INPUT METHODOLOGIES (AIRPORT SERVICES)

REASONS PAPER

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COMMERCE COMMISSION

Regulation Branch

Commerce Commission

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Foreword

The Commission has been entrusted with new regulatory functions under Part 4 of the Commerce Act. In key markets in which competition is limited, our central purpose is to promote the long-term benefit of the consumers of regulated services. This will be achieved by promoting outcomes consistent with those produced in workably competitive markets, where such outcomes provide incentives to suppliers to innovate, invest and improve their efficiency and reward both suppliers and consumers with a share of the efficiency gains created.

This work is important as it will directly affect essential infrastructure central to New Zealand's future economic prosperity, namely: gas pipelines, electricity lines and airport services.

Input methodologies promote certainty for suppliers and consumers in relation to the rules, requirements and processes applying to regulation under Part 4 of the Commerce Act. Increased regulatory certainty is critical for fostering efficient investment.

This has been a challenging exercise. We have been working with new and untested legislation, and have grappled with a range of issues for which there is no single 'right' answer. While we can look to regulatory regimes in other countries for guidance, there are significant differences between the New Zealand and overseas regimes. Ultimately, our key touchstone has been the purpose statement for Part 4, which is itself unique.

In determining the input methodologies, we have drawn on our collective expertise in economics, finance, law and accounting, as well as practical commercial experience. Where necessary, the Commission has applied its judgement to appropriately balance the interests of suppliers and consumers.

The Commission has benefited from the engagement with interested parties as we have moved through an extensive and robust consultation process for the last two years. We have been assisted by the views of a range of experts in economic regulation and other related matters, including those assisting submitters, and two panels of international experts convened by the Commission – one on matters relating to the cost of capital and the other, primarily, on matters regarding asset valuation, cost allocation and taxation.

In reaching our decisions, we have carefully considered the full range of options before the Commission. The most controversial issue in developing input methodologies for airport services has been the valuation of the assets used to supply regulated services at the start of the Part 4 regime.

Regulated suppliers have argued for asset valuations at the start of the Part 4 regime that are likely to be significantly higher than the regulatory valuations already in place. Adopting this approach could legitimise price increases by making it more difficult for interested persons to assess whether the suppliers are limited in their ability to extract excessive profits. On the other hand, airlines and their representatives argued for establishing the asset value by rolling forward an earlier, and lower, valuation from 2002. The Commission was not convinced by either proposition; it has instead selected an approach that is based on existing regulatory valuations, which Airports have disclosed under information disclosure regulation.

Overall, we are satisfied that the package of input methodologies determined today, will, when applied to information disclosure regulation for airports, best meet the purpose statement under Part 4 of the Commerce Act. These input methodologies will provide a strong foundation for delivering the long-term benefits to consumers envisaged by Parliament when it enacted Part 4.

Dr Mark Berry

Chair

Sue Begg

Deputy Chair

Pat Duignan

Commission Member

Peter JM Taylor

Commission Member

22 December 2010

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GLOSSARY OF TERMS, ABBREVIATIONS AND DEFINITIONS

Abbreviation	Definition
AAA	Airport Authorities Act 1966
ABAA	Accounting based allocation approach
ABC	Activity Based Costing
ACCC	Australian Competition and Consumer Commission
Act, The	Commerce Act 1986
AECT	Auckland Energy Consumer Trust
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
AIAL	Auckland International Airport Ltd.
Air NZ	Air New Zealand Ltd.
Airlines	Air New Zealand Ltd., and the Board of Airline Representatives New Zealand.
Airports	Auckland International Airport Ltd.; Christchurch International Airport Ltd.; Wellington International Airport Ltd.; and the NZ Airports Association.
ANS	Air Navigation Service
Asset Valuation Report	Yarrow, G., Cave, M., Pollitt, M., Small, J., *Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, May 2010
BARNZ	Board of Airline Representatives New Zealand
CAA	Commerce Amendment Act 2008
Capex	Capital Expenditure
CAPM	Capital Asset Pricing Model
CDA	Costs Directly Attributable
CnDA	Costs Not Directly Attributable
CEG	Competition Economists Group
CIAL	Christchurch International Airport Ltd.
Commission, The	Commerce Commission
CPI	Consumer Price Index
CPI-X	CPI minus X
CPP	Customised Price-Quality Path
CRA	CRA International (formerly Charles River Associates)
DAC	Depreciated Annual Cost
DCF	Discounted Cash Flow
DHC	Depreciated Historic Cost
DPP	Default Price-Quality Path
Draft Expert Reviews	An individual independent expert review of the Commission's draft decisions for IMs as set out in the Draft Reasons Papers for EDBs and GPBs
Draft IMs	Draft IM Determinations
DRC	Depreciated Replacement Cost
Economic	The regulation of the price and quality

Abbreviation	Definition
Regulation	
EDBs	Electricity Distribution Businesses
EDS	Electricity Distribution Services
ELBs	Electricity Lines Businesses
ENA	Electricity Networks Association
EV	Economic Value
Expert Panel	Cost of Capital Expert Panel
Experts	The Commission's independent expert economic advisors for IMs
Explanatory Note to the Bill	The Explanatory Note to the Commerce Amendment Bill 2008
FCM	Financial Capital Maintenance
FERC	Federal Energy Regulatory Commission
Final Expert Reviews	An individual independent expert review of the Commission's updated draft decisions for IMs for EDBs and GPBs by the Commission's expert economic advisors prior to it determining the IMs
GAAP	Generally Accepted Accounting Practice
GDN	Gas Distribution Network
GPBs	Gas Pipeline Businesses
GFC	Global Financial Crisis
GIC	Gas Industry Co Limited
GPS	Government Policy Statement
GST	Goods and Services Tax
GTBs	Gas Transmission Businesses
HC	Historic Cost
IC	Incremental Cost
IBES	Institutional Brokers' Estimate System
ID	Information Disclosure
ID Discussion Paper	Information Disclosure Discussion Paper, 29 July 2009
IDV	Information Disclosure Valuations
ID Determination	The information disclosure requirements to apply to specified airport services
IHC	Indexed Historic Cost
IM Discussion Paper	Input Methodologies Discussion Paper, 19 June 2009
IMs	Input Methodologies
IPART	Independent Pricing and Regulatory Tribunal of New South Wales
IRD	Inland Revenue Department
IRR	Internal Rate of Return
LECG	Law and Economics Consulting Group LLC
MCE	Ministerial Council on Energy (Australia)
MDL	Maui Development Limited

Abbreviation	Definition
MEAs	Modern Equivalent Assets
MED	Ministry of Economic Development
MEUG	Major Electricity Users' Group
MRP	Market Risk Premium
MVAU	Market Value Alternative Use
MVEU	Market Value Existing Use
NERA	National Economic Research Associates
NGC	Natural Gas Corporation
NPV	Net Present Value
NZAA	New Zealand Airports Association
NZIER	New Zealand Institute of Economic Research
ODRC	Optimised Depreciated Replacement Cost
ODV	Optimised Deprival Valuation
OECD	Organisation for Economic Co-operation and Development
OEM	Original equipment manufacturer
Ofcom	Office of Communications, UK
Ofgem	Office of the Gas and Electricity Markets, UK
Ofreg	Office for the Regulation of Electricity and Gas, UK
Ofwat	Water Services Regulation Authority, UK
Opex	Operating Expenditure
ORC	Optimised Replacement Cost
ORR	Office of Rail Regulation, UK
Paper, The	Commerce Commission, *Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper*, 22 December 2010
Part 4 Purpose	Purpose of Part 4, set out in section 52A of the Act
PIE	Portfolio Investment Entity
Post-tax cost of capital	Where the cost of debt is adjusted down by an interest tax deduction, and the company is remunerated for its (un-levered) tax liabilities through a cash flow allowance.
Provisions Paper	Commerce Commission, Regulatory provisions of the Commerce Act 1986 – Discussion paper, 19 December 2008
PV	Present Value
PwC	PricewaterhouseCoopers
QCA	Queensland Competition Authority
QCMA	Queensland Co-operative Milling Association Limited
RAB	Regulatory Asset Base
RDG	Revised Draft Cost of Capital Guidelines
Reserve Bank	Reserve Bank of New Zealand
ROI	Return on investment
S&P	Standard and Poors
SCP	Structure – Conduct – Performance

Abbreviation	Definition
SBL	simplified Brennan-Lally
Submissions Review	Yarrow, G., Cave, M., Pollitt, M., Small, J., *Review of Submissions on Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, November 2010
TAMRP	Tax-adjusted Market Risk Premium
TSO	Telecommunications Service Obligations
UK	United Kingdom
UK CAA	UK Civil Aviation Authority
US	United States
Vanilla cost of capital	Where the corporate tax shield provided by debt capital is ignored in the cost of capital calculation, and firms are remunerated for their levered tax liabilities through a cash flow allowance.
VIX	VIX is the ticker symbol for the Chicago Board Options Exchange's Volatility Index.
WACC	Weighted Average Cost of Capital
WIAL	Wellington International Airport Ltd.

EXECUTIVE SUMMARY

Introduction

Purpose of this Paper

X1 The Commerce Commission (Commission) has determined input methodologies (IMs) for specified airport services (airport services) under Part 4 of the Commerce Act 1986 (the Act). Part 4 provides for the regulation of the price and quality of goods or services supplied in markets where there is little or no competition, and little or no likelihood of a substantial increase in competition (s 52). IMs set out the rules, requirements and processes applying to the regulation of those services. In accordance with s 52W, the Commission's reasons for these IMs will be set out in the relevant Gazette notice that publishes the IMs. This Reasons Paper (Paper) expands on those reasons.

Regulated services discussed in this Paper

X2 This Paper discusses the IM Determination that has been made by the Commission in respect of airport services supplied by Auckland International Airport Limited, Wellington International Airport Limited and Christchurch International Airport Limited (Airports).

Part 4 Regulatory Framework

Purpose and application of IMs

X3 The purpose of IMs is to promote certainty for suppliers and consumers in relation to the rules, requirements and processes applying to the regulation, or proposed regulation, of goods and services under Part 4 (s 52R). IMs must include certain matters, to the extent applicable to the type of regulation (s 52T).

Purpose and application of types of regulation

X4 Airports are only subject to information disclosure regulation—the purpose of which is to ensure that sufficient information is readily available to interested persons to assess whether the purpose of Part 4 is being met (s 53A). Information disclosure regulation does not affect the right of Airports under the Airport Authorities Act 1966 (the AAA) to charge for airport services as they think fit.

X5 The Commission has released a s 52P determination that gives effect to information disclosure regulation for airport services along with the IM Determination applying to Airports.

Scope of IMs

X6 In light of the purpose of the information disclosure regulation, and the purpose of Part 4, the Commission has determined IMs for:

- the allocation of costs to regulated services supplied by the Airports;
- the valuation of assets that are used to supply airport services;

- the treatment of tax costs for regulatory purposes; and
- estimating the cost of capital (which is applied by the Commission only, to monitor and analyse information disclosed by the Airports).

Part 4 Purpose

X7 The central purpose of Part 4 is to promote the long-term benefit of consumers in markets where there is little or no competition and little or no likelihood of a substantial increase in competition (s 52A(1)). To achieve this, the Commission must promote outcomes in regulated markets that are consistent with those produced in competitive markets (to the extent relevant to markets with limited or no competition), such that regulated suppliers:

a. have incentives to innovate and to invest, including in replacement, upgraded, and new assets (s 52A(1)(a));

b. have incentives to improve efficiency and provide services at a quality that reflects consumer demands (s 52A(1)(b));

c. share with consumers the benefits of efficiency gains in the supply of the regulated goods or services, including through lower prices (s 52A(1)(c)); and

d. are limited in their ability to extract excessive profits (s 52A(1)(d)).

X8 'Competition' in Part 4, as in the rest of the Act, means 'workable or effective competition' (s 3(1))—hereafter 'workable competition'. Workable competition exists when there is an opportunity for sufficient influences to constrain the market power of suppliers (e.g. rivalry amongst existing suppliers, the threat of substitute goods and services, the threat of new entrants, or the buying power of consumers).

X9 The regulatory objectives in (a)-(d) of s 52A(1) reflect performance criteria that characterise workable competition.

- *Prices and quality*. In workably competitive markets, suppliers have incentives to constrain price and maintain or improve quality—as they otherwise would lose customers because price and quality are the two key aspects of goods and services that are often of most interest to consumers.

- *Investment*. In workably competitive markets, suppliers have incentives to undertake investments at an efficient level at the optimal time (to the extent these levels and time can be ascertained).

- *Innovation*. Workably competitive markets promote the discovery and use of new information, leading to the development of new goods/services, and more efficient production techniques.

- *Efficiency*. The promotion of allocative, productive and dynamic efficiency is a key feature of workably competitive markets. Efficiency gains are shared with consumers through lower prices, and/or better service quality, over time.

- *Profits*. In workably competitive markets, profits are just sufficient to reward investment, efficiency and innovation. Superior performers are more likely to be rewarded by receiving returns greater than a 'normal profit' (or 'normal

return'—i.e. their risk-adjusted cost of capital), at least for the short to medium term, until competitors catch up. Over the lifetime of its assets, a typically efficient supplier would not invest unless it expected, in advance, to earn at least a normal return.

Relevance and application of IMs

X10 It is in combination with each other, and with other requirements in the s 52P determination for information disclosure regulation, that IMs provide incentives for regulated suppliers to act in a manner consistent with the Part 4 Purpose.

X11 The key relevance of the IMs to the objectives in the purpose of Part 4 includes the factors highlighted in Table X1 below.

Table X1: Key Relevance of Input Methodologies to Regulatory Objectives

Methodology	Key Regulatory Objectives	Relevance
Cost allocation– s 52T(1)(a)(iii)	Section 52A(1)(c) and (a)	The way that costs are allocated between regulated and/or unregulated activities has an important bearing on monitoring how efficiency gains are shared with consumers of regulated services over time, as well as the extent to which investment by regulated suppliers in the provision of other goods or services is unduly deterred (also refer s 52T(3)).
Asset valuation, depreciation and revaluations– s 52T(1)(a)(ii)	Section 52A(1)(a) and (b)	The way that the value of the regulatory asset base (RAB) is rolled forward affects the disclosure of how regulated suppliers recover the investments that they make, which in turn affects the incentives to invest that they face.
Asset valuation– s 52T(1)(a)(ii)	Section 52A(1)(d)	The level of the 'initial' value of RAB (i.e. at the beginning of the Part 4 regime), is far less significant to incentives for investment or efficiency than the way that the value of the RAB is rolled forward, but it has a notable bearing on monitoring whether regulated suppliers are limited in their ability to extract excessive profits from consumers in future.
Treatment of tax– s 52T(1)(a)(iv)	Section 52A(1)(d)	The treatment of tax also has an impact on monitoring whether regulated suppliers are limited in their ability to extract excessive profits from consumers.
Cost of capital– s 52T(1)(a)(i)	Section 52A(1)(a) and (d)	The cost of capital will have an impact on monitoring whether financial capital is being maintained, and whether regulated suppliers are limited in their ability to extract excessive profits.

X12 The above IMs are key inputs to the calculation, or assessment, of financial information disclosure requirements; in particular, the return on investment (ROI) for Airports.

Overview of the Input Methodologies

Cost Allocation IM

X13 The cost allocation IM sets out the methodology for allocating asset values (which drive capital costs) and operating costs between regulated activities (i.e. aircraft and freight activities, airfield activities, and specified passenger terminal services), and between regulated activities and unregulated activities (e.g. retailing and car parking) in aggregate. The IM allocates all costs associated with the supply of regulated activities, thereby implicitly allocating all costs that are common to two or more types of activities (whether regulated or unregulated). This approach avoids having to explicitly identify and allocate common costs, which can be a difficult exercise given that such costs can be defined and measured in different ways.

X14 The IM requires a two-step allocation of operating costs and asset values:

- **allocation of costs 'directly attributable'**: (i.e. operating costs and asset values that are wholly and solely associated with undertaking a single type of regulated activity) to the type of activities to which they are directly attributable; and

- **allocation of costs 'not directly attributable'**: (i.e. operating costs and asset values that are associated with undertaking two or more types of regulated, or both regulated activities and unregulated activities in aggregate) by specifying the approach for determining the proportion of such costs it would be appropriate to recover from the regulated services with which they are associated.

X15 The IM provides for the **accounting-based allocation approach (ABAA)**. The ABAA requires not directly attributable operating costs and asset values to be allocated based on causal factors, or based on proxy factors where causally based allocators are not available. This approach is expected to move the allocation of costs closer to that in workably competitive markets, in which costs common to the supply of two (or more) types of services are borne by all of those types of services. Doing so ensures that the benefits of efficiency gains that arise from the joint supply of regulated and unregulated services at Airports are shared with consumers of the regulated services over time, consistent with s 52A(1)(c).

Asset Valuation IM

<u>Initial valuation</u>

X16 Unlike other suppliers of services regulated under Part 4, Airports own significant amounts of land. The value of land assets in the initial RAB for all Airports will be established using the Market Value Alternative Use (MVAU) valuation approach, because the value of land in workably competitive markets will broadly reflect its highest value in an alternative use. Where the costs of converting land for use as an

Airport are not already reflected in the MVAU valuation, such investments can be included in the initial RAB as non-land assets.

X17 The initial value of non-land assets in the RAB for all Airports for information disclosure purposes will be established with reference to the most recent regulatory values that have been permitted for each Airport prior to the start of the Part 4 regime. No factual evidence has been submitted to suggest that reference to existing regulatory valuations would prevent Airports from having the opportunity to earn at least a normal return on and of the original cost of installing assets. Although the valuation approach for non-land assets will only apply for the purposes of information disclosure, it should nonetheless give Airports no concern about the recovery of future investments. The approach is thus consistent with s 52A(1)(a).

X18 New replacement (i.e. new build) cost-based valuations for Airports are not required by the reference to workably competitive markets in the Part 4 Purpose, and are less aligned to that purpose than existing regulatory valuations.

X19 If regulated suppliers were permitted to increase their prices to reflect a change in replacement cost, without the revaluation gain being treated as income, regulated suppliers would not be limited in their ability to extract excessive profits. In the context of information disclosure regulation for Airports, such a revaluation (without appropriately treating the revaluation gain as income) could mask the existence of excessive profits. This would be unlikely to be consistent with s 52A(1)(d), or with the purpose of information disclosure regulation in s 53A.

X20 Likewise, write-downs of prior regulatory values of specialised assets should be avoided insofar as this may set a precedent that damages an Airport's supplier's incentives to invest in future.

Rolling forward the RAB value over time

X21 The value of the RAB is 'rolled forward' each year for capital additions (i.e. the value of commissioned or acquired assets), asset disposals, depreciation, and revaluations (i.e. indexation by the Consumer Price Index (CPI)). Land may also be revalued by Airports in any year using MVAU. Revaluations from CPI-indexation or from the application of MVAU affect the level of profits that Airports can expect in future. Thus to appropriately account for the longer term profitability effects of asset revaluation, any gains (or losses) that arise as a result of asset revaluations are to be treated as income (or losses) when monitoring prices.

X22 The value of the non-land assets in the RAB will be depreciated year-on-year on a straight-line basis unless Airports elect to apply an alternative depreciation approach.

Tax IM

X23 The treatment of taxation must ensure that interested persons have sufficient information to assess whether Airports expect to earn profits that are consistent with the profits that would be expected in a workably competitive market. In workably competitive markets, it is profits after tax that would on average be expected *ex ante* to be sufficient to reward investment, innovation and efficiency.

X24 Compared to the alternatives, the tax payable approach comes closest to approximating the cash flows an Airport would need to meet its tax obligations for any given period, and this approach applies to all the Airports.

Cost of Capital IM

X25 The cost of capital reflects the cost of debt and the cost of equity. The cost of capital, in particular the cost of equity, cannot be observed directly. Rather the individual components of the cost of capital must be estimated. Judgement is required in determining what tools and techniques should be used, what the level of individual parameters should be, and what adjustments may be required to ensure the resulting estimate of the cost of capital is reasonable.

X26 The cost of debt is estimated by reference to the risk-free rate (proxied by yields on Government bonds), plus a debt premium for the greater risk on corporate debt, and the costs of issuing debt.

X27 The term of the risk-free rate is to match the length of the Airports' pricing period, typically five years. This is to ensure that Airports can expect (*ex ante*) to earn a normal return, consistent with outcomes in workably competitive markets, such that suppliers are compensated for the interest rate risks they bear and are not over- or under-compensated (depending on the shape of the yield curve), which could occur if a longer (or shorter) term was chosen. The alignment of the term of the risk-free rate with the pricing period is compatible with other possible objectives such as longer term borrowing, given the availability and widespread use of interest rate swaps which allow firms to reset their interest rate re-pricing period to shorter terms (and the ability to match the pricing period if desired), even if the supplier has issued debt with a long original maturity date (for example, 10 years).

X28 The debt premium is calculated by reference to publicly traded bonds with a Standard and Poors long-term credit rating of A- and a remaining term of five years. The Airports Information Disclosure Determination also allows for those additional costs of issuing longer maturity debt (debt with an original term to maturity which exceeds five years) that cannot be managed through swaps, where Airports have in fact issued such debt.

X29 Confidential information provided by regulated suppliers with respect to their actual debt margins and costs has been used to confirm that the estimates of the cost of debt under the IM are a realistic estimate of the cost of debt finance for a regulated supplier issuing bonds with an A- rating.

X30 The IM uses the simplified Brennan-Lally Capital Asset Pricing Model (CAPM) to estimate the cost of equity. This model best fits the particular features of the New Zealand taxation system, and is so widely used in New Zealand that there is currently no credible alternative.

X31 The IM assumes that the tax-adjusted market risk premium (TAMRP) for owning a portfolio of New Zealand equity investments of average risk will average 7%. This reflects estimates from a range of sources reflecting both historical and forecast return on equity investments with average risk. It is consistent with the average

assumption used by New Zealand investment banks. An uplift to 7.5% is proposed until 2011 to take into account the impacts of the global financial crisis.

X32 The supply of airport services has relatively lower exposure to market risk than the average New Zealand company. This relative risk relationship compared to the overall share market is represented by beta. Using data from AIAL and 23 international listed airports, the Commission has estimated the asset beta for airport services at 0.60. The Commission's estimate is in the middle of the range of independent estimates of airport asset betas.

X33 Leverage is 17%, in line with the average leverage of the 24 international listed airports. Applying leverage of 17% to the asset beta results in an equity beta of 0.72.

X34 The Commission has tested the estimates of the cost of capital produced by the cost of capital IM to ensure it is reasonable and commercially realistic. In particular, the Commission has tested its estimate against independent estimates of the cost of capital in New Zealand, against airport regulatory decisions in the UK and Ireland, and against historic and expected returns for the New Zealand market.

X35 These tests confirm that the IM provides estimates of the cost of capital for Airports that are commercially realistic and can be expected to assist interested persons in assessing whether Airports are limited in their ability to extract excessive profits.

PART 1: REGULATORY FRAMEWORK AND KEY FEATURES OF THE INPUT METHODOLOGIES

CHAPTER 1: INTRODUCTION

1.1 Purpose of this Paper

1.1.1 The Commerce Commission (Commission) has determined input methodologies (IMs) for specified airport services ('airport services') under subpart 3 of Part 4 of the Commerce Act 1986 (the Act).[1] Part 4 provides for the regulation of the price and quality ('economic regulation') of goods or services supplied in markets where there is little or no competition, and little or no likelihood of a substantial increase in competition (s 52). IMs set out the rules, requirements and processes applying to the regulation of those services. Airport services regulated under Part 4 are supplied by Auckland International Airport Limited (AIAL), Wellington International Airport Limited (WIAL), and Christchurch International Airport Limited (CIAL) (hereafter referred to as the Airports).[2]

1.1.2 In accordance with s 52W, the Commission's reasons for these IMs will be set out in the relevant Gazette notices that publish the IMs.[3] This Reasons Paper (Paper) expands on those reasons.

Regulated services discussed in this Paper

1.1.3 Subpart 11 of Part 4 sets out provisions specific to the regulation of airport services, including how airport services are defined (s 56A).

1.1.4 This Paper only discusses the IM Determination that has been made by the Commission in respect of airport services.[4] The IM Determinations made by the Commission in respect of regulated electricity lines services and gas pipeline services are discussed in separate papers.[5]

1.1.5 The Commission has also determined the information disclosure requirements to apply to specified airport services (the ID Determination), which are discussed in the Information Disclosure (Airport Services) Reasons Paper.[6]

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1 Statutory references in this Paper are to the Act unless otherwise specified.

2 When referring to submissions from Airports in this Paper, the Commission also includes the submissions from the New Zealand Airports Association (NZAA).

3 Section 52W requires the Commission to publish the IMs by way of notice in the Gazette within 10 working days after the Commission determines the IMs.

4 Commerce Commission, *Commerce Act (Specified Airport Services Input Methodologies) Determination*, 22 December 2010.

5 The Commission has made four IM determinations in respect of electricity lines and gas pipeline services (i.e. electricity distribution, electricity transmission (Transpower), gas distribution and gas transmission). These determinations are discussed in Commerce Commission, *Input Methodologies (Transpower) Reasons Paper*, 22 December 2010; and Commerce Commission, *Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper*, 22 December 2010.

6 Commerce Commission, *Commerce Act (Specified Airport Services Information Disclosure) Determination*, 22 December 2010; Commerce Commission, *Information Disclosure (Airport Services) Reasons Paper*, 22 December 2010.

Structure of this chapter

1.1.6 The remainder of this chapter is structured as follows:

- Section 1.2 provides a brief background to Part 4, and highlights some of the key amendments made through the passage of the Commerce Amendment Act 2008 (CAA), and the reasons for those amendments;
- Section 1.3 describes the structure of this Paper; and
- Section 1.4 gives an overview of the process that the Commission has followed in determining the IMs, including consultation undertaken with interested parties and expert advice it has received.

1.2 Background to Part 4 of the Commerce Act

Benefits of competition and rationale for economic regulation

1.2.1 In competitive markets, suppliers of goods and services typically have incentives to innovate and to improve efficiency, in terms of both their operational and investment decisions. Suppliers expect to earn profits that at least compensate them for their cost of capital over time. The cost of capital is the financial return investors require (*ex ante*) from an investment given its risk.

1.2.2 Economists refer to the level of profits commensurate with the cost of capital as 'normal profits' or 'normal returns'. Suppliers that achieve a superior performance in competitive markets have the opportunity to earn more than normal returns in the short to medium term. However, these higher profits tend to be competed away as competing suppliers catch up. On the other hand, less efficient suppliers might not be successful, and could end up earning less than normal returns, therefore marking down the value of their assets, and/or ultimately exiting the market.

1.2.3 Competition helps ensure consumers are supplied with a choice of goods and services at the quantity and quality they demand, at an efficient price. Suppliers share efficiency gains with consumers over time by supplying goods and services at prices lower than they would be without competition, through improving the quality of existing goods and services, and through an expanded selection of goods and services.

1.2.4 Given these widely recognised benefits of competition, competition law in OECD countries typically includes provisions to promote competition, to restrict anti-competitive practices and to limit abuse of 'market power'. In New Zealand, such provisions are included in Parts 2 and 3 of the Commerce Act.

1.2.5 Where competition is limited or absent economic regulation may be appropriate. In markets with 'natural monopoly' characteristics, a single supplier can provide services in a particular market (often a particular geographic area) at a lower cost than any combination of two or more suppliers. This is often the case in energy networks (though not for energy generation, wholesaling or retailing), and is sometimes the case for airports (if a single airport would be the most cost efficient way of serving a particular area). Telecommunications, water networks, rail and ports can also exhibit natural monopoly characteristics. Hence, in most OECD

countries, some or all of these sectors are subject to some form of economic regulation.

1.2.6 Economic regulation is sometimes described as an attempt to 'mimic'—albeit imperfectly, and using different mechanisms—the competitive process in markets where competition is unlikely to be effective. For instance, in its advice to the Australian Ministerial Council on Energy ('MCE'), the Expert Panel to the MCE noted that "the policy goal for regulation may be to replicate as far as possible what a competitive market would otherwise deliver."[7] Although the Expert Panel acknowledged that "regulation cannot flawlessly mimic the competitive process", particularly given the existence of asymmetric information between the regulator and regulated entities, it stated that:

> The central objective of price control is to constrain the exercise of market power by firms that do not face effective competition for their services. Regulation and, specifically, the periodic determination of maximum prices or revenue is directed at achieving outcomes that could otherwise be expected from effective competition.[8]

1.2.7 In New Zealand, generic provisions for economic regulation are included in Part 4 of the Commerce Act. Part 4 also includes sector-specific regulatory provisions relating to energy networks and airports. In addition, other legislation—such as the Telecommunications Act 2001 and the Dairy Restructuring Act 2001—includes sector-specific regulatory provisions.

Types of economic regulation

1.2.8 Information disclosure (or regulatory accounting) is the most light-handed type of economic regulation, and can be used to complement other types of regulation. Information disclosure can:

- influence regulated suppliers' behaviour by making their performance in supplying regulated services more transparent; and
- provide the data necessary for implementing other types of regulation and for monitoring the effectiveness of those types of regulation.

1.2.9 Incentive-based price-quality regulation is common for energy network companies in many OECD countries. In the UK and Australia, price-quality regulation for energy network companies typically:

- caps average prices or revenues through a 'CPI minus X' (CPI-X) price or revenue cap/path;
- includes quality standards, to ensure that service quality does not deteriorate in response to any cost cutting made under the CPI-X price path; and
- can in some cases involve quality incentive/penalty schemes, linking quality and price/revenue more explicitly.

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7 Expert Panel on Energy Access Pricing, *Report to the Ministerial Council on Energy*, Canberra, Australia, April 2006, p. 11.

8 ibid, p. 118.

1.2.10 Negotiate-arbitrate regulation is sometimes applied where there are a small number of large and well-resourced consumers with some countervailing market power (e.g. a negotiate-arbitrate regime for some airports and their airline customers applies in the UK and Australia).

Recent history of economic regulation in New Zealand[9]

1.2.11 From 1986 to 2008, generic provisions in the old Part 4 of the Act (i.e. prior to the CAA) provided for the Commission to undertake inquiries into whether particular goods or services should be subject to 'price control' (comprising control of prices, revenues and/or quality standards). Inquiries could result in recommendations to the relevant Minister to impose price control under the old Part 5, on the grounds that: (a) those goods or services were or would be supplied in markets in which competition was limited or likely to be lessened; and (b) it was necessary or desirable for those goods or services to be controlled in the interests of persons acquiring those goods or services.

1.2.12 Two inquiries were completed by the Commission under the old Part 4.

- *Airfield activities* at the three major international airports (i.e. Auckland, Wellington and Christchurch International Airports). The Commission's recommendation to impose price control on relevant services supplied by Auckland International Airport was not accepted by the Minister of Commerce.[10]

- *Gas pipeline services*. The Commission's recommendation to impose price control on relevant services supplied by Vector (its Auckland gas network only) and by Powerco was accepted by the Minister of Energy, [11] and led to the Commission making authorisations for the supply of the controlled gas pipeline services under the old Part 5 (and which apply from 2005-2012).[12] The authorisations create a CPI-X price path and quality standards (Gas Authorisation).

1.2.13 During the 1990s, information disclosure regulations were introduced for:

- electricity lines businesses (ELBs)—i.e. electricity distribution businesses (EDBs) and Transpower—in 1994, under the Electricity Act 1992, administered by the Ministry of Economic Development (MED);

- gas pipeline businesses (GPBs) in 1997, under the Gas Act 1992, administered by MED; and

- the three major international airports in 1999, under the Airport Authorities Act 1966 (AAA), administered by the Ministry of Transport.

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9 A more detailed review was provided in the Commission's initial discussion paper on the Part 4 regime: Commerce Commission, *Regulatory Provisions of the Commerce Act 1986, Discussion Paper*, 19 December 2008, Chapter 3.

10 Commerce Commission, *Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, Final Report*, 1 August 2002.

11 Commerce Commission, *Gas Control Inquiry, Final Report*, 29 November 2004.

12 Commerce Act (Powerco Natural Gas Services) Authorisation 2008, Commission Decision No. 656; and Commerce Act (Vector Natural Gas Services) Authorisation 2008, Commission Decision No. 657.

1.2.14 In 2001, a number of sector-specific regulatory provisions were introduced: the Dairy Industry Restructuring Act 2001, the Telecommunications Act 2001, and the now-repealed Part 4A of the Commerce Act. Part 4A of the Act imposed a 'targeted control' (or 'thresholds') regime and information disclosure regime for all EDBs and Transpower, administered by the Commission.

Commerce Amendment Act 2008

1.2.15 The Explanatory Note to the Commerce Amendment Bill 2008 (Explanatory Note to the Bill) set out the reasons why the Government considered that economic regulation was required.

> The key reason for providing for price and quality control, or "economic regulation", is to counter the ability of firms that are not faced with competition or the threat of competition to charge excessive prices and/or reduce quality. Such firms may also have weak incentives to improve efficiency and to make investments in a timely manner.
>
> In practice, there are relatively few sectors that are not faced with competition or the threat of competition. These sectors tend to be those supplying core infrastructure such as electricity lines, gas pipelines, and airports. All OECD countries regulate such sectors, particularly where they are privately owned.[13]

1.2.16 In the case of Airports, the Explanatory Note to the Bill stated that:

> Many airports have strong natural monopoly characteristics. A sound regulatory regime should enable the regulator to identify the extent of monopoly pricing which should encourage airports to price their services in a manner consistent with a workably competitive market.[14]

1.2.17 There were a number of reasons why the provisions for economic regulation in the Act were amended in 2008. The Explanatory Note set out the key issues raised during the review of the regulatory provisions of the Act, and explained the amendments made to address those issues. The key issues and amendments include the following:

- *Purpose statement*. The lack of a purpose statement specific to old Part 4 inquiries led to "dispute and uncertainty", including judicial review. Under Part 4, a new common purpose statement was introduced for all regulatory provisions, building on the purpose statement in the old Part 4A, but with the addition of a specific requirement for regulation to incentivise investment and innovation.[15] The purpose statement of Part 4 (Part 4 Purpose) is discussed further below (Sections 2.3-2.6).

- *Types of regulation*. Prior to the amendment, the only type of regulation contemplated by Part 4 was price-quality control. The new Part 4 introduced a broader range of "fit-for-purpose" types of regulation: information disclosure regulation (subpart 4 of Part 4); default/customised price-quality regulation (subpart 6); individual price-quality regulation (subpart 7); and negotiate-

[13] The Explanatory Note to the Commerce Amendment Bill (201-1), Government Bill, as introduced to the House of Representatives, Wellington, 13 February 2008 (Explanatory Note), p. 33.

[14] ibid, p. 2.

[15] ibid, pp. 3 and 15-20.

arbitrate regulation (subpart 5).[16] Information disclosure regulation under Part 4 is discussed further below (paragraphs 2.7.1-2.7.4).

- *Regulatory certainty*. The Commission was perceived as having significant discretion under Parts 4A and 5. Many interested parties argued that this led to uncertainty for regulated, or potentially regulated, suppliers. Under the new Part 4 the Commission must set up-front regulatory methodologies, rules, processes, requirements and evaluation criteria—i.e. 'input methodologies'—applicable to particular regulated services and types of regulation.[17] The IMs that the Commission has set for regulated airport services are the focus of this Paper. The IMs that the Commission has set for regulated services supplied by Transpower, EDBs and GPBs are discussed in separate papers.[18]

- *Accountability of the Commission*. Some interested parties argued that the old Parts 4, 4A and 5 provided only limited accountability for decisions made by the Commission. Most decisions were subject only to judicial review, and not to an appeal against the substance of a decision.[19] Under the new Part 4, interested parties may appeal to the High Court against the Commission's IM determinations, and determinations concerning customised price-quality paths on the merits. The Act provides that an appeal may be allowed if the Court concludes that an amended or substituted IM would be "materially better" in meeting the Part 4 Purpose in s 52A, the purpose of IMs in s 52R, or both (s 52Z(4)).[20]

1.2.18 Although intended to put in place a "regulatory regime in line with the OECD mainstream to allow for regulation of suppliers of core infrastructural services, which are not subject to competition",[21] a number of key features of Part 4 are either unique or not widespread, notably:

- a purpose statement that includes an explicit reference to "promoting outcomes that are consistent with outcomes produced in [workably] competitive markets";[22]

- the setting of IMs—for instance, in Australia the Australian Energy Market Commission (AEMC) sets regulatory rules to be applied by the Australian

16 ibid, pp. 3, 5-6, 15, 18 and 21-22.

17 ibid, pp. 3, 18 and 25-27.

18 Commerce Commission, supra n 5.

19 Explanatory Note, supra n 15, pp. 3 and 17-18.

20 ibid, pp. 7 and 27-31.

21 ibid, p. 9.

22 The previous Australian National Electricity Rules were an exception. One of a number of core objectives was to: "regulate the non competitive market for distribution services in a way which seeks the same outcomes as those achieved in competitive markets" (Australian Energy Market Commission (AEMC), National Electricity Rules, Version 14, 31 May 2007, s 6.1.1(b)). However, the rules have since been amended by removing the core objectives, and references are now to the "national electricity objective" which is defined in the National Electricity Law. The national electricity objective is: "to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—(a) price, quality, safety, reliability and security of supply of electricity; and (b) the reliability, safety and security of the national electricity system" (section 7 of the National Electricity Law, which is a schedule to the National Electricity (South Australia) Act 1996).

Energy Regulator (AER), whereas in the UK, the Office of the Gas and Electricity Markets (Ofgem) is not bound by regulatory rules set in advance;

- *default* price-quality paths (DPPs) backed up by customised price-quality paths (CPPs), which appear to be unique to New Zealand; and
- the "materially better" standard of appeal.

Issues specific to the economic regulation of Airports

1.2.19 A specific concern with the regulatory regime for Airports prior to Part 4 was that the information disclosure regulations under the AAA were "ineffective".[23]

> The key problem identified with the current regulatory regime for airports is the lack of a credible information disclosure regime to constrain the exercise of substantial market power by major airports in setting airport charges. This problem has been exacerbated by the lack of guidelines on both the desired outcomes from the regulatory regime, and on appropriate input methodologies (how to value assets, calculate the cost of capital, etc) to provide guidance on desired regulatory outcomes.[24]
>
> The current regime lacks the requisite guidance around what information is required to facilitate effective negotiations between airports and users on the level of charges. This is likely to be a significant contributing factor (along with the lack of guidance) to the contentious and litigious features of the current regime. …
>
> The information is also generally insufficient to help the regulator or officials to determine whether excessive prices are being charged. For example, a 2001 review by Arthur Andersen Consulting for the Ministry of Transport found that the lack of clarity and specificity in the disclosure regulations meant that none of the disclosures would allow an interested party to understand the price-setting process to such an extent as to make a meaningful assessment, for example, of the appropriateness of cost allocations. …
>
> The statutory requirement for airports under the Airport Authorities Act 1966 is to consult, not to negotiate. Because airports have the right to make investment decisions and set charges unilaterally (after consultations) it is inevitable, absent an independent dispute resolution mechanism, or credible and timely threat of heavier handed regulation, that airports will tend to make decisions in their own interests. …
>
> Furthermore, the current disclosed information is not monitored or reported on at the departmental or regulator level. Thus, whether or not an airport is overrecovering based on the information disclosed is not compiled and presented by an independent body.[25]

1.2.20 Under Part 4, the Commission now has the responsibility for information disclosure regulation applying to the Airports. Although s 4A of the AAA does not limit the application of regulation under Part 4 of the Act, under that section each of the Airports may still "set such charges as it from time to time thinks fit for the use of the airport operated or managed by it, or the services or facilities associated therewith".

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23 ibid, p. 35.

24 ibid, p. 34.

25 ibid, pp. 35-37.

1.2.21 In addition, Part 4 requires that, as soon as practicable after any new price for an airport service is set by an Airport in or after 2012, the Commission must (under s 56G(1) of the Act):

- review the information that has been disclosed by Airports;
- consult with interested parties; and
- report to the Ministers of Commerce and Transport as to how effectively information disclosure regulation is promoting the Part 4 Purpose.[26]

1.2.22 The Explanatory Note to the Bill described the "over arching objectives of economic regulation of airports" under Part 4 as being to:

- provide a credible regulatory regime to address markets where competition is not possible:
- constrain the scope for exercise of substantial market power by airports:
- protect consumers from prices that would not be consistent with those in a workably competitive market:
- improve certainty, timeliness, and predictability for businesses: and
- provide for appropriate incentives for efficient investment in infrastructure, taking into account the benefits to end-users.[27]

1.2.23 The Explanatory Note also set out some of the benefits of regulating the Airports through information disclosure regulation based on IMs.

> Providing for specification of input methodologies provides better information to guide consultations between airlines and airports and pricing decisions. The proposed regulatory specific statement under the Commerce Act would also provide guidance on desired regulatory outcomes. This, together with providing an explicit role of monitoring and reporting by the Commission, should also create a more credible threat of further regulation if prices are shown to be excessive. Improved information disclosure will also allow the regulator to identify whether regulation should be removed.
>
> Specification of binding input methodologies would also remove much of the contention under the current regime. This reduces the scope for dispute, which could mean settlements are reached quicker, and at less cost, and that there are greater incentives to improve commercial relationships.
>
> The input methodologies required for robust information disclosure (such as asset valuations, revaluations, and allocation of common costs) would be binding, while methodologies such as pricing principles and how to calculate the cost of capital (which are required for monitoring and analysis) would be in the form of guidelines against which the disclosed information would be assessed. This would allow airports and airlines and other customers to reach commercial agreements taking into account

[26] ibid, p. 9

[27] ibid, p. 34.

efficiency, productivity, investment, and other issues while providing clear guidance to assist commercial negotiations.[28]

1.3 Structure of this Paper

1.3.1 The IMs are complex and, in some cases, the methodology comprises many detailed components that determine how the IMs will apply to information disclosure regulation in practice. The detailed components for each IM depend to a large extent on the type of IM and the overall approach for that IM. To assist the reader, the Commission has therefore structured this Paper into two main parts as described below.

Part 1: Regulatory framework and key features of the IMs

- In this part, the Commission:
  - describes the Part 4 regulatory framework, including the role of IMs in that framework (Chapter 2);
  - provides an overview of, and the Commission's reasons for, the key features of each of the IMs; and
  - briefly discusses the application of each IM to information disclosure regulation.
- Each IM (cost allocation, asset valuation, treatment of taxation, and the cost of capital) is discussed in a separate chapter (Chapters 3-6).

Part 2: Appendices on the detailed components of the IMs and how they apply

- Part 2 provides more detailed technical discussion on the components of the IMs and how each IM is applied to information disclosure regulation. There is one Appendix of this nature for each IM. There is a second Appendix for asset valuation, which responds to submissions on Schedule A of the IM Determination (Airport Land Valuation Methodology).
- In this part, the Commission also provides more detail on the consultation process it has undertaken to determine IMs (Appendix A).

Response to submissions

1.3.2 Submissions received during the consultation process are discussed in both parts of this Paper. The Commission's views on the appropriate IMs have evolved during the consultation process, and it has responded to submissions from consultation rounds prior to the consultation on the draft IM Determinations (Draft IMs) in its earlier papers (discussed further in Section 1.4 below). This Paper, therefore, primarily responds to submissions and cross-submissions received on the Draft IMs.[29]

[28] ibid, pp. 40-41.

[29] In making the IM Determinations for Airports, the Commission has also considered other relevant submissions on IMs, including those from interested parties submitting in respect of the IM Determinations for EDBs, GPBs and Transpower.

1.3.3 Where submissions on the Draft IMs were addressed by changes to the draft determinations for the purpose of technical consultation, they are not discussed again in this Paper.[30]

1.4 Process to Determine IMs

Statutory process for determining IMs

1.4.1 The statutory process for determining IMs is contained in s 52V, which provides that:

> (1) When the Commission begins work on an input methodology, it must publish a notice of intention to do so that –
>
> (a) outlines the process that will be followed; and
>
> (b) sets out the proposed time frames.
>
> (2) During the course of its work on an input methodology, the Commission –
>
> (a) must publish a draft methodology; and
>
> (b) must give interested persons a reasonable opportunity to give their views on that draft methodology; and
>
> (c) may hold 1 or more conferences; and
>
> (d) must have regard to any views received from interested persons within any time frames set.
>
> (3) Despite subsections (1) and (2), any work done or action taken (including any consultation) by the Commission on input methodologies before the commencement of this section may be treated by the Commission and any person consulted as work done or action taken under this section.
>
> (4) The Commission must consult with interested parties before deciding to treat earlier work or action as work or action done under this section.

Commission's process for determining IMs

1.4.2 In accordance with s 52V(1), on 11 December 2008 the Commission published a notice of intention (Intention Notice) advising that it had begun work on IMs.[31] Since December 2008, the Commission has undertaken extensive consultation with interested parties. The interested parties on IMs for Airports have primarily been the Airlines (Air New Zealand and the Board of Airline Representatives of New Zealand) and the Airports (including the NZ Airports Association). Unlike the position regarding IMs for ELBs and GPBs, therefore, the consultation process

[30] The reasons for changes to the draft determination were explained in a Consultation Update Paper released with the Revised Draft Determination for technical consultation. Commerce Commission, *Revised Draft Commerce Act (Airport Services Input Methodologies) Determination*, 1 October 2010; and Commerce Commission, *Input Methodologies (Airport Services) Consultation Update Paper*, 1 October 2010.

[31] Further detail on the process for IMs was set out in the Commission's discussion paper on the new legislative provisions: Commerce Commission, *Regulatory provisions of the Commerce Act 1986 – Discussion paper*, 19 December 2008 (Provisions Paper). Throughout the process to determine IMs, the Commission kept interested parties up to date on the process and timing of consultation steps through media releases, updates on its website and email notifications.

resulted in a balance of submissions (and expert advice) from both a consumer and supplier perspective. While the Airlines are not the only consumers (or type of consumers) of specified airport services, they are a major consumer of those services, and are well experienced in regulatory matters.

1.4.3 In some instances during the consultation process the Airports and Airlines were able to work together to agree a proposed approach (e.g. rules around non-standard depreciation) or to reach broad agreement on areas where there is little or no dispute between them (e.g. the cost allocation approach and the treatment of taxation). Where those proposals were appropriate under Part 4, this assisted the Commission in narrowing the scope of issues for consideration relatively early on. The valuation of assets has remained the key area of dispute throughout the Commission's process to determine IMs for Airports.

1.4.4 The consultation process can be described in three broad phases:

- Phase I: Discussion (December 2008 to November 2009).
- Phase II: Draft Determinations (December 2009 to September 2010).
- Phase III: Determinations (October 2010 to December 2010).

1.4.5 A brief summary of the Commission's process is below. More detail on the papers released at each consultation step is set out in Appendix A.

Extension to the deadline for determining IMs

1.4.6 During the Discussion phase, a number of interested parties (particularly on the IMs for EDBs and GPBs) raised concerns about timeframes for consultation, and the need for engagement on the detailed implementation of IMs. In particular, a number of parties sought to engage with the Commission through workshops on detailed proposals for IMs specific to each type of regulated service.

1.4.7 In response to these concerns, the Commission sought an extension to the deadline for determining IMs for services regulated under subparts 9 to 11 of Part 4. On 10 December 2009, the Minister of Commerce (Minister) announced his decision to grant the Commission an extension under s 52U(2) of 6 months, to 31 December 2010. The extension allowed the Commission to undertake additional consultation during Phase II.

Phase I – Discussion

1.4.8 A discussion paper on the new legislative provisions (the Provisions Paper), including IMs, was released in December 2008.[32] The Commission consulted on its preliminary views for IMs and how they would be applied for each of the regulated services under subparts 9-11 of Part 4 through its Input Methodologies Discussion Paper and associated reports (released in June 2009);[33] a public conference on IMs (other than the IM for the cost of capital); and a separate workshop on the cost of

[32] Commerce Commission, Provisions Paper, supra n 31.

[33] Commerce Commission, *Input Methodologies Discussion Paper*, 19 June 2009.

capital in November 2009. Written submissions and cross-submissions from interested parties were received at each stage.

Phase II – Draft Determinations

1.4.9 The key consultation step in the process to determine IMs was the publication of the Draft IMs for each type of regulated service in accordance with s 52V(2)(a) (the Draft IMs). The Draft IMs for Airports were released in May 2010.[34] Prior to the release of the Draft IMs, the Commission updated interested parties on its preliminary views through the release of an Emerging Views Paper in December 2009[35] and held a workshop on specified airport services in February 2010. Written submissions and cross-submissions from interested parties were sought at each stage, including before and after the workshop.

Phase III – Determinations

1.4.10 In Phase III, the Commission released a Revised Draft Determination for consultation on the technical drafting of the determination.[36] Written submissions were sought to ensure that the drafting of the IM Determination properly gave effect to the intended approaches for the IMs.

Expert advice obtained by the Commission

1.4.11 The Commission has been assisted throughout the process to determine IMs by expert advice. An overview of the expert advice obtained by the Commission is provided below. The Commission has had regard to this advice in determining IMs.

Economic advisors

1.4.12 The Commission's independent expert economic advisors for IMs (Experts) were:

- Professor Martin Cave of the London School of Economics, Centre on Regulation in Europe and Cambridge Economic Policy Associates;
- Dr Michael Pollitt of Cambridge University;
- Dr John Small of Covec Limited; and
- Professor George Yarrow of the Regulatory Policy Institute, Oxford.

1.4.13 Three of the Experts (Professors Cave and Yarrow and Dr Small) attended the Commission's conference on IMs in September 2009 to hear the views of interested parties and provide comment during the proceedings. Dr Small also attended the Airports Workshop on 17 February 2010.

1.4.14 The Experts prepared a joint report on asset valuation in workably competitive markets (Asset Valuation Report), which was released for consultation with the

[34] Commerce Commission, *Draft Commerce Act (Specified Airport Services Input Methodologies) Determination*, 31 May 2010 (updated on 1 June 2010). The Draft IMs were accompanied by a Draft Reasons Paper: Commerce Commission, *Input Methodologies (Airport Services) Draft Reasons Paper*, 31 May 2010.

[35] Commerce Commission, *Input Methodologies (Airport Services) Emerging Views Paper*, 23 December 2009.

[36] Commerce Commission supra n 30.

Draft IMs.[37] Submissions from interested parties on the Asset Valuation Report were reviewed by the Experts (the Submissions Review).[38]

1.4.15 Each Expert was asked to undertake an individual independent expert review of the Commission's draft decisions for IMs as set out in the Draft Reasons Papers for Airports[39] (the Draft Expert Reviews). The Draft Expert Reviews were released for comment during the consultation period.[40] In addition, each Expert was also provided with an opportunity to respond to comments on his individual report in the Submissions Review.[41]

1.4.16 The Commission also asked the Experts to undertake similar independent reviews of its updated decisions prior to the Commission determining the IMs (Final Expert Reviews). These decisions were updated following the Commission's consideration of submissions on the Draft IMs from interested parties.[42]

1.4.17 The Submissions Review and the Final Expert Reviews from Professors Cave and Yarrow and Dr Small were published on the Commission's website on 16 December 2010.[43] The Final Expert Review from Dr Pollitt was published on the Commission's website on 22 December 2010.

The cost of capital

1.4.18 Prior to the CAA being passed, the Commission had engaged a Cost of Capital Expert Panel (Expert Panel) to advise it in developing its generic Cost of Capital Guidelines to apply across all services it regulates. The Expert Panel has continued to advise the Commission in relation to the cost of capital for IMs (paragraphs 1.4.19 - 1.4.23).

1.4.19 The Expert Panel is comprised of:

- Professor Julian Franks of London Business School;

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37 Yarrow, G., Cave, M., Pollitt, M., Small, J., *Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, May 2010 (Asset Valuation Report).

38 Yarrow, G., Cave, M., Pollitt, M., Small, J., *Review of Submissions on Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, October 2010 (Submissions Review).

39 Commerce Commission, *Input Methodologies (Airport Services) Draft Reasons Paper*, 31 May 2010.

40 Cave, M., *Expert Review of the New Zealand Commerce Commission's Draft Decisions and Reasons for Specified Airport Services*, June 2010; Pollitt, M., *Expert Review of the New Zealand Commerce Commission's Draft Decisions and Reasons for Specified Airport Services*, June 2010; Small, J., *Expert Review of the New Zealand Commerce Commission's Draft Decisions and Reasons for Specified Airport Services*, June 2010; Yarrow, G., *Review of Input Methodologies (Airports Services) Draft Reasons Paper*, June 2010.

41 supra n 38.

42 Cave, M., *Expert Review of Reasons Papers of the New Zealand Commerce Commission relating to Electricity Distribution and Gas Pipeline Services and to Airports*, 13 December 2010; Pollitt, M., *Expert Review of the New Zealand Commerce Commission's Input Methodologies (Airport Services) Reasons Paper and Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper*, December 2010; Small, J., *Expert Review of Input Methodology Reasons Papers*, 14 December 2010; Yarrow, G., *Review of Input Methodologies (Electricity Distribution Services, Gas Pipeline Services and Airports) Reasons Papers*, 14 December 2010.

43 The Commission also published reports from Professor Yarrow and Dr Small (Small, J., *Response to CEG*, 23 November 2010; Yarrow, G. *Comments on a CEG memorandum of 17 November 2010,* 14 December 2010) responding to a memorandum from Competition Economics Group (CEG) on behalf of Vector (Competition Economics Group (on behalf of Vector), *Expert reports of Dr Small and Professor Yarrow*, 17 November 2010). The CEG memorandum commented on reports prepared by each Expert on behalf of Telstra, which were submitted to the Australian Competition and Consumer Commission (ACCC).

- Dr Martin Lally of Victoria University of Wellington; and
- Professor Stewart C. Myers of the MIT Sloan School of Management.

1.4.20 The Expert Panel's report was released for consultation as part of the Discussion phase (with the IM Discussion Paper and Revised Draft Cost of Capital Guidelines).[44]

1.4.21 Dr Lally attended the Commission's Cost of Capital Workshop in November 2009 to hear the views of interested parties and provide comment during the proceedings.

1.4.22 Subsequent to the Cost of Capital Workshop, the Commission engaged the Expert Panel to provide independent advice on whether it should change its previous estimate of the tax-adjusted market risk premium (TAMRP) as a result of the recent global financial crisis (GFC).[45]

1.4.23 The Expert Panel's joint report on the TAMRP was released for consultation with the Draft Reasons Papers for IMs.

1.4.24 Dr Lally has also reviewed certain submissions from PricewaterhouseCoopers (PwC) and Professor Guthrie on the Commission's draft decisions for the cost of capital IMs. These reports are:

- Comments on Input Methodologies (EDS) Draft Reasons Paper;[46] and
- Comments on Measurement Error and Regulated Firms' Allowed Rates of Return.[47]

1.4.25 Dr Lally's reports were published on the Commission's website on 16 December 2010.

<u>Advice on technical implementation of asset valuation methodologies for Airports</u>

1.4.26 Mr Kerry Stewart of Darroch Advisory Services was engaged to advise the Commission on technical implementation matters for the valuation of airports' assets. Mr Stewart attended the Airports Workshop on 17 February 2010 to hear the views of participants. Mr Stewart also assisted the Commission in the preparation of Schedule A to the IM Determination, which prescribes an airport land valuation methodology.

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44 Franks, J., Lally M., & Myers S., *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, 18 December 2008.

45 Franks, J., Lally, M., Myers, S., *Recommendation to the New Zealand Commerce Commission on whether or not it should change its previous estimate of the tax-adjusted market risk premium as a result of the recent global financial crisis*, 14 April 2010 (Franks, Lally and Myers, Recommendations on the estimate of the tax-adjusted market risk premium).

46 Lally, M., *Comments on Input Methodologies (EDS) Draft Reasons Paper,* 3 September 2010.

47 Lally, M., *Comments on Measurement Error and Regulated Firms' Allowed Rates of Return,* 13 September 2010.

CHAPTER 2: PART 4 REGULATORY FRAMEWORK

2.1 Introduction

2.1.1 This chapter discusses the regulatory framework under Part 4 of the Act and, in particular, the role of input methodologies within the context of that framework.

2.1.2 This chapter is structured as follows:

- Sections 2.1.3 and 2.3 provide an introductory overview of IMs, as well as of the purpose of information disclosure regulation;
- Section 2.4 discusses the Part 4 Purpose;
- Section 2.5 provides an overview of how the concept of 'workable or effective competition'—the concept of competition that underpins all parts of the Act, including Part 4—has been described, in both economics and in relevant case law;
- Section 2.6 discusses outcomes consistent with those produced in workably competitive markets in the context of the Part 4 Purpose;
- Section 2.7 explains the role of information disclosure regulation in promoting the Part 4 Purpose;
- Section 2.8 explains the relationship of IMs to information disclosure regulation applicable to Airports; and
- Section 2.9 sets out a number of additional statutory considerations relevant to setting IMs for Airports.

2.1.3 The regulatory framework is applied in the analysis underpinning the IMs set out in the following chapters.

2.2 Introduction to IMs under Part 4

Information disclosure regulation for airport services and IMs

2.2.1 Regulated airport services are defined in s 56A of the Act. The definition comprises all of the services supplied by the Airports in markets directly related to the following activities (whether for international and domestic flights):

a. aircraft and freight activities;

b. airfield activities;

c. specified passenger terminal activities; and

d. any other services that are determined by the Governor-General, by Order in Council made on the recommendation of the Minister of Commerce under s 56A(4), to be specified airport services for the purposes of Part 4.

2.2.2 Subpart 11 of Part 4 sets out provisions specific to the regulation of Airports. The Commission is required to make a determination under s 52P that specifies how information disclosure regulation applies to the Airports (s 56E).

2.2.3 A section 52P determination is, in turn, underpinned by a series of IMs that set out the rules, requirements and processes applying to the regulation of those services. As noted in Chapter 1, this Paper only discusses the IM Determinations that have been made by the Commission in respect of the Airports. The IM Determinations made by the Commission in respect of the other services currently regulated under Part 4 are discussed in separate papers.

2.2.4 Section 52T provides the Commission with a broad discretion as to the content and structure of IMs. In exercising its discretion, the Commission has had regard to a number of relevant considerations, including the purpose of IMs as set out in s 52R, the purpose of information disclosure regulation, the Part 4 Purpose in s 52A, and all submissions made by interested parties throughout the consultation process.[48]

Purpose of IMs

2.2.5 Subpart 3 and s 52C of Part 4 of the Act set out what IMs are, how they are determined and how they apply. Section 52R provides that the purpose of IMs is:

> to promote certainty for suppliers and consumers in relation to the rules, requirements, and processes applying to the regulation, or proposed regulation, of goods or services under [Part 4].

2.2.6 Promoting certainty is an important contributor to fostering an environment in which regulated suppliers have the appropriate incentives to invest, innovate and improve efficiency. The Commission considers that IMs will promote certainty for the Airports and consumers of airport services by setting out, as clearly as possible, a number of the key 'inputs', whether direct or indirect, to information disclosure regulation. As CRA International (CRA) submitted (on behalf of Unison), promoting certainty primarily requires that IMs are "well-specified to prevent, as far as possible, differences in interpretation by suppliers and regulators". Certainty, however, does not necessarily dictate what the most appropriate methodology is. The Commission generally agrees with CRA that promoting certainty "has no direct implication for the choice of alternatives within each methodology".[49]

2.2.7 In addition, the need to promote certainty does not dictate what the final numeric result will be in all cases. That may depend on future data or circumstances, at the time the IM is applied.[50]

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48 As noted above, in making the IM Determinations for Airports, the Commission has also considered other relevant submissions on IMs, including those from interested parties submitting in respect of the IM Determinations for EDBs, GPBs and Transpower.

49 CRA International, *Regulatory Provisions of the Commerce Act, Final Report prepared for Unison Networks*, 16 February 2009, p. 28.

50 For example, in the context of the cost of capital IM, the IM sets out a process for the Commission to update and publish the cost of capital each year to ensure it is current. Doing so provides certainty to both regulated suppliers and consumers at the time that cost of capital is applied by the Commission for the purpose of monitoring and analysing relevant information (i.e. concerning profitability) disclosed by the Airports (s 53F(2)(a)).

Definition of IMs

2.2.8 'Input methodology' is defined broadly in s 52C as:

> a description of any methodology, process, rule, or matter that includes any of the matters listed in section 52T and that is published by the Commission under section 52W; and, in relation to particular goods or services, means any input methodology, or all input methodologies, that relate to the supply, or to suppliers, of those goods or services.

2.2.9 This definition is elaborated on in s 52T:

(1) The input methodologies relating to particular goods or services must include, to the extent applicable to the type of regulation under consideration, –

(a) methodologies for evaluating or determining the following matters in respect of the supply of the goods or services:

(i) cost of capital:

(ii) valuation of assets, including depreciation, and treatment of revaluations:

(iii) allocation of common costs, including between activities, businesses, consumer classes, and geographic areas:

(iv) treatment of taxation; and

(b) pricing methodologies, except where another industry regulator (such as the Electricity Authority) has the power to set pricing methodologies in relation to particular goods or services; and

(c) regulatory processes and rules, such as –

(i) the specification and definition of prices, including identifying any costs that can be passed through to prices (which may not include the legal costs of any appeals against input methodology determinations under this Part or of any appeals under section 91 or section 97); and

(ii) identifying circumstances in which price-quality paths may be reconsidered within a regulatory period; and

(d) matters relating to proposals by a regulated supplier for a customised price-quality path, including –

(i) requirements that must be met by the regulated supplier, including the scope and specificity of information required, the extent of independent verification and audit, and the extent of consultation and agreement with consumers; and

(ii) the criteria that the Commission will use to evaluate any proposal.

(2) Every input methodology must, as far as is reasonably practicable, –

(a) set out the matters listed in subsection (1) in sufficient detail so that each affected supplier is reasonably able to estimate the material effects of the methodology on the supplier; and

(b) set out how the Commission intends to apply the input methodology to particular types of goods or services; and

(c) be consistent with the other input methodologies that relate to the same type of goods or services.

(3) Any methodologies referred to in subsection (1)(a)(iii) must not unduly deter investment by a supplier of regulated goods or services in the provision of other goods or services.

How IMs apply

2.2.10 Section 52C provides that IMs relate to 'the supply, or to suppliers, of [particular] goods or services'. Section 52T(1) provides that IMs must include certain matters 'to the extent applicable to the type of regulation'. The IMs that apply to a particular type of regulated service, and which are therefore relevant to the regulated suppliers that supply those types of services, will therefore also depend on the type or types of regulation to which the services are subject.

2.2.11 Airports are only subject to information disclosure regulation. Some matters set out in s 52T(1) are clearly not applicable to information disclosure regulation for Airports. In particular, the IMs referred to in s 52T(1)(d) only relate to customised price-quality paths under default/customised price-quality regulation. Similarly, the IMs referred to in s 52T(1)(c) relate to price-quality regulation only.

2.3 Purpose of Information Disclosure Regulation

2.3.1 Section 53A of the Act provides that the purpose of information disclosure regulation is:

> to ensure that sufficient information is readily available to interested persons to assess whether the purpose of [Part 4] is being met.

2.3.2 The way in which IMs relate to information disclosure regulation is discussed in Section 2.8 of this chapter.

2.4 Purpose of Part 4

2.4.1 Section 52A of the Act states that the purpose of Part 4 is:

> to promote the long-term benefit of consumers in markets referred to in section 52 by promoting outcomes that are consistent with outcomes produced in competitive markets such that suppliers of regulated goods or services—
>
> (a) have incentives to innovate and to invest, including in replacement, upgraded, and new assets; and
>
> (b) have incentives to improve efficiency and provide services at a quality that reflects consumer demands; and
>
> (c) share with consumers the benefits of efficiency gains in the supply of the regulated goods or services, including through lower prices; and
>
> (d) are limited in their ability to extract excessive profits.

2.4.2 The central purpose, therefore, is to promote the long-term benefit of consumers in markets where there is little or no competition and little or no likelihood of a substantial increase in competition.

2.4.3 'Competition' in the context of Part 4 of the Act means 'workable or effective competition' (s 3(1) of the Act).[51] Section 52C of the Act defines the term 'consumer' as "a person that consumes or acquires regulated goods or services". The use of both 'consumes' and 'acquires' suggests that the definition extends beyond end-use consumers and includes both direct and indirect acquirers. Consequently, in the case of Airports, 'consumer' refers not only to end-use consumers such as airline passengers, but also to airlines as well.

2.4.4 The central purpose is to be achieved by promoting outcomes consistent with those produced in workably competitive markets. The Commission has therefore sought to identify the outcomes typically produced in workably competitive markets. The IMs are designed to promote, in the regulated markets, outcomes consistent with those in workably competitive markets such that the objectives set out in s 52A(1)(a)-(d) of the Act are achieved.

2.4.5 Interested parties from the airport sector, as well as the electricity and gas sectors, have varied in how they referred to paragraphs (a) to (d)—'outcomes', 'characteristics', and 'objectives' have been some of the terms used during the consultation process. The Commission has adopted the terminology of both the Explanatory Note to the Commerce Amendment Bill and the Select Committee Report on the Bill, namely that paragraphs (a) to (d) set out the 'objectives' to be achieved by Part 4 regulation.[52] As clarified in the Explanatory Note to the Commerce Amendment Bill, promoting the long-term interests of consumers by promoting outcomes consistent with workable competition "requires suppliers to have incentives to invest and innovate, have incentives to improve efficiency and provide services at a quality required by consumers, share the benefits of efficiency gains with consumers, and limit excessive profits".[53] These 'requirements', or regulatory objectives, are reflected in paragraphs (a) to (d) of s 52A(1) of the Act.

2.4.6 Both CIAL and Powerco cautioned the Commission against using the term "regulatory objectives", and refers to (a) to (d) as "sub-paragraphs". They considered that "there is a real risk that the Commission is seen to be elevating (a) to

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[51] Except where references specifically refer to 'effective competition', 'workable competition' is used hereafter to refer to both workable and effective competition, and 'workably competitive markets' to refer to workably or effectively competitive markets.

[52] The Explanatory Note (supra n 15) refers to (a) to (d) as objectives when setting out the rationale that informed the Part 4 Purpose. References include the one at page 4, under the heading 'Test and processes for imposing regulation'. This is also done at page 17 as follows: "[t]here is also debate about whether the current purpose statement for Part 4A of the Act is appropriate given that there is no explicit reference to a key regulatory objective of providing for incentives to invest." At page 19, the Explanatory Note similarly refers to "a purpose statement that explicitly states that the objective of regulation is to improve efficiency and to protect consumers from excessive prices." Finally, at page 20, it notes that the purpose statement was adopted because it "includes both efficiency and distributional objectives, to provide for an appropriate balance between the protection of consumers and that of producers and investors." This approach of referring to (a) to (d) as objectives is also evident at page 2 of the Select Committee Report (refer: Commentary to the Commerce Amendment Bill (201-2), Government Bill, as reported from the Commerce Committee, Wellington, 28 July 2008) and also at page 5 where the report explicitly refers to "regulatory objectives set out in the purpose statement" when recommending the new s 53A, which was subsequently adopted.

[53] Explanatory Note, supra n 15, p. 4.

(d) to be the primary means of promoting the central purpose of Part 4 - which is clearly incorrect".[54] The concern of submitters in general appears to be the relevance of (a) to (d) in setting IMs. For instance, Orion has argued that "if the workably competitive standard is used as the Commission's starting point, each of the section 52A(1)(a)-(d) criteria flows as a matter of course".[55] ENA submitted that: "outcomes consistent with workable competition are taken to have occurred if the outcomes identified in s 52A(1)(a) to (d) are observed. By contrast, if the outcomes in paragraphs (a) to (d) are not observed or cannot be obtained, the outcome may not be consistent with workable competition".[56] NZAA has submitted that the Commission has "focused on promoting objectives (a)-(d)" rather than promoting outcomes consistent with workably competitive markets.[57]

2.4.7 The Commission's view is that the objectives in paragraphs (a) to (d) are integral to promoting the long-term benefit of consumers, and reflect the key areas of supplier performance that characterise workable competition (paragraphs 2.6.27-2.6.28). Unison submitted that "in order to determine whether the central purpose (long-term benefit of consumers) is to be fulfilled, one has to inquire whether outcomes consistent with outcomes produced in workably competitive markets are being promoted such that section 52A(1)(a) to (d) requirements are met".[58] The Commission agrees. This is in fact how the Commission has interpreted and applied the purpose of Part 4.

2.4.8 As discussed in subsequent chapters of this Paper, in relation to the IMs for airport services, the Commission has considered what outcomes would be consistent with those produced in workably competitive markets such that the objectives in paragraphs (a) to (d) of the Part 4 Purpose are achieved. In deciding on the appropriate IMs as a result of this exercise, the Commission has had to exercise its judgement—for instance, there is a natural tension between providing suppliers with incentives to invest and limiting their ability to extract excessive profits.

2.4.9 Airport services (i.e. those supplied by the three main international airports) are regulated under Part 4. Although competition between airports is observed in some countries overseas, where consumers may have some choice as to which airport to use, by definition the legislature has determined that markets in which these services are supplied in New Zealand are *not* workably competitive.[59] Nevertheless, s 52A(1) requires the Commission to promote outcomes that are **consistent with** outcomes produced in workably competitive markets. Guidance as to which of the variety of outcomes produced in workably competitive markets should be promoted by the Commission is provided by the regulatory objectives in s 52A(1)(a)-(d).

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54 CIAL, *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, paragraph 25; Powerco, *Submission 1 in Response to Draft Input Methodology and Information Disclosure Determinations,* 9 August 2010, paragraph 26.

55 Orion New Zealand Limited, *Submission on Input Methodologies: Draft Determination and Reasons Papers for Electricity Distribution Businesses*, 9 August 2010, paragraph 1.7.

56 Electricity Networks Association, *Submission 1 Regulatory Framework*, 9 August 2010, paragraph 13.

57 NZAA, *Submissions on Draft Input Methodologies and Draft Reasons Papers*, 12 July 2010, paragraph 21.

58 Unison Networks Limited, *Cross-submission on Commerce Commission Draft Input Methodology Determinations,* 2 September 2010, paragraph 13.

59 Section 52G(1)(a) provides that goods or services may be regulated under Part 4 only if they are supplied in markets where there is little or no competition and little or no likelihood of a substantial increase in competition.

Concept of competition in Part 4

2.4.10 As with all other parts of the Commerce Act, 'competition' in the context of Part 4 means 'workable or effective competition' (s 3(1)). In order to identify what outcomes are consistent with those produced in *workably* competitive markets, the Commission has first considered how the concept of workable competition is traditionally interpreted, in both economic and legal terms (paragraphs 2.5.1-2.5.18).

2.4.11 The Commission has also considered what factors influence workably competitive market outcomes, the extent to which those factors characterise regulated markets and what "outcomes consistent with those produced in workably competitive markets" means in the context of regulated markets (paragraphs 2.6.1-2.6.21). Specifically, the Commission has considered the outcomes in workably competitive markets in light of the regulatory objectives set out in paragraphs (a) to (d) of s 52A(1) (paragraphs 2.6.27-2.6.33).

Part 4 Purpose and information disclosure regulation

2.4.12 While the purpose of information disclosure is to ensure that interested parties have sufficient information to assess whether the Part 4 Purpose is being met, in the case of Airports information disclosure regulation is the primary mechanism by which the Commission promotes outcomes consistent with those produced in workably competitive markets. Consequently, this chapter also considers how information disclosure regulation under Part 4 can promote the Part 4 Purpose (paragraphs 2.7.1-2.7.4).

Part 4 Purpose and IMs

2.4.13 It is in combination with each other, and with other requirements in the s 52P determinations under Part 4 for information disclosure regulation, that IMs will provide incentives for regulated suppliers to act in a manner consistent with the Part 4 Purpose. This chapter concludes by setting out the relationship of IMs to information disclosure regulation (paragraphs 2.8.1-2.8.20).

2.4.14 Submitters are not consistent in their discussion about the role of the IMs and the Part 4 Purpose. NZAA has submitted that "Parliament intended that transparency and monitoring of performance under information disclosure would promote the Part 4 purpose statement - not the setting of input methodologies themselves".[60] On the other hand, NZAA has also submitted that "the methodologies proposed by NZ Airports are materially better than the Commission's Draft Determinations at meeting the Part 4 purpose statement".[61]

2.4.15 In s 52Z(4), the standard by which an IM is assessed on appeal is whether an amended or substituted IM is (or will be) materially better in meeting the purpose of Part 4, the purpose of IMs, or both. In the context of Airports, it is therefore clear that the Act intended that the IMs should promote the Part 4 Purpose through information disclosure regulation.

2.4.16 Given that the outcomes the IMs will promote are being postulated for markets which are not workably competitive, the extent to which workably competitive

[60] ibid, p. 17.

[61] ibid, p. 25.

market outcomes are relevant or observable in assisting the Commission in its decision-making has varied across IMs. Certain outcomes produced in workably competitive markets may be relevant to a greater or lesser extent depending on the IM. More significantly, outcomes that are potentially relevant to particular IMs in some workably competitive markets might not be desirable in workably competitive markets with similar characteristics to those regulated under Part 4.

2.4.17 At all times, the Commission has borne in mind the extent to which the outcomes in question are consistent with the regulatory objectives in s 52A(1)(a)-(d). Again, the Commission has found that not all of the objectives are equally relevant across all the IMs (paragraph 2.8.22).

2.4.18 There are, in many cases, practical constraints (for example, limits on available information about the regulated part of the business) on the Commission's ability to design IMs that, when applied to information disclosure regulation, will promote outcomes consistent with those in workably competitive markets. Therefore, in weighing the various options for setting IMs, the Commission has considered the extent to which each option is likely, over time, to move outcomes closer towards, rather than further away from, outcomes consistent with workably competitive markets.

2.5 Workable Competition

Workable competition in economics and competition policy

2.5.1 Given the importance of 'workable competition' in the Part 4 Purpose, the Commission has considered how the concept is interpreted in economic and legal terms. The concept of workable competition (and effective competition) was first developed by the economist J. M. Clark to provide a more realistic standard for competition policy decisions than theoretical economic models such as perfect competition.[62] For example, the OECD describes workable competition as:

> a notion which arises from the observation that since perfect competition does not exist, theories based on [perfect competition] do not provide reliable guides for competition policy.[63]

2.5.2 In contrast to the theoretical model of perfectly competitive markets, in which market participants are simply passive 'price takers', suppliers in workably competitive markets actively seek out and find opportunities for profitable investment and innovation. These are two of the main drivers of productivity improvements in the economy. Workable competition is therefore a *dynamic* process of rivalry between competing suppliers through which knowledge is both

[62] Clark, J.M., Toward a Concept of Workable Competition, *American Economic Review*, 30(Jun), 1940, pp. 149-157. The concept of 'workable competition' articulated by Clark in this paper was essentially a static concept, rather than a dynamic concept. Clark later favoured a more dynamic concept of competition to that which he first articulated in 1940. He went on to attempt to define various criteria for this concept using the term 'effective competition' (i.e. Clark, J.M., *Competition as a Dynamic Process*, The Brookings Institution, Washington DC, 1961, p. 450).

[63] OECD, Glossary of Industrial Economics and Competition Law, p. 85, available at: http://www.oecd.org/dataoecd/8/61/2376087.pdf.

generated and discovered, with market prices being one of the primary ways that information is disseminated to market participants.[64]

2.5.3 Furthermore, unlike 'perfect' models of competition—in which very specific 'equilibrium' outcomes arise as a result of a number of strict and unrealistic underlying assumptions—'workable' competition encompasses a wide range of outcomes.[65] As a consequence, workably competitive market outcomes are harder to define with precision. For example, the OECD states that:

> No consensus has arisen over what might constitute workable competition but all bodies which administer competition policy in effect employ some version of it.[66]

2.5.4 Likewise, the Commission's Experts describe workable competition as follows.

> Workable competition, or as is often called in competition law, effective competition, signifies that the relevant competitive process, whatever its precise structure, is, or is capable of, producing outcomes in terms of economic efficiency and consumer welfare that, at a minimum, are considered satisfactory or acceptable. …
>
> Since the economic organisation of an industry or market tends, over time, to adapt to its own relevant circumstances (the economic environment), market structures, economic institutions and business practices can vary significantly from one industry/market to another. Each may be competitive, but competitive in ways that might vary from those of another industry/market. It is not to be expected, therefore, that a workable or effective competition standard will be narrowly prescriptive as to the types and forms of economic organisation and business conduct that might be considered consistent with such competition. Indeed, there has been considerable debate in the literature over the indicia of workable competition.
>
> On the other hand, the concept is far from permissive of all forms of economic organisation and business conduct. For example, early developers of workable competition approaches tended to clearly describe (and seek to justify) explicit criteria to guide decisions over whether competition was and was not workable. Notwithstanding that there was, and remains, disagreement over the set of relevant indicators, most competition laws around the world rely (at least implicitly) on some notion of workable or effective competition.[67]

2.5.5 Definitions of workable competition found in the economic literature often encompass a variety of market structure, conduct and performance criteria (or indicators) that would be expected to be observed in order for the markets concerned to be considered workably competitive. While there is some controversy among economists in respect of the structure-conduct-performance approach,[68] it is

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64 Likewise, in the context of Parts 2 and 3 of Act, the Commission describes workable competition as a 'dynamic process' (e.g. Commerce Commission, *Mergers and acquisitions guidelines*, December 2003, p. 12).

65 In economics, equilibrium usually refers to the point at which supply and demand are in balance, and market conditions are not changing. At this point, the price level is such that the amount that consumers seek to buy is exactly equal to the amount that suppliers are able to produce.

66 OECD supra n 63, p. 86. There are other theoretical economic models of competition, such as 'perfect contestability' (e.g. Baumol, W., Panzar, J. and Willig, R., *Contestable Markets and the Theory of Industry Structure*, 2nd ed, Harcourt Brace Jovanovich, New York, 1988). The model of perfect contestability also differs from the concept of workable competition in that, like perfect competition, it is based on very strict and unrealistic underlying assumptions.

67 Yarrow, G., Cave, M., Pollitt, M., Small, J., *Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, May 2010 ('Asset Valuation Report'), p. 7.

68 For example: "While the structure-conduct-performance relationship is subject to debate, it nevertheless provides a useful framework", Viscusi, K., Vernon, J. and Harrington J. Jr., *Economics of Regulation and Antitrust*, The MIT Press, Cambridge, Massachusetts, 3rd ed., 2000, pp. 61-63. This debate tends to centre on the difficulties in

nonetheless a common approach used by competition authorities for analysing competition and market power.

2.5.6 In the Structure-Conduct-Performance ('SCP') paradigm proffered by economists, the first two criteria—structure and conduct—relate to factors such as the number of firms in the market and the way that those firms behave. These criteria are therefore particularly relevant to the promotion of workable competition under Parts 2 and 3 of the Act. In the context of Part 4 (i.e. economic regulation), the structure and conduct criteria are less relevant than the performance criteria. This is because there is little or no competition in the markets regulated under Part 4, and little or no likelihood of a substantial increase in competition. The performance criteria reflect the outcomes that are generally deemed to be the beneficial result of the rivalrous process of competition, and are therefore also relevant to the desired outcomes under Part 4.

2.5.7 A number of attempts have been made to define the SCP criteria for workably competitive markets in the academic literature. Key performance criteria typically involve:

- efficient production and distribution;
- profits at levels just sufficient to reward investment, efficiency, and innovation;
- prices that encourage rational choice, guide markets toward equilibrium, and do not intensify cyclical instability;
- output levels and product quality (that is, variety, durability, safety, reliability, and so forth) responsive to consumer demands;
- success accruing to sellers who best serve consumer wants; and
- appropriate exploitation of improved products and techniques.[69]

2.5.8 It is notable that the SCP definition of workable competition—and the performance criteria in particular—reflects wide recognition by economists that competitive pressures would be expected to move market participants closer towards *efficient* outcomes that are beneficial to consumers over time. The three dimensions of efficiency usually identified are allocative, productive and dynamic efficiency.

- *Allocative efficiency* occurs when resources are allocated within the economy to the uses in which they have the highest value.

measurement in structure-conduct-performance studies, and not the performance criteria themselves. For example, a survey of the traditional and modern applications of the structure-conduct-performance approach is presented in Chapter 8 of Carlton, D.W. and Perloff, J.M., *Modern Industrial Organization*, Pearson Addison Wesley, Boston, 4th ed. 2005. Notably, Carlton and Perloff state that: "Market *performance* is the success of a market in providing benefits for consumers", at p. 244.

69 These performance criteria are drawn from the similar lists provided in the 'Workable Competition' section in Chapter 2 of Scherer, F. and Ross, D., *Industrial Market Structure and Economic Performance*, 3rd ed., Houghton Mifflin, Boston, 1990, pp. 52-55, and in Chapter 7, 'Workable Competition', of Reid, G. C., *Theories of Industrial Organisation*, Basil Blackwell, New York, 1987, p. 125.

- *Productive efficiency* is present when producers use inputs in such a manner as to minimise costs, subject to technological constraints.

- *Dynamic efficiency* refers to decisions made over time and includes decisions relating to investment and/or innovation that can improve productivity as well as the range and quality of services.

2.5.9 One submitter strongly argued that efficiency considerations should be the cornerstone of regulation that seeks to promote outcomes consistent with workable competition.[70]

2.5.10 The promotion of efficiency is undoubtedly a key characteristic of workably competitive markets, but by no means the only one. As is discussed further below (paragraphs 2.6.15-2.6.33), in the context of Part 4, the regulatory objectives set out in s 52A(1)(a)-(d) encompass a wider range of 'performance areas' than efficiency alone.

Workable competition in competition law

2.5.11 Definitions of workable competition are also found in legal precedent. Many of the SCP criteria are echoed in various provisions in the Act and the Fair Trading Act 1986 (as well as aspects of other sector-specific legislation such as the Credit Contracts and Consumer Finance Act 2003). Importantly, the SCP framework has been applied as part of the Commission's, and the Courts', analytical approach to assessing restrictive trade practices under Part 2 and business acquisitions under Part 3 of the Act.

2.5.12 Legal definitions of workable competition tend to characterise it as acting to limit firms in their ability to set their own price and profit levels. For example, the Courts in New Zealand have generally approved the Australian Trade Practices Tribunal's discussion in *Re Queensland Co-operative Milling Association Ltd: Re Defiance Holdings Ltd. (QCMA)* as to the particular elements and principles that underlie workable competition. The discussion in QCMA draws attention to the US Attorney-General's observation that:

> … the basic characteristic of effective competition in the economic sense is that no one seller … has the power to choose its level of profits by giving less and charging more. … **the antithesis of competition is undue market power** in the sense of the power to raise price and exclude entry.[71]

2.5.13 In New Zealand, the High Court in *ARA v Mutual Rental Cars (Auckland Airport) Ltd* and *Fisher and Paykel Ltd v Commerce Commission*[72] has approved the following formulation of workable competition:

> Workable competition means a market framework in which the pressures of other participants (or the existence of potential new entrants) is sufficient to ensure that each participant is constrained to act efficiently and in its planning to take account of those other participants or likely entrants as unknown quantities. To that end **there must be an opportunity for each participant or new entrant to achieve an equal footing**

70 Frontier Economics, *Input Methodologies Draft Reasons Paper, for Air New Zealand*, July 2010.

71 (1976) 8 ALR 481 (emphasis added).

72 *Auckland Regional Authority v Mutual Rental Cars (Auckland Airport) Ltd* [1987] 2 NZLR 647, p. 671.

> **with the efficient participants in the market** by having equivalent access to the means of entry, sources of supply, outlets for product, information, expertise and finance. This is not to say that particular instances of the items on that list must be available to all. That would be impossible. For example, a particular customer is not at any one time freely available to all suppliers. **Workable competition exists when there is an opportunity for sufficient influences to exist in any one market which must be taken into account by each participant and which constrain its behaviour**.[73]

Constraints on market power in workably competitive markets

2.5.14 The previous quote highlights that workable competition can be considered to exist where there is an opportunity for sufficient influences to constrain the market power of existing market participants. During the consultation process, a number of submissions from regulated suppliers have presented arguments that rely on a standard of workable competition whereby (hypothetical) new entrants are considered to always provide the greatest constraint on the market power of incumbent suppliers. These arguments are primarily made in the context of the asset valuation IM and are therefore discussed in more detail in Chapter 4.[74] However, in light of the economic and legal interpretations of workable competition introduced above, it is worth highlighting a number of points that are relevant to those arguments in this chapter of the Paper.

2.5.15 The Commission notes that Professor Michael Porter explains the structure of an industry as being embodied in not just *one*, but *five* competitive forces:

- the power of buyers (i.e. consumers);
- the power of suppliers to the industry (i.e. upstream suppliers to the suppliers in the industry);
- the threat of new entrants;
- the threat of substitute goods or services; and
- the rivalry among existing competitors.[75]

2.5.16 Porter explains that the strongest forces in a particular case will be the one(s) that constrain the behaviour of firms within an industry.

> Different forces take on prominence, of course, in shaping competition in each industry. In the ocean-going tanker industry the key force is probably the buyers (the major oil companies), while in tires it is powerful OEM [original equipment manufacturer] buyers coupled with tough competitors. In the steel industry the key forces are foreign competitors and substitute materials.

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73 *Fisher & Paykel Ltd v Commerce Commission* [1990] 2 NZLR 731, 759 (emphasis added). This does not imply that competitors should actually be placed on an equal footing, as: "Competition is a means to the end of protecting the interests of consumers, rather than competitors in the market" (*Universal Music Australia v Australian Competition and Consumer Commission* (2003) 131 FCR 529 (FCA).

74 For example, PwC (on behalf of Christchurch International Airport Limited), *Response to the Discussion of Asset Valuation in the Draft Decisions Document*, 12 July, 2010, pp. 15-18; and PwC (on behalf of Powerco), *Response to the Discussion of Asset Valuation in the Draft Decisions Document*, 19 August 2010, pp. 16-18.

75 Porter M.E., *On Competition*, Harvard Business Review Book Series, Boston, MA, 1998, p. 86.

> Every industry has an underlying structure, or set of fundamental and technical characteristics, that gives rise to these competitive forces.[76]

2.5.17 Similarly, the definition of workable competition in *ARA v Mutual Rental Cars (Auckland Airport) Ltd* and *Fisher and Paykel Ltd v Commerce Commission* also highlights that it is not just new entrants that can influence and constrain the behaviour of existing market participants.[77]

2.5.18 Consequently, despite the submissions of a number of regulated suppliers, in applying outcomes produced in workably competitive markets to regulated markets, there appears to be no strong grounds for limiting the analysis to scenarios where potential new entrants provide the only relevant constraint on the market power of incumbents. Whether existing competitors, substitute goods or services, or new entrants provide the limiting constraint on a particular incumbent supplier will depend on the characteristics of the industry in question.

2.6 Workable Competition and the Part 4 Purpose

Factors influencing competitive market outcomes

2.6.1 In light of the meaning of 'workable competition' discussed in the previous section, the Commission has considered what factors influence workably competitive market outcomes, and the extent to which those factors characterise regulated markets (and also the extent to which those factors are absent). In particular, the Commission has considered what 'outcomes consistent with those produced in workably competitive markets' means in the context of regulated markets.

2.6.2 A number of real-world markets cannot be considered workably competitive and may not consistently produce desirable outcomes for consumers in the long-term. Competition law and economic regulation exist in OECD countries for this very reason. Neither the economic nor legal descriptions of workable competition are so broad as to simply mean any form of observed real-world competition, or any apparent price rivalry between firms that might last for just a short period.

2.6.3 Workably competitive market outcomes represent a desired set of outcomes, derived from the relevant economic concepts and legal precedent, but they reflect only a subset of observed outcomes in real-world markets. Furthermore, given that Part 4 relates to markets with little or no competition (or those with little or no likelihood of a substantial increase in competition), not all workably competitive market outcomes are likely to be relevant to regulated markets. In determining which particular outcomes should be promoted under Part 4, the Commission is guided by the regulatory objectives in s 52A(1)(a)-(d), and the central purpose of promoting the long-term benefit of consumers.

2.6.4 An illustrative list of some of the more important factors likely to affect outcomes in real-world competitive markets, and therefore likely to affect the extent to which

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[76] ibid, p. 23.

[77] A recent survey of the Australasian case law on the meaning of "workable and effective competition" is provided in: Land J., Owens J., and Cejnar L., The meaning of "competition", *New Zealand Universities Law Review*, Vol. 24, June 2010, pp. 98-112. The survey similarly highlights that competitive constraints on market power can come from a range of sources.

those outcomes can be considered consistent with outcomes in workably competitive markets, include:[78]

- the extent of market power (which can itself be influenced by many of the following factors);
- the extent of 'economies of scale'—economies of scale arise when the per unit cost of producing goods or services decreases as the quantity produced of those goods or services increases;
- the extent of 'economies of scope'—economies of scope arise when it is less expensive to produce different types of goods or services together (such as in a single firm) rather than separately (such as in two distinct firms);
- the extent of 'sunk costs'—sunk costs occur when investments, once committed to a specific use, are 'irreversible', meaning that the assets employed are 'specialised assets' which have a much lower value in any alternative use (e.g. an electric power cable has limited alternative uses);[79]
- the extent to which investments are durable and/or indivisible (i.e. where asset capacity is not perfectly matched to demand because it would not be efficient to do so on a lifecycle basis, and/or the assets are only available in certain fixed sizes);
- the extent of contracting (and the terms and conditions of those contracts, including their duration)—in particular, contracts in workably competitive markets tend to manage risks efficiently, by allocating identified risks to the party considered best placed to manage them;
- the costs of replacing assets (which will be affected, at any point in time, by supply and demand conditions in input markets);
- the relative efficiencies of firms within a market; and
- the expectations of demand growth or decline.

2.6.5 To give an indication of how these factors affect whether a market can be considered workably competitive or not, consider a situation where the presence of economies of scale or scope can *potentially* give rise to market power. If there are sufficient influences acting on firms that constrain that market power—such as the presence of a number of similar incumbent firms ensuring that, among other things, the profits of all firms are at levels just sufficient to reward investment, efficiency and innovation—the market might well be workably competitive.

[78] For example: Yarrow et al., Asset Valuation Report, supra n 67, pp. 10-16.

[79] In particular, the costs of installing (i.e. trenching) the cable, which will be capitalised into the total value of the cable, are generally irreversible and as such can be considered 'sunk'. Even if the cable were to have some value in an alternative use—such as its scrap value from selling the salvaged copper or aluminium—this value will be net of the costs involved in decommissioning the cable from its existing use.

2.6.6 The actual outcomes in that workably competitive market will differ depending on some of the other factors above. For example, if the sunk costs are very significant, long-term contracting between suppliers and consumers might be more common, potentially causing market prices to be influenced as much by historical events and costs as by current and expected future market conditions (paragraph 2.6.25). On the other hand, if there is unconstrained market power in the first instance, it is unlikely that the market would be considered workably competitive at all.

Relevant characteristics of regulated markets

2.6.7 Many regulated markets are characterised by long-lived specialised infrastructural investments, which typically exhibit economies of scale and/or economies of scope to an extent that it is often more efficient for a single supplier to provide services (at least in a particular area). The term 'natural' monopoly refers to the situation where the most efficient market structure from a societal perspective would be for a single efficient firm to supply the market in question.

2.6.8 In addition, investments in infrastructural markets tend to be durable and indivisible (i.e. 'lumpy'), and have no alternative use other than in the supply of the current services (i.e. once capital is committed, such service- or market-specific investments are sunk). These factors create substantial barriers to entry and exit in the relevant market.[80]

2.6.9 A number of submissions from regulated suppliers have argued that the most relevant insights are those derived from "better functioning" workably competitive markets—in other words, those with minimal (if any) barriers to entry and exit.[81] These arguments are primarily made in the context of the asset valuation IM and are therefore discussed further in Chapter 4. However, as with the related comments above concerning the constraints on market power from hypothetical new entrants, it is worth highlighting a number of points that are relevant to those arguments in this chapter.

2.6.10 In the markets regulated under Part 4, barriers to entry and exit are likely to significantly limit any credible threat of competitive pressure from new entrant suppliers seeking to 'contest' the market.[82] The barriers created give rise to a level of market power that, left unchecked, could produce outcomes that are not consistent with those produced in workably competitive markets.

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80 Barriers to exit can occur when an incumbent supplier cannot transfer its assets out of supplying services in a particular market. Such barriers to exit will also deter new entrants as, following entry, entrants would expect the incumbent to remain in competition with them and engage in retaliatory price changes.

81 For example, PwC (on behalf of Christchurch International Airport Limited), *Response to the Discussion of Asset Valuation in the Draft Decisions Document*, 12 July, 2010, p. 3; and PwC (on behalf of Powerco), *Response to the Discussion of Asset Valuation in the Draft Decisions Document*, 19 August 2010, p. 11.

82 Contestability theory (Baumol et al., supra n 66) maintains that the presence of natural monopoly does not in itself indicate the existence of market power, if the threat of new entry constrains prices to those that would occur in a competitive market. A perfectly contestable market assumes that entry is not impeded by fear of retaliatory price changes, and similar to the legal concept of workable competition (paragraphs 2.5.11-2.5.13) it is assumed that hypothetical new entrants and incumbents are able to compete on completely 'symmetric' terms (i.e. on an 'equal footing'). Unlike workable competition, however, the economic model of perfect contestability requires there to be no barriers to entry or exit, which means that the incumbent firm would not make any sunk investments (ibid, pp. 349-350).

2.6.11 In workably competitive markets, incumbent suppliers may have an absolute cost advantage over new entrants where long-lived specialised assets are required to supply consumers with services, and the incumbents have already invested in such assets. Such an absolute cost advantage is less likely to arise where the costs of replacing assets are decreasing (such as due to technological change), but is more likely to arise in situations where the costs of replacing assets are increasing rapidly (e.g. faster than inflation). This would particularly be the case if entrants would need to replicate at least some of the incumbents' existing assets, and if the capacity of those assets is not yet fully utilised, which is more likely to occur where assets are indivisible (paragraph 2.6.4).

2.6.12 Although such an absolute cost advantage would, if present, create barriers to entry for new entrants, this does not necessarily mean the market is not workably competitive. There may be other constraints or influences on the market power of incumbents which ensure that they cannot choose their level of profits by charging more (paragraph 2.5.12), and which limit profits to levels just sufficient to reward investment efficiency and innovation (paragraph 2.5.7). For example, as noted above (paragraphs 2.5.15-2.5.16), incumbents may be constrained by the threat of substitute services, by the buying power of consumers (such as through explicit or implicit long-term contracting arrangements—refer paragraphs 2.6.22-2.6.25), or through rivalry amongst the existing incumbents themselves.

2.6.13 In a regulated market context, where an incumbent supplier uses long-lived specialised assets to supply services and, as a result, can supply the market over time at a lower cost than a hypothetical new entrant,[83] it would be inappropriate to use the characteristics of the higher cost hypothetical new entrant as a benchmark for setting or monitoring the prices of regulated suppliers. Doing so is not required to provide the incumbent supplier with the incentive to innovate, or to invest and operate efficiently, and could provide a windfall reward for the supplier with no consequential long-term benefits to consumers.

2.6.14 Thus arguments that rely on the threat of entry to constrain the behaviour of incumbents, would therefore amount to assuming away those characteristics which create the market power that warrants regulatory intervention in the first place—namely, the barriers to entry created by investments in lower cost long-lived specialised assets.

Outcomes consistent with workably competitive markets in the context of regulated markets

2.6.15 As noted above (paragraph 1.2.5), the economic regulation of markets with the characteristics discussed in the previous subsection is sometimes described as an attempt to 'mimic' the competitive market process, or to achieve the same outcomes as workable competition, if it were feasible.

[83] Where the market has natural monopoly characteristics, a hypothetical new entrant would generally be expected to be able to enter the market successfully only by constructing assets sufficient to meet the *entire* market demand. By contrast, the incumbent only needs to construct assets necessary to meet *incremental* demand. On the one hand, a hypothetical new entrant may benefit from greater economies of scale and scope than the incumbent, given that the incumbent's assets have grown incrementally in the past to meet demand, whereas a new entrant might have a better opportunity than the incumbent to optimally configure and size its assets to meet current and forecast market demand. On the other hand, if hypothetical new entrants do not have access to the same, and cheaper, sources of supply as the incumbent—i.e. the incumbent's long-lived specialised and already sunk assets—a hypothetical new entrant will not be able to achieve an 'equal footing' with the incumbent (paragraph 2.5.13).

2.6.16 The Commission's Experts have, however, highlighted the challenges for a regulatory body like the Commission in using workably competitive market outcomes as a guide for economic regulation, and for implementing Part 4 in particular. For instance, Professor Yarrow has stated that:

> It is immediately apparent that the Commission is faced with a tricky task. …
>
> [W]hilst the central policy concerns relate to monopolized markets, the stars by which the Commission is to steer are those that are associated with competitive markets.
>
> The task is not made easier by the fact that the term 'competitive market' can itself be applied to a range of economic environments that can differ substantially from one another. Competition means rivalry, and rivalry can take many different forms and can occur in many different contexts. Considerable work is therefore required, if, from the broad canvas of possible 'competitive outcomes', policy approaches are to be developed which can usefully guide future regulatory decisions, and which can provide the certainty in relation to regulatory rules, requirements and processes which is required by the legislation.[84]

2.6.17 Professor Yarrow went on to consider how the concept of workable (or effective) competition can guide the Commission in its task of determining IMs under Part 4.

> Speaking roughly, effective competition tends to involve:
>
> • Strong incentives: outcomes matter a lot to the competitors.
>
> • Reasonably well matched capabilities: each competitor believes that he/she has a reasonable shot at winning some of the prizes.
>
> • The principal dimension of rivalry is to better serve consumers/customers: the focus of competition is on winning the customer's business.
>
> Section 52A captures these notions in its references to incentives, benefit sharing and limited ability to extract excess profits, and in the use of the notion of *promotion* of certain *broadly defined* types of outcome (in contrast to the more bureaucratic-managerial idea of achieving very *specific* outcomes).[85]
>
> [R]egulatory economists are fond of saying that good regulation should seek to replicate the outcomes of competitive markets. Indeed, the Draft Reasons paper itself quotes one of the leading regulatory economists to this effect:
>
> "*2.6.21 Likewise, in his seminal text on economic regulation, Alfred Kahn states that: "the single most widely accepted rule for the governance of regulated industries is regulate them in such a way as to produce the same results as would be produced by effective competition, if it were feasible."*
>
> Most of us in the trade have said something similar at some point in our careers, but it is important to understand why it is wrong, so as to avoid future pitfalls when developing regulatory rules.
>
> In the Kahn statement, the killer words are "if it were feasible". If it were feasible, we wouldn't nowadays want to regulate. We regulate because it is not feasible, and because it is not feasible we don't know what results competition will produce, *except possibly in static economic conditions with perfect information*. Outside this narrow, and entirely

84 Yarrow, G., *Review of Input Methodologies (Airports Services) Draft Reasons Paper*, June 2010, pp. 3-4.

85 ibid, p. 4.

> imaginary, economic environment (perfect information), it is impossible to produce the "same results" (which are both unknown and unknowable) as effective competition; and within the narrow environment of perfect information competition will produce results that are inferior to regulated monopoly, and hence would not usually be defined as workable or effective.
>
> For reasons given above, this is not fatal to the exercise of using the notion of workable competition as a guide when developing regulatory rules. Wisely, the NZ legislation does not require the Commission to *achieve* the *same outcomes/results* as would be produced by competition, but rather to *promote* rather *broadly defined* outcomes (which, to better avoid ambiguity, by explicitly distinguishing them from specific, precise, measurable outcomes, might better have been described as *tendencies*) that are *consistent* with those produced in competitive markets. These tendencies are then exemplified in terms of incentives and benefit sharing, not in terms of specific, well defined outcomes/results.[86]

2.6.18 Significantly, the Part 4 Purpose does not require the Commission to *achieve* workably competitive outcomes. Rather, the Part 4 Purpose requires the Commission to *promote* outcomes *consistent with* workably competitive outcomes.

2.6.19 A number of submissions from regulated suppliers have argued that the reference to workably competitive markets in Part 4 implies a *single* set of outcomes. Specifically, some of these submissions argue the only relevant set of outcomes is that which is consistent with the 'long-run equilibrium' condition in the relevant market. These arguments are primarily made in the context of the asset valuation IM and are discussed in more detail in Chapter 4.[87]

2.6.20 At this stage of the Paper, however, it is worth highlighting the views of the Commission's Experts, who have addressed this issue as part of their Review of Submissions on the Draft Decisions Paper. Although a key performance criterion of workably competitive markets is that prices guide markets *toward* equilibrium:

> Long-run equilibrium in workably competitive markets is not just ill-defined, it need not even exist. … "The pursuer never actually catches the pursued, but he is always chasing after him."[88]

2.6.21 Unlike theoretical economic models of competition such as perfect competition and perfect contestability, workable competition does not come with a set of pre-defined conditions for long-run equilibrium that dictate what the associated set of outcomes must be. Consequently, the theoretical concepts of competition presented by some submitters have provided less useful guidance to the Commission than the concept of workable competition discussed above, which recognises there are a range of factors that can influence workably competitive market outcomes (paragraph 2.6.4).

2.6.22 To illustrate this point, the Commission for example agrees with its Experts who suggest that workably competitive markets involving long-term contracting can provide some useful insights when evaluating various options for setting IMs,

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86 ibid, pp. 5-6 (emphasis in original).

87 For example, PwC (on behalf of Christchurch International Airport Limited), Response to the Discussion of Asset Valuation in the Draft Decisions Document, 12 July, 2010, pp. 8-11 and 15-17; and PwC (on behalf of Powerco), Response to the Discussion of Asset Valuation in the Draft Decisions Document, 19 August 2010, pp. 8-11 and 15-17.

88 Refer: Yarrow, G., Cave, M., Pollitt, M., Small, J., *Review of Submissions on Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, November 2010 (Submissions Review), p. 26.

particularly in the case of the IM for asset valuation (refer Chapter 4). Although long-term contracts are by no means ubiquitous in many real-world markets, the Commission considers that long-term contracts can provide useful insights because:

- they tend to be more prevalent in workably competitive markets that have a number of similar characteristics to the markets regulated under Part 4; and
- irrespective of how prevalent such contracts are in actual markets, when they do occur they can be more likely to promote outcomes consistent with workably competitive markets, and to reflect the objectives in s 52A(1)(a) to (d), than would otherwise be the case—i.e. if no such contracts existed.[89]

2.6.23 Workably competitive outcomes can be promoted through contractual arrangements where consumers seek competitive tenders (including proposed price, quality and/or quantity terms) from potential suppliers prior to awarding a contract. Consumers are then able to select the supplier that will provide them with the best combination of expected outcomes over the duration of the contract, and then fix the winning combination of conditions in the contract. Where specialised long-lived assets are employed, such arrangements also protect suppliers against the risk that they will not be able to earn a return on those assets, thereby encouraging investment in new infrastructure.[90] As a result, one view is that "the market response to sunk cost and attendant risk is the long-term contract", and "judging by the large number of long-term contracts, sunk costs are a common phenomenon".[91]

2.6.24 Implicit long-term contracting can also occur when the economic relationship between suppliers and consumers is of an ongoing nature. Short-term profit-seeking behaviour by a supplier might damage its reputation with established customers, who might choose to switch their business to rivals considered to be more 'reliable' or 'less opportunistic' in their pricing.[92]

2.6.25 Once contract terms are fixed (or are implicit in an ongoing relationship), price and quality outcomes are then affected by 'historical events'. This is because the terms reflect the economic conditions and expectations at the time the explicit or implicit contract was struck, which may be significantly different from present conditions.[93]

2.6.26 It is important to note, however, that regulatory arrangements under Part 4 are not explicitly intended to promote the outcomes of long-term contracting in workably competitive markets. Rather, because such contracts can effectively promote outcomes that are consistent with workably competitive market outcomes, as well as with the regulatory objectives in s 52A(1)(a)-(d), they—along with other factors—have provided some useful guidance to the Commission in setting IMs in a manner consistent with the Part 4 Purpose.

89 Refer: Yarrow et al., Asset Valuation Report, supra n 37, pp. 27-29.

90 For example: Shuttleworth, G., *ERGEG Paper on Tariff Principles: A Comment*, Prepared for Gas Transport Services, NERA Economic Consulting, London, 23 January 2008, p. 38.

91 Spulber, D., *Regulation and Markets*, MIT Press, Cambridge, MA, 1989, s 1.3.3.

92 Yarrow et al., Asset Valuation Report, supra n 67, p. 19.

93 Yarrow et al., Asset Valuation Report, supra n 67, p. 21.

Key areas of performance relevant to workably competitive market outcomes under Part 4

2.6.27 Under Part 4, the regulatory objectives in s 52A(1)(a)-(d) provide guidance on the specific types of outcomes that are to be promoted through the application of IMs to information disclosure regulation.

2.6.28 Paragraphs (a)-(d) of s 52A(1) specifically refer to the following areas of performance, which are also reflected in the performance criteria that characterise workable competition (paragraph 2.5.7 above).

- *Investment* (s 52A(1)(a)). In workably competitive markets, there is pressure on firms to undertake investments at an efficient level and at the socially optimal time. Superior investment decisions are rewarded by greater than normal returns (i.e. normal profits) in the short to medium term, and it is this prospect of earning above-normal returns for a period that provides incentives for efficient investment (and efficiency more generally). If a regulated firm does not expect to make at least a normal return on its efficient incremental investments going forward, it would be unable to maintain the quality of its services and would have no incentive to invest further in order to meet the growth in consumer demand.

- *Innovation* (s 52A(1)(a)). The most significant benefits of workably competitive markets to consumers over the long term are often considered to be incentives for dynamic efficiency—the discovery and use of new information that leads to the development of new goods and services, and to new, more efficient techniques of production. However, dynamic efficiency is not readily evaluated in advance, because its most important property is that it will lead to economically valuable information which is not known when *ex ante* assessments need to be made.[94] Consequently, although setting out clear regulatory rules and processes in advance promotes certainty, thereby providing a regulatory environment conducive to innovation (and to investment), it is a challenge for regulators to include specific regulatory provisions that directly promote innovation. In particular, where innovations improve quality rather than reduce costs, it is very difficult to promote such an outcome in a regulated market, due in part to the problems associated with measuring quality and, more significantly, in linking these to innovations.

- *Prices and quality* (s 52A(1)(b) and (c)). Price and quality are inextricably linked because they are the two key aspects of goods and services that are often of most interest to consumers. In workably competitive markets, consumer demand is responsive to changes in price and quality. Prices provide appropriate signals for allocating resources efficiently within the economy, and provide a level of profits just sufficient to reward investment, innovation and efficiency. In the case of regulated suppliers, ensuring prices result in revenues that provide a normal rate of return is only one of the necessary conditions for allocative efficiency. Allocative efficiency is not only dependent on overall revenue, but is also dependent on individual price levels and structure, because consumers respond to the prices that they face, rather than to the revenues that firms make. Similarly, service quality is more

[94] Yarrow et al., Submissions Review, supra n 88, p. 19.

important to consumers at an individual service level than on a whole-of-business basis.

- *Profits* (s 52A(1)(d)). In workably competitive markets, profits are expected to be just sufficient to reward investment, innovation and efficiency. Superior performers, however, are more likely to be rewarded by receiving returns greater than a normal return, at least for the short to medium term until their competitors catch up. Over the lifetime of its assets, a typically efficient firm in a workably competitive market would expect *ex ante* to earn at least a normal rate of return (i.e. its risk-adjusted cost of capital). Because allowing a firm the expectation of being able to earn normal returns over the lifetime of an investment provides it with the chance to preserve its 'financial capital' in real (not nominal) terms, such an outcome is often referred to as 'financial capital maintenance' or 'FCM'.[95] This is comparable to expectations in competitive markets that are conducive to promoting investment.[96] It is not, however, possible to guarantee that regulated suppliers earn a normal return over the life of assets, because any analysis used to monitor profitability, or to set regulated prices, will typically be conducted part way through the lifetimes of the assets utilised in supplying regulated services. Some information about past performance may not be known. Further, the allocation of risks between suppliers and consumers will usually mean that, although suppliers might have expected to earn a normal return *ex ante*, such a return is not earned *ex post*.

- *Efficiency* (s 52A(1)(b)). As noted above (paragraphs 2.5.8-2.5.10), the promotion of efficiency is a key aspect of workably competitive markets, and efficiency is generally considered to comprise three dimensions. Productive efficiency relates to the costs of production. Allocative efficiency is primarily about efficient price and quality outcomes, and dynamic efficiency is related to innovation, investment and profitability over time. In workably competitive markets, efficiency gains are generally shared with consumers through lower prices and better service quality over time. As in workably competitive markets, regulated suppliers will face incentives to improve efficiency where they are able to keep some of the benefits of efficiency gains.

2.6.29 Requiring information on these areas of performance to be disclosed by Airports will contribute to the purpose of information disclosure regulation in s 53A (paragraph 2.3.1 above). Under s 53B(2), the Commission:

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95 For example: "In defining the costs of depreciation and allowed return, regulators should adopt rules that meet the accounting principle of 'Financial Capital Maintenance' (FCM), i.e. rules which allow investors to maintain the real value of their capital. This principle is a necessary condition for total cost recovery – meaning for efficient investment and for the prevention of monopoly profits. … FCM therefore provides the standard by which investors effectively measure whether the regulatory regime is allowing them to recover their costs including a rate of return comparable with that offered by other companies and sectors" (Shuttleworth, G., supra n 90, pp. ii and 13). The concept of FCM underpins the decisions of regulators in many OECD countries (e.g. refer: Diewert E., Lawrence D. and Fallon J., *Asset Valuation and Productivity–Based Regulation Taking Account of Sunk Costs and Financial Capital Maintenance*, Report to the Commerce Commission, Economic Insights, Canberra, 11 June 2009, pp. 39-47).

96 For example: "**No commercial competitors would come into an industry if they did not expect to be able to recover the decline in real values of their assets, as well as earn a normal profit (the opportunity cost of capital)**. They would measure their return on investment after recovery of funds sufficient to maintain the real value of the **financial capital** they had invested" (HM Treasury Advisory Group, *Accounting for Economic Costs and Changing Prices*: A report to HM Treasury by an Advisory Group, Vol. 1, HMSO, London, 1986, paragraph 19 (emphasis in original)).

- may monitor and analyse all information disclosed in accordance with the information disclosure requirements; and

- must, as soon as practicable after any information is publicly disclosed, publish a summary and analysis of that information for the purpose of promoting greater understanding of the performance of individual regulated suppliers, their relative performance, and the changes in performance over time.

2.6.30 A number of submissions from regulated suppliers have argued that s 52A(1)(a) is the most important limb of s 52A, and therefore the promotion of investment (and innovation) should be the Commission's primary focus in determining IMs. In particular, NZAA points, for example, to comments made by the then Minister of Commerce when discussing the purpose statement in s 52A that:

> Starting with the incentives to innovate and invest is really sending a signal about how important it is not to forget that future needs are just as important when we are looking at a non-competitive market….I think we have the order right, and that sends a very good signal.[97]

2.6.31 Nevertheless, in reporting back on the Bill, the Select Committee considered similar arguments that "the primary objective in the purpose statement should be investment", and concluded that:

> Although we agree that incentives to invest are important, we consider they need to be balanced against the need to protect consumers from excessive prices.[98]

2.6.32 A balancing between the limbs in paragraphs (a)-(d) of the Part 4 Purpose is clearly required. Ensuring that regulated suppliers have the opportunity to receive at least a normal return on their new investments provides the incentives for them to make those investments in the first place. Where those investments are made at an efficient level and time, and are employed to provide services at the appropriate quality, then consumers will benefit over the long term. On the other hand, it is not usually in consumers' interests to face prices which recover costs which have never been incurred, or the costs of investments that have been made well in advance of being needed. The main reason economic regulation is required is to counter the market power of firms (i.e. the ability of firms that are not faced with competition or the threat of competition to charge excessive prices and/or reduce quality—paragraph 1.2.15).

2.6.33 It is not particularly significant how prevalent the desired workably competitive market outcomes might be in real-world markets. Rather, the more important consideration is the extent to which promoting those outcomes is consistent with the Part 4 Purpose. In some cases, there may be a number of different, but possibly mutually exclusive, workably competitive market outcomes that might be consistent with the regulatory objectives in s 52A(1)(a) to (d), and that provide some long-term benefits to consumers. Where this is the case, the Commission has weighed up the alternatives in terms of which of the outcomes consistent with those produced in

97 ibid, p. 72.

98 Commerce Amendment Bill (201-2), Government Bill, as reported from the Commerce Committee, Wellington, 28 July 2008, p. 2.

workably competitive markets (taking into account the relevant characteristics of the regulated market) is likely to achieve those objectives better, thereby promoting greater benefits for consumers in the long-term.

2.7 Role of Information Disclosure in Promoting the Part 4 Purpose

2.7.1 Generally speaking, a range of comparative information is available to participants in workably competitive markets. Consumers and suppliers can compare prices and the quality of goods and services. The ability to make these comparisons is an important enabler of competition. In markets with only a single supplier, economic regulation based on information disclosure can partly compensate for the absence of the information revelation process associated with rivalry between firms in workably competitive markets.

2.7.2 Information disclosure regulation under Part 4 of the Act is, in the first instance, intended to focus on ensuring that interested parties are able to assess whether the Part 4 Purpose is being met (paragraph 2.3.1); in particular, by helping to reflect the extent to which the objectives in s 52A(a) to (d) are being achieved.

2.7.3 Given the Part 4 Purpose, it is clear that the supply of regulated services is likely to be, and is intended to be, influenced by the relevant type of regulation. In this respect, information disclosure regulation not only contributes to the specific purpose set out in s 53A, but it can also promote the s 52A purpose by improving the distribution of existing information between regulated suppliers and interested persons, as well as in some cases expanding the information available to regulated suppliers themselves.

2.7.4 NZAA argue that the "draft methodologies appear to be designed to directly influence airports to achieve the Commission's view of acceptable performance under the Part 4 purpose statement".[99] However, as BARNZ has submitted, "without binding and specific input methodologies interested persons will not be able to identify whether a firm is earning excessive profits and the degree to which the purpose of Part 4 is being met".[100]

2.7.5 Placing information and analysis about the regulated suppliers into the public domain can also provide some of the incentives that are consistent with those in workably competitive markets—for example, by providing:

- sufficient information to consumers and other interested parties, including on the extent to which efficiency gains have been shared with consumers through lower prices or other means (consistent with s 52A(1)(c)). Doing so is likely to enhance consumers' countervailing market power, which may result in excessive profits being limited (consistent with s 52A(1)(d)),[101] and may

[99] ibid, p. 13.

[100] BARNZ, *Cross-submission on Commerce Commission Input Methodologies (Airport Services) Draft Determination and Draft Reasons Paper*, 3 August 2010, p. 1.

[101] In economics, countervailing power is often described as purchasers' ability to exert a substantial influence on the price, quality or terms of supply of the relevant good or service. A purchaser is able to credibly exert such countervailing power if it is large in relation to suppliers, well informed about alternative sources of supply, readily able to switch from one supplier to another, and able to foster new entry. Consequently, in workably competitive markets, consumers can themselves act as a constraint on market power (paragraphs 2.5.15-2.5.17 above).

facilitate consumer engagement with regulated suppliers about the desired level of service quality (consistent with s 52A(1)(b));

- better information to the owners of regulated suppliers in some cases, for example where information disclosure allows comparisons with suppliers in other geographic areas, this may facilitate more effective governance and helping them identify opportunities for value-enhancing trade in assets used to supply regulated services (i.e. consolidation of businesses), management contracting and so on, thereby promoting incentives for improved efficiency, including efficient investment and innovation (consistent with s 52A(1)(a) and (b)); and

- potentially increased incentives for the management of regulated suppliers to improve relative and absolute performance, both through the ability of interested parties to make comparisons and the public nature of the performance measures, similarly promoting incentives for improved efficiency, consistent with s 52A(1)(a) and (b).

2.8 Relationship of IMs to Information Disclosure Regulation

Relevance of IMs listed in s 52T

2.8.1 In the context of information disclosure regulation, the matters covered by IMs in s 52T(1)(a)—with the exception of some matters listed in s 52T(1)(a)(iii)—are most relevant to the disclosure of financial performance measures, as well as the financial statements and other information that supports those measures (s 53C(2)). In this respect, the key financial performance measure is '*return on investment*' (ROI), which is dependent on actual *revenue* received from the supply of regulated services (paragraphs 2.8.7-2.8.11).

2.8.2 The matters covered by IMs in s 52T(1)(b)—i.e. pricing methodologies—and in parts of s 52T(1)(a)(iii), relate to the way in which prices for individual services, classes of services, or for different customer groups are set once the overall level of revenue has been determined (as is discussed at paragraphs 2.8.18-2.8.20 below).

2.8.3 The 'rules and processes' referred to in s 52T(1)(c) are not applicable to information disclosure regulation as these relate solely to how price-quality regulation operates.

Key components of revenue

2.8.4 The matters referred to in s 52T(1)(a) include a number of cost components that a regulated supplier would be expected to recover in order to receive a normal return over time, consistent with a workably competitive market, namely:

- non-capital costs (e.g. operating expenditure and tax); and

- capital costs, comprising:

    - a 'return on' efficiently invested capital recognised for regulatory purposes, termed the regulatory asset base (RAB)—the value of which is updated each year for depreciation and efficient capital expenditure—multiplied by the cost of capital); and

- a 'return of' efficiently invested capital (i.e. by allowing recovery of the depreciation in the value of the RAB).[102]

2.8.5 A general expression for the revenue expected to be recovered by a regulated supplier can be represented as follows:

Regulatory Asset Base × Cost of Capital + Depreciation + Operating Expenditure + Tax

– Revaluations – Other income

= Revenue

2.8.6 The value of the RAB at the end of each year is generally determined—or 'rolled forward'—as follows:[103]

RAB (end of year) = RAB (beginning of year) – Depreciation + Revaluations + Capital Additions – Capital Disposals

Return on Investment and IMs under information disclosure

2.8.7 Measuring returns is an important aspect of assessing whether excessive profits are being limited, and whether financial capital is being maintained, and therefore assists interested parties to assess whether the Part 4 Purpose is being met.

2.8.8 On an annual basis, and in simplified form, the ROI for that part of a regulated supplier providing a particular type of regulated service can be calculated as follows.

$$ROI = \frac{\text{Revenue - Depreciation - Opex - Tax + Revaluations}}{\text{Regulatory Asset Base}}$$

2.8.9 The actual specification of the ROI will be in the relevant information disclosure determination (made under s 52P). Under information disclosure regulation, asset values, capital additions, and operating expenditure (i.e. opex) all need to be appropriately allocated to the particular type of regulated service to which they relate. If the ROI is calculated in this way it may be compared to the cost of capital applicable to supplying the type of regulated service in question, provided both the ROI and the cost of capital are calculated on a consistent basis (e.g. both in post-tax terms).[104]

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102 As is discussed in the Chapter 2 of the EDB/GPB Reasons Paper, the matters in s 52T(1)(a) also relate to a number of the key cost components generally included in the 'building blocks approach' to determining maximum regulated revenue (i.e. 'building blocks allowable revenue') under price-quality regulation.

103 For example: ACCC, *Statement of principles for the regulation of electricity transmission revenues – background paper*, 2004, p. 21.

104 Economic returns comparable to the cost of capital differ from publicly available assessments of accounting profitability, such as those found in statutory financial accounts. Any annual accounting-based estimate of returns such as the ROI can only ever be an approximation to measures of the economic returns of an investment over time, such as the internal rate of return (IRR). Any analysis of the profitability of regulated suppliers will almost inevitably be over a time period shorter than the economic lifetimes of the assets involved, and will have to primarily rely on accounting-based rather than economic-based data (particularly in respect of asset values). As a result, the differences between accounting-based measures of profitability and the economic IRR will differ significantly where there are substantial fluctuations in the underlying asset values during the period of assessment—especially if that period is only a single year. Consequently, by being able to take a longer term view, the Commission's published summary and analysis of disclosed information under s 53B(2) will play an important role. The Commission will be able to analyse the changes in disclosed ROIs over time, in light of changes in relevant disclosures relating to efficiency, in order to assist

2.8.10 Where the ROI is consistently higher than the cost of capital, this may imply that Airports are not appropriately limited in their ability to extract excessive profits (i.e. s 52A(1)(d)). The ROI equation is effectively the same as the equation for revenue above (paragraph 2.8.5) after that equation is rearranged in terms of the cost of capital, and then expressed in terms of the ROI (given the ROI and the cost of capital are intended to be comparable). Consequently, given that they are key 'inputs' to the ROI, the IMs discussed in Chapters 3-5—namely IMs for cost allocation, asset valuation (including depreciation and revaluations), and tax—are all relevant to the information required to be disclosed by the Airports under the ID Determination.

2.8.11 Under s 53F(1)(b), regulated suppliers that are subject to only information disclosure regulation, such as Airports, do not have to apply any methodologies for evaluating or determining the cost of capital set in accordance with s 52T(1)(a)(i). The reason for this provision is evident from the ROI formula above, in which the cost of capital does not appear. The cost of capital is only relevant in this context for comparative purposes. Consequently, under s 53F(2), the Commission may use methodologies for evaluating or determining the cost of capital to monitor and analyse disclosed information under s 53B(2), but doing so is not mandatory.

2.8.12 Although Airports are not required to apply an IM in relation to the cost of capital, the Commission considers that interested parties would not have sufficient information to assess whether Airports may be earning excessive profits if the Commission did not set a cost of capital IM. The Commission also considers it will promote certainty for suppliers and consumers if the cost of capital is set out in an IM. The cost of capital IM for Airports is discussed in Chapter 6.

Revaluation gains and losses

2.8.13 A key term in the equations above for revenue, RAB roll-forward and ROI, is 'Revaluations'. As noted above (paragraph 2.6.28), FCM requires that regulated suppliers are compensated for the impact of economy-wide inflation over time. Where a nominal cost of capital is used, the value of any existing asset in the RAB does not need to be revalued to reflect changes in economy-wide inflation for the supplier's financial capital to be maintained in real terms. Alternatively, however, regulated suppliers can also be compensated for inflation by applying a cost of capital calculated in real terms and by indexing the value of the RAB by the CPI, thereby revaluing that RAB. The two approaches are equivalent in present value terms when assessed over the lifetime of the assets.[105]

interested parties in assessing whether excessive profits are being limited, and whether financial capital is being maintained.

[105] For example: The Treasury, *Estimating the Cost of Capital for Crown Entities and State-Owned Enterprises*, Wellington, October 1997, pp. 67-72. 'Present value' is the value on a given date of a future payment or series of future payments, 'discounted' to reflect the time value of money. The time value of money is based on the premise that an investor prefers to receive a payment of a fixed amount of money today, rather than an equal amount in the future, all else being equal. This is because, if one received the payment today, one could then earn a return on the money until that specified future date. Hence, the present value of a future cost/benefit is the value of that cost/benefit discounted back to the present, by taking into account the compounded cost of capital. For example, if the cost of capital is 10%, the present value of receiving $100 in one year's time is $90.91 (found by dividing the $100 by 100%+10%). In two years' time, the present value of receiving $100 is $82.64 (found by dividing the $90.91 amount by 100%+10%).

2.8.14 Comparing ROIs based on a RAB value indexed to the CPI, with a nominal cost of capital, would double-count the effect of inflation. Hence, if a nominal cost of capital is applied to an inflated/indexed asset base, any revaluations of the asset, such as an upward revaluation for inflation, must be treated as income in the ROI for profits to be monitored effectively.[106]

2.8.15 The same principle applies, however, even where a revaluation occurs for reasons other than economy-wide inflation, and where the extent of the revaluation differs from the change in the CPI.[107] Because the use of a nominal WACC with a non-revalued asset base is consistent with FCM, any revaluation gain must be treated as income in the ROI.[108]

2.8.16 Doing so is consistent with a workably competitive market, in which returns are provided by both income and growth (i.e. capital gains). Capital gains themselves reflect an expectation of higher cash flows in the future, either through expected cash flows from revenue generated by employing assets to supply services, and/or through the sale of those assets.

2.8.17 Including the appropriate recognition of revaluations (i.e. both gains and losses) in disclosed ROIs will ensure that information disclosure regulation assists interested persons to assess whether financial capital is being maintained, consistent with s 52A(1)(a), and whether excessive profits are being limited, consistent with s 52A(1)(d).

Pricing methodologies and related cost allocation methodologies

2.8.18 Some of the matters set out in s 52T(1)(a)(iii)—such as those relating to the allocation of common costs between consumer classes and geographic areas—relate to the allocation of costs between services of the same type. These matters are applicable to setting *prices* for that type of regulated service, rather than the overall *revenue* that can be recovered in respect of that type of service. Therefore, these matters in s 52T(1)(a)(iii) are relevant to the IMs to be set for pricing methodologies under s 52T(1)(b).[109]

2.8.19 Under s 53F(1)(a), regulated suppliers that are subject only to information disclosure regulation, such as Airports, do not have to apply IMs for pricing methodologies. However, the Commission may use IMs for pricing methodologies to monitor and analyse information, and regulated suppliers may still be required to disclose information about the pricing methodologies that they do in fact use.

2.8.20 The Commission considers that it is not necessary to have an IM for Airports' pricing methodologies for the purpose of information disclosure to be met.

Because FCM implies that the present value of revenues equals the present value of costs, it is often referred to by the term 'NPV=0', which recognises that if this equivalence holds, then the *net* present value (NPV) of the revenues less the costs is zero. The term NPV=0 is used throughout earlier consultation documents and submissions on Part 4.

106 For example: IPART, *Weighted Average Cost of Capital*, Discussion Paper DP 56, Sydney, August 2002, p. 6.

107 Shuttleworth, supra n 90, pp. ii and 13-15.

108 For example: NERA, *Comment on the Commission's Valuation Choice Discussion Paper, Report prepared for Orion, Sydney*, February 2005, p. 9.

109 This is consistent with the definition of pricing methodologies in s 52C, which includes methodologies for setting different prices for different customer groups.

Interested parties can likely undertake their own analysis of the efficiency of prices, as pricing of specified airport services is not complex (relative to the pricing structures of electricity and gas networks). Airports will be required to disclose information on their price setting practices as part of the information disclosure requirements.

Relevance of particular IMs to the regulatory objectives

2.8.21 Relevant IMs in s 52T(1)(a) provide a number of the key 'inputs' to information disclosure regulation and combine with each other in a s 52P determination to determine what is to be disclosed as ROIs. Therefore, as noted above (paragraph 2.4.13), it is in combination with each other, and with other requirements in a s 52P determination, that IMs provide the strongest incentives for regulated suppliers to act in a manner consistent with the s 52A purpose statement.

2.8.22 Nevertheless, although each relevant IM is only part of a wider package, some types of IMs are more relevant to certain regulatory objectives in s 52A(1)(a) to (d) than to others. In particular:

- the way that costs are allocated between regulated and/or unregulated services has an important bearing on monitoring how efficiency gains made in the supply of regulated services are shared with consumers over time, which is relevant to s 52A(1)(c), as well as on the extent to which investment by regulated suppliers in the provision of other services is unduly deterred (i.e. s 52T(3) and s 52A(1)(a))[110]—refer Chapter 3;

- the way that the value of the RAB is rolled forward affects the disclosure of how regulated suppliers recover the investments that they make, which in turn affects the incentives to invest that they face, consistent with s 52A(1)(a) and (b) —refer Chapter 4;

- the level of the 'initial' value of RAB (i.e. at the beginning of the Part 4 regime), is far less significant to incentives for investment or efficiency than the way that the value of the RAB is rolled forward, but it has a notable bearing on monitoring whether regulated suppliers are limited in their ability to extract excessive profits from consumers, which is relevant to s 52A(1)(d) —refer Chapter 4;

- the treatment of tax also has an impact on monitoring whether regulated suppliers are limited in their ability to extract excessive profits from consumers, which is relevant to s 52A(1)(d) —refer Chapter 5; and

- the cost of capital will have an impact on monitoring whether financial capital is being maintained and whether regulated suppliers are limited in their ability to extract excessive profits, which is relevant to both s 52A(1)(a) and (d)— refer Chapter 6.

[110] "Other services" refers to "other goods or services", and "unregulated services" refers to "unregulated goods or services", for the purposes of this Paper.

2.9 Other Statutory Considerations

2.9.1 Airport services are defined under Part 4 by reference to the definitions of the corresponding activities in the AAA. The AAA sets out statutory obligations on, and powers of, Airports, including in relation to setting charges for airport services. The Commission has had regard to the Airports' obligations and powers under the AAA in setting IMs under Part 4, though it is notable that s 4A of the AAA, which provides for charges for the use of airport services, does not limit the application of Part 4 regulation. Air NZ has submitted that "the effect of section 4A(4) is to provide that the application of Part 4 regulation is not limited by section 4A's provision for airport pricing….The Commission is required only to take the AAA into account, and it has fulfilled that obligation".[111]

2.9.2 Some submissions on behalf of Airports have argued that the Commission is "strongly at risk of" and "dangerously close to" setting de facto price control of airport services.[112] This is incorrect. The Commission is not attempting to implement de facto price control of airport services. Airports are able to charge as they see fit. Obviously however, as noted above, the new Part 4 regime may, among other things, help to create incentives for Airports to ensure that the returns they generate are not excessive (paragraphs 1.2.22 - 1.2.23 and Section 2.7).

2.9.3 The Commission has also had regard to the AAA to the extent it is relevant to a specific IM and in particular, in identifying the type of information that the Commission considers should be disclosed by Airports. This information is set out in full in the Commerce Act (Specified Airport Services Information Disclosure) Determination 2010, and the reasons why that information is necessary are set out in the Information Disclosure (Airport Services) Reasons Paper.[113]

[111] Air NZ, *Cross-submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 3 August 2010, pp. 51.

[112] CIAL, *Submission on Draft Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, pp. 10, 16.

[113] Commerce Commission, *Commerce Act (Specified Airport Services Information Disclosure) Determination*, 22 December 2010; Commerce Commission, *Information Disclosure (Airport Services) Reasons Paper*, 22 December 2010.

CHAPTER 3: COST ALLOCATION

3.1 Introduction

IM for allocating costs

3.1.1 Section 52T(1)(a)(iii) of the Act requires that the IMs relating to a particular good or service must include, to the extent applicable to the type of regulation under consideration, an IM for the "allocation of common costs, including between activities, businesses, consumer classes and geographic areas".

3.1.2 The term 'common costs' is undefined in the Act and has a number of possible meanings (including a specific meaning applied by some economists). It can also be measured in a number of ways, as is explained later in this chapter. The Commission has therefore used the more general term 'shared costs' in most contexts, when referring to costs that are common to two or more types of services.

3.1.3 This chapter describes the IM for the allocation of airport costs between each of the three regulated activities, and between regulated and unregulated activities, undertaken by Airports. It also explains how the IM allocates common costs as required by s 52T(1)(a)(iii) and is appropriate under Part 4.

3.1.4 The Airports undertake three types of activities that are regulated under Part 4, i.e. aircraft and freight activities, airfield activities, and specified passenger terminal activities—collectively 'regulated activities' or 'regulated services' (s 56A(1)). They also undertake unregulated activities (e.g. retail activities and car parking) which are co-located with specified activities. [114]

3.1.5 The provision of different types of services by an Airport gives rise to the sharing of operating costs (e.g. power bills for lighting and air-conditioning in shared areas) and capital costs through the sharing of assets (e.g. circulation space within terminals, air conditioners).[115] The cost allocation IM covers the allocation of shared operating costs, and shared asset values (which drive capital costs). Setting an IM that allocates asset values that are shared will therefore also allocate capital costs.

3.1.6 As explained in this chapter, the total cost of supplying two or more types of services in combination is often lower than if the same services were provided independently. The resulting cost reductions represent efficiency gains associated with joint supply. To the extent that Airports benefit from these efficiency gains (e.g. through higher profitability over the short- to medium-term), they have an incentive to provide multiple services.

Application of the cost allocation IM

3.1.7 Airports are only subject to information disclosure regulation and hence the cost allocation IM only applies to the way in which costs are reported as part of

[114] Section 52T(1)(a)(iii) refers to allocating costs between 'activities' and specified airport services are, defined in terms of 'activities'. However, when referring to the allocation of costs between regulated and unregulated services or activities in this chapter, the terms services and activities are used interchangeably.

[115] Capital costs include both a return of the value of assets (i.e. depreciation) and a return on the value of assets (i.e. a return on investment).

information disclosure. The cost allocation IM is not applicable to the setting of prices. In setting their prices, Airports are therefore entitled to make their own decisions (consistent with the AAA) as regards the proportion of shared costs that should be recovered from consumers of the regulated services.

3.1.8 The cost allocation IM provides the rules that Airports must adhere to when disclosing their shared cost data (and other financial information that relies on cost data). These rules are important since the allocation of shared costs can have a significant effect on financial results as represented in regulatory accounts provided under an information disclosure regime, which in turn will affect assessments made by interested persons. Accordingly, the cost allocation methodology standardises the way the allocations of shared costs are reported, which in turn facilitates consistent assessment of performance over time and between regulated suppliers.

Overview of the IM and structure of this chapter

3.1.9 Table 3.1 provides an overview of the cost allocation IM. Its key components are discussed in this chapter and Appendix B.

Table 3.1 Overview of Cost Allocation IM

Approach in IM	Where discussed
If a cost is solely and wholly caused by a single activity the cost is 'directly attributable' and is allocated solely to that activity.	Section 3.3
Airports must apply the accounting-based allocation approach (ABAA) to allocate costs that are 'not directly attributable' between each of the three regulated activities, and between regulated and unregulated activities they undertake.	Section 3.3
Where possible, cost and asset allocators used to allocate costs to regulated activities must be based on current 'causal relationships'. Where this is not possible, proxy allocators must be used instead.	Section 3.3 Appendix B
'Causal relationships' are defined in relation to: • asset values, as a circumstance in which a factor influences the utilisation of an asset during the 18 month period terminating on the last day of the disclosure year in respect of which the allocation is carried out; and • operating costs, as a circumstance in which a cost driver leads to an operating cost being incurred during the 18 month period terminating on the last day of the disclosure year in respect of which the allocation is carried out.	Appendix B

3.1.10 In addition to applying the cost allocation IM, Airports need to disclose how they allocate costs (see Section 3.3 and Appendix B). Airports may also need to provide additional supporting information directly to the Commission.

3.1.11 The remainder of this chapter is structured as follows:

- Section 3.2 discusses the:
  - statutory considerations the Commission has had regard to in setting the IM;
  - economic and accounting cost concepts that the Commission considers need to be defined in order to set the IM;
  - relevant airport sector context; and
  - insights from workably competitive markets relevant to the IM, particularly in relation to incentives for efficiency, sharing of efficiency gains and incentives for investment.
- Section 3.3 sets out how costs are required to be allocated under the IM.

3.1.12 Further supporting technical information on the components and the application of the IM is provided in Appendix B.

3.2 Key Considerations in Determining the IM for Cost Allocation

Statutory requirements

3.2.1 The Commission has considered the Part 4 Purpose and examined the insights the phrase 'promoting outcomes consistent with outcomes produced in workably competitive markets' provides for the cost allocation IM for Airports. It has then considered whether, and if so how, each of the regulatory objectives in s 52A(1)(a)-(d) are relevant to allocating costs between different types of regulated activities, and between regulated activities and unregulated activities (in aggregate), and whether they provide any practical constraints on the form of the cost allocation methodology to be used as part of this IM.

3.2.2 In particular, the Commission has considered:

- Section 52A(1)(b), which requires that incentives for suppliers to improve efficiency must be promoted. The way in which these incentives arise is discussed in paragraphs 3.2.36 and 3.2.37;[116]
- Section 52A(1)(c), which requires that outcomes promoted must ensure that suppliers share the benefits of efficiency gains in the supply of regulated services with consumers of those services, just as efficiency gains are shared in workably competitive markets between suppliers and consumers.[117] The

[116] The existence of these incentives gives rise to efficiencies to be shared (s 52A(1)(c)) and incentives for investment (s 52A(1)(a)).

[117] The Commission's focus is on sharing efficiency gains made in the supply of regulated services. Some of these efficiency gains arise as a result of providing regulated and unregulated services in combination. The Commission is not concerned with efficiency gains arising solely in the supply of unregulated services.

sharing of the benefits of efficiency gains is discussed in paragraphs 3.2.38 to 3.2.48;[118] and

- Section 52T(3), which requires that the cost allocation IM must not unduly deter investment by a supplier of regulated services in the provision of other services (whether regulated or unregulated). Paragraphs 3.2.49 to 3.2.53 assess relevant outcomes in workably competitive markets, discuss the meaning of 'unduly' deterring investment and set out the relevant implications for setting the IM.[119]

3.2.3 Since this IM applies only under information disclosure regulation, these considerations relate only to the way in which interested persons can assess whether the Part 4 Purpose is being met.

3.2.4 As noted in the introduction to this chapter, the term 'common costs' is undefined in the Act, but can be interpreted and measured in different ways. The following section (paragraphs 3.2.7 to 3.2.20) explains the key economic and accounting concepts relevant to the reference to 'common costs' in s 52T(1)(a). It also explains why setting a cost allocation IM that allocates all costs associated with the supply of regulated services will implicitly allocate 'common costs' as required under s 52T(1)(a), irrespective of how the term is defined.

3.2.5 Following this, paragraphs 3.2.21 to 3.2.35 explain some important economic characteristics of the services provided by Airports relevant to the IM. They also discuss the relevance of demand complementarities and the AAA consultation process to the level of costs actually allocated between different services supplied by Airports.

3.2.6 Finally, paragraphs 3.2.36 to 3.2.58 set out the issues relating to cost allocation outcomes currently achieved in the airport sector and the implications of these for setting the IM under Part 4.

Economic and accounting cost concepts relevant to common costs and efficiency gains

Efficiency gains from economies of scope

3.2.7 For a firm that provides a single type of service, all of its costs (i.e. operating costs and capital costs) are incurred in providing that service. In a workably competitive market, firms can make efficiency gains by offering one or more additional services which:

- utilise some or all of the firm's existing assets and/or operations that are already utilised in supplying the original type of service; and/or

- can optimise the size of indivisible assets that can be shared.

3.2.8 For example, a hypothetical new airport operator faces the following choice in constructing a new terminal:

[118] The existence of this sharing is also consistent with limiting suppliers' ability to extract excessive profits under s52A(1)(d).

[119] The requirement not to unduly deter investments is also consistent with s 52A(1)(a).

- constructing an integrated terminal building that provides both regulated services and unregulated services, the latter of which (e.g. retail services) tend to be co-located with, but are not essential for, the provision of regulated services; or

- constructing a separate terminal building for regulated services and a separate building for retail services.

3.2.9 The construction of a single integrated building gives rise to shared costs (e.g. walls, floors and ceilings). By providing the two services in combination, an Airport may achieve efficiency gains due to economies of scope. These arise where multiple services (or subsets of services) can be provided at a lower total cost by the supplier (in this example, in the same building) than if they were provided independently (in this example, in separate buildings).

3.2.10 In economic terms, these efficiency gains from economies of scope are sometimes referred to as the 'common cost' associated with the supply of a given combination of different types of service. Economists sometimes refer to 'common costs' as all costs that are not incremental costs.[120] In comparing a scenario where two types of services are supplied together with a scenario where the two types of services are supplied separately, the 'common costs' (or efficiency gains) are the difference in costs in moving from the more expensive supply scenario to the more efficient one. This specific meaning of 'common cost' is termed 'economic common cost' in this chapter.[121]

Shared costs

3.2.11 However, economic common costs are not typically the same as the costs that would, either in a plain English sense or in accounting terms, be described as 'shared costs' or 'common costs'.

3.2.12 This difference can be illustrated with reference to the above example. Assume that the construction of separate buildings for regulated and unregulated services would cost $100 each, resulting in a total cost of $200. Assume also that a multi-purpose building for providing both regulated and unregulated services, as used by many modern airports, costs $180. The efficiency gains from achieving economies of scope (which are defined above as the 'economic common costs') are $20. The shared cost, however, may be considered to be the full $180 cost of the building as the entire building is required to provide both services.

3.2.13 The shared costs captured by the firm's accounting systems are unlikely to equal the economic common costs. The shared costs captured by the firm's accounting system are likely to be a measure of the total cost of supplying all the services, which is required to be shared across each type of service. As discussed above,

[120] Incremental cost means the additional cost (i.e. including both operating costs and capital costs) that will be incurred if a given service (or group of services) is provided in addition to an existing service (or group of services). The incremental cost is also the cost that could be avoided by ceasing to provide one service whilst continuing to provide another service.

[121] For a fuller discussion on the economic and accounting concepts used in the IM, refer to Commerce Commission, *Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper,* December 2010, Chapter 3, Section 3.2.

economic common costs on the other hand, reflect the efficiency gains generated as a result of supplying both services together. Accounting systems are not typically intended to capture such potentially hypothetical costs, as the firm's management is interested in recording costs that are actually incurred and, where appropriate, developing rules for how to allocate these costs.

3.2.14 The extent to which costs are recognised in a particular accounting system as being shared, will also depend on the detail of the way in which accounting information is captured by the firm (i.e. the level of detail these systems provide). For instance, to accurately allocate staff costs would require staff to record the time they spend on particular activities associated with the provision of a service. If they do not do this, it will be difficult for the firm's accounting system to attribute staff costs. On the other hand, if staff are required to fill in timesheets (as these are used alongside a more detailed accounting system) it may be possible for a firm to attribute all of its staff costs across the different types of services it supplies.

3.2.15 The example in paragraphs 3.2.8 and 3.2.12 is predicated on the assumption that once a decision is made to develop an integrated terminal, all terminal-related costs are necessarily treated by the firm's accounting system as being shared. In practice however, some of the areas of a terminal building may be clearly identified as being only used for either regulated or unregulated services. Certain parts of the terminal building may be clearly identified as being used for providing regulated services (e.g. check-in areas) or unregulated services (e.g. closed retail areas), whereas others may be identified as being shared (e.g. terminal walkway areas). Depending on the detail provided by the firm's accounting system, the amount of cost attributed to each type of service will differ and the amount of cost which is not attributed by it (or considered as 'shared') will vary.

3.2.16 The above example illustrates both the difference in the underlying concepts of 'economic common cost' and 'shared costs,' as well as the fact that the interpretation of 'shared costs' by a firm's accounting systems can vary significantly.

Accounting cost concepts used in the IM

3.2.17 The costs which a firm would likely consider to be 'shared' will be those costs which its accounting system treats as being related to more than one service (i.e. as not directly attributable to a particular service). The magnitude of the shared costs identified by that firm will depend on how its accounting system attributes costs. To clarify the way in which these costs should be measured, the Commission's starting point for the cost allocation IM is to divide costs into costs that are 'directly attributable' and costs that are 'not directly attributable'. This better reflects how shared costs are likely to be recorded in practice, and is therefore more meaningful than simply referring to costs that are 'shared'.

3.2.18 In the context of this IM, costs directly attributable (CDA) are defined as those which can be wholly and solely associated with a single type of regulated activity, or wholly and solely associated with the unregulated services (in aggregate) provided by an Airport. Costs not directly attributable (CnDA) are all other costs, namely those which cannot be wholly and solely associated with a single type of regulated activity (or wholly and solely associated with the unregulated activities).

3.2.19 The cost allocation IM allocates all costs associated with regulated activities whether they are directly attributable or not directly attributable.[122] By doing so, common costs—irrespective of how they are interpreted—will be allocated between different types of regulated and unregulated activities, without having to explicitly define, identify and allocate common costs which, as discussed above, can be defined and measured in different ways. [123]

3.2.20 The cost allocation IM therefore requires that operating costs and asset values that are directly attributable to a particular type of regulated activity are allocated to that regulated activity. It also sets out rules for deciding what proportion of operating costs and asset values associated with, but not directly attributable to, a regulated service may be recovered from that regulated service. Since the Commission is only concerned with setting rules for the allocation of costs to regulated services, the IM does not include any mandatory steps for allocating costs that are wholly and solely associated with unregulated services.[124]

Airport sector context

Scope of shared costs and currently used cost allocation methodology

3.2.21 Airports undertake three types of regulated activity as well as unregulated activities. Unregulated activities undertaken by Airports include retailing (e.g. food and beverage, shops) and property-related services (e.g. property investment, lounges, car parkings and bus and taxi facilities). Unregulated activities and services at Airports are well developed and represent over 50% of total revenues for each Airport.[125]

3.2.22 While the analysis of unregulated revenue as a share of total costs indicates that unregulated services are a core part of Airports' business models, IM consultation

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122 The IM therefore does not need to attempt to quantify a dollar value for shared costs (which is a difficult task, and one that is not necessary to promote the Part 4 Purpose, or to promote outcomes consistent with workably competitive markets).

123 Airlines submitted that the Commission should ensure that the allocation of CnDA avoids allocating costs that are directly attributable to unregulated services (Air New Zealand Limited, Air New Zealand Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 27, paragraphs 141-143). Airports submitted that the cost allocation IM should focus exclusively on CnDA (NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 44, paragraph 209). The IM addresses both airlines' and airports' views by ensuring that its scope is kept as narrow as is necessary to be consistent with the purpose of Part 4, whilst still providing the Commission with enough information to assess whether CDA and CnDA are likely to have been appropriately allocated to regulated services.

124 Air NZ submitted that the Commission needs to ensure that the cost allocation process excludes costs that are wholly and solely attributable to unregulated services and do so in a way that recognises unregulated services are in fact unregulated (Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, p. 44, paragraph 166). These comments along with those in its later cross-submission (Air New Zealand Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010) p. 27, paragraphs 141-144) indicate support for Dr. John Small's concern that "there might nevertheless be merit in adding a step to the cost allocation process in which the components of common costs are checked to ensure that none are directly attributable to unregulated services, to provide comfort that all are genuinely common costs" (Dr John Small, *Expert Review of the New Zealand Commerce Commission's Draft Decisions and Reasons for Specified Airport Services*, June 2010, p. 4, paragraph 16). Under s 53D of the Act, a regulated supplier can be required to disclose information related to the supply of unregulated services (in aggregate) for the purpose of monitoring compliance with information disclosure regulation. The Commission considers that its ability to require these disclosures addresses concerns raised by Air New Zealand and John Small.

125 Figure based on AIAL, *Annual Report,* June 2010; AIAL, *Disclosure Financial Statements,* June 2010; CIAL, *Annual Report,* June 2010; CIAL, *Disclosure Financial Statements,* June 2010; WIAL, *Annual Report* March 2010; and WIAL, *Disclosure Financial Statements,* March 2010.

has not produced estimates of the extent to which costs are shared between regulated and unregulated services.

3.2.23 All Airports currently allocate costs between their various regulated and unregulated activities using a form of activity-based costing (ABC).[126] The IM consultation process revealed that Airports' accounting systems are designed to directly allocate a high proportion of what appear to be CnDA to expenditure categories related to regulated or unregulated activities. Through the use of these allocations, Airports' accounting systems appear to be identifying these costs as CDA. Given the broad scope for Airports to interpret shared costs as they see fit, these allocations might indicate that shared costs are comparatively low. However, using the Commission's definition of CnDA, the shared costs might in fact be larger than indicated by Airports' accounting systems, which are currently identifying these costs as CDA.

3.2.24 Based on the size and scope of regulated and unregulated services, a significant proportion of operating costs and assets (including terminal space, air conditioning power and equipment, access roads to airports) is likely to be shared between regulated and unregulated services.

3.2.25 Notwithstanding this, the Airports' approach to allocating costs appears to be appropriate for their own financial and management accounting requirements. More importantly, as discussed further below, it appears to produce outcomes that in many cases are satisfactory for both Airports and airlines, and consistent with those in workably competitive markets.

Importance of demand complementarities

3.2.26 An important factor in the relatively limited debate on the cost allocation IM in submissions is that the existence of an important economic characteristic of Airports—the demand complementarity between regulated and regulated services—leads Airports to allocate some shared costs to all activities.

3.2.27 Services are complements when they tend to be consumed together (e.g. bread and butter) and when increasing the price of one also reduces the demand for the other.

3.2.28 For example, an increase in the demand for flights induced by a reduction in airport charges (to the extent it is passed on by airlines into lower air fares) will also increase the demand for unregulated services such as retailing and property-related services and possibly increase the Airport's overall profitability (in particular, if due to co-location, some of the unregulated services are very profitable).[127]

3.2.29 This characteristic is important as an increase in passenger volumes not only increases revenues and profits generated from regulated services, but also those generated from unregulated services. An Airport therefore has an incentive to take

[126] A cost allocation methodology based on ABC techniques links costs to activities based on causal factors, or to reasonable proxy factors where the underlying cost drivers are not readily identifiable (see further discussion in paragraphs 3.3.7 to 3.3.10 below.).

[127] There are certain constraints on this outcome. For example, where an airport is capacity-constrained, an increase in passenger numbers resulting from a price reduction for regulated services may not be able to be met. Indeed, in such circumstances, it may be more profitable to increase prices for regulated services.

into account the complementary nature of its services when making commercial decisions, including those on pricing.

3.2.30 Consequently, to the extent that regulated and unregulated activities share costs, Airports will tend to set prices in a way that allocates some portion of shared costs to all activities, rather than only to those undertaken to provide regulated services.

Consultation obligations

3.2.31 The presence of well-informed and active consumers may affect cost allocation outcomes (to the extent they desire different outcomes) through the exercise of countervailing power.

3.2.32 Airports consult major consumers (i.e. airlines) under the mandatory AAA pricing consultation requirement creating transparency around the cost allocation process and outcomes. However, Airports are only required to consult (as opposed to negotiate) on pricing and irrespective of airlines' views, may set prices as they see fit.

3.2.33 For airlines to exercise significant countervailing power, they would need to have the ability to switch to a different airport. While in practice their ability to do this is limited for most of their flights, they may influence airports through other measures short of moving flights. This might include, for example, changing the frequency of scheduling, diverting international flights and reducing the dependency on a specific airport for transit purposes. Moreover, airlines' views may also carry weight with regard to Airports' decision-making processes on cost allocation as Airports are likely to have regard for the potential consequences of giving little or no weight to airlines' views. These could include more heavy-handed regulation (e.g. price-quality or negotiate-arbitrate regulation), or a move to other less favourable bases of regulation for the Airports (such as a change from a dual till to a single till approach).

Current cost allocation outcomes

3.2.34 Overall, although some areas of disagreement do exist,[128] there appears to be broad agreement between Airports and airlines on cost allocation outcomes.[129] This is probably due to the incentives provided by demand complementarity and the effect of countervailing power noted above. Throughout the IM consultation process, there was also relatively little disagreement with the Commission's proposed approach to the cost allocation IM.

3.2.35 Irrespective of the level of agreement on cost allocation outcomes, in setting this IM the Commission needs to ensure that application of the cost allocation IM, when applied under information disclosure, assists interested persons in assessing whether the Part 4 Purpose is being met. This is discussed in the remainder of Section 3.2.

[128] For a discussion on areas of disagreement see paragraphs 3.2.54 to 3.2.58 below.

[129] The broad agreement was in strong contrast to the consultation with EDBs and GPBs, whose views differed in many aspects from the Commission's.

Incentives for efficiency in workably competitive markets

3.2.36 In a workably competitive market, a firm that supplies a single type of service may temporarily achieve a competitive cost advantage over its competitors through diversification by providing additional types of services. Over the period in which none of its competitors supply the same expanded mix of services, a multi-service firm may charge (up to) the same level of prices as its competitors and benefit from its higher relative efficiency by earning above-normal profits.

3.2.37 The prospect of these above-normal profits creates the incentive to utilise existing operations and assets to also supply other types of services and to achieve economies of scope.

Sharing of efficiencies

3.2.38 In the longer-term, competitors in workably competitive markets will generally imitate the business model of the firm that first succeeded in achieving economies of scope. Consequently, above-normal profits will generally be competed away[130] and the firm will not be able to keep the benefit of its efficiency gains over the longer-term.[131]

3.2.39 The competitive process, and the prices of the services that result from it, determine which type of consumers eventually receives the benefits of the efficiency gains.

3.2.40 The competitive process leads to the benefits of efficiency gains initially realised by the firm in the form of above-normal profits being shared with consumers over time, including through lower prices. This results in the following:

- consumers facing lower prices and/or receiving better quality for the relevant services than would have prevailed had these efficiency gains not been made; and
- from the point when the firm earns only a normal profit, the benefits from these efficiency gains continuing to be enjoyed by consumers on an ongoing basis.

<u>Insights on sharing efficiencies in workably competitive markets</u>

3.2.41 Prices in workably competitive markets are influenced by demand-side factors (e.g. consumers' willingness to pay for a service with a given quality, and any demand complementarities between different services) and supply-side factors (e.g. the cost of inputs, and production technology such as that used in achieving economies of scope).

3.2.42 Managers of firms in workably competitive markets adjust prices to maximise profits for all services in the hope that all costs (including shared costs) incurred in the provision of these services are recovered. In order to do this, managers implicitly

130 This outcome is one of the type referred to in s 52A(1)(d) of the Act.

131 The term 'longer-term' is used in this chapter to describe a timeframe over which economic concepts, such as prices, costs and profitability are repeatedly exposed and, as a result, respond and adjust to influences from market forces or regulatory policy. They are not used to describe an economic equilibrium outcome. As discussed in Chapter 2, workable competition is a dynamic process and does not necessarily ever result in a static equilibrium.

take into account consumers' willingness to pay for the services and any demand complementarities.[132]

3.2.43 They are unlikely to contemplate the concepts of economic common costs, shared costs or attributable costs (or the use of a cost allocation methodology to identify these) in their pricing decisions but will effectively be sharing costs.[133]

3.2.44 Demand for a service being unresponsive to price implies that consumers have a high 'willingness to pay' for the service. Among a set of services with shared costs provided by a given firm, a service characterised by a low demand-responsiveness to price increases can be expected to recover a greater proportion of shared costs than a service that is more demand-responsive. Conversely, if demand is responsive to price then this service may contribute less to shared costs.

3.2.45 Where services are complementary in demand, suppliers' profits in workably competitive markets are maximised by taking into account the fact that changes in the price of one service affect demand for another service. As a result, in the longer-term, all services are expected to make some contribution to shared costs.

3.2.46 Experts advising Airports (as well as EDBs and GPBs) unanimously agreed that in workably competitive markets some proportion of shared costs would be expected to be recovered from all services in the longer-term.[134] As such, some benefits of efficiency gains would be shared with consumers of all types of services with shared costs.

3.2.47 Some submissions were made on s 52A(1)(c) in earlier rounds of consultation.[135] The Commission notes that Airports have not submitted on this issue in response to the Draft Reasons Paper and Draft IMs.

3.2.48 As discussed above, Airports have an incentive to recover shared costs from all services they operate.[136] Given that Airports are only subject to information disclosure, they are likely to set prices in a way that ensures they retain at least some

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132 This makes the simplifying assumption that firms only have control over certain supply side factors. In practice, firms in workably competitive markets may also affect demand through marketing and advertising.

133 Nonetheless, although a firm's managers might not explicitly use a cost allocation methodology for setting prices, they may want to monitor the performance of new or existing ventures (e.g. the profitability of new product lines). For example they will wish to monitor services' revenues against the incremental costs of introducing those new services. Where not all costs are directly attributable to different types of services, this requires them to apply some form of cost allocation methodology to allocate shared costs to those services using the firm's accounting system.

134 Mr. Murray from LECG representing NZAA, Mr. Balchin from PricewaterhouseCoopers representing CIAL, Mr. Mellsop from NERA representing AIAL, *Input Methodologies Conference (Airport Services) Transcript*, 15 September 2009, pp. 48-49, lines 29-15.

135 See for example, NZ Airports Association, *Submission on the Input Methodologies Discussion Paper, Attachment: LECG, Comments on Commerce Commission Input Methodologies Discussion Paper prepared for NZ Airports Association*, 31 July 2009, pp. 21-22. For further discussion of the Commission's response to these submissions see Commerce Commission, *Input Methodologies (Airport Services) Draft Reasons Paper*, 31 May 2010, pp. 49-51, paragraphs 3.2.56-3.2.63.

136 The Commission considers that incentives to allocate costs faced by airports differ from those faced by suppliers of other types of regulated services, such as electricity distribution services and gas pipeline services. For these services, lack of significant complementarity in demand between most regulated and unregulated services is more likely to provide incentives for other types of regulated suppliers to allocate all, or a majority of, shared costs to the regulated services. During consultation, these suppliers argued that no shared costs should be allocated to unregulated services. For further discussion of these submissions see Commerce Commission, *Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper*, December 2010, Chapter 3, Section 3.2.

of the benefits of these efficiency gains. The ability to retain these gains provides Airports with incentives to achieve economies of scope. As such, outcomes for regulated services are therefore likely to be consistent with outcomes produced in workably competitive markets.

Incentives for investment in other services and s52T(3)

3.2.49 Section 52T(3) requires that the IM must not unduly deter investment by a supplier of regulated services in the provision of other services. The Commission considers that an investment would only be 'unduly' deterred in the context of Part 4 to the extent that the investment would not be deterred in a workably competitive market.

3.2.50 Some submissions were made on s 52T(3) in earlier rounds of consultation.[137] The only submission received on the Draft Reasons Paper and Draft IMs on this issue was from NZAA, which noted that it "does not necessarily agree with the Commission's interpretation of 'unduly deter' in section 52T(3)" but also stated that in its view "the draft cost allocation input methodology in its current form should not, in NZ Airports' view, unduly deter investment".[138]

3.2.51 As discussed above, the complementary nature of services and the Airports' ability to retain at least some of the benefits from efficiency gains means that they have incentives to invest.

3.2.52 Both regulated and unregulated services are an integral part of the Airports' business models, as evidenced by revenue shares in excess of 50% for unregulated services (see paragraph 3.2.21). Airports have extensive experience in supplying and developing profitable new unregulated services. Such services are profitable despite sharing some of the efficiencies with consumers of regulated services.

3.2.53 Given that unregulated services are well established, and the fact the IM only applies under information disclosure, the Commission considers that it is very unlikely that the application of the IM would deter, let alone 'unduly' deter investments.

Practical issues to be addressed by the IM

3.2.54 Overall, there is limited evidence available to the Commission to suggest that cost allocation outcomes for Airports' regulated activities are inconsistent with outcomes produced in workably competitive markets. However, the IM consultation process highlighted some areas where it may be difficult for interested persons to assess whether the Part 4 Purpose is met.

3.2.55 Firstly, in some situations Airports appear to have allocated all shared costs to regulated services, i.e. they interpreted costs as directly-attributable, when they may not have been. This was particularly evident in a few instances where all of the shared costs had been allocated to a single activity. Examples of this provided by BARNZ included:

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137 NZ Airports Association, *Post-Conference Cross-Submission on the Input Methodologies Conference for Airports*, 15 October 2009, paragraphs 97-98, pp. 23–24; NZ Airports Association, *Submission on the Input Methodologies Discussion Paper, Attachment: LECG, Comments on Commerce Commission Input Methodologies Discussion Paper prepared for NZ Airports Association*, 31 July 2009, p. 21.

138 NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 44, paragraph 209.

- circulation space within the terminals and waiting areas being allocated to the regulated service on the grounds that these areas are needed for passenger processing. The basis for this was that even if retail activities and cafes were not present the same size terminal would still be required; and

- airfield perimeter fences being allocated 100% to the airfield cost centre, even where they run through or adjacent to aircraft and freight commercial leased areas and form the perimeter fencing for these areas. The basis for this was that it is an aeronautical requirement to have perimeter fences.[139]

3.2.56 The IM addresses this issue by clarifying the meaning of shared costs as CnDA. In addition, the ID Determination for Airports provides transparency through information disclosure and monitoring requirements.

3.2.57 Secondly, information used to allocate costs in ABC cost allocation systems is based, where possible, on 'causal relationships'. 'Causal relationship' is a concept that can be defined in different ways. There is some evidence that its interpretation has led to some instances where all shared costs have been allocated to a regulated activity. Submissions by both BARNZ and Air NZ highlighted that in some circumstances Airports have interpreted the term 'causal relationship', a concept used in ABC, as referring to the original factors which resulted in the operating cost being incurred[140] and this "has resulted in aeronautical regulated activities being allocated an inappropriately high share of the costs".[141] According to BARNZ, situations where Airports have interpreted the causal relationships inappropriately include the following examples:

- main roads to the Airport—these are required for passengers and their size is dictated by peak passenger volumes. According to the Airports, commercial activities do not cause these costs and the roads would be no different in width or size without commercial activities; and

- management costs— these would be the same even if the Airport were to provide only specified airport activities. Retail and commercial activities do not increase these costs.[142]

3.2.58 According to BARNZ and Air NZ, disagreements on the meaning of causal relationships have at times led to an inappropriate share of operating costs and assets being allocated to specified airport services in the past.[143] Given that the IM defines

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139 BARNZ, *Pre-Workshop Submission on the Input Methodologies (Airport Services) Emerging Views Paper*, 3 February 2010, pp. 26-28, answer to question 21.

140 Air New Zealand Limited, *Pre-Workshop Submission on the Input Methodologies (Airport Services) Emerging Views Paper*, 3 February 2010, p. 56, answer to question 21; BARNZ, *Pre-Workshop Submission on the Input Methodologies (Airport Services) Emerging Views Paper*, pp. 26-28, answer to question 21.

141 Air New Zealand Limited, *Pre-Workshop Submission on the Input Methodologies (Airport Services) Emerging Views Paper*, 3 February 2010, p. 56, answer to question 21.

142 BARNZ, *Pre-Workshop Submission on the Input Methodologies (Airport Services) Emerging Views Paper*, pp. 26-28, answer to question 21.

143 BARNZ, *Pre-Workshop Submission on the Input Methodologies (Airport Services) Emerging Views Paper*, pp. 26-28, answer to question 21; Air New Zealand Limited, *Pre-Workshop Submission on the Input Methodologies (Airport Services) Emerging Views Paper*, p. 56, answer to question 21.

the meaning of 'causal relationships' (refer to Appendix B), this issue has been addressed going forward.

3.3 Allocation of Costs under Part 4

3.3.1 The IM provides for the following two-step allocation of operating costs and asset values:

- **allocation of costs directly attributable (CDA)** (i.e. operating costs and asset values that are wholly and solely associated with a single type of regulated activity undertaken by Airports) to the activities to which they are directly attributable; and

- **allocation of costs not directly attributable (CnDA)** (i.e. operating costs and asset values that are associated with the undertaking of more than one regulated activity, or both regulated activities and unregulated activities in aggregate) to the activities they are associated with.

3.3.2 Following the allocation of CDA, suppliers must allocate CnDA using the accounting-based allocation approach (ABAA). This requires operating costs and asset values to be allocated based on causal factors, or based on proxy factors where causal-based allocators are not available.

3.3.3 The ABAA is a form of cost allocation using ABC principles to allocate costs. As discussed in paragraph 3.2.23, all airports already use ABC methods to allocate costs. However, the clarification of some of the terminology used in the allocation process such as the meaning of CnDA and the definition of 'causal relationships' is expected to make the allocation of shared costs to regulated activities compatible with outcomes produced in workably competitive markets in situations where this may not currently be the case.

3.3.4 The allocation of shared costs can have a significant effect on financial results in regulatory accounts presented under an information disclosure regime, which in turn will affect assessments made by interested persons. The cost allocation methodology standardises the way the allocation of shared costs is carried out for the purposes of information disclosure. This in turn facilitates assessment by interested persons of performance over time and between regulated suppliers. [144]

3.3.5 The remainder of this section describes the ABAA and the role it plays in moving outcomes towards those in workably competitive markets. Further, it provides details on the approach and explains that approach's effects on efficiency sharing under information disclosure. Finally, the section also discusses the transparency under information disclosure which complements the IM.

3.3.6 For further details on how the cost allocation IM is applied, refer to Appendix B, which sets out the following:

- further details on ABAA as well as on other components of the IM; and

[144] As further discussed below, standardisation for the purposes of information disclosure is promoted by applying the rules in the IM.

- details on the application of the IM as part of information disclosure, and price-quality regulation.

Accounting-based allocation approach

Cost allocation

3.3.7 In specifying a practical approach to cost allocation that is applied as a process and rules within Airports' accounting systems, the Commission has considered the accounting approaches that tend to be used for allocating CnDA in a regulatory setting and which approach is most appropriate in the context of the Part 4 regulatory regime.[145]

3.3.8 Modern approaches to cost allocation in a regulatory context generally use ABC.[146] An ABC approach allocates costs on the basis of processes that are eventually traced back to outputs. The establishment of causal relationships (using quantitative analysis to develop cost allocators) introduces a level of objectivity to the allocation of costs. However, for some cost categories, the mapping of costs onto processes and outputs may not be possible and therefore an allocation rule based on proxy factors (i.e. simple discretionary rules not based on causality) needs to be used instead. As discussed above, Airports already undertake a form of ABC to allocate costs.

3.3.9 The ABAA is an application of ABC. An ABAA that uses cost allocators based on current causal (or proxy) relationships, to the extent that cost allocations are reflected in costs is likely to result in all services bearing a portion of shared costs associated with the provision of those services.[147] Through the analysis of disclosed information, interested persons will be able to assess whether the Part 4 Purpose is met, in particular with regards to the sharing of benefits of efficiency.

3.3.10 In order to ensure consistency with outcomes in workably competitive markets, the cost allocation IM needs to provide flexibility for Airports to reflect their business models. In addition, a range of different causal factors might appear equally valid, yet result in different cost allocation outcomes. For example, the use of terminal area occupied to allocate terminal maintenance costs between regulated and unregulated activities may produce different allocations if these have previously been made on the basis of maintenance staff timesheets.

3.3.11 Parties have provided a number of specific comments on prescription in earlier rounds of consultation to which the Commission has responded.[148] The only submission on the Draft Reasons Paper on this topic was from BARNZ:

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145 Although allocations from the application of the accounting processes and rules may not be fully efficient, when specified appropriately they are likely to promote outcomes consistent with those produced in workably competitive markets.

146 The Commission's IM Discussion Paper discusses several possible accounting-based approaches to allocating costs. Commerce Commission, *Input Methodologies Discussion Paper*, 19 June 2009, pp. 105-107, paragraphs 5.65-5.76.

147 See Appendix B for a discussion of current causal (or proxy) relationships.

148 See for example, NZ Airports Association, *Post-Workshop Submission on Input Methodologies (Airport Services)*, 8 March 2010, p. 9, paragraph 20; BARNZ, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 8, answer to question 11. For further discussion of the Commission's response to these submissions see Commerce Commission, *Input Methodologies (Airport Services) Draft Reasons Paper*, 31 May 2010, pp. 49-51, paragraphs 3.3.15-3.3.21.

> While it will be cost effective for the cost allocation process to be based on the current ABC cost allocations of the airports, and BARNZ agrees this is an appropriate starting point for cost allocation, BARNZ is not convinced that the Commission has provided sufficient additional guidance to ensure the objectives in s52A are met. BARNZ notes that sufficiency of prescription is also an issue highlighted in the Expert Review by Michael Pollitt. BARNZ requests that the Commission both reconsider now whether additional guidance should be provided and also specifically earmark this issue for examination during the s56G review is to consider how effectively information disclosure regulation is promoting the s52A purpose in respect of the specified airport services.[149]

3.3.12 The Commission notes that submitters have not provided specific suggestions as to how more prescription may be provided for through the IM.

3.3.13 There clearly is a balance to be struck between the different reasons for and against a certain level of prescription, including the need to fit suppliers' circumstances and the cost of compliance.

3.3.14 International experience highlighted by Dr. Michael Pollitt demonstrates the potential pitfalls of a lack of standardisation.[150] On the other hand, transparency can be more important than a high level of standardisation of data as highlighted by Professor George Yarrow.[151]

3.3.15 The Commission considers a greater level of prescription is not appropriate at this time. As stated above, it is important that the IM affords sufficient flexibility to Airports to adequately reflect their own business models in cost allocations made. However, as discussed in paragraphs 3.3.17 - 3.3.21, the transparency provided through cost allocation disclosure and monitoring requirements will provide interested persons with information about how regulated suppliers are allocating their costs. This information will also be available to the Commission when it reviews the cost allocation IM (as required by s 52Y(1)) and assesses whether the current balance between flexibility and prescription remains appropriate.

3.3.16 The ABAA, therefore, does not prescribe cost or asset allocators for particular operating cost line items or assets and by providing flexibility over the choice of these allocators, suppliers will be able to implement the ABAA in a way appropriate to their particular circumstances. However, the IM defines the meaning of a causal relationship which, as discussed above, is a key concept when implementing the ABAA (refer to Appendix B).

Role of transparency

3.3.17 The flexibility in the application of the IM potentially leads to less consistency between Airports and across time periods in the allocation of costs. However, transparency in cost allocation disclosures can compensate for this. For example, to the extent that cost allocators and cost line items are transparently disclosed, the

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149 BARNZ, *Submission on Commerce Commission Information Disclosure (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 4.

150 Dr. Michael Pollitt, *Expert Review of the New Zealand Commerce Commission's Draft Decisions and Reasons for Specified Airport Services*, p. 4.

151 Professor George Yarrow, *Review of Input Methodologies (Electricity Distribution Services and Gas Pipeline Services) Draft Reasons Paper*, p. 8.

Commission and other interested persons will be able to understand the differences in disclosures made by different regulated suppliers and factor it into comparisons.

3.3.18 Greater transparency may help to improve the consistency of allocations (i.e. the consistency between and within Airports over time) as it is likely to bring with it greater scrutiny from interested parties.

3.3.19 While comparisons between regulated suppliers may provide valuable insights, the assessment of trends in performance of each supplier over time will also assist interested persons in assessing whether the Part 4 Purpose is being met. It would also be desirable, however, for the cost allocation IM to promote consistency and comparability in the disclosure of financial information over time by each regulated service.[152]

3.3.20 Application of the IM through ID requires that disclosures relating to cost allocation be made by suppliers.[153] Such information will assist interested persons in assessing whether the Part 4 Purpose is being met. Where changes in definitions or practice are undertaken, the ID Determination requires additional disclosures that set out the effect these changes have on information provided.[154]

3.3.21 Appendix B provides further detail on the application of the IM under information disclosure. This appendix also sets out further detail on the types of information likely to be required by the Commission for the purposes of monitoring compliance with the cost allocation IM pursuant to s 53ZD.

[152] Commerce Commission, *Input Methodologies Discussion Paper*, 19 June 2009, pp. 99-100, paragraph 5.37.

[153] The Commission's information disclosure requirements regarding cost allocation and the reason why these promote the Part 4 Purpose are set out in Schedules 9 and 10 of the Airports ID Determination and Chapter 3 of the ID Reasons Paper.

[154] NZAA submitted that the IM needs to give flexibility for Airports to change allocations at reasonable cost (NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 46, paragraph 212). The IM provides for Airports to make these changes. Sufficient transparency is provided through information disclosure.

CHAPTER 4: VALUATION OF ASSETS

4.1 Introduction

4.1.1 The IMs relating to specified airport services must include methodologies for determining the "valuation of assets, including depreciation and treatment of revaluations" (s 52T(1)(a)(ii)). The matters covered in the IM for the valuation of assets include:

- establishment of the initial regulatory value of each Airport's asset base;
- revaluation of assets in the future;
- calculation of depreciation; and
- treatment of asset acquisitions and disposals.

4.1.2 The reasoning for the Commission's decisions in relation to the IM for the valuation of assets is explained in this chapter and/or the accompanying appendix.[155]

IM for the valuation of assets

4.1.3 For most businesses, the value of an asset depends on its expected profitability, which—in a workably competitive market—is constrained by competition. In regulated markets, however, there is little or no competition and little or no likelihood of a substantial increase in competition. Airlines can be expected to have some degree of countervailing market power but the potential profitability of an Airport would nonetheless provide an inappropriate reference point for assessing returns, since it could be based on (and thus lead to) future monopoly pricing.

4.1.4 Regulatory asset values must instead be based on alternative approaches to valuation. Rather than *reflecting* the profits that an Airport expects to earn, the valuation of assets will help *determine* an appropriate baseline against which profitability can be assessed consistent with the purpose of information disclosure regulation as set out in s 53A. In other words, in a regulatory context, the usual link between asset values and profitability (and therefore prices as well) is reversed.

Application of the IM for the valuation of assets

4.1.5 There are two main ways in which regulatory asset values apply to price monitoring. First, the values provide the basis for determining the return *of* capital required by suppliers in each period (i.e. to cover depreciation in asset values). Secondly, they are used in conjunction with an estimate of the supplier's cost of capital—expressed in percentage terms—to determine the return *on* capital that suppliers require to cover their financing costs in dollar terms. These elements together, the required return *on* and *of* capital, are known as a supplier's capital costs.[156]

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155 Appendix F responds to technical submissions on Schedule A of the IM Determination (Airport Land Valuation Methodology).

156 References to the 'cost of capital' in this IM and in general relate to the estimate of the required return *on* capital. The term 'capital costs' covers both the return *on* and return *of* capital.

4.1.6 As discussed in Chapter 2, regulatory asset values—and the capital costs that they imply—then help to determine, along with the other elements of the regulatory regime, the revenues that an Airport can expect to be able to earn before profits appear excessive. The IM for the valuation of assets therefore applies to specified airport services by way of its effect on profitability assessments.

Overview of IM and structure of this chapter

4.1.7 Table 4.1 sets out the components of the IM for the valuation of assets for Airports, and indicates where in this paper each component is discussed.

Table 4.1 Overview of the Asset Valuation IM

Approach in IM	Where discussed
Airports must establish the initial value of their non-land assets using existing regulatory valuations, specifically asset values as on the last day of the disclosure year 2009, and as disclosed in the 2009 disclosure financial statements.	Section 4.3
Airports must roll forward the initial value of their non-land assets using CPI-indexation. For this purpose Airports must use the 'All Groups Index SE9A' published by Statistics New Zealand. For each quarter prior to the December 2010 quarter Airports must multiply the CPI value from that index by 1.02, to adjust for the recent change in GST.	Section 4.3; Appendix C, Section C13
Airports: • must establish initial RAB values for their land assets, as on the last day of the disclosure year 2009, using the MVAU approach specified in Schedule A of the IM Determination; • can revalue airport land in their RAB value using an MVAU valuation approach, in accordance with Schedule A, in any disclosure year. For revaluations to be recognised in the RAB value, they must encompass all land held by the Airport in its RAB value. All future development land must be revalued using an MVAU approach as at the same date. In years in which no MVAU revaluation is undertaken, land in the RAB value and future development land must be CPI-indexed. For this purpose Airports must use the 'All Groups Index SE9A' published by Statistics New Zealand (CPI values prior to December 2010 must be multiplied by 1.02).	Sections 4.3; Appendix C, Sections C2, C13
Airports should exclude from their RAB values: • any assets not used to provide specified airport services, as defined in s 56A; • future development land; • any asset that is part of works under construction; • working capital;	 Section 4.3 Sections 4.3; Appendix C, Section C3 Appendix C, Section C4 Appendix C Section C5

Approach in IM	Where discussed
• goodwill; and • easement land, that is land acquired for the purpose of creating an easement, and with the intention of subsequently disposing of the land.	Appendix C Section C5 Appendix C Section C10
Airports must capitalise financing costs on works under construction consistent with GAAP, at a rate no greater than the Airport's estimate of its post-tax cost of capital. Airports must cease capitalising financing costs when the asset is commissioned. When works under construction are commissioned, Airports must reduce the cost of the asset, established consistent with GAAP, by the amount of any revenue derived in relation to the assets while they were works under construction (where such a reduction is not already made under GAAP, and where the revenue has not already been reported as income under information disclosure).	Appendix C, Section C4
Airports may include in their RAB values finance leases and intangible assets provided that they are identifiable non-monetary assets that are not goodwill, consistent with the meanings under GAAP. Airports must establish the value of permitted intangible assets added to the RAB value after the last day of the disclosure year 2009 using the cost model for recognition under GAAP.[157]	Appendix C, Section C5
Airports should include capital additions in their RAB values at cost in the year in which the asset is 'commissioned', that is when the asset is first 'used by the Airport to provide specified airport services other than excluded services'. When an Airport disposes of an asset the closing RAB value of that asset, for the disclosure year in which the disposal occurs, is nil.	Appendix C, Sections C6,
If an Airport purchases an asset from another supplier of services regulated under Part 4, then it must add the asset to its RAB value at the asset's equivalent value in the RAB of the seller. Where an Airport purchases an asset from a related party (that does not supply services that are regulated under Part 4), it must add the asset to its RAB value at depreciated historic cost where documentation is available to support this. Where sufficient records do not exist to establish depreciated historic cost, the Airport must use the asset's market value as verified by an independent valuer. The market value must be established using the MVAU approach in the case of land, and must not exceed the asset's depreciated replacement cost for non-land assets. For this purpose a related party includes both: • business units of the Airport that supply services other than specified airport services; and • a party that under GAAP is considered a related party (including any party that has conducted business either directly or indirectly with the supplier in the current financial year).	Appendix C, Section C7

[157] See accounting standard NZ IAS 38, paragraph 24.

Approach in IM	Where discussed
Airports must remove assets recognised as lost from their RAB values in the disclosure year in which they are identified as lost, and must reduce the RAB value by the asset's opening RAB value in that year. From the end of the 2012 disclosure year, lost assets that were in the initial RAB value will be permitted to remain in the RAB value. After the end of the 2012 disclosure year, Airports may only add found assets to the RAB value that were commissioned after the 2009 disclosure year. Airports must add found assets to the RAB value in the year in which they are found, and must establish the RAB value of found assets at cost, consistent with GAAP, where sufficient records exist. Where sufficient records do not exist, the Airport may assign the asset the same value as a similar asset in the RAB (where such an asset exists). If no such similar asset exists, the Airport must use the asset's market value as verified by an independent valuer (in the case of land, the market value must be determined using Schedule A of the IM Determination).	Appendix C, Section C8
Airports must recognise capital contributions by adding the asset in question to the RAB value at cost (measured in accordance with GAAP), reduced by the amount of the capital contribution received (where the capital contribution does not reduce the cost of the asset under GAAP). Airports must include vested assets in the RAB value at the cost to the Airport. The cost at which the asset enters the RAB value may not exceed the amount of consideration paid by the Airport in respect of that asset.	Appendix C, Section C9
All Airports must include new easement rights in the RAB value at cost in the year in which the rights are acquired, provided that the RAB value of new easement rights does not exceed fair market value, as determined by an independent valuer.	Appendix C Section C10
Airports must depreciate their assets on a straight line basis, unless they elect to use a non-standard depreciation approach (subject to the ID Determination). No depreciation is to be applied to land and easements (other than fixed life easements).	Appendix C, Section C11
Airports may determine asset lives for airport assets. However, total (unallocated) depreciation over the lifetime of the asset must not exceed the value at which the asset is first recognised in the Airport's RAB value under Part 4 (after adjusting for the effects of revaluations).	Appendix C, Section C11
Where an asset is stranded or expected to become stranded, Airports may adjust the asset life consistent with the requirements in respect of asset lives.	Appendix C, Section C12
Airports must record the total (i.e. 'unallocated') value of an asset in the asset base and roll it forward (for depreciation, revaluations, additions etc) on an unallocated basis. The cost allocation IM is applied to this asset value whenever it is necessary to determine a specifically attributable (i.e. 'allocated') portion of the asset value for regulated activities (for example to calculated depreciation and revaluations).	Appendix C, Section C14

4.1.8 The structure of the chapter is as follows:

- Section 4.2: Key considerations in determining the IM for the valuation of assets. This section outlines:
  - the variety of valuation approaches that have been discussed during consultation (paragraphs 4.2.5 to 4.2.11); and
  - the insights that can be derived from workably competitive markets in relation to the IM for the valuation of assets (paragraphs 4.2.12 to 4.2.28)
- Section 4.3: Valuation of assets under Part 4. This section:
  - explains why it is appropriate to establish the initial value of non-land assets by having regard to existing regulatory valuations (paragraphs 4.3.4 to 4.3.14);
  - in relation to non-land assets, summarises the alternative options proposed by submitters and the main reasons put forward to support these alternatives; and provides the Commission's responses to each of the main themes raised by submitters in relation to the way that the initial value is established (paragraphs 4.3.15 to 4.3.54);
  - explains why the initial value of land should be established with reference to its highest value in an alternative use, and discusses and responds to submissions on this topic (paragraphs 4.3.55 to 4.3.79); and
  - explains the way in which the RAB value is to be rolled forward over time, including responses to key submissions on this topic (paragraphs 4.3.80 to 4.3.86).

4.1.9 Appendix C provides more detail on specific components of the IM for the valuation of assets, and their application to information disclosure. Appendix F contains responses to detailed points raised in relation to the MVAU approach for the valuation of land.

4.2 Key Considerations in Determining the IM for the Valuation of Assets

4.2.1 The decisions in association with the valuation of assets can be thought of in two related parts. First, the 'initial' value of the Regulatory Asset Base (the RAB) must be established at the start of Part 4; secondly, these RAB values must be 'rolled forward' over time (i.e. updated year-on-year). Both these elements of the asset valuation exercise must be determined in accordance with the relevant statutory requirements: the purpose of IMs (paragraphs 2.2.5 - 2.2.11) and the Part 4 Purpose (section 2.4 in Chapter 2).

4.2.2 During consultation on the IM for the valuation of assets, the primary point of difference between the Commission and submitters has centred on the extent and nature of the guidance provided by the Part 4 Purpose when valuing non-land assets. Before turning to the issues in detail in Section 4.3, this section provides the context for that debate (paragraph 4.2.5 - 4.2.11), and sets out the insights from workably

competitive markets that have guided the Commission's decision making (paragraphs 4.2.12 - 4.2.28).

The distinction between land and non-land assets

4.2.3 The distinction between land and non-land assets is that:

- **land** has many potential uses and can therefore be considered a 'non-specialised' asset; whereas
- **non-land assets** are generally 'specialised' in the sense that they would have very little value if they were not used to supply specified airport services.

4.2.4 Airports own significant quantities of both types of asset. There is broad agreement on the appropriate valuation approach for land (although—as discussed further below—the same cannot be said of the treatment of past costs of converting land for use as an Airport). In a workably competitive market, as discussed further below (paragraphs 4.3.55 - 4.3.60), the value of a non-specialised asset in its existing use will broadly reflect its highest value in an alternative use. This valuation approach has therefore informed the initial valuation of land under Part 4, and the way that the value of land is to be rolled forward over time.

Valuation approaches discussed during consultation on IMs

4.2.5 There has, however, been far more debate about the valuation of non-land assets. If these assets were to be valued on the basis of their highest value in an alternative use, then very low values would be produced. As discussed further below (paragraphs 4.2.20 - 4.2.28), this would be inappropriate because it would send out very poor signals for future investment.

4.2.6 Determining the level of remuneration Airports will able to earn before profits appear excessive in future for capital investments they have made in the past (i.e. for existing assets) is problematic. This is determined by the 'initial RAB value'. Establishing the initial RAB value is a particularly contentious task where it is undertaken midway through the lives of assets that were previously unregulated, or regulated under a different regime.

4.2.7 The significance of the valuation task should not be underestimated. Since higher regulatory valuations result in a higher estimate of the level of capital costs in future, the higher the valuation, the higher the prices a business would be allowed to charge in future before profits appeared excessive. The converse applies to lower initial valuations.

4.2.8 There is no international 'best practice' or 'standard' approach when establishing initial RAB values for non-land assets, as recognised by some submitters during consultation. The NZAA, for example, has noted that "given the enormous collective body of work from experts around the world on valuation methods….there is no credible basis for suggesting that there is one 'correct' method".[158]

[158] NZ Airports Association, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, paragraph 17, p. 3.

4.2.9 As discussed in paragraphs 4.2.20 - 4.2.28, all of the various accounting-based valuation approaches that have been discussed during consultation—and which are summarised in Table 4.2 below—are conceivably consistent with promoting outcomes consistent with outcomes produced in workably competitive markets. The same can also be said of existing regulatory valuations. These have been prepared on the basis of a combination of these valuation approaches and represent the current basis upon which interested persons can assess the profitability of Airports.

Table 4.2 Accounting-based Approaches to the Valuation of Assets

Type of Approach	Key Elements	Specific Valuation Techniques
Historic cost-based approaches	• Based on the original cost of construction and installation. • These values may be adopted with or without indexation applied from the date at which the assets were installed. • The values are depreciated using either an 'actual' or 'assumed' depreciation schedule.	**Depreciated Actual Cost (DAC)** • 'Actual depreciation' is calculated on the basis of the depreciation previously recovered (or believed to have been recovered) from consumers. **Depreciated Historic Cost (DHC)** • 'Assumed depreciation' is calculated on the basis of an accounting-based depreciation schedule—such as straight-line depreciation. No indexation is applied. **Indexed Historic Costs (IHC)** • Assumed depreciation is used and indexation is applied.

Type of Approach	Key Elements	Specific Valuation Techniques
Replacement cost-based approaches	• Based on the cost of replacing the entire network with assets of similar service potential (i.e. Modern Equivalent Assets, or 'MEAs'). • Some form of 'optimisation' may be applied when assessing these costs to reflect changes in the required deployment, modernity and scale of the assets to achieve the same level of services as supplied by the existing assets. • Optimisation can range from the elimination of surplus assets at one end of the spectrum, to the complete redesign of the network at the other. • Depreciation, if applied, is usually 'assumed'; it is not based on 'actual' depreciation charged to consumers in the past.	**Depreciated Replacement Cost (DRC)** • Depreciation is calculated based on the remaining service potential of the asset (i.e. based on remaining asset lifetimes). • Assumptions are required on the likely costs of replacing each class of asset(s) and the type of depreciation that should be applied. **Optimised Depreciated Replacement Cost (ODRC)** • Similar to DRC, but also requires assumptions around the appropriate form of optimisation to apply. **Optimised Replacement Cost (ORC)** • No depreciation is applied because ORC assumes only new assets are installed. **Optimised Deprival Value (ODV)** • Initially developed for use in insurance and damages estimation. Often described as being equal to the 'loss to the owner' if they were deprived of their assets and then took action to minimise their loss. • Valuation outcomes are the same as for ODRC, except where it would not be rational from an economic perspective to replace the asset (or group of assets) with modern equivalents. In these cases, the valuation is based on the greater of scrap value, and the unconstrained potential profitability of the assets. The valuation that is greater is known as the asset's Economic Value (or EV).

4.2.10 In the view of submitters, however, it would not be appropriate to have regard to existing valuations when establishing initial values under Part 4. Airports are arguing for a valuation approach that would be likely to produce initial RAB values that are materially above existing regulatory values, whereas Airlines are arguing for an approach that would result in valuations that are materially below existing regulatory values:

- Airports have generally argued that the reference to workably competitive markets in the Part 4 Purpose strongly implies that asset values should be determined on the basis of a replacement cost-based approach carried out at the inception of Part 4. Airports generally consider that an ODRC approach would be most appropriate; and

- Airlines and their representatives have argued in favour of greater reliance on historic costs when valuing assets under Part 4; amongst other reasons, because they consider that this is required by the reference to workably competitive markets in the Part 4 Purpose.

4.2.11 The approach used in future to value investments, and the rate at which investments should be recovered, is generally a less contentious issue. This is because—unlike the initial valuation—the alternatives that are available are generally equivalent in Net Present Value (NPV) terms.[159] It is also possible to achieve a shared understanding about the rules that will apply in advance. The majority of regulators of airport services in the US, UK and Australia currently use an historic cost-based approach to roll forward regulatory values of non-land assets once regulatory values have been established initially. In submissions, Airlines agreed that an historic cost-based approach should be used in future.[160] Airports, however, supported periodic replacement cost-based revaluations.[161]

Insights from workably competitive markets

4.2.12 The reference to workably competitive markets in the Part 4 Purpose is clearly relevant to the valuation of assets under Part 4. By way of context, the remainder of this section outlines the factors that influence asset values in workably competitive markets.[162]

4.2.13 One of the key factors that influence asset values in workably competitive markets is the extent of asset specialisation. At one end of the spectrum, there are workably competitive markets in which the vast majority of assets could be used for a variety of different purposes and which can therefore be considered 'non-specialised' (e.g. land). The other end of the spectrum comprises workably competitive markets in which asset specialisation is important. To the extent that assets are specialised, they have little value in alternative use - once capital is committed such service or market-specific assets are sunk. Where sunk costs are significant, physical capital is not mobile between different uses.

4.2.14 In the markets regulated under Part 4, assets can be considered to be highly specialised.[163] These assets have little value in an alternative use; and no assets in alterative uses could fulfil a similar specialised function. This characteristic causes

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159 Refer footnote 111.

160 For example: BARNZ, Cross *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Determination and Draft Reasons Paper*, 3 August 2010, p. 2.

161 For example: Wellington International Airport Limited, *Submission on the Draft Input Methodologies & Information Disclosure (Airport Services) Determinations and Draft Reasons Papers*, 12 July 2010, pp. 4-5, paragraphs 12.1 and 12.3; NZAA, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, pp. 6 and 23-26, paragraph 27 and 92-101; Christchurch International Airport Ltd, *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, pp. 29-30, paragraphs 118-121 and 123-125.

162 A number of the conclusions in this section are supported by the findings of a report on asset valuation that the Commission requested an advisory panel to provide in an independent capacity. This panel comprised academics in the field of regulatory economics: Professor George Yarrow, Dr Martin Cave, Dr Michael Pollitt and Dr John Small. Refer: Yarrow, G., Cave, M., Pollitt, M., Small, J., *Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, May 2010.

163 Asset specialisation and sunk costs are discussed in paragraphs 2.6.4 - 2.6.13.

barriers to entry into, and exit from, regulated markets to such an extent that competition is not workable.[164]

4.2.15 Asset specialisation lay at the centre of much the debate about the valuation of assets under Part 4. Compared to the Commission and the Experts, submissions received from or on behalf of Airports generally consider that relatively strong predictions can be made about the valuation of specialised assets in workably competitive markets. A number of submitters also attach more weight than the Commission to the insights that are derived from the valuation of assets in workably competitive markets in which there is a lesser degree of asset specialisation. The reasons for these differences in opinion are explained in paragraphs 4.3.27 - 4.3.43 below.

4.2.16 Before turning to these issues, this section highlights the way asset specialisation affects the valuation of assets in workably competitive markets. It does this by outlining the insights from asset valuation in workably competitive markets that can be reached by considering:

- factors affecting profitability—and thus asset values—in all workably competitive markets (paragraph 4.2.17);
- the valuation of non-specialised assets in workably competitive markets (paragraphs 4.2.18 - 4.2.19); and
- the valuation of assets in workably competitive markets in which there is a greater degree of asset specialisation (paragraphs 4.2.20 - 4.2.28).

Asset valuation in all workably competitive markets

4.2.17 As discussed in Chapter 2, the factors likely to affect the expected profitability—and thus asset values—of a supplier operating in any workably competitive market includes such things as the number of existing and potential competitors, the costs facing these rivalrous entities (both those costs incurred now and those expected in the future), the extent of any contracting arrangements, and any changes in the likely path of future demand. The interplay between these various factors will vary between different markets and thus the same factor will not have the largest bearing on valuations in all markets. Each of these factors will affect expected profitability—and thus asset values—more heavily in some markets than in others.

Valuation of non-specialised assets – opportunity cost

4.2.18 Since a non-specialised asset can be readily redeployed between different uses, the value of such an asset in its existing use will reflect quite closely its highest value in an alternative use. The reason for this is that owners can boost potential returns by employing their assets elsewhere if this is more profitable. This process of redeployment will tend to harmonise the values of similar assets employed in different activities throughout the economy. As a result, the expected profitability of an asset with multiple potential uses—i.e. a non-specialised asset—will generally reflect its profitability in an alternative use which in turn will reflect its value in an

[164] Barriers to entry and exit are created by specialised assets for a variety of reasons. For an example of some of the key reasons, refer: Commerce Commission, *Regulatory Provisions of the Commerce Act 1986 - Discussion Paper*, 19 December 2008, pp. 49-50, paragraphs 49-50.

alternative use.[165] Economists refer to this forward-looking alternative use value as the asset's 'opportunity cost'.[166]

4.2.19 Put another way, the value of a non-specialised asset will be similar to the cost of replacing the asset with an equivalent asset that is redeployed from an alternative activity.[167] This is because a similar second hand asset could be redeployed from another market, at a price broadly equal to its value in that market. There is therefore a strong convergence between asset values in a particular market and replacement costs in this sense. However, asset values may deviate from the cost of building a *new* asset at today's prices. This is because of construction and ordering lags,[168] and changes in the buoyancy of the economy.[169]

Valuation of assets when specialisation is more significant – a wider potential range

4.2.20 By definition the value of a specialised asset in a workably competitive market is unlikely to bear a particularly close relationship to its value in an alternative use. The reason for this is that owners are not able to redeploy specialised assets readily if there is a change in expected profitability. As a result, the value of a specialised asset in its existing use will be unlikely to correspond closely—if at all—to its opportunity cost.

4.2.21 Likewise, the cost of replacing an asset by redeploying another asset from an alternative use is of very limited relevance to the value of a specialised asset. Assets employed in alternative uses are unlikely to be able to fulfil the specialised function of existing assets. So replacement cost, in the sense of replacement with a used asset, is not particularly relevant to the valuation of specialised assets in workably competitive markets.

4.2.22 The cost of replacing a specialised asset part-way through its useful life must therefore be assessed with reference to the cost of constructing a new asset. As noted above, however, the relationship between the costs of installing an entirely new asset and the value of an existing asset—specialised or otherwise—may be fairly distant. One is not a reliable proxy for the other due to, amongst other things, ordering and construction lags.

4.2.23 As the extent of asset specialisation in a market becomes more pronounced, the link between prices—and thus asset values—and the cost of replacing assets at today's prices is more limited. The inter-linked reasons for this include:

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165 ibid, p. 15. Put another way, the net cash flow derivable in each use would be similar.

166 The term opportunity cost is used because it refers to the most valuable alternative being forgone, and thus the cost of a lost opportunity (e.g. for investment).

167 supra n 161, p. 15.

168 ibid, p. 15.

169 ibid, p. 16. The reason that construction and ordering lags will have an effect is that existing assets are capable of producing a return from today forward, whereas newly constructed assets may not be commissioned until some years into the future. Hence, due to the fact that a dollar today is worth more than a dollar tomorrow, the value of an existing asset may not correspond particularly closely to the value of an asset yet to be commissioned. Of course, for many non-specialised assets, there will be little delay between ordering and delivery of such assets. The buoyancy of the economy is relevant to the extent that it implies that there is either excess capacity or capacity constraint across the whole economy. This will lead to a general depression or revival in asset values across the economy relative to the costs of new replacements.

170 supra n 161, p. 19.

- the fact that workable competition, if it exists, will in most cases tend to exert pressure on prices through rivalry between a number of established suppliers rather than the competition implied by potential new entrants. This limits the importance of changes in the cost of investing in new assets at any given point in time, since each existing supplier is unlikely to need to replace all their assets at once. Any effect will only occur with a lag. This means that replacement costs at different points in time will be relevant to asset values, not simply the cost of replacing assets today.[170]

- the fact that uncertainty about the future or barriers to entry or exit mean that expected profitability may have to change by quite a distance—in either direction—before new entry occurs, or before existing suppliers exit the market.[171] This implies that asset values can rise above, or fall below, the costs of replacing assets and remain there durably.[172] Moreover, it cannot simply be the current cost of replacing assets that matters to the timing of investment; the replacement costs expected in future time periods would play a role too.[173]

4.2.24 In addition, long-term pricing arrangements between consumers and suppliers are more likely in workably competitive markets where specialised investments are common. This is because they help guard against the risk of opportunism by either suppliers or consumers once the investment has been made. These arrangements may be of either an implicit, reputational variety (such as when there is a repeated relationship between two or more parties), or enshrined explicitly in a mechanism such as a long-term contract.[174] Credible relationships of this nature—where both parties are confident that the other will not act opportunistically—limit the responsiveness of profitability to changes in market conditions (e.g. if replacement costs increased).

4.2.25 When there are on-going relationships between suppliers and consumers as a result of asset specialisation, prices would be likely to be informed—at least to some extent—by the costs actually incurred by a supplier. The most direct and obvious link with past history arises when outcomes are determined—at least in part—by explicit long-term contracting arrangements.[175] These arrangements need not link prices to a replacement cost index, but can nevertheless result in outcomes that are consistent with outcomes produced in workably competitive markets.[176]

171 ibid, p. 22.

172 ibid, p. 22.

173 ibid, p. 22.

174 ibid, p. 19. Many of the submissions on reasoning contained within the Draft Reasons Paper in relation to these arrangements appear to have considered that the Commission was only focused on a narrow interpretation (i.e. solely on explicit long-term contracts). The Commission made clear, however, that the relationships to which it was referring are a good deal broader than long-term contracts. As noted above, these relationships need not be explicit. Regulation is often analysed as a type of (highly) incomplete contract between investors and consumers, i.e. regulatory asset values provide an implicit basis for assessing the economic relationship between the supplier and its consumers over the long-term. As noted at page 27 of the Experts' Report of May 2010, in a workably competitive market, the existence of long-term contracting may mean that asset values at the start of any period would tend to reflect the past bargains between consumers and suppliers, not simply the costs of replacing assets today. Based on this analysis, adjustments to prior existing valuations to reflect current replacement costs are not desirable. Refer, ibid, p. 27.

175 ibid, p. 37.

176 ibid, p. 21.

4.2.26 There are a number of benefits associated with implicit or explicit long-term pricing arrangements. In particular, suppliers are limited in their ability to extract excessive profits relative to the costs that they actually incur. Suppliers nevertheless have appropriate incentives to invest, because pricing arrangements of this nature mean that they can expect to earn at least a normal rate of return over time. Profits would be sufficient to reward investment, innovation and efficiency. Without arrangements of this sort, a supplier may not have appropriate incentives to invest in specialised assets.

4.2.27 All the conditions described above are consistent with workable competition and, as a consequence, the value of a specialised asset will differ depending on the market context in which it is used. The valuation could conceivably be some way below or above the cost of replacing the entire collection of assets today (paragraphs 4.2.23 - 4.2.26).[177] No point on this range can definitively be regarded as synonymous with the value of specialised assets in all workably competitive markets.

4.2.28 In summary, it is the Commission's view that:

- in the case of land, its value in a workably competitive market will broadly reflect its highest value in an alternative use;
- in the case of non-land assets, all of the valuation approaches discussed during consultation—i.e. those listed in Table 4.2 and existing regulatory valuations—produce valuations that are conceivably consistent with promoting outcomes consistent with outcomes produced in workably competitive markets;
- in workably competitive markets sharing some similarities with the markets regulated under Part 4—i.e. where there is a high degree of asset specialisation and an on-going relationship between suppliers and consumers—current replacement costs are just one of a number of factors that influence asset values;
- in workably competitive markets suppliers expect to earn at least a normal rate of return over time; and
- an obvious corollary of this is that the reference in the Part 4 Purpose to workably competitive markets alone does not require that regulatory valuations reflect current replacement costs when valuing specialised assets initially under Part 4, nor are they required at any point in the future (i.e. when rolling forward initial RAB values).

4.3 Valuation of Assets under Part 4

4.3.1 In light of the discussion above, different approaches are appropriate for land and non-land assets under Part 4.

[177] In a workably competitive market, asset values and cash flows over an asset's lifetime will reflect the fact that suppliers expect to earn a normal economic return on the investments they make. But at any point in time part-way through the lifetime of their assets, expectations—and thus asset values—will vary.

Valuation of land assets under Part 4

4.3.2 For land, the valuation approach that is most clearly consistent with promoting outcomes consistent with outcomes produced in workably competitive markets is the opportunity cost concept (paragraphs 4.2.18 - 4.2.19). Hence, regulatory valuations of land should reflect the Market Value Alternative Use (MVAU) methodology outlined in Schedule A of the IM Determination. Submitters generally supported using the MVAU approach for valuing land in principle, although there was disagreement as to how MVAU should be applied in practice. These issues are discussed in greater detail in paragraphs 4.3.55 - 4.3.60 below.

4.3.3 For non-land assets, the Commission considers that it is appropriate to have regard to existing regulatory valuations. As noted above, this valuation approach has been contested by both Airports and Airlines. The reasons for this approach are explained in paragraphs 4.3.4 - 4.3.14 below, followed by the Commission's response to submissions (paragraphs 4.3.15 - 4.3.54).

Valuation of non-land assets under Part 4

4.3.4 For non-land assets, context is important to deriving meaningful insights from the reference to 'workably competitive markets'. There is an on-going relationship between Airports and their consumers in the market for specified airport services. In recent years, this relationship has been shaped by the regulatory arrangements applying to each Airport. During this period, Airports were required to disclose information about the value of their asset base.

4.3.5 As explained further below, there are good reasons for having regard to existing valuations:

- they sit amongst the valuations that are consistent with outcomes produced in workably competitive markets (paragraph 4.2.28 above);
- in the context of a continuing relationship between suppliers and consumers, material changes to valuations—either upward or downward—would be unlikely to be consistent with the outcomes produced in workably competitive markets in which there is a high degree of asset specialisation (paragraphs 4.2.20 - 4.2.28);
- as discussed in paragraph 4.3.9 below, one-off write-downs of existing regulatory values of specialised assets would be likely to be inconsistent with suppliers having appropriate incentives to invest (i.e. s 52A(1)(a));
- as discussed in paragraph 4.3.10, no factual evidence has been submitted to suggest that existing valuations will prevent Airports from being able to earn at least a normal return on the original costs of installing assets before profits appear excessive;
- as discussed in paragraphs 4.3.11 - 4.3.12 below, one-off write ups of existing regulatory values of specialised assets would not allow interested persons to assess whether suppliers are being limited in their ability to extract excessive profits (i.e. s 52A(1)(d)); and

- it is consistent with good regulatory practice to have regard to valuations that have been permitted in the past (paragraph 4.3.13).

The long-term benefits of credible on-going relationships in workably competitive markets

4.3.6 In workably competitive markets in which there is a high degree of asset specialisation, credible on-going relationships deliver benefits for both suppliers and consumers in the long-term (paragraph 4.2.24 - 4.2.26 above). This is because credible pricing arrangements provide a more certain environment for investment. Short-term opportunism by either suppliers or consumers in these markets can undermine these on-going relationships and cause detrimental outcomes in the long-term.[178]

4.3.7 Likewise, regulatory decisions around the valuation of specialised assets—and thus an appropriate level of pricing—can have a significant effect on regulated outcomes. Monitoring prices on a materially different basis to that used in the past would be likely to damage the confidence that Airports and/or their consumers have in the arrangements put in place under Part 4. As discussed further below, Airports must be confident that they will have the opportunity to earn at least a normal return on new investments without profits appearing excessive, while consumers must be confident that the approach will reveal if Airports are limited in their ability to extract excessive profits.

Preserving incentives to invest by having regard to prior regulatory valuations

4.3.8 Regulatory values must be set continuously at a level that provides comfort to suppliers that they will be able to earn sufficient revenues to recover any investments that they will make in new, upgraded and replacement assets (including the costs of financing those investments) without profits appearing excessive. The confidence that each Airport will have in this mechanism will be informed, at least in part, by the regulatory treatment of their past investments.

4.3.9 Write-downs of prior regulatory values of specialised assets should be avoided insofar as this may set a precedent that damages a supplier's incentives to invest in future. This is a key reason why regulators do not value specialised assets on the basis of opportunity costs. Such an approach would establish extremely low initial RAB values, which would not give rise to an environment that is conducive to future investment.

4.3.10 Airports have not provided any factual evidence to suggest that existing regulatory valuations will fail to provide them with the opportunity to earn at least a normal return on the original cost of installing the assets used to supply specified airport services before profits appear excessive.[179] Reference to existing regulatory valuations when establishing initial RAB values under Part 4 should therefore give Airports no concern about the recovery of future investments. This approach is therefore consistent with s 52A(1)(a).

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178 ibid, p. 19.

179 Some submitters have argued that existing regulatory valuations could, in theory, be inconsistent with suppliers having the opportunity to earn at least a normal rate of return. This would only be possible if suppliers had been pricing in a certain way in the past. No submitter has provided any evidence to suggest that suppliers have been pricing in this way in practice.

Limiting the ability to extract excessive profits by having regard to prior regulatory values

4.3.11 A material one-off increase in the regulatory value of an Airport's past investments on the basis of a replacement cost-based approach meets with similar objections to a material decrease on the basis of an opportunity cost valuation. An increase in pricing of the scale that could be implied by a new replacement cost-based revaluation would be equally inconsistent with the outcomes produced in workably competitive markets characterised by on-going relationships between suppliers and consumers.

4.3.12 In a workably competitive market, a supplier's ability to implement a substantial price increase that is inconsistent with pre-existing arrangements would be limited, not least because consumers would switch to a less opportunistic supplier (irrespective of whether the increase in prices was smoothed or sudden).[180] In such markets, this switching limits suppliers in their ability to extract excessive profits. But in a regulatory context, consumers do not have the option to switch to an alternative supplier of the same service when prices are increased. Thus, if Airports were to materially increase prices, they would be able to extract excessive profits without this being apparent to interested persons. This would be unlikely to be consistent with monitoring whether s 52A(1)(d) was being achieved.

Having regard to existing valuations is consistent with good regulatory practice

4.3.13 It is therefore appropriate to have regard to regulatory valuations of specialised assets that have been permitted in the past, even when the scope and objectives of regulation have changed.[181] That the Commission should have regard to prior regulatory valuations when valuing assets under Part 4 is underscored by comments made by Dr Michael Pollitt in response to submissions on the *Joint Report on Asset Valuation in Workably Competitive Markets*:[182]

> The introduction of the 2008 Commerce Act could be expected to bring both change and continuity. Change in the sense that there would be line under old disputes about the basis for regulating the industry. Continuity in the sense that the 2008 Act is set within a general context of a country committed to the protection of private property rights, where some reasonable reference to past valuations of regulated assets is to be expected.

4.3.14 The initial RAB values of non-land assets are then to be rolled forward in a way that makes it relatively straightforward for interested persons to assess whether the Part 4 Purpose is being met. Capital additions will be included at cost, RAB values will be linked to the CPI and straight-line depreciation is to be applied as the standard depreciation approach. Non-standard approaches to depreciation may also be accommodated in accordance with information disclosure requirements. Greater detail about the way the RAB value is to be rolled forward can be found in paragraphs 4.3.80 - 4.3.86.

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180 ibid, p. 19.

181 As discussed further below (paragraphs 4.3.16 and 4.3.24 - 4.3.26), Airports have argued that if the Commission is having regard to prior regulatory arrangements when establishing initial RAB values under Part 4 then this would imply new replacement cost-based valuations should be permitted because these revaluations would have been permissible had the amendments to the Commerce Act not been enacted.

182 Yarrow, et al., supra n 38 , p. 23.

Views of Airports on the valuation of non-land assets

4.3.15 The majority of submissions received from or on behalf of Airports consider that the valuation methodology outlined above is inappropriate. For various reasons, these submitters consider that a new replacement cost-based (ODRC) valuation is required. Given increases in replacement costs in recent years, such a valuation could lead to a material increase in regulatory valuations for each Airport.[183] This section outlines the key themes to these arguments.

4.3.16 Some Airports have argued that if the Commission were to have regard to previous regulatory arrangements when establishing initial RAB values under Part 4, then this would require new replacement cost-based valuations to be undertaken for these businesses.[184] In particular, the NZAA has argued that Airports have been periodically revaluing their assets every five years and that this should be allowed to continue.[185]

4.3.17 Airports have also argued that past regulatory valuations are not relevant to the initial RAB value under Part 4. They consider that the reference to workably competitive markets in the Part 4 Purpose implies that new replacement cost-based valuations should be undertaken (both initially and in future to roll forward the RAB value). Without repeating the arguments in full here, the main arguments advanced by the Airports can be summarised as follows:[186]

- The most relevant insights for asset valuation are those derived from markets that share few, if any, similarities to those in which there is little or no competition. These are said to be amongst the "better functioning" workably competitive markets because there are minimal (if any) barriers to entry and exit, and thus the threat of entry from other firms provides a strong constraint on the market power of incumbents.[187] These are the markets in which there is only a limited degree of asset specialisation.

- The use of replacement costs is justified by the theoretical Hypothetical New Entrant test. Under the conditions of this theoretical model—which assumes that sunk costs are zero—the threat of entry from potential competitors acts as

[183] Indeed, even in the absence of any changes in replacement costs, the valuation might change by a large amount. This is because the outcome of a replacement cost-based valuation is sensitive to changes in the assumptions underpinning the approach. What is more, during the Gas Authorisation, different interpretations of the same specification of a replacement cost-based approach resulted in valuation differences of up to 30 per cent. Refer: Commerce Commission, *Authorisation for the Control of Supply of Natural Gas Distribution Services by Powerco Ltd and Vector Ltd, Decisions Paper*, 30 October 2008, paragraphs 376 to 397. Ranges of ODRC valuations outcomes in Australia have at times been even higher. Ibid, paragraph E.15.

[184] NZAA, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 22, paragraph 87.

[185] ibid, p. 22, paragraph 87.

[186] For example: Auckland International Airport Ltd, *Submission to the Commerce Commission on Draft Input Methodologies Determination (Airport Services)*, 12 July 2010, pp. 5 and 13, paragraphs 17 and 63; Wellington International Airport Limited, *Submission on the Draft Input Methodologies & Information Disclosure (Airport Services) Determinations and Draft Reasons Papers*, 12 July 2010, pp. 4-5, paragraphs 12.1 and 12.3; Christchurch International Airport Ltd, *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, pp. 15, 27-29, 32, paragraphs 104-108, 112-117 and 133-136.

[187] Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, Attachment: PricewaterhouseCoopers, *Response to the Discussion of Asset Valuation in the Draft Decisions Document - Report for Christchurch Airport*, 12 July 2010, pp. 3, 10 and 16.

the primary constraint on the profitability of existing suppliers. Markets in which the threat of entry effectively constrains market power in this manner are said to be 'contestable'. Thus it is proposed that the relevant touchstone for the valuation of assets under Part 4 is the costs facing a 'Hypothetical New Entrant' into each market.

- While asset values can and do depart temporarily from replacement costs in workably competitive markets, they will not be persistently above or below replacement costs in the long-run, nor is there any reason to expect that asset values will be systematically above or below replacement costs over time. Asset values will already correspond to their replacement cost or, if the market is in a temporary disequilibrium, a re-alignment process will be underway. The market equilibrium, at which supply and demand are in balance, is said to be the appropriate basis for valuation under Part 4.

- Greater weight should be given to the importance of long-run equilibrium conditions, rather than short-run dynamics of a market. Current replacement cost is the outcome that would be observed in a market in long-run equilibrium. These tendencies towards equilibrium, it is argued, are constant in workably competitive markets, including in workably competitive markets where there is a higher degree of asset specialisation.

- Empirical evidence suggests that even if asset values do deviate from replacement costs in the short-term then they will still trend towards replacement costs over the longer-term.

4.3.18 In summary, submissions from Airports have raised two key questions in relation to the initial valuation of assets under Part 4:

- First, are new replacement cost-based valuations required on the basis that—in the view of submitters—this would be consistent with the regulatory arrangements previously applying to each Airport (paragraphs 4.3.24 - 4.3.26)?

- Secondly, would a new replacement cost-based valuation better meet the Part 4 Purpose than having regard to existing regulatory valuations, given the need to promote outcomes consistent with outcomes produced in workably competitive markets (paragraphs 4.3.27 - 4.3.43)?

Consideration of issues raised by Airports in relation to the existing regulatory arrangements

4.3.19 This section addresses the first of these two questions. It outlines:

- the valuation approaches that have been used to derive valuations consistent with the regulatory arrangements previously applying to each Airport; and

- the Commission's response to arguments that new replacement cost-based valuations would be consistent with existing regulatory arrangements.

Existing regulatory valuations

4.3.20 Since 1 September 1999, the regulatory value of Airports' investments has been determined under the Airport Authorities (Airport Companies Information Disclosure) Regulations 1999 (Airport Disclosure Regulations). These regulations have required AIAL, WIAL and CIAL to disclose annual information pertaining to the value of assets attributable to 'identified airport activities'.[188] Valuations were required to comply with Generally Accepted Accounting Practice (GAAP).

4.3.21 The valuation approaches adopted by the different Airports under the AAA have been similar but not identical. Under GAAP, the value of property, plant and equipment (i.e. all assets in the RAB) must be recognised initially in the balance sheet at cost and thereafter carried in accordance with either an historic cost model or fair value model, at the choice of the reporting entity.[189] Airports have all adopted a fair value approach, whereby assets are valued on a depreciated replacement cost approach. Any assets added since the date of the last replacement cost-based valuation have been included at cost.

4.3.22 2009 was the first full calendar year in which all three Airports disclosed information about the value of their assets under the transitional provisions applying under Part 4.

4.3.23 Despite the differences in approach used by the various Airports to value their assets, all the valuations are consistent with the regulatory provisions that applied to each Airport at the time. Airports had a relatively wide discretion as to the approach they could use and the year in which they undertook the valuation. No valuation approach was mandatory under the Commerce Act. In addition, while the Minister for Transport had powers under s 9A of the AAA to issue more prescriptive guidelines for disclosure, these powers were never used.

Consideration of arguments relating to existing regulatory arrangements

4.3.24 It is important to have regard to the regulatory valuations that have been disclosed in accordance with previous regulatory arrangements. This does not mean that new replacement cost-based valuations must be undertaken at the start of Part 4. As discussed above, the Commission does not consider that material changes to the values ascribed to non-land assets would be consistent with meeting the Part 4 Purpose.[190]

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188 The Airport Disclosure Regulations define 'identified airport activities' in the same way as section 56A of the Act, by referring to the definitions contained in section 2 of the AAA.

189 Reporting of asset values under GAAP is currently governed by the asset valuation accounting standard 'New Zealand Equivalent to International Accounting Standard 16' (NZ IAS 16). NZ IAS 16 applies to 'property, plant and equipment' and states in paragraphs 32-33 that the fair value of land and buildings is usually determined from market based evidence. If there is no market based evidence because of the specialised nature of the asset and the asset is rarely sold, an entity may estimate fair value using an income approach or a depreciated replacement cost (e.g. ODRC) methodology. Previous asset valuation standards included SSAP-28 (up to 2001) and FRS 3 (2002-2007). In the past, the requirements of the standards have accommodated a wide range of valuation techniques adopted by the airport companies, such as DHC, ODRC, ORC, market based comparisons, and capitalisation of income.

190 Unlike the information disclosure regulations for EDBs and GPBs, Airports have not previously been required to disclose profitability indicators. A key feature of the information disclosure regulations that were in place for EDBs and GPBs since the 1990s was that any revaluations gains were recognised 'as income' in disclosed profitability measures. This is because upward asset revaluation implies a higher level of expected profitability in future, and downward revaluations imply a lower level of profitability in future. This is true in both workably competitive

4.3.25 No Airport has provided evidence to suggest that it would suffer a loss as a result of a decision made on the basis that it understood that a new replacement cost-based valuation would be undertaken under previous regulatory arrangements (e.g. loss of revenue). If this had been the case, then the case for undertaking a new valuation would be strengthened. As it is, the case is weak. The valuation of assets under Part 4 is therefore not constrained in any way by the valuation approach that Airports could have potentially elected to use to value their assets in the future had the amendments to Part 4 not been enacted.

4.3.26 Overall, there would appear to be no justification for new valuations on the basis of regulatory arrangements applying in the past.

Consideration of arguments related to the relevance of replacement costs in workably competitive markets

4.3.27 The second issue that Airports have raised with respect to the initial valuation of assets is whether or not replacement cost-based valuations are required by the reference to workably competitive markets in the Part 4 Purpose.

4.3.28 The Commission has received a wealth of independent advice on this topic during the consultation process, on behalf of Airports, Airlines and from its own Experts. Ultimately, the arguments that have been advanced in favour of new replacement cost-based valuations have not proved to be persuasive. As explained in greater detail below, the main reasons are that:

- it is wrong to dismiss existing regulatory valuations;
- replacement costs are only one of a number of influences on the value of a specialised asset in a workably competitive market; and
- long-run equilibrium is not a defining feature of the asset values that are produced in workably competitive markets (not in theory or in practice).

<u>Dismissing existing regulatory valuations would be wrong</u>

4.3.29 The arguments in favour of new replacement cost-based valuations are considerably weakened when considered in light of the existing relationship between Airports and their consumers that has been shaped by regulatory arrangements in the past. Material changes to these valuations—either upward or downwards—would be likely to be inconsistent with outcomes produced in workably competitive markets in which there are on-going relationships between suppliers and consumers.

<u>Replacement costs are only one of a number of influences on the value of specialised assets</u>

4.3.30 There are some significant areas of common ground between the Commission and Airports. For example, it is widely accepted that replacement costs:

- are one of a number of factors that exert an influence on asset values in most if not all workably competitive markets (paragraph 4.2.17); and

markets—where asset values rise and fall on the basis of changes in expected profitability—and in regulated markets—where the asset value determines those expectations (i.e. profits that can be expected before they appear excessive).

- will have a relatively strong link to the value of assets in workably competitive markets in which barriers to entry and exit are low, and in which the extent of asset specialisation is fairly limited (i.e. markets that share few, if any, characteristics with the markets that Airports operate in, in which there is little or no competition).

4.3.31 A key point of difference arises because Airports consider that it would be inappropriate to consider the way that assets are valued in workably competitive markets that share similarities to the markets regulated under Part 4 (i.e. in regard to the extent of specialisation of the assets involved). The reason for this is that they consider that workably competitive markets in which assets are specialised to a fairly large extent lie "possibly at the fringes of what may be considered workably competitive".[191] In the Commission's view, this does not diminish the relevance of the valuations likely to be produced in these markets.

4.3.32 It would be wrong to completely ignore the wide variety of workably competitive markets that exist, especially those that most closely resemble the factual context of the markets for specified airport services. This is because the Commission's task lies in designing regulatory arrangements that are appropriate in light of the factual characteristics of the markets being regulated. Economic theory that assumes away these characteristics in their entirety is unhelpful and potentially misleading.

4.3.33 When the extent of asset specialisation in a market increases, replacement costs are likely to have a distant relationship to asset values. This is because the costs facing potential entrants are just one of a number of possible factors that could constrain profitability and thus asset values of existing suppliers (paragraph 4.2.17). They do not necessarily provide the strongest constraint because a high extent of specialisation of assets will weaken the threat of entry (i.e. it creates barriers to entry and exit). Workable competition between incumbents within the market would, however, provide some constraint on pricing. Thus, in these circumstances, the cost of replacing the collection of assets at today's prices would only have a limited relevance to asset values. The costs incurred by existing suppliers in different time periods would begin to have a greater influence on prices.

4.3.34 Thus arguments that rely on the threat of entry to constrain the behaviour of existing suppliers do not lead to the "most conservative" estimate of the prices that would be observed in a workably competitive market; they simply rely on more onerous assumptions.[192] These assumptions are not appropriate for valuation in the current context, because they preclude the possibility that competition within the market provides a greater constraint on prices (and by extension asset values) than competition from potential competitors.

4.3.35 The most relevant insights are likely to come from markets in which appropriate outcomes are produced despite—rather than in the absence of—a relatively pronounced degree of asset specialisation. Pricing arrangements in these markets are

[191] Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, Attachment: PricewaterhouseCoopers, *Response to the Discussion of Asset Valuation in the Draft Decisions Document - Report for Christchurch Airport*, 12 July 2010, p. 10.

[192] Refer, for example: CIAL, *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, p. 15, paragraph 50.

such that neither suppliers nor consumers will be able to profitably sustain an opportunistic attempt to exploit the other party once an investment has been made. In other words, the arrangements prevent both suppliers and consumers from using their market power to 'hold up' the other party. This point was highlighted by the Commission's Experts:[193]

> Remembering that the purpose of the current exercise is to assist in the development of regulation, it is sensible to recognise both that the existence of workable competition is consistent with a range of different market circumstances and that it is those circumstances that are closer to the conditions prevailing in regulated or price-monitored activities that are likely to provide the more immediately relevant benchmarks. Since, in regulated industries, the regulator has an influence on selling prices that is akin to the potential influence of a buyer with market power – a similarity that is reflected in the economics literature on regulation, which focuses considerable attention on the 'policy credibility' or opportunism problem – we think it appropriate to direct attention to workably competitive markets that are subject to potential hold-up problems.

4.3.36 The Commission has therefore not been convinced by the case for drawing conclusions solely from the markets in which there is a low degree of asset specialisation.

Asset values in workably competitive markets are not defined by long-run equilibrium

4.3.37 In the view of Airports, asset values being in line with replacement costs represents the market equilibrium at which supply and demand are in balance, which in turn is said to be the appropriate basis for valuation under Part 4. While accepting that the value of a specialised asset can deviate from replacement costs in workably competitive markets, they argue that replacement costs remain relevant because they continue to exert an influence over the longer-term. They therefore consider that new replacement cost-based valuations are required because there are tendencies towards equilibrium in workably competitive markets.

4.3.38 While the Commission agrees that workably competitive markets will tend towards equilibrium over time, asset values in these markets are not defined by a long-run equilibrium. J.M. Clark is the academic widely credited with first distinguishing workable competition from other traditional economic models of competition (refer Chapter 2). He noted that in workably competitive markets, "tendencies towards equilibrium…never reach their static limits".[194] So in workably competitive markets, long-run equilibrium is unlikely to be reached, shortages and surpluses continuously arise and outcomes constantly evolve. Asset values in particular vary in light of changing expectations about the future, not simply in light of changes in replacement costs today.

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193 Yarrow, et al., Asset Valuation Report, supra n 162, p. 20.

194 In economics, equilibrium usually refers to the point at which supply and demand are in balance, and market conditions are not changing. At this point, the price level is such that the amount that consumers seek to buy is exactly equal to the amount that suppliers are able to produce. Static long-run equilibrium could be achieved, in theory, if all changes in background economic parameters were to cease (e.g. demand stopped growing, technology remained the same), and suppliers were able to respond instantaneously and with full flexibility until no demand was left unsatisfied at the market price. Entry and exit during this adjustment process is assumed to be free and costless. Clearly, these static adjustments are not a descriptor of what happens in the real world. Suppliers operate day-to-day on the basis of the configuration of assets currently installed, prices cannot be varied instantaneously and the demand for services is ever changing.

4.3.39 Empirical evidence supports this conclusion. It demonstrates that while asset values in workably competitive markets characterised by specialised assets may occasionally converge with replacement costs, they only *very rarely if ever* equate and will normally diverge by a significant amount for a prolonged period of time, including in some cases indefinitely.[195] The extent and duration of any deviation will be influenced by, amongst other things, any arrangements that have shaped the relationship between suppliers and their consumers.

4.3.40 This should not be taken to mean that equilibrium concepts are irrelevant to understanding the operation of workably competitive markets. It simply says that they are not a defining feature of these markets. Perfectly competitive equilibrium, for example, is a static concept and clearly does not describe the way in which any workably competitive market operates in reality. It nevertheless provides a way in which to think about the operation of markets that conform more closely to the underlying assumptions, and to explain differences in the operation of those that do not. These assessments are considered according to the facts pertaining to the conditions that actually exist in a particular workably competitive market. A number of other (often more relevant) theories of imperfect competition will also be referred to during these assessments. The aim is to align economic theory, as far as practicable, to the facts of the particular case.

4.3.41 Nor does it imply that replacement costs are entirely irrelevant to the determination of asset values under Part 4. Given the way that the RAB will be rolled forward (paragraphs 4.3.80 - 4.3.86), replacement costs will continue to exert an influence on asset values over the longer-term. This is because replacement costs will affect asset values at the time that assets need to be replaced. They will also have a bearing when the RAB value is indexed to inflation, because inflation is affected by changes in replacement costs.[196]

Conclusions on arguments in relation to the relevance of replacement costs in workably competitive markets

4.3.42 In summary, the arguments that have been advanced in favour of new replacement cost-based valuations to establish initial RAB values under Part 4 are not persuasive:

- It is wrong to dismiss existing regulatory valuations:
  - existing valuations are consistent with promoting outcomes consistent with outcomes produced in workably competitive markets (paragraphs 4.2.20 - 4.2.28);
  - existing valuations reflect the continuing relationship between Airports and their consumers that has been shaped by past regulatory arrangements (paragraph 4.3.4); and

[195] Yarrow, et al., Asset Valuation Report, supra n 162, Annex 1.

[196] In theory, if conditions were to remain the same for a prolonged period of time—i.e. in a 'steady-state'—then the RAB roll forward rules would result in asset values that tended towards, and eventually reached, a position that could be considered to be 'in equilibrium'. In practice, it is unlikely that this equilibrium will ever be reached, owing to a variety of dynamic factors such as growth in demand. There will nevertheless be tendencies towards equilibrium, caused by the influence of replacement costs over the longer term.

- given this context, material changes to existing valuations—either upwards or downwards—would be unlikely to be consistent with outcomes produced in workably competitive markets (paragraphs 4.3.6 - 4.3.7).

- Replacement costs are only one of a number of influences on the value of specialised assets in workably competitive markets:
  - the predictions of an economic analysis that is based on assuming that assets display a limited degree of asset specialisation are misleading (paragraph 4.3.30 - 4.3.36);
  - when there is a high extent of asset specialisation in a market, replacement costs are likely to have a more distant relationship to asset values than when there is a low extent of specialisation (paragraphs 4.2.23 - 4.2.27); and
  - valuations based on current replacement costs are likely to be higher, and provide a far less appropriate constraint on pricing, than valuations that are not predicated on assuming away—in their entirety—the high extent of asset specialisation that is a central characteristic of the market for specified airport services (paragraph 4.3.34).
- Asset values in workably competitive markets are not defined by long-run equilibrium in theory or in practice (paragraphs 4.3.37 - 4.3.40).
- The initial RAB value does not need to reflect today's replacement costs for replacement costs to have an influence over the longer term (paragraph 4.3.41).

4.3.43 In reaching its decision to have regard to prior regulatory valuations, the Commission notes the following:

- Airports were unable to demonstrate to the Commission's satisfaction that asset values in workably competitive markets characterised by substantial specialised assets would:
  - be equivalent to a new replacement cost-based valuation; or
  - bear a particularly close relationship to a new replacement cost-based valuation.
- Upward revaluations might be warranted if Airports were able to demonstrate that prices set on the basis of existing regulatory valuations would not maintain their efficient financial capital (i.e. earning less than a normal return on the original cost of their investment). They have not done so. Existing valuations are therefore consistent with Airports having appropriate incentives to invest (i.e. s 52A(1)(a)), while also limiting any excessive profits that would be disguised as a result of a higher asset value (i.e. consistent with s 52A(1)(d)).
- The new Part 4 Purpose does not in any way require new replacement cost-based asset valuations (such as new ODRC valuations).

Views of Airlines on the valuation of assets

4.3.44 As noted earlier, the Airlines favoured using an historic cost approach in establishing the initial RAB value. The main reason that Airlines consider that greater reliance on historic costs would be more appropriate is that, in their view, existing regulatory valuations reflect expectations of future monopoly profits, which would be legitimised under information disclosure regulation if these values were used to assess profitability. They consider that revaluations in the past are not required for Airports to be able to earn at least a normal return (i.e. they will disguise excessive profits).

4.3.45 Airlines argue that greater reliance on historic costs would be more appropriate—i.e. going back further than the time horizon upon which existing regulatory valuations are based—as this measures the funds actually committed by investors to the business.[197] Airlines therefore consider that allowing more recent revaluations to flow through into price monitoring would prevent interested persons from assessing returns earned by each Airport over the lifetime of their assets.[198]

4.3.46 Airlines effectively consider that the initial valuation should be based on the terms of a contract that Airports could have struck with their consumers, had there previously been workable competition for the right to provide specified airport services. In these markets, consumers are unlikely to agree contractual terms *ex ante* that would be expected to provide a return for Airports that is excessively above the costs they would actually incur (or expect to incur) in future.

4.3.47 Airlines have also argued that it would be appropriate to reduce the value of non-land assets by applying a used and useful test to the initial RAB (and have raised similar arguments in relation to land, as discussed in paragraphs 4.3.74 - 4.3.79 below).[199] They consider that assets that are not used or useful should be excluded from the initial RAB.

Consideration of arguments advanced by Airlines in relation to the valuation of non-land assets

4.3.48 There is clearly some merit to the arguments advanced by Airlines. In workably competitive markets with a high degree of asset specialisation, long-term contracts are often used to protect the interests of both suppliers and consumers. Such arrangements therefore provide useful guidance to the Commission when valuing assets consistent with the Part 4 Purpose, since specialised assets are prevalent in the market for specified airport services too.

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197 The Commission notes that BARNZ have argued in favour of an approach in which at least some portion of revaluation gains since the historic costs were incurred are stripped out of existing valuations, rather than an approach based simply on the historic costs updated for some portion of the revaluation gains since that date. The two approaches would result in equivalent initial RAB values. The Commission notes, however, that by using existing valuations—in accordance with the IM Determination—interested persons will be able to assess the extent to which previous revaluation gains have been taken into account in past pricing. For the reasons explained above, downward adjustments to these existing valuations are not desirable. Refer, for example: BARNZ, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 11.

198 Refer, for example: Air New Zealand, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, p. 31, paragraph 115.

199 Air New Zealand, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, p. 37, paragraphs 140-141; NZIER, *Conditions for Inclusion in the Regulatory Asset Base, Comments on the Commerce Commission's Proposed "used" Test*, 9 July 2010, pp. 1-3.

4.3.49 It is also clear, however, that no actual contract is in place between Airports and their consumers. Nor is there clear evidence of an understanding between the two parties that would justify placing greater reliance on historic costs. Airports have had (and continue to have) wide discretion in relation to the prices that they can set. Any *ex ante* contract would instead have to be hypothesised by the Commission, and imposed *ex post*. This presents difficulties, because there are a large number of potential contracts that could conceivably have been arranged between Airports and their customers.[200] There is insufficient evidence to make a satisfactory case as to why any particular assumed contract should be preferred over any others: a wide range of different contracts could have been observed in each market for specified airport services had the markets previously been subject to workable competition.

4.3.50 Existing regulatory valuations sit within the range of valuations that are consistent with outcomes produced in workably competitive markets. There is no avoiding the fact that any downward adjustments on the basis of hypothesised contracts would be likely to be perceived as unnecessarily arbitrary. This would not be desirable in light of the emphasis on investment incentives contained within s 52A(1)(a).

4.3.51 Thus, while it would be possible to speculate as to the possible contracts that might have been agreed in the past, had the market previously been subject to workable competition, this would be unnecessary and undesirable in the current context. Disregarding the prior regulatory values ascribed to non-land assets, in favour of what could be perceived as a somewhat arbitrary alternative, is likely to have a detrimental effect on investment incentives. It is therefore not the case that all else would be equal if a lower valuation was chosen.

4.3.52 As noted above, one thing that long-term contracting does highlight is that it is important to protect the credibility of on-going relationships between suppliers and their consumers where there is a high degree of asset specialisation in workably competitive markets. *Ex post* opportunism can cause very detrimental outcomes in the long-term. While this gives rise to explicit contracts in some workably competitive markets, in others reliance is placed on the credibility of an on-going relationship. In the current context, the issue at stake relates to the credibility of regulatory asset valuations, and the confidence that Airports will have that the valuation of future investments will be sufficient to allow them to recover the associated costs without profits appearing excessive.

4.3.53 In summary, Airlines have not been able to support arguments in favour of establishing the initial RAB value with reference to historic costs with compelling arguments in favour of one historic valuation over another.[201] In light of s 52A(1)(a),

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200 For example, assumptions would be required around: (i) the length of the assumed contract – this could stretch back to (a) the date of vesting, (b) to 2002 (when the Commission undertook the Airports Inquiry), or (c) to some other year instead; (ii) the way in which the values at the start of the contract should be established – this could be based on (a) a replacement cost-based valuation disclosed by the Airport, (b) vesting documentation, or (c) an alternative replacement cost-based approach specified by the Commission; and (iii) the cost recovery profile since the start of the contract – any value at the start of the assumed contract could be depreciated according to (a) each Airport's past pricing behaviour, or (b) any one of a number of types of depreciation that could be assumed (e.g. un-indexed straight-line depreciation); (iv) any risk sharing arrangements that might have been agreed.

201 For example, Air NZ and BARNZ have expressed support for different approaches during consultation. Air NZ has generally argued in favour of reference to 2002 values that were established on the basis of the vesting values of Airports, whereas BARNZ have also supported earlier valuations that were based on ODRC. Refer, for example: Air

material downward adjustments to the value of specialised assets should be avoided (paragraphs 4.3.8 - 4.3.10). It is consequently appropriate to have regard to the valuations of non-land assets that have been permitted under regulatory arrangements in the past. Greater reliance on the historic costs of each Airport's investments has therefore been rejected by the Commission.

4.3.54 The Commission also rejects the argument by Airlines that a used and useful test should be applied to non-land assets in the initial RAB. The initial RAB value will exclude assets that are not used to supply specified airport services, as defined in s 56A, but it would not be appropriate to go beyond this. This is because further tests could result in write-downs of the regulatory valuations disclosed in accordance with the regulatory provisions applying to each Airport at the time. That would not appear to be appropriate in an information disclosure context as it would involve writing down the value of an Airport's asset base with the benefit of hindsight (and on the basis of subjective assumptions about 'usefulness').

Valuation of land under Part 4

4.3.55 In a workably competitive market, the value of land is likely to broadly reflect its MVAU. The Part 4 Purpose therefore provides useful guidance in relation to the valuation of land. Submitters generally supported the MVAU approach in principle, although as discussed below, there was disagreement as to how MVAU should be applied in practice (i.e. how the costs of land conversion should be treated).

4.3.56 In coming to this view, the Commission considered whether it would be more appropriate to use existing regulatory valuations for airport land. Unlike investments in specialised assets, however, the majority of investments associated with land can be recovered in the event that the supply specified airport services were to cease. The regulatory values permitted previously are therefore of less relevance to investment incentives for land.

4.3.57 The correct incentives to invest in land in future will be provided if Airports expect to be able to earn a return on any investment in land before profits appear excessive that is sufficient to compensate them for the costs of acquiring and holding onto that land. The cost of continuing to hold onto land acquired in the past is measured by the opportunity cost that the Airport incurs today by using the land to supply specified airport services (i.e. instead of using it to supply other services).[202] Providing a signal to Airports that they will be consistently able to earn revenues that compensate them for the opportunity cost of holding land without profits appearing excessive is therefore the appropriate approach when valuing land under Part 4.[203]

NZ, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, p. 4, paragraph 11; BARNZ, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 4.

202 The Commission notes that there is no objective way of estimating how much the land would be worth to a hypothetical alternative airport operator. In addition, under s 56A, the definition of specified airport services includes reference to the companies that supply the services (including any successors to the current companies that operate all or part of the Airports). Hence the value of land in an alternative use cannot be established by estimating the value of land to an alternative owner supplying specified airport services.

203 Frontier Economics on behalf of Air NZ submitted that the Commission has not addressed the interdependency between the value of specialised assets and land. Frontier argues that valuations, which assume the land can be sold independently with no loss of profit associated with the sunk assets, will be too high. They consider that a lower value

4.3.58 Airlines, however, have proposed that a past MVAU land valuation should be adopted (e.g. the 2002 value used by the Commission in the Airports Inquiry),[204] and that revaluation of land from that date should only be recognised and included in the RAB value if it was necessary for each Airport to earn at least a normal rate of return on the opportunity cost assessed at that date.[205] This echoes the view of Airlines on the appropriate way to establish the initial value of non-land assets in the RAB (i.e. as discussed in paragraph 4.3.44, Airlines consider it would be more appropriate to place greater reliance on historic costs).

4.3.59 Airports, on the other hand, prefer an approach to land valuation under Part 4 known as Market Value Existing Use (MVEU). This is the approach Airports have generally used previously in disclosures. The MVEU approach tends to produce higher valuations than the MVAU methodology because, as discussed further below, the former includes a premium above MVAU for all past costs of airport specific land conversion (even those incurred in the distant past), whereas the latter does not. That said, land conversion costs may nonetheless be included under a regulatory regime even if an MVAU approach is used, but it would not be recognised in the value of land—the costs would be recognised separately by way of a non-land regulatory asset instead.

4.3.60 The way in which the MVAU methodology must be applied is set out in Schedule A of the IM Determination. This methodology must be applied by an independent valuer on behalf of the Airport.

Treatment of items associated with past investments in land conversion

4.3.61 As noted above, a key difference between the values produced by MVAU and MVEU can be caused by the treatment of past costs incurred to convert land for use as an Airport. The issue is whether or not these items should be included in the RAB, and if so, how these should be valued. The items relate to activities such as the levelling of land when the Airport was first built, and protecting or stabilising land by the construction of seawalls.

4.3.62 Airports argue that all such items should be treated as specialised assets, and thus included in the RAB.[206] In the main, however, past investments in the conversion of land for use as an airport will have contributed to the value of land in an alternative use. These costs will therefore be reflected in a higher MVAU valuation than would

could be assigned to certain parcels of land with no efficiency consequences, while land that is not closely tied to the relevant specialised assets has a higher opportunity cost. However, only land that is used to supply specified airport services is included within the RAB, so it is likely that all the land is closely tied to the value of specialised assets. In addition, a downward adjustment to land values on this basis would be no different to a downward adjustment to the value of non-land assets. The Commission has therefore rejected the proposal made by Frontier. Refer: Frontier Economics, *Input Methodologies Draft Reasons Paper Comments Prepared for Air New Zealand*, 12 July 2010, pp. 7-8.

204 For example: Air New Zealand, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, p. 33, paragraph 121; Frontier Economics, *Input Methodologies Draft Reasons Paper Comments Prepared for Air New Zealand*, 12 July 2010, p. 9.

205 BARNZ, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, pp. 6 and 12, Table X2.

206 Refer, for example: Infratil, *Airport Services Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010. Airports propose establishing the value of specialised assets on the basis of the costs of replacement. In the case of conversion costs, this would be equivalent to treating land that has already been levelled as if this was not yet the case, and then assessing the cost in today's terms of carrying out the levelling that was undertaken many years ago.

otherwise have been the case (e.g. levelled land is typically more valuable than unlevelled land and the value of land will rise during the period in which it is held). This consideration sets items related to land conversion apart from the non-land assets considered above.

4.3.63 Inclusion of the majority of these land conversion items as separate non-land assets in the RAB is unlikely to have any effect on Airports' incentives to invest in future. Airports are likely to have already fully recovered these costs in the past. Since the value of any costs that remain outstanding will be captured at the start of information disclosure regulation under Part 4 by the fresh valuation of land (if indeed any of these costs have not yet been fully recovered), it is appropriate that profits appear excessive if Airports attempt to recover an amount for these costs that exceeds the amount implied by the MVAU valuation of land. While inclusion of the majority of these items will not enhance Airports' incentives to invest in future, their exclusion will not harm those incentives either.

4.3.64 No evidence has been presented to suggest that this proposition is incorrect. Including most of these items would therefore have no other effect than to reduce the apparent level of profitability for an Airport for a given level of pricing. This would be likely to materially increase the level of prices that Airports could justifiably charge their consumers without consumers receiving any offsetting benefit. Absent any clear reason to include these items, such an approach would therefore appear undesirable in Part 4 terms.

4.3.65 There are, however, some exceptions to the general proposition outlined above. Recognition of past investments is required where the expenditure has been incurred relatively recently and would not be expected to affect the value of land in an alternative use. In these cases, profits will appear excessive if Airports attempt to recover these costs unless these items are included in the RAB and assigned a value.

4.3.66 Investments which have negligible effect on the value of land in an alternative use have therefore been permitted into the initial RAB.[207] It is appropriate to recognise the specialised nature of these investments. These investments should be depreciated, just as with other non-land assets, using a finite asset lifetime. Airports appear to have adopted this treatment for the relevant assets that have been discussed during consultation. As a result, the IM Determination simply states that items related to land conversion are to be excluded from the initial RAB and provides a relevant definition (notably, the seawall at AIAL is to be included as a non-land asset).

4.3.67 This treatment of past conversion costs clearly falls short of the treatment desired by Airports.[208] The use of existing regulatory valuations to establish the initial value of

[207] For the avoidance of doubt, the IM Determination has identified the construction of a seawall at AIAL as an asset that should not be excluded from the initial RAB. The Commission has also identified the development of the Runway End Safety Area (RESA) at WIAL as a recent conversion cost that would not yet be fully depreciated and so should be included in the RAB value. The RESA is classified as a civil works in WIAL's disclosure statements, and therefore does not need to be explicitly allowed for in the Determination. This list is clearly not exhaustive.

[208] Auckland Airport, *Submission to the Commerce Commission on Draft Input Methodologies Determination (Airport Services)*, 12 July 2010, pp. 5, 21, paragraphs 17d, 115; Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, pp. 28, 35-36, paragraphs 111, 150-152; NZ Airports, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, 12 July 2010, p. 7, paragraph 28; NZ Airports, *Submission on Draft*

non-land assets in the RAB will, however, result in a treatment overall that is favourable to Airports relative to the costs that were originally incurred when assets were installed. Airports have not provided any evidence to suggest that they will not be able to earn at least a normal return on the original costs of their investments before profits appear excessive.

4.3.68 Thus in no way would this treatment of past land conversion costs jeopardise the Airports' future investment incentives, particularly in the context of an information disclosure regime. Including these costs would simply have the effect of increasing the ability of Airports to earn higher future profits before those profits appeared excessive.

Treatment of remediation costs when estimating opportunity cost

4.3.69 In undertaking MVAU valuations of airport land, Airports should not account for anticipated 'remediation costs' (i.e. the costs of converting land for an alternative use). Airports must recognise actual remediation costs in financial disclosures at the time those costs are incurred (i.e. when an Airport undertakes remediation and pays for it or, alternatively, disposes of a piece of land without undertaking remediation but at a discounted price).

4.3.70 This is a topic upon which the Commission received contrasting views from different Airports, and from different Airlines. Oxera (on behalf of the NZAA) has noted that it is "unlikely that remediation costs will be insignificant",[209] but CIAL has nevertheless offered support for ignoring remediation costs.[210] Frontier Economics (on behalf of Air NZ) also broadly supports an approach that ignores anticipated remediation costs when assessing the MVAU of the land.[211] By contrast, Property Advisory Limited (on behalf of BARNZ) has argued that certain remediation costs should be taken into account when assessing the MVAU of the land.[212]

4.3.71 Recognising remediation costs only as they are incurred will mean that, in years prior to that, the RAB value used to calculate the ROI will be higher.[213] This implies that Airports could set higher prices during that period without profits appearing excessive (compared to the option of requiring remediation costs to be estimated and deducted from the land value at the time an MVAU valuation is undertaken). Even if

Information Disclosure Determination and Draft Reasons Paper, 12 July 2010, p. 35, paragraph 150; Wellington International Airport Ltd., *Submission on the Draft Input Methodologies & Information Disclosure (Airport Services) Determinations and Draft Reasons Papers*, 12 July 2010, p. 5, paragraph 12.2.

209 Oxera Consulting Ltd., *Valuation of airport assets - Expert report prepared at the request of New Zealand Airports Association*, 12 July 2010, p. 18, paragraph 4.11.

210 Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, p. 28, paragraph 109.

211 Frontier Economics, *Input Methodologies Draft Reasons Paper, Comments Prepared for Air New Zealand*, July 2010, p. 7.

212 BARNZ, *Submission on Airports Draft Reasons Paper and Draft Determination - Property Advisory Letter - Schedule A,* 12 July 2010, p. 5, paragraph 24.

213 Requiring Airports to recognise actual remediation costs when they are incurred also gives Airports flexibility in how they incur and recognise remediation costs, to reflect the way these costs may actually be incurred in the future. Airports may recognise remediation costs in their financial disclosures as operating expenditure, as capital expenditure, or as a reduction in the sale price for unremediated land.

Airports acted in this way, however, the NPV of the disclosed cash flows over the whole period would be the same in both cases.

4.3.72 It is therefore not necessary to engage in the potentially costly and uncertain exercise of estimating the cost of remediating land. Both approaches are equivalent in NPV terms, and are therefore consistent with promoting outcomes consistent with outcomes produced in workably competitive markets. The primary reason for preferring this approach is that it does not result in write-downs of the RAB value of land when Airports make investments that would be costly to reverse (e.g. if a runway was installed then this would imply increased costs of remediating land, which would lower the value of land). This would not be consistent with Airports having appropriate incentives to invest.

4.3.73 When undertaking an MVAU valuation, the airport land must therefore be assumed to be vacant and unencumbered by any airport related improvements.

Treatment of future development land

4.3.74 Land is to be excluded from the RAB unless it is currently used in the supply of specified airport services. This means that land being held or developed for future use—i.e. future development land—will not be included in the initial RAB.[214] Airports can nevertheless expect to be able earn a full return on and of the costs incurred in holding and developing this land without profits appearing excessive, provided it is eventually commissioned for use to supply airport services. This land will therefore enter the RAB once demand is sufficient to justify expansion of the Airport – not before.

4.3.75 Airports have opposed this approach on the basis that they do not consider there is good reason to depart from the approach they currently adopt, which is to include some or all future development land in the asset base.[215] They also consider there is a "clear statutory directive" to include future development land in the RAB value immediately.[216] By contrast, Airlines have supported the reasoning set out below.[217]

4.3.76 In reaching its view on this matter, the Commission notes that no specific treatment is implied by the reference to workably competitive markets. While capacity constraints could cause higher prices for services supplied using existing land before congestion eases,[218] relationships between suppliers and consumers could be such that the price would not rise until additional land comes into service, or price rises

214 This discussion focuses on land assets held for future development. However, the relevant requirements of the IM Determination apply to all assets (land and non-land) held for future use in the provision of specified airport services.

215 For example: NZAA, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 7, 36-40, paragraphs 28, 156 -174, 176-177, 179 and 182; Oxera Consulting Ltd, , *Valuation of airport assets - Expert report prepared at the request of New Zealand Airports Association*, 12 July 2010, p. 20, paragraph 4.24; AIAL, *Submission to the Commerce Commission on Draft Input Methodologies Determination (Airport Services)*, 12 July 2010, pp. 11 and 20, paragraphs 53-56 and 113-114; Wellington International Airport Limited, *Submission on the Draft Input Methodologies & Information Disclosure (Airport Services) Determinations and Draft Reasons Paper*, 12 July 2010, p. 4, paragraph 12.1.

216 NZAA, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 7.

217 Air New Zealand, *Cross Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, pp. 5 and 21, paragraphs 22 and 110; BARNZ, *Cross Submission on Commerce Commission Input Methodologies (Airport Services) Draft Determination and Draft Reasons Paper*, 3 August 2010, pp. 3-4 and 23-25.

218 As suggested by, for example: Auckland International Airport Limited, *Post-Workshop Submission,* 8 March 2010 *Attachment: A. Kahn, Statement on behalf of Auckland International Airport Limited*, 10 August 2001, p. 6.

could be delayed even further into the future in order to encourage greater utilisation of the associated assets in the short- to medium-run.

4.3.77 The treatment of future development land is based instead on the indirect incentives that the treatment would be likely to create under information disclosure regulation. Airports should not have an incentive to acquire land imprudently, nor to hold land indefinitely without developing it. Requiring that land is currently used before it enters the RAB places the risk of ultimate non-development on the Airports (i.e. profits will appear excessive if Airports attempt to earn a return on the value of the land before it is developed in order to supply specified airport services).[219] Given that Airports are best placed to manage this risk, it is reasonable that they are the ones that are required to bear it. Under this treatment there is a possibility that Airports will attempt to commission new capacity imprudently or in advance of the time that they otherwise would have. In practice, the incentives to attempt this are limited, because interested persons will have sufficient information to be able to assess whether or not such an attempt has been made.

4.3.78 The alternative treatment would be to include future development land before it is currently used. This would appear to provide Airports with little if any incentive to avoid investment in land they own but do not use. It would also provide greater incentive to invest in land speculatively.

4.3.79 The Commission has given careful consideration to the Airports' arguments that there is a "statutory directive" to include future development land in Airports' RAB values.[220] Even though holding future development land forms part of the regulated services, it does not follow that the Commission must set an IM for the valuation of assets that treats future development land in the same manner as land currently in use. There is no express provision under Part 4 that requires such an approach. As discussed above, such an approach is not required by reference to workably competitive markets. While it is debatable exactly when the holding costs relating to future development land would be recovered in a workably competitive market, it is likely that such a market would provide discipline on a firm to commence development at an efficient time.

Rolling forward the initial RAB value of land and non-land assets over time

4.3.80 Turning now to the way that the initial RAB value is updated over time, decisions have been required around the appropriate form of depreciation and the way in which revaluations are to be calculated.

4.3.81 The IM provides that these regulatory valuations be linked to CPI-indexation to preserve the value of supplier's investments in real terms. Airports will also have the opportunity to revalue their land to reflect the opportunity cost of their land, should they so desire. This provides the correct signal that they will consistently be able to charge on the basis of the opportunity costs of using land to supply specified airport services without profits appearing excessive. As discussed in Chapter 2, all

[219] That said, the risks are modest under an information disclosure regime, not least because land could be sold—given that it has a value in an alternative use— and any residual risk relates to holding and development costs.

[220] NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 7.

revaluations of land and non-land assets must be treated as income under information disclosure regulation (i.e. when assessing profitability).

4.3.82 For non-land assets straight-line depreciation is to be applied as the standard depreciation approach. An Airport may nonetheless apply a non-standard approach should they so desire, provided disclosure of the change and its impacts are made. This assists interested persons in assessing whether the approach adopted by Airports is consistent with the Part 4 Purpose being met. For land, no depreciation is to be applied; it is simply to be revalued instead.

4.3.83 For non-land assets, the advantages of CPI-indexation and straight-line depreciation (together) are relatively straightforward. In addition to protecting the regulatory value of each regulated supplier's investment in real terms, depreciation is calculated in a simple, transparent and well-understood form. It also results in a cash flow profile that is generally consistent with a prudently financed supplier meeting both their debt obligations and the costs of new investment (i.e. consistent with s 52A(1)(a)). This approach is consistent with the approaches that are used by the majority of regulators of similar services in Australia and the UK.

4.3.84 The following sections outline the key issues related to revaluations that have arisen during consultation. Further detail in relation to depreciation can be found in Appendix C (see Section C11).

Revaluations

4.3.85 Airlines have expressed broad support for the use of CPI-indexation for land and non-land assets.[221] The Airlines also appeared to support periodic revaluations of land using an MVAU approach so long as revaluation gains are appropriately treated as income.[222]

4.3.86 Airports have, however, argued that on-going replacement cost-based valuations and/or a producer/construction price index would be more appropriate than CPI-indexation for rolling forward the value of non-land assets.[223] The Commission has rejected this approach for the following reasons:

- replacement cost-based valuations are not required to promote outcomes consistent with outcomes produced in workably competitive markets;

221 BARNZ, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 6, Table X2.

222 The submission received from Air NZ on the Draft Decisions did not discuss MVAU valuations in the context of rolling forward the RAB value. BARNZ, however, appeared to support such an approach provided revaluation gains were appropriately treated as income for price monitoring purposes. Refer, for example: BARNZ, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 6. The Commission notes that upward and downward revaluations from the date of the initial RAB will be treated consistently. However, for the reasons explained in this chapter, material downward adjustments to regulatory valuations of non-land assets would not be appropriate when establishing the initial value of the RAB.

223 NZAA, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, pp. 21 and 42, paragraphs 82 and 194; Christchurch International Airport Ltd, Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services, 12 July 2010, pp. 36-37 and 37-38, paragraphs 156-158 and 162-165; PwC, *Response to the Discussion of Asset Valuation in the Draft Decisions Document*, 12 July 2010, p. 19, paragraph 4.4; Wellington International Airport Limited, *Submission on the Draft Input Methodologies & Information Disclosure (Airport Services) Determinations and Draft Reasons Paper*, 12 July 2010, p. 6, paragraph 12.4.

- the main argument against a replacement cost-based approach relative to CPI-indexation is that the former implies a counter-intuitive cash flow profile when revaluation gains are treated as income during profitability assessments. This is because the faster that the cost of replacing assets increases relative to the CPI in any given assessment period, the lower the revenues that an Airport will be able to earn during that period before their profits appear excessive (i.e. once the potential future income associated with asset revaluation has been accounted for);

- the Commission does not consider that a replacement cost-based approach involving optimisation provides better incentives for efficient investment by Airports, because they require notionally reconfiguring the Airport in ways that may be impossible for the Airport to achieve in practice (i.e. that are now prohibitively expensive given the existing configuration of assets); and

- taking an existing valuation and rolling it forward for actual capital expenditure, depreciation and CPI-indexation—despite some uncertainty inherent in the CPI—provides far more predictable valuation outcomes than periodic replacement cost-based revaluations. Certainly the resulting value is objectively verifiable and auditable *ex post*. This transparency is particularly beneficial in the context of an information disclosure regime.

CHAPTER 5: TREATMENT OF TAXATION

5.1 Introduction

IM for the treatment of taxation

5.1.1 The IMs relating to specified airport services must include, to the extent applicable to information disclosure regulation, the "treatment of taxation" (s 52T(1)(a)(iv)).

5.1.2 The IM for the treatment of taxation sets out the methodology that is to be used to determine the regulatory tax allowance for each Airport. This is primarily affected by the depreciation deduction that is used for regulatory tax purposes.

5.1.3 Tax costs are one of the main types of costs facing Airports, and are therefore a key part of any assessment of an Airport's profitability. In practice, the task of determining the tax costs associated with the supply of specified airport services is not a straightforward one because, as is discussed in the cost allocation chapter (Chapter 3), all three Airports supply a range of unregulated services. Since tax is paid to the Inland Revenue Department (IRD) on a whole-of-business basis, the tax costs associated with the supply of specified airport services are not directly observable.

5.1.4 The tax costs associated with the supply of specified airport services could be determined in the same manner as other operating costs—i.e. by applying the cost allocation IM to the tax costs associated with all the Airport's regulated and unregulated activities. However, tax obligations arise as a consequence of many other operational and capital decisions made by the Airport. It is therefore possible that applying a tax cost allocation methodology in its own right might result in an allocation of tax costs that is inconsistent with the other costs allocated to specified airport services.

5.1.5 Tax costs associated with the supply of specified airport services must consequently be calculated by applying the corporate tax rate to regulatory taxable income. Regulatory taxable income is the total regulatory income *less* expenses associated with the supply of airport services. These expenses are allocated to specified airport services by applying the cost allocation IM, but adjusting for any revenue or expenses not recognised as assessable or deductible under tax legislation (e.g. revaluation gains or losses).

5.1.6 Thus, the main expression for estimating tax costs, subject to potential adjustments, will be:

Total Regulatory Income

– Depreciation deduction for regulatory tax purposes

– Other deductions and adjustments for regulatory tax purposes (e.g. deductible opex, interest)

= Regulatory Taxable Income

× Corporate Tax Rate

= Regulatory Tax Allowance

Application of the IM for the treatment of taxation

5.1.7 As Airports are only subject to information disclosure regulation, the IM for the treatment of taxation only applies to the way in which profitability is reported. This in turn affects the way in which interested persons can assess an Airport's profitability performance, in order to assist those persons to assess whether the purpose of Part 4 is being met (which is the purpose of information disclosure regulation set out in s 53A). Airports will therefore need to provide 'sufficient' information on the assumptions that underpin the tax calculation to satisfy the needs of interested persons.

Overview of the IM and structure of this chapter

5.1.8 This chapter provides an overview of, and reasons for, the treatment of taxation for specified airport services. As no submissions were received on the Commission's draft decisions in relation to taxation, and no reasons have emerged to change the substance of the draft decisions, no substantive changes have been made to those draft decisions.

Table 5.1 Summary of IM for the Treatment of Tax for Airports

Approach in IM	Where discussed
An Airport's tax obligations should be estimated using a 'tax payable' approach.	Section 5.3
The cost allocation IM is to be applied, and tax legislation is to be applied (to the extent practicable and subject to other relevant provisions in the IMs), to calculate the regulatory taxable income.	Appendix D, Section D2
Tax deductible debt interest should be calculated using a notional leverage that is consistent with the cost of capital IM.	Appendix D, Section D2

Approach in IM	Where discussed
Tax losses in an Airport's wider tax group should be ignored when estimating tax costs, and any tax losses generated in the supply of airport services should be notionally carried forward to the following disclosure year.	Appendix D, Section D2
The regulatory tax asset value of assets acquired from another Airport or from a supplier of another type of regulated service should remain unchanged in the event of an acquisition of assets used to supply services under Part 4.	Appendix D, Section D2
The initial regulatory tax asset value should be the lesser of that recognised by the Inland Revenue Department (IRD) for the relevant assets or share of assets used to supply airport services, and the initial RAB value.	Appendix D, Section D2

5.1.9 The remainder of this chapter is structured as follows:

- Section 5.2 sets out the key considerations in determining the IM for the treatment of taxation; and
- Section 5.3 sets out the overall approach to the treatment of tax for Airports under Part 4 and the Commission's reasons to support this approach.

5.1.10 Further details about the IM for the treatment of taxation can be found in Appendix D. This briefly discusses the application of the methodology to information disclosure regulation. It also sets out detailed components of the methodology, including:

- the other deductions used for regulatory tax purposes and the way in which they are estimated;
- the tax treatment of acquisitions;
- the way in which the initial regulatory tax asset value is established (where appropriate); and
- the treatment of tax losses.

5.2 Key Considerations in Determining the IM for Treatment of Tax

5.2.1 This section discusses the statutory guidance available to the Commission in setting an IM for the treatment of tax, and the Commission's interpretation of that guidance.

5.2.2 An IM for the treatment of taxation is intended to promote certainty for suppliers and consumers in relation to the way that tax costs are to be treated for information disclosure purposes (i.e. s 52R). It must promote this purpose and the Part 4 Purpose (i.e. s 52A(1)) in light of the purpose of the relevant regulatory instrument, which in the case of Airports is only information disclosure regulation.

5.2.3 Therefore, this section considers the ways in which the treatment of taxation for Airports can assist interested persons in assessing whether the Part 4 Purpose is being met (i.e. s 53A). Following on from this, as signalled in Chapter 2, the Commission has asked itself what guidance 'promoting outcomes consistent with outcomes produced in workably competitive markets' provides when making decisions on the treatment of taxation IM. It has also considered how each of the regulatory objectives in s 52A(1)(a)-(d) are relevant to the decision, and whether there are any practical constraints on the treatment of tax under Part 4.

Insights from workably competitive markets

5.2.4 Apart from covering capex and opex, efficient suppliers providing services in workably competitive markets will generally expect their revenues to cover the tax costs that arise as a consequence of their business decisions. As a result, in workably competitive markets, profits would on average be expected to be just sufficient to reward investment, innovation and efficiency.

5.2.5 However, the exact time at which suppliers recover tax costs in workably competitive markets will vary, according to supply and demand conditions prevailing at the time or as determined by the terms and conditions of any long-term contractual arrangement agreed previously. Many permutations for cost-recovery are therefore potentially valid, given the particular context, provided it is consistent with suppliers having the opportunity to earn an adequate level of profitability over time, after having met their tax obligations to the relevant tax authority.

Implications for the treatment of taxation under Part 4

5.2.6 The regulatory objectives contained in s 52A(1)(a)-(d) of the purpose statement suggest, however, that an appropriate treatment of taxation under information disclosure regulation will likely need to be informed by a number of additional considerations.

5.2.7 First, as noted in Chapter 2, the Commission has interpreted 'profits just sufficient to reward investment, innovation and efficiency' as meaning that its decisions should be consistent with expected profitability levels that are closer to, rather than further from, an expectation of a normal rate of return over time (i.e. FCM). This is reinforced in s 52A(1)(d), which requires that the outcomes promoted under Part 4 must be consistent with outcomes produced in workably competitive markets, such that suppliers are limited in their ability to extract excessive profits.

5.2.8 Second, the Commission considers that a focus on incentives for tax efficiencies on their own ought not to outweigh the consideration of incentives to promote improvements in overall economic efficiency, consistent with s 52A(1)(b). It is difficult to conclude that decisions with very different tax consequences are not equally legitimate. This is because tax liabilities arise as a result of many other business decisions and as such a move that increases tax costs may be desirable, provided they lead to, or are caused by, a reduction in costs overall. Tax efficiency savings are therefore only desirable insofar as they are consistent with a reduction in costs overall (i.e. that they are to the long-term benefit of consumers).

5.2.9 Air NZ and BARNZ agree with this conclusion.[224] NZAA and the regulated Airports share the opinion that improvements in overall efficiency and tax efficiency are not mutually exclusive: tax efficiency is one component of how a regulated supplier can improve its overall efficiency.[225] The Commission agrees with this view. However, the Commission considers that, to the extent that suppliers have incentives to price in line with the IMs that are set, the treatment should be primarily motivated by the effect it will have on overall economic (not tax) efficiency (consistent with s 52A(1)(b)).

5.2.10 Third, the Commission considers that the treatment of taxation should generally be consistent with flat aggregate prices in real terms, unless economic depreciation suggests otherwise. This proposition reflects that flat aggregate pricing over time is consistent with allocative efficiency in workably competitive markets (i.e. consistent with suppliers having incentives to improve economic efficiency and thus s 52A(1)(b)). This is because, where all other things are equal (i.e. consumer preferences do not change), the efficient Ramsey prices for a regulated monopolist subject to a normal profit constraint will be constant prices in real terms.[226] A flexible approach to regulatory depreciation is intended to accommodate situations in which this is not likely to be the case (Chapter 4).

5.2.11 Finally, the tax treatment of transactions should recognise that, in workably competitive markets, the efficiency gains from those transactions, assuming such gains eventuate, will be shared with consumers over time, consistent with s52(1)(c). On the other hand, in workably competitive markets, risks tend to be allocated to those market participants that are best placed to manage them. This is likely to reduce the overall costs of supply, and therefore be consistent with the long-term benefit of consumers.

5.2.12 One way to promote outcomes consistent with both of these considerations is to allow the net tax benefits (or costs) of a transaction to be borne by an Airport. These will be more significant in the case of major asset acquisitions rather than share purchases. Doing so recognises that the Airport should retain some benefits of the transaction as a reward for improved efficiency and investment, thereby assisting in promoting efficient investment (consistent with s52A(1)(a) and (b)). It also recognises that the Airport is best placed to manage the risks should the efficiency gains from the transaction not eventuate as planned. Nonetheless, if there are other efficiency gains achieved through the transaction that are not tax-related, then these should be shared with consumers over time.

5.2.13 In the airports sector, however, major asset acquisitions (as opposed to share purchases) are not common. The issues associated with the tax consequences of transactions should nonetheless be recognised, as welfare-enhancing trades are to the

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224 Air New Zealand Limited, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 65, paragraph 185; BARNZ, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 52.

225 NZAA, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 77; AIAL, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 69; WIAL, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 54.

226 Refer, for example: W. Baumol, Optimal depreciation policy: Pricing the products of durable assets, *Bell Journal of Economics and Management Science* Vol. 2, 1971, 638-656; and W. Rogerson, Optimal depreciation schedules for regulated utilities, *Journal of Regulatory Economics* Vol. 4, 1993, pp. 5-33).

long-term benefit of consumers. An appropriate mechanism under information disclosure regulation is one which would not, to the extent practicable, suggest that suppliers are earning excessive profits when they are simply retaining the net tax benefits of an acquisition which has the potential to improve efficiency overall.

5.3 Treatment of Taxation under Part 4

5.3.1 The overall approach to taxation primarily requires definition of the appropriate depreciation deductions for regulatory tax purposes in the formula given in paragraph 5.1.5 (i.e. a tax expense—with or without a deferred tax balance—or a 'tax payable' approach).[227]

5.3.2 The Commission's decision is that an Airport's tax obligations should be estimated using a 'tax payable' approach. This corresponds to the use of regulatory tax depreciation as a deduction for regulatory tax purposes (as opposed to regulatory depreciation).

Commission's reasons

5.3.3 When compared to the other main approaches (discussed further below), the tax payable approach comes closest to approximating the cash flows an Airport would need to meet their tax obligations to the IRD for any given period. This is an appropriate approach under information disclosure regulation as it will, over time, allow interested persons to assess the extent to which Airports are being remunerated for the tax costs that are estimated to arise in each period as a result of the prices that the Airports have chosen to set 'as they see fit'. The tax payable approach is supported by BARNZ and Air NZ.[228]

5.3.4 In particular, the tax payable approach is consistent with Airports expecting to earn profits at least sufficient to reward innovation, investment and efficiency, while also being consistent with Airports being limiting in their ability to extract excessive profits (i.e. over-recover their tax costs). Moreover:

- the tax payable approach is consistent with a relatively flat pricing profile in real terms over time when implemented alongside CPI-indexed straight-line depreciation of the RAB value (i.e. in line with the Commission's decision for the standard asset valuation roll forward approach to apply to depreciable assets);
- the tax payable approach is consistent with Airports having incentives to pursue overall improvements in efficiency, whilst not disincentivising any improvements in tax efficiency that would be to the long-term benefit of consumers; and
- as discussed below (paragraphs D2.11 - D2.16), a tax payable approach can be implemented in a way that the Airport retains the net tax benefits (or costs) of the transaction, thereby promoting incentives for efficiency-enhancing trades,

[227] An explanation of the main approaches can be found in Section 7.3 of the IM Discussion Paper - Commerce Commission, supra n 33, Chapter 7.

[228] BARNZ, *Pre-Workshop Submission on the Input Methodologies (Airport Services) Emerging Views Paper*, 3 February 2010, p. 3; Air New Zealand Limited, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 28.

while protecting consumers from the downside of transactions that do not achieve the expected gains.

Alternatives considered by the Commission

5.3.5 The main alternative to a tax payable approach were two variants of the tax expense approach:

- the first, *without* a deferred tax balance adjustment to the RAB value (i.e. 'tax expense'); and
- the second, *with* a deferred tax balance adjustment to the RAB value (i.e. 'deferred tax').

Tax expense approach

5.3.6 The most material way that a 'tax expense' approach to measuring tax costs differs from a tax payable approach is in the depreciation deduction for regulatory tax purposes. An implicit assumption in the tax expense approach is that the depreciation for regulatory tax purposes is the same as regulatory depreciation, rather than the tax deduction actually recognised under tax rules (which is found by applying tax depreciation rates to the regulatory tax asset value of the regulated supplier). Thus, a tax expense approach corresponds to the use of regulatory depreciation as a deduction for regulatory tax purposes (as opposed to regulatory tax depreciation). It is therefore not intended to provide a good estimate of the actual tax obligations facing an Airport (in present value terms).

5.3.7 The tax expense approach was supported by NZAA, WIAL and AIAL, with the main arguments advanced in favour of it being that it:

- is the least cost approach that will sufficiently inform interested persons as to whether the Part 4 Purpose is being met, since the use of a tax payable approach would not materially impact any long-run assessment of ROI for Airports;[229]
- does not require separate management and allocation of tax assets and tax depreciation that are required by the tax payable approach;[230]
- complies with International Financial Reporting Standards;[231] and
- incentivises tax efficiencies.[232]

5.3.8 Submissions on behalf of airlines, however, argued against the tax expense approach on the basis that the tax expense approach "is not consistent with suppliers being limited to an expectation of earning a normal return over time and that such an approach would not be consistent with s 52A(1)(d)".[233]

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229 AIAL, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, pp. 72-73.

230 NZAA, *NZ Airports Cross-submission on Input Methodologies Discussion Paper,* 28 August 2009, p. 39.

231 NZAA, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 50.

232 AIAL, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 69.

233 BARNZ, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 52.

5.3.9 The tax expense approach is slightly simpler than a tax payable approach to implement, as it does not require information about the regulatory tax asset value to be maintained separately from information on the RAB. However, this benefit is not sufficient to outweigh the fact that the tax expense approach is inconsistent with being able to effectively monitor whether Airports are being limited to an expectation of earning a normal return. This is because the tax expense approach is not equivalent in present value terms to a tax payable approach, and the tax payable better reflects the actual tax costs faced by a regulated supplier.

5.3.10 In addition, it is unclear why a tax expense approach should provide stronger incentives for tax efficiencies than using a tax payable approach, or why it is necessary for the tax treatment to imply that Airports should be able to justify greater than normal returns in order to incentivise efficient investment. To ensure appropriate incentives for investment, Airports must expect to be able to justify at least a normal return on their future investments. The tax payable approach provides such an expectation. The tax expense approach does no more than suggest that an expectation of greater than normal profits would be justified.

5.3.11 In addition, the New Zealand Equivalents to International Financial Reporting Standards, in particular NZ IAS 12, require a deferred tax approach to be used, not the tax expense approach preferred by the Airports. The Commission has consequently not been persuaded that it should implement a tax expense approach.

'Deferred tax' approach

5.3.12 For regulatory purposes, a deferred tax approach is intended to adjust the tax expense approach to be consistent with suppliers expecting to earn normal profits over time. A deferred tax adjustment—which is applied to the RAB value—corrects for the over-compensation for tax costs in present value terms that would otherwise be implied by the tax expense method. However, although for regulatory purposes any deferred tax approach is intended to be NPV-equivalent to the tax payable approach, such is not the case for financial reporting purposes. Also, any deferred tax approach implies a different distribution of tax costs across time to that of a tax payable approach.

5.3.13 While one implementation of a deferred tax approach has had strong support from suppliers of regulated electricity distribution services and gas distribution services, a deferred tax approach was not supported by any submitters in relation to information disclosure regulation of specified airport services. AIAL and CIAL in particular raised concerns about the complexity of the approach. For example, AIAL notes in its submission on the Provisions Paper that deferred tax approaches "give rise to various time-consistency issues which can become quite unmanageable, particularly in a world where prices are not subject to formal price control".[234] In its submission on the IM Discussion Paper, BARNZ agreed with this view expressed by AIAL.[235]

5.3.14 All other things being equal, it is desirable under information disclosure regulation for the tax costs disclosed by a supplier in each disclosure period to be more (rather than less) reflective of the tax obligations arising as a result of the costs and

234 AIAL, *Submission to the Commerce Commission on the Regulatory Provisions of the Commerce Act 1986 Discussion Paper,* 16 February 2009, p. 36, paragraph 184.

235 BARNZ, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 52.

revenues attributable to that period. The Commission has therefore rejected the deferred tax approach when making its decisions on the IM for the treatment of taxation to apply to specified airport services.

CHAPTER 6: COST OF CAPITAL

6.1 Introduction

6.1.1 Section 52T(1)(a)(i) requires the IMs relating to a particular good or service to include, to the extent applicable under the relevant type of regulation, an IM for the cost of capital. This chapter summarises the IM for estimating the cost of capital, its key parameters, and the reasoning which underpins the cost of capital IM.

An IM for estimating the cost of capital

6.1.2 The IM sets out how the Commission is to estimate a cost of capital for regulated services. The cost of capital is the financial return investors require from an investment given its risk. Investors have choices, and will not invest in an asset unless the expected return is at least as good as that they would expect to get from a different investment of similar risk. The cost of capital is an estimate of that rate of return.

6.1.3 There are two main types of capital: debt and equity capital. Both have a cost. For debt, it is the future interest payments. For equity, it is the expectation of dividend payments by the firm, and where profits are retained and reinvested, the expectation of larger dividend payments by the firm some time in the future. The cost of capital reflects the cost of debt and the cost of equity, and the respective portion of each that is used to fund the investment.

6.1.4 The cost of capital, in particular the cost of equity, cannot be observed directly.[236] Rather it must be estimated from the available data using a number of tools and techniques. This is not a simple task. The available tools are imperfect, the data can be hard to obtain or unreliable, and can change over time. Older data can be re-interpreted in new ways; newer data may call into question previous assumptions. The cost of capital is forward-looking. That is, it reflects expectations of the returns required in the future, which cannot be observed in advance.

6.1.5 In estimating the cost of capital, there are also choices around the analytical models to be used, over the level of each parameter, and around the estimate of the cost of capital to be applied under the different regulatory instruments. The estimation of a cost of capital is not a mechanical task. To determine the methodology for estimating the cost of capital, and to assure itself that the estimate is reasonable and meets the Part 4 Purpose and the purpose statement of information disclosure regulation, the Commission has had to exercise a degree of judgement over these matters. The Commission has carefully considered the effect of a number of choices individually and in combination. The Commission has used its IM to estimate the cost of capital based on current market conditions. It has then tested the resulting estimate of the cost of capital against a range of market information to ensure the IM is reasonable and commercially realistic, in the context of how the cost of capital is to be applied in regulation under Part 4.

[236] The cost of equity, expressed as a rate of return, is the discount rate implicit in the price at which equity can be raised (given the investors' expectations of future cash flows which they will derive or have claim to). This discount rate cannot be directly observed or calculated because the investors' true expectations cannot be directly observed.

Application of the IM

6.1.6 The IM specifies how the cost of capital will be determined. The cost of capital varies between different services.

6.1.7 The cost of capital IM does not specify the cost of capital for a regulated service directly. Rather, it sets out the methodology for determining the cost of capital for each service. Some parts of the IM specify values for certain parameters, such as tax rates, while other parts specify a methodology for obtaining estimates where information is constantly changing, such as interest rates.

6.1.8 The cost of capital as set out in the IM comprises two parts. The first and most significant component is the weighted average cost of capital (WACC). The WACC is determined for each regulated service and applies to all regulated suppliers of that service. The second component is the term credit spread differential which is treated as a separate component because it will apply to qualifying firms only. Although it is conceptually a component of the cost of capital, for the purposes of this IM it is treated as an adjustment to cash flows (and is included in the ID Determination).

6.1.9 The IM will be used to produce estimates of the cost of capital for regulated services. The estimate of the cost of capital will be used to assess the profitability of regulated suppliers.

Overview of IM and structure of this chapter

6.1.10 There are many complex, technical issues in developing a methodology for determining the cost of capital. Rather than addressing all of these issues fully in this chapter, these issues are discussed in detail in Appendix E to this document, which should be read together with this chapter. Similarly, detailed references to sources are set out in Appendix E and are kept to a minimum in this chapter.

6.1.11 Many issues affecting the development of the cost of capital IM affect all of the services regulated under Part 4. This Paper therefore discusses submissions from all sources, including EDBs, GPBs and Transpower, rather than focusing only on submissions from Airports and airport users.

6.1.12 Table 6.1 sets out the components of the IM for the cost of capital for all regulated suppliers, and indicates where in this paper each component is discussed.

Table 6.1 Summary of IM for the Cost of Capital for Airports

Approach in IM	Where discussed
The cost of capital is an estimate of firms' weighted average cost of capital (WACC) which reflects the cost of debt and the cost of equity used to fund investment.	Sections 6.1, E1, E2
The Commission will publish annually for Airports: • a mid-point estimate of the five-year post-tax WACC and vanilla WACC; and • a 25th percentile and 75th percentile estimate of the five-year post-tax WACC and vanilla WACC.	Sections 6.7, E14

Approach in IM	Where discussed
The methodology for estimating a vanilla WACC is: *cost of debt × leverage + cost of equity × (1- leverage)* The methodology for estimating a post-tax WACC is: *cost of debt (after corporate tax) × leverage + cost of equity × (1- leverage)*	Sections 6.7, E2
For all regulated suppliers of airport services, the cost of debt is estimated as: *risk free rate + debt premium + debt issuance costs*	Sections 6.3, E2
• the risk free rate is estimated by the Commission as part of publishing annual WACCs for all regulated suppliers. The risk free rate is estimated from the observed market yield to maturity of benchmark vanilla New Zealand Government NZ$ denominated nominal bonds with a term to maturity that matches the typical term of Airports' pricing agreements (five years);	Sections 6.3, E4, E14
• the debt premium is also estimated by the Commission as part of publishing annual WACCs for all regulated suppliers as the difference between the risk free rate and the yield on publicly traded corporate bonds for Airports with a Standard and Poors long-term credit rating of A- and a term to maturity which matches the pricing period (typically five years); and	Sections 6.3, E5, E14
• debt issuance costs are 35 basis points (0.35%) p.a.	Sections 6.3, E5
The Airports ID Determination allows qualifying suppliers to disclose a separate allowance for the term credit spread differential, which reflects the additional costs associated with holding a longer-term debt portfolio. The term credit spread differential is used to adjust cash flows in information disclosure regulation. Qualifying suppliers are suppliers with a debt portfolio which has a weighted average original tenor debt portfolio which exceeds the pricing period (typically five years).	Sections 6.1, 6.3, E6
Cost of equity is estimated using the simplified Brennan-Lally CAPM as: *risk free rate × (1- investor tax rate) + equity beta × TAMRP*	Sections 6.4, 6.5, E2
• the risk free rate is the same as for the cost of debt;	Section 6.3
• the equity beta for Airports is 0.72, derived from:	Sections 6.5, E8
o an asset beta for Airports of 0.60; and	Sections 6.5, E8
o leverage of 17%;	Sections 6.6, E3
• the investor tax rate is the maximum prescribed investor tax rate under the PIE tax regime, which is 30% until 30 September 2010 and 28% thereafter. Changes in the prescribed rate will flow through to future WACC estimates automatically; and	Sections 6.5, E10
• the tax adjusted market risk premium (TAMRP) is 7.5% until 30 June 2011 and 7% thereafter. The TAMRP is expressed as a five-year composite rate (to match the term of the pricing period), hence the TAMRP estimated for the five year period which commences on 1 July 2010 is 7.1% and for the five year period which commences on 1 July 2011 is 7%.	Sections 6.5, E7

Approach in IM	Where discussed
The corporate tax rate is 30% up until the end of the 2011 tax year, and 28% thereafter. Changes in the corporate tax rate will flow through to future post-tax WACC estimates automatically.	Sections 6.5, E10
The Commission has compared the expected WACC outputs under the IM against a range of other financial and economic information in order to check that the application of the cost of capital IM produces commercially realistic estimates of WACC for Airports.	Sections 6.8. E13

6.1.13 The rest of this chapter is structured as follows:

- Section 6.2 discusses the key considerations the Commission has had regard to in setting the IM;
- Section 6.3 discusses the cost of debt, with technical detail on the risk-free rate, debt premium and debt issuance costs, and the term credit spread differential discussed in separate sections of Appendix E;
- Section 6.4 discusses the model for estimating the cost of equity;
- Section 6.5 applies the preferred model for estimating the cost of equity. Technical detail on the tax-adjusted market risk premium, asset and equity betas, debt betas, and tax, are discussed in separate sections of Appendix E.
- Section 6.6 discusses leverage;
- Section 6.7 discusses the estimation of a WACC range; and
- Section 6.8 describes how the Commission tested the estimates of the cost of capital produced by the cost of capital IM to ensure they are reasonable.

6.1.14 Three further appendices to this paper discuss the overall approach and framework for estimating the cost of capital; the treatment of asymmetric risks; and the application of the cost of capital IM.

6.2 Key Considerations in Determining the Cost of Capital IM

6.2.1 In setting the cost of capital IM the Commission considered the Part 4 Purpose. The Part 4 Purpose is to promote long-term benefit of consumers by promoting outcomes consistent with outcomes produced in workably competitive markets such that the objectives outlined in s52A(1)(a)-(d) are achieved. The cost of capital IM seeks to ensure expectations are for a normal rate of return similar to that expected in workably competitive markets for activities of comparable risk, such that the Part 4 Purpose is met.

Insights from workably competitive markets

6.2.2 The cost of capital is the expected rate of return that will attract investment. It is the expected rate of return at which investors are willing to invest, because this expected return is as good as they can get from the range of investment choices with similar

risk. Investors can hold a range of investments to limit their risks through diversification. To well-diversified investors, only the risks that affect all investments matter; the risks specific to just one investment can be expected to offset one another and are therefore of little consequence. The return they seek reflects the effect of each investment on the risk of the overall portfolio, not the risk of a single investment viewed in isolation.

6.2.3 The actual rate of return may differ to the expected return. Market and economic developments tend to differ from the expected course of events, and factors such as a successful or unsuccessful new product, decisive or indecisive management actions, or effective or ineffective competitors may result in better or worse than expected returns. However, where a business faces workable or effective competition, a period of returns above the cost of capital cannot be expected to last. The supplier which is earning returns above the cost of capital can attract capital to expand and at the same time other suppliers, eager to maintain their market share and to maximise their own profits, compete hard to catch up. Active and discriminating consumers seek the best deal they can, wherever they can. Through a combination of these processes the superior returns can be expected to erode, and actual returns trend towards a normal rate of return – the cost of capital.

6.2.4 Returns in excess of the cost of capital, are a signal for new investment to occur. In workably competitive markets, investors actively seek new opportunities to invest. In particular, such investors seek opportunities where the expected returns are in excess of the cost of capital. This new investment may be by an existing supplier or by new suppliers, and this new investment increases the supply of services into the markets for the services thus placing downward pressure on returns. Conversely, where expected returns are lower than the cost of capital, some suppliers may exit the industry and invest elsewhere, rather than continue to supply services where the returns are too low.

6.2.5 Firms in workably competitive markets are price-takers not price makers. In such markets, firms cannot expect to earn returns above the cost of capital for an extended period. Nor can firms expect to dictate to the market what the rate of return will be. A firm pricing its product on the basis of its own excessive (i.e. inefficient) estimate of the cost of capital will lose sales and profits to competitors. In workably competitive markets, the price of products is determined by the cost of capital for suppliers in general, not by the cost of capital for an individual supplier. This is particularly relevant where a supplier has constraints on its capital structure. These constraints may elevate the estimated cost of capital for such suppliers above the cost of capital at which less constrained suppliers can access capital. A supplier which sets prices based on a higher estimate of its cost of capital than the actual cost at which capital is available in an industry cannot expect consumers to pay these higher prices. In workably competitive markets, inefficient costs (of capital or otherwise) are borne by the supplier, not the consumer.

6.2.6 Firms in workably competitive markets continue to innovate and invest as this offers the prospect of improved returns, even if the benefits are eventually competed away. And investors remain willing to invest so long as the returns are as good as those available from comparable investments elsewhere.

6.2.7 In summary, a key outcome from workably competitive markets is that it is the market's view of the cost of capital that matters, not the cost of capital specific to one producer, or a producer's view of the cost of capital. Further, where investors choose to have a diversified portfolio of returns, they care principally about how an investment contributes to the risk of their overall portfolio, rather than the specific risks which affect a single investment (as that can be diversified away).

Developing a robust cost of capital methodology

6.2.8 The Commission has taken a number of steps to develop a robust and workable methodology to estimate the cost of capital. In addition to the rounds of consultation outlined in Chapter 1 and Appendix A (which included a two day workshop specific to the cost of capital), these steps included:

- seeking independent expert advice on the cost of capital from a Cost of Capital Expert Panel (described in Chapter 1 at paragraphs 1.4.18 - 1.4.25);
- consideration of the published literature on cost of capital issues; and
- testing the Commission's conclusions on the level of individual parameters, and its estimate of the overall WACC, against a range of financial and economic information.

6.2.9 The results of that extensive programme of work, and extensive consultation process, is summarised in this chapter and the IM Determinations.

6.3 The Cost of Debt

6.3.1 Debt is a source of capital for many firms. The cost of debt to a firm can be expressed as the sum of the risk-free rate – the rate at which the New Zealand Government can borrow – and the additional debt premium above the risk-free rate the firm must pay due to a lender's assessment of the firm's risk of default compared to the risk-free rate. The IM also includes an allowance for the costs of issuing debt. So the cost of debt is as follows:

Cost of debt = risk-free rate + debt premium + debt issuance costs

6.3.2 Each component is discussed in turn below.

Risk-free rate

6.3.3 A risk-free rate is the rate of interest expected when there is no risk of default. Debt issued by the New Zealand Government and denominated in New Zealand dollars is considered to be free of default risk. The rate of interest on Government issued debt can generally be readily observed from the trading on the debt market.

6.3.4 The risk-free rate may either increase with term or decrease with term. When the risk-free rate declines with term, there is said to be an 'inverse yield curve'. New Zealand has had an inverse yield curve for significant periods in the past. At present New Zealand has a 'positive yield curve'. That is, Government bonds with a longer term to maturity have a higher yield than Government bonds with a shorter term to maturity (for example, 10 years versus five years). Higher long-term rates may be

due to the uncertainty about future short-term rates or an expectation that future rates will rise, or uncertainty about future inflation and thus the real return on Government bonds.

6.3.5 With a positive yield curve, (as New Zealand currently has) it is in the interests of suppliers for the cost of capital to be based on a longer term rate, but the opposite would be the case when there is an inverse yield curve.

6.3.6 The term of the risk-free rate should match the length of the pricing period because if the term of the risk-free rate is longer than the pricing period and there is a positive yield curve, regulated suppliers will be compensated for risks they do not bear. Conversely, if there is an inverse yield curve, regulated suppliers will be under-compensated if the term of the risk-free rate is longer than the pricing period.

6.3.7 Submissions from regulated suppliers sought a term that was longer than the pricing or regulatory period (for example, a 10 year term). (While Airports do not have a regulatory period under Part 4, other services regulated under Part 4 do. The arguments around the term of the risk-free rate (and the debt premium) are very similar. For convenience, the rest of this discussion uses the term regulatory period, rather than pricing period, when considering the appropriate term of the risk-free rate.)

6.3.8 In essence, the arguments for a term of the risk-free rate that was longer than the regulatory period were that:

- regulated supplier's assets had a long life and firms generally seek to finance such assets with longer maturity debt (that is, longer than the regulatory period); and
- some firms have issued a portion of their debt with a maturity exceeding five years to manage their re-financing risks. [237]

6.3.9 Therefore, according to submissions from suppliers, the term of the risk-free rate and debt premium which matches the regulatory period is too short and would under compensate suppliers. However, these submissions overlook (i) the ability of regulated suppliers to reset prices at the end of the regulatory period to compensate for changes in risk-free rates; and (ii) the widespread use of interest rate swaps. These are now discussed.

The power to reset prices

6.3.10 Airports can reset their prices at the end of each pricing agreement to reflect, among other things, changes in the risk-free rate if this has altered the cost of capital. Through the regular resetting of prices the uncertainty over the level of long-term interest rates is borne by users, rather than suppliers. Accordingly, suppliers' prices should not reflect a premium for the uncertainty of risk-free rates beyond the length of the pricing period.

[237] Based on data received from regulated suppliers during 2009, the Commission estimates three of the 32 responding regulated suppliers had debt portfolios with an average original term to maturity which exceeded five years. In the 2010 survey, five of the 29 responding regulated suppliers had debt portfolios with an average original term to maturity which exceeded five years.

The availability of interest rate swaps

6.3.11 Firms have a mix of debt maturities to manage re-financing risk, including issuing long-term debt. This spreads a firm's re-financing requirements over a longer period and reduces the amount of debt that needs to be re-financed in any one year. Reducing re-financing risks has benefits for consumers, but long-term debt typically has a greater cost than medium or short-term debt.

6.3.12 The use of fixed-rate long maturity debt would, in the absence of a swap market, fix a firm's interest rate for the term of the loan, say 10 years.[238] But many firms do not want their interest rate fixed for 10 years, especially when the rate of interest on shorter-term debt is typically lower. Therefore the firm will use an interest rate swap, typically at the same time as the debt finance is raised, to shorten the period for which their interest rate is fixed. This can result in a lower rate of interest – the trade-off being that the firm does not know what interest rates will be at the time of the re-pricing.

6.3.13 The use of interest rate swaps allows the firm to choose the interest rate re-pricing period it faces, independently of the maturity date of the debt. For example, Transpower explained at the Cost of Capital Workshop that its target interest rate re-pricing period was 2 years, even though it raises debt capital with a longer maturity.

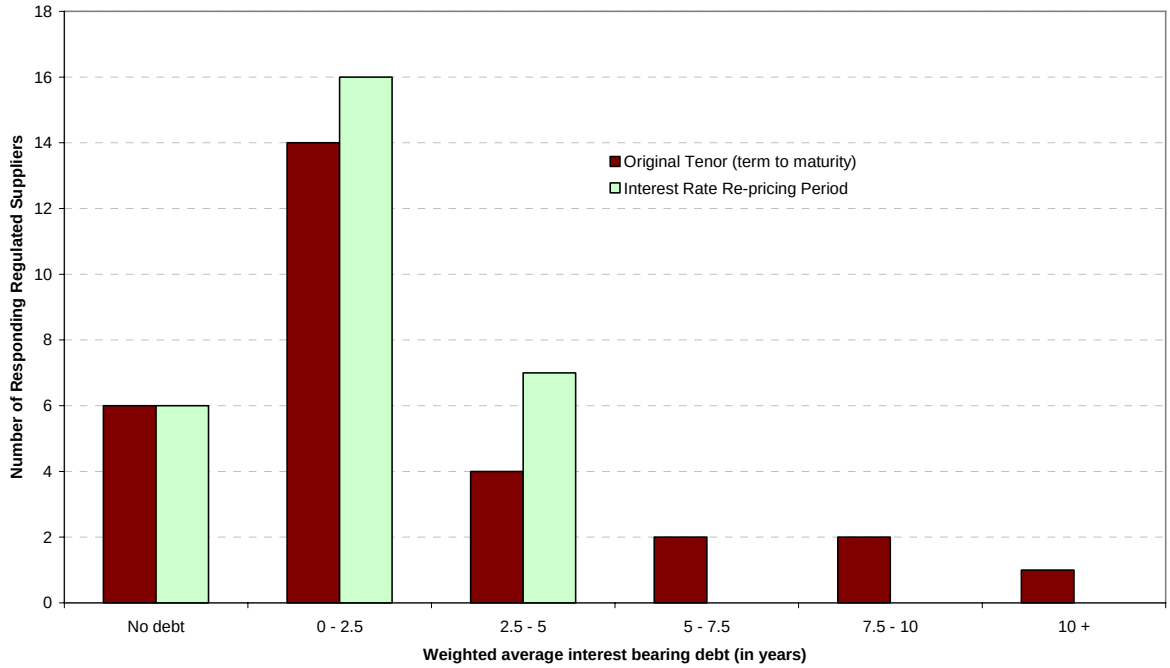
6.3.14 Interest rate swaps are widely used. This was evidenced in the information on debt profiles that the Commission obtained from regulated suppliers. Specifically, this showed that regulated suppliers were using swaps extensively to shorten their interest rate re-pricing periods.

6.3.15 Figure 6.1 compares the weighted average original tenor for regulated suppliers' debt with the weighted average interest rate re-pricing period for that debt.[239] The chart illustrates that due to the use of interest rate swaps, suppliers' choice of interest rate re-pricing period is independent of the tenor of the debt. Firms with long maturity debt had chosen interest rate re-pricing periods that were significantly shorter. No firm had an average interest rate re-pricing period which exceeded five years (even if the tenor of their debt was longer).

238 A small number of New Zealand firms have issued bonds with floating rates of interest.

239 Tenor refers to the original term to maturity of a tranche of issued debt.

Figure 6.1 Regulated Suppliers' Debt Portfolios: Tenor vs. Interest Rate Re-pricing Period (2010)



6.3.16 The data on the actual interest rate re-pricing faced by regulated suppliers illustrates regulated suppliers' ability to use swaps to alter their interest rate re-pricing period, and to set it to a term consistent with or shorter than the regulatory period. As such, it is inappropriate to set the term of the risk-free rate longer than the term of the regulatory period (and that it should not be set at 10 years). That is, doing so would (assuming a positive yield curve) over-compensate suppliers as they would receive a (higher) risk-free rate in their regulatory cost of capital when their actual interest costs have been re-priced to a much shorter term (lower rate) by the use of interest rate swaps.[240]

6.3.17 A number of New Zealand monopoly suppliers who are free to determine their own prices use a term for the risk-free rate which matches the pricing period when estimating their own cost of capital. For example, Airways Corporation uses a five year risk-free rate in its estimate of its cost of capital[241] and a number of airports (e.g. Hamilton, AIAL, CIAL[242]) adopt a five year term for the risk-free rate in their estimates of the cost of capital, which corresponds with the length of their pricing agreements.

[240] The cost of entering an interest rate swap is included in the term credit spread differential allowance in respect of long-term debt (see Appendix E6).

[241] Airways Corporation, *Pricing Proposal 2009/10 Air Navigation Service Charges for Aircraft 5 Tonnes and under Supporting Information Pack,* p. 2. Airways Corporation, *Statement of Corporate Intent 2010/11 – 2012/13*, p. 11.

[242] Hamilton International Airport, *Landing Charges Pricing Methodology*, March 2008, p.15. Auckland International Airport Limited, *Identified Airport Activities Disclosure Financial Statements for the year ended 30 June 2009*, p. 42. Christchurch International Airport Limited, *Disclosure Financial Statements for the year ended 30 June 2009*, p. 42.

6.3.18 The risk free rate of return is estimated by the Commission as part of publishing annual WACCs for all regulated suppliers.

6.3.19 A more detailed discussion of issues around the risk-free rate is included in Appendix E4.

Debt premium

6.3.20 The second component of the cost of debt, which is added to the risk-free rate, is the debt premium. The debt premium reflects the additional risk an investor is exposed to when lending to a borrower other than the government. The size of the debt premium principally depends on the creditworthiness of the borrower, but also reflects the inferior liquidity of corporate bonds relative to Government bonds. Financially strong firms can borrow at a lower debt premium than weaker firms or financially distressed firms.

6.3.21 There are potentially significant costs and risks to consumers if a supplier becomes financially distressed. For example, a supplier in financial distress may curtail maintenance spending or reduce or defer efficient investment in network assets. This, in turn, may adversely affect the quality and reliability of service experienced by consumers. Excessive levels of debt are not in the long-term interests of consumers.

6.3.22 Credit ratings are an indication of a borrower's creditworthiness. The higher the rating, the lesser the assessed likelihood of default. A notional rating is specified as if suppliers' actual credit ratings were used, they would have an incentive to increase gearing with adverse implications for consumers.

6.3.23 Standard & Poors' minimum long-term credit rating to be considered investment grade is BBB-. The Commission considers the debt premium should be estimated by reference to a bond with a Standard & Poors' long-term credit rating of A- (or equivalent rating from another recognised agency). A Standard & Poors' long-term credit rating of A- is sufficiently high to ensure there is an adequate buffer against the possibility that economic downturns or shocks can lead to financial distress, whilst providing regulated suppliers with some flexibility over the level of gearing and the choice of debt instruments.

6.3.24 New Zealand has only a limited number of bonds that are publicly traded. This can make it difficult to estimate accurately the debt premium for an airport with a credit rating of A- and a remaining term to maturity of five years. The IM Determination allows the Commission to consider a wider range of credit ratings and issuers than just A- rated bonds issued by an airport, when estimating the debt premium for airports. This is discussed more fully in Appendix E5.

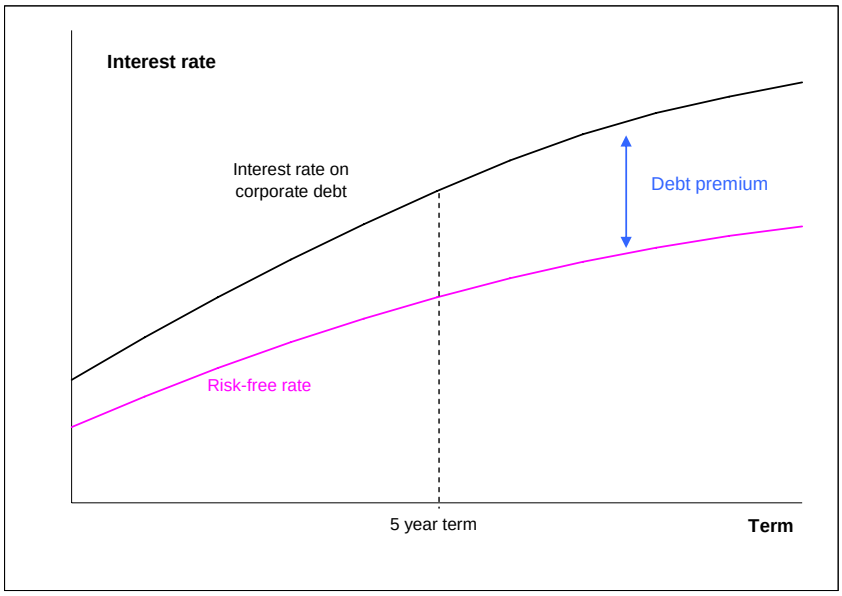
6.3.25 The debt premium is estimated by the Commission as part of publishing annual WACCs for all regulated suppliers.

The greater debt premium on long-maturity debt

6.3.26 The debt premium always increases with the original term to maturity (even if there is a negative yield curve). The increase in the debt premium as term increases is illustrated in Figure 6.2 below. The risk-free rate is shown as the lower line in the

graph, while the debt premium is the gap between the total cost of debt (the top line) and the risk-free rate.

Figure 6.2 The Relationship Between the Debt Premium and Term



6.3.27 As discussed above, firms use interest rate swaps to shorten the interest rate re-pricing period of the risk-free part of the interest rate on long-term debt. However, the greater debt premium on long-term debt cannot be economically removed through the swap market in the way the risk-free rate can be swapped. That is, the greater debt premium on longer-term debt continues to be borne by the firm.

6.3.28 Some suppliers have issued some debt with an original term to maturity that is longer than the regulatory period, for example, to manage refinancing risk. The Commission has surveyed regulated firms to see how many firms have a debt portfolio which, on average, exceeds the term of the regulatory period. Of the 29 regulated suppliers which responded to the Commission's request for information, the Commission estimates that only five (including Auckland International Airport and Wellington International Airport) have a debt portfolio whose weighted average tenor exceeds five years.

6.3.29 Where a supplier has a debt portfolio with a long average tenor, consumers benefit from the reduced re-financing risk and thus it is appropriate to recognise that part of the higher cost of issuing longer maturity debt which cannot be removed through the swap market. Therefore, there is an allowance for the incremental debt premium on longer term debt and the cost of executing an interest rate swap to shorten the re-pricing period of the long-term debt.

6.3.30 This allowance (called the term credit spread differential) is included in the Airport's ID Determination. It will only apply where a supplier's debt portfolio has a weighted average tenor exceeding the length of the regulatory period. For suppliers whose debt portfolio has a weighted average tenor which is less than the length of

the regulatory period, the allowance will not apply. For such suppliers, a debt premium based on the term of the regulatory period is sufficient.[243]

6.3.31 This allowance will not be added to the estimate of the weighted average cost of capital (which will apply to all suppliers of services regulated under Part 4); rather the allowance will be added separately as an allowable cost (along with operating costs, depreciation etc) for qualifying suppliers only. The mechanics of how this allowance will apply in practice are explained in Appendix E6.

6.3.32 The practical effect of the term credit spread differential, in conjunction with a term for the risk-free rate and debt premium which matches the regulatory period, is to ensure suppliers are appropriately compensated including where greater debt premium is incurred due to the issue of long-term debt. It ensures suppliers are not overcompensated for risks and costs they do not incur (which would occur if the term of the risk-free rate and debt premium was greater than the term of the regulatory period).

6.3.33 The term credit spread differential is a practical way of recognising and compensating for the actual debt premium and swap costs incurred on long-term debt by some but not all suppliers, whilst ensuring the cost of capital is not overstated.

6.3.34 A more detailed discussion about the debt premium, including points raised in submissions and the Commission's response to these points, is included in Appendix E5. The term credit spread differential allowance is discussed in Appendix E6.

Debt issuance costs

6.3.35 Firms incur costs when raising new debt. These costs are not reflected in the debt premium but are an inherent cost of raising the debt finance needed to support an ongoing business. The Commission considers these costs should be included in the cost of capital for regulated suppliers.

6.3.36 Different forms of debt have different issuance costs. The Commission's estimate of the cost of issuing debt is based on the cost of issuing publicly-traded bonds, as this is the only publicly-available data.

6.3.37 The Draft Reasons Paper proposed an allowance of 0.30% per annum for a public issue of five year bonds, which was based on prior Commission decisions and a 1995 US estimate of debt issuance costs. Submissions from suppliers on the Draft Reasons Paper included more up-to-date data on the costs of issuing public bonds in New Zealand. Notwithstanding some issues with the quality of this data, the Commission considers this information does provide an improved basis for estimating the level of issue costs, and has increased the allowance for issue costs on publicly issued bonds to 0.35% per annum.

[243] This could be seen as concessional for such suppliers since their actual debt tenor is less than the term of the regulatory period (and debt premiums rise with term). However, it is for each supplier to determine the average tenor of its debt portfolio. The Commission does not want to incentivise regulated suppliers to increase their re-financing risk by relying more heavily on shorter term debt.

6.3.38 The Commission considers this is a generous allowance for the costs of raising debt funding, as many regulated suppliers make extensive use of bank loans which would generally have an all-up cost below the all-up cost of public bond issues (though bank debt may have more onerous covenants). It is also greater (as a percentage) than the levels allowed by overseas regulators but the Commission considers this is justified by the smaller relative debt issues by New Zealand's regulated suppliers which may result in issue costs being a larger percentage of the debt amount.

6.3.39 In 2010 the Commission undertook a confidential survey on aspects of regulated suppliers' debt portfolios. The results of this survey indicate that the average debt issuance costs for publicly traded bonds was 0.22% per annum. This implies the 0.35% per annum allowance for debt issuance costs in the IM is appropriate, if not generous in favour of suppliers.

6.3.40 Further detail on the level of debt issuance costs, including points raised in submissions and the Commission's response to these points, is included in Appendix E5. The appendix also includes a discussion on how regulated suppliers use swaps, and access offshore debt markets at a cost comparable with the all-up estimate of debt premium under the IM.

6.4 The Cost of Equity – The Choice of Model

6.4.1 The difficulties in estimating the cost of equity are greater than in estimating the cost of debt. The cost of equity, and most of its components, cannot be directly observed, but have to be estimated based on an analytical model. The choice of a model for determining the cost of equity is discussed in this section. Then the inputs for the preferred model have to be estimated. This is addressed in Section 6.5.

6.4.2 The cost of equity is higher than the cost of debt as equity holders take more risk than debt holders (taking account of the different taxation treatments that may apply). There is a significant variation in risk between firms in different sectors of the economy. Airports provide important services with relatively stable demand, face limited substitutes and limited competition. Users have few choices and limited bargaining power. More crucially, in regard to estimating the cost of equity, such firms may be less affected than the average firm by general cycles in economic activity. In that case, and run properly, such firms face lower systematic risk than the average New Zealand firm. The expected return on equity in airports is lower than for a typical or average company.

The Capital Asset Pricing Model

6.4.3 There are a number of methods to estimate the cost of equity including the Capital Asset Pricing Model (CAPM), the dividend growth model and the Fama-French three factor model. Of these, the CAPM is the most commonly used and most widely accepted methodology in investment analysis.

6.4.4 The use of the dividend growth model and the Fama-French three factor model to estimate the cost of equity is discussed in Appendix E2. These models have not gained the level of acceptance for estimating the cost of capital that the CAPM has. The Fama-French model is also criticised for its weak theoretical foundations, the

possibility its results are due to chance; and the weak statistical significance of the factors included in the model. Its use in an Australian regulatory context was recently considered but firmly rejected by the AER.[244]

6.4.5 The dividend growth model is used by a number of US regulators but its use is best suited to listed firms as it requires a share price, good forecasts of dividend growth, and the method is only appropriate for stable, mature firms. Most New Zealand regulated firms are not listed, and there is a general lack of information required to reliably and confidently use the dividend growth model in a regulatory context.[245]

6.4.6 The CAPM was first developed in the early 1960s. The CAPM proposes that the cost of equity can be modelled as comprising a risk free component and a premium for risk. Under the CAPM, the size of the premium for risk increases in line with increases in the firm's exposure to systematic risk (with a measure of this risk which is referred to as beta). Systematic risk refers to market-wide risks which affect all risky investments. Non-systematic risk refers to risks which affect an individual company.

6.4.7 Globally, there is very widespread acceptance and use of the CAPM to estimate the cost of equity. In New Zealand, there is almost exclusive use of CAPM to estimate the cost of equity. The CAPM is:

- taught in undergraduate courses and texts;
- used by advisors and analysts in the market in estimating the cost of capital for firms;
- used in independent appraisal reports on takeovers; e.g. recent uses are Abano and NZ Farming Systems;
- used by many companies in estimating their cost of capital for consulting on pricing or disclosing regulatory returns; and
- used by The Treasury in estimating the cost of capital for Crown Entities and State-Owned Enterprises.

6.4.8 Other models to estimate the cost of equity have not achieved any significant degree of usage or acceptance in practice in New Zealand.

6.4.9 While the theory underpinning the CAPM is seen as intuitive and appealing, like all economic models the CAPM has its limitations. Like any model it contains a number of simplifying assumptions that may not hold in practice such as that there are no restrictions on short-selling, markets are frictionless, and investors may borrow or lend unlimited amounts at the risk-free rate.[246]

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244 AER, *Jemena Gas Networks, Access arrangement proposal for the NSW gas markets Final decision*, 1 July 2010- 30 June 2015, pp. 108-172. A summary of the AER's conclusions are set out in paragraph E2.26.

245 Use of the dividend growth model to estimate the cost of equity is further discussed in paragraphs E2.28 to E2.30.

246 Copeland, T., Weston, J., and Shastri K., *Financial Theory and Corporate Policy* 4th Edition, Pearson Education, 2005, chapter 6.

6.4.10 Another criticism of the CAPM is its poor performance in empirical tests. The CAPM forecasts returns from a stock to increase in a linear relationship to increases in beta (i.e. systematic risk). In some *ex post* tests of the CAPM, returns show a flatter line than CAPM has projected. That is, returns do not reflect variations in beta as strongly as expected. Use of the CAPM may therefore understate the cost of equity for low beta stocks, and overstate the cost of equity for high beta stocks. Possible explanations for this are that CAPM may exclude some variables that may help to explain the actual returns shown by stocks. For example, studies have suggested a large number of potential explanatory variables including include relative firm size, book to market values, and share price momentum.

6.4.11 There are, however, a range of possible explanations for the results from the empirical tests. For example, the results may reflect the serious methodological problems that exist in undertaking robust tests of the CAPM,[247] or the difficulty of correctly observing the market portfolio.

6.4.12 Notwithstanding the criticisms of the CAPM, it is used extensively by regulators to estimate the cost of equity. The recent Independent Pricing and Regulatory Tribunal (IPART) review notes that all Australian regulators currently use the CAPM.[248] Use of CAPM is required under the Australian National Electricity Rules (which have the force of law and govern the operation of the Australian National Electricity Market). The CAPM is also used extensively in regulatory decisions in Ireland, UK and other parts of Europe, and is sometimes used as a cross-check in the United States (where the dividend growth model is generally preferred).

6.4.13 The CAPM has been used by the Commission since Decision 207 (1988) to estimate the cost of equity under the Commerce Act. The use of the CAPM was considered and accepted by the New Zealand High Court in the Auckland Bulk Gas Users case. In its judgment in that case the High Court described the CAPM as "a sensible theory, logically rigorous and consistent with accepted and acceptable economic thinking".[249] The Court stated that the CAPM:

> …is a simple concept, fundamental to financial theory, providing a positive relationship between the perceived or estimated risk and the required rate of return. We believe it is a satisfactory model and an appropriate method to calculate the capital cost for pricing purposes. We think that the Commission was entitled to make use of that methodology to the exclusion of other particular formulas in making its pricing decision.[250]

6.4.14 The Cost of Capital Expert Panel also considered how best to estimate the cost of equity. All members of the panel recommended the use of the CAPM (in one form or another).[251]

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247 See for example the discussion in paragraph E2.22.

248 IPART, *Alternative approaches to the determination of the cost of equity*, November 2009. IPART oversees regulation of the water, gas, electricity and public transport industries in New South Wales.

249 *Auckland Bulk Gas Users v Commerce Commission* 1 [1990] NZLR 448, p. 467.

250 *Auckland Bulk Gas Users v Commerce Commission* 1 [1990] NZLR 448, p. 467.

251 Professor Myers recommended the classical CAPM, Associate Professor Lally recommended the simplified Brennan-Lally CAPM, while Professor Franks recommended the use of both of these models and the International CAPM.

6.4.15 The IM uses the CAPM for the following reasons:

- it enjoys almost universal use and acceptance by New Zealand companies, practitioners and analysts;
- it has been used consistently by regulators in New Zealand, Australia, UK and Europe;
- there is no consensus as to what model is better than the CAPM;
- no other model enjoys even a fraction of the support in practice that the CAPM enjoys; and
- there is still extensive ongoing debate about the theoretical basis of the other models, and there are difficulties in sourcing reliable data for these other models.

Simplified Brennan-Lally CAPM

6.4.16 The CAPM was developed by Sharpe, Lintner and Mossin during the early 1960s. The classical version of the CAPM assumes that all forms of investment income are equally taxed, and therefore that both dividends and capital gains are not taxed more favourably than interest. Since then a number of variations to the CAPM have been developed which incorporate different taxation considerations including the Officer CAPM in relation to the Australian taxation system and the Brennan-Lally CAPM in relation to the New Zealand taxation system. A different variant, the International CAPM, takes into account international investors.

6.4.17 The Brennan-Lally CAPM (Lally's adaptation for New Zealand circumstances of a CAPM model elaborated by Brennan) was developed to reflect New Zealand's taxation system. Specifically, it recognises the presence of imputation credits and the general absence of taxes on capital gains. [252] There is an extended form of the Brennan-Lally CAPM and a simplified version, but it is the simplified Brennan-Lally CAPM that has become the dominant form of the CAPM in use in New Zealand. Indeed, in New Zealand the term simplified Brennan-Lally CAPM has become largely synonymous with the generic term CAPM, and the terms are frequently used interchangeably. It is reasonably rare to find a CAPM-based estimate of the cost of equity in New Zealand that does not rely on the simplified Brennan-Lally CAPM.

6.4.18 In the New Zealand context, the simplified Brennan-Lally CAPM has generally been used by the Commission in prior cost of capital decisions. The reasons for preferring the simplified Brennan-Lally CAPM in the IM rather than other CAPMs are:

- the assumptions of the simplified Brennan-Lally CAPM are consistent with the New Zealand tax system, whereas the assumptions of other CAPMs are not. For example, the classical Sharpe-Lintner CAPM does not adjust for the effect

[252] The dividend imputation system lets companies pass on to their shareholders credits for the New Zealand income tax paid by the company. This means that shareholders get the benefit of the income tax the company has paid.

of imputation credits and assumes the same rate of taxation on dividends as on capital gains. This is not representative of the New Zealand system of taxation. Professor Franks notes the UK used a similar model to the simplified Brennan-Lally CAPM when it had a tax imputation regime that was similar to New Zealand's;[253]

- the simplified Brennan-Lally CAPM is very widely used and accepted in New Zealand, including by companies, investment analysts, practitioners, independent takeover appraisal reports, and advisors, and is the preferred method for estimating the cost of capital in New Zealand;

- the continued use of the simplified Brennan-Lally CAPM was strongly supported at the Cost of Capital Workshop;[254] and

- the continued use of the simplified Brennan-Lally CAPM was supported by most submissions on the Draft Reasons Paper, although submissions sought an allowance for model error and parameter error.

Ad hoc allowance for model error

6.4.19 A number of submissions sought an *ad hoc* allowance for model error. In general, the argument was that an *ad hoc* adjustment should be made to the estimate of the cost of equity produced by the simplified Brennan-Lally CAPM to allow for the possibility that the cost of equity may be understated, especially on low beta stocks.

6.4.20 The fundamental difficulty with making *ad hoc* adjustments is that it is necessary to know why an adjustment is required, to assess whether it is justified (in the context of a particular industry, and to ensure consistency with the legislation) and what the size of the adjustment should be.

6.4.21 Associate Professor John Handley provided the following advice to the AER (on a similar issue):

> Contrary to the view of the JIA/CEG, the fact that we don't have a clear explanation for the empirical results is of critical importance. In short, if there was a problem with the model (and again, the analysis of Roll suggests that this is not necessarily the case) then we would need to know exactly what that problem was before we could consider making any adjustments to the model's output. Further and as mentioned in my previous report, in this case, the most appropriate way to proceed would be to completely replace the Sharpe CAPM with an appropriate alternative asset pricing model. Simply making an ad hoc adjustment to the CAPM determined rate of return as suggested by CEG (albeit to tie it back to their empirical results) would by definition be arbitrary and therefore could not be justified. Unless one knows first, whether there is a problem and second, what is the source of the problem then one cannot possibly come up with an appropriate "solution".[255]

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253 Franks, J., Lally M., and Myers S, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, 2008, p. 11.

254 Commerce Commission, *Cost of Capital Workshop Transcript*, 12-13 November 2009, pp. 38-40. After the workshop, Vector noted that "[h]istorically the Commission has adopted the simplified Brennan-Lally CAPM. It was evident from the workshop that there was little dispute that this is an acceptable approach to use." Vector, *Cross Submission to Commerce Commission on the Weighted Average Cost of Capital Workshop*, 2 December 2009, p. 7.

255 Handley, J., *Further Comments on the Sharpe CAPM, Report Prepared for the Australian Energy Regulator*, 16 March 2009, p. 6.

6.4.22 There are a number of other objections to making *ad hoc* adjustments:

- there are multiple competing models and explanations for the empirical results and no consensus on how these are to be interpreted. The Commission, therefore, cannot determine a robust or defensible basis for when an adjustment is required, how large it should be, and potentially in which direction it should go;
- there is no evidence that practitioners make explicit allowances for model error when estimating a firm's cost of capital in non-regulatory contexts;
- there is no evidence before the Commission that regulated suppliers themselves, or their advisers, make any such *ad hoc* adjustment for model error when estimating the cost of equity in non-regulatory contexts;[256]
- the Commission has never made *ad hoc* allowances for model error previously and has not been made aware that any other regulators have done so; and
- some of the possible adjustments concern variables such as the relative size of firms, or a firm's market value relative to its book value. These variables are firm-specific, whereas the IM seeks to estimate the efficient industry cost of capital.

6.4.23 The Commission does not consider it is appropriate to make *ad hoc* adjustments for model error, and the IM does not provide for any ad hoc adjustments for model error.

Specific submissions in support of an ad hoc allowance for model error

6.4.24 A number of submissions argued that the Commission was wrong to rely solely on the simplified Brennan-Lally CAPM. These submissions argued that an *ad hoc* allowance should be made to the cost of equity estimated using the simplified Brennan-Lally CAPM to allow for the possibility that it may understate the cost of equity on low beta stocks. For example:

- CRA, on behalf of Unison Networks, argued for a small company premium;[257]
- Professor Grundy, on behalf of Vector, proposed the use of the Black CAPM;[258] and

[256] Some firms may set higher hurdle rates of return for new investments that are above the estimated cost of capital. This may be done for a number of reasons, including to offset the risk that the forecast cash-flows from a new investment may reflect an over-optimistic view of its potential success. High hurdle rates for new projects are not, in the Commission's view, evidence that an explicit allowance has been made for model error in using CAPM to estimate the cost of capital. Further, even if a firm sets higher hurdle rates for new projects, the expected return for the company is determined by its estimated WACC, not the hurdle rates.

[257] Charles River Associates, *Regulated Returns for Australian and New Zealand Electricity Distribution*, 15 August 2010. A report on behalf of Unison, pp. 5-14.

[258] Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Grundy B. *The Calculation of the Cost of Capital: a report prepared for Vector Limited*, 13 August 2010.

- a number of submissions noted that the assumption in the simplified Brennan-Lally CAPM that investors fully value imputation credits was not true in practice, so the estimates of cost of capital may be understated as a result.

6.4.25 Each of these suggestions is discussed in turn.

Small company premium

6.4.26 CRA, on behalf of Unison Networks, noted certain empirical studies that show that the actual returns on US companies with smaller market capitalisations may be greater than for companies with larger market capitalisations. This implies that use of the CAPM (which takes no account of company size) may understate the expected return for companies with small market capitalisations. CRA propose an additional premium to the cost of capital for regulated suppliers based on their relative size.

6.4.27 The Commission disagrees with this approach. First, it has not been conclusively established that smaller companies do have a higher cost of capital than implied by the CAPM because a number of studies have failed to find the so-called small cap effect. In recent advice to the Commission for Energy Regulation (Ireland) on the small company premium, Europe Economics observed that there is "scant evidence that there is any small companies premium to explain", [259] that "for the period since 1981, there appears to be no small companies premium", [260] and "the use of a small companies premium is incompatible with the broad thrust of modern corporate finance theory". [261]

6.4.28 Second, even if there is a small company premium it is not clear that this is relevant under Part 4 of the Act. As discussed in paragraphs 6.2.2 to 6.2.7, the focus on outcomes in workably competitive markets requires a focus on the efficient cost of capital, over time, for an industry. Firms which incur higher costs, by not increasing their market capitalisation, cannot expect to recover these costs from consumers in workably competitive markets. Accordingly, and consistent with the Part 4 Purpose, they should not expect to recover these costs in markets regulated under Part 4 either.

Black CAPM

6.4.29 Professor Grundy and CEG challenged the use of the simplified Brennan-Lally CAPM. After reviewing the weaknesses of the Sharpe-Lintner CAPM, Professor Grundy asserts that the Black CAPM better fits the empirical data, and that use of the Black CAPM would produce much higher estimates of the cost of equity for low beta firms.

6.4.30 However, despite devoting 12 pages of his 18 page submission critiquing the Sharpe-Lintner CAPM, it is notable that Professor Grundy's submission:

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259 Europe Economics, *Report for the Commission for Energy Regulation, Cost of Capital for Transmission Asset Owner, Transmission System Owner, Distribution System Operator*, 11 June 2010, Appendix 1, p. 3.

260 Europe Economics, *Report for the Commission for Energy Regulation, Cost of Capital for Transmission Asset Owner, Transmission System Owner, Distribution System Operator*, 11 June 2010, Appendix 1, p. 1.

261 Europe Economics, *Report for the Commission for Energy Regulation, Cost of Capital for Transmission Asset Owner, Transmission System Owner, Distribution System Operator*, 11 June 2010, Appendix 1, p. 3.

- offers no evidence of the superiority of the Black CAPM, other than asserting that it better fits the data;

- contains no critique of the assumptions of the Black CAPM (despite Black himself calling one of the key assumptions in the Black CAPM "unrealistic")[262] nor does it address the criticisms of bias in a number of empirical tests of the CAPM that is made by Pettengill, Sundaram, & Mathur;[263]

- does not refer to any empirical support for the Black model or note its mixed performance in empirical tests; and,

- perhaps most critically, does not discuss why, despite being developed 35 years ago, the Black CAPM still enjoys no popular support. The Commission is not aware of any advisor or company in New Zealand that uses the Black CAPM – which is similar to the conclusion the AER drew recently. Nor is there any evidence that Vector, on whose behalf Professor Grundy submitted, actually uses the Black CAPM itself. If the Black CAPM is a better predictor of the cost of equity (for New Zealand firms), it could be expected to be much more widely used than it is.

In the Commission's view, Professor Grundy's submission considerably overstates the level of support for the Black CAPM.

6.4.31 In short, there is no compelling evidence before the Commission that the Black CAPM is a better predictor of the cost of equity, such that the results of an established and generally used and accepted model (the simplified Brennan-Lally CAPM) should be replaced or adjusted with the results from a model that is not established, and that is not used in practice either by market participants or other regulators.

<u>International investors and the value of imputation credits</u>

6.4.32 A third line of submissions calling for an adjustment to the results from the simplified Brennan-Lally CAPM concerns its assumption, like that of the classical Sharpe-Lintner CAPM, of a segregated domestic market. That is, the simplified Brennan-Lally CAPM assumes all investors are resident shareholders and can use the imputation credits paid with dividends. A number of submitters noted that this assumption was unrealistic given the high level of international ownership in New Zealand generally. Submitters argued that this implied the simplified Brennan-Lally CAPM may therefore underestimate the cost of capital on the grounds that international investors would require a higher return then domestic investors since

[262] Black, F., Capital market equilibrium with restricted borrowing, *Journal of Business*, 1972 (45) p. 444, at p. 446.

[263] G. Pettengill, S Sundaram, & I. Mathur, The Conditional Relation between Beta and Returns, *Journal of Financial and Quantitative Analysis*, Vol. 30, No, 1 Mar 1995, pp. 101-116. Pettingill et al argue that many prior empirical tests are biased against the CAPM as they fail to adjust for the conditional relationship between actual returns and beta. Adjusting for this bias, Pettingill et al find a strong positive relationship between beta and returns. Their work spawned a significant number of subsequent studies, the results of which were also more supportive of the CAPM than previous studies, and in particular that there was a strong relationship between beta and returns.

the international investors cannot use the imputation credits distributed by New Zealand companies.

6.4.33 The Commission considers that domestic and international investors have different perspectives on a number of components of the cost of capital, not just how imputation credits are valued. In particular, international investors hold different portfolios and perceive the relative risk of New Zealand investments differently to domestic investors. For international investors, the risk of New Zealand firms is measured against the range of investments they have access to. New Zealand firms may well represent a diversification opportunity from the perspective of such investors. In that case, investment in New Zealand firms would not add as much systematic risk and could in this sense be less risky than if evaluated only in the context of other New Zealand firms.[264]

6.4.34 The simplified Brennan-Lally CAPM was designed to focus on New Zealand resident shareholders. To consider the position of international investors a different CAPM model is required, such as the International CAPM. The International CAPM takes into account that international investors hold a very different market portfolio to New Zealand investors, and may face a different market risk premium, beta and risk-free rate to New Zealand investors. It is far from clear that this will produce a higher estimate of the cost of equity. Indeed the available evidence suggests that it is more likely that use of an International CAPM will produce lower estimates of the cost of equity than a domestic CAPM would estimate.[265] That is, use of a domestic CAPM (such as the simplified Brennan-Lally CAPM) is therefore likely to be more generous in favour of New Zealand suppliers, than the use of an international variant of the CAPM. In previous advice to the Commission on electricity lines businesses, Dr Lally sought to quantify the potential bias from use of a domestic CAPM rather than an international variant.[266] He concluded that the cost of equity using a domestic CAPM (simplified Brennan-Lally CAPM) was about 0.7% higher than if an International CAPM was used.[267]

Conclusion on choice of model for estimating the cost of equity

6.4.35 The Commission considers the simplified Brennan-Lally CAPM is the best model for estimating the cost of equity in New Zealand. Like other models it has its imperfections. However, the simplified Brennan-Lally CAPM enjoys such

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264 There is strong support for this conclusion in the literature. See, for example: Stulz, R., *Globalization of equity markets and the cost of capital*, Paper prepared for the SBF/NYSE Conference on Global Equity Markets, Feb 1999, Table 1. Perold, A., The Capital Asset Pricing Model, *The Journal of Economic Perspectives*, Vol. 18 No. 3, 2004, pp. 3-24.

265 See, for example, the argument of Dr Lally (in Lally, M., *The cost of capital for regulated entities, Report Prepared for the Queensland Competition Authority*, February 2004, pp. 27-32) and in the Expert Panel report (Franks, J., Lally M., & Myers S, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, 2008), at p. 11. And see also, for example, Stulz, R., Globalization and the cost of capital: The Case of Nestle, *European Financial Management*, 1995, pp. 30-38; Errunza, V., and Miller, D., Market segmentation and the cost of capital in International Equity Markets. *Journal of Financial and Quantitative Analysis*, Vol. 35, December 2000, pp. 577-600; Errunza, V., and Miller, D., Market segmentation and the cost of capital in International Equity Markets. *Journal of Financial and Quantitative Analysis*, Vol. 35, December 2000, pp. 577-600.

266 Lally, M., *The Weighted Average Cost of Capital for Electricity Lines Businesses*, September 2005, pp. 63-66.

267 Lally, M., *The Weighted Average Cost of Capital for Electricity Lines Businesses,* September 2005, p. 66. Assuming an asset beta of 0.50, and 40% leverage, the domestic CAPM increased the WACC by about 1% over the international CAPM.

widespread support, and competing models such limited support, that there is currently no credible alternative.

6.4.36 The Commission acknowledges that the results of a number of empirical tests imply that the CAPM may understate the returns on low beta stocks. This possibility is acknowledged also by the Cost of Capital Expert Panel. However, there are a number of possible explanations for the results of the empirical tests, no better model is available, and there is no reliable basis for determining the size or direction of any adjustment for model error that may be required. Nor is there any evidence that New Zealand market participants make an allowance for model error when using the simplified Brennan-Lally CAPM to estimate the cost of equity for New Zealand firms. In short, the evidence is not sufficient to justify making a specific *ad hoc* adjustment to compensate for the possibility of model error.

6.4.37 To address a number of uncertainties over the true cost of capital, the IM requires the Commission to estimate a range for the cost of capital although the starting point for assessing profitability will remain the mid-point estimate of the cost of capital (this is discussed in Appendix E11). Further, the Commission's estimate of the cost of capital using the IM is checked for reasonableness against a range of other information, and the Commission concludes that its estimates produced using the simplified Brennan-Lally CAPM are reasonable and commercially realistic. Appendix E13 discusses these reasonableness tests in detail.

6.4.38 The application of the simplified Brennan-Lally CAPM is discussed in the next section.

6.5 Cost of Equity – Applying the Simplified Brennan-Lally CAPM

6.5.1 Under the simplified Brennan-Lally CAPM, the expected cost of equity is a function of the risk-free rate (after tax) plus the equity beta multiplied by the Tax-adjusted Market Risk Premium (TAMRP).

Cost of equity = Risk-free rate x (1 - Investor tax rate) + Equity beta x TAMRP

6.5.2 The following section considers each component in turn.

The risk-free rate

6.5.3 The same term of the risk-free rate is adopted for the cost of equity that was used for the risk-free rate and the debt premium. This ensures consistency in estimating the cost of equity and the cost of debt. It also ensures the overall cost of capital is estimated on a basis consistent with the regulatory period to which it will be applied.

TAMRP

6.5.4 The market risk premium (MRP) represents the additional return, over and above the risk-free rate, that investors look for to compensate them for the risk of holding a portfolio of average risk (more precisely the market portfolio which is the average risk portfolio).

6.5.5 Under the simplified Brennan-Lally CAPM, the MRP is adjusted for tax faced by the investor on equity returns (hence, tax adjusted MRP, or TAMRP). The TAMRP can

be derived from the MRP. Consistent with the use of a five-year term for the risk-free rate in the CAPM, the Commission also uses a five-year risk-free rate when estimating the TAMRP.

6.5.6 The TAMRP is a forward looking concept which cannot be directly observed. A number of approaches can be used to estimate the TAMRP. These approaches include:

- studies of historic returns on shares relative to the risk-free rate;
- surveys of investors that ask them to state their expected rate of return for the overall market; and
- empirical estimates of the MRP from share prices and expected dividends.

6.5.7 In setting a value of the TAMRP, the Commission has considered a range of information sources. The most common approach to estimation of the TAMRP is to use historic returns on the market. While *ex post* returns have fluctuated significantly over time, regulators and practitioners have typically used or placed weight on estimates over long periods of time.[268]

6.5.8 There is debate as to whether historical premiums are accurate predictors of future premiums. A number of prominent finance experts have argued that future rates of return will be less than that experienced historically.[269] Surveys of investors can provide an indication of the premium that investors will look for in the future. However, surveys can be unreliable as respondents can, for example, interpret questions in different ways.

6.5.9 The Commission has considered a range of information, including both forecast and historic estimates of the TAMRP. A range of such estimates is shown in the table below. The table evidences a wide range of estimates of the TAMRP. Both the mean and median are around 7%.

Table 6.2 Estimates of the TAMRP - Assuming a 5-Year Term (where possible) of the Risk-Free Rate for 2010

Methodology	NZ	US	Other	All
Ibbotson *	7.27%	7.67%	7.50%	
Siegel *	6.40%	7.30%	6.60%	
Cornell	5.20%	6.80%		
Survey	8.20%	6.90%		

[268] Conceptually, over the long term, the occasions on which the premium of actual returns over the risk-free rate exceeds investors' expectations should be offset by the occasions on which that premium is below investors' expectations. So the average premium will therefore provide an estimate of the premium that on average investors look for.

[269] See for example Dimson, E., Marsh P. and Staunton M., *Triumph of the Optimists: 1001 Years of Global Investment Returns,* Princeton University Press, New Jersey, 2002; Dimson, E., Marsh P. and Staunton M., Global Evidence on the Equity Risk Premium, *Journal of Applied Corporate Finance,* Vol. 14, 2003, pp. 27-38; and Arnott, R. and Bernstein P., What Risk Premium is 'Normal'?, *Financial Analysts Journal*, Vol. 58, No. 2, March/April 2002, pp. 64-85.

Methodology	NZ	US	Other	All
Median	6.84%	7.10%	7.05%	7.09%
Mean	6.77%	7.17%	7.05%	6.98%
* The Ibbotson estimate for "Other" and Siegel estimates in this table are for a 10-year risk-free rate term not a 5-year term. It is not possible to adjust the Ibbotson estimate for "Other" due to the lack of a suitable proxy. It is not possible to adjust the results from the Siegel method due to the lack of a term structure for inflation-proof bonds.				

6.5.10 A number of submissions from suppliers called for a TAMRP of 7.5%. In support of this, submitters referred to an informal survey of attendees at the Cost of Capital Workshop where, at that time, most participants were using a TAMRP of 7.5% (responses ranged from 7% to 7.75% with one response of 9%).

6.5.11 The Commission does not consider this informal survey to be a good indicator of the TAMRP in New Zealand. In particular, the sample at the conference was very small, it was not randomly selected (most of the attendees were selected by regulated suppliers), and the attendees' views are not representative of the range of views on the prevailing TAMRP in New Zealand. For example, the informal survey excludes all of the major investment banks who are major players in raising debt and equity finance for many firms. New Zealand investment banks use TAMRP estimates ranging between 6.5% and 7.25% as shown in Table 6.3 below.

Table 6.3 TAMRP Estimates Used by Major New Zealand Investment Banks

Investment bank	TAMRP estimate used
Deutsche Bank / Craigs Investment Partners	6.5% (plus separate recognition for imputation credits)
Goldman Sachs	6.8%
Forsyth Barr	7%
UBS	7%
Macquarie Bank	7%
First NZ Capital	7.25% (uplifted from a normal 7% after the GFC)

6.5.12 Many New Zealand advisors that propose a 7.5% estimate of the TAMRP appear to rely on research on the New Zealand TAMRP undertaken by PwC. In a submission on behalf of ENA, PwC critiques the Commission's discussion of the TAMRP estimate in the EDB Draft Reasons Paper, including that it relies on out-of-date information.[270]

6.5.13 PwC's publicly available research in support of its 7.5% estimate of the TAMRP is dated 2002. The Commission estimates that if this were updated for the subsequent

[270] The Commission comments on other issues raised by PwC regarding the TAMRP are in Appendix E7.

performance of the New Zealand market, the estimate of the TAMRP would fall by approximately 0.5% to around 7%.[271]

6.5.14 The appropriate level of the TAMRP was considered also by the Commission's Cost of Capital Expert Panel. The panel recommended that the Commission retain its approach of examining both forward-looking and backward looking estimates, though the experts differed on the weight that should be given to each. The panel considered the Commission's proposed 7% estimate of the TAMRP to be reasonable. The Commission has used an estimate of 7% since 2003.

6.5.15 In light of all the information available to it, the Commission considers the best estimate of the likely future long-term TAMRP for the NZ market is 7%. This is because it:

- best reflects the range of evidence available, including both historical returns and expected future returns;
- is considered reasonable by the Cost of Capital Expert Panel; and
- is consistent with the range of TAMRP estimates used by New Zealand market participants, including New Zealand investment banks.

Impact of the GFC

6.5.16 In the Draft Reasons Paper the Commission proposed a temporary uplift of 0.5% to 7.5% in the TAMRP until June 2011 to reflect the effects on the premium for risk from the Global Financial Crisis (GFC). The Commission took this view on the basis of advice from the Cost of Capital Expert Panel that the MRP had likely increased as a result of the GFC.[272] However, as there was no good information on the amount or duration of any increase, the size and timing of the uplift was a judgement call by the Commission. Some, but not all, regulators in other countries also temporarily increased their MRP estimates.

6.5.17 Some submissions argued that the Commission was premature to conclude the GFC would end by June 2011. The Commission accepts that the effects of the GFC in terms of slow economic growth may last beyond June 2011, but with respect to the TAMRP the relevant issue is the GFC's effect on the size of the premium investors seek for holding risky assets. There is strong evidence that the increase in the TAMRP from the GFC was temporary and is reverting to normal (that is, around 7%). In particular the Commission notes:

- the New Zealand share market and global share markets have stabilised and are at levels well above their GFC-induced lows;

[271] This is discussed at paragraph E7.73.

[272] J. Franks, M. Lally, and S. Myers, *Recommendations to the New Zealand Commerce Commission on whether or not it should change its previous estimate of the tax-adjusted market risk premium as a result of the recent global financial crisis*, 14 April 2010.

- the VIX, a key short-term indicator of investor risk aversion, has fallen significantly and is back to around its long-term trend levels;[273]

- the Australian Competition and Consumer Commission, which increased its MRP estimates after the GFC, has in recent decisions reverted back to its normal long-run estimate of the Australian MRP;[274]

- annual surveys of the level of MRP companies and analysts use in their CAPM models indicate a decline since the GFC;[275] and

- many New Zealand market participants did not increase their TAMRP estimates during or after the GFC (for example only one of the advisors at the Cost of Capital Workshop had increased its TAMRP estimate). Some New Zealand market participants have subsequently reduced the temporary increase they made to their TAMRP estimates during the GFC (e.g. First NZ Capital).

6.5.18 For the above reasons, the Commission concludes the best estimate of New Zealand's long-run TAMRP remains 7%, and that it is prudent and realistic to temporarily increase the estimated TAMRP to 7.5% but that this should end during 2011. The estimated TAMRP is expressed as a five year composite rate. For the five year period which commences on 1 July 2010, the TAMRP is 7.1% and for the five year period which commences on 1 July 2011 the TAMRP is 7%.

Asset betas

6.5.19 Beta is a measure of exposure to systematic risk. Systematic risk measures the extent to which the returns on a company fluctuate relative to the equity returns in the stock market as a whole. If an investment had no systematic risk (i.e. it would show no correlation with returns on the market), its equity beta would be zero.[276] If an investment in the equity of a company is of average risk, the equity beta will be 1. This means that the premium over the risk-free rate that equity investors expect will be the same as the average for the overall market (the TAMRP).

6.5.20 Beta is estimated empirically. As the cost of capital is intended to be forward-looking, forward-looking betas are required. As there is no reliable way to forecast asset betas, the Commission, like other analysts, assumes that historic beta estimates are indicative of future betas. Historic estimates of average betas are used as beta is expected to be relatively stable over time.

6.5.21 At the time of the Draft Reasons Paper the Commission estimated the asset beta of 0.65 for airports based on analysis of the monthly data over five years for 10 airports

[273] VIX is the ticker symbol for the Chicago Board Options Exchange's Volatility Index. The VIX is a widely used measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices. Higher levels of the VIX indicate greater expected market volatility, while lower VIX levels indicate a more benign outlook.

[274] See for example, ACCC, *Australian Postal Corporation 2010 Price Notification Decision*, May 2010, p. 80 and ACCC, *Australian Rail Track Corporation Limited Hunter Valley Coal Network Access Undertaking, Draft Decision*, March 2010, pp. 565-570.

[275] See for example Fernandez, P, and del Campo, J., *Market Risk Premium used in 2010 by Analysts and Companies: a survey with 2,400 answers*, May 21 2010. In the survey reported in that paper three times as many respondents had reduced their MRP estimates in 2010 when compared to their estimates in 2009, than had increased their estimates (pp. 3-4, and 6-7).

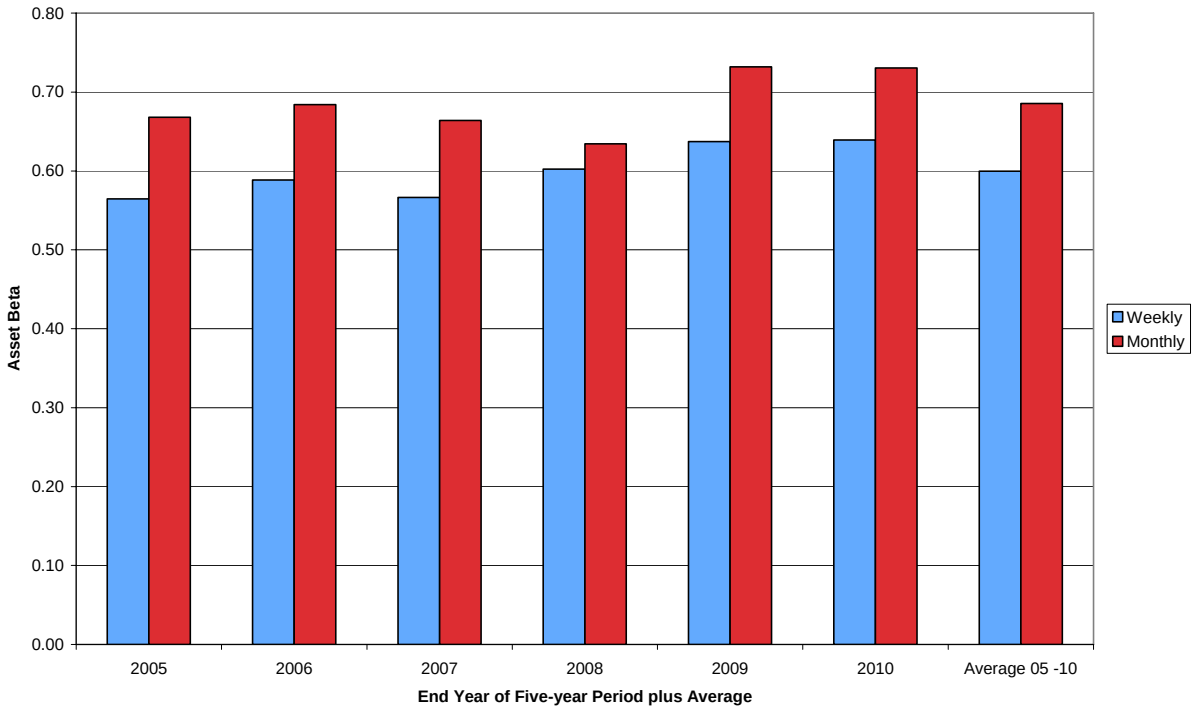
[276] The Commission is not aware of any company which has a beta of zero.

(AIAL plus nine overseas airports). Since then, the Commission has undertaken extensive further analysis of relevant asset betas. The Commission's analysis is set out in more detail in Appendix E8. The Commission's empirical analysis included:

- a wide range of sampling periods, using data over the period from 1990 to 2010. This was to ensure the estimate of the asset beta was not due to a sampling period that was unrepresentative of the true beta. This assumes that the average beta for the industry is relatively stable;
- daily, weekly and monthly frequency data. This was to ensure the estimate of the asset beta was not biased by the choice of sampling frequency;[277] and
- a much larger sample of 24 airports (AIAL plus 23 overseas airports). Small companies were excluded to ensure any thin trading in their shares could not affect the estimates of the asset beta.

6.5.22 A summary of the results is shown in Figure 6.3 below. As a result of the extensive further analysis undertaken by the Commission, with a much larger sample, the Commission concluded that a reasonable estimate of the asset beta for the larger sample of airports is 0.60.

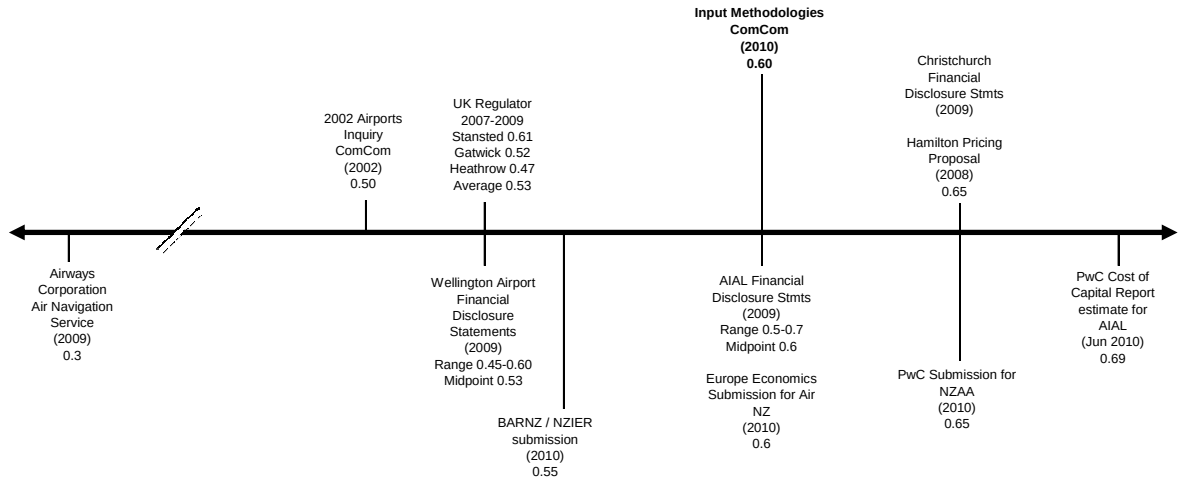
Figure 6.3 Airports Comparable Companies Unadjusted Asset Betas



[277] The advantage of shorter (e.g. daily) periods is that they provide more observations, and potentially increase the statistical robustness of estimating beta. The disadvantage of shorter periods include that beta can be distorted if stocks trade infrequently. Shorter periods are also further removed from the concept that is being estimated (i.e. how stocks perform relative to significant market movements) and may therefore be misleading if share prices do not follow a purely random walk.

6.5.23 To assess the reasonableness of the asset beta estimate, the Commission has compared the results of its asset beta analysis across a range of estimates of the asset beta from other sources. The results of this comparison are shown in Figure 6.4 below.

Figure 6.4 Comparison of Asset Beta Estimates for Airports with Other Asset Beta Estimates



6.5.24 Figure 6.4 shows the Commission's 0.60 estimate of the asset betas for airport services fall within the range of comparable information. The Commission also notes that despite the differing approaches to estimating the asset beta, most of the estimates reported above fall within a reasonably tight range, (and with the Commission's estimate near the middle of the range). This supports the Commission's view that its estimate of the asset beta for airport services is reasonable.

6.5.25 A more detailed discussion about asset and equity betas, including detail on how the Commission has estimated the betas, the reasons why the IM does not include an allowance for regulatory differences, and a discussion of points raised in submissions is included in Appendix E8.

Taxes

6.5.26 The corporate tax rates used in calculating the cost of capital mirror the statutory tax rates. These are 30% until the end of the 2011 tax year (typically 31 March 2011), and 28% from then on. The IM Determination allows for any future changes in tax rates to flow through to the calculation of the cost of capital.

6.5.27 The investor tax rate has been set to reflect the maximum prescribed investor rate under the Portfolio Investment Entities (PIE) regime. This rate applies to investors other than those investors on lower personal tax rates. Under the PIE regime taxes on profits in a PIE are capped at the maximum prescribed investor rate which is 30% until 30 September 2010, and 28% beyond that. Those rates are therefore used in determining the investor tax rate.

6.5.28 Tax situations specific to particular investors do not in principle affect the cost of capital. Taxes are borne by the individuals themselves not by the firms of which they are shareholders. Therefore the IM does not provide for the tax circumstances of individual investors (accumulated tax losses, inability to use imputation credits). This is consistent with the requirement that the cost of capital under Part 4 must be consistent with outcomes in workably competitive markets. As discussed in paragraphs 6.2.2 to 6.2.7, the cost of capital in workably competitive markets is that of an efficient industry cost of capital. An estimate that was based on the tax situation of individual companies or investors would not reflect the cost of capital in a workably competitive market.

6.5.29 A more detailed discussion on taxation issues is included in Appendix E10.

6.6 Leverage

6.6.1 Leverage refers to the mix of debt and equity capital that is used to fund an investment. Leverage is used in two places in estimating the cost of capital. One use is to re-lever the asset beta into an equity beta (and vice versa). The second use is to derive a weighted average cost of capital (WACC) from the estimates of the cost of debt and the cost of equity.

6.6.2 In a tax neutral world, leverage is generally understood not to affect a firm's WACC, since the cost of capital reflects the riskiness of the cash flows, rather than how these are divided up between equity and debt investors. When corporate tax is considered, the WACC is generally understood to decline with increases in leverage.[278] This is because interest costs are tax deductible to the firm but dividends are not.

6.6.3 When personal tax is considered some of the tax advantages of debt are reduced. The New Zealand dividend imputation credit regime allows firms to pass on to their shareholders a credit for the tax the company has already paid.

6.6.4 When the simplified Brennan-Lally CAPM is used to estimate the cost of equity (in conjunction with the simplified beta leveraging formula, i.e. debt beta is assumed to be zero), and the estimated cost of debt includes a positive debt premium, the resulting estimate of WACC increases as leverage increases.[279] The higher the value for the debt premium incorporated in the estimated cost of debt, the greater the effect on the resulting estimate of WACC as leverage increases.[280] This anomaly is being created by the analytical models used to estimate the WACC rather than simply reflecting unusual market conditions.

6.6.5 This positive relationship between leverage and the estimated cost of capital is a potentially serious anomaly as it is inconsistent with the behaviour of firms in workably competitive markets. That is, firms in workably competitive markets do issue debt and, so long as the debt levels are prudent, are considered to be acting

[278] This is the context normally set out in textbooks when discussing the use of the classical CAPM to estimate the cost of equity, as an input to estimating the WACC.

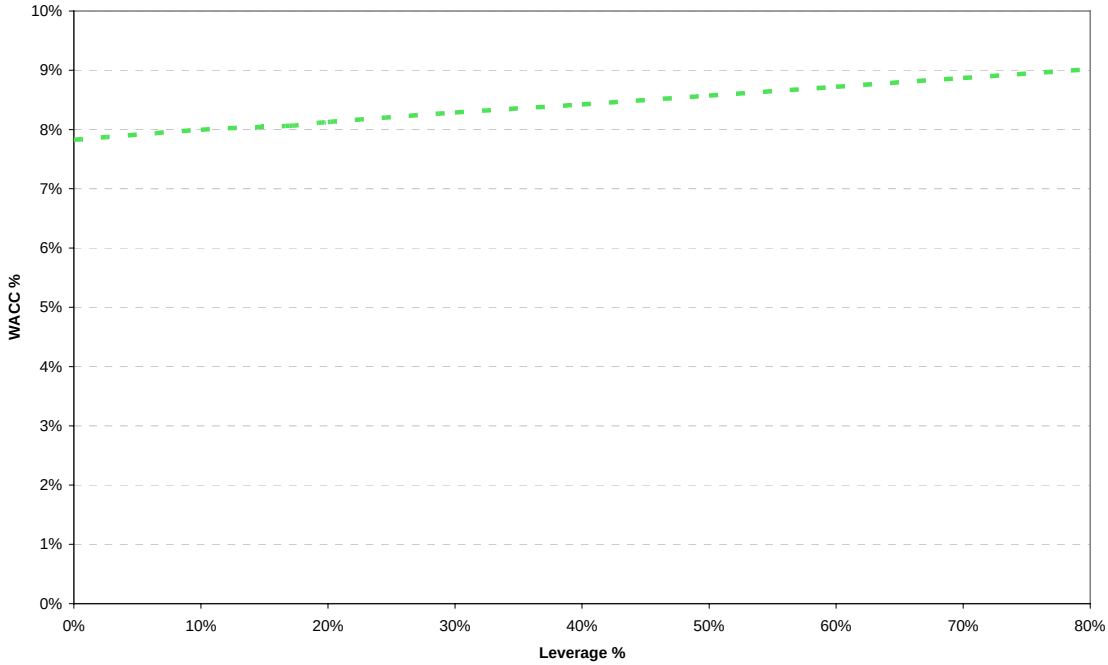
[279] The debt premium itself is a function of leverage. That is, the debt premium would be expected to increase as leverage increases.

[280] If the value for the debt premium incorporated in the estimated cost of debt is sufficiently high, the resulting estimate of WACC can increase as leverage increases, even if the cost of equity is estimated using the classical CAPM.

rationally when they do so. In regard to regulated suppliers this anomaly, if left uncorrected, would result in such suppliers obtaining an increase in the cost of capital if they were able to persuade the regulator to use higher leverage assumptions when applying the simplified Brennan-Lally CAPM. If the Commission were to regard the actual leverage of regulated suppliers as a relevant consideration in deciding on the leverage assumption, such suppliers would have an incentive to increase their leverage which could be detrimental to the long-term interests of consumers by raising the risk of bankruptcy.

6.6.6 The effect of leverage on the cost of capital can be substantial, as illustrated in Figure 6.5 below.

Figure 6.5 The Post-tax Cost of Capital Rises with Increases in Leverage under the Simplified Brennan-Lally CAPM[281]



6.6.7 The situation is not unique to the simplified Brennan-Lally CAPM. A similar anomaly was noted by the UK Competition Commission in its most recent price-setting review of Heathrow. The UK Competition Commission used the classical CAPM.

> The key feature of these charts is the upward-sloping relationship that exists between a firm's gearing and its pre-tax cost of capital when one assumes a zero debt beta. This suggests that gearing up increases a firm's pre-tax cost of capital and therefore warrants the inclusion of a higher rate of return in price caps—something that can be seen explicitly in Table 1 at the beginning of this appendix where BAA's estimates for the pre-tax cost of capital at Heathrow increase with the use of a higher gearing figure, while estimates of the pre-tax cost of capital at Gatwick fall on the assumption of lower gearing.

[281] Assuming a risk-free rate of 4.96%, a debt premium of 1.75%, debt issuance costs of 0.35%, an asset beta of 0.60, a TAMRP of 7.1%, average investor tax rate of 28.1% and average corporate tax rate of 28.4%. These parameter values are consistent with the reasonableness tests the Commission has undertaken. See Appendix E13.

> We find this overall position difficult to reconcile with the observed behaviour of a range of firms in a broad sample of different industries. In the regulated sectors, the trend in recent years has been for firms to inject more debt into their capital structures on the apparent assumption that higher levels of gearing represent more efficient financing. Indeed, ADI has told us that its own decision to move BAA's gearing from around 34 per cent to more than double this figure would improve the efficiency of BAA's financing.
>
> Given this starting point, we do not accept the argument that higher levels of gearing produce a higher cost of capital. We do not believe that this is a credible characterization of the returns that investors require at different levels of gearing ....[282]

6.6.8 The Commission too would not want to set a higher cost of capital due to higher levels of gearing. To address this anomaly, the UK Competition Commission used debt betas.[283] The Draft Reasons Paper for Airports proposed to resolve this anomaly by setting a single notional level of leverage of 40% to apply to all services regulated under Part 4.

6.6.9 In adopting the 40% notional leverage assumption in the Airport's Draft Reasons Paper the Commission addressed the anomaly in the simplified Brennan-Lally CAPM which sees the cost of capital increasing with leverage. The Commission sought to protect consumers from the risks of suppliers increasing leverage (which would result in a higher cost of capital if actual leverage was provided for in the IM), as higher leverage increases the risk of financial distress, and this has potentially detrimental consequences for consumers.

6.6.10 PwC (for ENA and Telecom) submitted that there are other more technically correct ways to address the anomaly of the cost of capital increasing with leverage. The two options identified by PwC were to use the leverage level observed in the samples of comparator companies (that is, 17% for airports and 44% for EDBs, GPBs and Transpower) or to use non-zero debt betas. PwC submitted that the:

> "Commission is technically wrong to attempt to apply a single fixed leverage assumption to all regulated firms. If debt betas are to be excluded from the WACC analysis (which we concur with), then to be consistent the notional leverage used in the WACC estimation should be close to the average leverage of the comparator companies used to derive the (average) beta estimate. This is a fundamental requirement in order to be able to justify application of a "short cut" approach and thus ignore debt betas." [284]

6.6.11 While the technical issue identified by PwC (for ENA) was not discussed in submissions relating to Airports (by either Uniservices or PwC (for NZAA), or BARNZ and Air NZ or their experts), the Commission considers it is of greater

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282 UK Competition Commission, *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, paragraphs 88-90, p. F23.

283 A debt beta measures the systematic risk associated with a firm's debt. A detailed discussion on debt betas is included in Appendix E9.

284 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, Attachment: PricewaterhouseCoopers, Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010. p. 8; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, Attachment: PricewaterhouseCoopers, Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 10.

concern for Airports than for EDBs, GPBs, and Transpower. This is because the average leverage for the sample of comparator airports is 17%, which is significantly below the 40% notional leverage assumption, whereas the sample average leverage for EDBs, GPBs and Transpower is only slightly above the notional leverage assumption (44% versus 40%).

6.6.12 The use of non-zero debt betas is theoretically sounder than using notional leverage, as the use of non-zero debt betas would reduce or eliminate the extent to which the post-tax WACC estimate for each service varies with leverage.

6.6.13 However, the Commission notes that most submissions continue to prefer the use of zero debt betas, that most regulators do not use debt betas (though a minority do)[285], and that the Commission has not used non-zero debt betas in the past. Further, there are practical difficulties in accurately estimating debt betas (but this is offset in part by the estimates available from regulatory decisions overseas, which are generally in the range of 0.1 to 0.2).

6.6.14 If the cost of capital IM specifies leverage for each regulated service in line with that observed for the respective sample of comparator companies (that is, 17% for Airports), the cost of capital estimated and applied under Part 4, will be the same for those services regardless of whether the debt beta is set at zero or at a level to make the estimated cost of capital invariant to leverage.

6.6.15 For these reasons, which are explained more fully in Appendix E3, the IM specifies leverage of 17% for Airports, and does not incorporate the use of non-zero debt betas (since for this leverage level the resulting WACC is the same for all values of debt beta).

6.6.16 Some submissions proposed that regulated suppliers' actual leverage should be used. For the reason outlined in paragraph 6.6.5 this is not appropriate. If actual leverage were used, non-zero debt betas would have to be used in the simplified Brennan-Lally CAPM to minimise the effect of leverage on the estimate of the cost of capital and ensure there are no incentives on suppliers to increase leverage (or propose increases in leverage that would exploit the anomaly in the model).

6.6.17 As the equity beta is calculated using leverage and an asset beta, a leverage of 17% applied to an asset beta for airports of 0.60 results in an equity beta of 0.72. The leverage assumption and equity beta will be fixed for the duration of the IM Determination.

6.7 Estimating a WACC Range

6.7.1 The weighted average cost of capital reflects the cost of debt and the cost of equity, given the mix of debt and equity. There is a post-tax WACC and a vanilla WACC.

[285] Notably, the Queensland Competition Authority (see, for example, Queensland Competition Authority, *Gladstone Area Water Board: Investigation of Pricing Practices, Final Decision*, June 2010), pp. 126-127. And see also the UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, paragraphs 88-90, pp. F21-F28.

The former includes the after-tax cost of debt; the latter includes the cost of debt before tax, as shown in the following equations.

Post-tax WACC = Cost of debt (after tax) x Leverage + Cost of equity x (1 – Leverage)

Vanilla WACC = Cost of debt x Leverage + Cost of equity x (1 – Leverage)

6.7.2 The IM provides for both vanilla WACCs and post-tax WACCs to be specified for application under information disclosure regulation.

Estimating a WACC range

6.7.3 The WACC must be estimated since its components, for example the cost of equity, cannot be observed directly. This raises the prospect of error since it is not possible to know the true cost of equity. To allow for this estimation error, it is usual practice to estimate a range for the WACC.

6.7.4 The Commission has previously used estimates of the standard errors of the components of the WACC, to estimate a standard error of the WACC. This can be used to estimate the distribution of the estimate of the WACC, for example, the 25th and 75th percentile estimate. This approach is consistent with the Commission's previous practice.

6.7.5 A wide variety of submissions were made on the approach to estimating a range. Some submissions called for the use of Monte Carlo simulations, others for the Commission to use its judgement to chose a point estimate of the WACC from a range of WACC estimates that reflected ranges for certain parameters. Some submissions criticised the Commission's approach as implying greater precision than was possible in practice. Other submissions took the Commission's approach and called for different values for particular parameter estimates and the addition of more variables to the analysis. In short, there was no consensus on what a better methodology of establishing a range would be. The Cost of Capital Expert Panel generally supported the Commission's statistical approach.

6.7.6 It is a matter of judgement as to which approach is best. The IM specifies the statistical approach since it provides greater transparency and predictability for suppliers and interested persons. This promotes certainty for suppliers and consumers in relation to regulatory rules, requirements and processes.

The estimated cost of capital for regulated suppliers

6.7.7 The parameters for estimating the cost of capital for Airports are set out in Table 6.4 below. The values for leverage, debt issuance costs, the equity beta, and the TAMRP, will be fixed by the IM Determination. Tax rates are linked to certain statutes and update as these change. The parameters for the risk-free rate and debt premium change over time. Using the estimates observed during the month of June 2010, these are estimated to be 4.96% and 1.75% respectively.

Table 6.4 Parameter Point Estimates and their Standard Error

Parameter	Point estimate	Standard error
Leverage	17%	0
Debt issuance costs	0.35%	0
Asset beta	0.60	0.16
Tax-adjusted market risk premium*	7.1%	0.015
Average Corporate tax rate **Average Investor tax rate**	28.4% 28.1%	0
Risk-free rate (as at 1 July 2010)	4.96%	0
Debt premium (as at 1 July 2010)	1.75%	0.0015 (minimum)

* Includes a 0.5% uplift to TAMRP for one year.

6.7.8 This results in the estimates of WACC as set out below in Table 6.5 as at 1 July 2010.

Table 6.5 Estimated WACCs using the Parameters Specified in Table 6.4

Parameter	
Vanilla WACC	8.40%
Post-tax WACC	8.06%

6.7.9 For the purposes of information disclosure, these (mid-point) WACC estimates will enable interested parties to assess the profitability of a regulated service. The Commission will also estimate the WACC at the 25th and 75th percentiles.

6.7.10 On its website the Commission will publish annually for Airports:

- a mid-point estimate of the five year post-tax WACC to apply under ID regulation; and
- an estimate of five year vanilla WACC at the 25th and 75th percentile.

6.7.11 A more detailed discussion on estimating the WACC range is included in Appendix E11.

6.8 Does the Commission's Methodology Produce Commercially Realistic Estimates of the Cost of Capital?

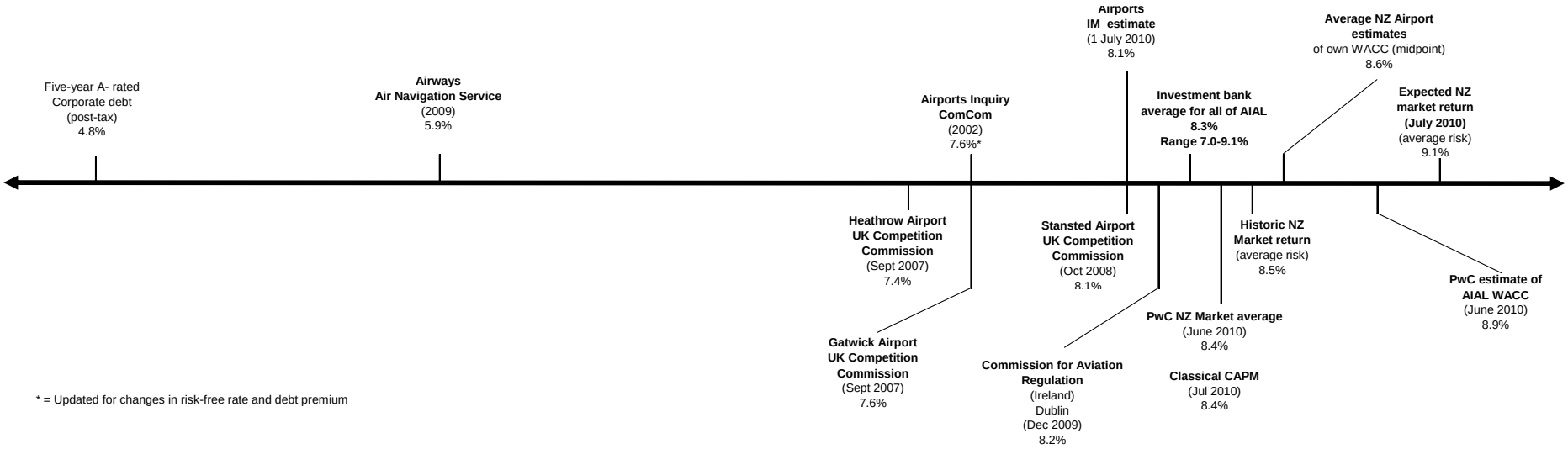
6.8.1 Airports provide important services, with relatively stable demand, face limited substitutes and limited competition. Users have few choices and limited bargaining power. Airports face lower systematic risk than the average firm in the economy. So the expected returns in airports are lower than for a typical or average company.

6.8.2 Figure 6.6 compares the estimates of the post-tax WACCs for Airports against a range of other information. In particular:

- current New Zealand post tax risk-free rates and post tax cost of corporate debt;
- historic and forecast estimates of the returns by New Zealand investors on investments of average risk;
- previous New Zealand regulatory decisions, and recent regulatory decisions in the United Kingdom for airports;
- external estimates of the post-tax WACC for New Zealand airports; and
- estimates of the WACC using other approaches, including using the classical CAPM.

6.8.3 The current risk-free rate, corporate cost of debt and the historic return on the New Zealand market can be estimated independently of the choice of model, CAPM or otherwise.

Figure 6.6 Testing the Reasonableness of the IM Estimates of the WACC Against Comparative Information



6.8.4 More detail on each of the data points in Figure 6.6 is included in Appendix E13.

6.8.5 The estimate of the post-tax WACC for Airports when applying the cost of capital IM is reasonable since:

- it is above the UK Competition Commission's estimates of the cost of capital for Heathrow and Gatwick and similar to the estimate for Stansted and the Irish regulator's estimate for Dublin airport;
- it is above the cost of capital estimated by the self-regulating Air Navigation Service (part of Airways Corporation NZ) and the estimate implied in the Commerce Commission's airport inquiry;
- it is slightly below the New Zealand investment bank average estimate for all of AIAL's business (including unregulated services which would be expected to have a higher WACC),[286] and the estimate using the classical CAPM (which assumes imputation credits have no value).
- it is below the estimate of the historic returns on New Zealand investments of average market risk, the Airport's average estimate of their own WACC, PwC's estimate for all of AIAL's business (including unregulated services which would be expected to have a higher WACC) [287] and the expected estimate for New Zealand average market risk.

6.8.6 Overall, the Commission considers this comparative information is largely consistent with the Commission's estimates, and strongly supports the Commission's conclusion that the cost of capital IM produces estimates of the cost of capital that are reasonable and commercially realistic. The use of commercially realistic estimates of the cost of capital under Part 4 ensures suppliers have incentives to invest and are limited in their ability to extract excessive profits.

Other potential reasonableness checks

6.8.7 Professor Myers and Professor Franks recommended the use of the Fama-French three-factor and the DCF model as reasonableness checks on CAPM estimates, "provided that necessary data are available and that the model's assumptions are reasonably satisfied" (p. 8). However, there is very little New Zealand data available to robustly estimate a cost of equity using these methods and no submission provided estimates of the cost of equity in New Zealand using these models. Therefore, the Commission does not consider that it is practical to use these models as reasonableness checks.

Information on reasonableness tests in submissions

6.8.8 Some submissions included a discussion of reasonableness and comparative information on the cost of capital. These are discussed in Appendix E13. The

[286] The investment bank estimates seek to estimate AIAL's cost of capital over the life of its assets and some use a 10 year risk-free rate which is higher than the current market average, while the Commission's IM is for a specified five year regulatory period, and is explicitly linked to market interest rates.

[287] PwC publishes estimates for around 70 listed New Zealand companies on a quarterly basis and is publicly available on the internet at http://www.pwc.com/nz/en/cost-of-capital. The June 2010 report was the most recent available at the time this Paper was finalised.

Commission has considered these submissions but, for the reasons set out in Appendix E13, the Commission does not consider that they are reliable tests into whether the IM estimates of WACC are reasonable.

PART 2: APPENDICES

APPENDIX A: INPUT METHODOLOGIES CONSULTATION PROCESS

A1.1 This Appendix sets out the key consultation documents that the Commission has released as part of its consultation process for Airports IMs to date, including expert reports that accompanied those consultation papers. It also lists the transcripts from the conference and workshops that the Commission has held in relation to Airports.

A1.2 The list is not intended to include all documents or information provided to or by interested parties in relation to IMs. Unless indicated otherwise, the report is a Commission report.

Table A1 Key Consultation Papers for IMs (Airports)

Date of Release	Report Name
11 December 2008	Notice of intention to start work on Input Methodologies
19 December 2008	Regulatory Provisions of the Commerce Act 1986 Discussion Paper
19 June 2009	Input Methodologies Discussion Paper
19 June 2009	Revised Draft Cost of Capital Guidelines, with expert report: o Franks, J., Lally M., & Myers S., *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, 18 December 2008
22 September 2009	Transcript - Input Methodologies Conference – Airport Services, 15 September 2009
22 September 2009	Input Methodologies Conference - Invitation for Post-conference Submissions
27 October 2009	Cost of Capital Straw-person Worked Example (for discussion at workshop on 12-13 November 2009)
18 November 2009	Transcript - Cost of Capital Workshop - Day 1, 12 November 2009
18 November 2009	Transcript - Cost of Capital Workshop - Day 2, 13 November 2009
18 November 2009	Cost of Capital: Invitation for Post-Workshop Submissions
18 November 2009	Cost of Capital: Effects of Leverage on WACC Under Two Different CAPMs (A spreadsheet "BL versus classical CAPM" underpinning this paper was released on 26 November 2009)
18 November 2009	Dr Martin Lally, *WACC and Leverage*, 17 November 2009
10 December 2009	Update on Process to Determine Input Methodologies and Airports Information Disclosure
23 December 2009	Input Methodologies (Airports) Emerging Views Paper

Date of Release	Report Name
11 February 2010	Airports Workshop (17-18 February 2010) - RAB & Cost Allocation Workshop Materials
22 February 2010	Transcript - Airports Workshop - Day 1, 17 February 2010
22 February 2010	Transcript - Airports Workshop - Day 2, 18 February 2010
22 February 2010	Invitation for Airports Post-Workshop Submissions
14 May 2010	Update on Process to Determine Input Methodologies
31 May 2010	Input Methodologies (Airport Services) Draft Reasons Paper; and Draft Commerce Act (Specified Airport Services Input Methodologies) Determination, with expert reports: o Yarrow, G., Cave, M., Pollitt, M., Small, J., *Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, May 2010; and o Franks, J., Lally, M., Myers, S., *Recommendation to the New Zealand Commerce Commission on whether or not it should change its previous estimate of the tax-adjusted market risk premium as a result of the recent global financial crisis*, 14 April 2010
25 June 2010	Expert Reviews of Airports Draft Reasons Papers o Professor Martin Cave, *Expert Review of the New Zealand Commerce Commission's Draft Decisions and Reasons for Specified Airport Services*, June 2010; o Dr Michael Pollitt, *Expert Review of the New Zealand Commerce Commission's Draft Decisions and Reasons for Specified Airport Services*, June 2010; o Dr John Small, *Expert Review of the New Zealand Commerce Commission's Draft Decisions and Reasons for Specified Airport Services*, June 2010; and o Professor George Yarrow, *Review of Input Methodologies (Airport Services) Draft Reasons Paper*, June 2010
1 October 2010	Revised Draft Commerce Act (Specified Airport Services Input Methodologies) Determination Input Methodologies (Airport Services) Consultation Update Paper
16 December 2010	Expert reports: o Professor Martin Cave, *Expert Review of Reasons Papers of the New Zealand Commerce Commission relating to Electricity Distribution and Gas Pipeline Services and to Airports*, 13 December 2010; o Dr Martin Lally, *Comments on Input Methodologies (EDS) Draft Reasons Paper,* 3 September 2010; o Dr Martin Lally, *Comments on Measurement Error and Regulated*

Date of Release	Report Name
	Firms' Allowed Rates of Return, 13 September 2010; o Dr John Small, *Response to CEG*, 23 November 2010; o Dr John Small, *Expert Review of Input Methodology Reasons Papers*, 14 December 2010; o Yarrow, G., Cave, M., Pollitt, M., Small, J., *Review of Submissions on Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, November 2010; o Professor George Yarrow, *Comments on a CEG memorandum of 17 November 2010,* 14 December 2010; and o Professor George Yarrow, *Review of Input Methodologies (Electricity Distribution Services, Gas Pipeline Services and Airports) Reasons Papers*, 14 December 2010
22 December 2010	Expert report: o Dr Michael Pollitt, *Expert Review of Reasons Papers of the New Zealand Commerce Commission relating to Electricity Distribution and Gas Pipeline Services and to Airports*, December 2010
To be released on 23 December 2010	Commerce Act (Specified Airport Services Input Methodologies Determination) 2010 Input Methodologies (Airport Services) Reasons Paper, 22 December 2010

APPENDIX B: COMPONENTS AND APPLICATION OF THE COST ALLOCATION IM

B1 Introduction

B1.1 This section sets out the components of the cost allocation IM. The section is structured as follows:

- Section B2 describes the accounting-based allocation approach; and
- Section B3 explains the application of the cost allocation IM under information disclosure.

B2 Accounting-Based Allocation Approach

Approach

B2.1 As discussed in Section 3.3, the IM requires that, where possible, cost and asset allocators are based on current 'causal relationships'. These are defined by the IM as those which existed during the 18 months terminating on the last day of the disclosure year in respect of which the allocation is carried out and include:

- in relation to asset values, as a circumstance in which a factor influences the utilisation of an asset within this period; and
- in relation to operating costs, as a circumstance in which a cost driver leads to an operating cost being incurred within this period.

B2.2 Additionally, where it is not possible to identify current 'causal relationships' and proxy allocators need to be used, Airports must provide a rationale for the selection of these and their associated allocator metrics as part of their information disclosure.[288]

Reasons

B2.3 A causal relationship reflects current factors that lead to relevant costs being incurred. In relation to capital costs, a causal relationship reflects the current factors which influence the utilisation of assets. Asset values allocated on the basis of this utilisation in turn determine how capital costs are allocated.

B2.4 In order to incorporate current factors, the Commission considers that an 18 month time frame is the appropriate period over which 'causal relationships' must be identified. The submission from BARNZ noted it "considers an 18 month timeframe to be appropriate".[289] However, while NZAA submitted that the Commission's use of 18 months "would not prevent airports from using the reporting period to review

[288] Full disclosure requirements for this information are set out in Schedules 9 and 10 of the Airports ID Determination.

[289] Board of Airline Representatives New Zealand Incorporated, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 4.

and establish the current relationship",[290] a number of submitters argued that a 12 month time frame would be preferable.[291]

B2.5 Air NZ submitted that the draft determination did not accurately reflect the Draft Reasons Paper, particularly in relation to the definition of the term 'current relationship'.[292] Air NZ and NZAA suggested alternative wording for the definition of 'causal relationship' which incorporated use of an 18 month period to define the term current. CIAL submitted alternative wording which limited the period over which causal relationship could be identified to the financial year.[293]

B2.6 A time frame up to and including the last day of the disclosure year will ensure that causal relationships are current. The Commission has chosen an 18 month time frame rather than a 12 month time period because there may be situations where, due to information availability or the compliance costs involved in the collection of information (such as the cost of conducting a new sampling study), it may not be possible for suppliers to recalculate metrics for cost and/or asset allocators for each disclosure year.

B2.7 Practical examples of current causal relationships used as cost allocators which fit the definition for 'causal relationship' might include:

- the number of staff hours recorded against each service during the 18 months recorded on timesheets; and
- the proportion of terminal space split between regulated activities and other activities over the previous 12 months.[294]

B2.8 In some circumstances quantifiable causal relationships may not exist. In such circumstances, Airports must use quantifiable proxy relationships instead and proxy cost and asset allocators based on these relationships must then be applied. Where proxy allocators are used, Airports must justify their use. Metrics used when applying proxy cost and asset allocators should also be calculated using relevant data from the same 18 month period as the metrics used for causal cost and asset allocators.

B2.9 Examples of proxy cost and asset allocators may include revenue, staff numbers, and balances of CDA allocated (i.e. use of CDA as a proxy for allocations of CnDA).

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290 NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 46, paragraph 213.

291 See, for example: Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, pp. 39-40, paragraphs 173-182; and Air New Zealand Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 27, paragraph 144.

292 Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, pp. 42-43, paragraphs 156-160.

293 See, Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, p. 39; NZ Airports, *Submission on Airports (Input Methodologies) Draft Determinations and Draft Reasons Paper – Proposed Amendments*, 12 July 2010, p. 5; Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, pp. 42-43.

294 This example has been included to clarify that allocators may be calculated over any period up to 18 months ending on the last day of the disclosure year in which the allocation is carried out.

Similar to cost and asset allocators based on causal relationships, proxy cost and asset allocators should be based on factors in existence during the same 18 months on the last day of the most recent disclosure year.

B3 Application of the Cost Allocation IM to Information Disclosure

B3.1 Under s 52S, Airports will be required to apply the cost allocation IM when making disclosures pursuant to the Airports ID Determination.

B3.2 For the avoidance of doubt, the cost allocation IM applies to historical information made available under information disclosure requirements, but does not apply to forecast information provided for information disclosure purposes. For further details on the way in which forecasts need to be provided under ID, see chapter 5 of the Airports ID Determination and Reasons Paper.

B3.3 This information is required to provide interested parties with sufficient information to assess whether the Part 4 Purpose is being met. For example, information disclosed should be sufficient to allow interested persons to assess whether regulated suppliers have shared with consumers the benefits of efficiency gains in the supply of regulated services. Information disclosed will also assist the Commission in monitoring compliance with the cost allocation IM, and in turn will assist the review of this IM required by s 52Y(1) of the Act.

B3.4 For an overview of the type of information on operating cost and asset value allocations that Airports must disclose, refer to the Airports ID Determination.[295]

B3.5 In order to fulfil its monitoring role and assist in the review of the IM at a later date, the Commission is likely to require additional information annually on the underlying assumptions and outcomes having applied the cost allocation IM, including:

- additional information on the split of cost allocator metrics between airport activities and unregulated activities (in aggregate); and
- the financial value of all operating costs and asset values allocated to each of regulated activities and unregulated activities (in aggregate) as a result of applying cost or asset allocators.

B3.6 Any information that the Commission agrees is commercially sensitive will not be publicly disclosed.[296]

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295 Full disclosure requirements for this information are set out in Schedules 9 and 10 of the Airports ID Determination.

296 Airlines disagreed with the Commission's proposal that some additional information required from Airports may not be made publicly available, stating that "protecting material in the way proposed by the Commission is antithetical to the very nature of an information disclosure regime" and considered that a system similar to that used in the investigation of MTAS should be used for maintaining confidential information (See for example Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, p. 43, paragraph 162). However, information must be publicly disclosed pursuant to the purpose of information disclosure. The Commission's summary and analysis will also assist interested persons in making their assessment of whether the Part 4 Purpose is being met. Any information requested under s 53ZD is required for the purpose of monitoring compliance by the Commission, and not for the purpose of allowing interested parties to assess whether the Part 4 Purpose statement is being met.

APPENDIX C: COMPONENTS AND APPLICATION OF THE IM FOR THE VALUATION OF ASSETS

C1 Introduction

C1.1 This Appendix discusses and expands on the detailed components of the IM for the valuation of assets for Airports for the purposes of information disclosure regulation, and includes the following components:

- detailed application of MVAU for land assets;
- future development land (excluded assets);
- works under construction;
- intangible assets (including goodwill, working capital, and finance lease);
- additions and disposals;
- sale and purchase of assets;
- lost and found assets;
- vested assets and capital contributions;
- easements;
- depreciation;
- stranded assets;
- consumer price index; and
- application of the IM for the valuation of assets to information disclosure.

C2 Detailed Application of MVAU for Land Assets

Approach

C2.1 Airports can revalue land in the RAB using an MVAU valuation methodology, in accordance with Schedule A, in any disclosure year. For revaluations to be recognised in the RAB value, they must encompass all land held by the Airport in its RAB value. All future development land must be revalued using MVAU as at the same date as the MVAU revaluation of land in the RAB. If an MVAU revaluation occurs more than once in a disclosure year, the IM Determination only recognises the last revaluation undertaken in that year.

C2.2 In disclosure years in which Airports do not undertake an MVAU revaluation, they must annually revalue land (together with all other assets) using CPI-indexation.

C2.3 With regard to land conversion costs the IM Determination excludes land conversion costs from the RAB value except for the:

a. seawall for AIAL. This asset must be included in the RAB value, and valued by applying straight line depreciation to the 2009 disclosed regulatory value. For the purpose of depreciating this asset, AIAL must set a finite asset lifetime; and

b. the current work on the Northern Runway at AIAL. This activity must be included in works under construction and treated as discussed in paragraphs C4.1 to C4.16. For this purpose, AIAL must include the cost of constructing the Northern Runway in its works under construction, as an amount no greater than $17.3 million.

Reasons

C2.4 Unlike specialised assets, land tends to appreciate in value over time. In addition, the changes in the value of land in an alternative use can be observed in a comparatively liquid market. This suggests that changes in the MVAU of land would provide a reasonable approximation for an appropriate measure of economic depreciation/appreciation. The requirement that all land in an Airport's RAB value and land held for future development are revalued at the same time ensures that the land values are all treated consistently.

C2.5 The treatment of land conversion costs is discussed in Chapter 4 (paragraphs 4.3.61 - 4.3.68). As noted in that discussion there are exceptions to the general rule that land conversion costs will be reflected in a higher MVAU valuation. Recognition of items related to past land conversions is required where expenditure has been incurred relatively recently (and so could not be expected to have been fully recovered through charges), and where the land conversion would not be expected to affect the value of land in an alternative use.

C2.6 The Airports Inquiry in 2002 found that the only item associated with land conversion that would not be reflected in a higher estimate of the opportunity cost of using land as an airport was, at the time, the construction of the seawall at AIAL. Cross-submissions on the Consultation Update Paper also identified $17.3m of works under construction for the Northern Runway at AIAL as relating to land conversion costs.[297] Accordingly, the IM Determination recognises the specialised nature of these investments.

[297] Auckland International Airport Limited, *Submission on Airport Services Input Methodologies Consultation Update Paper*, 22 October 2010, p. 7, paragraph 34.

C2.7 Submissions also identified the Runway End Safety Area at WIAL as a recent conversion cost that would not yet be fully depreciated.[298] However, this asset is classified as civil works in WIAL's disclosure statements, and so will already be included in the initial RAB value.[299] It therefore does not need to be explicitly allowed for in the Determination. WIAL and NZAA mentioned, in submissions on the Draft Determination, unspecified amounts of expenditure over the past decade on "replacement of the failing protection works along the western perimeter, major repairs to the concrete breakwater and periodic repair of holes in the Akmon layer".[300] These submitters did not provide specific details as to how this expenditure is classified in existing regulatory valuations, nor did they provide evidence as to the total value of such expenditure (neither accounting cost under GAAP, nor depreciation up to the 2009 disclosure year). Accordingly the IM Determination does not include any specific provision for this expenditure.

C3 Future Development Land (Excluded Assets)

Approach

C3.1 As discussed in Chapter 4, the IM Determination requires future development land currently held by Airports to be excluded from the initial RAB value (and from associated disclosed profitability measures) until it is used in the supply of specified airport services.[301] Airports must establish the 'base value' of the land held for future development as at the balance date of the 2009 disclosed financial statements using an MVAU valuation as at that date.

C3.2 For future development land acquired by an Airport subsequent to the balance date of the 2009 financial disclosures, the 'base value' of the land will be the cost of acquisition.

C3.3 At the point when construction of the development on such land commences, the land will be included in works under construction at its 'base value' (net of tracking revaluations), together with accumulated holding costs to that date (net of income generated from the land not otherwise reported under information disclosure requirements, but excluding 'tracking revaluations'). For this purpose, 'tracking revaluations' are the sum of all revaluations undertaken in prior disclosure years (whether due to CPI-indexation or MVAU revaluations). These are also included in the 'base value' to ensure that it reflects an up-to-date disclosed value with respect to the revaluations.

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298 Wellington International Airport Limited, *Submission on the Draft Input Methodologies & Information Disclosure (Airport Services) Determinations and Draft Reasons Paper*, 12 July 2010, p. 5, paragraph 12.2; NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 35, paragraph 151. Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 6.

299 Wellington International Airport Limited, *Submission on Airport Services Input Methodologies Revised Draft Determination and Consultation Update Paper*, 22 October 2010, p. 3, paragraph 19.

300 Wellington International Airport Ltd., *Submission on the Draft Input Methodologies & Information Disclosure (Airport Services) Determinations and Draft Reasons Papers*, 12 July 2010, p. 5, paragraph 12.2.

301 This discussion focuses on land assets held for future development. However, the relevant requirements of the IM Determination apply to all assets (land and non-land) held for future use in the provision of specified airport services.

C3.4 Once the development has been 'commissioned', the future development land will enter the RAB value through the RAB roll-forward formula. The value attributed to the land shall be the 'base value' recorded in works under construction (i.e. net of 'tracking revaluations') together with any land related costs incurred during the construction period. The accumulated holding costs (net of income not otherwise reported under information disclosure requirements, but excluding revaluation gains and losses) shall be treated as a non-land asset, and depreciated from the time the asset is commissioned.

C3.5 Airports must annually revalue future development land using CPI-indexation, and may periodically revalue the land using an MVAU valuation methodology (consistent with the treatment of airport land in the RAB value). When an Airport undertakes an MVAU revaluation for all airport land in the RAB, it must also do so for future development land.

C3.6 The ID Determination specifies information on future development land to be disclosed, outside the RAB value, in disclosure periods prior to commissioning of the new development.

Reasons

C3.7 As discussed fully in Chapter 4, the treatment of future development land is based on the incentives the treatment would be likely to create.[302] For the purposes of information disclosure, Airports must separately calculate, with respect to future development land: the value of the land (including cumulative revaluations); net revenue derived from the land; holding costs; and cumulative gains or losses arising from periodic regulatory revaluations ('tracking revaluations').

C3.8 NZAA welcomed the Commission's decision to include holding costs on future development land when the asset is commissioned (but disagreed with the exclusion of future development land from the RAB).[303]

C3.9 To provide transparency around the value of the future development land, and thus allow interested parties to make assessments as to whether the Part 4 Purpose is being met, it is necessary to identify holding costs, and other factors such as net revenue and revaluations, separately from the initial land value. This is provided for in the formula set out in clause 3.11 of the IM Determination.[304] This treatment is supported by submissions received on this topic.[305]

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302 See paragraphs 4.3.74 to 4.3.79.

303 NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 36, paragraph 156.

304 Clause 3.12 (2) states that the cost of an excluded asset to which this clause applies for a disclosure year is determined in accordance with the formula: initial value + holding costs - net revenue - tracking revaluations.

305 For example, on the definition of 'holding cost' for future development land see Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Information Disclosure (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 14; on the separation of revaluations from net revenue, see NZ Airports Association, *Cross Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, 3 August 2010, pp. 25 and 27.

C3.10 The result of the formula in clause 3.11 also ensures that the value of the future development land is equivalent to what the value would have been had it been included in the RAB value.

C4 Works Under Construction

Approach

C4.1 All Airports must exclude any asset that is part of works under construction from their RAB value. Airports must capitalise the financing costs attributable to the construction of an asset in accordance with GAAP,[306] and cease capitalising financing costs at the point at which the asset is commissioned.[307] For this purpose Airports must use a rate that is not greater than the Airport's estimate of its post-tax cost of capital. Consistent with GAAP, Airports must suspend capitalising financing costs during periods in which they suspend construction of the asset.

C4.2 Airports must value land that is part of works under construction on the last day of the 2009 disclosure year using MVAU.

C4.3 When works under construction are commissioned, the RAB value of the asset must be net of any revenue earned. That is, Airports must reduce the cost of the asset, established consistent with GAAP, by the amount of any revenue derived in relation to the assets while they were works under construction (where such a reduction is not already made under GAAP and where the revenue has not already been reported as income under information disclosure).

Reasons

C4.4 In reaching its conclusions about the treatment of works under construction the Commission has considered the following key issues:

a. the timing of the inclusion of capital and financing costs in the RAB value;

b. how to quantify financing costs; and

c. the valuation of land in works under construction.

Timing of inclusion of financing costs

C4.5 In workably competitive markets, assets that have not been commissioned would not normally be expected to earn a return on the capital expended.[308] The Commission's approach is therefore to allow Airports to report the recovery of capex and financing costs incurred during construction, from the time the asset is commissioned. This approach is consistent with GAAP. Under GAAP (NZ IAS 23), finance costs are

306 The relevant accounting standard is New Zealand Equivalent to International Accounting Standard 23 Borrowing Costs as updated from time to time, or any equivalent standard that replaces that standard under Generally Accepted Accounting Practice.

307 Paragraph C6.1 sets out the Commission's decision on the definition of 'commissioned' under the IM for the valuation of assets.

308 Commerce Commission, *Input Methodologies Discussion Paper*, 19 June 2009, p. 180, paragraph 6.222.

calculated from the 'commencement date' to the date at which "substantially all the activities necessary to prepare the qualifying asset for its intended use or sale are complete".[309]

C4.6 Therefore, the Commission has adopted the 'commissioning' date as the point to allow capitalised financing costs for assets under construction to enter the RAB value as part of the total cost of the commissioned asset.[310] This decision is consistent with GAAP and the outcome expected in a workably competitive market.

Quantification of financing costs

C4.7 The financing of assets under construction contributes to Airports' overall costs of creating or replacing the assets used to provide airport services. For regulatory purposes, financing costs are usually conceived of as constituting the costs of both debt and equity financing (the firm's cost of capital), with the cost of debt being calculated on a post-tax basis.

C4.8 In workably competitive markets, suppliers have incentives to complete capital works in a timely and efficient manner. This includes minimising the costs (including financing costs) of completing the works on time, and to a given standard. Promoting improved efficiency is one of the regulatory objectives set out in the Part 4 Purpose (in particular s 52A(1)(b)).

C4.9 After due consideration, the Commission has concluded that the best option to quantify financing costs is to apply GAAP—specifically NZ IAS 23 with the minor modifications discussed below. Adopting GAAP ensures that the regulatory value of newly commissioned assets is consistent with the financial reporting treatment of those assets, thereby reducing compliance costs for suppliers.[311]

C4.10 NZ IAS 23 allows debt costs that are directly attributable to the construction or production of an asset to be capitalised as part of the asset cost.[312] Where debt is specifically acquired for an asset then the borrowing costs are readily identifiable. Where an entity borrows generally (for example, from a central pool of funding) then NZ IAS 23 allows the weighted average of the debt cost to be used for that portion of the funding. The Commission considers NZ IAS 23 has the following drawbacks in a regulatory context:

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309 Paragraph 17 of NZ IAS 23 defines the commencement date for capitalisation as "the date when the entity first meets all of the following conditions: (a) it incurs expenditures for the asset; (b) it incurs borrowing costs; and (c) it undertakes activities that are necessary to prepare the asset for its intended use or sale."

310 New capex must also be added to the RAB value on the commissioning date, see the discussion of capital additions in Section C6.

311 CIAL noted that calculating financing costs for information disclosure using WACC rather than interest costs will mean that the cost of the asset as reflected in the RAB value for an asset will differ from the cost of the asset that is reported for financial accounting purposes (for which the cost of debt finance is used to calculate financing costs during construction). Christchurch International Airport Ltd., Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services, 12 July 2010, p. 38, paragraph 168. The Commission would not expect an Airport's debt costs to exceed its WACC, so in general an Airport should be able to continue to use its interest costs consistent with GAAP if it wishes.

312 NZ IAS 23, paragraphs 10-15. Paragraph 10 defines debt costs that are 'directly attributable to the acquisition, construction or production of a qualifying asset' as 'those borrowing costs that would have been avoided if the expenditure on the qualifying asset had not been made.' This is consistent with the meaning of 'directly attributable' in the cost allocation IM, albeit focussed at the level of particular assets, rather than services.

a. eligibility to capitalise finance costs under GAAP depends on the way that capital works are funded (through debt or equity), which may depend on the different practices of different Airports; and

b. adopting an NZ IAS 23 treatment, under which actual debt costs are capitalised, may dilute Airports' incentives to source funds that are competitively priced (to the extent that these decisions are influenced by information disclosure requirements).

C4.11 To the extent that information disclosure requirements influence Airports' financing decisions, the Commission has mitigated these drawbacks by adapting the approach in NZ IAS 23. Specifically, in quantifying their financing costs, Airports should apply a rate that is not greater than their estimate of their post-tax cost of capital (reflecting the costs of both debt and equity financing). The practical effect of this is that Airports may apply their actual cost of debt, consistent with GAAP, up to their estimated cost of capital.

C4.12 The IM Determination requires Airports to apply their own estimate of their cost of capital in quantifying financing costs. Airports do not have to apply a cost of capital established under the cost of capital IM (refer section 53F(1)(b) of the Act, which provides that suppliers that are subject only to information disclosure regulation do not have to apply methodologies for evaluating or determining the cost of capital).

C4.13 The Commission notes, however, that interested persons will be able to assess whether Airports have incentives to improve efficiency in relation to financing costs by comparing the Airports' disclosed holding costs to estimated holding costs calculated using the regulatory WACC (as published by the Commission in accordance with the cost of capital IM).

C4.14 The treatment described in paragraph C4.11 will:

a. allow a full economic cost of financing to be capitalised by Airports (not just the cost of debt) thereby providing a more accurate assessment of profitability;

b. remove the opportunity for Airports to attribute specific tranches of high cost debt to capital projects; and

c. avoid the need for standardised multipliers to calculate financing costs.[313]

C4.15 The treatment may diverge from a strict GAAP application under NZ IAS 23 (and could produce a difference in the cost of new assets in some fixed asset registers). However, Airports should have existing estimates of their cost of capital which they can use for this purpose, and the capitalisation methodology—being substantially similar to that contained in NZ IAS 23—should be well understood. These factors should limit the extent of compliance costs.

C4.16 NZ IAS 23 includes a 'suspension' rule under which capitalisation of finance costs is suspended during periods in which active development of the asset is suspended,

[313] NZAA welcomed the Commission's decision not to apply a multiplier, see NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 43, paragraph 204.

if these periods are 'extended periods' (i.e. do not involve substantial technical and administrative work and are not a temporary delay necessary for getting the asset ready for use). This 'suspension' rule provides an incentive for suppliers to limit construction time to that strictly necessary for construction. The Commission has therefore adopted this approach.[314]

C4.17 The IM Determination requires that Airports must deduct any income earned in relation to assets while they are works under construction from the cost of the asset (where such a reduction is not already made under GAAP, and where the revenue has not otherwise been reported as income under information disclosure) for the purpose of establishing the asset's RAB value. This will ensure that the cost of the asset that enters the RAB value on commissioning fully reflects the actual (net) cost to the Airport, and is consistent with the treatment of excluded assets.[315]

Treatment of land

C4.18 Airport land that is already held as part of works under construction on the last day of the 2009 disclosure year should be valued using an MVAU methodology. This is to ensure that land valuations are treated consistently. In particular, when land that forms part of a newly constructed asset enters the RAB value, it will be valued consistently with other airport land. The Commission's reasons for adopting an MVAU approach to airport land are discussed in Chapter 4.

C4.19 The IM Determination provides that when land that is part of works under construction is commissioned and enters the RAB, the value of the land is the MVAU valuation, plus financing costs, less net revenue derived from the land while it was a works in construction. If the net revenue is greater than total financing costs, then the net effect is that the land would enter the RAB at a value below its MVAU value. NZAA recommended that when land is transferred from works under construction into the RAB value, the IM Determination should provide that such land is commissioned at no less than MVAU.[316] BARNZ objected to NZAA's recommendation, arguing that it would mean that users would be required to bear the costs where an asset owner acquires assets in advance at a net cost to users, but would not be entitled to receive any of the benefit where the decision to acquire assets in advance results in an overall saving to the cost of acquisition. BARNZ considered this approach would not be in accordance with s 52A, which requires the sharing of efficiency gains.[317]

C4.20 The Commission agrees with BARNZ's concerns, and considers that the costs and revenues from holding land prior to commissioning should be treated symmetrically. When the land is commissioned and enters the RAB value, Airports must reduce the

[314] The suspension rule would not address situations where airports progress work, but slowly so as to draw out the period over which financing costs accrue. However, the Commission considers that greater transparency around forecast and actual capex, under the information disclosure requirements, should reveal this type of behaviour.

[315] BARNZ noted and supported this change in technical consultation. BARNZ, *Submission on Airport Services Input Methodologies Consultation Update Paper*, 22 October 2010, pp. 4-5.

[316] NZAA was specifically concerned with the possibility that, where net revenue is greater than the holding costs associated with land, this would reduce the total RAB value of the land below its MVAU value. New Zealand Airports Association, *Submission on Airport Services Input Methodologies Consultation Update Paper*, 22 October 2010, p. 9, paragraph 35.

[317] Board of Airline Representatives New Zealand, *Cross-Submission on Revised Update Paper & Determination - Land Conversion Costs*, 2 November 2010, p. 9.

cost of the asset by the amount of any revenue derived from the asset while they were works under construction. This is the case irrespective of whether any such revenue is greater, or less than, the capitalised financing costs. If, in any given case, net revenues derived from an asset held as works under construction are not fully reflected, along with financing costs, in determining the cost of the asset on commissioning, the asset's RAB value will be overstated. Thus NZAA's proposal could, in some circumstances, inflate the RAB value. Depending on the particular circumstances this may reduce interested parties' ability to assess whether the Airport is earning excessive profits.

C5 Intangible Assets

Approach

C5.1 Airports may include in the RAB value finance leases and intangible assets, provided that they are identifiable non-monetary assets that are not goodwill, consistent with the meanings under GAAP. Accordingly, Airports must exclude working capital and goodwill from their RAB values.

C5.2 Airports must establish the value of permitted intangible assets as follows:

a. for intangible assets in the initial RAB value, using the value ascribed to those assets in the Airports' 2009 financial disclosures;

b. for intangible assets added to the RAB value after the last day of the 2009 disclosure year using the cost model for recognition, under GAAP.[318]

Reasons

C5.3 Intangible assets are best defined as "identifiable non-monetary assets without physical substance".[319] Examples include computer software, patents, copyrights, and franchises. Regulated suppliers may expend resources on acquiring or developing, maintaining or enhancing such assets, and should be able to earn a return of and on that investment where:

a. this is consistent with the Part 4 Purpose; and

b. the assets are used to supply specified airport services (it is not sufficient for intangible assets to merely be associated with an Airport).

C5.4 GAAP (through the accounting standard NZ IAS 38) provides that an intangible asset can only be recognised if, and only if, it meets the following criteria:[320]

c. it is capable of being separated or divided from the entity and sold, transferred, licensed, rented or exchanged, either individually or together with a related contract, asset or liability, or arises from contractual or other legal rights; and

[318] See accounting standard NZ IAS 38, paragraph 24.

[319] See NZ IAS 38, paragraph 8.

[320] NZ IAS 38, paragraphs 12, 21-22.

d. it is probable that future economic benefits that are attributable to the asset will flow to the entity and the cost of the asset can be measured reliably.

C5.5 NZ IAS 38 requires intangible assets to be measured initially at cost. The standard prohibits the recognition of internally generated brands, publishing titles, customer lists and items similar in substance from being recognised as intangible assets. In these cases, there is no reliable way of measuring the costs (if any) to the supplier of investing in these items.

C5.6 The Commission considers that the criteria set out in paragraph C5.4 are consistent with the Part 4 Purpose, specifically s 52A(1)(d). If Airports apply these criteria in establishing and rolling forward their RAB values, their financial disclosures should reflect the actual costs (identifiable and measured reliably) of providing services to consumers. The criteria set out in the standard therefore provide a useful guide in determining the value of the intangible assets that should be permitted to enter the RAB value under Part 4. BARNZ agreed that only intangible assets that meet GAAP should be included in the RAB value.[321]

C5.7 The sections that follow discuss the required treatment of specific categories of intangible asset—goodwill, working capital, and finance leases.

Goodwill

C5.8 Goodwill arises from business acquisitions, where a business is acquired from another supplier for a price which is greater than the fair value of the assets of the business at the time of the acquisition. The difference is usually attributed to 'goodwill' and is recognised in the financial statements of the acquirer as an asset.[322] Goodwill is an intangible item and represents the acquirer's anticipation of future economic benefits from assets where such benefits are not capable of being individually identified and separately recognised.

C5.9 In markets subject to workable competition suppliers are generally unable to earn an additional rate of return simply as the result of the amount of goodwill included in their payments to acquire assets. Even if such payments were justifiable, the process of separating out the portion of those payments which reflect specific factors (such as potential efficiency gains) would be subjective and arbitrary. Further, the inclusion of goodwill in the RAB value may encourage inefficient consolidations. Excluding goodwill from the RAB value will help to produce outcomes consistent with those observed in workably competitive markets, and will promote the long-term benefits of consumers accordingly. All Airports must therefore exclude goodwill from their RAB values.

Working capital

C5.10 In considering whether to include working capital in the RAB value, the Commission has defined working capital as the liquidity a business needs to meet its

[321] Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 5.

[322] It is important to distinguish between the 'fair value' of the assets of the business, and the 'fair value' of the business enterprise as a whole (that is the price a purchaser is willing to pay for the business), which may be greater. Accounting Standard NZ IFRS 3 provides guidance on the recognition of goodwill for 'business combinations', paragraphs 51-55.

short-term obligations. This is net working capital, i.e. current assets less current liabilities. Overall, including working capital in the RAB value is unlikely to have a material effect on the ROI, and therefore is unlikely to have a substantial benefit in terms of meeting the Part 4 Purpose, or the purpose of information disclosure. The Commission's reasons for this view are:

a. For consistency with the Part 4 Purpose (in particular s 52A(1)(b)), the IM for the valuation of assets should preserve Airports' incentives to manage their working capital efficiently. The Commission's approach retains incentives to manage working capital efficiently, as it will not be compensated where working capital is unduly high (and conversely will not be penalised if working capital is low or negative);

b. Working capital is concerned with the timing of cash flows required to provide the regulated services. Airports will, in effect, be compensated for the effects of cash flow shortfalls, if any, during capex programmes which involve periods of intensive cash usage.[323] This reduces the effect of excluding working capital from the RAB value—even if working capital were included in the RAB value, it would be net of this large sum;

c. Excluding working capital prevents Airports from including current assets in the RAB value, but also excludes the offsetting effect of current liabilities.

C5.11 While businesses may already have their own processes in place for measuring working capital, there is no specific GAAP definition or treatment of working capital. For example, current liabilities included in working capital are a subset of term liabilities which are defined under GAAP. Further, in practice businesses share working capital across all of their operations. If Airports were permitted to include working capital in their RAB values, they would need to allocate it between regulated services and other parts of the business. Thus in order to provide certainty for Airports, and other interested persons, the Commission would need to develop rules for defining and allocating working capital.

C5.12 The above drawbacks are not insurmountable. However, it is difficult to justify the added regulatory costs of including working capital in the RAB value, as the benefit from doing so, in terms of the Part 4 Purpose and the purpose of information disclosure, is likely to be immaterial.

C5.13 The exclusion of working capital is implemented in the IM Determination by excluding intangible assets from the RAB value, unless they are both identifiable and non-monetary. As working capital is an intangible asset that is monetary, Airports must exclude working capital from their RAB values.

Finance Leases

C5.14 GAAP (accounting standard NZ IAS 17) provides for 'finance leases' to be treated in a similar way to fixed assets and corresponding term liabilities even though the recognised finance lease asset can arguably remain an intangible. In this context,

[323] The IM Determination allows Airports to capitalise the cost of finance during the construction of new assets and to include this in the RAB value once new works are commissioned. This allows the Airport to earn a return on the cash payments made to suppliers when constructing new assets (see Section C4).

'finance leases' are leases where substantially all the risks and rewards incidental to ownership are passed to the lessee, for the term of the lease.[324]

C5.15 The Commission considers there is potential benefit in allowing Airports to recognise finance leases, in accordance with the standard. It can be efficient for Airports in planning future additions, to choose leases over the option of owning the asset, where this minimises costs over the asset's life. This outcome is consistent with what would be expected in a workably competitive market, and with s 52A(1)(b) of the Act. Failing to recognise finance leases in the RAB value could penalise Airports for such efficiency enhancing behaviour. Hence Airports are permitted to include finance leases in the RAB value, consistent with GAAP (specifically NZ IAS 17).

C5.16 BARNZ agreed that finance leases should be treated in accordance with NZ IAS 17 but noted that the finance charge and repayment of outstanding amounts associated with a finance lease should not be included as operating expenses when the airport is the lessee.[325] The Commission agrees and notes that in accordance with the IM Determination that all such costs will be treated as a finance cost.

C6 Additions and Disposals

Approach

C6.1 Subject to any other decisions on specific types of transaction, Airports must include capital additions in the RAB value at cost in the year in which they are 'commissioned'. For this purpose the term 'commissioned' for new capital expenditure is defined to mean first 'used by the Airport to provide specified airport services other than excluded services'.

C6.2 Where an Airport disposes of an asset, the closing RAB value of that asset, for the disclosure year in which the disposal occurs, is nil. Section C7, below, discusses treatment of asset sales between regulated parties and related parties.

Reasons

C6.3 The requirement that a new asset must be 'used' in the definition of 'commissioned' is a practical way of ensuring that only assets that are used to provide specified airport services are included in the RAB value. Whether an asset is 'used' is a purely factual matter within the knowledge of Airports, which can be objectively assessed by interested parties. The exclusion of future development land from the RAB value, until it is used in the supply of specified airport services, is discussed in Chapter 4 (Section 4.3).

C6.4 NZIER on behalf of BARNZ submitted that for capital additions, the IM Determination should provide that assets may be included in the RAB value:

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[324] A finance lease may provide for ownership of the asset to pass to the lessee at the end of that period. The term 'finance' reflects the fact that this type of lease is essentially a financing arrangement that may lead to the acquisition of an asset. Vehicles and IT equipment are examples of assets where such leases might be used.

[325] Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 5.

i. if their inclusion in the RAB value has been previously approved by all major users of the airport (as defined in the AAA) at the time approval was given; or

ii. they are currently 'used and useful' for the provision of specified airport services.

Where 'useful' should mean the assets are necessary to provide efficiently the quantity and quality of services that reflect consumer demands.[326]

C6.5 Excluding assets which are not used to provide airport services will ensure that the ROI is not overstated, thus better enabling interested parties to assess whether Airports are limited in their ability to earn excessive profits. The matter of whether an asset is both 'used' and 'useful' (which is potentially more subjective and more open to disagreement) is more appropriately left for interested persons to assess based on disclosed information.

C6.6 In the case of additions, the ID Determination requires disclosure of forward looking information on planned capex. This should allow interested persons to monitor whether suppliers are planning to invest when and where required to meet consumer demands, and whether they have appropriate incentives to invest and improve efficiency. The ID Determination also requires Airports to disclose annual comparisons of actual to forecast expenditure, with an explanation of significant variances. This explanation should provide sufficient information for interested persons to reconcile their assessments of planned efficiency with actual outcomes. These disclosures, taken together, should provide sufficient information for interested parties to be able to assess the justification for substantial new additions to the RAB value. In light of this the Commission does not consider additional approvals or tests, as suggested by NZIER, are necessary in terms of meeting the Part 4 Purpose and the purpose of ID.[327]

C6.7 If the RAB value is substantially lower than the market value, this may create incentives for Airports to sell airport land. The Commission considered neutralising this incentive by requiring Airports, when they dispose of airport land, to reduce their RAB values by the proceeds of any such disposal. This is the approach adopted by regulators in other jurisdictions, e.g. the UK Civil Aviation Authority (UK CAA). However, the implementation of this approach is problematic. It would require Airports to create a notional (and possibly negative) land asset in the RAB value, causing an anomaly in Airports' asset registers going forward. This could cause problems for Airports' price setting processes (to the extent that Airports may, if they wish, use the regulatory RAB value for price setting purposes).

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326 Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Information Disclosure (Airport Services) Draft Reasons Paper and Draft Determination, Attachment: NZIER, Conditions for Inclusion in the Regulatory Asset Base - Comments on the Commerce Commission's proposed 'used' test - Report to BARNZ*, 9 July 2010, pp. 2-3. This proposal was also supported by Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, pp. 37-38, paragraph 147.

327 Under the Airport Authorities Act, Airports are already subject to a requirement to consult on capital expenditure of greater than 20 percent of the value of the airport company's assets within the given accounting period.

C6.8 BARNZ supported the approach described in paragraph C6.7.[328] However, NZAA and AIAL submitted that this approach could lead to significant undervaluation of the remaining land, and discourage potential efficiency enhancing disposals.[329]

C6.9 Under the IM Determination, Airports may periodically revalue airport land using MVAU, with interim CPI-indexation. As a result the RAB value of the land is unlikely to be substantially lower than market values, depending (among other things) on the frequency of MVAU revaluations. In light of this, and given that Airports are only subject to ID regulation at this time, the Commission has concluded that the additional complexity of implementing the above approach is not warranted.

C6.10 The alternative approach is to require that disposals of land are treated in the same way as other asset disposals (see paragraph C7.2). That is, where they dispose of land, Airports must reduce their RAB value by the RAB value of the land in question. Any difference between the change in the Airport's RAB value and the proceeds from the sale must then be recognised as a gain or loss under ID requirements (subject to decisions on sale and purchase of assets between regulated suppliers, and between related parties, as discussed in Section C7 below). This should have an equivalent effect in net present value terms, compared to reducing the RAB value by the proceeds of the sale, but may cause one-off fluctuations in the ROI.

C6.11 The Commission notes that most of the land in the RAB value is tied to the provision of airport services—it is not realistic to suppose Airports might be able to sell large segments opportunistically. In practice therefore, only a relatively small portion of airport land is likely to be affected by this decision.

C7 Sale and Purchase of Assets

C7.1 Transactions for the sale and purchase of assets that are used to supply specified airport services may occur between Airports and other entities that are not regulated under Part 4, other entities that are related parties (including other parts of the Airport's business), and other regulated suppliers.

C7.2 Such transactions should be treated consistent with GAAP, unless this is inconsistent with the Part 4 Purpose. The GAAP approach raises no concerns for arms' length transactions between an Airport and an unregulated entity. Where an asset is purchased by an Airport from an entity not regulated under Part 4, the asset should be included in the RAB value at cost in the year of purchase, where cost is the purchase price of the asset. The ID Determination provides that any gain or loss from such a transaction must be treated as income.

C7.3 The IM Determination implements the above approach, with the following exceptions:

328 Board of Airline Representatives New Zealand Incorporated, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 6.

329 NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 43, paragraph 203; Auckland International Airport Limited, *Submission to the Commerce Commission on Draft Input Methodologies Determination (Airport Services)*, 12 July 2010, p. 21, paragraph 117.

a. where an Airport buys an asset from another supplier of regulated services; and

b. where an Airport buys an asset from, or sells an asset to, a related party.[330]

Acquisitions from another supplier of services that is regulated under Part 4

Approach

C7.4 Where an asset is purchased from another supplier of services that is regulated under Part 4, the buyer must add the asset to its RAB value at the asset's equivalent value in the RAB of the seller, i.e. at its most recent RAB value. The seller must not recognise gains or losses as income, under the ID Determination.

C7.5 This requirement overrides the requirements governing transactions between related parties, discussed in paragraphs C7.7 to C7.10 below.

Reasons

C7.6 Where an Airport buys an asset from another supplier of regulated services, the asset base from which a return can be earned should not be affected by the sale price. Otherwise returns over the life of the asset could exceed the total cost of owning and operating the asset in the combined books of the vendor and purchaser. Such a result would not be consistent with promoting outcomes such that suppliers of regulated goods and services are limited in their ability to extract excessive profits. It could also provide suppliers with an incentive to trade assets unnecessarily. In a workably competitive market, suppliers are not able to increase prices simply because assets have been traded. Thus the Commission considers that the prescribed treatment under GAAP is not consistent with the Part 4 Purpose. Instead the carrying RAB value of the asset should be added to the RAB value of the purchaser and deducted from the vendor's RAB value.

Acquisitions from a related party (including other, unregulated, parts of the same business)

Approach

C7.7 The IM Determination requires that, where a regulated supplier purchases an asset from a related party (that does not supply services that are regulated under Part 4), it must add the asset to its RAB value at:

a. depreciated historical cost, provided documentation is available to support this; or

b. where sufficient records do not exist to establish this cost, its market value, as verified by an independent valuer. For this purpose, where the asset is land, the market value must be established using the MVAU approach specified in Schedule A of the IM Determination. For non-land assets, the market value may not exceed the asset's depreciated replacement cost.

[330] The IM Determination defines a related party to include any person that in accordance with GAAP is related to the Airport in question, or any part of the Airport in question that does not supply specified airport services.

C7.8 For this purpose a related party includes both:

a. business units of the same Airport, that supply services other than specified airport services; and

b. a party that under GAAP is considered a related party (including any party that has conducted business either directly or indirectly with the supplier in the current financial year).

Reasons

C7.9 Where a supplier of specified airport services purchases an asset from a related party—or sells an asset to a related party—the value at which the asset is transferred is open to manipulation. The presumption is that transactions with a related party are not arms' length transactions. Without the discipline of an arms' length negotiation the price paid may be greater (or less) than the asset's market value. This could create a transfer of wealth between the supplier and consumers that would not occur in a workably competitive market.

C7.10 To address this concern, where an Airport buys an asset from a related party, the asset's RAB value should not be based on the purchase price, but instead on some objective, independent measure. Where the asset concerned is land, the asset should enter the RAB value at MVAU, valued in accordance with Schedule A, and verified by an independent valuer.

C8 Lost and Found Assets

Approach

C8.1 A lost asset is an asset that has been included in an opening RAB value of an Airport, but is subsequently determined by an Airport to never have been used to provide specified services. Airports must remove lost assets from the RAB value in the disclosure year in which they are identified as lost, and must reduce the RAB value by the asset's opening RAB value in that year. From the end of the 2012 disclosure year, lost assets that were in the initial RAB value will be permitted to remain in the RAB value.

C8.2 A found asset is an asset that has not previously been included in the RAB value but is found by an Airport to have been used to provide specified services in a previous financial year, and was commissioned after the disclosure year 2009. After the end of the disclosure year 2012, Airports may only add to the RAB value found assets that were commissioned after the disclosure year 2009.

C8.3 Airports must add found assets to the RAB value in the year in which they are found, and must establish the RAB value of found assets at cost, consistent with GAAP, where sufficient records exist. Where sufficient records do not exist the Airport may assign the asset the same value as a similar asset (where such an asset exists) that is:

a. of a similar asset type and age; and

b. in the RAB value at the beginning of that disclosure year.

C8.4 If no such similar asset exists, the Airport must verify the asset's value based on an independent valuer's report confirming the asset's market value at the time the found asset is added to the RAB value. Where the found asset is land, the market value must be established using the MVAU approach set out in Schedule A of the IM Determination.

Reasons

C8.5 Once the initial RAB value is established, allowing Airports to add found assets that they have been using to provide the regulated services as at the initial RAB value date would have the effect of allowing revisions to the initial RAB value after it has been established. In particular, as discussed below (see paragraph C8.12), changes to the RAB value arising from adjustments for lost and found assets are not recognised as income. This could enable Airports to seek to add found assets to the RAB value in the future in order to retrospectively increase the initial RAB value, without any offsetting adjustment reflected to income. This would reduce certainty for both suppliers and consumers under the Part 4 regime.

C8.6 NZAA submitted that it would be unreasonable to exclude assets required to provide specified airport services from the initial RAB due to them not having been included in the 2009 disclosure statements.[331] Under the IM Determination, the constraint that Airports may only add to the RAB value found assets commissioned after the 2009 disclosure year only comes into effect after the 2012 disclosure year. Airports will have an opportunity to correct for errors in the RAB value during the 2011 year.

C8.7 In light of this, there is no justification for enabling Airports to make further corrections in relation to 2009 disclosure values, once this correction period has passed. This includes asset register corrections. Accordingly once the initial RAB value is established, corrections for found assets are limited to:[332]

a. in the case of lost assets, assets that are included in the RAB value after the disclosure year 2009; and

b. in the case of found assets, assets that are commissioned after the 2009 disclosure year.

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331 New Zealand Airports Association, *Submission on Airport Services Input Methodologies Consultation Update Paper*, 22 October 2010, p. 3, pp. 12-13, paragraphs 48-52.

332 The following hypothetical example illustrates the type of asset register corrections that will be permitted after the 2012 disclosure year. Assume an Airport constructs a new building after 2009 (and assume for simplicity that the building is directly attributable to specified airport services). The original design of the building provides for 50 lighting fixtures. During construction the design is altered so that only 48 lighting fixtures are actually installed. The change in design is not reflected in the asset register, so that when the building is commissioned 50 lighting fixtures are added to the RAB value. If the Airport discovers this error in a subsequent disclosure year the extra 2 lighting fixtures should be recognised as lost assets and removed from the RAB value. Conversely if the final construction includes 52 lighting fixtures, but only 50 are added to the RAB value when the building is commissioned (based on the original design), then the Airport may correct for this error in a subsequent disclosure year under the provisions for found assets.

C8.8 Consistent with GAAP, lost assets must be removed from the RAB value and found assets included in the RAB value in the period in which they are lost or found.[333]

C8.9 The key question here is how a found asset should be valued for this purpose. GAAP (IAS 16) requires the asset to be valued at cost. If records exist, cost should be measured on an historic cost basis, rolled forward to the current period using CPI-indexation (consistent with the RAB roll-forward approach).

C8.10 Where records are not available to establish the cost of a found asset, 'found' assets should be able to be included at the same value as similar assets already in the RAB value. This would be consistent with GAAP, and would avoid the compliance costs of using independent valuers to establish asset values. The IM Determination achieves this by providing that where assets are found which are consistent with the asset categories included in the opening RAB value, they are assigned the same value as a similar asset in the opening RAB value, which has the same expected remaining asset life.

C8.11 Where no records or similar asset exists, the value of the asset must be established using an estimate of its market value (verified by an independent valuer).

C8.12 Recognition of lost and found assets enables the correction of prior errors in the RAB value. This is distinct from revaluation gains and losses. Revaluations must be recognised as income as they reflect changes in the earning potential of an EDB's or GPB's asset. This is not the case when correcting for lost and found assets – Airports therefore do not need to recognise such corrections as revenue or an expense.

C8.13 Given that lost and found assets are not recognised as income, it is important that the rules provide sufficient scrutiny to ensure the value of such assets cannot be manipulated.

C8.14 Accordingly, some form of verification of found assets is appropriate, to ensure only assets that are used to provide airport services are brought within the RAB value, and that the value of such assets is reasonable. The definition of found asset specifies that a found asset must have been 'used' to provide specified airport services in a prior financial year. Further, under ID requirements, each Airport must provide a Directors' certification that disclosed information (which includes the disclosed adjustment for lost and found assets) complies with the ID Determination. These two requirements together amount to a certification that found assets have been used to provide specified airport services.

C9 Vested Assets and Capital Contributions

Approach

C9.1 The IM Determination requires Airports to recognise capital contributions by adding the net amount of the capital expenditure to the RAB value at the date the associated

[333] The accounting standard IAS 8 sets out the GAAP treatment of prior period errors. That standard requires that any material prior period errors should be corrected retrospectively in the first set of financial statements authorised for issue after their discovery.

asset is commissioned. For this purpose, where the capital contribution does not reduce the cost of the asset under GAAP, the asset in question enters the RAB value at cost (measured in accordance with GAAP), reduced by the amount of the capital contribution received.

C9.2 Regulated suppliers must include vested assets in the RAB value at the cost to the airport, consistent with the cost based approach to additions, and with the net approach to capital contributions set out above. That is, the cost at which the asset enters the RAB value may not exceed the amount of consideration paid by the Airport in respect of that asset. Where assets are vested at no cost to the Airport, the RAB value should be nil, accordingly.[334]

C9.3 The initial RAB value of any existing vested assets will be the value for those assets included in the Airports' 2009 financial disclosures.

Reason

C9.4 The Commission has considered the treatment of capital contributions, and vested assets, in rolling forward the RAB value, and has concluded that capital contributions should be netted off against the cost of the asset when it is recognised in the RAB, and vested assets recognised at the cost to the Airport.[335] Accordingly, capital contributions and vested assets are not recognised as income in the ID Determination.

C9.5 Under the Commission's approach, the effect of capital contributions and vested assets will be spread over the remaining life of the assets, and should be NPV-equivalent to the alternative of treating capital contributions and vested assets as income. Further, adopting this 'net approach' reduces year on year volatility in disclosed ROIs, compared with the alternative 'income' treatment.

C9.6 The Commission considers that its approach will address the concern raised by BARNZ that Airports could seek to increase their RAB value by revaluing vested assets before including the asset in the RAB value.[336]

C10 Easements

Approach

C10.1 All Airports must include new easement rights in the RAB value at cost in the year in which the rights are acquired, provided that the RAB value of new easement rights does not exceed fair market value, as determined by an independent valuer. The cost of new easement rights are the costs to acquire the rights, together with any associated injurious affection payments and all other costs of establishing the

[334] Examples of vested assets include roading assets that may be transferred from a government or local government owner to an airport. By way of illustration, in 2003 Transit NZ and Manukau City Council transferred Pukaki Bridge and a portion of Puhinui Road to AIAL (see BARNZ, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, pp. 34–35).

[335] See Commerce Commission, Information Disclosure (Airport Services) Consultation Update Paper, 11 October 2010, p. 8.

[336] Board of Airline Representatives New Zealand Inc, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, pp. 34-35, Q. 61.

easements, (excluding any costs that are expensed by the Airport as operating expenditure).

C10.2 Where an Airport acquires land to create a new easement, with the intention of on-selling the land, only the costs of the easement may be included in the RAB value.

C10.3 The value of existing easements will be the value for those easements included in each Airport's 2009 disclosures. Airports may depreciate easements only where they have a limited life or are required for a known, limited period of time (this applies to existing as well as new easements).

Reasons

C10.4 An easement is a property right to do something, or to prevent someone else from doing something, usually in a particular geographic area. The costs of creating or acquiring easement rights can form part of the costs of the assets necessary for an Airport to provide specified services to consumers.

C10.5 Airports should be entitled to recover reasonable costs of creating easements for the purpose of providing regulated services. Providing some limitation on the RAB value of a new easement will ensure Airports have incentives to limit these costs. The market value of an easement at the time of its establishment should reflect the reasonable costs to establish the easement rights and therefore is an appropriate measure to use as a limitation on costs. For this purpose the market value includes:

a. where an Airport does not own the land over which the easement is being established, legal costs plus any injurious affection payment to the land owner to recognise any reduction in the value of the land attributable to the easement; or

b. where an Airport owns the land over which the easement is being established, legal costs, the amount of any reduction in the value of the land caused by the creation of the easement, and holding costs up to the point that the land is sold or the associated asset is commissioned (whichever occurs first).

C10.6 With respect to holding costs, the IM Determination allows Airport to capitalise holding costs on all monies paid to purchase land for the purposes of creating an easement, up to the date that the easement is created. As discussed above, (paragraphs C4.7 to C4.16) such holding costs may be calculated at a rate no higher than the Airport's estimate of its post-tax cost of capital.

C10.7 An Airport may face other legitimate costs associated with the construction of new assets. For example, where an Airport pays compensation to land owners for disruption to their business resulting from construction, it should be able to recover these costs. However, such costs would generally be a cost of the construction, not a cost of the easement. As such they should be included in works under construction, consistent with GAAP, and would be capitalised when the newly constructed asset is commissioned. Only costs that are a direct cost of establishing the easement may be included in the value of the easement.

C11 Depreciation

Depreciation methodology

Approach

C11.1 The IM Determination provides that Airports must depreciate their assets on a straight line basis, unless they elect to use an alternative, 'non-standard' approach. Where an alternative approach is used, the ID Determination sets out the information that the Commission requires Airports to disclose.[337]

C11.2 No depreciation is to be applied to land and easements (other than fixed life easements).

Reasons

C11.3 Straight line depreciation will, in steady-state conditions (e.g. when investment is not increasing), equate to economic depreciation at the level of the overall RAB value even if the individual assets that go to make up the RAB value have very different economic depreciation profiles. This is because the asset base is composed of assets at different stages in their economic lives. Provided economic depreciation changes in a fairly uniform way across all assets as time progresses, there will tend to be a neutral impact on overall depreciation in each period (since the impact of older assets and newer assets will tend to cancel out).

C11.4 However, the Commission considers that constraining Airports' flexibility to choose the most appropriate depreciation method is inappropriate given Airports are only subject to information disclosure regulation. Airports should be permitted to determine depreciation appropriate to their particular circumstances, provided Airports disclose sufficient information so that interested parties can assess the impact on financial disclosures.

C11.5 Accordingly the IM Determination allows Airports flexibility to choose to use a non-standard depreciation approach, subject to information disclosure requirements in the ID Determination. Submissions from NZAA and CIAL supported this approach.[338] BARNZ considered that this approach was appropriate, but noted the importance of an appropriate level of information disclosure such that interested persons can obtain a full understanding of depreciation approaches and changes in the lives of assets.[339]

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337 See Section 3.6 of the ID Reasons Paper for discussion of the ID requirements relating to non-standard depreciation disclosures.

338 NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 42, paragraphs 196-198; Christchurch International Airport Ltd, *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, p. 38, paragraph 167.

339 Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 7.

Asset lives

Approach

C11.6 Consistent with the treatment of depreciation, Airports should determine asset lives for airport assets, except that, in the case of:

a. fixed life easements, the asset life is the duration of the easement; and

b. found assets, the Airport may assign the same asset life as that applying to a similar asset already in the RAB value.

C11.7 Total 'unallocated' depreciation (i.e. depreciation prior to the application of the cost allocation IM) over the lifetime of any asset, must not exceed the value at which the asset is first recognised in an Airport's RAB value under Part 4 (after adjusting for the effects of revaluations). The value at which an asset is first recognised in the RAB is its initial RAB value (for assets in the initial RAB) or the asset's value of commissioned asset, or value of found asset, as determined pursuant to the IM Determination.

Reasons

C11.8 Under a straight-line depreciation approach, the depreciation charge in any year is calculated based on the asset's estimated life. Asset lives therefore have a significant impact on the time profile of depreciation charges. To the extent that depreciation is reflected in pricing, asset lives can determine the extent to which current or future consumers pay for assets.

C11.9 Some regulatory regimes specify standard asset lives. Standard asset lives ensure that the depreciation charge in each period is:

a. consistent from business to business for the same asset type; and

b. appropriately allocated over the expected useful economic life of an asset.

C11.10 The Commission has reviewed guidance on standard asset lives available from New Zealand sources, and from other regulators.[340] These sources give wide ranges for asset lives relevant to Airports, and so would impose little practical constraint on asset lives the Airports could apply. It is not clear that this approach would deliver any substantial benefit over the option of allowing Airports to establish asset lives themselves.

C11.11 Therefore the IM Determination provides that Airports can determine asset lives for airport assets, and change those asset lives, subject to information requirements.[341] However, Airports should ensure that the total amount of depreciation respect of any

[340] The New Zealand Infrastructure Asset Valuation and Depreciation Guidelines, issued by the National Asset Management Steering Group in 2006; Valuation Guidance for Property, Plant and Equipment, Including Specialised Items in the Health and Education Sectors, issued by The Treasury in 2007; asset life information provided by regulators in the UK, Ireland, and Australia.

[341] NZAA welcomed the decision to allow Airports to determine asset lives for airport assets. NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 42, paragraph 199.

asset does not exceed 100 percent of that asset's value, taking into account revaluations over its life.

C11.12 This approach gives Airports flexibility to establish appropriate asset lives, while placing some transparency around the way that flexibility is applied.

C11.13 This proposed approach should also give Airports sufficient flexibility to implement an appropriate treatment of fully depreciated assets. As an asset enters the last few years of its expected physical life, it may become apparent that its economic life (that is the period over which the Airport can use the asset to provide airport services) may outlast the asset life originally set by the Airport.[342] Where this is the case, it is appropriate that Airports can extend the expected physical asset life of the asset, before the asset becomes fully depreciated. This provides some incentive for suppliers to retain such assets in service (to the extent that information disclosure requirements affect such incentives).

C12 Stranded Assets

Approach

C12.1 Where an asset is stranded or expected to become stranded, Airports may adjust the asset life consistent with the Commission's decision on asset lives above.

C12.2 For this purpose stranded assets include dedicated assets which have become stranded.

C12.3 Any changes in asset lives are subject to the requirement that Airports may not charge depreciation on any asset greater than 100 percent of that asset's value over its life taking into account revaluations. (In the case of a dedicated asset the asset's value would include the capital cost of converting the asset for a different use once the initial contract has expired, if applicable.)

Reasons

C12.4 An asset can become stranded in a workably competitive market when demand for services supplied by that asset falls away. If assets are stranded, or are likely to become so soon, for reasons beyond the control of the Airport, ensuring the supplier is compensated for any losses it incurs protects incentives for new investment, consistent with s 52A(1)(a). This is particularly important where the assets involved are large, and long-lived.

C12.5 However, it does not necessarily follow that the regulatory rules should provide compensation for asset stranding just because the loss was due to an event that appeared to be beyond the Airport's control. In workably competitive markets, airports would have incentives to seek to continue to use, and earn a return on all their assets where this is commercially feasible. They would therefore strive to find an alternative use for assets, rather than writing them off. Under Part 4 it is desirable that Airports have incentives to take such action to avoid assets becoming stranded.

[342] See Commerce Commission, *Input Methodologies Discussion Paper*, 19 June 2009, pp. 175–176, paragraphs 6.196 to 6.198.

In particular, this would be consistent with s 52A(1)(b) of the Act.[343] BARNZ and Air NZ agreed that Airports should be incentivised to find alternative uses for stranded assets, and raised concerns that reimbursing asset owners for the full cost of the stranded asset does not achieve this.[344]

C12.6 The information disclosure regime under Part 4 should at a minimum reveal whether Airports have taken action to reduce the possibility of asset stranding, or to find an alternative use for a stranded asset. Where an Airport reduces an asset life, the ID Determination provides that the Airport must disclose this as a non-standard depreciation, including providing the justification for the change, and the extent of consumer agreement. NZAA supported this approach.[345]

C13 Consumer Price Index

C13.1 Airports must index their RAB values, and the value of future development land, using CPI (except where an Airport undertakes an MVAU revaluation of all land in its RAB, and its future development land).[346]

C13.2 The IM Determination requires Airports to use a value of the Consumer Price Index (CPI) for the purposes of calculating annual revaluations for the purpose of rolling forward the RAB value under information disclosure.

C13.3 The Commission's approach is that where an actual CPI value is required it will be the CPI stipulated in the 'All Groups Index SE9A' as published by Statistics New Zealand.

Goods and Services Tax adjustment

C13.4 An adjustment is required to CPI values for quarters prior to December 2010 to take account of the effect of the Government's increase to the Goods and Services Tax (GST) from 12.5% to 15%, which took effect from 1 October 2010, on the CPI. The Commission's approach is to multiply CPI values prior to December 2010 by 1.02. This is based on the estimate published by the Reserve Bank.[347] The adjustment mechanism in the IM Determination could also apply to any future changes to GST.

C13.5 As set out in the Reserve Bank of New Zealand's Monetary Policy Statement, "Budget 2010 included reductions to personal tax rates that more than offset the effects of the increase in GST on real incomes. The GST increase is therefore assumed to have no effect on wage bargaining. Increases in other indirect taxes are assumed to have only a limited impact on inflation expectations."[348] The cost base of each Airport is therefore likely to be unaffected by the GST increase as wages are

343 Commerce Commission, *Input Methodologies Discussion Paper*, 19 June 2009, p. 210, paragraphs 6.199 to 6.201; Air New Zealand Limited, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 61, paragraphs 169-170.

344 BARNZ, *Submission on the Input Methodologies Discussion Paper,* 31 July 2009, pp. 46–47, Q. 82.

345 NZ Airports Association, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 43, paragraph 201.

346 See Chapter 4 (paragraphs Section 1:4.3.80 - Section 1:4.3.86), Section C2, and C3.

347 Reserve Bank of New Zealand, Monetary Policy Statement, June 2010, p. 22, available from: http://www.rbnz.govt.nz/monpol/statements/jun10.pdf

348 ibid.

not expected to increase, and Airports claim back their direct GST costs. The Commission therefore considers it appropriate to remove the impact of GST from the CPI series used for revaluation purposes.[349]

C14 Application of the Asset Valuation IM to Information Disclosure

C14.1 This section summarises how the IM for the valuation of assets will apply under information disclosure regulation. The purpose of information disclosure is to ensure sufficient information is readily available to interested parties to assess whether the purpose of Part 4 is being met (s 53A).

C14.2 The disclosure of Airports' ROI, in accordance with the ID Determination, will inform interested parties' assessment, and the Commission's analysis, of whether Airports are limited in their ability to earn excessive profits (in particular s 52A(1)(d)).

C14.3 The IM for the valuation of assets is a key input into the calculation of the ROI measure, as it determines:

a. the level of depreciation charges;

b. the value of revaluations; and

c. the total value of the RAB.

Asset allocations in establishing and rolling forward the RAB value

C14.4 Under the IM Determination, Airports must establish initial RAB values for non-land assets based on values disclosed in the 2009 disclosure financial statements. These asset values were allocated between specified airport services and other airport activities consistent with the requirements of the AAA. In order to ensure that initial RAB values are allocated consistent with the requirements of Part 4, the IM Determination requires Airports to 'unwind' the previous asset allocation and apply the cost allocation IM, as follows:

a. Airports must establish unallocated initial RAB values for each asset, using the asset values disclosed in the 2009 disclosure financial statements, but valued as if no allocation of asset value relevant to regulatory disclosures had been undertaken;

b. Airports must then apply the cost allocation IM to the unallocated initial RAB values, to establish the initial RAB value for each non-land asset.

C14.5 As discussed elsewhere in this paper (see Sections 4.3 and C2), Airports must establish the unallocated initial RAB value for airport land by valuing the land in accordance with Schedule A of the IM Determination. To establish the initial RAB

[349] The Reserve Bank of New Zealand estimates that the increase in GST translates to a 2.02 percent increase in CPI inflation. For the Commission's purposes this figure has been rounded to 2 percent.

value of land assets, Airports must then apply the cost allocation IM to the MVAU value of the land.

C14.6 The roll forward of the asset values in the RAB value for a disclosure year must reflect the changes occurring in that year in the allocation of assets between Airports, and between all regulated and unregulated activities an Airport supplies.

C14.7 This is achieved by recording the total (i.e. 'unallocated') value of an asset in the RAB value and rolling it forward (for depreciation, revaluations, additions etc). The cost allocation IM described in Chapter 3 and Appendix B is applied to this asset value whenever it is necessary to determine a specifically attributable (i.e. 'allocated') portion of the asset value for regulated activities.

C14.8 The 'allocated' RAB value is used to calculate depreciation and revaluations in respect of that asset for that year. As the opening RAB value for any asset in a disclosure year is simply the closing RAB value for the preceding disclosure year, the cost allocation IM need only be applied once in any disclosure year (to the unallocated closing RAB value) in order to produce an allocated closing RAB value.

C14.9 This process should ensure that as the RAB value is rolled forward it continues to reflect an up-to-date allocation of asset values, and is likely to reflect the type of allocation process adopted by Airports in practice.

APPENDIX D: REGULATORY TAX

D1 Introduction

D1.1 This appendix is split into two sections. The first outlines the key components of the IM for the treatment of taxation; the second deals with the way in which the IM for the treatment of taxation will apply to information disclosure regulation of specified airport services.

D2 Components of the Methodology

List of components

D2.1 The key components of the decisions relating to the treatment of taxation are:

- deductions for regulatory tax purposes;
- the treatment of tax losses in the wider tax group;
- the tax treatment of acquisitions; and
- establishing the initial regulatory tax asset value.

Deductions for regulatory tax purposes

Approach

D2.2 When calculating regulatory taxable income, the cost allocation IM and tax rules (to the extent practicable) are to be used, subject to other relevant provisions in the IMs. Debt interest should be calculated using a notional leverage that is consistent with the cost of capital IM.[350]

Reasons

D2.3 As noted at the outset of this chapter, an issue for regulators lies in identifying the proportion of the annual tax liability that is attributable to the provision of regulated services. Under Part 4, this can be difficult in the case of Airports, each of which supplies a number of services that are not regulated under Part 4. To address this complicating factor, an estimate of tax costs can be derived by applying tax legislation to the regulatory accounts of the regulated part of the business, to the extent practicable, and subject to other relevant provisions in the IMs (i.e. the IMs have precedence). The regulatory accounts, and the revenue and expenses used to derive regulatory net income, are found by applying the cost allocation IM to the operating costs and asset values associated with supplying airport services.

D2.4 Given that the allocation of debt costs is not covered by the cost allocation IM, a similar decision is also required on the way in which, and thus how much, debt

[350] Under the ID Determination, Airports are also able to make a deduction respect of the term credit spread differential, where applicable (refer Chapter 6).

interest should be allocated to the Airport's regulated activities when making an assessment of regulatory net income. This is because debt is typically issued on a consolidated (i.e. whole group) basis. A simple way to address this allocation problem is to also use a proxy deduction for interest—found by multiplying the interest rate on debt capital by a 'benchmark' leverage ratio and by the value of the RAB.

D2.5 Air NZ supports the application of benchmark leverage in respect of calculating the (levered) regulatory tax allowance, whereas AIAL, BARNZ, NZAA and WIAL opposed it. For instance, NZAA argued that "[i]t is a simple process for actual leverage to be considered for each Airport".[351] It is, however, appropriate that the level of debt attributed to the regulated part of the business be consistent with the level of leverage used in calculating the WACC. This ensures that the treatment is consistent with two main ways in which the WACC can potentially be calculated: a 'vanilla' WACC, and a 'post-tax' WACC.

D2.6 When the Commission's estimates the cost of capital facing an Airport, a notional rather than actual level of leverage will be used (for the reasons given in Chapter 6 (Section 6.6)). Since tax costs facing the Airport are estimated in a way that recognises that they realise tax benefits through leverage (i.e. by estimating the 'levered tax liability', which is an estimate of tax costs after the tax deduction for interest is taken into account), the Airport's rate of return would need to be compared to a cost of capital that is free of any tax adjustments to the cost of debt. The resultant WACC is consequently known colloquially (in New Zealand) as a 'vanilla WACC' (i.e. a weighted combination of the pre-tax cost of debt and the post-tax cost of equity).[352]

D2.7 Typically, however, interested persons in New Zealand are likely to be more familiar with a post-tax WACC than a vanilla WACC. In the post-tax formulation of the WACC, the tax deduction for interest is already included in the WACC formula. To avoid double-counting of the tax deduction for interest, this amount (i.e. the interest tax shield) must be added to the levered tax liability where a ROI value is being compared to the post-tax WACC. To ensure comparability, the leverage assumption in this interest tax shield calculation must match the leverage assumption in the post-tax WACC calculation. As is discussed in the Information Disclosure Reasons Paper for Airports, the Commission will calculate the WACC on both bases, and therefore requiring the ROI value to be calculated with and without the inclusion of the interest tax shield, as appropriate.

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351 AIAL, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 70; NZAA, *Submission on the Input Methodologies Discussion Paper,* 31 July 2009, p. 77; BARNZ, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 54; WIAL, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 55.

352 The Commission notes that one option would be assess regulatory returns on a pre-tax basis (i.e. by including the estimate of tax costs in the cost of capital). However, as noted in the IM Discussion Paper, supra n 33, the Commission considers it is more transparent to separate out these two types of cost (i.e. by treating tax as a separate Building Block).

Treatment of tax losses in the wider tax group

Approach

D2.8 Tax losses in an Airport's wider tax group should be ignored when estimating tax costs. Any tax losses generated in the supply of airport services should be notionally carried forward to the following disclosure year.

Reasons

D2.9 Tax losses in the wider tax group should generally be ignored when estimating tax costs—among other reasons, to prevent the attribution of tax benefits to a regulated part of the tax group when they have already been attributed and used up by another regulated part of the wider tax group.

D2.10 There is not a clear cut case for the alternative, which would require Airports to share with consumers the benefits that can be achieved by utilising tax losses in the wider tax group. In particular, it is not obvious that an issue of allocative or dynamic efficiency is at stake. It is also important that tax benefits are not allocated to more than one business unit, as this could potentially disadvantage suppliers of multiple services regulated under Part 4. Although this is not currently the case for any of the three Airports, it is still appropriate, on balance, to recognise this possibility by ignoring the position of the wider tax group.[353]

Tax treatment of acquisitions

Approach

D2.11 Like the RAB value, the regulatory tax asset value of acquired assets should remain unchanged in the event of an acquisition of assets used to supply services under Part 4 (i.e. either from another Airport or from a supplier of another type of regulated service).

Reasons

D2.12 To implement the proposed tax payable approach, Airports will need to calculate regulatory tax depreciation by applying tax depreciation rules specified under tax rules to the regulatory tax asset value of their investments. In the event of future asset acquisitions, the regulatory tax asset value of the acquired assets, like the RAB value of those assets, should however remain unchanged. This means that the regulatory tax asset value would not be adjusted to reflect the transaction price, and is therefore different to how the tax asset value would be recognised under tax rules in most cases.[354]

D2.13 Although this departs from the approach under tax legislation, the merits of this modified tax payable approach are that:

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353 In its submission on the Emerging Views Paper, BARNZ sought clarification on whether this also means that subvention payments should also be ignored. Subvention payments have an equivalent effect to the utilisation of tax losses. For the avoidance of doubt, the Commission therefore notes that subvention payments should also be ignored when calculating tax costs facing Airports.

354 This is consistent with the tax treatment that has been employed by the ESC when regulating electricity distribution services in Victoria, Australia. See: ESC, *Electricity distribution price review 2006-10, Final decision Volume 1, Statement of purpose and reasons*, October 2005, pp. 331-332, and 398-399.

- Airports retain the net tax benefits of a transaction, but also bear any subsequent costs (i.e. should the IRD revisit the tax consequences of the transaction);

- excessive profits and incentives to pay a significant premium over the RAB value are still limited by ignoring any acquisition premium (i.e. post-sale RAB value is equal to pre-sale RAB value, which is the same as under the unmodified tax payable approach); and

- incentives are retained to make efficiency gains to cover any acquisition premium over RAB, and these efficiency gains would still be shared with consumers over time.

D2.14 The application of the proposed modified tax payable approach is, however, unlikely to have a material effect for the Airports, as major asset acquisitions (as opposed to share purchases) are not common.

D2.15 An alternative approach would be to set the regulatory tax asset value to the acquisition cost of the assets, consistent with recognition under tax rules in most cases. As discussed in the IM Discussion Paper, this would, however, require providing the Airport that purchases the assets with an NPV-adjustment to the RAB value to compensate them for any premia they paid as a result of the tax depreciation claw-back consequences of the acquisition. No submissions were received by the Commission in relation to either of these two alternatives.

D2.16 The Commission rejected these options on the basis that they would not be consistent with suppliers retaining the same amount of the net tax benefits of an acquisition (where such benefits arise). This may have the effect of not promoting some efficiency enhancing trades, consistent with s 52A(1)(a), as effectively as the Commission's proposed approach.

Establishing the initial regulatory tax asset value

Approach

D2.17 The initial regulatory tax asset value should be the lesser of that recognised under tax rules for the relevant assets or share of assets, and the initial RAB value.

Reasons

D2.18 The Commission considers that an appropriate starting point for establishing the initial regulatory tax asset value is to use the equivalent actual tax book value for the same assets as recognised under tax rules.

D2.19 However, the Commission considers that the way the initial regulatory tax asset value is established should not appear to be inconsistent with the way in which it is subsequently rolled forward. Given the way that the regulatory tax asset value is rolled forward, this implies that it would never (in aggregate) exceed the RAB value (in aggregate). The Commission therefore considers that this condition should also be met when the initial values of the regulatory tax asset value and the RAB value are established.

D2.20 No submissions were made on this topic in relation to information disclosure regulation of specified airport services. Given that this issue arises as a result of major asset acquisitions, and Airports have not been involved in such transactions in recent years, it is likely that the issue is not relevant. Although the Commission considers that it is appropriate for the initial regulatory tax asset value of the Airports to be capped at the RAB, it has not explicitly proposed a provision to ensure this in the Determination, as it considers that the actual tax book values for all Airports will already be below the initial RAB value.

D3 Application of the Tax IM to Information Disclosure

D3.1 Pursuant to s 52S, the Commission must apply the IM for the treatment of taxation when setting information disclosure requirements under subpart 4 of Part 4. Airports will be required to disclose information in accordance with these requirements. For the avoidance of doubt, the IM for the treatment of taxation applies to historical information made available under information disclosure and is not required to be applied to forecast information provided for information disclosure purposes.

D3.2 Supporting information is required to provide interested parties with sufficient information to assess whether the Part 4 Purpose of the Act is being met. It will also assist the Commission in monitoring compliance with the IM for the treatment of taxation. In particular, the Commission considers that, given its materiality to the tax calculation, the calculation for rolling forward the regulatory tax asset value should be transparently disclosed by Airports.

D3.3 Details on the Commission's proposals for the disclosure of information related to tax are provided in the Commission's Reasons Paper on the Information Disclosure Requirements for Airports.

APPENDIX E: COST OF CAPITAL

E1 The Framework for Determining the Cost of Capital IM

Overview of the decision-making framework

E1.1 For firms to make investments, they need to raise money ('capital'). There are two generic sources of capital: debt and equity.[355] In general terms, debt involves the firm promising to make specific payments to the debt provider, which are specified when the debt capital provider first provides the capital. In contrast, the firm in general makes only conditional, if any, promises to make specific payments to providers of equity. Equity providers have a degree of actual or potential control over the firm and expect to obtain a return from the success of the firm. Firms may raise debt capital by, for example, issuing bonds or borrowing from a bank. Firms may raise equity capital by, for example, issuing shares that may be traded on the stock exchange or by retaining earnings. Usually, debt eventually has to be repaid to the provider of debt capital, whereas equity does not have to be repaid to the provider of equity capital. Firms will almost always have some form of equity capital.

Key cost of capital concepts

E1.2 Raising either debt or equity capital involves a cost to the firm. In the case of debt capital, the cost is the return which the investor expects to obtain from the firm. It is a cost because the debt investor will only provide capital if the firm promises to provide this return, including a margin to compensate the investor for the possibility that the firm will not in fact meet its promise.

E1.3 The cost of equity is the return which the equity investor expects to obtain from the firm. In the case of equity, the firm does not promise the return but instead the investor decides what amount of capital they are prepared to provide in return for a share in the firm. Such a share entitles the investor (i.e. shareholder) to a corresponding proportion of dividends and other returns provided to shareholders. Therefore the cost of equity is conceptually the dilution of the existing shareholders' interest that results from raising equity capital, including the dilution (i.e. spreading of the claim to future cash flows over a larger capital investment) implicit in the retention of cash flow or in accounting terms retained earnings. Investors supplying capital will require that the price of the shares issued to them is such that the expected return is equal to the return they would expect to obtain on an alternative investment of equal risk. Their obtaining a share in future cash flows is at the expense of the other shareholders. The cost of capital reflects the cost of debt and the cost of equity, and the respective proportion of each that is used to fund the investment.

E1.4 The cost of equity capital to the firm is not directly observable.[356] The cost can however be deduced in a number of ways. As an illustration, one approach to

[355] There are a variety of forms of both debt and equity capital.

[356] The cost of equity, expressed as a rate of return, is the discount rate implicit in the price at which equity can be raised (given the investors' expectations of future cash flows which they will derive or have claim to). This discount rate cannot be directly observed or calculated because the investors' true expectations cannot be directly observed.

estimating the cost of equity capital is to consider the average returns actually obtained by equity investors over a long time period (i.e. many years) and to assume that on average over this long time period the occasions on which the actual return exceeds the equity investors' expectations offset the occasions on which the actual return falls short of the equity investors' expectations. On this assumption the actual average return over a long time period will provide an estimate of equity investors' expected return, and that is the cost of equity capital.

E1.5 The total capital of a firm is the sum of the market value of the firm's debt and the market value of its equity. When the cost of debt capital is weighted by the proportion of debt capital to total capital, and the cost of equity capital is weighted by the proportion of equity capital to total capital the result is the 'Weighted Average Cost of Capital' or, in short, WACC or the 'cost of capital' to the firm. The cost of capital is expressed as a percentage of its total capital, i.e. as a rate of return.

E1.6 The simplest formulation of the cost of capital does not take explicit account of the tax deductibility of interest and is referred to as the 'vanilla' weighted average cost of capital. This is used in applications where the tax deductibility of interest is taken into account in cash flows. The vanilla formula is:

$$\textbf{Cost of capital} = \mathbf{r_d L + r_e(1-L)}$$

where r_d is the cost of debt capital, r_e is the cost of equity capital, and L is the leverage ratio. The leverage ratio is the proportion that debt capital represents of the total capital (total capital is the sum of debt capital plus equity capital).[357]

Guidance from the Act – workably competitive markets

E1.7 As signalled in Chapter 2, the Commission has asked itself what guidance 'promoting outcomes consistent with outcomes produced in workably competitive markets' means for making its decisions on the cost of capital. The Commission has also considered whether, and if so how, each of the regulatory objectives in s 52A(1)(a)-(d) are relevant to the decision on cost of capital, and whether there are any practical constraints on the form of the cost of capital. The Commission has considered the inter-relationship between capital markets (which are highly competitive) where funding is raised, and product/service markets where the capital for the most part funds investment.

E1.8 Analysis of the factors determining firms' cost of capital in workably competitive capital markets suggests that the cost of capital is primarily related to the exposure to risk that cannot be avoided by diversifying i.e. by spreading investment across a variety of firms.[358] The risk which cannot be reduced by diversification is

[357] As WACC relates to expected market rates of return, in theory the *market* value of both debt capital and equity capital should be used in the calculation of the leverage ratio. However, in practice, calculating the market value of debt capital is difficult as most corporate debt is rarely traded. Fortunately, in the vast majority of cases in New Zealand the book value of debt capital is a reasonable proxy for the market value of debt capital. With respect to equity capital, the market value of equity capital will be available if the shares of the firm are listed on a stock exchange. If the shares are not listed, only the book value of equity capital will be available.

[358] See Markowitz, H., Portfolio Selection, *Journal of Finance*, Vol. 7, No. 1, 1952, pp. 77-91; Tobin, J., Liquidity preference as behavior towards risk, *The Review of Economic Studies*, Vol. 25, 1958, pp. 65–86.

systematic risk.[359] This is the exposure to overall market movements i.e. the correlation of the movements in the value of the firm or asset to the total value of all assets. Most models of the cost of capital recognise that the higher a firm's level of exposure to systematic risk, the higher it's cost of capital. This reflects a risk-reward trade-off, insofar as investing in firms where returns are likely to be more correlated with market returns, (i.e. investments exposed to more risk), will require higher expected returns. Unsystematic risk is not generally rewarded in workably competitive capital markets.[360]

The relationship between firms' returns in workably competitive markets and the cost of capital

E1.9 The cost of capital is the expected rate of return to be earned in the long-term for investment to occur. The expected rate of return must cover the cost of capital in order to attract the required investment funds.

E1.10 Assuming workably competitive capital markets, investors will be prepared to make capital available for firms to compete in supply of products and services whenever the expected return is at least as high as the cost of capital. In workably competitive product and services markets, firms are able to lower prices and/or improve quality while still meeting the expectations of their capital providers so long as their expected return is at least as high as the cost of capital. Thus if they are able to reduce their costs, there will be a tendency for prices to be reduced and/or quality to be improved until expected returns have fallen to the cost of capital.

E1.11 Actual returns will deviate from expected returns due to a wide range of unanticipated factors. By definition, the expected overall result of unanticipated factors over an extended period is that they cancel each other out. Thus in a workably competitive product or services market the expectation at any time looking into the future is that the average return over a long time period will tend to the cost of capital. The outturn observed in any particular case looking back into the past may of course differ from this expectation for a wide range of reasons.

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[359] In the context of the cost of capital, it is useful to distinguish between two types of risk, systematic risk and unsystematic risk:

Systematic risk reflects the extent to which an asset (or stock) participates in the fluctuations or movements in the overall market. Systematic risk of an asset (or stock) is therefore sometimes described as that component of risk that is 'correlated' with the overall market. Examples of systematic risks are the impact that changes in real GDP, inflation, currency movement, major technological advances and a recession have on the returns earned on an individual asset (or stock). The correlation of the returns on an asset with the value weighted return on all assets in the market is the asset's beta.

Unsystematic risk (or idiosyncratic specific asset risk) is the risk unique to a specific asset (or stock), and this component of the risk of an asset (or stock) is uncorrelated with general movements in the overall market. It includes the risks associated with an asset (or stock) that arise through increasing competition, changes to antitrust legislation, technological innovations, and geographic location. Empirical studies have generally found that the unsystematic or idiosyncratic risk will be eliminated (or diversified out of) through investors holding a sufficiently large portfolio of stocks. The unsystematic risk associated with an asset (or stock) is therefore also referred to as the 'diversifiable risk'. The risk that remains after diversification is the systematic risk, also referred to as the 'non-diversifiable' risk.

[360] A key analytical basis of the pre-eminent cost of capital model, the CAPM, is that provided capital markets are competitive and efficient, equity investors will only expect to be compensated for bearing systematic risk. Rational investors could and would diversify away firm-specific risk, so such risk should not be priced by the market. (This result would hold to a first approximation provided capital markets are workably competitive.) The implication for regulators is that, when setting allowed rates of return, compensation should only be awarded to investors for bearing systematic risk.

Implications for estimating the cost of capital for Airport services under Part 4

Cost of capital in the context of regulation

E1.12 As discussed in Chapter 2 (see, for example, paragraph 2.6.28), the Commission considers that to enable regulated suppliers to raise capital, regulation should provide them with the expectation of earning at least a normal return in the long-term, i.e. they should expect to maintain their efficient financial capital.

E1.13 That said, when considering the concept of expecting to earn at least a normal rate of return in the long-term, it is important to have regard to two key clarifications. First, under default/customised price-quality regulation, the Commission is only seeking to align revenues to achieving at least normal returns in the long-term on an *ex ante* basis. Indeed, as noted in Chapter 2 above, incentive-based regulation might be expected, in principle, to result in *ex post* returns somewhat in excess of the cost of capital, as firms achieve efficiency savings during the regulatory period. Similarly, in allowing an appropriately risk-adjusted cost of capital, the Commission is allowing regulated firms to earn sufficient remuneration to compensate for risks associated with the adverse effects on the industry concerned of economic fluctuation that may arise in a particular regulatory control period. As such, any attempt to align returns to the cost of capital on an *ex post* basis could undermine the key incentive effects of the regulatory framework.

E1.14 Second, as outlined in greater detail below, due to the uncertainty and standard errors associated with the key parameters used in the estimation of the cost of capital, the Commission will identify a cost of capital range. If the Commission chooses a point estimate above the mid-point of the range, the overall return may reflect an allowance somewhat in excess of an expectation of a normal rate of return on an *ex ante* basis.

E1.15 In workably competitive markets, risks are allocated to the parties best able to bear them. As discussed above, an accurate estimate of firms' cost of capital needs to reflect their level of systematic risk exposure.

E1.16 In workably competitive markets where there are sunk costs and long-lived specialised infrastructure investments, suppliers can reduce the risk of not recovering their costs, through long-term contracting. Long-term contracts can potentially increase the likelihood of the supplier earning the required return on investment, while also protecting consumers from the exercise of market power after the contract is competitively awarded. Such contracts can reduce the supplier's exposure to systematic risk (i.e. correlation of returns to market returns).

E1.17 In markets where there is no or limited competition, suppliers have exclusive or almost exclusive dealings with customers as there are no or limited competitors for consumers to switch to. In the case of monopoly suppliers of regulated services, regulation ensures that these suppliers can expect to earn at least a normal return on their assets. This provides for a similar relationship to a long-term contract in a workably competitive market, although there may be an even stronger expectation of cost recovery for an essential facility monopoly supplier.

E1.18 In particular, for a monopoly supplier of regulated services there is likely to be an expectation of less variation in profitability as a result of any shock to the

economy,[361] as unlike a workably competitive market supplier, there is almost guaranteed demand for the service and little likelihood of any effective competition in the future. Therefore, there will potentially be lower risks associated with profitability and cost recovery than would arise in a workably competitive market with long-term contracts in place.

E1.19 For this reason the cost of capital in regulated services around the world is often observed to be lower than that of unregulated companies in competitive markets. However, there may also be some variability in the cost of capital amongst regulated services on the basis of the type of regulatory regime implemented.[362]

E1.20 For example, where the period between regulatory reviews is longer (e.g. price-cap regulation for a five-year period), regulated suppliers will potentially be exposed to greater variation in their expected returns compared with those regimes where more frequent regulatory reviews can occur and any costs are directly passed through (e.g. traditional US-style rate-of-return regulation). All other things being equal, in these circumstances, price-cap regulation with less frequent regulatory reviews, will lead to a higher cost of capital. In this case the benefits of less frequent regulatory reviews in encouraging improvement in efficiency is being valued as offsetting the higher cost of capital from the consumers perspective.

Cost of capital under Part 4

E1.21 Under Part 4, the Commission may set an IM for the estimation of the cost of capital for the purposes of monitoring and analysing information disclosed by the Airports. The Commission has considered a range of analyses used by capital market practitioners to estimate the cost of capital. The Commission has also considered academic analyses of the factors relevant to the choice of which forms of analysis and corresponding models are appropriate for the purposes of Part 4. In reviewing these analyses, the Commission is mindful that the purpose of Part 4 is to promote the long term benefit of consumers by promoting outcomes consistent with those in workably competitive markets. The Commission notes that the models used by it are based on capital markets being workably competitive and are used by firms, and advisers to firms, in workably competitive markets. The Commission's choice of cost of capital model has been informed by advice from its Expert Panel[363] and the submissions received during the Commission's consultation on the cost of capital. The Commission has tested the results of its IM to ensure they are commercially realistic in light of the information on the expected returns on investments of comparable risk, and ensure that suppliers of regulated services have an incentive to innovate and invest.

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361 There is an argument that once it is known that a firm will be regulated, investors will expect that the beta of the firm to be lower than if it were not regulated. Regulation ensures that the firm cannot fully exploit its market power which in turn means that less of its customers are facing the point at which they would reduce their demand i.e. in practice give up their connection to the grid. The Commission's estimates of beta are based on a sample of comparative firms that includes regulated firms and so incorporate the effects of regulation.

362 Alexander, I., Mayer, C. and Weeds, H., Regulatory structure and risk: an international comparison, Policy research working paper 1698, *The World Bank*, December 1996, and Alexander, I., Estache, A., and Oliveri, A., A few things transport regulators should know about risk and the cost of capital, *Utilities Policy,* 9, 2000, pp. 1-13.

363 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, Report prepared for the Commerce Commission, 18 December 2008, p. 6.

E1.22 In the context of information disclosure, the Commission uses its cost of capital estimates to provide a guide for normal returns that will assist interested parties in assessing if excessive returns are being earned and thereby assist in determining whether the purpose of Part 4 of the Act is being met.

E1.23 The regulatory challenge for the Commission is to determine an estimate of the cost of capital for the provision of regulated services that is consistent with the cost of capital faced by suppliers[364] in workably competitive markets, i.e. neither too high, nor too low, such that the objectives in s 52A(1)(a) to (d) are achieved.

E1.24 In the context of monitoring, if the cost of capital is set too low it might incorrectly suggest that a supplier of regulated services was not limited in its ability to extract excessive profits. If the supplier were to reduce prices as a response to such an incorrect indication of excessive profitability, this might prevent the supplier from attracting sufficient capital to undertake efficient investment. This would be inconsistent with s 52A(1)(a) of the Act. Equally, a cost of capital that is set too high would mask the regulated supplier's ability to extract excessive profits over the medium or long-term.[365] This would be inconsistent with s 52A(1)(d) of the Act.

Estimating the cost of capital

E1.25 The methodology for setting the cost of capital must ensure that the expected returns from investing in regulated services are similar to other investments of comparable risk, so regulated suppliers have incentives to innovate, invest and improve, and are limited in their ability to extract excessive profits.

E1.26 While neither the cost of debt nor the cost of equity are directly observable, the former can be more readily estimated than the latter. This is because the estimation of the cost of debt requires fewer assumptions and approximations than the estimation of the cost of equity. In addition, a number of models exist for estimating the cost of equity. The Commission must identify what it considers to be the most appropriate model to use.

E1.27 Further, there are a number of parameters associated with the cost of debt and cost of equity that need assigned values when estimating the cost of capital. Some of these parameter estimates have measurement errors associated with them, i.e. there is uncertainty as to how well the estimated value represents the parameter's unobservable 'true' value.

E1.28 In estimating the cost of capital, the Commission recognises that this is an estimation process, which is likely to be imprecise. The aim of the Commission therefore is to estimate a cost of capital that, when applied under Part 4, promotes outcomes as regards to quality and pricing of the regulated services that are consistent with those produced in workably competitive markets.

E1.29 In regards to information disclosure, due to the imprecision of the cost of capital estimation, the Commission will estimate a range for the cost of capital.

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364 The cost of capital faced by suppliers in workably competitive markets is determined in the capital market which may be closer to a perfectly competitive market.

365 The Commission notes that, in the short-term, suppliers of regulated services may achieve above-normal profits if they outperform the objectives set by the regulator.

Cost of capital across different types of regulated services

E1.30 When estimating the cost of capital for suppliers in a workably competitive market, a number of the parameter estimates, such as the risk-free rate and the tax-adjusted market risk premium, will be common across services regulated under Part 4 of the Act. To the extent that there are differences between the cost of capital estimates across services, sectors, or industries in workably competitive markets, this should reflect differences in the level of systematic risk that they face. Parameters that may differ across services, reflecting variability of returns or risk include the measure of systematic risk in the cost of equity (i.e. the beta estimates) and estimates of the debt premium.

E1.31 Therefore, cost of capital estimates across different types of regulated services, such as those provided by Airports, EDBs, GPBs and Transpower, reflect differences in the risk profiles associated with the supply of these services.[366]

E2 Overall Approach

The appropriate cost of capital framework

E2.1 The IM for the cost of capital framework requires that a vanilla cost of capital and post-tax cost of capital will be estimated for Airport services for the purpose of information disclosure.

E2.2 The vanilla cost of capital will be determined as the expected cost of equity capital and the expected cost of debt capital, weighted by the respective proportion each represents of the total capital. The post-tax cost of capital will be determined as the expected cost of equity capital and the after tax expected cost of debt capital weighted by the respective proportion each represents of the total capital. These are given by the following formulae:

$$\textbf{vanilla cost of capital} = \mathbf{r}_d\mathbf{L} + \mathbf{r}_e\mathbf{(1-L)}$$

$$\textbf{post-tax cost of capital} = \mathbf{r}_d\mathbf{(1-T}_c\mathbf{)L} + \mathbf{r}_e\mathbf{(1-L)}$$

where $\mathbf{r}_d$ is the cost of debt capital, $\mathbf{r}_e$ is the cost of equity capital, $\mathbf{T}_c$ is the corporate tax rate, and L is the leverage ratio. The leverage ratio is the proportion that debt capital represents of the total capital (total capital is the sum of debt capital plus equity capital).

E2.3 The framework for the cost of capital IM includes that:

- a vanilla WACC and post-tax WACC will be estimated for Airports for the purpose of information disclosure;
- the estimate of the expected cost of debt capital will be calculated as the risk-free rate plus the debt premium;

[366] Further, where estimates for different regulatory instruments are taken at different times and over different periods (e.g. the CPP can apply for either a three, four or five year period), the estimates of the cost of capital will differ. This is consistent with the outcomes expected in workably competitive market where the cost of capital is estimated at different times and for different periods.

- debt issuance costs will be added on to the cost of debt;
- the estimate of the expected cost of equity capital is to be derived by using the simplified Brennan-Lally version of the capital asset pricing model (CAPM);
- reasonableness testing against other versions of the CAPM will not be specified as part of the IM. However, the Commission has tested the estimates of the cost of capital using the IM, against estimates using the classical CAPM, and a range of other information;[367]
- a service-specific, rather than supplier-specific, cost of capital will be estimated for airport services (i.e. the same cost of capital will apply to all Airports); and
- no adjustments will be made to the cost of capital for unsystematic or asymmetric risk, including real options.

Commission's reasons for the form of the WACC

E2.4 The WACC can be calculated on a vanilla or post-tax basis. In the case of a vanilla WACC, the corporate tax shield provided by debt capital is ignored in the cost of capital estimation, and firms are remunerated for their levered tax liabilities through a cash flow allowance. In the case of a post-tax WACC, the cost of debt is adjusted down by an interest tax deduction, and the company is remunerated for its un-levered tax liabilities through a cash flow allowance (i.e. the 'interest tax shield' is included).

E2.5 Submitters did not state any clear preference in terms of how suppliers should be remunerated for tax liabilities but stressed the need for consistency between the Commission's approach with regard to regulatory tax and the WACC.

E2.6 The IM's approach with regard to tax is consistent with the use of a vanilla WACC. However, the Commission does acknowledge that a post-tax WACC is more readily understood by interested parties. Ensuring the WACC is understood by interested parties is particularly important in the context of information disclosure and to promote certainty.

E2.7 For these reasons, the IM requires estimation of both a post-tax and vanilla WACC for the purposes of information disclosure.[368] The ID Determination includes an adjustment to the post-tax ROI for the notional interest tax shield (i.e. the notional deductible interest, as defined in the IM, multiplied by the corporate tax rate) to ensure consistency with a post-tax WACC.

[367] This is discussed in Section E13 Reasonableness checks on the cost of capital.

[368] Use of a vanilla cost of capital is consistent with including tax as a separate building block, where the tax benefits associated with leverage are incorporated in the tax building block and not in the cost of capital. Including the tax benefits in the building blocks more accurately reflects the supplier's tax liabilities to the IRD. It therefore represents a more transparent approach.

Commission's reasons - estimating the cost of debt

Cost of debt

E2.8 The cost of debt ($\mathbf{r}_d$) is the expected overall cost to the firm of borrowing. The standard practice in analysis of the cost of debt is to decompose the cost of debt into two components. The two components are: the risk-free rate, the rate at which a debt issuer that was certain to meet its debt obligations would be able to borrow (for example, New Zealand dollar obligations of the New Zealand government), and the debt premium. The debt premium compensates the investor for the risk that the issuer in question may default, plus an allowance for the inferior liquidity of corporate bonds relative to government bonds

E2.9 Firms incur fees and other costs when they raise debt capital. These costs are referred to as debt issuance costs. The IM recognises that fees and costs associated with prudent debt issuance and refinancing are legitimate expenses that are to be compensated.

E2.10 Thus, the cost of debt will be as follows:

Cost of debt = risk-free rate + debt premium + debt issuance costs allowance

E2.11 Debt issuance costs can be accounted for either in the cash flows or as an addition to the cost of debt capital. The IM compensates firms for debt issuance costs in the form of a fixed addition to the cost of debt, rather than an allowance in cash flows, as it provides a greater degree of certainty to firms. It also promotes a greater degree of comparability across suppliers.

E2.12 The Commission's approach to estimating the risk-free rate, the debt premium and debt issuance costs are discussed sections E4 and E5 of this appendix respectively.

E2.13 The additional debt premium that firms incur on issuing long term debt is discussed in Section E6. The approach to estimating debt betas is discussed in Section E9.

Commission's reasons - estimating the cost of equity

Cost of equity - appropriate model for estimating the cost of equity

Overview

E2.14 The cost of equity is the expected rate of return required by investors on equity capital that compensates them for the risk they bear, the time value of money, and the opportunities they forgo by committing funds to the firm. The cost of equity cannot be observed directly it must be estimated.

E2.15 One of the most common economic models used to estimate the cost of equity is the CAPM (referred to as the classical CAPM), which was originally developed by Sharpe, Lintner and Mossin.[369] The Commission considers that there are two main alternative asset pricing models to the CAPM: the Fama-French three-factor

[369] See Sharpe, W., Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk, *Journal of Finance*, Vol. 19, No. 3, 1964, pp. 425–442; Lintner, J., The Valuation of Risky Assets and the Selection of Investments in Stock Portfolios and Capital Budgets, *Review of Economics and Statistics*, 47, 1965, pp. 13–37 and Mossin, J., Equilibrium in a Capital Asset Market, *Econometrica*, Vol. 34, No. 4, 1966, pp. 768–783.

model;[370] and the group of models usually described as discounted cash flow (DCF) models. These models are discussed below.

The capital asset pricing model (CAPM)

E2.16 The CAPM is a single factor model that postulates a positive linear relationship between the expected return on an asset and the systematic risk associated with holding that asset. For a discussion of systematic (and unsystematic risk), please refer to paragraph E1.8.

E2.17 Under the assumptions on which the CAPM is based, the cost of equity is decomposed into two components - the risk free rate plus the risk premium applicable to an individual stock. The risk premium is directly proportional to that stock's exposure to systematic risk, i.e. its beta.

E2.18 The CAPM is appealing because it identifies a single measure of risk and it is well-understood by analysts and commentators. The CAPM has received support from many regulators and academics as a reasonable model for estimating the regulated cost of capital.[371]

E2.19 Like all economic models, the CAPM has its limitations. For example, it contains a number of simplifying assumptions which may not hold in practice such as that there are no restrictions on short-selling, markets are frictionless, and investors may borrow or lend unlimited amounts at the risk-free rate.[372] Further, in some studies the actual returns of low-beta stocks appear to be higher than the CAPM's predictions, and the returns of high-beta stocks appear to be lower. A number of other economic factors have been shown to explain historical average returns better than the CAPM's beta in specific cases.[373]

E2.20 There are, however, a range of possible explanations for the results recorded in such empirical tests. For example, the results may reflect the serious methodological problems that exist in undertaking a robust test of the CAPM, including the difficulty of correctly observing the market portfolio.

E2.21 In their classic finance textbook, Copeland, Weston & Shastri note that there are many alternative explanations for the CAPM's performance in empirical tests and that a great deal of energy has been devoted to the empirical tests on how well the

370 Fama, E. F., French, K. R., Common Risk Factors in the Returns on Stocks and Bonds, *Journal of Financial Economics,* Vol. 33, No. 1, 1993, pp. 3–56.

371 See Myers, S. C., The Application of Finance Theory to Public Utility Rate Cases, *Bell Journal of Economics and Management Science*, Vol. 3, 1972, pp. 58–97 and Myers, S. C., On the Use of β in Regulatory Proceedings: A Comment, *Bell Journal of Economics and Management Science*, Vol. 3, 1972, pp. 622–627. Wright, S., Mason, R., Miles, D., *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.*, a Smithers & Co. Ltd. report to the OFT and U.K. economic regulators, 2003. IPART, *IPART's weighted average cost of capital*, Research - Final Decision, p. 2 and p. 13.

372 Copeland, T., Weston, J., and Shastri K., *Financial Theory and Corporate Policy* 4th Edition, Pearson Education, 2005, chapter 6.

373 See Grinblatt, M., Titman, S., *Financial Markets and Corporate Strategy*, 2nd edition, McGraw-Hill: New York, 2002, Section 5.40; and for surveys of the empirical evidence on the CAPM see Campbell, J. Y., Lo, A. W., MacKinlay, A. C., *The Econometrics of Financial Markets*, Princeton: New Jersey, 1997, pp. 211-217 and Jagannathan, R., Meier, I., Do We Need CAPM for Capital Budgeting?, *Financial Management*, Vol. 31, 2002, pp. 55–77.

CAPM model fits the data.[374] They conclude, that "researchers have been working on tests of the CAPM for nearly 40 years, and no conclusive evidence has been published to date – the jury is still out".[375]

E2.22 An example of the methodological problems in robustly testing the CAPM is provided by Pettengill, Sundaram & Mathur (Pettengill et al.).[376] Pettengill et al. note that CAPM posits a positive relationship between beta and expected returns, but the relationship is conditional on the market excess returns when realised returns are used. That is, when the market excess returns are positive (negative), the relationship between returns and beta would be positive (negative). In other words, low beta stocks earn lower returns during up markets, but higher returns during down markets. Pettengill et al. argue that many prior empirical tests of the CAPM are biased against the CAPM as they fail to adjust for the conditional relationship between actual returns and beta. Adjusting for this bias, Pettengill et al. find a strong positive relationship between beta and returns. Their work spawned a significant number of subsequent studies the results of which were also more supportive of the CAPM than previous studies, and in particular that there was a strong relationship between beta and returns.

E2.23 Professor Myers observes that the CAPM's beta sometimes suffers from estimation errors so large that it can be difficult to draw any reliable conclusions; that the instability of beta over time can be problematic; and that the model does not seem to provide a comprehensive explanation of the risk-return relationship on either a theoretical or empirical level.[377] However, in his advice to the Commission, Professor Myers still recommends the use of the CAPM framework to estimate the cost of capital as it provides valuable insights.[378]

Alternative asset pricing models

E2.24 The Fama-French three-factor model adds two factors to the CAPM's market factor ('MRP'). These factors are a firm size factor (the return on small-firm stocks minus the return on large-firm stocks) and a book-to-market factor (the return on high book-to-market ratio stocks minus the return on low book-to-market ratio stocks). Each factor may represent a risk premium that contributes towards the overall risk premium of the asset.

E2.25 Fama and French assert that their simple three-factor model explains most of the risk premiums of stocks (the so-called anomalies of the CAPM) identified by these competing models.[379] However, the theoretical foundations of the Fama-French factors are less well-developed than that of the CAPM, and Fama and French have

374 Copeland, T., Weston, J., and Shastri K., *Financial Theory and Corporate Policy* 4th Edition, Pearson Education, 2005.

375 ibid, p. 164.

376 G. Pettengill, S Sundaram, & I. Mathur, The Conditional Relation between Beta and Returns, *Journal of Financial and Quantitative Analysis, Vol. 30, No, 1 Mar 1995, pp. 101-116.*

377 Myers, S. C., On the Use of β in Regulatory Proceedings: A Comment, *Bell Journal of Economics and Management Science*, Vol. 3, 1972, pp. 622–627.

378 Franks, J., Lally, M. and Myers, S., *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, Report prepared for the Commerce Commission, 18 December 2008, pp. 9-11 (Franks, Lally and Myers, Recommendations on Cost of Capital Methodology).

379 Fama, E. F., French, K. R., Multifactor Explanations of Asset Pricing Anomalies, *Journal of Finance*, Vol. 51, 1996, pp. 55–84.

been criticised for 'data mining' — inferring the existence of relationships in the data that appear purely through chance.[380] Wright, Mason and Miles (Wright et al.) observe that the statistical significance of the factors themselves is dubious; there is little evidence that the historical risk premiums associated with these factors are significantly different from zero.[381] Furthermore, the reliability of the model may vary between countries; the model has typically been applied to US or UK data.

E2.26 A specific application of the Fama-French model was considered in detail by the AER in the Jemena Gas decision.[382] The AER concluded that:

- The Fama-French three-factor model was not well accepted by academics, financial market practitioners, nor regulators; [383]
- The Fama-French three-factor model is empirically driven, without a strong theoretical grounding;[384]
- The estimates produced by the Fama-French three-factor model "are not arrived at on a reasonable basis"; [385] and
- The Fama-French three-factor model "does not produce a better estimate or forecast than the CAPM of the cost of equity". [386]

E2.27 Finally, the availability of reliable size and book-to-market data may constrain the model's applicability to some New Zealand industries. Hence, the Fama-French three-factor model suffers from its own limitations.

DCF Models

E2.28 There are several forms of DCF models. The simplest of these is Gordon's constant dividend growth model, which says that the cost of equity capital on an equity security is the discount rate that equates the current stock price to the present value of the future stream of expected dividends, which are expected to grow in perpetuity at a constant rate.[387]

E2.29 DCF is routinely applied by US regulators, such as the Federal Energy Regulatory Commission ('FERC'), as the primary model for estimating firms' allowed return on equity.[388]

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380 For examples see Campbell, J., Why Long Horizons? A Study of Power Against Persistent Alternatives, *Journal of Empirical Finance*, Vol. 8, 2001, pp. 459–491 and MacKinlay, A. C., Multifactor Models do not Explain Deviations from the CAPM, *Journal of Financial Economics*, Vol. 38, 1995, pp. 3–28.

381 Wright, S., Mason, R., Miles, D., *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.*, a Smith & Co. Ltd. report to the OFT and U.K. economic regulators, 2003, pp. 72-76.

382 AER, *Jemena Gas Networks, Access arrangement proposal for the NSW gas markets Final decision*, 1 July 2010- 30 June 2015, pp.108-172.

383 ibid, pp. 108-172, pp. 119-134.

384 ibid, pp. 108-172, pp. 134-138.

385 ibid, pp. 108-172, p. 142.

386 ibid, pp. 108-172, p. 148.

387 Gordon, M., The Investment, Financing, and Valuation of the Corporation, Irwin: Homewood, 1962.

388 Gordon, K., Makholm, J. D., *Allowed Return on Equity in Canada and the United States: An Economic, Financial and Institutional Analysis*, NERA report, 2008.

E2.30 There are a number of limitations with the DCF models:

- First, the informational requirements mean the standard model is only feasible for listed firms that pay dividends;
- Second, the constant growth assumption is only reasonable for stable, mature firms;
- Third, good forecasts of dividend growth are essential. In practice, forecasts of firms' earnings are used as a surrogate for the growth in dividends, so it is necessary to assume that earnings and dividends grow roughly in balance. It is also necessary to assume that forecasts do not systematically underestimate or overestimate earnings, and that growth forecasts are based on the same information that the market uses to value firms' stocks.[389] Presently, forecasts of earnings for some, but not many, New Zealand firms are available through the Institutional Brokers' Estimate System (IBES);
- Fourth, dividend growth forecasts, which are generally only available for the short-run, often exceed the long-run rate of economic growth. Cornell observes that, as a consequence of this empirical fact, and the constant growth model's assumption that the forecast growth rate applies in perpetuity, gives rise to the implausible result that the company will eventually engulf the entire economy.[390] Multistage models described in the Expert Panel report and by Cornell, seek to overcome this problem;[391] and
- Finally, the model relies on the assumption that financial markets are efficient and correctly value investments.[392] The empirical evidence on that question has been mixed, at best.

E2.31 There are many other asset pricing models apart from the three discussed here. Wright et al. survey several of these, including nonlinear, conditional, multifactor and intertemporal models. They conclude that each suffers from its own shortcomings, and in their view, "there is no one clear successor to the CAPM for practical cost of capital estimation".[393]

Estimating the cost of equity in practice

E2.32 The CAPM remains the most widely applied asset pricing model by both regulators and financial practitioners in New Zealand and throughout the world. In its previous regulatory decisions, the Commission has consistently applied a CAPM framework. All Australian regulators use the CAPM approach to estimate the cost of equity, it

389 See Grinblatt, M., Titman, S., *Financial Markets and Corporate Strategy*, 2nd edition, McGraw-Hill: New York, 2002, pp. 388-390.

390 Cornell, B., *The Equity Risk Premium: the Long-run Future of the Stock Market*, Wiley: New York, 1999.

391 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, Report prepared for the Commerce Commission, 18 December 2008; Cornell, B., *The Equity Risk Premium: the Long-run Future of the Stock Market*, Wiley: New York, 1999, Chapter 3.

392 Independent Regulators Group (IRG), *Regulatory Accounting — Principles of Implementation and Best Practice for WACC Calculation*, February, 2007, p. 19.

393 Wright, S., Mason, R., Miles, D., *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.*, a Smithers & Co. Ltd. report to the OFT and U.K. economic regulators, 2003, Chapter 3, p. 76.

has been used also in the UK and Europe, while DCF has been applied by some US regulators (and CAPM is used as a cross-check in some instances).

E2.33 In the New Zealand context, the Commission has considered the regulatory cost of capital for the Telecommunication Service Obligation ('TSO') net cost calculations determination,[394] the Airports Inquiry,[395] in the Gas Control Inquiry,[396] the Electricity Inquiry into Unison,[397] and the Gas Authorisation.[398] In these decisions, the Commission has consistently applied a CAPM framework.

E2.34 The use of the CAPM was considered and accepted by the New Zealand High Court in the Auckland Bulk Gas Users case.[399] In its judgment in that case the High Court described the CAPM as "a sensible theory, logically rigorous and consistent with accepted and acceptable economic thinking". The court stated that the CAPM: [400]

> …is a simple concept, fundamental to financial theory, providing a positive relationship between the perceived or estimated risk and the required rate of return. We believe it is a satisfactory model and an appropriate method to calculate the capital cost for pricing purposes. We think that the Commission was entitled to make use of that methodology to the exclusion of other particular formulas in making its pricing decision.

Challenges to regulators' use of the CAPM

E2.35 Over the years, many regulators have been challenged on their reliance on CAPM through submissions. In doing so, many submitters rely on the empirical literature to justify adoption of a different method of estimating the cost of equity, notwithstanding that there is no conclusive evidence or consensus on how to interpret the empirical tests or what a better method may be.

E2.36 The issue was considered in detail by Wright, Mason and Miles (Wright et al.)[401] for the U.K. economic regulators[402] and the Office of Fair Trading. Wright et al. concluded that:[403]

394 Commerce Commission, *Determination for TSO Instrument for Local Residential Service for period between 20 December 2001 and 30 June 2002*, 17 December 2003, and every year with the latest being the Commerce Commission, *Draft TSO Cost Calculation Determination for TSO Instrument for Local Residential Telephone Service for period between 1 July 2008 and 30 June 2009*, 4 December 2009.

395 Commerce Commission, *Final report Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports*, 1 August 2002.

396 Commerce Commission, *Gas Control Inquiry*, Final Report, 29 November 2004 (Commerce Commission, Gas Control Inquiry).

397 Commerce Commission, *Electricity Distribution - Regulation of Electricity Lines Businesses Targeted Control Regime Intention to Declare Control Unison Networks Limited*, September 2005.

398 Commerce Commission, *Gas Authorisation Decisions Paper*, 30 October 2008.

399 *Auckland Bulk Gas Users v Commerce Commission* [1990] 1 NZLR 448, see esp. pp. 466-467.

400 *Auckland Bulk Gas Users v Commerce Commission* [1990] 1 NZLR 448, p. 467.

401 Wright, S., Mason, R., Miles, D., *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.*, a Smithers & Co. Ltd. report to the OFT and U.K. economic regulators, 2003, pp. 72-76; Smithers & Co. Ltd, A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the UK, Feb 13, 2003.

402 The U.K. economic regulators are The Civil Aviation Authority (CAA), Office of Water Services (OFWAT), Office of Gas and Electricity Markets (Ofgem), Office of Telecommunications (Oftel), Office of the Rail Regulator (ORR) and Office for the Regulation of Electricity and Gas (OFREG).

403 Wright, S., Mason, R., Miles, D., *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.*, a Smithers & Co. Ltd. report to the OFT and U.K. economic regulators, 2003, p. 75-76.

> [t]he Capital Asset Pricing Model (CAPM) is (still) widely-used to estimate firms' costs of capital. There is considerable evidence of empirical shortcomings in the CAPM; but its clear theoretical foundations and simplicity contribute to its popularity.

E2.37 After reviewing some of the empirical research developments, Wright et al note:[404]

> In summary: the empirical shortcomings of the CAPM are known. Alternative models to address this issue have their own shortcomings - weak theoretical foundations and empirical challenges. In our view, there is no one clear successor to the CAPM for practical cost of capital estimation.

E2.38 The issue has also been addressed by a number of Australian regulators, including the AER (2009 and 2010[405]), the QCA (2004) and most recently by IPART (Nov 2009, final Apr 2010[406]). All have continued to use the CAPM to estimate the cost of equity.

E2.39 Notwithstanding the criticisms levelled at the model and its imperfections, for the following reasons, the Commission retains the CAPM:

- it enjoys almost universal use and acceptance by New Zealand companies, practitioners and analysts;
- it has been used consistently by regulators in New Zealand, Australia, the UK and Europe;
- there is no consensus as to what model is better than the CAPM;
- no other model enjoys even a fraction of the support in practice that the CAPM enjoys;
- there is still extensive ongoing debate about the theoretical basis of the other models, and there are difficulties in sourcing reliable data for these other models;
- the use of CAPM was upheld by the High Court in New Zealand; [407] and
- the Commission's Cost of Capital Expert Panel also considered how best to estimate the cost of equity. All members of the panel recommended the use of the CAPM (in one form or another).[408]

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404 ibid, p. 76.

405 AER, *Electricity Transmission and Distribution Network Service Providers - Review of the Weighted Average Cost of Capital (WACC) Parameters, Final Decision*, May 2009. AER, *Jemena Gas Networks, Access arrangement proposal for the NSW gas markets Final decision, 1 July 2010- 30 June 2015*, June 2010, pp.108-172.

406 IPART, *Alternative approaches to the determinations of the cost of equity – other industries discussion paper*, November 2009, p. 18. IPART, *IPART's weighted average cost of capital, Research - Final Decision*, p. 2 and p. 13.

407 *Auckland Bulk Gas Users v Commerce Commission* [1990] 1 NZLR 448, see esp. at pp. 466-467.

408 Professor Myers recommended the classical CAPM, Associate Professor Lally recommended the simplified Brennan-Lally CAPM, while Professor Franks recommended the use of both of these models and the International CAPM.

Submissions on use of the CAPM

E2.40 In submissions on the Revised Draft Cost of Capital Guidelines (RDG)[409] and IM Discussion Paper[410] interested parties highlighted the CAPM's poor performance in under (over) estimating the cost of equity for low (high) beta firms.[411] LECG for ENA cited evidence indicating that, when applied to New Zealand capital market data, the CAPM has been unable to detect any relationship between excess returns and beta. LECG also cited evidence that for New Zealand electricity lines and gas pipeline businesses the precision of CAPM-based cost of capital estimates were low.[412]

E2.41 PwC (for 17 EDBs) submitted that:[413]

> We acknowledge the practical difficulty in being able to estimate the parameters required by other models such as the International CAPM, the Dividend Discount (or DCF) model and the Fama-French three factor model. We therefore consider that the Classical and Brennan-Lally CAPMs are the most practical to apply in New Zealand at this time.

E2.42 During further consultation on the appropriate cost of capital for the IM the majority of the suppliers and users of regulated services recommended that for IMs the Commission should use a CAPM framework, instead of other estimation models (i.e. dividend discount model, Fama-French model), to estimate the cost of equity.

Conclusion - appropriate model for estimating the cost of equity

E2.43 The CAPM is the most widely understood and most widely used method for estimating the cost of equity in New Zealand, and by regulators in Australia, the UK, and Europe. Whilst alternative models exist, they are rarely used in practice (including in a regulatory context) and have their own shortcomings, including an extensive ongoing debate about their theoretical basis, and the difficulties in sourcing reliable data required by the other models. Due to its strong theoretical foundations, its simplicity and its greater acceptance, the CAPM is preferred by the Commission.

Cost of Equity - The form of the CAPM

Overview

E2.44 Since its initial development a number of variations of the CAPM model have been developed which incorporate different assumptions relating to the taxation of returns from debt and equity. The classical CAPM effectively assumes that personal taxes do not differ across forms of income, and as a result, these tax rates drop out of the model. It therefore does not adjust for the effect of any imputation credits attached to dividends, or reflect differences in tax rates in capital gains relative to dividends.

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409 Commerce Commission *Revised Draft Guidelines - The Commerce Commission's Approach to Estimating the Cost of Capital*, 19 June 2009 (RDG).

410 Commerce Commission, *IM Discussion Paper*, 19 June 2009.

411 See for an example PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009.

412 LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report for ENA, 11 August 2009, p. 10 (LECG for ENA, Comments on estimating the Cost of Capital).

413 PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on Behalf of 17 EDBs, 2 December 2009, p. 7.

It is therefore inconsistent with the New Zealand tax regime that permits the use of imputation credits to offset investor tax obligations in order to avoid double taxation (i.e. on company earnings, and then again on personal earnings), and generally imposes no capital gains tax.

E2.45 The 'Brennan-Lally CAPM' (and the simplified version of it) is an alternative to the classical CAPM that explicitly takes account of differing tax rates on different forms of income. Lally, and Cliffe and Marsden modified Brennan's model to adapt it to the New Zealand tax regime. The simplified version of the model considers only the effects of dividend imputation and assumes that capital gains are tax free.[414]

E2.46 The formula to calculate the cost of equity using the simplified Brennan-Lally CAPM is:

$$\mathbf{r_e = r_f(1-t_i) + \beta_e TAMRP}$$

where r_f is the risk-free rate, t_i is the investor tax rate on interest, B_e is the equity beta and TAMRP is the tax adjusted market risk premium.

E2.47 In Australia, the Officer Model was developed in relation to the Australian taxation system. A different CAPM variant, the International CAPM takes into account international investors.

E2.48 However, none of these models fully reflect market circumstances. In particular, the classical CAPM and simplified Brennan-Lally CAPM, and to some extent the Officer model, assume national capital markets are closed. The international CAPM assumes that capital markets are integrated but this model has difficulties in its application. [415]

E2.49 In practice, New Zealand capital markets are partially integrated in the sense that overseas investors play a large role. One implication of the presence of international investors is that not all imputation credits can be fully utilised since non-New Zealand taxpayers cannot obtain the full benefits of imputation.

E2.50 In this regard, Unison submitted that:[416]

> … the Commission should recognise that only a portion of investors in New Zealand's capital markets are able to utilise dividend imputation credits, i.e. rather than assuming 100% of investors are able to utilise imputation credits, the Commission should use an estimate of the actual proportion.

E2.51 The Commission notes that there are two alternatives to the classical and simplified Brennan Lally frameworks that attempt to take account of the partial integration of

414 Lally, M., The CAPM under Dividend Imputation, *Pacific Accounting Review*, 4, 1992, pp. 31–44; Cliffe, C., and A. Marsden, The Effect of Dividend Imputation on Company Financing Decisions and the Cost of Capital in New Zealand, *Pacific Accounting Review*, 4, 1992, pp. 1–30; Brennan, M., Taxes, Market Valuation and Corporate Financial Policy, *National Tax Journal*, 23, 1970, pp. 417–27.

415 The Commission considers that the data requirements of the International CAPM (especially the requirement of a market risk premium that is suitable for more than one country) are too substantial for this model to be considered for practical use.

416 Unison, *Appendix: Submission on Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital*, 14 August 2009, p. 5.

New Zealand with international markets. These alternatives are (i) the Officer model,[417] and (ii) the full (or not simplified) Brennan-Lally CAPM. The Officer model assumes interest and capital gains are subject to the same rate of tax and recognises that imputation credits may not be valued by all investors (such as international investors). The value placed on imputation credits by investors on average is known as the "gamma" parameter in the cost of capital calculation. The main difference between the full and simplified version of the Brennan-Lally CAPM is that the former allows for differences in tax rates on interest, dividends and capital gains and for partial use of imputation credits.

E2.52 The Officer version of the CAPM model is widely used by regulators and finance practitioners in Australia.[418] Due to this widespread adoption of the Officer framework over the past decade there have been numerous papers estimating the average utilisation rates of imputation credits in Australia. Despite the availability of estimates and data in Australia, there has still been considerable debate about the value of the gamma parameter that should be use in regulatory proceedings there.[419]

E2.53 In New Zealand, the same body of literature in relation to the utilisation rate of imputation credits does not appear to exist. In particular, the Commission is not aware of any up-to-date estimates of the utilisation rates of imputation credits for New Zealand. This in part seems to be due to the paucity of data that exists in New Zealand. Instead, applications of the Brennan-Lally CAPM in the New Zealand context typically use the simplified Brennan-Lally CAPM, rather than the Officer or the extended Brennan Lally CAPM to estimate the cost of capital.

E2.54 A number of submissions highlighted that some international investors, in particular, cannot utilise the imputation credits distributed with dividends.[420] Therefore, the assumption in the simplified Brennan-Lally CAPM that imputation credits would be fully used is inappropriate. Those submissions contend that use of the simplified-Brennan-Lally CAPM may therefore understate the cost of equity.

E2.55 The Commission accepts that international investors are substantial investors in New Zealand, and with New Zealand's limited level of domestic savings, international

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417 Officer, R. R., The cost of capital of a company under an imputation tax system, *Accounting & Finance*, Vol. 34, 1994, pp. 1-17.

418 For example, the Australian Energy Regulator (AER), the Australian Competition and Consumer Commission (ACCC), Independent Pricing and Regulatory Tribunal of New South Wales (IPART) and Queensland Competition Authority (QCA). See Handley, J.C., *Further comments on the valuation of imputation credits, report prepared for the AER*, Final, 15 April 2009, p. 6. Also see Lally, M., Regulatory revenues and the choice of the CAPM: Australia versus New Zealand, *Australian Journal of Management*, Vol. 31, No. 2, December 2006, pp. 313-332, who compares the Officer version of the CAPM against the simplified Brennan-Lally CAPM and the standard Sharpe-Lintner-Mossin CAPM. Lally finds that which of the three models performs best depends on the utilisation rate of imputation credits.

419 See AER, *Final decision: Electricity transmission and distribution network service providers – Review of the weighted average coat of capital (WACC) parameters*, May 2009, pp. 393-469 (AER, Final Decision on WACC for Electricity); and Handley, J. C., *Further comments on the valuation of imputation credits*, Report prepared for the AER, 15 April 2009.

420 Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, 13 August 2010, pp. 29-30; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 30-32; Orion New Zealand Ltd, *Cross Submission on EDBs (Input Methodologies) Draft Determinations and Reasons Paper*, Attachment: NERA Report, 2 September 2010, pp. 7-9.

investors are arguably the marginal investors. However, the position of international investors should not be looked at on a piecemeal basis as the differences between international investors and domestic investors are not limited just to the value placed on imputation credits. Rather, international investors face different risk-free rates, different market portfolios, and different views on risk (beta) as well as different tax considerations. A full consideration of these differences would require the use of an international CAPM, reflecting estimates of the particular parameters that relate to international investors.

E2.56 This matter was discussed by the Expert Panel Report.[421] The advice from Dr Lally is that an international CAPM would tend to provide lower estimates of the cost of equity, than either the simplified Brennan-Lally CAPM or the classical CAPM. Professor Myers did not agree that use of the international CAPM would necessarily yield lower estimates than the simplified Brennan-Lally CAPM.[422] In support of Dr Lally's conclusion the Commission notes that there are a number of papers which conclude that the estimated cost of capital from an international perspective is lower than the estimated cost of capital from the perspective of domestic investors. These are noted in paragraphs 6.4.32 to 6.4.34.

E2.57 The Commission notes that some investors in Airports may not be able to use imputation credits fully either, for example, certain types of trusts. However the ownership structure of regulated suppliers should not affect the choice of the framework used to estimate the cost of capital as the impact of ownership structure should fall on the owners not on consumers. That the impact of the ownership structure for certain firms would alter prices in the market, is inconsistent with outcomes in workably competitive markets.

E2.58 The only aspect that is relevant is the overall integration of the New Zealand market as a whole not whether individual entities choose to only access the lowest cost of capital structure available given the New Zealand markets' extent of integration. Furthermore, adopting different cost of capital assumptions based solely on ownership structure where there are a number of regulated service providers (particularly where the difference reflects public or private ownership) could potentially create perverse investment incentives. As a result, the Commission considers that it should adopt a single model, which focuses on domestic investors, when estimating suppliers' cost of equity. Given the body of research suggesting that international estimates of the cost of capital are lower than those from a purely domestic perspective, the adoption of a domestic CAPM (simplified Brennan-Lally CAPM) is more likely to advantage regulated suppliers than to disadvantage them.

Form of CAPM used in practice

E2.59 All Australian regulators currently use the Officer CAPM framework for estimating the cost of equity capital.[423] UK regulators typically use the classical CAPM

421 Franks, J., Lally, M., Myers, S., *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, 18 Dec 2008, pp. 10-11.

422 ibid.

423 Similar to the simplified Brennan-Lally framework the Officer model explicitly takes account of imputation credits, but by contrast, assumes that capital gains are taxed at the same rate as interest in Australia. For example, see cost of capital decisions by the AER, ACCC, IPART and QCA.

framework as, in part, it is consistent with the UK tax regime.[424] Professor Franks in the Cost of Capital Expert Report notes that the UK had a partial imputation system in the late 1980s and early 1990s "… and most parties used a Brennan-Lally-type model."[425]

E2.60 Both the Australian and UK regulators have recently reviewed the use of the CAPM framework against alternative models but have decided not to depart from it as their principal tool to estimate suppliers' cost of equity.

E2.61 In its decisions in estimating the cost of equity capital, the Commission has consistently used the simplified Brennan-Lally CAPM[426] over the classical and Officer model. This has been done on the basis that this version of the CAPM better accounts for the investor tax regime operating in New Zealand than the classical CAPM (which does not allow for imputation credits) and the Officer model (which assumes interest and capital gains are equally taxed).[427] In the RDG and IM Discussion Paper, the Commission proposed continuing to use the simplified Brennan-Lally CAPM.

E2.62 At the Cost of Capital Workshop, participants from the suppliers of regulated services indicated that they use the simplified Brennan-Lally CAPM to calculate the cost of capital.[428]

Submissions on the form of the CAPM

E2.63 In a post-workshop submission Vector noted that "[h]istorically the Commission has adopted the simplified Brennan-Lally CAPM. It was evident from the conference that there was little dispute that this is an acceptable approach to use". In that submission also Vector submitted that there was no "persuasive evidence" to depart from the use of the simplified Brennan-Lally CAPM and that the Commission should not depart from it unless there was persuasive evidence to do so.[429]

E2.64 In submissions on the Draft Reasons paper, however, Vector submitted that it is not clear that the simplified Brennan-Lally CAPM is the strongest candidate method for estimating the cost of capital. Vector suggested further data and studies are required, and the Commission should review its choice of model within 18 months of the publication of the IMs.[430] However, the Commission considers a decision to

424 Office of the Gas and Electricity Markets (Ofgem), Water Services Regulation Authority (Ofwat), Office of Communications (OFCOM), UK Competition Commission, Civil Aviation Authority (CAA) and Office of Rail Regulation (ORR) all use the classical CAPM framework.

425 Franks, J., Lally, M., Myers, S., *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, 18 Dec 2008, paragraph 31.

426 The simplified Brennan-Lally CAPM has been used in cost of capital estimations by the Commission since 2002 (Commerce Commission, *Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, Final report*, 2002).

427 Sharpe, W., Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk, *Journal of Finance, 19*, 1964, pp. 425-42; Linter, J., The Valuation of Risky Assets and the Selection of Investments in Stock Portfolios and Capital Budgets, *Review of Economics and Statistics, 47*, 1965, pp. 13-37.

428 Commerce Commission, *Cost of Capital Workshop Transcript*, 12-13 November 2009, pp. 38-40.

429 Vector, *Cross Submission to Commerce Commission on the Weighted Average Cost of Capital Workshop*, 2 December 2009, pp. 7-8.

430 Vector, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost Of Capital*, 13 August 2010, paragraph 120.

undertake such a review would be inconsistent with the statutory purpose of IMs, which is to "promote certainty for suppliers and consumers in relation to the rules, requirements and processes applying to regulation of services under [Part 4]".[431] However, if a substantially improved model was to be developed, and/or there was a significant change in the models used in practice in New Zealand to estimate the cost of capital, the Commission would need to consider whether the cost of capital IM would need to be amended. The Commission notes that Vector's most recent submission did not explain the apparent change in Vector's position on the suitability of the simplified Brennan-Lally CAPM, nor whether the model or models Vector itself uses have changed.

E2.65 ENA and LECG (for ENA) ".. support[s] the model applied by the Commission, viz, the post-tax form of the CAPM" (that is, the simplified Brennan-Lally CAPM) noting that "… the post-tax form of the model attempts to address New Zealand's imputation tax structure."[432] Uniservices (for NZAA) agreed that the simplified Brennan-Lally version of the CAPM is an acceptable model for New Zealand under the assumptions of the dividend imputation tax regime.[433]

E2.66 Some submitters considered the Commission should use a number of approaches and models, rather than just the simplified Brennan-Lally CAPM. NERA for Orion[434] submitted that no single method of estimating the cost of equity should be relied upon exclusively, and that the Commission should inform itself of estimates from other models.[435]

E2.67 LECG did not support that approach. LECG's view was that:[436]

> … use of different models raises the question of how the different results obtained should be combined – a question that is unlikely to have a simple answer. Therefore, I agree with the Commission in continuing to follow the advice of its long standing expert adviser, Associate Professor Lally, to use only the post-tax form of the CAPM as the model for estimation of the cost of equity.

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431 Section 52R of the Act.

432 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p. 1; Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, Attachment: LECG, Response to Commerce Commission's Draft Cost of Capital Input Methodology: a report prepared for the Electricity Networks Association*, 13 August 2010, p. 1.

433 NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper, Attachment: Uniservices, Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, p. 21.

434 Orion New Zealand Ltd, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper, Attachment: NERA, The Cost of Equity: a report prepared for Orion New Zealand Ltd*, 2 September 2010, p. 3 and p. 23.

435 A similar point was made by Prime Infrastructure (Prime Infrastructure, *Submission on EDBs (Input Methodology) Reasons Paper, Cost of Capital - The Investor Perspective*, 13 August 2010, pp. 7-9) and Telecom (Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010).

436 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, Attachment: LECG, Response to Commerce Commission's Draft Cost of Capital Input Methodology: a report prepared for the Electricity Networks Association*, 13 August 2010, p. 7.

Leverage

E2.68 One of the shortcomings that the Commission is concerned about when estimating the cost of capital using the simplified Brennan-Lally CAPM to calculate the equity component of WACC is the relationship of the cost of capital with leverage, i.e. the proportion of debt capital relative to total (i.e. debt and equity) capital. It is normal to regard the use of leverage as a discretionary capital structure decision which implies that leverage is increased only where it would reduce or at least not increase the WACC. However, the cost of capital increases with leverage when using the simplified Brennan-Lally CAPM in conjunction with the simplified beta gearing model to calculate the equity component of WACC. If this relationship were true any use of debt would be contrary to the interest of the firm (and thus would not be in the interests of shareholders) and estimation of the cost of capital based on leverage other than zero would be an overestimate of the cost of capital that would correspond to an efficient capital structure.

E2.69 The Commission has been aware of the counter-intuitive relationship between leverage and the cost of capital when applying the simplified Brennan-Lally CAPM in the past. However, it is only since the recent GFC and its associated increase in the debt premium, that this relationship has become so pronounced.

E2.70 Submitters generally agreed that the observation that New Zealand firms include debt in their capital structures indicates that their Boards and managements do not believe that leverage (at least up to a certain point) increases the cost of capital. One implication of concern to the Commission is that if the simplified Brennan-Lally CAPM were to be applied such that increases in the regulated firm's actual leverage would result in increases in their allowed cost of capital, that would result in an incentive for suppliers of regulated services to increase their leverage. That could well be detrimental to the long-term benefit of consumers to the extent that the risk of default by the supplier was increased with consequent adverse effects on consumers.

E2.71 The Commission recognises the significance of this aspect of the cost of capital when applying the simplified Brennan-Lally CAPM, and has sought to mitigate the effects thereof, at least to some extent, by adopting a level of notional leverage for each regulated service that reflects the sample of international firms that were analysed to estimate beta for the respective regulated service. This will be discussed in further detail in Section E3 on leverage.

Conclusion - Cost of Equity - The form of the CAPM

E2.72 The Commission acknowledges that one of the shortcomings of estimating the cost of capital by applying the simplified Brennan-Lally CAPM to calculate the equity component of WACC is the counter-intuitive relationship between WACC and leverage that results. The cost of capital increases with leverage when the simplified Brennan-Lally CAPM is used to calculate the equity component of WACC.

E2.73 Nevertheless, the cost of capital IM uses the simplified Brennan-Lally CAPM to estimate the cost of equity capital. This is for three main reasons:

- First, it takes into account the effect of the New Zealand tax system whereby interest is taxable for investors but (in simplified terms) returns on equity are

not double taxed (i.e. dividends are not taxable when received if corporate tax has been paid and no capital gains tax is levied on equity);[437]

- Second, it has been adopted in previous regulatory determinations by the Commission,[438] and the New Zealand Treasury has endorsed the use of the simplified Brennan-Lally CAPM for estimating the cost of equity capital for Crown Entities and State-Owned Enterprises;[439] and

- Third, in New Zealand, the simplified Brennan-Lally CAPM is the most widely used approach to estimate the cost of equity capital - by equity analysts, by suppliers of regulated and unregulated services, and practitioners.[440]

E2.74 The Commission notes that the full Brennan-Lally and Officer versions of the CAPM could be used to reflect the fact that not all investors are able to access imputation credits. However, the Commission considers that the benefits of using these models are outweighed by the additional level of complication and data requirements they would impose. Further, they are not generally used in New Zealand to estimate the cost of equity capital.

E2.75 As noted, the Commission recognises the significance of the relationship between WACC and leverage when applying the simplified Brennan-Lally CAPM to estimate the cost of equity. However, it considers that the advantages of using this framework outweigh the disadvantages as long as the effects of the counter-intuitive relationship between the cost of capital and leverage is mitigated by adopting a level of leverage that is based on the comparative firm sample. This will be discussed in further detail in this paper's section on leverage (section E3).

E2.76 A number of participants at the Cost of Capital Workshop, and a number of submitters, proposed that the Commission should consider testing its estimates with the classical CAPM.

E2.77 The Commission recognises the limitations of the simplified Brennan-Lally CAPM and the merits of using alternative CAPMs to test the results from the simplified Brennan-Lally CAPM. However, formally including a requirement to undertake reasonableness tests in the IM would have created significant subjectivity and uncertainty. For example, the Commission would have to determine (a) the weight that would be accorded to each reasonableness test, (b) criteria outlining when to adjust its cost of equity estimate derived from the simplified Brennan-Lally CAPM

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437 The New Zealand tax regime permits the use of imputation tax credits, attached to dividend payments, to offset the investor's tax obligations. When combined with most investors being exempt from tax on capital gains it results in equity returns being essentially tax free in the hands of the investor whilst interest income is not.

438 See Commerce Commission, *Gas Control Inquiry, Final Report*, 29 November 2004; Commerce Commission, *Gas Authorisation Decision Paper*, 30 October 2008; Commerce Commission, *Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, Final report*, 1 August 2002; and any Commerce Commission TSO Decision Paper.

439 New Zealand Treasury, *Estimating the Cost of Capital for Crown Entities and State-Owned Enterprises*, A handbook prepared for the Treasury, 1997.

440 At the cost of capital workshop Professor Bowman was the only person not to endorse the use of the simplified Brennan-Lally CAPM. Professor Bowman preferred the use of the Officer framework. PwC NZ publish a quarterly cost of capital report that uses the Brennan-Lally model. See http://www.pwc.com/nz/en/cost-of-capital/index.jhtml.

in light of the results from the reasonableness tests, and (c) the degree of any resulting adjustment from the reasonableness tests. All three steps would require a significant degree of additional judgement and would have, most likely, to be considered on a case-by-case basis. For these reasons, the Commission considers that formally including reasonableness tests - and any associated adjustment process – in the IM would be inconsistent with the purpose of IMs of providing certainty to suppliers and consumers of regulated services.

E2.78 In reaching its view on the final cost of capital IM, the Commission has tested the estimates of the cost of capital from an application of the IM (using the simplified Brennan-Lally CAPM) against a range of other information including estimates of the cost of capital using the classical CAPM. The purpose of this testing is to ensure that the cost of capital IM produces commercially realistic estimates of the cost of capital that are adequate to ensure continuing investment in regulated services and that suppliers are limited in their ability to extract excessive profits. These tests are further discussed in Section E13.

Ad hoc allowance for model error

E2.79 A number of submissions from suppliers on the Draft Reasons Papers and draft determinations, submitted that the Commission was wrong to rely on the simplified Brennan-Lally CAPM and that the Commission should make an ad hoc allowance for model error.[441] These submissions argued that an ad hoc allowance should be made to the cost of equity estimated using the simplified Brennan-Lally CAPM (or the cost of capital) to allow for the possibility that the cost of equity on low beta stocks may have been understated. For example:

- CRA (for Unison) argued for a premium for small companies;[442]
- Professor Grundy (for Vector) argued for the use of the Black CAPM;[443]
- some submissions argued for more explicit consideration to be given to the cost of equity required by international investors since they are significant investors in New Zealand and unlike most New Zealand investors cannot use imputation credits.[444]

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441 See, for example, Vector, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, 13 August 2010, pp. 29-31. Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: LECG, *Response to Commerce Commission's Draft Cost of Capital Input Methodology: a report prepared for the Electricity Networks Association*, 13 August 2010, pp. 11-15. Powerco Limited, *Submission 2 in Response to Draft Input Methodology Decisions and Determination Cost of Capital*, 13 August 2010, pp. 9-11.

442 Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Charles River Associates, *Regulated Returns for Australian and New Zealand Electricity Distribution: a report prepared for Unison Networks Limited*, 15 August 2010.

443 Vector, *Submission on EDBs and GPBs (Input Methodology) Draft Determination and Reasons Paper*, Attachment: B. D. Grundy, *The Calculation of the Cost of Capital - A report for Vector,* 13 August 2010.

444 Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 30-32.

E2.80 For the reasons sets out in Section 6.4 of this paper, the Commission does not consider ad hoc adjustments for model error are justified generally or in response to the specific examples identified in submissions. Rather than repeat the Commission's analysis in this appendix, the reader is referred back to paragraphs 6.4.19 - 6.4.34.

Commission's reasons – service-specific versus supplier-specific cost of capital

E2.81 If suppliers of a regulated service have similar exposure to systematic risk—that is, if they have similar technology, scale, cost structures, exposure to macroeconomic factors and exposure to regulation—then the Commission should, in principle, apply a 'benchmark' or service-specific cost of capital for all suppliers of the regulated service.[445] On the other hand, if suppliers have a materially different exposure to systematic risk then the Commission should, in principle, apply a supplier-specific cost of capital for each supplier of the regulated service.

E2.82 Parameters in the cost of capital estimation that could be considered on a supplier-specific basis are (a) leverage, (b) debt premium, and (c) the equity (or asset) beta.[446] In making its decisions for airport services, the Commission considered each of these parameters individually and concluded that service-specific estimates would be more appropriate for each of them. The reasons for this are discussed in the relevant sections for each parameter.

E3 Leverage

Decision - leverage

E3.1 The IM specifies a service-wide notional leverage of 17% when estimating the cost of capital for Airport services.

Commission's reasons - leverage

Overview

E3.2 Leverage is the ratio of debt to total capital (i.e. debt plus equity). Leverage is used in the cost of capital estimation in two places: first, in order to calculate the capital structure weights in the cost of capital, and secondly, in the formula transforming asset betas to equity betas (and vice versa).

E3.3 There are three possible approaches to setting the leverage value for a type of service. These are:

- optimal leverage – where the cost of capital for a firm is minimised;
- actual leverage – the ratio of a firm's actual debt capital to the firm's actual debt plus equity capital (where market values are used); and

[445] In some sectors, the industry is made up of a single supplier. In such cases, the Commission may draw on evidence of comparable businesses both overseas and in other sectors in New Zealand to establish a suitable benchmark cost of capital for the firm.

[446] The remaining cost of capital parameters such as the risk-free rate, the tax-adjusted market risk premium, and investor and corporate tax rates apply to all firms in the New Zealand economy equally.

- notional leverage – the level consistent with a hypothetical representative supplier of a regulated service.

Leverage and firms' cost of capital - theoretical and practical considerations

E3.4 In theory, where there are no taxes and no bankruptcy costs or costs of financial distress apply, the market value of an investment is not affected by the relative proportions of debt and equity capital, i.e. leverage. In other words, leverage does not change the total amount of risk associated with the investment, or the cost of capital. Leverage just reallocates the existing risk between suppliers of debt capital and suppliers of equity capital. The cost of capital would be expected to be invariant to changes in leverage.[447]

E3.5 With the introduction of corporate taxes, firms can deduct interest on debt capital as an expense for tax purposes ('leverage tax shield'), but cannot deduct dividends on equity capital. Therefore, taking into account corporate taxes but not personal taxes, as leverage increases, the leverage tax shield increases. As a result the cost of capital declines as leverage increases.[448] Taking account of personal taxes, in New Zealand the effect of dividend imputation and no tax on capital gains redresses the tax advantage of debt described above.[449]

E3.6 Leverage also possesses a number of qualitative advantages that would be expected to lower the actual cost of capital or to benefit capital providers but cannot be incorporated into models of the cost of capital. These include the signalling value of debt in the presence of asymmetric information,[450] the reduction of underinvestment problems arising from the use of equity finance,[451] the reduction of agency costs due to the disciplinary effects of debt,[452] and the financial flexibility arising from debt.

E3.7 In practice, businesses would not include debt in their capital structure unless they believed that doing so would lead to the cost of capital remaining unchanged or decreasing, not increasing.

Leverage and the simplified Brennan-Lally CAPM

E3.8 When debt premiums are particularly high, estimates of WACC that incorporate CAPM estimates for the cost of equity component show WACC as increasing with leverage. This effect is amplified when using the simplified Brennan-Lally CAPM in conjunction with the simplified beta gearing model, as the WACC increases with a positive debt premium when using the simplified Brennan-Lally CAPM and more

447 Modigliani, F., Miller, M. The Cost of Capital, Corporation Finance and the Theory of Investment, *American Economic Review,* Vol. 48, No. 3, 1958, pp. 261–297.

448 Modigliani, F., Miller, M., Corporate income taxes and the cost of capital: a correction, *American Economic Review,* Vol. 53 No. 3, 1963, pp. 433–443.

449 Not all equity investors in the New Zealand market can fully utilise imputation credits. In particular, international investors cannot utilise imputation credits. However, this does not mean such investors have a higher estimate of the cost of capital than domestic investors. This is discussed further at paragraphs 6.4.32 - 6.4.34.

450 Ross, S., The Determination of Financial Structure: The Incentive Signalling Approach, *Bell Journal of Economics*, Spring, 1977, pp. 23-40.

451 Myers, S., Majluf, N., Corporate Financing and Investment Decisions when Firms have Information that Investors do not Have, *Journal of Financial Economics*, Vol. 13, 1984, pp. 187-221.

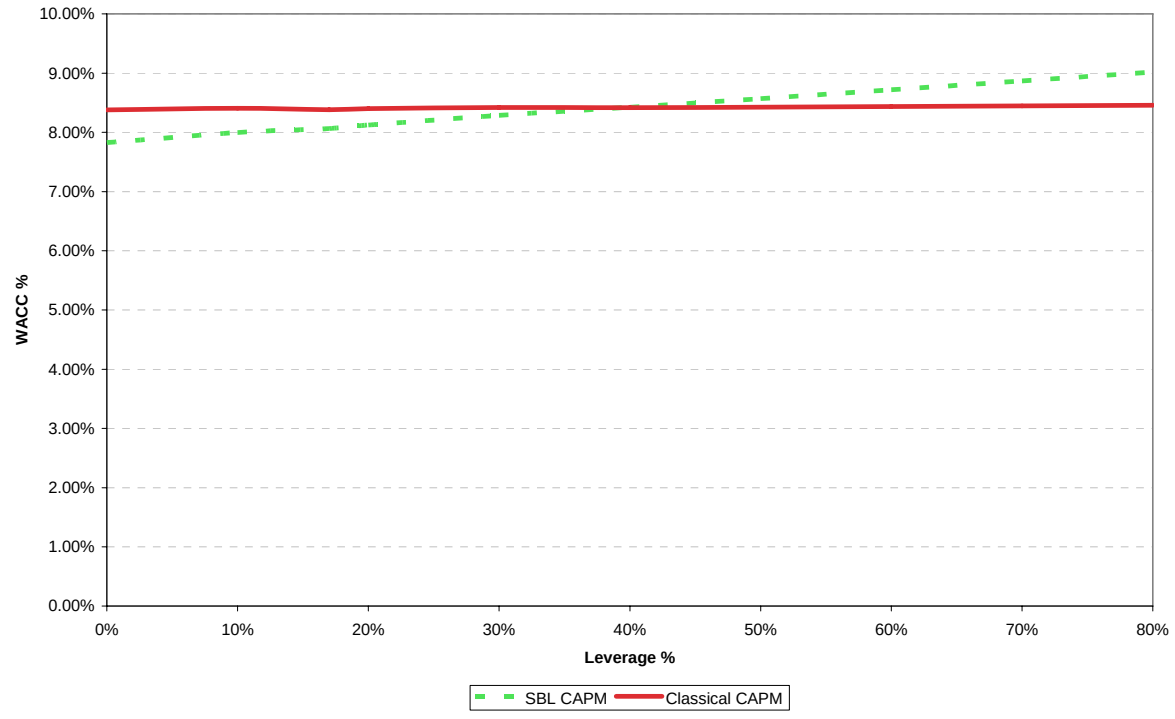
452 Jensen, M., Meckling, W., Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics*, Vol. 3, 1976, pp. 305-360; Jensen, M., Agency Costs of Free Cash Flow, Corporate Finance and Takeovers, *American Economic Review*, Vol. 76, 1986, pp. 323-329.

rapidly than when using the classical CAPM framework. This implies that the cost of capital is minimised when leverage is zero, and thus this would represent the optimal leverage. Using an example with assumed values for a number of parameters, [453] the magnitude of this anomaly in terms of changes in the post-tax WACC is illustrated in Table E1 and Figure E1 below. This contrasts the post-tax WACC estimated using the simplified Brennan-Lally CAPM and the classical CAPM.

Table E1 Leverage and Post-tax Cost of Capital

Leverage	Post-tax cost of capital estimated using the simplified Brennan-Lally CAPM	Post-tax cost of capital estimated using the classical CAPM
0%	7.83%	8.44%
20%	8.12%	8.46%
40%	8.42%	8.48%
60%	8.72%	8.50%

Figure E1 Leverage and the Post-Tax WACC Estimated Using the Simplified Brennan-Lally CAPM Versus the Classical CAPM



[453] This assumes a risk-free rate of 4.96%, a debt premium of 2.10% (including debt issuance cost of 0.35%), an asset beta of 0.60, a TAMRP of 7.1% (equivalent to an MRP of 5.8% for the classical CAPM), average investor tax rate of 28.1% and average corporate tax rate of 28.4%. For both WACC estimates the tax neutral formula for the effects of leverage on betas has been used. These parameters values are consistent with the reasonableness test the Commission has undertaken, (see Appendix E13).

E3.9 The table and figure above illustrate how the post-tax WACC, estimated using the simplified Brennan-Lally CAPM for the cost of equity, increases as leverage increases, while holding all other parameters constant. The table shows that, using the simplified Brennan-Lally CAPM for the cost of equity, the post-tax WACC would be approximately 7.8% assuming zero leverage. The post-tax WACC would increase to 8.1% at an assumed leverage of 20%. At an assumed leverage of 60%, the post-tax WACC would be approximately 8.7%.

E3.10 In contrast, the table and figure above illustrates how the post-tax WACC, estimated using the classical CAPM for the cost of equity, increases only marginally as leverage increases, while holding all other parameters constant. The Commission notes this increase in WACC with leverage, where the classical CAPM is used for the cost of equity, is an unconventional result which reflects the current very high debt premiums.

E3.11 This increase in the cost of capital with higher levels of leverage under the simplified Brennan-Lally CAPM:

- is inconsistent with both capital structure theory and observed practice;
- if incorporated in the cost of capital IM, would risk creating an incentive for suppliers of regulated services to increase their actual leverage in order to generate higher allowed rates of return or to propose higher benchmark leverage so as to receive a higher estimate of the cost of capital; and
- can be large, particularly when debt premiums (which affect the cost of debt) are high.

E3.12 Where the simplified Brennan-Lally CAPM is used in the context of information disclosure, suppliers of regulated airport services have an incentive to assert that the notional leverage should be as high as possible. This is because, when estimating the cost of capital using the simplified Brennan-Lally CAPM to estimate the cost of equity, any increase in leverage will flow through into a higher allowed cost of capital.

E3.13 Similarly, if suppliers' allowed cost of capital is influenced by their actual leverage, with the allowed cost of capital being estimated from the simplified Brennan-Lally CAPM, suppliers have an incentive to increase their actual leverage in order to increase the allowed cost of capital. Suppliers would recognise that, although the allowed cost of capital has risen, the actual market cost of capital they face is likely to have remained unchanged.[454]

E3.14 This anomaly (of the cost of capital increasing with leverage) is not unique to the Commission's current development of IMs using the simplified Brennan-Lally CAPM. A similar anomaly with respect to the classical CAPM was noted by the UK

[454] The Commission notes that the de-levering of the equity beta is based on the market value of leverage of the comparative firm sample. Therefore, to be consistent with the asset beta the re-levering should also be based on market value leverage. As only three of the suppliers affected by Part 4 have market value data available to estimate the market value of leverage the use of actual leverage for each supplier will bias the cost of capital for the majority of the regulated suppliers that are covered by Part 4 as their actual leverage would be based on book values.

Competition Commission in a recent price-setting review of Heathrow/Gatwick. The UK Competition Commission stated that:[455]

> The key feature of these charts is the upward-sloping relationship that exists between a firm's gearing and its pre-tax cost of capital when one assumes a zero debt beta. This suggests that gearing up increases a firm's pre-tax cost of capital and therefore warrants the inclusion of a higher rate of return in price caps—something that can be seen explicitly in Table 1 at the beginning of this appendix where BAA's estimates for the pre-tax cost of capital at Heathrow increase with the use of a higher gearing figure, while estimates of the pre-tax cost of capital at Gatwick fall on the assumption of lower gearing.
>
> We find this overall position difficult to reconcile with the observed behaviour of a range of firms in a broad sample of different industries. In the regulated sectors, the trend in recent years has been for firms to inject more debt into their capital structures on the apparent assumption that higher levels of gearing represent more efficient financing. Indeed, ADI has told us that its own decision to move BAA's gearing from around 34 per cent to more than double this figure would improve the efficiency of BAA's financing.
>
> Given this starting point, we do not accept the argument that higher levels of gearing produce a higher cost of capital. We do not believe that this is a credible characterization of the returns that investors require at different levels of gearing ….

E3.15 The Commission too would not want to set a higher cost of capital due to higher levels of leverage. To address this anomaly, the UK Competition Commission used debt betas.[456] The use of debt betas was generally not supported by submissions in New Zealand,[457] or the Expert Panel, although the Expert Panel recommended the Commission consider debt betas if they are significant.[458]

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455 UK Competition Commission, *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, paragraphs 88-90, p. F23.

456 A debt beta measures the systematic risk associated with a firm's debt. A detailed discussion on debt betas is included in the debt beta section (section E9).

457 Aurora Energy Limited, *Submission to the Commerce Commission on its Discussion Paper on Input Methodologies*, 14 August 2009, p.18; LECG for ENA, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, 11 August 2009, p. 18; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of NZAA, 31 July 2009, p. 27; Maui Development Limited, *Submission to the Commerce Commission on the Input Methodology Discussion Paper*, July 2009, pp. 19-20; NZ Airports, *Submission by NZ Airports Association on the Commerce Commission Input Methodologies Discussion Paper*, 31 July 2009, pp. 49-50; Powerco Limited, *Input Methodologies Discussion Paper*, 14 August 2009, p. 30; PwC, Revised Draft Guideline s- Submission to Commerce Commission, August 2009, Report on Behalf of Powerco, p. 26; PwC for 17 EDBs, Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital, 14 August 2009, pp. 11-12; Synergies Economic Consulting for Vector, Initial WACC Review, 13 August 2009, pp. 23-25; Synergies Economic Consulting for Vector, WACC Review Final, 31 August 2009, pp. 36-39; Telecom, Annex B: Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital, August 2009; ENA, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, p. 9; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 12; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, p. 86; Electricity Networks Association, *Submission on EDBs (Input Methodology) Draft Determination and Reasons Paper*: Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital Parameter Estimates*, 13 August 2010, p. 56; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, Appendix; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 36-37; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 12; Christchurch

E3.16 At the Cost of Capital Workshop, representatives of the suppliers of regulated services recognised that the cost of capital increases with leverage under the simplified Brennan-Lally CAPM but were unconcerned by this. Representatives of consumers of regulated services argued that it was inappropriate to allow suppliers' cost of capital to increase with leverage. There was broad agreement that the positive relationship between leverage and cost of capital when applying the simplified Brennan-Lally CAPM would be counter-intuitive. The Commission sought clarification on this matter from Dr Lally.

Advice from Dr Lally

E3.17 In advice to the Commission, Dr Lally attributed the anomalous increase in the estimates of the cost of capital with increased leverage to the combined effects of the following on the estimate of the debt premium:[459]

- the assumption that the debt beta is zero;
- a liquidity premium within the cost of debt that has no counterpart within the cost of equity; and
- the use of the promised debt premium rather than the more conceptually correct expected debt premium which would be lower. (The higher the debt premium, the higher the increase in the cost of capital for any given increase in the level of leverage.)

E3.18 Dr Lally outlined that, if the simplified Brennan-Lally CAPM was used by the Commission, then it could adopt one of three options (all of which are further discussed below):[460]

- accepting the anomaly and continuing to use the simplified Brennan-Lally CAPM (status quo);[461]
- setting leverage equal to zero; and
- using a non-zero debt beta and defining the cost of debt as the expected yield plus an allowance for bankruptcy costs.

International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 4; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 39; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: *Uniservices, Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, p. 16.

458 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of capital Methodology*, December 2008, pp. 23-24.

459 Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009, pp. 3-5.

460 ibid, p. 5.

461 Dr Lally considered that this option would overestimate the cost of capital as the cost of debt would be improperly defined as the promised yield rather than as the expected yield plus an allowance for bankruptcy costs.

E3.19 Dr Lally considered that the policy to minimise the effect of the anomaly was far from clear and that measurement difficulties would seem to rule out the third option. Dr Lally concluded that:[462]

> When using the simplified Brennan-Lally CAPM in conjunction with the simplified beta gearing model, WACC … rises with leverage and therefore implies that leverage is undesirable. However, the use of debt by companies is typical. This implies that companies are acting irrationally or that there is some deficiency in the models used to estimate WACC. This paper shows that there are some deficiencies in the WACC model currently employed by the Commerce Commission, but these are not readily correctable, leaving the choice between the status quo (which overstates WACC) and a simple alternative in the form of setting WACC equal to the unlevered cost of capital (which would understate WACC). Choosing between these two options is a judgement matter for the Commission.

Possible solutions

E3.20 The Commission considers that the relationship between cost of capital and leverage when applying the simplified Brennan-Lally CAPM to estimate the cost of equity is a significant matter as the effect of leverage on the cost of capital estimate can be substantial (as illustrated in Table E1 and Figure E1 and the accompanying discussion). Therefore, the Commission considers that accepting the anomaly is not an appropriate solution.

E3.21 In its IM Draft Reasons Papers the Commission identified an additional option, which was a variation of Dr Lally's option (i) above. This option is to use a notional leverage which attempts to choose the point where the model neither overstates nor understates the cost of capital. In order to ensure that the cost of capital estimate does not create perverse incentives when using the simplified Brennan-Lally CAPM, the Commission has considered the following options:

Option a setting leverage equal to zero;

Option b setting a notional leverage that either is fixed:

i. for all services regulated under Part 4 of the Act;
ii. for each service and is based on the average leverage of the comparative firms sample used to derive the asset beta estimate; and

Option c using a non-zero debt beta.

These options are discussed below.

Option a: Setting a zero leverage

E3.22 An advantage of setting leverage equal to zero and using the simplified Brennan-Lally CAPM to estimate the expected cost of equity capital (and hence the cost of capital) is that the allowable regulatory rate of return would be invariant to the leverage choice of a supplier. This would avoid the incentive problems discussed in paragraphs E3.12 and E3.13. WACC being invariant to leverage also does not contradict capital structure theory in the way that WACC increasing with leverage at all levels of leverage does (see paragraphs E3.4 to E3.7).

[462] Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009, p. 7.

E3.23 In submissions on the Revised Draft Guidelines and the draft IM, Ireland, Wallace & Associates (for MEUG) noted that if the simplified Brennan-Lally CAPM is used to estimate the cost of equity then the WACC is sensitive to leverage and is lowest when leverage is equal to zero. They submit that on efficiency grounds (i.e. the lowest cost of capital constitutes an appropriate benchmark), the best estimate of the efficient cost of capital structure for regulated suppliers, if the simplified Brennan-Lally CAPM is being used, is to assume zero leverage. [463]

E3.24 AECT, ENA, Powerco, Telecom, PwC (for Telecom), Unison, Uniservices (for NZAA) and Vector all disagreed with the zero leverage assumption proposed by the submissions from Ireland, Wallace & Associates (for MEUG). [464] They submitted the zero leverage assumption is inappropriate, as it does not recognise that most infrastructure firms have debt in their capital structures and is inconsistent with workably competitive market outcomes, as debt financing (up to a point) is considered to lower WACC. These arguments generally imply that leverage reduces WACC in practice, but adoption of a non-zero leverage and the simplified Brennan-Lally CAPM would result in a higher WACC.

E3.25 ENA and PwC (for Telecom) have argued that a practical application of a simplified modelling setup (assuming a debt beta of zero) should not be allowed to be used as a

[463] Major Electricity Users' Group, *Submission on Draft Input Methodologies and Draft Cost of Capital Guidelines*, Attachment: Ireland, Wallace & Associates Limited, *Submission on the Input Methodologies Discussion Paper: prepared for Major Electricity Users' Group*, 31 July 2009; Major Electricity Users' Group, *Cross-Submission on Draft Input Methodologies and Draft Cost of Capital Guidelines*, Attachment: *Ireland, Wallace & Associates Limited, Cross-Submission on the Input Methodologies Discussion Paper: prepared for Major Electricity Users' Group*, 3 September 2009; Major Electricity Users' Group, *Post-Workshop Submission on Cost of Capital Workshop*, Attachment: *Ireland, Wallace & Associates Limited, Post-Workshop Submission on the Input Methodologies Cost of capital: prepared for Major Electricity Users' Group*, 2 December 2009; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Ireland, Wallace & Associates Limited, *Submission on the Cost of Capital*, 13 August 2010.

[464] Auckland Energy Consumer Trust, *Post-Workshop Cross-Submission to Commerce Commission on Cost of Capital Workshop*, 2 December 2009, pp. 24-25; Electricity Networks Association, *Cross submission on the cost of capital workshops*, 2 December 2009, pp. 7-8; Powerco Limited, *Cross submission on Input Methodologies Discussion Paper*, 28 August 2009, p. 2; Telecom, *Cross Submission on the Revised Draft Guidelines for Estimating the Cost of Capital*, 28 August 2009, p. 5; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 10; Unison, *Cross submission on Input Methodologies*, 28 August 2009, p. 4; Vector, *Cross-submission to the Commerce Commission on Submissions on the Input Methodologies Discussion Paper*, 28 August 2009, pp. 8-9; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 3 September 2010, p. 1; Electricity Networks Association, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, Attachment: PwC Report, 3 September 2010, p. 3; Powerco Limited, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 31 August 2010, pp. 7-8; Unison Networks Ltd, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determinations and Reasons Paper*, 2 September 2010, pp. 7-8; Vector Ltd, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determinations and Reasons Paper*, 3 September 2010, pp. 4-7; NZ Airports Association, *Post-Workshop Submission on Input Methodologies Cost of Capital*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of - Report for NZAA*, 2 December 2009, p. 87; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 23-25; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, p. 15.

theoretical framework for arguing for an extreme leverage assumption of zero leverage.[465]

E3.26 NZIER (for BARNZ) noted that setting leverage equal to zero was a logical position for the Commission but did not prefer this option. NZIER submitted that in balancing the relevant factors the IM should provide for a moderate benchmark leverage in each service.[466]

E3.27 Other considerations with a zero leverage assumption are that:

- there is no regulatory precedent by overseas regulators or the Commission for setting leverage equal to zero;
- a leverage assumption of zero is not consistent with the observed behaviour of firms in workably competitive markets as they have debt;[467]
- Dr Lally advises that at zero leverage the result of using the model to estimate the cost of equity would tend to underestimate the true cost of capital;[468]and
- using zero leverage has implications for other parameters within the cost of capital framework, such as the equity beta.

E3.28 In summary, a zero level of leverage is the optimal leverage position under the simplified Brennan-Lally CAPM with an assumed debt beta of zero (i.e. the cost of capital is minimised at this point). However, with a more realistic value of the debt beta, this may no longer be the case. Further, zero leverage is inconsistent with practice, as suppliers' actual capital structure includes a portion of debt. Therefore, in the interests of maintaining a relationship with suppliers' actual capital structure, the Commission considers that the notional leverage should be greater than zero. If zero leverage was applied, and it was considered to be an underestimate of the cost

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465 Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, p. 8; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 10.

466 Board of Airline Representatives New Zealand Incorporated, *Post Workshop Submission on the Input Methodologies and Cost of Capital*, Attachment: The New Zealand Institute of Economic Research Incorporated, *Cost of Capital: prepared for the Board of Airline Representatives New Zealand Incorporated*, 28 November 2009, pp. 2-3.

467 It has been suggested in the corporate finance literature that capital structure may reflect, among other things, (i) a desire to take advantage of tax benefits (Graham, J. R., Debt and the Marginal Tax Rate, *Journal of Financial Economics*, Vol. 41, 1996, pp. 41–73), (ii) a desire to mitigate free cash flow agency problems (Jensen, M. C., Agency Costs of Free Cash Flow, Corporate Finance and Takeovers, *American Economic Review*, Vol. 76, 1986, pp. 323–329), (iii) imperfect or incomplete capital markets (Rose, J. R., The Cost of Capital, Corporation Finance, and the Theory of Investment: Comment, *American Economic Review*, Vol. 49, 1959, pp. 638–639 and Modigliani, F., and Miller, M., Corporate income taxes and the cost of capital: a correction, *American Economic Review, Vol. 53* No. 3, 1963, pp. 433–443), (iv) the prospective costs of financial distress or bankruptcy (Myers, S. C., The Capital Structure Puzzle, *Journal of Finance*, Vol. 39, 1984, pp. 575–592), (v) the availability of internal finance (Myers, S., and Majluf, N., Corporate Financing and Investment Decisions when Firms have Information that Investors do not Have, *Journal of Financial Economics*, Vol. 13, 1984, pp. 187–221), (vi) the nature of strategic interactions between competitors, suppliers and customers (Harris, M., and Raviv, A. The Theory of Capital Structure, *Journal of Finance*, Vol. 46, 1991, pp. 297–355), (vii) whether or not the firm is in the market for corporate control (Harris, M., Raviv, A., Corporate Control Contests and Capital Structure, *Journal of Financial Economics*, Vol. 20, 1988, pp. 55–86 and Stulz, R., Managerial control of voting rights: Financing policies and the market for corporate control, *Journal of Financial Economics*, Vol. 20, 1988, pp. 25-54), and (viii) the firm's growth prospects (Graham, J. R., How Big Are the Tax Benefits of Debt?, *Journal of Finance*, Vol. 55, 2000, pp. 1901–1941). As yet, there is no completely unified theory on the determinants of optimal capital structure (for regulated or unregulated firms).

468 See Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009, pp. 5-6.

of capital, then a margin would have to be added. There is presently no theoretical framework or precedent for estimating such a margin. A zero leverage assumption would also reduce the cost of capital to just the cost of equity capital. In addition, this assumption would set the equity beta equal to the asset beta when estimating the cost of equity.

Option b: Setting a notional leverage

E3.29 Adopting a positive 'notional' level of leverage would be preferable to adopting a zero leverage assumption. This would limit the adverse impact of the anomaly in the simplified Brennan-Lally CAPM, and maintain a relationship with suppliers' actual capital structure. The approach of using a notional level of leverage is consistent with:

i. the approach taken in previous Commission regulatory decisions, where a service specific notional leverage assumption for the regulatory service in question has been applied;

ii. the approach taken by the majority of overseas regulators; and

iii. the approach agreed to by most parties in their submissions on this matter.

i. Notional leverage set at the same level for all regulated services under Part 4

E3.30 In the Draft Reasons Papers the Commission adopted 'notional' leverage of 40% for all regulated services so as to limit the adverse impact of the anomaly in the simplified Brennan-Lally CAPM.[469]

E3.31 The Draft Reasons Papers discussed how the Commission could set the level of notional leverage for all services.[470] The Draft Reasons Papers noted that "[g]iven the variation of leverage levels among regulated suppliers, there is no one 'right' level of leverage".[471] It also explained that the Commission had adopted a notional leverage assumption in previous regulatory decisions, although these leverage assumptions differed between the regulated services. Therefore, applying a single level of notional leverage across all regulated services would require the exercise of judgement by the Commission.

E3.32 In setting a single notional leverage assumption the Commission sought to "balance the legitimate use of debt capital in the capital structure of suppliers of services regulated under Part 4 of the Act with the need to protect customers of the suppliers

469 Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, section 6.5, pp. 168-182; Commerce Commission, *Input Methodologies Electricity Distribution Services, Draft Reasons Paper*, section 6.5, pp. 224-238; Commerce Commission, *Input Methodologies Gas Pipeline Services, Draft Reasons Paper*, section 6.5, pp. 206-220.

470 Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, paragraphs 6.5.40-6.5.61; Commerce Commission, *Input Methodologies Electricity Distribution Services, Draft Reasons Paper*, paragraphs 6.5.41-6.5.62, pp. 233-238; Commerce Commission, *Input Methodologies Gas Pipeline Services, Draft Reasons Paper*, paragraphs 6.5.41-6.5.62, pp. 215-220.

471 Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, paragraph 6.5.40; Commerce Commission, *Input Methodologies Electricity Distribution Services, Draft Reasons Paper*, paragraphs 6.5.41, pp. 233; Commerce Commission, *Input Methodologies Gas Pipeline Services, Draft Reasons Paper*, paragraphs 6.5.41, p. 215.

of these regulated services from the substantial consequences and costs if financial distress of a supplier of regulated services were to occur".[472]

E3.33 In setting the level of notional leverage for all regulated services, the Commission considered actual leverage for regulated firms in New Zealand and overseas, the level of leverage assumed in prior regulatory decisions in New Zealand (25%-40%) and the leverage assumption in regulatory decisions overseas. Ultimately, the Commission considered greatest informational value was from New Zealand regulatory precedent and adopted 40% as the estimate for the level of notional leverage. This estimate was consistent with the leverage assumed in previous Commission energy decisions, but at the top end of the range submitted by New Zealand airports. A number of submissions were received on the issue of leverage.

E3.34 Uniservices (for NZAA) agreed with the notional leverage assumption of 40% (the Airports made a similar point), whilst noting that the three Airports will have different leverage positions compared to the notional leverage assumption.[473]

E3.35 On the other hand, BARNZ and Air NZ considered that notional leverage of 40% was inappropriately high. BARNZ submitted that the Commission should continue to apply its previous leverage of 25%.[474]

E3.36 Ireland, Wallace & Associates (for MEUG) submitted that the appropriate cost of capital model is the unlevered cost of capital which is indifferent to leverage, and that the Commission's proposed notional leverage approach achieves a cost of capital which is indifferent to leverage but has elevated the cost of capital above that of the unlevered cost of capital. They submitted that the practical consequences are material and adverse for consumers.[475]

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472 Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, paragraph 6.5.58.

473 NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, p. 15; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 12; Christchurch International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 4; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 41.

474 Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, pp. 9-10 and 16; Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, pp. 44-45.

475 Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Ireland, Wallace & Associates Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses) Reasons Paper: prepared for Major Electricity Users' Group*, 13 August 2010, p. 2; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010; Major Electricity Users' Group, *Submission on EDBs (Input Methodology) Draft Determination and Reasons Paper*, *Appendix: MEUG comments on Pan Industry Input Methodology for Cost of Capital*, 13 August 2010, pp. 4-7.

E3.37 PwC (for ENA and Telecom) submitted, in conjunction with a worked example to demonstrate, that the:[476, 477]

> Commission is technically wrong to attempt to apply a single fixed leverage assumption to all regulated firms. If debt betas are to be excluded from the WACC analysis (which we concur with), then to be consistent the notional leverage used in the WACC estimation should be close to the average leverage of the comparator companies used to derive the (average) beta estimate. This is a fundamental requirement in order to be able to justify application of a "short cut" approach and thus ignore debt betas.

E3.38 PwC considered that if the Commission were to apply a zero debt beta assumption and a leverage estimate that was lower than the leverage of the comparative firms sample used to derive the asset beta, this would result in an under-estimation of cost of capital for EDBs, GPBs and Transpower. The Commission notes that under this logic the reverse is also true for Airports (i.e. assuming 40% notional leverage will overstate the cost of capital for Airports).

E3.39 CEG (for Vector), ENA and Powerco made a similar point that the notional leverage assumption should be based on the sample of comparator suppliers.[478] Transpower submitted that as it was subject to IPP regulation there is no need to apply a service-wide notional leverage assumption and instead Transpower's actual forward-looking leverage should be used.[479]

E3.40 In its cross-submissions for ENA, PwC submitted the Commission should use either a service-wide leverage assumption based on the comparator firms sample or use non-zero debt betas. PwC preferred the former.[480]

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476 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010. p. 8; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 10.

477 PwC (and others) had made similar comments in other submissions during the consultation period on the IM and RDG. See PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on Behalf of 17 EDBs, 2 December 2009, p. 10; PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on Behalf of Telecom, 2 December 2009, pp. 9-11; PricewaterhouseCoopers, *Commerce Commission WACC Conference*, Report on Behalf of Powerco, 2 December 2009, pp. 14-15 Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, pp. 7-8; Wellington Electricity, *Post-workshop submission for the Commerce Commission's cost of capital workshop, November 12 and 13, 2009*, 3 December 2009, pp. 8-10.

478 Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 32-35; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 3 September 2010, p. 1; Powerco Limited, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 2 September 2010, p. 7.

479 Transpower New Zealand Ltd., *Submission on Transpower (Input Methodologies) Draft Reasons Paper, Cost of Capital Decisions*, August 2010, p. 10.

480 Electricity Networks Association, *Cross-Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Cross-Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination 2010: a report prepared for Electricity Networks Association*, September 2010, p. 3.

E3.41 The technical issue identified by PwC (for ENA and Telecom) in the assumption of 40% notional leverage for all services was not discussed in submissions relating to Airports (by either Uniservices or PwC (for NZAA), or BARNZ and Air NZ or their experts). However, the Commission considers it is of greater significance for Airports than for EDBs, GPBs, and Transpower because the average leverage for the sample of comparator airports is 17%, which is significantly below the 40% notional leverage assumption. In contrast, the sample average leverage for EDBs, GPBs and Transpower was only slightly above the notional leverage assumption (44% versus 40%).

E3.42 In adopting the 40% notional assumption, the Commission's key concern was to address the anomaly in the simplified Brennan-Lally CAPM which sees the cost of capital increasing with leverage. The Commission sought to protect consumers from the risks of suppliers increasing leverage, and thereby increasing the risk of financial distress, as this was inconsistent with the Part 4 purpose. As PwC has outlined, there are other ways to address the anomaly which are technically more correct.

E3.43 PwC (for ENA) submitted that:[481]

> Should the Commission wish to set a regulatory WACC that is indifferent to leverage, the principled approach would be for the Commission to fix an industry-wide leverage assumption that is consistent with the observed leverage of the comparator companies used to derive the asset beta assumption. Failing this, the Commission will then need to re-consider introducing debt betas into the analysis.

E3.44 The option of setting a service-specific notional leverage is discussed below. The option of introducing debt betas is considered in the following section.

ii. Setting service-specific notional leverage based on leverage of the comparator companies

E3.45 Using a notional leverage assumption will remove the variation of the cost of capital due to changes in leverage. But, as discussed above, a number of submissions considered that if the Commission used a zero debt beta with a notional leverage assumption that was not consistent with the leverage of the comparative firms sample used to derive the asset beta, the Commission will be introducing an unnecessary bias into the cost of capital. As a result, submitters considered that the leverage assumption for a regulated service should be based on the average leverage of the associated comparative firms sample used in estimating the asset beta for that regulated service.

E3.46 Appendix E8 identifies the comparative firms sample and the process for choosing the comparative firms sample for Airports. Table E2 displays the results of the individual firms' last five-year average (market value) leverage, which is consistent

[481] Electricity Networks Association, *Cross-Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Cross-Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination 2010: a report prepared for Electricity Networks Association*, September 2010, p. 3.

with the leverage used to estimate the asset beta.[482] This results in an overall average leverage for the sample of 17%.[483]

Table E2 List of Comparable Firms and the Average Market Leverage for 2005-2010

Name	Average Leverage for 2005-2010
Aerodrom Ljubljana	0%
Aeroporto di Firenze	3%
Aeroports de Paris	27%
Airport Facilities	35%
Airports of Thailand	37%
AIAL	25%
Australian Infrastructure	5%
Beijing Capital International Airport	18%
Flughafen Wien	25%
Flughafen Zuerich	42%
Fraport	19%
Gemina	56%
Grupo Aeroportuario del Centro Norte	1%
Grupo Aeroportuario del Pacifico	0%
Grupo Aeroportuario del Sureste	0%
Kobenhavns Lufthavne	19%
Guangzhou Baiyun International Airport	10%
Hainan Meilan International Airport	0%
Japan Airport Terminal	15%
MAP Group	44%
Malta International Airport	17%
SAVE	15%
Shanghai International Airport	5%
Shenzhen Airport	0%
Xiamen International Airport	0%
Mean market leverage	**17%**

E3.47 Based on this analysis the airports-specific notional leverage should be 17%.

[482] Table E18 on page 303 includes a short description of each of these airports.

[483] The average leverage estimate is also 17% when using all observations for leverage used in each of the five-year periods used to estimate the asset beta.

E3.48 Setting a service-wide notional leverage which reflects the average leverage of the sample of comparator firms, also reflects the differences in leverage which exist between airports and the other regulated services.

Option c: Non-zero debt betas

E3.49 The use of non-zero debt betas is a third alternative to address the anomaly of WACC estimates rising with leverage. Dr Lally and PwC have both identified the use of a zero debt beta as a factor in the estimates of the cost of capital increasing with leverage.[484] The use of non-zero debt betas can reduce the impact of leverage on the estimate of the cost of capital. At a certain level, the use of debt betas could make the cost of capital invariant to leverage.

E3.50 The use of a non-zero debt beta was discussed by a number of submitters during consultation on the IM.[485] However a majority of these submitters did not favour the

[484] A debt beta measures a firm's systematic risk associated with borrowing. That debt does have systematic risk is evidenced by the increases in debt premiums during the GFC. Debt betas are discussed further in Appendix E9.

[485] Aurora Energy Limited, *Submission to the Commerce Commission on its Discussion Paper on Input Methodologies*, 14 August 2009, p. 18; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of ENA, 11 August 2009, p. 18; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of NZAA, 31 July 2009, p. 27; Maui Development Limited, *Submission to the Commerce Commission on the Input Methodology Discussion Paper*, July 2009, pp. 19-20; NZ Airports, *Submission by NZ Airports Association on the Commerce Commission Input Methodologies Discussion Paper*, 31 July 2009, pp. 49-50; Powerco Limited, *Input Methodologies Discussion Paper*, 14 August 2009, p. 30; PricewaterhouseCoopers, *Revised Draft Guideline s- Submission to Commerce Commission, August 2009*, Report on Behalf of Powerco, p. 26; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, pp. 9-11; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, pp. 11-12; PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on Behalf of 17 EDBs, 2 December 2009, pp. 9-11; Synergies Economic Consulting. *Initial WACC Review*, Report prepared for Vector, 13 August 2009, pp. 23-25; Synergies Economic Consulting, *WACC Review Final*, Report prepared for Vector 31 August 2009, pp. 36-39; Telecom, *Annex B: Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 36-37; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 12; Christchurch International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 4; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 39; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, p. 16; Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 8 and p. 56; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, 13 August 2010*, Appendix; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 10 and p. 53 ; PricewaterhouseCoopers, *Commerce Commission WACC Conference*, Report on Behalf of Powerco, 2 December 2009, pp. 14-15 Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, pp. 7-8; Wellington Electricity, *Post-workshop submission for the Commerce Commission's cost of capital workshop, November 12 and 13, 2009*, 3 December 2009, pp. 8-10; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists

use of debt betas. Many of these submitters emphasised the practical difficulties in estimating the debt beta. The difficulties of estimating the debt beta are discussed in the debt beta section (Appendix E9).

E3.51 Transpower and its experts Officer and Bishop favoured the use of debt betas in their submissions on the EDBs Draft Reasons Paper.[486, 487] Officer and Bishop considered the assumption that the beta of BBB+ debt was zero was unrealistic and would tend to bias downwards the asset beta and the regulated cost of capital.

E3.52 On the issue of bias, the Commission notes that if the leverage of the individual entities from the sample of comparative firms is used when de-levering the respective entity's equity beta and the average leverage of the sample of comparative firms is used in the re-levering of the average estimated asset beta, then the resulting WACC estimate will not be biased (upwards or downwards) even if the debt beta is set at zero. Alternatively, if the correct debt betas are consistently incorporated in the de-levering process and the re-levering process, and the debt premium reflects the expected yield and bankruptcy costs,[488] the resulting WACC too should not be biased.

E3.53 Officer and Bishop asserted that the Commission should use a debt beta of 0.2 for Transpower.[489]

E3.54 Although it is difficult to estimate the value of debt betas empirically, it is possible to back-solve for the value of the debt beta that results in the cost of capital becoming invariant to leverage. This is an approach that some practitioners in the New Zealand capital markets (e.g. equity analysts, investment bankers and corporate finance managers) have used in the past, to reflect the principle that the cost of capital should be invariant to changes in leverage. This approach would allow the observed leverage to be incorporated in the cost of capital estimate, without the level of leverage having any net impact on the cost of capital estimate.

Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 32-35; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 3 September 2010, p. 1; Powerco Limited, *Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 2 September 2010, p. 7; Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p. 11; *Transpower Limited, Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 22-24.

486 Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p. 11; Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 22-24.

487 BARNZ did not favour the use of debt betas but noted that adopting an estimate of zero is extremely conservative and highly favourable to the regulated suppliers. See Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 18.

488 See Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.

489 Officer and Bishop estimated the debt beta to be 0.2. See Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 22-24.

E3.55 Such an approach assumes that the observed debt premium is purely a reward for systematic risk. However, Dr Lally advised the Commission that the positive relationship between leverage and the cost of capital was not entirely due to systematic risk, so flattening the line entirely may be inappropriate.[490]

E3.56 Dr Lally's advice is that even if the debt beta were estimated to accurately capture the true systematic risk component of the debt premium, the cost of capital/leverage relationship might still be positive. In his view, there is a liquidity premium for corporate debt (for which there is no counterpart in the cost of equity) and debt incurs bankruptcy costs, which increase as leverage does. Furthermore, Dr Lally recommended that if debt betas were used the Commission should define the cost of debt as the expected yield (not the promised yield) plus an allowance for bankruptcy costs. This raises additional estimation challenges.

E3.57 The use of a non-zero debt beta is theoretically the better approach to address the anomaly that increases in leverage can increase the cost of capital when using the CAPM framework. That is, the use of a non-zero debt beta can make the post-tax WACC estimate for each service less variant or invariant to leverage, as it should be. This would also ensure there is no incentive for regulated suppliers to increase leverage to exploit the anomaly.

Comparing Option B(ii) and Option C

E3.58 The Commission notes that technically the result from applying a service-wide notional leverage assumption based on leverage from the sample of comparative firms (Option B(ii)) and the use of a non-zero debt beta (Option C) provide the same estimate of the post-tax WACC at the leverage from the sample of comparator companies. This is demonstrated below.

E3.59 Table E3 and Figure E2 demonstrate the impact on the post-tax WACC estimated using the simplified Brennan-Lally CAPM to estimate the cost of equity, with debt betas of zero and 0.2 for Airports.[491]

Table E3 Leverage, debt betas and the post-tax WACC for Airports[492]

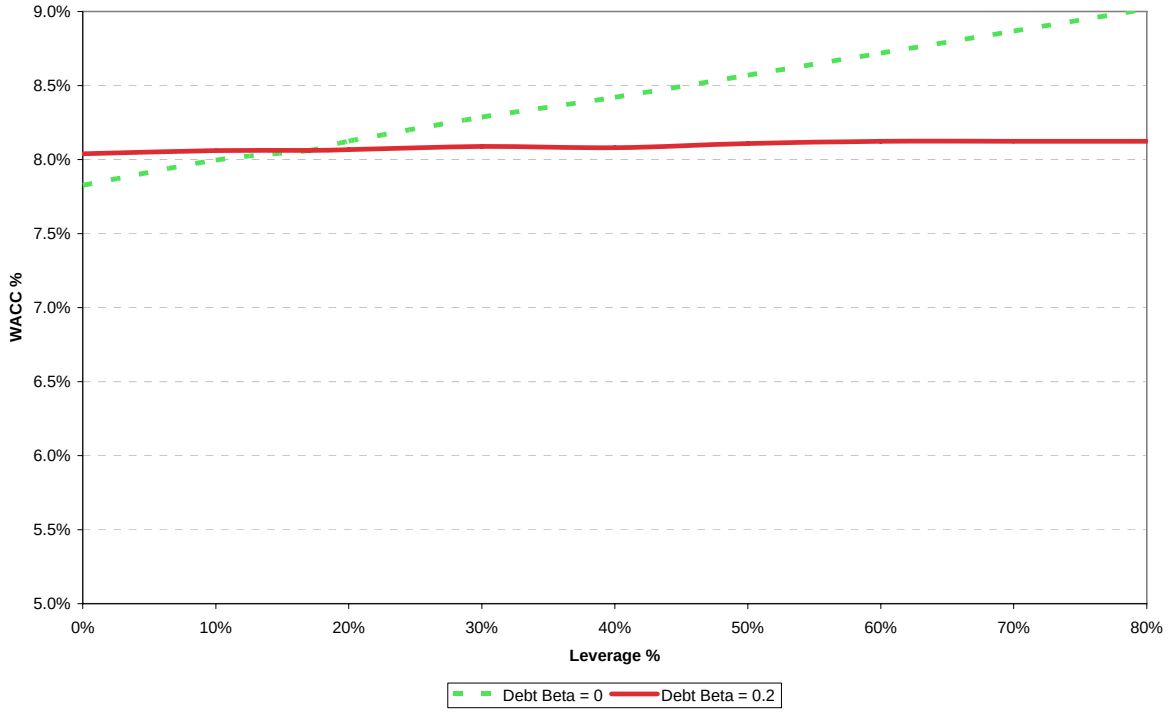
Leverage	Post-tax cost of capital estimated using a zero debt beta	Post-tax cost of capital estimated using a debt beta of 0.2
0%	7.83%	8.04%
17%	**8.06%**	**8.06%**
20%	8.12%	8.07%
40%	8.42%	8.08%
60%	8.72%	8.12%

490 Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.

491 This assumes a risk-free rate of 4.96%, a debt premium of 2.10% (including debt issuance cost of 0.35%), an asset beta of 0.60 for a debt beta of zero, an asset beta of 0.63 (estimated using a debt beta of 0.2 in the de-levering process) for a debt beta of 0.2, a TAMRP of 7.1%, average investor tax rate of 28.1% and average corporate tax rate of 28.4%. These parameter values are consistent with the reasonableness tests the Commission has undertaken. See Appendix E13.

492 The estimates in the table are mid-point estimates of the post-tax WACC.

Figure E2 Leverage and the Post-Tax WACC Estimated for Airports, Using the Simplified Brennan-Lally CAPM and Different Values for the Debt Beta.



E3.60 Assuming 17% leverage, and keeping all else constant the result of the post-tax WACC from the table and figure above demonstrate that applying Option B(ii) (debt beta =0) or Option C (debt beta = 0.2) give the same estimate of the post-tax WACC (i.e. 8.06%).[493]

Conclusion - Option B(ii) vs. Option C

E3.61 When using the same value for leverage as the average leverage value observed in the sample of comparator companies, then whether a zero debt beta or a positive non-zero debt beta is used, it will not change the estimates of the post-tax WACC that result from applying the IM in respect of a regulated service.

Overall conclusion - Leverage

E3.62 The Commission considers that where the use of the simplified Brennan-Lally CAPM results in estimates of WACC which increase with leverage the model is displaying an anomaly. Given the differences can be large, the Commission considers the anomaly should be addressed. The use of a single notional leverage assumption across all services under Part 4 would achieve this, but the Commission accepts (in line with the submission from PwC) that applying this approach to each service separately would ensure the cost of capital is invariant to leverage in a more technically correct manner.

E3.63 Conceptually the use of a non-zero debt beta is superior to the use of notional leverage, as this addresses the anomaly that increases in leverage can increase the

[493] As part of this analysis the Commission also evaluated the resulting post-tax WACC estimated using an asset beta consistent with a debt beta of 0.1. This also resulted in the post-tax WACC of 8.06%.

cost of capital when using the CAPM framework. That is, the use of a non-zero debt beta can make the post-tax WACC estimate for each service invariant to leverage, as it should be.

E3.64 Most submissions continue to prefer debt betas not be used (that is, they be set at zero), that most regulators do not use debt betas, the Commission has not done so in the past, and that there are practical difficulties in accurately estimating debt betas (but that this is offset in part by the estimates available from regulatory decisions overseas, and the possibility of back solving for the debt beta). Further, and importantly, the Commission notes that service specific notional leverage based on leverage from the sample of comparator companies (Option b(ii)) and use of a non-zero debt beta (Option c) results in the same estimate of post-tax WACC.

E3.65 Accordingly, the IM does not reflect the use of debt betas (as the debt beta is set at zero), though the Commission notes that if actual firm leverage were to be used, then non-zero debt betas should be used in the simplified Brennan-Lally CAPM to minimise the effect of the anomaly and ensure there was no incentive on firms to increase leverage to exploit the anomaly.

E3.66 The Commission does not consider it is appropriate to use actual leverage for any regulated supplier as it would introduce the same technical issues into the estimation of the cost of capital that PwC identified with the issue of notional leverage across different services. That is, using any leverage assumption other that of the comparative firm sample for estimating the asset beta, would bias the estimate of the cost of capital. If actual leverage (for example, for the airports) were used, however, non-zero debt betas would have to be used in the simplified Brennan-Lally CAPM to minimise the effect of leverage on the cost of capital and ensure there are no incentives on suppliers to increase leverage or propose increases in leverage that would exploit the anomaly in the model.

E3.67 The IM specifies a service-wide notional leverage of 17% when estimating the cost of capital for Airport services.

E4 Risk-free Rate

Decision - the risk-free rate

E4.1 In relation to the risk-free rate the IM specifies:

- the process and methodology for estimating the risk-free rate;
- the term of the risk-free rate will be five years in the case of information disclosure regulation for Airport services and estimates of the five-year risk-free rate will be done on an annual basis;
- that the Commission will use the observed market yield to maturity of benchmark NZ government NZ$ denominated nominal bonds to estimate the risk-free rate;

- that the Commission will estimate the risk-free rate by averaging the observed market yields on the government bonds over one calendar month prior to when the cost of capital is being estimated; and

- that the Commission will update the estimate of the risk-free rate for each cost of capital estimation.

Commission's reasons - the risk-free rate

Overview

E4.2 The risk-free rate is the interest rate that an investor would expect to earn by holding a risk-free asset. The Commission uses the risk-free rate when estimating both the cost of debt and the cost of equity.

E4.3 In practice, the risk-free rate cannot be observed; it is usually approximated by the return on a very safe asset such as a government bond. When selecting the risk-free rate, the first step is therefore to identify a suitable proxy. Depending on the proxy chosen, the second step is to decide whether to use the current risk-free rate or an historical average of the risk-free rate. The third step is to decide whether to use spot rates or yields to maturity. The fourth step is to determine the timing and period of estimation from the proxy. The final step is to determine the appropriate maturity (term) of the rate. Each of these issues is discussed in turn below.

Commission's reasons - suitable proxy for the risk-free rate

E4.4 The Commission considers that a good risk-free proxy should be (i) virtually free of risk, (ii) liquid, (iii) free of restrictions on trade, and (iv) not have characteristics other than its returns distribution that attracts or discourages investors.

E4.5 The Commission and most other regulators have traditionally employed their respective government's local currency denominated bonds as the relevant proxy for the risk-free rate. However, it has been argued before the Commission and some overseas regulators that because of the low supply of government bonds at that time, a more appropriate benchmark is the yield on interest rate swaps (swap rate).[494] This was motivated by a widening of spreads between government securities and swap rate, across maturities.[495] However, this effect has diminished as a result of increased availability of government bonds after the recent GFC.

E4.6 Submitters generally agreed that the most suitable proxy for the risk-free rate in New Zealand continues to be the New Zealand government bond rate.[496] However,

[494] An interest rate swap is an agreement between two parties to exchange one stream of interest payments for another. The most common type of interest rate swap exchanges fixed interest rate payments for floating interest rate payments for a given principal amount and period of time. The floating rate in such contracts is often based on interbank offer rates (e.g. LIBOR). Swap rates are quoted in terms of the fixed rate that must be paid in order to convert to floating (Fleming, M. J., Financial Market Implications of the Federal Debt Paydown, *Brookings Papers on Economic Activity*, Vol. 2, 2000, pp. 221–251).

[495] An undersupply of government securities can occur when, for example, large fiscal surpluses prompt governments to retire existing debt and issue new debt more slowly.

[496] Commerce Commission, *Cost of Capital Workshop Transcript*, pp. 136-141.

some submitters have suggested that the Commission should continue to review the use of government bonds in preference to swaps for estimating the risk-free rate.[497]

E4.7 PwC (for ENA) noted the swap rate may not be totally risk free as it may still incorporate a premium (albeit, typically small) for the default risk of the banks active in this market, who are the swap counterparties. PwC considered a possible approach to address this point was to use the price of credit default swaps for those banks as a deduction from the swap rate in order to derive a "pure" risk free rate.[498]

Conclusion - suitable proxy for the risk-free rate

E4.8 The Commission considers that benchmark New Zealand government bonds best fulfil the conditions at paragraph E4.4. With regard to swap rates, the Commission notes that:

- swap rates appear to be widely used by practitioners as benchmarks for some purposes but that does not necessarily imply that they are a good proxy for the risk-free rate;
- the conditions that originally motivated the suggestion to use swap rates (low supply of government bonds) no longer apply;
- the notion that swap rates should replace government bond yields as the risk-free proxy has not achieved widespread consensus in academia, and therefore does not appear to support the use of swap rates as the risk-free rate in CAPM calculations;[499]
- the Commission is not aware of any regulator that has employed swap rates in place of yields on government securities as a proxy for the risk-free rate; and
- for the Commission to adopt the swap rate as the basis for its risk-free rate, it would need to be satisfied that there is a long-term trend indicating that the swap rate is a better proxy for the risk-free rate than the government bond rate. The Commission considers that, currently, there is no such trend.

Commission's reasons - historical or current risk-free rates

E4.9 The risk-free rate can be estimated by reference to average historical interest rates (for example, the last ten years to proxy the long-term average risk free rate); or current interest rates (for example, based on rates around the time the cost of capital is determined for each regulatory period). Regulators in the UK generally use

[497] PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, p. 8; Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, p. 9; *Telecom Limited, Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 12; Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 20.

[498] Electricity Networks Association, *Submission on EDBs (Input Methodology) Draft Determination and Reasons Paper, PricewaterhouseCoopers Submission on the Cost of Capital Parameter Estimates*, 13 August 2010, p. 20.

[499] Hull, J., Predescu, M., White, A., The Relationship between Credit Default Swaps Spreads, Bond Yields and Credit Rating Announcements, *Journal of Banking and Finance*, Vol. 28, 2004, pp. 2789-2811.

approaches which reflect long-term historical average risk-free rates.[500] The Commission and the Australian regulators generally use current interest rates in regulatory determinations.

E4.10 Using historical rates reflects long-term average actual risk-free rates and will lead to estimated costs of equity and debt which tend to be relatively stable over time. In a price setting context, this relative stability will tend to lead to relatively stable returns to suppliers and prices to consumers over time. However, this apparent stability could blunt the signals from structural changes in the financial markets with respect to new investment in infrastructure, as significant changes in interest rates only slowly affect the specified cost of capital.

E4.11 The use of current rates will lead to estimated costs of equity and debt which more closely reflect changes in expectations in the financial markets. That is, they are more up-to-date estimates of interest rates and therefore the cost of capital. In a price setting context, using current rates means changes in expectations in the financial markets will be signalled more rapidly to suppliers, and to consumers.

Conclusion – historical or current risk-free rates

E4.12 The Commission considers that the use of current rates better achieves the Part 4 Purpose (of promoting the long-term benefit of consumers such that suppliers have, among other things, incentives to invest) and the potential dynamic efficiency benefits of investment, than the use of historic rates.

Commission's reasons - yield to maturity versus spot rates

E4.13 The Commission typically uses yields to maturity[501] on benchmark New Zealand government bonds as the proxy for the risk-free rate in the CAPM.[502] However, the theoretically correct approach would be to use spot rates (sometimes referred to as zero coupon rates) instead, i.e. the rates that would apply to a bond that delivers a single payoff at maturity.

E4.14 If yields to maturity on coupon paying bonds are used in place of spot rates, the resulting estimates of the cost of capital will be biased downward or upward depending on whether the yield curve is upward or downward sloping. Such inaccuracies are likely to be greatest for low-risk investments because the NPV[503] of such investments is more sensitive to changes in the risk-free rate than for risky projects, which will have a larger risk premium.

E4.15 In a submission on the RDG PwC (for 17 EDBs) argued that:[504]

> Using spot rates on government bonds as the risk-free rate in the CAPM is the theoretically preferred approach. However, we agree that in many circumstances, for

[500] For example Ofcom based the risk-free rate on a five year average rate with analysis undertaken for periods using six months up to five years. Ofcom, *A new pricing Framework for Openreach, Annexes*, 22 May 2009, p. 168-169.

[501] A bond's yield to maturity, also known as its internal rate of return, is the discount rate that sets the price of the bond equal to the discounted value of the promised future payments on the bond.

[502] Benchmark New Zealand government bonds usually pay coupons every six months.

[503] NPV refers to the present value of future cash flow less the initial investment.

[504] PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, p. 8.

pragmatic reasons, including obtaining data and the preference for the use of a single rate, using yields to maturity would be an appropriate approach.

E4.16 In all previous decisions and determinations using the cost of capital, the Commission has estimated the risk-free rate using the yield to maturity on New Zealand Government bonds. Australian and UK regulators also estimate the risk-free rate using the yields of their respective governments' bonds.

E4.17 In advice to the Commission, the Expert Panel recommended that the Commission employ yields to maturity as an approximation to represent the risk-free rate (as it presently does), but use spot rates as a cross-check. Dr Lally accepted that the risk-free rate should have a duration, rather than a term, equal to that of the regulatory cash flows, but he argued that the effect of using terms rather than durations is slight.[505]

Conclusion - yield to maturity versus spot rates

E4.18 The Commission acknowledges that, in theory, it should use spot rates to estimate the risk-free rate, rather than yields to maturity. However, yields to maturity are more readily obtainable than spot rates (most practitioners rely on financial institutions to estimate the spot rates), and using a single interest rate in the estimation process simplifies the necessary calculations.

E4.19 For this reason, the Commission will use yields to maturity when estimating the cost of capital. The Commission notes that in consultation on the cost of capital a number of interested parties acknowledged that they use and would advise the Commission to use yields to maturity when estimating the cost of capital.

Commission's reasons - averaging period

E4.20 The Commission is aware that market volatility can significantly increase at any time and, thus, of the effect that an event such as the GFC can have. Therefore, the Commission needs to balance the need to obtain a current market estimate, with the desire that the estimate be representative of its level more generally.

E4.21 In the Airports Inquiry, the risk-free rate was estimated by averaging the yields on New Zealand government bonds over the period in which Airports consulted with their substantial customers. The period used by the Commission was six months.[506]

E4.22 In all TSO net cost calculation determinations, the Gas Control Inquiry, Electricity Distribution – Control of Unison and the Gas Authorisation, the Commission estimated the risk-free rate by averaging the yields on New Zealand government bonds one month before the start of a regulatory period.[507]

E4.23 The Australian Energy Regulator's (AER) approach to the averaging period is to allow the regulated businesses discretion to choose the length of the averaging

[505] Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, pp. 17-18.

[506] Commerce Commission, *PartIV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, Final report*, 2002, pp. 150-151.

[507] Commerce Commission, *Gas Control Inquiry, Final Report*, 28 November 2004; Commerce Commission, *Regulation of Electricity Lines Businesses Target Control Regime Reasons for Not Declaring Control Unison Networks Limited*, 11 May 2007; Commerce Commission, *Gas Authorisation Decision Paper*, 30 October 2008.

period within the span of 10 to 40 business days. In the opinion of the AER, the range of 10 to 40 business days represented an optimal length of time to balance the trade-off between 'volatility driven error' and 'old information driven error'. Other Australian regulators use a similar approach.

E4.24 In advice to the Commission in the Electricity Distribution – Control of Unison, the Gas Control Inquiry and the Gas Authorisation, Dr Lally indicated that he favoured averaging the risk-free rate over the preceding month before the start of the regulatory/disclosure period. Dr Lally stated that the reason for this position was:[508]

> … the data should be current but the use of the rate on a single day (or less) yields exposure to a 'freakish' rate, due to the volumes of trades or to trades motivated by particularly strong incentives to transact.

E4.25 At the Cost of Capital Workshop parties agreed that taking a one-month average of the adjusted yields on New Zealand government bonds was appropriate in estimating the risk-free rate.[509]

Conclusion - averaging period

E4.26 As discussed above, the Commission needs to balance the need to obtain a current market estimate of the risk-free rate, with the desire that the estimate of the risk-free rate be representative of its level more generally. The Commission considers that a one calendar month averaging period strikes an appropriate balance as it reduces the degree of volatility while still providing a relatively up-to-date estimate of the risk-free rate.

Commission's reasons - updating the risk-free rate

E4.27 As outlined above, the risk-free rate is subject to volatility. This volatility was particularly pronounced during the recent GFC. Therefore, the Commission will update its estimate of this parameter every time it estimates the cost of capital for regulatory purposes.

Commission's reasons - the appropriate term of the risk-free rate

E4.28 The term of the risk-free rate should ensure the resulting estimate of the cost of capital is estimated with a term that is consistent with the pricing period.

Previous decisions

E4.29 In previous decisions, the Commission has always matched the term of the risk-free rate to the period for which prices are set or price reset (referred to as the regulatory period). The regulatory periods ranged from one year (the TSO net cost calculation) to seven years for the Gas Authorisation.[510] In the case of the Airports Inquiry, the

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508 Lally, M., *The weighted average cost of capital for gas pipeline businesses*, paper prepared for the Commerce Commission, 24 November 2004, p. 27; Lally, M., *The weighted average cost of capital for electricity lines businesses*, paper prepared for the Commerce Commission, 8 September 2005, p. 29; Lally, M., *The weighted average cost of capital for gas pipeline businesses,* paper prepared for the Commerce Commission, October 2008, p. 38.

509 Commerce Commission, *Cost of Capital Workshop Transcript*, pp. 136-141.

510 Commerce Commission, *Determination for TSO Instrument for Local Residential Service for period between 20 December 2001 and 30 June 2002*, 17 December 2003, and every year with the latest being the Commerce Commission, *Draft TSO Cost Calculation Determination for TSO Instrument for Local Residential Telephone Service for period between 1 July 2008 and 30 June 2009*, 4 December 2009 and Commerce Commission, *Gas Authorisation Decision Paper*, 2008, pp. 163-165.

Commission considered the term of the risk-free rate should be set at five years as this was the period that Airports typically set their prices for.[511] The term of the risk free rate needs to match the regulatory period to ensure the supplier of the regulated service only earns a normal rate of return.

Matching the term of the risk-free rate to the regulatory period to ensure a normal rate of return

E4.30 A fundamental concept in finance is that the interest rate applied to a set of cash flows should reflect the risk, and the term, of those cash flows. To illustrate, consider the pricing of a zero-coupon five year bond. The only discount rate that will correctly price this bond is the five year spot rate. Applying an interest rate with a term other than five years would generate either windfall gains or losses to the holder of the bond by mispricing it. The precise outcome will depend on the slope of the term structure of interest rates.

E4.31 In the regulatory context, the Commission will typically be evaluating returns over a given horizon — the pricing period. Matching the term of the risk-free rate to the term of the pricing period ensures that the cost of capital reflects an expectation that regulated suppliers will earn profits equivalent to a normal rate of return over the pricing period.[512]

E4.32 The risk-free rate may either increase with term or decrease with term. When the risk-free rate declines with term, there is said to be an 'inverse yield curve'. That is, long term interest rates are lower than short term interest rates. New Zealand has had an inverse yield curve for significant periods in the past. At present New Zealand has a 'positive yield curve'. That is, Government stock with a longer term has a higher rate of interest than Government stock with a shorter term (for example, 10 years versus five years). Higher long term rates may be due to the uncertainty about future short term rates, an expectation that future rates will rise and the uncertainty about future inflation, which is greater for long-term bonds.

E4.33 Setting the risk-free rate to a term longer (or shorter) than the regulatory (pricing) period may provide gains or losses depending on the term structure of interest rates. With a positive yield curve, (as New Zealand currently has) it is in the interests of suppliers for the cost of capital to be based on a longer term rate, but the opposite would be the case when there is an inverse yield curve.

Expert panel

E4.34 In advice to the Commission on the appropriate cost of capital the Expert Panel had different views about how the term of the risk-free rate should match the regulatory period. The Expert Panel made the following recommendations on the term of the risk-free rate:[513]

511 Commerce Commission, *Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, Final report*, 2002, pp. 150-151.

512 Lally, M., Regulation and the choice of the risk free rate, *Accounting Research Journal*, 2004, Vol. 17 (1), pp. 18-23. Lally, M., *Determining the Risk Free Rate for Regulated Companies,* August 2002.

513 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, pp. 13-17.

- Dr Lally recommended the Commission retain its current practice of setting the intercept term in the CAPM equal to the current risk-free rate whose maturity matches the length of the regulatory cycle.

- Professor Myers recommended using a L-year forecast of the one-year risk-free rate as the intercept term of the CAPM, standardising on L = 5 years. If standardisation is rejected, L should match the length of the regulatory cycle.

- Professor Franks agreed with Professor Myers' recommendation. Professor Franks suggested that the Commission could standardise on L = 3 if regulatory cycles in New Zealand are typically three years.

E4.35 In previous advice to the Commission on estimating the cost of capital Dr Lally has advised the Commission to set the term of the risk-free rate, in the cost of debt and first term of the CAPM, equal to the price setting period (i.e. regulatory period).[514]

Submissions

E4.36 In consultation, a number of suppliers of regulated services disagreed that the term of the risk-free rate should match the regulatory period.[515] These parties argued that

[514] Lally, M., *The weighted average cost of capital for gas pipeline businesses, paper prepared for the Commerce Commission*, 24 November 2004; Lally, M., *The weighted average cost of capital for electricity lines businesses, paper prepared for the Commerce Commission*, September 2005; Lally, M., *The weighted average cost of capital for gas pipeline businesses, paper prepared for the Commerce Commission*, October 2008; Lally, M., *The cost of capital for the airfield activities of New Zealand's international airports*, 2001.

[515] NZ Airports, *Submission by NZ Airports Association on the Commerce Commission Input Methodologies Discussion Paper*, 31 July 2009, p. 49; Auckland International Airport Limited, *Submission to the Commerce Commission Draft WACC Guidelines Paper,* 31 July 2009, p. 1; Christchurch International Airport Limited, *CIAL Submission on the Revised Draft Cost of Capital Guidelines,* 3 August 2009, p. 2; Christchurch International Airport Limited, *Submission on Commerce Commission Input Methodologies Discussion Paper,* 7 August 2009, p. 27; LECG, Comments on the Commerce Commission's proposed approach to estimating the cost of capital, Report for NZAA, 31 July 2009, p. 27; Maui Development Limited, *Submission to the Commerce Commission on the Input Methodology Discussion Paper,* July 2009, pp. 17-18; Orion, *Submission on Input Methodologies Discussion Paper,* 14 August 2009, p. 29; Powerco Limited, Input Methodologies Discussion Paper, 14 August 2009, p. 28; PricewaterhouseCoopers, *Revised Draft Guidelines - Submission to Commerce Commission*, Report on behalf of Powerco, August 2009, p. 11; Powerco Limited, Submission on the Input Methodologies Discussion Paper, Attachment: PricewaterhouseCoopers, *Commerce Commission's Revised Draft Guidelines and aspects of the Input Methodologies Discussion Paper relating to Cost of Capital prepared for Powerco Limited*, 14 August 2009, p. 8; PowerNet, *Submission of PowerNet to the Commerce Commission on the Input Methodologies as part of the Implementation of Part 4 of the Commerce Act,* 14 August 2009, p. 4; Telecom, Annex B: *Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital,* August 2009; Transpower, *Submission to the Commerce Commission on: Transpower Process and Recommendation Discussion paper, Input Methodologies Discussion Paper,* August 2009, pp. 23-24; Unison Networks Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Castalia Strategic Advisors, *Submission on Input Methodologies: Regulatory Cost of Capital: a report prepared for Unison Limited*, 13 August 2009, pp. 5-6; Vector Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Synergies Economic Consulting, *Initial Weighted Average Cost of Capital Review: prepared for Vector Limited*, 13 August 2009, pp. 15-16; Synergies Economic Consulting, *WACC Review: Final*, Report on behalf of Vector Ltd, 31 August 2009, p. 17; Unison, Appendix: *Submission on Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital,* 14 August 2009, p. 6; Auckland Energy Consumer Trust, *Cross Submission to the Commerce Commission on Cost of Capital Workshop*, 2 December 2009, p. 20; Castalia Strategic Advisors, *Commerce Commission – Cost of Capital – Cross Submission on Behalf of Transpower,* 2 December 2009, pp. 3-4; Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, p. 9-11; Maui Development Limited, *Cost of Capital Workshop 12th-13th November 2009 – Cross-submission,* 2 December 2009, pp. 7-8; PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report for 17 EDBs, 2 December 2009, p. 11; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 12; Synergies Economic Consulting, *Cost of Capital Cross Submission*, Report on behalf of Vector, 2 December 2009, pp. 11-13; Telecom, *Cost of Capital Guidelines – Post-Workshop Submission,* 2 December 2009 p. 3; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital,* Report on Behalf of NZAA, 2 December 2009, pp. 24-27; Unison, *Post-Conference Submission on the*

the risk-free rate with the longest maturities available in New Zealand – 10 years – should be used. In support of this, suppliers cited:

- Mitigation of re-financing risk;
- The matching principle. Firms that are required to finance assets with expected lives greater than a regulatory review period will seek to borrow term debt with a maturity greater than a typical regulatory review period;
- Normal commercial practice where firms issue a portion of their debt for a longer term; and
- Mitigation of regulatory risk.[516]

E4.37 Therefore, according to submissions from suppliers, the term of the risk-free rate and debt premium which matches the regulatory period is too short and would under compensate suppliers. However, these submissions overlook: (i) the ability of regulated suppliers to reset prices at the end of the regulatory period to compensate

Weighted Average Cost of Capital, 2 December 2009, Section 3; Vector, *Cross Submission to the Commerce Commission on the Weighted Average Cost of Capital Workshop*, 2 December 2009, pp. 9-10; Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services,* 12 July 2010, p. 42; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper,* Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA,* 12 July 2010, pp. 25-26; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers,* Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association,* 3 August 2010; p. 11; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers,* 3 August 2010, p. 39; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers,* 3 August 2010, p. 12; Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers,* Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association,* 13 August 2010, pp. 24-25; Powerco Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers,* 13 August 2010, pp. 11-15; PricewaterhouseCoopers on behalf of 20 Electricity Distribution Businesses, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers,* 13 August 2010, pp. 11-13; Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers,* 13 August 2010, pp. 8-11; Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers,* Attachment: Asia-Pacific Risk Management Limited, *Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited,* 12 August 2010, pp. 11-35; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital,* 13 August 2010, pp. 20-22; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 51-60; Prime Infrastructure, *Submission on EDBs (Input Methodology) Reasons Paper, Cost of Capital - The Investor Perspective,* 13 August 2010, p. 10.

[516] Uniservices (for NZAA) considered that suppliers subject to regulation have the potential for risk associated with changes in the regulatory framework over time. In the presence of regulatory risk Uniservices submitted that suppliers would source debt financing that matches there assets life and not the regulatory period to ensure a supplier maintains a prudent commercial treasury policy. See NZ Airports Association, *Cross-submission on the Cost of Capital Conference*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital - Report for NZAA*, 2 December 2009, p. 25.

for changes in risk-free rates; and (ii) the widespread use of interest rate swaps. These are now discussed.

The power to reset prices

E4.38 The interest rate on Government bonds generally increases with term. Higher long term rates may be due to the uncertainty about future short term rates, an expectation that future rates will rise and the uncertainty about future inflation, which is greater for long-term bonds.

E4.39 Airports, like other regulated suppliers, can reset their prices at the end of each regulatory (pricing) period to reflect, among other things, changes in the risk-free rate if this has altered the cost of capital. Through the regular resetting of prices the premium for uncertainty over the level of long-term interest rates is borne by users, rather than suppliers. Accordingly, suppliers' prices should not reflect a premium for the uncertainty of risk-free rates beyond the length of the pricing period.

The availability of interest rate swaps

E4.40 The Commission notes that firms have a mix of debt maturities to manage refinancing risk, including long term debt. This spreads a firm's re-financing requirements and reduces the amount of debt that needs to be refinanced in any one year. Reducing re-financing risks has benefits for consumers, but long-term debt typically has a greater cost (specifically a greater debt premium) than medium or short term debt.

E4.41 The use of fixed rate long-term debt to manage refinancing risk also fixes a firm's interest rate for the term of the loan.[517] But many firms want to manage their interest rate risk, often for shorter terms than the term of the loan. Therefore the firm enters into an interest rate swap, typically at the same time as the debt finance is raised, to shorten the period for which their interest rate is fixed. This can result in a lower rate of interest. Indeed, it may result in a much shorter interest rate re-pricing period.

E4.42 In other words, firms are able to use interest rate swaps to re-price their interest costs (earlier than the maturity date of their debt) and lower their overall interest cost. Through the use of interest rate swaps firms can enjoy the benefits of long-term debt (secured funding and reduced refinancing risk) without having to pay the full cost of long term debt finance.

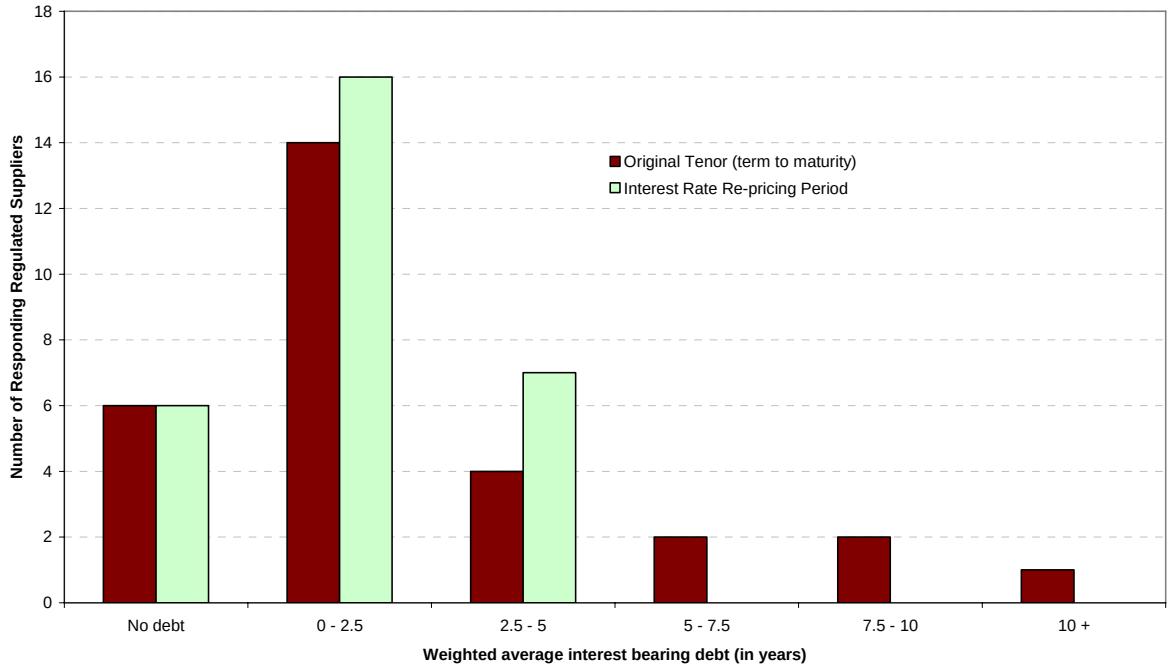
E4.43 Interest rate swaps are used to hedge the risk-free rate component of their debt portfolios. This leaves the debt premium component matched to the term to maturity that the debt was originally issued for. Interest rate swaps are widely used in this way. This was evidenced in the information on debt profiles that the Commission obtained from regulated suppliers in 2010. Specifically, this showed that the interest rate re-pricing period was shorter than the average term to maturity of the debt portfolio. That is, firms were using interest rate swaps extensively. Many had an interest rate re-pricing period that was less than five-years, with the weighted average interest rate re-pricing period being 3.3 years in 2010, which is much shorter

[517] A small number of New Zealand firms have issued bonds with floating rates of interest.

than the term of the regulatory period. Transpower explained at the Cost of Capital workshop that its target interest rate re-pricing period was 2 years.

E4.44 Figure E3 compares the weighted average original term to maturity for regulated suppliers' debt with the weighted average interest rate re-pricing period for that debt portfolio. The chart shows that five firms have a debt portfolio with a weighted average tenor (original maturity) greater than five years, and of these three firms had a weighted average tenor greater than 7.5 years, but that after accounting for interest rate swaps, no firm had an average interest rate re-pricing period which was greater than five years. Through the use of interest rate swaps, suppliers can choose their interest rate re-pricing period, and this decision is independent of the original maturity of the debt.

Figure E3 Regulated Suppliers' Debt Portfolios: Weighted Average Original Term to Maturity vs. Weighted Average Interest Rate Re-pricing Period (2010)



E4.45 The data on the actual interest rate re-pricing faced by regulated suppliers illustrate regulated suppliers' ability to use swaps to alter their interest rate re-pricing period, and to set it to a term consistent with or shorter than the regulatory period. As such, it is inappropriate to set the term of the risk-free rate longer than the term of the regulatory period (and it should not be set at 10 years). That is, doing so would (assuming a positive yield curve) over-compensate suppliers as they would receive a (higher) risk-free rate in their regulatory cost of capital when their actual interest costs have been re-priced to a much shorter term (lower rate) by the use of interest rate swaps.[518]

[518] The cost of executing an interest rate swap is included in the term credit spread differential allowance in respect of suppliers which issue long-term debt (see section E6).

E4.46 The widespread availability and use of interest rate swaps means the term of the risk-free rate should not exceed the term of the regulatory (pricing) period (and should not be set at 10 years).

E4.47 In support of the longer period for the risk-free rate, Castalia (for Unison), argued that refinancing risk is real for suppliers and this risk is not considered in any way in the CAPM framework. Therefore, in Castalia's view, the use of a term for the risk-free rate to match the regulatory period, clearly breaches the principle of suppliers expecting to earn at least a normal return as it under-compensates prudent and efficient regulated businesses.[519] The Commission notes that as regulated suppliers can use interest rate swaps to hedge the risk-free rate, this is however an argument regarding the term for the debt premium (which cannot be hedged in the same way) rather than an argument relevant to the term of the risk-free rate per se.

E4.48 The Commission accepts that use of a term for the debt premium which matches the regulatory period may under-compensate those suppliers which on average borrow for a term to maturity which exceeds the length of the regulatory period, as the supplier cannot hedge the greater debt premium. To recognise the greater debt premium on long maturity debt (where it is actually incurred by a supplier), the cost of capital IM includes an allowance for the costs incurred by firms in issuing longer-term debt to manage their re-financing risks. This is discussed in Section E5 on the debt premium and Section E6 on the term credit spread differential.

E4.49 The Commission notes the arguments made by suppliers in support of a 10 year term that it is normal commercial practice to match funding to asset lives to the extent possible. The Commission has surveyed regulated suppliers on their debt portfolios. These surveys, undertaken in 2009 and 2010, showed that the majority of regulated suppliers that are subject to Part 4 only issue debt for periods of up to five years (see Section E5 on the debt premium for a more detailed analysis). Thus, actual behaviour is not consistent with the claim.

E4.50 The Commission notes that a number of monopoly suppliers use a term for the risk-free rate which matches the pricing period, when estimating their cost of capital. This is so even where the supplier is free to determine its own prices. For example, Airways Corporation uses a five year risk-free rate for its estimate of its cost of capital[520] and a number of airports (e.g. Hamilton, AIAL, CIAL[521]) adopt a five year term for the risk-free rate in their estimates of the cost of capital, which corresponds with the length of their pricing agreements.

Conclusion - the appropriate term of the risk-free rate

E4.51 The period of focus for regulatory purposes is the regulatory period, which is generally five years, not the life of the asset or business. Setting the term of the risk-free rate equal to the term of the regulatory period ensures that regulated

519 Unison Networks Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Castalia Strategic Advisors, *Submission on Input Methodologies: Regulatory Cost of Capital: a report prepared for Unison Limited*, 13 August 2009, pp. 3-6.

520 Airways Corporation, *Pricing Proposal 2009/10 Air Navigation Service Charges for Aircraft 5 Tonnes and under Supporting Information Pack,* p. 2. Airways Corporation, *Statement of Corporate Intent 2010/11 – 2012/13*, p. 11.

521 Hamilton International Airport, *Landing Charges Pricing Methodology*, March 2008, p. 15. Auckland International Airport Limited, *Identified Airport Activities Disclosure Financial Statements for the year ended 30 June 2009*, p. 42. Christchurch International Airport Limited, *Disclosure Financial Statements for the year ended 30 June 2009*, p. 42.

suppliers are compensated for the risk they are exposed to during the regulatory period and that regulated suppliers are able to have the expectation of earning a normal return in the long-run. The regulated supplier also knows what the risk-free rate is for the duration of the regulatory period and can plan and manage its business accordingly.

E4.52 Setting the term of the risk-free rate at 10 years, when there is an inverse yield curve, would under-compensate suppliers. Conversely, when there is a positive yield curve, a 10 year term of the risk-free rate would over-compensate suppliers.

E4.53 When suppliers reset their prices at the end of each pricing period to reflect changes in WACC including changes in interest rate, the premium for uncertainty in long-term risk-free rates is borne by consumers, not suppliers. The use of a risk-free rate with a term longer than the pricing period would compensate suppliers for an uncertainty they do not bear.

E4.54 New Zealand suppliers make widespread use of interest rate swaps to manage interest rate risk. As suppliers can and do shorten the interest rate re-pricing period through the use of interest rate swaps, the term of the risk-free rate should not be based on a 10 year term.

E4.55 The term credit spread differential has been included in the Airports ID Determination to recognise and compensate for the greater debt premium some regulated suppliers may actually incur on their debt portfolio.[522] Regulated suppliers will qualify for this allowance where their average debt tenor (and therefore debt premium) is more than five years.

E4.56 In the context of information disclosure regulation, the IM specifies a five-year term when estimating the risk-free rate. The estimate will be updated annually.

E5 Debt Premium and Debt Issuance Costs

Decision - debt premium and debt issuance costs

E5.1 The debt premium is the additional interest rate, over and above the risk-free rate, required by suppliers of debt capital to compensate them for being exposed to the risks of default in lending to a firm plus an allowance for the inferior liquidity of corporate bonds relative to government bonds. In general, the longer the firm wishes to borrow the debt for, the higher the debt premium that the firm has to pay to the suppliers of debt capital.

E5.2 The Commission estimates the debt premium as an intermediate step towards estimating the cost of debt, which forms a component in estimating the cost of capital.

E5.3 The IM specifies a service-specific (as opposed to a supplier-specific) debt premium as the difference between the corporate borrowing rate and the risk-free rate. As with the risk-free rate, the Commission proposes to update the estimate of the debt premium for each cost of capital estimation.

[522] It is an adjustment to the cash flows in the ROI that is calculated under information disclosure.

E5.4 In relation to the debt premium for airport services, the IM specifies that:

- the term of the debt premium will be the same as the term used for the risk-free rate;
- the debt premium will be estimated by taking account of the average debt premium that would reasonably be expected to apply to publicly traded vanilla New Zealand dollar denominated corporate bonds that are issued by a supplier of airport services that is neither majority owned by the government nor a local authority, with a Standard and Poors long-term credit rating of A-, or equivalent rating from Moody's or Fitch;
- to address the small number of bonds with a Standard and Poors long-term credit rating of A- that are publicly traded in New Zealand, this may involve, as required, progressively expanding the range of publicly traded bonds considered to include:
  - those which are not issued by a supplier of airport services;
  - those with a Standard and Poors long-term credit rating other than A-;
  - those issued by an entity majority owned by the government or a local authority,

  but in each case adjusting the observed debt premium to approximate the debt premium that is likely to have been observed had the bond been of the type first described.
- the risk-free rate will be estimated using New Zealand government NZ$ denominated bonds (refer Section E4);
- the five-year estimate of the debt premium will be updated annually; and
- as with the risk-free rate, the Commission will estimate the debt premium by averaging the debt premium over one calendar month prior to when the cost of capital is being estimated.

E5.5 Unlike the risk-free rate which can be hedged, the greater debt premium on long term debt cannot be hedged economically. The ID Determination provides an allowance (the term credit spread differential) which compensates for the greater debt premium on long maturity debt where the firm has an average original tenor (time to repayment) which exceeds the regulatory period. As part of this allowance, the ID Determination also compensates a qualifying regulated supplier (that is, a supplier with an average debt tenor which is greater than the regulatory period), for executing an interest rate swap (to hedge the risk-free rate).

E5.6 The IM provides that debt issuance costs will be included in the cost of capital estimation for airport services, as a 35 basis points p.a. (0.35% p.a.) margin to the cost of debt capital, based on amortising the debt issuance costs over the same period as the term of the debt premium i.e. five years.

Commission's reasons - debt premium

The term of the debt premium

E5.7 As with the risk-free rate, the term of the debt premium will match the regulatory period.[523] This ensures internal consistency.

E5.8 In previous regulatory decisions, the Commission has generally aligned the term of the corporate rate of borrowing used to measure the debt premium with the term for the risk-free rate.[524]

E5.9 Some submitters disagreed with the Commission's decision to estimate the debt premium for the same term as the regulatory period. They stated that the debt premium should be measured for the term that is optimal (having regard to cost efficiency, including minimising amortised issuance costs and prudent management of re-financing risk). Submitters considered that prudent firms in a competitive market will match their debt maturities to the life of the assets.[525] Many of these

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523 Appendix E4 includes further discussion on the risk-free rate.

524 The exception to this is the TSO net cost calculation determination for 2006/2007. For a full explanation of the result and reasoning see Commerce Commission, *Final TSO Cost Calculation Determination for TSO Instrument for Local Residential Telephone Service for period between 1 July 2006 and 30 June 2007*, 7 October 2009, pp. 25-40.

525 Christchurch International Airport Limited, *Submission on the Revised Draft Cost of Capital Guidelines*, 3 August 2009, p. 2; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, p. 13; Powerco Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: PricewaterhouseCoopers, *Commerce Commission's Revised Draft Guidelines and aspects of the Input Methodologies Discussion Paper relating to Cost of Capital prepared for Powerco Limited*, 14 August 2009, pp. 32-34; Telecom, Annex B: *Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009; Transpower, *Submission to the Commerce Commission on: Transpower Process and Recommendation Discussion paper Input Methodologies Discussion Paper*, August 2009, pp. 25-27; Synergies Economic Consulting, *WACC Review: Final*, Report prepared for Vector, 31 August 2009, pp. 18-24; Unison, *Post-Conference Submission on the Weighted Average Cost of Capital*, 2 December 2009, p. 7; Synergies Economic Consulting, *Cost of Capital Cross Submission*, Report prepared for Vector, 2 December 2009, pp. 11-13; Electricity Networks Association, *Cross Submission on the Cost of Capital Workshop*, 2 December 2009, pp. 9-10; PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on Behalf of 17 EDBs, 2 December 2009, p. 12; PricewaterhouseCoopers, *Cross Submission on the Commerce Commission's Cost of Capital Workshop*, Report on behalf of Telecom, 2 December 2009, p. 13; Auckland Energy Consumer Trust, *Cross Submission to the Commerce Commission on Cost of Capital Workshop*, 2 December 2009, p. 20; Vector, *Cross Submission to Commerce Commission on the Weighted Average Cost of capital Workshop*, 2 December 2009, pp. 9-10; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report prepared for NZAA, 2 December 2009, pp. 43-44., Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, Attachment: PricewaterhouseCoopers, Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 24-25; Powerco Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, pp. 11-15, paragraphs 30-48; PricewaterhouseCoopers on behalf of 20 Electricity Distribution Businesses, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010 (PWC for 20 EDBs, Submission on the Draft Cost of Capital for EDBs and GPBs Determinations and Draft Reasons Papers), pp. 11-13; Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, pp. 8-11; Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, Attachment: Asia-Pacific Risk Management Limited, Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited*, 12 August 2010, pp. 11-35; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, 13 August 2010, pp. 20-22; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 51-60; Prime

submitters recommended that the Commission should assume a 10 year term for estimating the debt premium.

E5.10 CEG (for Vector) provided evidence from other countries of the original maturity of debt issued by regulated electricity suppliers. Since these suppliers issue debt for periods longer than five years, CEG submitted that the Commission should use a term for the debt premium longer than the regulatory period.[526]

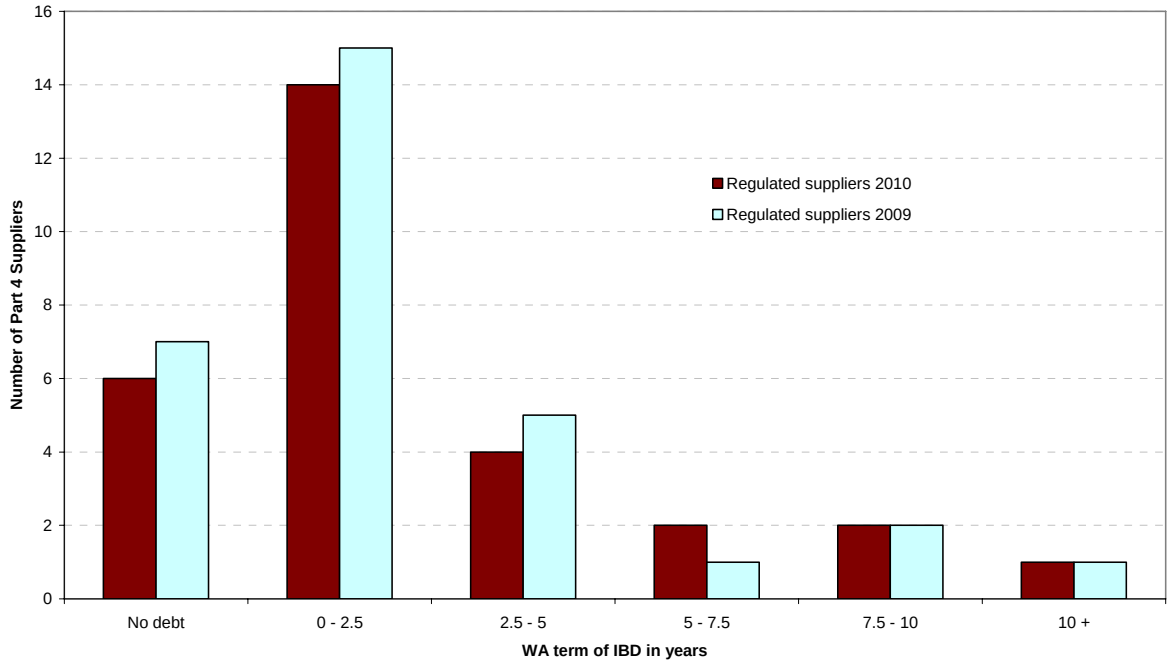
E5.11 In 2009 and 2010 the Commission surveyed suppliers of services regulated under Part 4. In 2010 (2009) only five (four) of the 29 (31) regulated suppliers which responded to the Commission's request advised that the actual weighted average original period to maturity of their debt was greater than five years - and only one was greater than ten years.[527] The responses are shown in Figure E4. Large suppliers generally issued longer-maturity debt, while (the more numerous) smaller suppliers did not. In the 2010 survey, the value-weighted average original period to maturity of the regulated suppliers who responded was 7.4 years (in the 2009 survey it was 7.3 years). For suppliers of airports services the weighted average original period was approximately five years in 2009 and 2010.

Infrastructure, *Submission on EDBs (Input Methodology) Reasons Paper, Cost of Capital - The Investor Perspective*, 13 August 2010, p. 10; Transpower New Zealand Ltd., Submission on Transpower (Input Methodologies) Draft Reasons Paper, Cost of Capital Decisions, August 2010, p. 10; Transpower New Zealand Ltd., *Submission on Transpower (Input Methodologies) Draft Reasons Paper and Individual Price-Quality Path*, Attachment: R. R. Officer & S. Bishop - *Independent Review of Commerce Commission's WACC Proposals for Transpower*, 5 August 2010, pp. 11-14.

526 Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 51-60.

527 The five suppliers with debt portfolios with an average original tenor exceeding five years comprised two suppliers of airport services, and three suppliers of electricity and/or gas services.

Figure E4 Regulated Suppliers' Debt Portfolios: Weighted Average Original Term to Maturity of Interest Bearing Debt



E5.12 For the majority of regulated suppliers (24 of 29 in 2010; and 27 of 31 in 2009) the weighted average original period to maturity of their debt was five years or less. Therefore, basing the estimation of the debt premium on a 10 year term would overstate the debt premium by compensating them for costs they do not actually incur.

E5.13 For the 24 (27) regulated suppliers in 2010 (2009) whose weighted average term to maturity was less than five years, a debt premium based on a five year term could be seen as concessional (since, on average, they are paying a debt premium on shorter maturity debt, that is, a lower debt premium). However, it is for each supplier to determine the average tenor of its debt portfolio. The Commission would not want to incentivise firms to increase their refinancing risk by relying more heavily on shorter maturity debt.

E5.14 For the suppliers that have, on average, issued debt with a term to maturity that is longer than the regulatory period (thereby incurring a greater debt premium), the Commission has ensured that they will not be under-compensated as they will qualify for the term credit spread differential allowance. This is discussed further in paragraphs E5.16 to E5.19 and in more detail in Appendix E6.

Conclusion - term of the debt premium

E5.15 The IM specifies a five-year term when estimating the debt premium. The Commission will update the estimate of the five year debt premium on an annual basis.

Term credit spread differential

E5.16 Some regulated suppliers issue debt with an original period to maturity greater than five years to manage their exposure to re-financing risk. At the same time such suppliers may also enter into an interest rate swap to shorten the interest rate re-pricing period.

E5.17 Prudent management of re-financing risk by issuing debt with a long period to maturity is in the long term interests of consumers. Therefore, where a regulated supplier actually issues debt with an original period to maturity greater than five years, and the weighted average original period to maturity of its debt portfolio is also greater than five years, the Commission considers that an allowance for the additional debt premium is appropriate. The allowance relates only to debt issues with an original period to maturity greater than five years.

E5.18 Where an issue of debt qualifies for this allowance, to be consistent, the amortisation period applied to the notional debt issuance costs attributed to the issue of debt will be adjusted to reflect the actual original period to maturity. In addition, there is an allowance for the execution costs of an interest rate swap.

E5.19 A more detailed explanation of the term credit spread differential and how it works is set out in Appendix E6.

Australian 10 year debt premium

E5.20 A number of submissions referred to the practice of Australian regulators in estimating the debt premium (and the risk-free rate) on a 10 year term and submitted that the Commission too should adopt a 10 year term for estimating the debt premium.[528] The Australian adoption of the 10 year term is often linked to the Gasnet decision by the Australian Competition Tribunal.[529] In that case, the regulated firm (Gasnet) submitted an access agreement which used a 10 year risk-free rate to estimate its cost of debt. The regulator (ACCC) rejected that approach, arguing a five year term should be adopted. The issue for the Tribunal was whether the regulator was entitled to reject the firm's rate of return as being inconsistent with the code. The Tribunal decided the firm's use of the 10 year Government bond was permitted under the code and that the regulator was wrong to reject Gasnet's access arrangement.

E5.21 The Gasnet decision did not examine critically whether a 10 year term or a term matching the regulatory period was a better approach to estimating the cost of capital. The issue as to whether or not the use of a 10 year term may over-compensate suppliers was not discussed in the Tribunal's decision.

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528 See, for example, Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 19. Prime Infrastructure, *Cost of Capital – The Investor Perspective*, 13 August 2010, p. 10. Wellington Electricity Lines Limited, *Submission to the Commerce Commission on Draft Cost of Capital Input Methodology Decision*, 13 August 2010, p. 12.

529 Australian Competition Tribunal, *Application for review of the decision by the Australian Competition and Consumer Commission published on 17 January 2003 in connection with revisions to the access arrangement for the gas transmission system owned by Gasnet Australia (Operations) Pty Ltd*, 23 December 2003.

E5.22 Since around the time of the Gasnet decision, most Australian regulators have adopted a 10 year term for the risk-free rate and debt premium.

E5.23 More recently in Australia, the use of a 10 year term for estimating the debt premium has been increasingly questioned by Australian regulators and indeed by the Australian Competition Tribunal. For example:

- the AER issued a draft decision paper proposing moving to a five year term, though in its final decision it adopted a "cautious approach" and retained the 10 year term, despite acknowledging that this overstated the cost of debt for suppliers;[530]
- the QCA moved to a five year term (with allowance for additional debt premium on longer maturity debt) in its 2010 decision on QR Networks;[531]
- IPART issued a public discussion document which discusses, among other things, whether to shorten the 10 year term to align with the regulatory period;[532] and
- the Australian Competition Tribunal, in a September 2010 decision, questioned the continued appropriateness of a 10 year bond. The Tribunal's judgment noted that:

> There is another point worth noting about the AER's methodology. It arises out of the difficulty in identifying a sufficient number of long term bonds to determine yield. The reasons a 10 year bond was originally chosen was because, in the past, many firms favoured long term debt, albeit that it came at a higher cost, because it reduced refinancing or roll-over risks. The high rate was then hedged via interest rate swaps. That may no longer be the position. If not, the AER may need to reconsider its approach in light of more current strategies of firms in the relevant regulated industry. Further, there seems to be little point in attempting to estimate the yield on a bond which is not commonly issued.[533]

E5.24 The Commission notes that these developments suggests the preference for a 10 year term by Australian regulators may be changing (and already has changed in the QCA decision noted above) and suggests a potential convergence between those approaches with that adopted in the cost of capital IM.

<u>Debt premium – service-specific or supplier-specific</u>

E5.25 The interest cost of borrowing may vary between suppliers of airport services. However, the use of notional leverage requires that the debt premium reflect the notional leverage level, and therefore the debt premium would be a notional debt premium. The notional debt premium should be associated with the Commission's

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530 AER, *Electricity transmission and distribution network service providers Review of the weighted average cost of capital (WACC) parameters*, May 2009, p. 173.

531 QCA, *QR Network's – Tariffs and Schedule F, Draft decision*, June 2010, pp. 33-39. The final decision made no change to the draft decision. See, QCA, *QR Network's 2010 DAU, Final decision*, September 2010.

532 IPART, *Developing the approach to estimating the debt margin Other industries – Discussion Paper*, November 2010, Chapter 8, pp. 57-60.

533 Australian Competition Tribunal, *Application by ActewAGL Distribution [2010] ACompT 4*, 17 September 2010, paragraph 72.

assessment of a Standard and Poors long-term credit rating of A- for airport services.[534]

Approach to estimating the debt premium

E5.26 There are a range of options by which firms can raise debt. In simple terms, these options include bank loans, issuing bonds in New Zealand to institutions or the public and issuing bonds overseas. Each option has its own market volume, tenor and credit worthiness characteristics.

E5.27 In principle, there are two generic ways of estimating the debt premium. The 'simple approach' only considers credit-rated publicly traded corporate bonds denominated in New Zealand dollars when calculating the debt premium. The 'complex approach' acknowledges that firms may raise debt capital through a number of channels in addition to issuing bonds in New Zealand.

Estimating the debt premium - the 'simple approach'

E5.28 The simple approach to estimating the debt premium involves three steps:

i. identify credit-rated publicly traded vanilla[535] corporate bonds denominated in New Zealand dollars, issued by the regulated service in question in New Zealand and, as a cross-check, issued by other infrastructure businesses which are not the regulated service in question, in New Zealand.

ii. obtain the market yield to maturity on these bonds and the contemporaneous risk-free rate, and estimate the debt premium by taking the difference between these two.

iii. estimate, by interpolation, what the debt premium would be for a term to maturity equal to the regulatory period, consistent with a specified Standard and Poors long-term credit rating, or equivalent rating from Moody's or Fitch, for bonds issued by suppliers of the regulated service in question.

E5.29 Advantages of the simple approach to estimating debt premiums are that it is relatively simple and easy to understand, and it is transparent and objective as it only uses publicly available data. Due to its generic nature, the simple approach to estimating debt premiums requires fewer subjective assumptions regarding, for example, treasury risk management policies or market issuance capacity.

E5.30 The main disadvantage of the simple approach to estimating debt premiums is that it does not recognise any other means by which firms can raise debt except publicly traded corporate bonds. However, data for these other means is not publicly available.

Estimating the debt premium - the 'complex approach'

E5.31 The complex approach to estimating the debt premium involves first, estimating the debt premium for each option by which firms can raise debt denominated in (or swapped back to) New Zealand dollars. Second, it involves estimating the overall

[534] The appropriate credit rating is discussed below, commencing at paragraph E5.44.

[535] Vanilla bonds are defined as senior unsecured nominal debt obligations denominated in NZ$ without callable, puttable, conversion, profit participation, credit enhanced or collateral features.

debt premium by making assumptions about the weighting of each borrowing option in a notional debt portfolio.

E5.32 A number of submitters argued that the simple approach to estimating debt premiums would ignore the fact that firms raise debt capital through a number of channels in addition to corporate bonds, e.g. bank debt and issuing bonds overseas. Submitters claim that ignoring these channels could result in an estimated debt premium that was not representative of firms' actual debt premiums.[536]

E5.33 Unison submitted a model that sets out the range of borrowing options available in practice to large New Zealand firms, and the respective estimated debt premium associated with each option. The model uses these individual estimated debt premiums to estimate an overall debt premium for a supplier of regulated services. To generate the overall debt premium, the model uses various market-related assumptions (e.g. market bond issuance capacity) and entity-related assumptions (e.g. the entity's treasury risk management policies with respect to liquidity management and minimum headroom) to determine the weighting of each borrowing option in the debt portfolio.[537]

E5.34 The main advantage of the complex approach to estimating debt premiums is that it recognises that firms may raise debt through a number of different channels. As such, this approach better mimics firms' actual behaviour.

E5.35 The main disadvantages of this approach are that it requires data that: (a) is firm-specific and does not correspond to a representative benchmark; and (b) is not publicly available. The use of non-publicly available data would reduce certainty to suppliers and users as it may impede their ability to independently replicate the estimation process.

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536 Auckland Energy Consumer Trust , *Cross Submission to the Commerce Commission on Cost of Capital Workshop*, 2 December 2009, p. 21; PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report on behalf of 17 EDBs, 2 December 2009, p. 13; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 12; Synergies Economic Consulting, *Cost of Capital Cross Submission*, Report on behalf of Vector, 2 December 2009, pp. 11-13; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, pp. 42-51; Unison, *Post-Conference Submission on the Weighted Average Cost of Capital*, 2 December 2009, Section 4; Vector, *Cross Submission to the Commerce Commission on the Weighted Average Cost of Capital Workshop*, 2 December 2009, pp. 19-20; Wellington Electricity, *Post-Workshop Submission for the Commerce Commission's Cost of capital Workshop*, November 12 and 13, 2009, 3 December 2009, p. 6 and Commerce Commission, *Cost of Capital Workshop Transcript*, pp. 144-158; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 27-28; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 40; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 12; Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, pp. 16-17; Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Asia-Pacific Risk Management Limited, *Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited*, 12 August 2010, p. 34; Wellington Electricity Lines Limited, *Submission on EDBs and GPBs (Input Methodology) Draft Determination and Reasons Paper, Draft Cost of Capital Input Methodology Decision*, 13 August 2010, pp. 9-10.

537 Unison, *Unison Networks Limited Cost of Debt Model*, 22 December 2009.

E5.36 In terms of the ability to obtain the necessary data for this approach, the Commission notes that very few debt suppliers in New Zealand would be in a position to supply reliable non-public market representative data, and it is unclear if these entities could be considered un-conflicted (as they might be shareholders, advisers to, or debt capital suppliers of the relevant supplier).

E5.37 If the Commission were to attempt to benchmark using the debt premium on bank loans, it would face the practical issue of obtaining reliable independent data as to what the 'market' average debt premium on bank loans actually is. This is because, this information, by its nature, is private and each debt premium 'quote' reflects an individual bank's (undisclosed) assessment of the creditworthiness of the specific borrower, together with the bank's (undisclosed) required financing terms and covenants. The debt premium currently shown in the Unison model presumably reflects Unison's banker's assessment of Unison's creditworthiness. However, the assessed creditworthiness is not stated nor are the financing terms or covenants required by the specific bank disclosed.

E5.38 Any attempt by the Commission to obtain useful data would first need to define a benchmark creditworthiness and 'terms sheet', against which quotes of the applicable debt premium could be obtained. Secondly, it would need to involve real potential customers to give the banks an incentive to provide realistic, market driven quotes. Debt premium quotes from all of the banks would be required if something approaching a 'market' average debt premium for bank loans was to be estimated.

E5.39 Estimating an overall debt premium for the range of options by which debt can be raised would also require various assumptions to be made so that the weighting of each borrowing option in the notional debt portfolio could be determined. The nature of the assumptions required, (e.g. various market related assumptions, including maximum issuance capacity and minimum issue size; and various entity related assumptions; including the entity's treasury risk management policies with respect to liquidity management and minimum headroom) means that it is unlikely that the Commission could specify a group of assumptions that all suppliers, yet alone suppliers and users, would agree on.

Conclusion - approach to estimating the debt premium

E5.40 On balance, the Commission considers that it should continue to use the simple approach to estimating debt premiums.[538] This is for three main reasons:

- First, whilst there are a range of options available to suppliers for raising debt, publicly available data with respect to the debt premiums are only available for publicly traded bonds, which form the basis of the simple approach.
- Second, other than for publicly traded bonds, debt premiums are generally not publicly available. Using the complex approach to estimate debt premiums would require such non-public data, which is likely to impede the ability of

[538] PwC (for ENA) accepted that there were valid arguments in favour of the simple approach, but had concerns with the application. See Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 21-33.

interested persons to independently replicate the debt premium estimation process.

- Third, a Unison model type approach requires several subjective assumptions to be made (e.g. weighting of each borrowing option in the debt portfolio) that are open to challenge by suppliers and users of regulated services.

E5.41 The Commission notes two key differences between Unison's and the Commission's debt premium estimate. First, the dates for the debt premium information are not the same. Second, while Unison's estimate is specific to it, the Commission's estimate is service-wide. Despite these differences, the overall debt premium estimated by the Unison model is similar to the debt premium estimate shown in the Commission's straw person example which used the simple approach to estimating debt premiums.

E5.42 The Commission, like the Australian regulators (for example, AER, IPART, QCA), has consistently adopted the simple approach to estimating debt premiums.

E5.43 The Commission notes that for any maturity period up to approximately four years, the all up debt premium (that is, including debt issuance costs) on a bank loan is likely to be lower than the all up debt premium (including debt issuance costs) on publicly traded corporate bonds.[539] In practice, firms including regulated suppliers rarely borrow directly from a bank for a five-year term, and thus the actual all up debt premium incurred by firms on a bank loan (unless a firm were deemed particularly un-creditworthy) would most likely be less than the all up debt premium on a publicly traded corporate bond with five years to maturity. The Commission therefore considers its approach to be relatively favourable to suppliers.

Credit ratings and the debt premium

E5.44 As discussed above, the IM provides that the debt premium will be estimated using publicly traded corporate bonds denominated in New Zealand dollars. An important determinant of a bond's debt premium is the market's assessment of, amongst other things, its credit worthiness. The long-term credit rating associated with the bond can be used as a proxy of this creditworthiness.

E5.45 In the Revised Draft Guidelines and the IM Discussion Paper, the Commission proposed to benchmark allowed debt premiums against the premiums paid by firms on bonds of a reasonable long-term investment grade from a major credit rating agency, e.g. Standard and Poors / Moody's ratings A-/A3 or BBB+/Baa1.

E5.46 At the Cost of Capital Workshop a number of suppliers encouraged the Commission to think about a lower benchmark credit rating than outlined in the RDG and IM Discussion Paper.[540] For example, Mr. Morgan (for Unison) preferred a range of BBB to BBB+ as that was the credit rating that he observed most of the EDBs were within. Mr. Basher (for NZAA and WIAL) preferred a lower than A- credit rating, stating that as a consequence of potential investment programmes airports are about

[539] Against this, bank loans usually require compliance with a range of more onerous financing terms (including regular reporting to the bank) and covenants, In addition, this is one of the main reasons that new publicly traded corporate bonds are rarely issued for an original period to maturity of less than four years.

[540] Commerce Commission, *Cost of Capital Workshop Transcript*, pp. 143-158.

to undertake, the extra borrowing required may lead to a reduction in credit ratings and if the suppliers were not going to receive compensation for that borrowing through a regulatory rate there was a risk that they could be discouraged from making the investment.[541]

E5.47 In submissions on the Draft Reasons Papers suppliers of regulated services considered the benchmark credit rating was too high. Airports proposed a Standard and Poors BBB+ long-term credit rating rather than an A-.[542] EDBs and GPBs proposed a BBB long-term credit rating rather than BBB+.[543] A number of these parties submitted that the credit rating should be the same as the average credit rating of the comparative firms sample used to estimate the asset beta.

E5.48 In previous regulatory decisions, the Commission has considered advice from Dr Lally on the appropriate debt premium.

E5.49 Dr Lally in his advice on the Airports Inquiry and the Electricity Distribution – Control of Unison, did not reference a credit rating in order to estimate the debt premium.[544] In the Airports Inquiry Dr Lally relied on evidence from submissions and in the electricity decision he relied on the estimate used in the Airports Inquiry, supplemented by data from Powerco and Vector.[545]

E5.50 Similarly, in the Gas Control Inquiry and the Gas Authorisation, Dr Lally estimated a debt premium using data from both Powerco and Vector. In the Gas Authorisation Dr Lally did not favour specifying a credit rating as he considered it was not apparent what credit rating to specify. Further, even if a credit rating could be specified, such as BBB, Dr Lally noted that there were not enough bonds on offer to enable estimation of a debt premium.[546]

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541 ibid, p. 145 and p. 148.

542 NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 28-30; Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, p. 42.

543 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 9-12 and pp. 26-27; Powerco Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p. 15; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, 13 August 2010, p. 21; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Bancorp Treasury Services Limited, *Expert Report to Vector Limited*, August 2010, pp. 25-33; Wellington Electricity Lines Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, pp. 9-10.

544 Lally, M., *The weighted average cost of capital for electricity lines businesses*, September 2005, pp. 55-57.

545 Powerco and Vector currently have publicly traded bonds with a Standard and Poors long-term credit rating of BBB and BBB+ respectively.

546 Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, pp. 85-86. The only bond available at the time of the Gas Authorisation was unusable.

E5.51 It is standard practice amongst overseas regulators (such as the AER, Ofgem, Ofwat, Ofcom, the UK Competition Commission, and the UK CAA) to specify an appropriate long-term credit rating on debt for the service in question and then to estimate the debt premium or cost of debt using debt with the same or similar long-term credit rating.[547]

E5.52 The UK Competition Commission's approach, for airports, is to base the cost of debt on the yield from a mixture of bonds of utility companies with a Standard and Poors long-term credit rating of BBB and A. The UK Competition Commission noted that the choice of the credit rating can never be entirely scientific.[548]

E5.53 In its 2007 price control review of Heathrow and Gatwick the UK Competition Commission, using a number of different considerations, took the view that these airports should be able to obtain a Standard and Poors rating of BBB+.[549]

E5.54 The issue was considered again in the price control review for Stansted. The UK Competition Commission decided that Stansted should have a Standard and Poors long-term credit rating of A-. [550]

Conclusion - credit rating

E5.55 The Commission considers that a Standard and Poors long-term credit rating of A- (or equivalent rating from Moody's or Fitch) is appropriate for benchmarking the allowed regulated service wide debt premium on the debt of airport services. The Commission considers that the notional long-term credit rating used for estimating the regulated service wide notional debt premium should reflect a prudent long-term level of exposure to credit default risk. Specifically, the notional long-term credit rating should be, and remain, comfortably within an 'investment grade' credit rating as defined by the major credit rating agencies, and a Standard and Poors long-term credit rating of A- (or equivalent rating from Moody's or Fitch) is the minimum notional long-term credit rating that provides an adequate margin of safety with respect to Airport services. Setting the minimum notional long-term credit rating at, for example, BBB (being only one notch above BBB-, the lowest investment grade long-term credit rating) provides a materially lower margin of safety that a reasonable investment grade is maintained in the long-term.

E5.56 A Standard and Poors long-term credit rating of A- is consistent with the approach adopted by the UK Competition Commission in a recent decision on Stansted.

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547 AER, *Final decision: Electricity transmission and distribution network service providers – Review of the weighted average coat of capital (WACC) parameters*, May 2009; Ofgem, *Electricity Distribution Price Control Review Final Proposal*, 7 December 2009, pp. 49-51; PricewaterhouseCoopers, *Advice on the cost of capital analysis for DPCR5*, Final Report to the Office of Gas and Electricity Markets, 28 July 2009, pp. 59-71; Ofwat, *Future Water and Sewerage Charges 2010-2015 – Final Determination* , April 2009, p. 8; Ofcom, *Ofcom's approach to risk in the assessment of the cost of capital*, August 2005; Competition Commission, *Stansted Airport Ltd - Q5 price control review*, 23 October 2008, Appendix L, p. L5 (Competition Commission, Review of Stansted Airport Q5 price control); Competition Commission, *BAA Ltd - A report on the economic regulation of the London airport companies (Heathrow Airport Ltd and Gatwick Airport Ltd)*, 28 September 2007, Appendix F; CAA, *Airport Regulation - Economic Regulation of Stansted Airport 2009-2014 - CAA Decision*, 13 March 2009.

548 Competition Commission, *Stansted Airport Ltd - Q5 price control review*, 23 October 2008, Appendix L, p. L5.

549 Competition Commission, *BAA Ltd - A report on the economic regulation of the London airport companies (Heathrow Airport Ltd and Gatwick Airport Ltd)*, 28 September 2007, Appendix F.

550 Competition Commission, *Stansted Airport Ltd - Q5 price control review*, 23 October 2008, Appendix L, pp. L5-L7.

E5.57 Published long-term credit ratings, and the associated market yields, on corporate bonds are influenced by a range of factors. These factors include the nature of the entity (not just the regulated service, unless it is an entity which operates a stand-alone or 'pure play' business that corresponds to a single regulated service); the owner of the entity and the assessed likelihood of the owner standing behind the entity and its debt, if it were to get into difficulty. From a regulatory perspective, the Commission is interested in the long-term credit rating of the supplier of the regulated service on a stand-alone basis. However, in practice, the Commission is unable to ring fence the regulated service (and its associated credit rating) from the remainder of the entity.

Limited number of publicly traded bonds in New Zealand

E5.58 The Airports Draft Determination specified that the debt premium was to be estimated based only on the observed yields of publicly traded bonds with a Standard and Poors long-term credit rating of A-.

E5.59 There are only a limited number of publicly traded vanilla New Zealand dollar denominated corporate bonds that are issued by an Airport that is neither majority owned by the government nor a local authority, with a Standard and Poors long-term credit rating of A-, or equivalent rating from Moody's or Fitch. Some submitters on the Draft Reasons Paper considered that reliance only on A- bonds may not be workable or feasible in practice.

E5.60 As discussed in the Update Paper, the Commission has amended the Determination to progressively expand the range of publicly traded bonds considered to include:

- those which are not issued by a supplier of airport services;
- those with a Standard and Poors long-term credit rating other than A-; and
- those issued by an entity majority owned by the government or a local authority.[551]

However, in each case adjusting the observed debt premium to approximate the debt premium that is likely to have been observed had the bond been of the type described in E5.59. In short, the IM Determination enables the Commission to have regard to a wider range of information on prevailing debt premiums, but sets out a methodology to ensure the premium estimated is that which could reasonably be expected to relate to a bond with a Standard and Poors long-term credit rating of A-.

E5.61 A range of submissions were received on the revised debt premium methodology in the Technical Consultation round. ENA sought further clarification around certain points of detail,[552] and Powerco submitted that the IM "should provide more detail" as under the draft IM (as released for technical consultation in October 2010)

551 Commerce Commission, *Revised Draft Commerce Act (Airport Services Input Methodologies) Determination*, 1 October 2010; and Commerce Commission, *Input Methodologies (Airport Services) Consultation Update Paper*, 1 October 2010.

552 For example, where the Commission will source its bond yield information, how the averaging would be done, and how the Commission will weight the different estimates of the debt premium. Electricity Networks Association, *Submission on Technical Consultation on Parts 1-4 of Revised Input Methodologies*, 12 November 2010, pp. 10-11.

Powerco "cannot estimate the material effects of the methodology".[553] Vector describes the proposed methodology as "unsatisfactory in that it is almost completely subjective",[554] while CEG (for Vector) submitted that the accuracy of the cost of debt estimate would be improved and its volatility lowered if all that the Commission methodology said was " the Commission will have regard to all relevant available information, including submissions from interested parties, when arriving at an estimate of the notional cost of debt for a benchmark bond with the characteristics that they are issued by an EDB, have a qualifying rating of BBB+ debt, and have a remaining term to maturity of 5 years".[555]

E5.62 Other submissions supported the revised approach. For example, NZAA submitted that:[556]

> The Commission's proposal to have regard to bonds with a wider range of long-term credit rating and issuers other than just Airports will likely result in a more commercially realistic debt premium.

E5.63 Telecom submitted that:[557]

> The Commission has amended its proposed approach to assessing a debt margin based on comparator company market evidence. We agree with this broadened approach on this issue.

E5.64 In light of submissions on technical consultation, the IM Determination includes floating rate bonds, and specifies that the debt premium observed on bonds with a remaining term of less than five years will ordinarily be taken as the minimum debt premium for a five year term.

E5.65 The Commission does not accept that the methodology is subjective. The Commission considers that its methodology for estimating the debt premium strikes an appropriate balance between:

- promoting certainty for consumers and suppliers in relation to the estimation of the debt premium; and
- providing the flexibility necessary to ensure that it is workable for the duration of the IM, given the number of publicly traded bonds in New Zealand and that the composition of those bonds will change over time.

E5.66 A worked example on the estimation of the debt premium for EDBs is included from paragraph E5.107. The approach for estimating the debt premium for Airport Services would be very similar.

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553 Powerco Limited, *Powerco submissions on Parts 1-4 of revised draft input methodologies determination for electricity and gas distribution businesses*, 12 November 2010, p. 3.

554 Vector, *Submission I response to the Commerce Commission's Revised Draft Determinations and Consultation Update Papers for Electricity Distribution Businesses and Gas Pipeline Businesses, Cost of Capital*, 16 November 2010, p. 4.

555 Vector Limited, *Submission I response to the Commerce Commission's Revised Draft Determinations and Consultation Update Papers for Electricity Distribution Businesses and Gas Pipeline Businesses, Cost of Capital*, Attachment: Competition Economists Group, *Review of updated input methodologies*, November 2010, p. 21.

556 NZ Airports Association, *Technical consultation: Submission on revised draft input methodology determinations*, 22 October 2010, p. 14.

557 Telecom, *Input methodologies electricity distribution services – WACC (cost of capital)*, 12 November 2010, p. 2.

Averaging period

E5.67 Debt premiums on corporate bonds, and the risk-free rate, are continually changing. Therefore the timing of when these rates are determined for the purposes of estimating the cost of capital could have a material effect on the estimate.

E5.68 In previous regulatory decisions, the Commission has used the month end corporate borrowing rate for the two or three preceding month ends.

E5.69 The availability of relevant data is gradually improving over time. As a consequence, to minimise the effect of unusual market volatility, the IM provides for use of the average of the daily observations for one calendar month prior to when the cost of capital is being estimated for both the debt premium and the risk-free rate.

Updating the debt premium

E5.70 As outlined above, the debt premium (similar to the risk-free rate) can be subject to volatility. This volatility has been particularly pronounced during the recent GFC. Therefore, the Commission will update its estimate of this parameter each time it is required to estimate the cost of capital.

Standard error of the debt premium

E5.71 The debt premium is an estimate and as such has uncertainty associated with it. The standard error captures this uncertainty and will be estimated alongside the debt premium parameter on an annual basis.

E5.72 The standard error of the debt premium, denoted by s_n, is estimated using the following formula:

$$s_n = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}\left(x_i - \bar{x}\right)^2}$$

where:
N is the number of sample observations;
x_i are the observed values of the sample items; and
$\bar{x}$ is the mean value of these observations (the debt premium estimate).

E5.73 In estimating the standard error of the debt premium the Commission will have regard to bonds rated A- that are issued by a supplier of airport services that are neither majority owned by the Crown nor a local authority.[558]

E5.74 However, if there are no bonds that meet the criteria above the Commission considers that an appropriate floor for the debt premium standard error is 0.0015 p.a. As AIAL is currently the only issuer that meet the criteria, the standard error for estimating the cost of capital for airport services will likely be 0.0015.

Commission's reasons - debt issuance costs

E5.75 Debt issuance costs are the costs associated with issuing debt capital that firms incur in addition to the interest rate paid on the debt itself. Debt capital normally has a finite period to maturity, so debt capital needs to be re-financed regularly. The

[558] By Standard and Poors or an equivalent rating by Moody's or Fitch.

Commission considers that debt issuance costs to re-finance debt capital are a legitimate expense that ought to be compensated.[559] As the IM adopts a notional debt premium a notional allowance is also made for debt issuance costs.

E5.76 There are two possible approaches to compensating for debt issuance costs—through cash flows or a margin that is added to the cost of debt capital.

E5.77 In advice on the Gas Authorisation Dr Lally considered that the allowance for debt issuance cost in the cost of debt capital as opposed to including them in the cash flows was superior, because it allocates the costs to all periods rather than concentrating them in the periods in which they are paid.

E5.78 In advice to the Commission in the Expert Panel report, Dr Lally recommended that the Commission include debt issuance costs in the cost of capital. Professor Myers recommended that the Commission handle debt issuance costs through the regulatory cash flows and not in the cost of capital.[560]

E5.79 In advice on the Gas Authorisation and 2006/2007 and 2007/2008 TSO net cost calculation determinations, Dr Lally recommended that the Commission include debt issuance costs in the cost of debt capital as a 30 basis points addition.[561] This figure was derived from Lee, Lochhead, Ritter and Zhao (Table 2) who found that the average cost of a new bond issue was approximately 130 basis points (1.30%).[562] The 30 basis points (0.3%) is the result of annualising the 130 basis points (1.30%) cost for a new bond issuance over five-years, and rounded up from an estimate of 26 basis points (0.26%).

E5.80 Some submitters provided more recent data on the costs of issuing publicly traded bonds in New Zealand:

- based upon its identified sample of 17 bond prospectuses for New Zealand dollar denominated debt, PwC (for ENA and Telecom) provided evidence that implied an average debt issuance cost of 37 basis points (0.37%) per annum;[563]

[559] In contrast, equity capital is normally available into perpetuity and does not need regular refinancing. Therefore, the Commission has not included an equity issuance cost allowance in estimating the cost of equity capital as the implied issuance cost per annum is immaterial.

[560] Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, p. 32.

[561] Lally, M., *The weighted average cost of capital for gas pipelines businesses, paper prepared for the Commerce Commission,* 28 October 2008, p. 87; Lally, M., The Estimated Debt premium for the TSP, report prepared for the Commerce Commission, 25 June 2009.

[562] Lee, I., Lochhead, S., Ritter, J. and Zhao, Q., The Cost of Raising Capital, *The Journal of Financial Research*, Vol. 19, 1996, pp. 59-74.

[563] Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 34; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 34.

- Asia Pacific Risk Management (for Unison) did not provide a separate analysis but stated that they agreed with PwC's conclusions; and[564]

- based upon its identified sample of 23 bond prospectuses for New Zealand dollar denominated debt, Bancorp (for Vector) provided evidence that implied an average debt issuance cost of 47 basis points (0.47%) per annum.[565]

E5.81 PwC and Bancorp's analysis has been based on the amount of debt offered. However, according to the Bancorp analysis, approximately half of the offers they identified actually raised significantly more debt than that offered (i.e. significant over-subscriptions were accepted). These over-subscriptions would almost certainly lower the actual basis point per annum equivalent of the average debt issuance costs incurred below PwC's and Bancorp's respective estimates.[566]

E5.82 Adjusting the issuance costs for the debt actually raised (as identified by Bancorp), PwC's evidence implies an average actual debt issuance cost of 33 basis points (0.33%) per annum, and Bancorp's evidence implies an average actual debt issuance cost of 34 basis points (0.34%) per annum.[567]

E5.83 Notwithstanding some issues with the quality of the data regarding the costs of issuing publicly traded bonds in New Zealand, the Commission considers this publicly available data provides an improved basis for estimating the level of debt issuance costs. Therefore, the Commission has increased the allowance for debt issuance costs to 35 basis points (0.35%) per annum, based on amortising the debt issuance costs over the same period as the term of the debt premium (i.e. five years). The Commission considers this to be a generous allowance. The allowance is higher than the allowance used by other regulators. However, the Commission considers this is reasonable as New Zealand entities tend to have smaller debt issues than their overseas counterparts.

E5.84 The Commission notes that the Australian regulator, IPART, allows 12.5 basis points (0.125%) per annum for debt issuance costs. The UK Competition Commission allowed 15 basis points (0.15%) per annum in the Heathrow and Gatwick decision, but in the subsequent Stansted decision noted that this was too high and reduced the allowance for debt issuance costs to 10 basis points (0.10%) per annum.

E5.85 The submission from PwC (for ENA and Telecom) also highlighted that some small firms have incurred much higher debt issuance costs when issuing bonds in New Zealand – their analysis implied average debt issuance costs of 160 basis points

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564 Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Asia-Pacific Risk Management Limited, *Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited*, 12 August 2010, p. 37.

565 Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Bancorp Treasury Services Limited, *Expert Report to Vector Limited*, August 2010, p. 59.

566 Not surprisingly, there is substantial overlap between the samples identified by PwC and Bancorp. However, there are a number of discrepancies in the detail of those offers which appear in both samples.

567 The average actual debt issuance costs are likely to have been slightly higher due to the higher amount of debt actually raised.

(1.60%) per annum. [568] The Commission does not consider that this evidence is relevant to Airports. None of these small firms identified by PwC are subject to regulation under Part 4 or have a similar risk profile to Airports. These firms are not comparable to Airports. In addition, three of the five referenced bond issues date from 2001. It is likely that these small firms issued bonds, rather than obtain bank loans, to avoid compliance with a range of potentially more onerous financing terms (including regular reporting to the bank) and covenants imposed by banks. Setting the allowance for debt issuance costs based upon this evidence would imply, amongst other things, that consumers of regulated services should be required to pay the costs of decisions by small firms to remain inefficiently small.

E5.86 Asia Pacific Risk Management (for Unison) and Bancorp (for Vector), submitted that allowance should also be made for the costs of maintaining committed bank liquidity lines.[569] The Commission notes that these types of facilities typically support short term funding programmes, such as commercial paper programmes. Neither submitter presented any evidence that the all up debt premium of these facilities exceeded the all up debt premium allowed by the Commission's approach based on publicly traded bonds. In fact, Asia Pacific Risk Management (for Unison) presented a table setting out the all up debt premium over New Zealand government bonds for committed bank funding facilities ranging from one year up to five years (the all-up debt premium increases with term) it noted that the all-up debt premium for a five year committed bank funding facility is similar to the all-up debt premium of a five year publicly traded bond.[570] This implies that the Commission's approach of estimating the all-up premium on public bonds produces a reasonable estimate of the cost of bank loans.

E5.87 Asia Pacific Risk Management (for Unison), Bancorp (for Vector) and Vector submitted that allowance should also be made for the costs associated with raising debt offshore, including the conversion factor and basis swap spread.[571]

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568 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 36; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 35.

569 Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers,* Attachment: Asia-Pacific Risk Management Limited, *Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited,* 12 August 2010, pp. 36-38; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital,* Attachment: Bancorp Treasury Services Limited, *Expert Report to Vector Limited,* August 2010, pp. 40-43.

570 Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers,* Attachment: Asia-Pacific Risk Management Limited, *Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited,* 12 August 2010, p. 34.

571 Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers,* Attachment: Asia-Pacific Risk Management Limited, *Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited,* 12 August 2010, pp. 31-34; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline*

E5.88 Asia Pacific Risk Management (for Unison) also submitted that EDBs would view the New Zealand debt capital market as their primary funding source and would only tap international debt capital markets on an opportunistic basis.[572] Asia Pacific submitted that:

> EDB's would "tap" these funding markets when considered favourable relative to the NZ debt market. Any decision to issue in an international market would be considered relative to what could be achieved in the NZ market. It is unlikely that an EDB would have an ongoing bond programme in an international market; rather issues are less frequent and privately placed with wholesale investors. An ongoing funding programme, such as Powerco's, is more likely in the NZ debt markets. Accordingly, I do not believe an arithmetical weighting of NZ and Australian international debt premium amounts, of similar issuers and terms, is appropriate.[573]

E5.89 In contrast, Bancorp (for Vector) submitted that:

> We are also of the opinion that the Commission should consider using pricing levels from Australia when determining the debt premium. We do not recommend using pricing data from other jurisdictions such as the United Kingdom or the United States other than as a 'reasonableness' test given the inherent difficulties in trying to calibrate these to reflect New Zealand specific conditions.[574]

E5.90 An Airport may decide to obtain a portion of its funding from offshore, where the cost of such funding is more attractive than financing in New Zealand. However, as the primary funding source is New Zealand, New Zealand sourced estimates are the benchmark.

Conclusion - debt issuance costs

E5.91 The Commission considers that costs associated with prudent refinancing are legitimate expenses that ought to be compensated. In principle, so long as suppliers of regulated services are compensated only once for debt issuance costs, the Commission is indifferent as to whether the compensation occurs through the allowed cash flows or as a margin on the cost of debt capital.

E5.92 The cost of capital IM provides a supplier with compensation for a notional cost of debt capital rather than its actual cost of debt capital. As such, it should also incorporate the debt issuance costs as a notional amount in the cost of debt capital rather than as an actual cost in the cash flows. On this basis, the appropriate way to allow for debt issuance costs is by adding a margin on the cost of debt capital, rather than the alternative of requiring estimation of nominal debt capital so as to derive a dollar cash flow value of debt issuance costs.

Businesses Cost of Capital, Attachment: Bancorp Treasury Services Limited, *Expert Report to Vector Limited,* August 2010, pp. 42-43.

572 Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Asia-Pacific Risk Management Limited, *Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited*, 12 August 2010, p. 31.

573 Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Asia-Pacific Risk Management Limited, *Commerce Commission Cost of Debt Funding Submission Report: prepared for Unison Networks Limited*, 12 August 2010, p. 2.

574 Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Bancorp Treasury Services Limited, *Expert Report to Vector Limited*, August 2010, p. 34.

E5.93 Whilst there are a range of options available to suppliers for raising debt, publicly available data with respect to debt issuance costs is only available for publicly traded bonds. Using other options would require the use of non-public data, which is likely to impede the ability of suppliers and interested parties to independently replicate the debt issuance cost estimation process. The Commission considers that an allowance for debt issuance costs of 35 basis points p.a. (0.35% p.a.) added to the cost of debt capital is appropriate, based on amortising the debt issuance costs over the same period as the term of the debt premium i.e. five years.

E5.94 The Commission notes that, while there is some level of uncertainty as to what the true debt issuance costs are, this uncertainty has little effect on suppliers' cost of capital as a small difference in debt issuance costs is likely to be immaterial to the final allowed rate of return. Therefore, no allowance is made for the standard error of debt issuance costs.

Will the IM produce commercially realistic estimates of the debt premium and debt issuance costs?

E5.95 This section discusses whether the IM will produce commercially realistic estimates of the debt premium and debt issuance costs for regulated suppliers, given the actual debt premium and issuance costs for such suppliers.

E5.96 The Commission has compared its estimate of the debt premium when applying the IM with the estimates provided through the Bloomberg New Zealand fair value curve. The Bloomberg fair value curve with the closest rating to the A- rating is the New Zealand A fair value curve. As at 1 September 2010, the Commission estimates the debt premium on a A- rated bond with a five-year remaining term to maturity as 1.75% p.a., while the corresponding Bloomberg fair value estimate of the debt premium for an A rated bond is 1.59% p.a. Given the differences in assumed credit ratings, the estimate of a 1.75% p.a. debt premium for an A- rated bond is appropriate in the Commission's view.

E5.97 The Commission requested confidential details of the costs actually incurred by regulated suppliers with respect to raising debt capital. The information provided by suppliers indicates that the all up debt premium (debt premium plus annual allowance for debt issuance costs) under the IM is comparable with the all up debt premium actually incurred on debt capital recently raised by suppliers. Relative to debt capital raised by suppliers in the past, the estimates provided under the IM are generous.

E5.98 The Commission's request for information from regulated suppliers also obtained information on the issuance costs actually incurred on bonds that are currently on public issue. The Commission estimated the value weighted average debt issuance costs on publicly issued bonds for each supplier which responded. The average debt issuance costs were 0.22% p.a. This implies the 0.35% p.a. allowance for debt issuance costs in the IM is appropriate, if not generous in favour of suppliers.

E5.99 Bancorp (for Vector) submitted an analysis of debt issuance costs and proposed a considerably higher allowance for debt issuance costs.[575] However, Bancorp's analysis makes little reference to the costs actually incurred by Vector with respect to raising its own debt capital. In light of the confidential information received from EDBs, GPBs and Transpower in response to the Commission's request for information (referred to in the previous two paragraphs), the Commission is comfortable that the IM will produce an all-up debt premium (including debt issuance costs) that is commercially realistic.

E5.100 The IM estimates the debt premium by reference to the yields on New Zealand publicly traded bonds. Some firms can and do access other debt markets, especially via US private placements, to secure long maturity debt and diversify funding sources when it is attractive to do so. The Commission has considered whether the IM generates estimates of the all-up debt premium that will allow regulated suppliers to access the US private placement market first by reference to the historic debt premiums between the New Zealand and US markets adjusting for costs; and second by reference to recent transactions involving AIAL. Each is discussed in turn.

E5.101 Figure E5 below sets out the difference (gross credit spread difference) between:

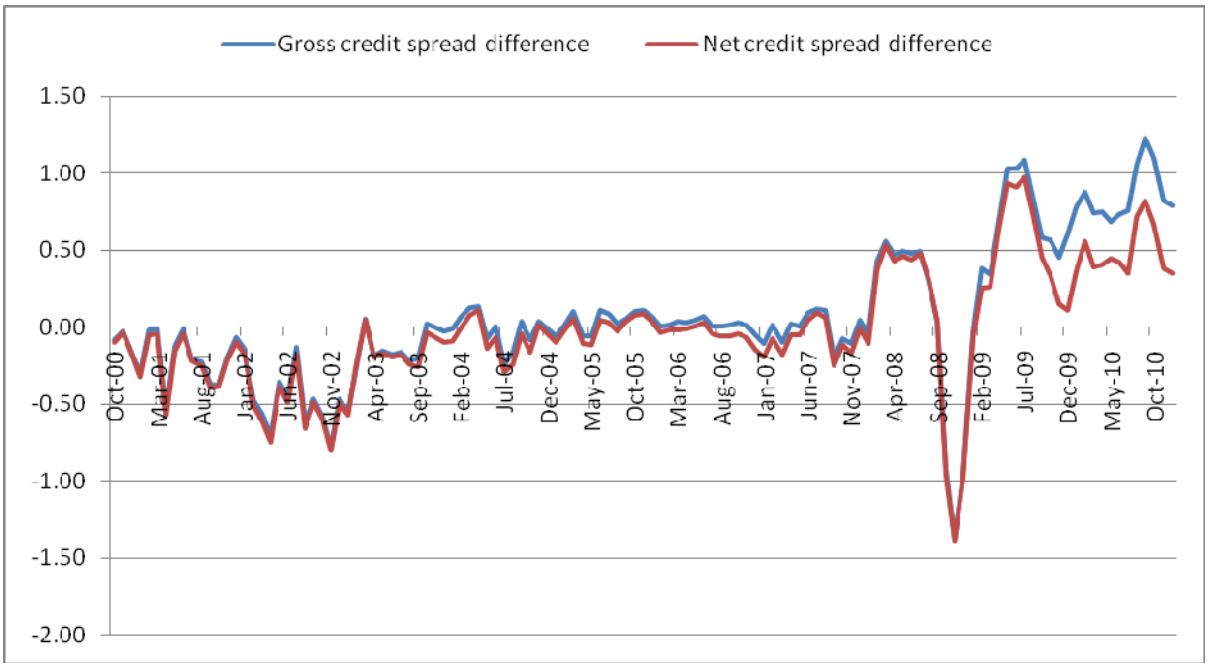
- the credit spread between the Bloomberg NZ A fair value curve and the Bloomberg NZ swap rate, for a tenor of five years, over the last ten years; and
- the credit spread between the Bloomberg US Utility A fair value curve and the Bloomberg US swap rate, for a tenor of five years, over the last ten years.[576]

E5.102 The figure also shows this gross credit spread difference net of the Bloomberg NZD/USD basis swap spread, for a tenor of five years, (net credit spread difference) over the last ten years.

[575] Bancorp (for Vector), *Debt Issuance Cost Analysis*, 16 November 2010.

[576] Bloomberg fair value curves are used for this analysis as they provide an efficient and consistent basis for a comparison over an extended period of time. The A fair value curve is used as this is the closest available fair value curve to the A- (Airports) / BBB+ (EDBs, GPBs, and Transpower) rating specified under the IM.

Figure E5 Raising US Debt – Gross and Net Credit Spread Difference



E5.103 Where this net credit spread difference is positive, this indicates the possibility that the all-up cost of US dollar debt capital swapped to New Zealand dollars is less than the all-up cost of New Zealand dollar debt capital. To ascertain whether this is definitely the case requires a consideration of costs not reflected in the net credit spread difference (for example, the conversion factor, Approved Issuer Levy, hedging credit cost, and issue costs), and the 0.35% allowance for debt issuance costs specified under the IM.

E5.104 The Commission concludes that, on average over time, New Zealand referenced estimates of the debt premium are a reasonable proxy for US debt premiums (including the basis swap spread). Sometimes, the US market is relatively unattractive versus the New Zealand debt market (for example, 2000-2002) while at others times (such as the past 18 months) US debt markets are relatively cheaper and therefore attractive to New Zealand corporate borrowers. The Commission notes that a number of New Zealand firms have recently accessed the US debt markets for long maturity debt, including both AIAL and Vector (and have swapped it back to New Zealand dollars).

E5.105 In mid November 2010 Auckland International Airport publicly announced details of its sale of US$150 million of notes (comprised of three tranches) in the US private placement market to re-finance maturing debt.[577] Swapped into New Zealand dollars (i.e. including the cost of the basis swap, conversion factor and hedging credit cost), the notes provide long term funding at debt premiums over the New Zealand benchmark interest rate of 2.145% (10 year tenor), 2.078% p.a. (12 year tenor) and 2.268% p.a. (10 year tenor) respectively. This re-financing demonstrates that suppliers do use swaps and will raise debt capital overseas when it is cheaper to do so (i.e. the all-up cost of US dollar debt capital converted to New

[577] Auckland Airport, *Inaugural USPP Issuance for Auckland Airport*, NZX Market Release, 19 November 2010.

Zealand dollars is less than the all-up cost of New Zealand dollar debt capital). Adjusting for the tenor of this long term debt capital, the debt premium payable by AIAL on its recent US issue is similar to the debt premium that would be estimated under the IM. (For example, based on the yield to maturity of AIAL's publicly traded bonds in New Zealand, the interpolated debt premium for a five year tenor is approximately 1.75% p.a. plus 0.35% per annum for debt issuance costs plus the term credit spread differential allowance).

E5.106 Based on the forgoing discussion of actual costs of debt incurred by New Zealand regulated suppliers, the Commission concludes that the cost of capital IM will produce estimates of the cost of debt, including debt issuance costs, which are commercially realistic.

A worked example illustrating how the debt premium is estimated

E5.107 Under the IM the debt premium will be estimated by taking account of the average debt premium, relative to five-year government stock, that would reasonably be expected to apply to publicly traded vanilla New Zealand dollar denominated corporate bonds issued by the regulated service in question that is neither majority owned by the government nor a local authority, with a Standard and Poors long-term credit rating of BBB+ for EDB/GPB and Transpower (A- for Airports), or equivalent rating from Moody's or Fitch, and a remaining term to maturity of five-years.

E5.108 Under the IM the debt premium for a regulated service is to be estimated using the following three general steps:

i. Identify credit-rated publicly traded vanilla[578] corporate bonds denominated in New Zealand dollars, issued by the regulated service in question in New Zealand and, as a cross-check, issued by other infrastructure businesses which are not the regulated services in question, in New Zealand.

ii. Obtain the wholesale market yield to maturity on these bonds and the contemporaneous risk-free rate, and estimate the debt premium by taking the difference between these two.

iii. Estimate, by interpolation, what the debt premium would be for a term to maturity equal to the regulatory period, consistent with a specified Standard and Poors long-term credit rating, or equivalent rating from Moody's or Fitch, for bonds issued by the regulated service in question.

E5.109 The IM Determinations provide a more detailed description of the approach. For Airports see Part 5, Clause 5.4.[579]

E5.110 To address the small number of bonds with the specified Standard and Poors (or equivalent) long-term credit rating that are publicly traded in New Zealand the IM Determination sets out a hierarchy of publicly traded bonds to be considered. These include:

[578] Vanilla bonds are defined as senior unsecured nominal debt obligations denominated in NZ$ without callable, puttable, conversion, profit participation, credit enhanced or collateral features.

[579] Commerce Commission, *Commerce Act (Specified Airport Services Input Methodologies) Determination*, 22 December 2010.

i. those which are not issued by the regulated service in question;

ii. those with a Standard and Poors long-term credit rating other than the stipulated credit rating; and

iii. those issued by an entity majority owned by the government or a local authority.

E5.111 In each case the observed debt premium is adjusted to approximate the debt premium that is likely to have been observed had the bond been of the type first described.

E5.112 This section provides a worked example of the process in the IM for estimating the debt premium for EDBs, GPBs and Transpower as at 1 September 2010. The methodology for estimating the debt premium for inclusion in the estimated WACC for Airport services is highly similar, and the worked example outlined below is instructive for airports also.

Estimating the debt premium for EDBs, GPBs and Transpower

E5.113 For EDBs, GPBs and Transpower the IM specifies that the appropriate Standard and Poors long-term credit rating for setting the debt premium is BBB+. This example estimates the debt premium as at 1 September 2010.

E5.114 The EDBs IM Determination (see Part 2, subpart 4, clause 2.4.4, subclause 3(d)) indicates that the debt premium is the average spread that would be expected to apply to a vanilla NZ$ denominated bond that:[580]

i. is issued by an EDB or GPB that is neither majority owned by the crown nor a local authority;

ii. is publicly traded;

iii. has a qualifying rating of BBB+; and

iv. has a remaining term to maturity of five years.

E5.115 Based on data from Bloomberg, Table E4 provides the remaining term to maturity and estimated debt premiums consistent with the remaining term to maturity of five years following the EDBs determinations as at 1 September 2010. That is, it averages data for the month of August 2010, to estimate the debt premium for 1 September 2010, and interpolates to five years remaining term to maturity (or closest period) the debt premium as the difference between the contemporaneous wholesale yields of the identified corporate bonds and government bonds.

[580] There is a difference between the estimation periods of the cost of capital between the various regulatory instruments. For the process for Airport Services see Part 5, clause 5.4 in the Airport IM Determinations. Commerce Commission, *Commerce Act (Specified Airport Services Input Methodologies) Determination*, 22 December 2010.

Table E4 Bond Issuers and Debt Premiums Under Consideration

Bond Issuer	S&P long-term Credit Rating	Remaining Term to Maturity (years)	Estimated Debt Premium (% p.a.)
Transpower*	AA-	5	1.16%
AIAL*	A-	5	1.75%
Genesis Energy*	BBB+	5	1.58%
Mighty River Power*	BBB+	5	1.73%
Vector	BBB+	4.1	1.82%
WIAL	BBB+	3.2	2.34%
Contact Energy*	BBB	5	2.10%
Powerco*	BBB	5	2.24%

* interpolated from bonds with remaining term to maturity greater than and less than five years.

E5.116 Each IM Determination sets out the order in which the Commission will have regard to the debt premium estimates.[581]

E5.117 Subclause 4(a) indicates that the Commission will have regard to bonds that:

i. have a qualifying rating of BBB+; and

ii. are issued by an EDB or GPB that is neither majority owned by the Crown nor a local authority.

E5.118 In Table E4 there is only one bond that fits the criteria of subclause 4(a), which is the bond issued by Vector. However, this single bond has a remaining term to maturity of less than five years.

E5.119 Subclause 5(b) states that the spread on a bond that has a remaining term to maturity of less than five years will ordinarily be considered to be the minimum spread that would reasonably be expected to apply on an equivalently credit-rated bond issued by the same entity with a remaining term to maturity of five years.

E5.120 Therefore, only taking into consideration subclause 4(a) the minimum debt premium for a qualifying rating of BBB+ is estimated to be 1.82% p.a.

E5.121 Subclause 4(b) indicates that the next criteria the Commission will have regard to are those issues that:

i. have a qualifying rating of BBB+; and

ii. are issued by an entity other than an EBD or GPB that is neither majority owned by the Crown nor a local authority.

E5.122 A bond issued by WIAL fits these criteria but has a remaining term to maturity of less than five years (remaining term to maturity is 3.2 years). However, this bond is

[581] For Airports see Part 5, clause 5.4 and especially subclauses 4 and 5.

not considered to meet the criteria of subclause 5(b) as it appears to be anomalous as this debt premium estimate is higher than the debt premium estimate of the lower rated longer-term BBB bonds of Contact Energy and Powerco. As a result, there are no results considered from subclause 4(b).

E5.123 The next criteria included in the IM is subclause 4(c) which indicates that the Commission will consider bond issues that:

i. have a qualifying rating different to BBB+; and

ii. are issued by an EBD or GPB that is neither majority owned by the Crown nor a local authority.

E5.124 There is one debt premium estimate that meets these criteria, the result from Powerco bonds with a BBB Standard and Poors long-term credit rating (that is, a rating lower than a BBB+). This five-year debt premium estimate is 2.24% p.a. Having regard to this estimate implies a debt premium for a qualifying rating of BBB+ would be less than 2.24% p.a.

E5.125 The next criteria included in the IM is subclause 4(d) which indicates that the Commission will consider bond issues that:

i. have a qualifying rating different to BBB+; and

ii. are issued by an entity other than an EBD or GPB that is neither majority owned by the Crown nor a local authority.

E5.126 There are two bonds that meet these criteria, the bonds issued by:

- AIAL which has bonds with a A- Standard and Poors long-term credit rating and a five-year debt premium estimate of 1.75% p.a.; and

- Contact which has bonds with a BBB Standard and Poors long-term credit rating and a five-year debt premium estimate of 2.10% p.a.

E5.127 The resulting debt premium estimates from subclause 4(c) and (d) are based on a remaining term to maturity of five years and are one credit rating notch either side of BBB+. Subclause (5)(c) requires the Commission to adjust the spreads of bonds described under subclauses 4(b) to 4(e) to approximate the spread that is likely to have been observed had the bonds in question been of the type described in subclause 4(a) (that is, a long-term credit rating of BBB+, and been issued by an EDB or GPB). Applying subclause 5(c), the AIAL debt premium estimate (1.75% p.a. at A-)_would have been higher if it were rated BBB+ , while both the Powerco (2.24% p.a. at BBB) and Contact (2.1% p.a. at BBB) estimates would have been lower (if rated BBB+). In short, the three estimates would have converged on around 2.0% p.a. if rated BBB+ with a remaining term to maturity of five years.[582]

E5.128 The final criteria included in the IM is subclause 4(e) which indicates that the Commission will consider bond issues that are:

i. investment grade credit rated; and

[582] Taking a simple average of these three estimates also results in an estimated debt premium of 2.0% p.a.

ii. issued by an entity that is majority owned by the Crown or a local authority.

E5.129 There are three entities with bonds that meet these criteria. These bonds were issued by:

- Transpower, which has bonds with a Standard and Poors long-term credit rating of AA- and a five-year debt premium estimate of 1.16% p.a.;
- Genesis Energy, which has bonds with a Standard and Poors long-term credit rating of BBB+ and a five-year debt premium estimate of 1.58% p.a.; and
- Mighty River Power, which has bonds with a Standard and Poors long-term credit rating of BBB+ and a five-year debt premium estimate of 1.73% p.a.

E5.130 Clause 2.4.4(5)(a) establishes a hierarchy with progressively lesser regard given to bonds identified in subclause (4)(b) to (4)(e), with least regard placed on 4(e). Little weight is placed on the debt premium estimates from the Transpower, Genesis Energy and Mighty River Power. These do not alter the debt estimate as they are all below the minimum debt premium estimate set by the Vector bond of 1.82% p.a.

E5.131 In this example, in estimating the five-year debt premium for a qualifying rating of BBB+ as at 1 September 2010 the Commission had primary regard to the following debt premium estimates:

i. on bonds specified in subclause 4(a) the minimum debt premium is 1.82% p.a.;

ii. taking into considerations the results from bonds specified in subclause 4(c) and (d), and the adjustment required in Clause 2.4.4(5)(c), the Commission considers this information provides an appropriate debt premium estimate of 2.0% p.a. for EDB, GPB and Transpower.

Conclusion on the debt premium estimate from the worked example

E5.132 Following the EDBs IM Determination Part 2, subpart 4, clause 2.4.4 the Commission estimates a debt premium to apply to EDB, GPB and Transpower as at 1 September 2010 is 2.0% p.a.

E6 Term Credit Spread Differential

E6.1 The cost of capital IM uses a risk-free rate and debt premium estimated over a term that matches the pricing period, generally five years. .

E6.2 Regulated suppliers may issue debt with a term exceeding five years to manage their refinancing risk. The issue of such debt will typically have a greater debt premium due to the longer term. Regulated suppliers who issue long term debt may also incur costs to enter into interest rate swaps to reduce their initial interest rate re-pricing period from the length of the bond, to a shorter period.

E6.3 The ID Determination recognises the additional debt premium and the interest rate swap execution costs that are incurred from issuing longer term debt, to the extent

that such debt is issued. This will be achieved through an allowance – the allowance for long-term credit spread.

E6.4 This allowance will not apply to all suppliers. Rather, it will apply only to regulated suppliers whose debt portfolio, as of the date of the most recent audited financial statements, has a weighted-average tenor greater than five years. For such suppliers the allowance will apply in respect of individual bond issues which have a tenor exceeding five years ('qualifying debt').

E6.5 The allowance is not part of the WACC, but in the context of information disclosure, it will be reflected in the expenses and ROI disclosed in accordance with the ID Determination.

E6.6 In respect of qualifying debt issues, the allowance represents:

- the additional term credit spread difference over swap on long-term debt versus that on five year debt as at the date of pricing;[583]
- the execution costs of an interest rate swap; and
- a downward adjustment in relation to the annual notional debt issue costs to reflect the longer term of the qualifying debt issue.

Each is discussed in turn.

The term credit spread difference

E6.7 Like the methodology for estimating the debt premium, the term credit spread difference is estimated based on debt with an assumed Standard and Poors long-term credit rating of A- for Airports. However, due to the limited number of long-maturity bonds (especially with maturities of around 10 years), the Commission has considered further how the term credit spread difference can best be estimated in practice. In particular, the Commission considers that the use of Bloomberg NZ fair value curves is a practical alternative to trying to estimate the term credit spread difference by reference to the debt premiums on individual bonds (and avoids the need to extrapolate).

E6.8 The following table sets out the estimated additional credit spread over swap (expressed in % per annum) between a tenor of 10 years and a tenor of five years, at a selection of dates in the past, for selected New Zealand publicly traded bonds, the Bloomberg NZ A fair value curve and the Bloomberg US Utility A, BBB+ and BBB fair value curves.

[583] By convention, interest rate swaps reference the swap rate rather than the government bond rate.

Table E5 Additional Credit Spread over Swap between Five-year and 10-year Debt

Entity	S&P Long-term credit rating	Jun 2005	Jun 2006	Jun 2007	Jun 2008	Jun 2009	Jun 2010
Powerco	BBB	0.18%	0.15%	0.14%			
AIAL	A-		0.19%	0.16%			
Telecom	A		0.21%	0.20%			
Bloomberg NZ BFV	A		0.18%	0.16%	0.41%	0.60%	-0.05%
Bloomberg US Utility BFV	A	0.15%	0.17%	0.15%	0.22%	0.18%	0.49%
Bloomberg US Utility BFV	BBB+	0.19%	0.22%	0.15%	0.44%	0.07%	0.39%
Bloomberg US Utility BFV	BBB	0.15%	0.25%	0.19%	0.53%	0.05%	0.41%

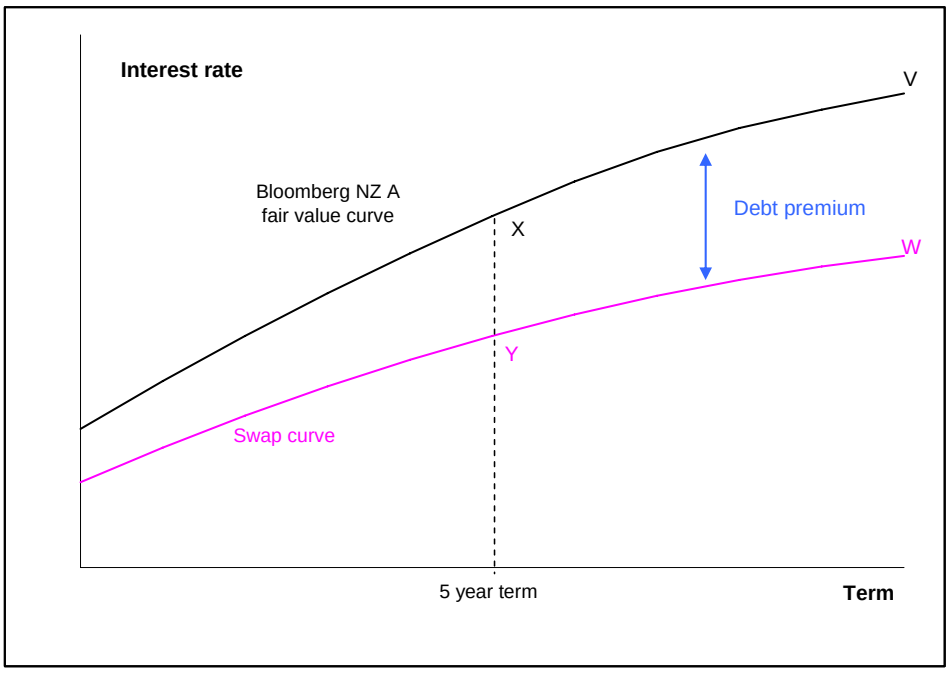
Source: Bloomberg, Commission analysis

E6.9 As can be seen in the above table, the lack of new issuance of appropriate New Zealand publicly traded bonds since 2007 with a tenor of, for example, 10 years makes it difficult, without extrapolation, to estimate the additional credit spread over swap relative to a tenor of 10 years. In addition, the affects of the volatility associated with the GFC is apparent in the estimates from 2008 onwards.

E6.10 Bloomberg does not currently offer a New Zealand fair value curve with a Standard and Poors long term credit rating less than A. However, the estimates from the New Zealand publicly traded bonds and the Bloomberg NZ and US fair value curves shown in the table above do not suggest that there is a discernible difference in the estimate of the additional credit spread over swap related to considering debt issues with a Standard and Poors long term credit rating of BBB, BBB+, A- or A, as opposed to the target of BBB+ / A-. This suggests that the Bloomberg NZ A fair value curve is a good proxy for estimating the term credit spread difference on A- bonds. The ID Determination therefore specifies that the term credit spread difference should be estimated by reference to the Bloomberg NZ A fair value curve.

E6.11 The additional credit spread over swap is the difference between the Bloomberg NZ A fair value curve, as a proxy for long-term corporate debt, and the contemporaneous swap rate for the same tenor as the Airport's qualifying debt issue and for a tenor of five years, as at the date of pricing the long-term corporate debt issue. The graph below illustrates the spread. Specifically the term credit spread difference is defined as (V-W) - (X-Y) on the graph below. The Bloomberg NZ A fair value curve will be used to estimate the interest rates V and X.

Figure E6 Illustration of the Term Credit Spread



E6.12 It is apparent in the Table E5 above that the volatility associated with the GFC is having an effect on the estimates of the additional credit spread over swap. In particular, there are some estimates which are implausibly low (for example, that the differential could be negative). This could be addressed by setting a minimum floor on the additional credit spread over swap. Setting a minimum both gives qualifying suppliers with qualifying debt a degree of certainty and also protects them on the downside from exposure to post GFC volatility. Likewise, there are some estimates which appear to be abnormal spikes, which could be addressed by setting a maximum cap on the additional credit spread over swap.

E6.13 Based on the estimates from the various data sources referenced in the table above, the Commission has set a minimum of 0.15% per annum and a maximum of 0.60% per annum for the additional credit spread over swap.

Execution cost of an interest rate swap

E6.14 Allowance will also be made for interest rate swap execution costs (i.e. the amount that is half of the wholesale bid and offer spread for an interest rate swap, for a notional principal amount equal to the principal amount of the debt) on qualifying debt as at the date of pricing.

Notional debt issue cost readjustment

E6.15 There will also be a re-allocation of the annual notional debt issuance costs to reflect the longer tenor of the qualifying debt issue. An allowance for debt issuance costs is included in the WACC at 0.35% per annum on an assumed term of five years. Regulated suppliers that issue longer maturity debt have the greater term credit spread on such debt recognised through the term credit spread difference allowance.

Such regulated suppliers will incur debt issuance costs less frequently. Therefore the allowance for debt issuance costs needs to be re-allocated to reflect the longer debt maturity. The adjustment will reallocate the costs over the tenor of the qualifying debt issue (rather than the assumed five year term in the WACC specified in the IM Determination). This reallocation will be included in the allowance for long term credit spread, while the 0.35% allowance for issuance costs will be included in the WACC. The notional debt issue cost readjustment will be a negative number.

E7 TAMRP

Approach - TAMRP

E7.1 The IM provides that the TAMRP, relative to a five-year risk-free rate, is 7%.

E7.2 Due to the impact of the GFC on the premium for owning risky assets, the TAMRP is temporarily increased to 7.5% for the regulatory years ending in the calendar years 2010 and 2011. After this the TAMRP reverts to its long-term level of 7%.

E7.3 The TAMRP will be expressed as a composite rate for a five year period. For example, for the year commencing 1 July 2010, the TAMRP would be 7.1% and for the year commencing 1 July 2011, it would be 7.0%.[584]

Commission's reasons - approach to estimating the long-term TAMRP

Overview

E7.4 The market risk premium ('MRP') measures the additional expected return over and above the risk-free rate required to compensate investors for holding the market portfolio. It represents the premium investors can expect to earn for bearing only systematic (market) risk. The form of the MRP that is consistent with the simplified Brennan-Lally CAPM is the TAMRP. The TAMRP is neither a supplier-specific parameter nor an industry-specific parameter, but rather is common to all assets in the economy.

E7.5 Most of the underlying data is expressed in terms of the MRP (i.e. before making the tax adjustment that is required in applying this parameter in the simplified Brennan-Lally CAPM) and, therefore, in this Reasons Paper data relating to MRP estimates has been converted to the TAMRP equivalent.[585] In the interest of brevity, the term

[584] A five-year TAMRP is derived as a weighted average of the years that 7.5% applies and the years 7% applies. For example, the TAMRP of 7.1% from 1 July 2010 is derived as the weighted average of one year at 7.5% and four years at 7%, (calculated by $(7.5 \times 1 + 7.0 \times (5 - 1)) \div 5$).

[585] For the non-Australian estimates the MRP is related to the TAMRP by using the formula MRP = TAMRP – $R_f(T)$, where R_f is the risk-free rate and T is the investor tax rate (the value for investor tax rate will depend on the time period and tax assumption that the estimate is based on). For the conversion process of the Australian based MRP estimates see Lally, M., *International Comparison of Regulatory Cost of Capital for Gas Distribution Businesses*, Report to the New Zealand Commerce Commission, 28 October 2008, p. 12. Charles River Associates for Unison (see *Regulated Returns for Australian and New Zealand Electricity Distribution*, 15 August 2010, pp. 41-42) submit that the utilisation rate for the Australian based MRP conversion process should use the latest AER estimate of 0.65, rather than assume a utilisation rate of 1 which implies fully segregated markets. Dr Lally (see *Comments on Input Methodologies (EDS) Draft Reasons Paper*, 3 September 2010, pp. 7-9) notes that the AER estimate of 0.65 relies on data both prior to and subsequent to a relevant tax change in 2001, whereas the AER should only rely on data subsequent to this tax change. In addition, the AER has misinterpreted the analysis contained in a study it has relied on. Correcting for these two items, the AER's estimate of the utilisation rate should have been 0.77, rather than 0.65. Finally, Dr Lally notes that the

'TAMRP' is used in the text that follows except where there is specific reference to a MRP value.

E7.6 The TAMRP is not directly observable and therefore needs to be estimated. This is because:

- the TAMRP is an *ex ante* (forward-looking) concept and, as a result, reflects investors' expectations; and
- the market portfolio itself cannot be observed as market values for many assets are not known, so it requires the use of a proxy (e.g. returns on an index of listed equities).

E7.7 In light of these factors, considerable debate remains over which of the various approaches that have been identified for estimating the TAMRP is most appropriate in a regulatory setting. This has become further complicated by the advent of the GFC, which has led to revisions about the level of risk in markets and investors' expectations towards risk.

E7.8 In reaching an estimate for the TAMRP, the Commission has considered:

- the appropriate methodology and estimate for the TAMRP;
- applying this methodology in a regulatory context, including whether both New Zealand and foreign data should be used; and
- whether any adjustment, temporary or permanent, should be made as a result of the GFC.

Appropriate methodology for estimating the TAMRP

E7.9 In estimating the TAMRP, the Commission has assessed which of a range of possible estimation techniques to adopt. In particular, the Commission has considered:

- whether to adopt an *ex post* (historic) or *ex ante* (forward-looking) estimate for the cost of capital, or some combination of both;
- whether to estimate the TAMRP using arithmetic averages or geometric averages; and
- the appropriate term of the risk-free rate used in estimating the TAMRP.

Ex post approaches

E7.10 Estimates of the expected MRP have traditionally been based on *ex post* returns. Since these returns have fluctuated significantly across countries and across time (even decades), regulators have typically used or placed weight on long-term historical estimates. Dimson, Marsh and Staunton is widely regarded by both

simplified Brennan-Lally CAPM explicitly assumes that the utilisation rate is 1 and this should extend to the estimate used in the present circumstances.

practitioners and regulators as being one of the most authoritative sources of historical estimates.[586]

E7.11 The most common *ex post* approach is to average the historical spread between market returns (i.e. the returns on a market index used to proxy the market portfolio) and risk-free rates. The most common of these is the Ibbotson (Morningstar) approach used by Dimson, Marsh and Staunton. Other *ex post* methods have been developed by Siegel[587] and Merton.[588]

E7.12 Siegel shows that the Ibbotson type estimate of the standard MRP is unusually high due to the very low returns on bonds during 1926-1990. Siegel adjusts the Ibbotson type estimate through adding back the historical average long-term real risk-free rate and then deducting an estimate of the expected long-term real risk-free rate.

E7.13 Merton estimates the market risk premium as the product of an estimate of market risk and an estimate of the market risk premium per unit of market risk.

E7.14 A key advantage of the Ibbotson *ex post* approach is that it is relatively objective and easy to interpret. Further, a conceptual justification for the use of historical estimates is that investors base expectations of the MRP on past experience. Historical premiums, however, may be poor predictors of future expected premiums. Dimson, Marsh and Staunton argue that global equity returns have exceeded expectations in the past century, and that this growth is unlikely to be repeated.[589] Thus, prospective MRP estimates based on unadjusted historical averages may be biased upwards.[590]

E7.15 It is possible that investors' risk preferences have changed over time, which would alter expected rates of return. Shifts in investors' tolerance of risk may be reflected in changes in stock price-to-earnings or stock price-to-dividend ratios. Dimson, Marsh and Staunton find a long-term upward trend in price-to-dividend ratios for a number of markets, and argue that such trends cannot persist in the long-run.[591] Removing the contribution of these trends from historical MRP averages causes their MRP estimates to fall.

E7.16 As financial markets deepen and become more globally integrated, the opportunities for investors to diversify their portfolio increase. This will tend to reduce the level

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586 Ofcom, *Ofcom's approach to risk in the assessment of the cost of capital*, August 2005, p. 29; Ofcom, *A new pricing Framework for Openreach*, May 2008, p. 85; Ofwat, *Future Water and Sewerage Charges 2010-2015 – Final Determination*, April 2009, pp. 128-129; Competition Commission, Review of Stansted Airport Q5 price control, October 2008, Appendix L, p. L17; Ofgem, *Electricity Distribution Price Control Review Final Proposal - Allowed Revenues and Financial Issues*, 7 December 2009, p. 12; AER, Final decision: Electricity transmission and distribution network service providers – Review of the weighted average coat of capital (WACC) parameters, May 2009, pp. 191-192.

587 Siegel, J., The Equity Premium: Stock and Bond Returns since 1802, *Journal of Economic Theory*, Vol. 8, 1992, pp. 28-38.

588 Merton, R., On Estimating the Expected return on the Market. An Exploratory Investigation, *Journal of Financial Economics,* Vol. 8, 1980, pp. 323-361.

589 Dimson, E., Marsh, P. and Staunton, M., *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press, New Jersey, 2002.

590 See Dimson, E., Marsh, P. and Staunton, M., Global Evidence on the Equity Risk Premium, *Journal of Applied Corporate Finance,* Vol. 14, 2003, pp. 27-38.

591 ibid.

of risk faced by investors, and therefore, the premium they expect for bearing such risk.

E7.17 The results from Dimson, Marsh and Staunton,[592] applying the Ibbotson methodology, appear to be the most commonly referenced estimates for the historical averages by regulators in Australia and the UK, and practitioners.[593] Ofcom's view is that the work carried out by Dimson, Marsh and Staunton is widely regarded as being one of the most 'authoritative sources' of historical estimates.[594] One of the reasons for this is that Dimson, Marsh and Staunton address key methodological problems that previous research on the MRP had failed to deal with, such as survivorship bias.[595]

E7.18 The reliability of estimates based on historical averages relies on the quality and availability of the underlying data. If only a relatively short time series is available, the resulting MRP estimates are likely to be statistically imprecise. However, adopting too long a series in an attempt to improve the precision of the MRP estimates increases the possibility of including data from periods that are less relevant to the current period.[596]

E7.19 In advice on the appropriate TAMRP on the Gas Authorisation, Dr Lally considered results from Credit Suisse First Boston[597] and Boyle[598] who had used the Merton methodology to estimate the MRP.[599] Boyle concluded that the results from his analysis could not be relied on. In advice on the Gas Authorisation Dr Lally noted that:[600]

> The apparent source of the problem here is that the variance shifts unpredictably over time and the market risk premium is based upon the *expected* future variance rather than past actual variance. Since actual variance fluctuates much more than expected variance, Boyle's range overestimates the true variation across time in the market risk premium. Clearly the use of a very long period for estimating future variances would be inconsistent with the presumption of intertemporal variations that underlies this methodology.

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592 This data first appeared in Dimson, E., Marsh, P. and Staunton, M., *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press, New Jersey, 2002. Since then Dimson, Marsh and Staunton have published the results in an annual Global Investments Return Yearbook.

593 Regulators that have referenced Dimson, Marsh and Staunton estimates for the MRP in recent decisions involving the cost of capital include: AER, Ofwat, Ofcom, Ofgem.

594 Ofcom, *Ofcom's approach to risk in the assessment of the cost of capital*, August 2005, p. 29; Ofcom, *A new pricing Framework for Openreach*, May 2008, p. 85.

595 Survivorship bias is the tendency for companies that no longer exist due to failure, takeovers etc., to be excluded from performance studies because the data on them is no longer collected as they no longer exist.

596 For example, MRP estimates are available for the US using data from as far back as the 1800s. These estimates have low standard errors due to the large sample they draw on, but because financial markets have changed so significantly since the early years of that sample, the results are likely to be biased estimates of future expected premiums.

597 Credit Suisse First Boston, *Equity Valuation Methodology*, 1998.

598 Boyle, G., Risk, Expected return, and the cost of equity capital. *New Zealand Economic Papers*, Vol. 39, 2005, pp. 181-194.

599 Lally, M., *The weighted average cost of capital for electricity lines businesses*, September 2005, p. 12-13; Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, pp. 18-19.

600 Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, p. 18.

E7.20 Dr Lally further noted that the Credit Suisse First Boston results faced similar conceptual difficulties and concluded that the results from Merton-type estimates should be excluded from the final estimation of the TAMRP.

E7.21 Whilst Merton has a sound theoretical foundation, it has also been viewed as one of the least robust methods empirically because of the significant standard errors associated with the estimated results. Consequently, the Commission places no weight on the resulting Merton *ex post* estimates in its decisions following Dr Lally's recommendation.[601]

Ex ante approaches

E7.22 Using a forward-looking or *ex ante* approach to estimate the MRP is consistent with the MRP in theory being an *ex ante* measure. Among the *ex ante* approaches[602] are the DCF model and the results from surveys of academics and practitioners. These approaches have their own drawbacks.

E7.23 There are a number of well known limitations with the DCF model, which were previously noted under the Overall Approach (see Appendix E2). Some of these limitations which are relevant to estimating an *ex ante* MRP are:

- good forecasts of dividend growth are essential;
- dividend growth forecasts, which are generally only available for the short-run, often exceed the long-run rate of economic growth; and
- the models rely on the assumption that financial markets are efficient and correctly value investments at all times.

E7.24 Survey evidence can be subjective and difficult to interpret. For example, the results may suffer from non-response bias and questions, no matter how carefully crafted, either might not be properly understood or might not elicit the correct response. These issues might result in an upward or downward bias in responses. An example of this was referred to in advice to the Commission, where Dr Lally assessed an estimate of the market risk premium from survey evidence and noted that the results for at least one group (practitioners) may be biased upwards due to some responses mistakenly supplying an estimate of the TAMRP rather than the MRP.[603]

Conclusion - ex post versus ex ante approaches for estimating the TAMRP

E7.25 In light of the above discussion, both *ex post* and *ex ante* approaches are used to estimate the TAMRP for the IM.

E7.26 All Expert Panel members advised that evidence from the *ex ante* and *ex post* looking approaches should be considered. However, the experts did not agree on the

601 See for example Commerce Commission, *Electricity Distribution - Regulation of Electricity Lines Businesses Targeted Control Regime - Intention to Declare Control Unison Networks Limited*, September 2005; and Commerce Commission, *Gas Authorisation Decisions Paper*, 30 October 2008.

602 Although described here as forward-looking, the *ex ante* approaches mentioned here do, strictly speaking, draw on historical data. Specifically, analysts' earnings and growth forecasts used in the DCF model, and survey respondents' future expectations, would typically be informed by past experience.

603 Commerce Commission, *Gas Control Inquiry*, Final Report, 29 November 2004, pp. 12-13.

weight that should be given to each approach.[604] Submitters generally agreed that both approaches should be considered by the Commission when determining the TAMRP, but that greatest weight be placed on the *ex post* results.[605] However, CIAL submitted that standard practice is to use only *ex post* results.[606]

E7.27 The weighting placed on each approach is a matter of judgment for the Commission, which requires taking into account all the available evidence, and current market circumstances. For instance, if due to the GFC the world were considered a more risky place in the medium or longer term, then additional weight may need to be put on forward-looking estimates. Further consideration is given to the GFC later in this section.

E7.28 In summary, to estimate the TAMRP the Commission relied on *ex post* Ibbotson-type estimates undertaken by Dimson, Staunton and Marsh, the Siegel approach, as well as *ex ante* estimates. The Commission excluded the Merton estimates from its consideration.

Estimating the TAMRP using arithmetic averages versus geometric averages

E7.29 When the TAMRP is estimated by taking the difference between market returns and the risk-free rate, a question can arise as to whether this process should be based on arithmetic or geometric averages.

E7.30 The choice can have a material effect on the estimated TAMRP, as the arithmetic average can be of the order of 2% above the geometric average.

E7.31 As the arithmetic approach results in a higher TAMRP estimate compared to the geometric approach, a preference for the former represents a favourable decision from the view point of suppliers.

E7.32 Although the Commission has not explicitly discussed the matter in previous decisions, the Commission has used a TAMRP estimate that was based on an arithmetic average. BARNZ considered the use of the arithmetic average over the geometric average was another example of the Commission taking what was a favourable decision from the point of view of suppliers'.[607] In cross-submissions, Uniservices (for NZAA), disagreed with BARNZ, submitting that the Commission was not adopting a position favourable to suppliers in its choice of the arithmetic as opposed to the geometric average in the determination of the TAMRP.[608]

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604 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, pp. 21-22.

605 Maui Development Limited, *Submission on the Input Methodologies Discussion Paper*, July 2009, p. 19; Powerco Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: PricewaterhouseCoopers, *Commerce Commission's Revised Draft Guidelines and aspects of the Input Methodologies Discussion Paper relating to Cost of Capital prepared for Powerco Limited*, 14 August 2009, p. 14; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, pp. 9-10.

606 Christchurch International Airport Limited, *CIAL Submission on Revised Draft Guidelines,* 3 August 2009, p. 2.

607 Board of Airline Representatives New Zealand Inc, Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination, 12 July 2010, p. 17.

608 NZ Airports Association, Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in*

E7.33 In setting the TAMRP for the IM, the Commission has continued to use a TAMRP estimate based on an arithmetic average. The Commission notes Dr Lally advised that using an arithmetic average generates a value for the regulated service that is expected to match the initial investment. On the other hand, using a geometric average generates a value for the regulated service that is expected to be less than the initial investment.[609] The arithmetic approach is used by most other regulators when estimating the MRP though the UK Competition Commission and the UK CAA use geometric averages. The geometric MRP estimates range from 2.5% to 4.5%,[610] whereas arithmetic estimates are typically between 4% and 5.4%.

Term of the risk-free rate used in estimating the TAMRP

E7.34 The risk-free rate features in three places in the cost of capital calculation (in the cost of debt estimation, the first term of the CAPM and in the estimation of the TAMRP). It is explicitly part of both the cost of debt and the cost of equity. In addition, the risk-free rate is also an implied component of the TAMRP (which measures, as outlined above, the additional expected return over and above the risk-free rate required to compensate investors for holding the market portfolio).

E7.35 Appendix E4 discusses the appropriate term of the risk-free rate and that the term of the risk-free rate in the cost of debt and the cost of equity is matched to the term of the regulatory period.

E7.36 There is ongoing debate among practitioners and academics concerning what the term(s) of the risk-free rate in the cost of equity calculation should be. As part of the Expert Panel, Professor Myers and Professor Franks recommended that the Commission employ one risk-free rate in its cost of equity calculation. Dr Lally recommended that the Commission define the TAMRP relative to the average interval (across investors) between portfolio reassessments and define the term of the risk-free rate within the cost of equity calculation to match the regulatory period, even if this leads to the use of two different risk-free rates within the cost of equity.

E7.37 A number of submitters agreed that the term of the risk free rate should be consistent throughout the cost of capital IM and, as a majority of these indicated, through their submissions on the risk-free rate, that the appropriate term would be 10 years.[611]

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its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association, 3 August 2010, p. 12.

609 Lally, M., *Comments on Input Methodologies (EDS) Draft Reasons Paper*, 3 September 2010, p. 2.

610 On the cost of capital, the UK Civil Aviation Authority takes the UK Competition Commission's advice on the generic elements (i.e. the risk-free rate and the MRP). In the Competition Commission's report it used a range of 2.5-4.5% on a geometric basis CAA, *Heathrow/Gatwick quinquennial review - Final report*, 3 October 2007, Appendix F; CAA, *Airport Regulation Economic Regulation of Stansted Airport 2009-2014 – CAA Decision*, March 2009, Appendix L.

611 Powerco Limited, Input Methodologies Discussion Paper, 14 August 2009, p. 28; Powerco Limited, Submission on the Input Methodologies Discussion Paper, Attachment: PricewaterhouseCoopers, Commerce Commission's Revised Draft Guidelines and aspects of the Input Methodologies Discussion Paper relating to Cost of Capital prepared for Powerco Limited, 14 August 2009, p. 12; Auckland International Airport Limited, *Submission to the Commerce Commission Draft WACC Guidelines Paper,* 31 July 2009, p. 2; LECG, Comments on the Commerce Commission's proposed approach to estimating the cost of capital, Report for NZAA, 31 July 2009, p. 27; PricewaterhouseCoopers, Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital, Report on behalf of 17 EDBs, 14 August 2009 , p. 17; Telecom, *Annex B: Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital,* August 2009, Annex B; Commerce Commission, Cost of Capital Workshop Transcript, pp. 175-176.

E7.38 In a submission on the Draft Reasons Papers PwC (for ENA) and Uniservices (for NZAA) agreed that the term of the risk-free rate in the TAMRP should match the term of the regulatory period (regulated suppliers considered this term should be 10 years).[612]

E7.39 At the Cost of Capital Workshop and in post workshop submissions, PwC stated that their estimate of 7.5% for the New Zealand TAMRP had been primarily based on analysis it undertook of historical realised returns in the New Zealand market measured relative to short-term government bonds with a term to maturity of one to three years.[613] However, although PwC uses a term of five years for the risk-free rate in its quarterly cost of capital publication in conjunction with their TAMRP estimate it submitted that the Commission should use a term of 10 years for the risk-free rate consistently across the cost of capital.[614]

Conclusion - term of the risk-free rate used in estimating the TAMRP

E7.40 The Commission has set the term of the risk-free rate in the IM to be equal to the term of the regulatory period, typically five years. Using a term of five years for the risk-free rate in estimating the TAMRP ensures consistency.

E7.41 Given that regulatory periods can be from three to five years under Part 4 price-quality regulation, multiple TAMRP estimates may be required.

E7.42 In previous decisions, the Commission has used an estimate of the TAMRP above the 10 year risk-free rate. The IM continues the approach of estimating only one TAMRP covering all lengths of regulatory period. However, the TAMRP in the IM has been calculated against a five year risk-free rate, rather than a 10 year rate. This ensures there is a single risk-free rate used in estimating the cost of capital and that it (generally) matches the term of the regulatory period .

E7.43 The Commission considers there is no case for changing its TAMRP estimate on a regular basis. This is similar to the practice of many advisors who do not regularly change their estimate of the TAMRP. For example, PwC has not publicly updated its estimate of TAMRP since 2002.

Commission's reasons - the long-term TAMRP estimate

E7.44 In setting the TAMRP estimate, the Commission considered its previous regulatory decisions (as the parameter is a long-term estimate), evidence from studies of forward and backward-looking TAMRP estimates, advice from the Expert Panel, evidence provided by submitters, market risk premium estimates used by overseas regulators, and the impact of the GFC.

612 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association,* 13 August 2010, p. 18.

613 Commerce Commission, Cost of Capital Workshop Transcript, p. 178 and PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report for 17 EDBs, 2 December 2009, p. 17.

614 PricewaterhouseCoopers, *The Cost of Capital Report*: As at 30 June 2010. This report and previous reports can be obtained from the PwC New Zealand web site (http://www.pwc.com/nz/en/cost-of-capital).

Previous estimates of the TAMRP used by the Commission

E7.45 The Commission has estimated a TAMRP in a number of previous regulatory decisions. These are summarised in Table E6 below.

Table E6 Estimates of the TAMRP used by the Commission

Decision	Year of Decision	TAMRP Estimate
Airports Inquiry[615]	2002	8%
TSO determinations - 2001-2002	2003	8%
TSO determinations - 2002-2003 onwards	2005 - 2008	7%
Gas Control Inquiry[616]	2004	7%
Unison Post-breach Inquiry[617]	2007	7%
Gas Authorisation[618]	2008	7%

E7.46 The table above illustrates that the Commission has adopted TAMRP estimates of either 7% or 8%. In all decisions after 2003, the Commission has adopted a TAMRP estimate of 7%.

E7.47 In the context of the Airports Inquiry, Dr Lally generated TAMRP estimates in the range of 7% to 9% using both *ex post* and *ex ante* approaches.[619] No single approach to estimating the TAMRP was considered by the Commission to be necessarily better than any other approach. Having considered submissions and advice from Dr Lally, the Commission's view was to adopt a TAMRP of 8%, within the range of 7% to 9%, in recognition of the uncertainty surrounding the estimate.

E7.48 In the report prepared for the Commission in the Gas Authorisation in 2008, Dr Lally adopted a similar approach as for the Airports Inquiry (in that he used both *ex post* and *ex ante* approaches to generate TAMRP estimates), but relied on updated evidence where it was available. He reviewed estimates of the TAMRP using *ex post* approaches of the Morningstar (Ibbotson) and Siegel types; the constant reward to risk methodology of Merton, the *ex ante* approach of Cornell; and survey evidence, based on information from both New Zealand and foreign markets.[620] On this basis Dr Lally recommended an estimate of 7% for the TAMRP. Table E7 displays the results from Dr Lally's advice.

615 Commerce Commission, *Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports*, Final report, 2002.

616 Commerce Commission, *Gas Control Inquiry*, Final Report, 29 November 2004.

617 Commerce Commission, *Regulation of Electricity Lines Businesses - Targeted Control Regime - Reasons for Not Declaring Control - Unison Networks Limited*, 11 May 2007, pp. 38-39.

618 Commerce Commission, *Gas Authorisation Decisions Paper*, 30 October 2008.

619 Lally, M., *The cost of capital for the airfield activities of New Zealand's international airports*, November 2001 (Lally, WACC for Airports).

620 For a more detailed analysis see Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, pp. 16-38.

Table E7 Estimates of the TAMRP by Lally 2008 - Implying a 10 Year Term for the Risk-free Rate

Methodology	NZ	US	Other	All
Ibbotson	7.70%	8.40%	8.20%	
Siegel	6.40%	7.30%	6.60%	
Cornell	5.40%	6.60%		
Survey	8.00%	5.70%		
Median	7.05%			6.95%
Mean	6.88%			7.03%

E7.49 Across the entire set of results, the range for the TAMRP is 5.4% to 8.4% with a median of 6.95% and a mean of 7.03%.

Changing the estimate to represent a five-year TAMRP

E7.50 The TAMRP estimates displayed in Table E7 are based on a term for the risk-free rate of 10 years. As outlined above, in the context of regulation under Part 4, the term for the risk-free rate is five years. Table E8 displays the result for the TAMRP estimates based on advice provided to the Commission by Dr Lally in 2008[621] updated for a five year term for the risk-free rate.

Table E8 Estimates of the TAMRP by Lally 2008 Implying a Five Year Term for the Risk-free Rate

Methodology	NZ	US	Other	All
Ibbotson*	7.70%	8.40%	8.20%	
Siegel*	6.40%	7.30%	6.60%	
Cornell	5.20%	6.80%		
Survey	8.20%	6.20%		
Median	7.05%			7.05%
Mean	6.88%			7.10%
* The Ibbotson and Siegel estimates in this table are for a 10-year risk-free rate term not a 5-year term.				

E7.51 The results in the above table for the Ibbotson and Siegel-type estimates are unchanged as Dr Lally did not convert these estimates into an estimate relative to a five year term for the risk-free rate.

E7.52 However, the difference between the average five year and 10 year risk-free rate approximated using New Zealand government bonds covering the period 1985 – 2008 is 8.97% and 8.89% respectively. The TAMRP estimated using a five-year risk-free rate is therefore 0.08% higher than that estimated using the 10 year risk-free rate.

621 Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, pp. 24-25.

E7.53 This suggests that Ibbotson and Siegel-type estimates of the TAMRP for New Zealand would be slightly lower assuming a five year rather than a 10 year term for the risk-free rate.

E7.54 The difference between the average five year and 10 year risk-free rate approximated using US government bonds covering the period 1962 – 2008 is 6.82% and 7.04% respectively. The TAMRP estimated using the five-year risk-free rate is therefore 0.22% lower than that estimated using the 10 year risk-free rate.

E7.55 This suggests that Ibbotson and Siegel-type estimates of the TAMRP for the US would be higher.

E7.56 To ensure consistency between the TAMRP and the term of the risk-free rate, Table E8 is restated in Table E9 to reflect a risk-free rate term of five-years for the New Zealand and US Ibbotson estimates.

Table E9 Estimates of the TAMRP for 2008 - Implying a Five Year Term for the Risk-free Rate

Methodology	NZ	US	Other	All
Ibbotson*	7.62%	8.84%	8.20%	
Siegel*	6.40%	7.30%	6.60%	
Cornell	5.20%	6.80%		
Survey	8.20%	6.20%		
Median	7.01%	7.05%	7.40%	7.05%
Mean	6.86%	7.29%	7.40%	7.14%
* The Ibbotson estimate for "Other" and Siegel estimates in this table are for a 10-year risk-free rate term not a 5-year term. It is not possible to adjust the Ibbotson estimate for "Other" due to the lack of a suitable proxy. It is not possible to adjust the results from the Siegel method due to the lack of a term structure for inflation-proof bonds.				

E7.57 This results in the average TAMRP for New Zealand of 6.86% and an average TAMRP from all estimates of 7.14%.[622]

E7.58 In its submission on the EDB Draft Reasons Paper and using data from 1931 to 2010, PwC (for ENA) and PwC (for Telecom) estimates the adjustment to the 10

[622] The adjustment to the TAMRP for the US is estimated by using the conversion MRP = TAMRP – R_f(T), where R_f is the contemporaneous five-year risk-free rate of return and T is the contemporaneous investor tax rate (33%). In this formula the MRP is also adjusted to represent a five-year MRP estimate rather than a 10 year MRP estimate. The New Zealand risk-free rate in obtained from Bloomberg and is the average for the month of December 2007.

Conversion of US Ibbotson estimate to five-years

Raw US MRP	6.30%
Adjustment for difference between US five-years and 10 year risk-free rate	0.22%
NZ Investor Tax Rate	33%
NZ five-year risk-free rate	7.02%
TAMRP	8.84%

year TAMRP to convert to a five-year TAMRP is 0.04% and using data from 1962 to 2010 estimates the US difference at 0.08%.[623] Updating the Ibbotson estimates for New Zealand and the US resulted in a mean TAMRP of 7.11%.

E7.59 PwC submitted that the effect of the Commission's revision of the term of the risk-free rate used in estimating the TAMRP from 10 to five-years suggested that the estimated TAMRP should be increased by 0.1% to 7.1%.[624]

E7.60 However, the results from the PwC analysis concerning the period for the adjustments are neither consistent with the data in Table E8 nor Table E9. These tables provide evidence based on Dr Lally's 2008 advice in 2008, rather than in 2010.

E7.61 Further, in advice to the Commission on PwC's analysis, Dr Lally considered that precision down to the level of 0.1% was not possible with respect to the expected TAMRP and therefore continued to favour rounding to a higher unit of measurement. Accordingly, the appropriate rounded value for the expected TAMRP remains at 7%.[625]

E7.62 The Commission notes that that in its published paper on the New Zealand TAMRP, PwC state that their estimate of the TAMRP is rounded to the nearest 0.5%. PwC's submission to the Commission to alter the TAMRP by 0.1% is therefore at odds with their own approach.[626]

E7.63 In light of the factors discussed above, the Commission considers that an overall long-term TAMRP estimate of 7% is appropriate when using a five-year risk-free rate to estimate the TAMRP.

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623 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 41-42; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, Submission on Cost of Capital Material In the Commerce Commission's Draft *Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, pp. 40-41.

624 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 41-42; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, pp. 40-41; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, Attachment: PricewaterhouseCoopers, *Report: prepared for Electricity Networks Association*, 3 September 2010, p. 41.

625 Lally, M., *Comments on Input Methodologies (EDS) Draft Reasons Paper*, 3 September 2010, p. 4.

626 PricewaterhouseCoopers, *New Zealand Equity Market Risk Premium*, September 2002, p. 10.

Expert Panel's view – TAMRP estimate

E7.64 The Expert Panel's recommendation on the TAMRP was that the Commission's estimate of 7% (for the simplified Brennan-Lally CAPM) was reasonable.[627]

Views of submitters – TAMRP estimate

E7.65 In submissions on the Revised Draft Guidelines and draft IMs, Air NZ, BARNZ and MEUG, agreed that the Commission's estimate of 7% for the TAMRP was appropriate.[628] Transpower submitted that the TAMRP should be 7% in normal conditions.[629]

E7.66 Suppliers of regulated services disagreed with the Commission's use of 7% as the estimate of the TAMRP and stated that the Commission's estimate was too low.[630]

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627 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, pp. 13-17.

628 Air New Zealand Limited, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 70; Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies Discussion Paper,* 31 July 2009, p. 58; Board of Airline Representatives New Zealand Inc, *Submission on Airports Draft Reasons Paper and Draft Determination - Effect of valuation date*, 12 July 2010, p.10; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, Appendix, p. 3.

629 Transpower New Zealand Ltd., *Submission on Transpower (Input Methodologies) Draft Reasons Paper, Cost of Capital Decisions,* August 2010, p. 11.

630 NZ Airports Association, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 80; Auckland International Airport Limited, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 75; Wellington International Airport Limited, *Submission to the Commerce Commission on Input Methodologies*, 7 August 2009, p.59; Christchurch International Airport Limited, S*ubmission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 27; Christchurch International Airport Limited, *CIAL Submission on the Revised Draft Guidelines*, 3 August 2009, p. 4 ; NZ Airports Association, *Submission on the Input Methodologies Discussion Pape*r, Attachment: LECG, *Comments on Commerce Commission Input Methodologies Discussion Paper prepared for NZ Airports Association*, 31 July 2009, pp. 26-27; Unison Networks Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Castalia Strategic Advisors, *Submission on Input Methodologies: Regulatory Cost of Capital: a report prepared for Unison Limited,* 13 August 2009, pp. 8-9; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of ENA, 11 August 2009, pp. 17-18; Maui Development Limited, *Submission on the Input Methodologies Discussion Paper*, July 2009, p. 19; Powerco Limited, *Submission on the Input Methodologies Discussion Paper*, 14 August 2009, pp. 29-30; Powerco Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: PricewaterhouseCoopers, *Commerce Commission's Revised Draft Guidelines and aspects of the Input Methodologies Discussion Paper relating to Cost of Capital prepared for Powerco Limited*, 14 August 2009, pp. 14-17; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, pp. 9-10; Vector Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: *Synergies Economic Consulting, Initial Weighted Average Cost of Capital Review: prepared for Vector Limited*, 14 August 2009, pp. 35-43; Telecom, *Annex B: Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009, Transpower, *Submission to the Commerce Commission on: Transpower Process and Recommendation Discussion paper, Input Methodologies Discussion Paper,* August 2009;, Annex B; Transpower, *Submission to the Commerce Commission on: Transpower Process and Recommendation Discussion paper Input Methodologies Discussion Paper*, August 2009, pp. 25-27; Unison, *Appendix: Submission on Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital*, 14 August 2009, Appendix, p. 7; Vector Limited, *Submission on Input Methodologies Discussion Paper*, 14 August 2009, p. 91;Commerce Commission, Cost of Capital Workshop Transcript, pp. 88-96; Electricity Networks Association, *Cross submission on the cost of capital workshops,* 2 December 2009, pp. 11-12; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report for NZAA, 2 December 2009, p. 41; PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, Report for 17 EDBs, 2 December 2009, pp. 14-15; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 14; PricewaterhouseCoopers, *Commerce Commission WACC Conference: Submission on Behalf of Powerco*, 2 December 2009, p. 13; Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, pp. 41-42; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, p. 31; Electricity Networks

Some of these submitters contended that the TAMRP proposed by the Commission should be in the range of 7.5% to 8% based on the estimates they use However, the majority of the submitters did not provide any information on the approach that their TAMRPs were based on.

E7.67 Officer and Bishop (for Transpower), using historical data estimated an MRP for New Zealand under normal conditions in the range of 6%-8%.[631] However, Officer and Bishop considered that the MRP is not constant and properly cannot be adequately represented by a stable distribution.

E7.68 Officer and Bishop do not provide persuasive evidence that the long-term forward looking TAMRP is likely to be substantially above the long-term historical TAMRP.

E7.69 In its submission on the EDB Draft Reasons Paper PwC (for ENA) and PwC (for Telecom) submits that some of the estimates were outdated[632] and TAMRP estimates of the Siegel and Cornell type should be excluded on the grounds of being ad hoc and outdated respectively.[633]

Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 42-45; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 3 September 2010, p. 2; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper, Attachment: PricewaterhouseCoopers, Report: prepared for Electricity Networks Association*, 3 September 2010, pp. 10-13; Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: LECG, *Response to Commerce Commission's Draft Cost of Capital Input Methodology: a report prepared for the Electricity Networks Association*, 13 August 2010, p. 16; Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, 3 September 2010, p. 2; Powerco Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, pp. 13-14; PricewaterhouseCoopers on behalf of 20 Electricity Distribution Businesses, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, pp. 15-16; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, pp. 38-45; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, 13 August 2010, p. 35; Vector Limited, *Cross Submission on Cost of Capital (Input Methodologies) Draft Reasons Paper*, 3 September 2010, p. 3; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 24-30; Wellington Electricity Lines Limited, *Submission on EDBs and GPBs (Input Methodology) Draft Determination and Reasons Paper, Draft Cost of Capital Input Methodology Decision*, 13 August 2010, p. 11; KPMG, *Cross-Submission on GPBs (Input Methodology) Draft Reasons Paper, Cost of Capital*, 13 August 2010, p. 15.

631 Officer and Bishop based the New Zealand MRP of Australia data as they considered the Australian market to be comparable. See Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 14-15.

632 The Commission notes that PwC did update the survey evidence but did not update the Ibbotson estimates. The Commission provided the most recent Ibbotson estimates in the EDBs Draft Reasons Paper, Table 6.12, p. 276.

633 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft*

E7.70 Dr Lally noted that whilst PwC argue that Siegel-type estimates should be excluded on the grounds of being ad hoc, PwC later argues that the estimated TAMRP should be adjusted for the GFC, which amounts to making an ad hoc adjustment. With respect to Cornell-type estimates, Dr Lally observes these estimates should be updated not excluded. He notes that while PwC updates the US survey-based estimates it has not made use of the most up to date version of the surveys referenced. In addition, PwC also does not update the Ibbotson type estimates. Correcting for these items, Dr Lally concluded that the PwC submission does not support a current estimate for the expected TAMRP of 8.0%.[634]

E7.71 A number of advisors at the Cost of Capital Workshop favoured a TAMRP of 7.5%. Those advisors appear to rely on research undertaken by PwC on the New Zealand TAMRP. At the Cost of Capital Workshop, PwC confirmed that their TAMRP estimate of 7.5% was measured relative to 'short-term' government bonds with a term to maturity of one to three years and that the TAMRP estimate would be lower if assessed against long-term bonds.[635] This implies PwC's TAMRP estimate of 7.5% would be lower if estimated against a five-year risk-free rate.

E7.72 The Commission understands that PwC's research in support of its 7.5% estimate of the TAMRP was last publicly updated in 2002,[636] and therefore is somewhat dated. It relies solely on historical estimates of the New Zealand expected TAMRP (with no consideration of forward-looking estimates nor of data from overseas).

E7.73 If PwC were to update its own research on the New Zealand TAMRP, based on the performance of the New Zealand share market since the end of June 2002 (the stated end date of PwC's research), the Commission estimates that the resulting TAMRP estimate would be approximately 0.5% lower. That is, if PwC's unrounded estimate of the TAMRP versus short-term bonds in 2002 had been 7.5% then the updated unrounded estimate of a five-year risk-free rate would be approximately 7.0%. Such a result is in line with the Commission's TAMRP estimate of 7%.

Updating the TAMRP for 2010

E7.74 Table E10 summarises what advisors indicated at the Cost of Capital Workshop was their current advice on the TAMRP to clients (November 2009).

Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association, 13 August 2010, p. 42; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 41.

634 Lally, M., *Comments on Input Methodologies (EDS) Draft Reasons Paper*, 3 September 2010, pp. 4-7.

635 Commerce Commission, *Cost of Capital Workshop Transcript*, pp. 89 and 177-178.

636 PricewaterhouseCoopers, *New Zealand Equity Market Risk Premium*, September 2002.

Table E10 Summary of Workshop Advisors' Current TAMRP Advice to Clients

Organisation	TAMRP Recommendation
KPMG	7.75%
Ireland, Wallace and Associates (Mr Ireland)	7.5%
Uniservices (Dr. Marsden)	7.5%
LECG (Prof Van Zijl)	7.5%
PwC NZ (Mr Redmayne)	7.5%
PwC Aus (Mr Balchin)	7.5%
NZIER (Dr Layton)	7%
Synergies Economic Consultancy (Professor Bowman)	9%

E7.75 The Commission does not consider this informal survey to be the best indicator of the estimated TAMRP in New Zealand. In particular, the sample at the Cost of Capital Workshop was very small, it was not randomly selected (most of the responses were selected by regulated suppliers), and it is not representative of the range of views on the prevailing estimated TAMRP in New Zealand. For example, the informal survey excludes all of the major investment banks in New Zealand who are major players in actually raising debt and equity finance for many firms. The Commission notes the New Zealand investment banks have current TAMRP estimates ranging between 6.5% and 7.25% as shown in Table E11 below.

Table E11 Summary of TAMRP Estimate Used by New Zealand Investment Banks

Investment Bank	TAMRP estimate used
Deutsche Bank / Craigs Investment Partners	6.5% (plus separate recognition for imputation credits)
Goldman Sachs	6.8%
Forsyth Barr	7%
UBS	7%
Macquarie Bank	7%
First NZ Capital	7.25% (uplifted from a normal 7% after the GFC)

E7.76 The Commission has updated the analysis undertaken in the Gas Authorisation where possible, and in particular it has updated the Ibbotson estimate and survey evidence reported in Table E9 (i.e. 2010 Ibbotson estimates from Dimson, Marsh and Staunton and new survey evidence from the US[637]).

[637] The analysis includes survey data from the US, submitted by PwC (Electricity Networks Association, *Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper*, Attachment: PricewaterhouseCoopers, *Report: prepared for Electricity Networks Association*, 3 September 2010, pp. 10-13) and corrected as per the advice from Dr Lally (Lally, M., *Comments on Input Methodologies (EDS) Draft Reasons Paper*, 3

E7.77 The Commission estimates that the New Zealand five-year long-run average risk-free rate is 0.03% higher than the New Zealand 10 year average risk-free rate using data covering the period 1985 – 2010 (five-year estimate of 8.64% and 10 year estimate of 8.61% respectively). Using data from 1931 to 2010, PwC (for ENA and for Telecom) estimated that the five-year risk-free rate was lower than the 10 year risk-free rate with an adjustment required of 0.04%.[638] This continues to suggest that Ibbotson and Siegel-type estimates of the TAMRP for New Zealand would be very similar assuming either a five year or 10 year term for the risk-free rate.

E7.78 The difference between the average five-year and 10 year risk-free rate approximated using US government bonds covering the period 1962 – 2010 is 0.25% (6.62% and 6.87% respectively). This results in the five-year risk-free rate being lower than the 10 year risk-free rate by 0.25%. PwC estimates this adjustment to be 0.08%.[639] This suggests that Ibbotson and Siegel-type estimates of the TAMRP for the US would be higher.

E7.79 Table E12 below indicates that from the New Zealand evidence, the mean TAMRP (rounded to the nearest 0.5%) is 7.0%, and if all the eleven estimates are used (i.e. the TAMRP from New Zealand, the US and other), the mean is 7.0%.

September 2010). PwC submitted that the survey result from Graham and Harvey was based on a geometric average therefore the MRP estimate has been adjusted to reflect a result based on an arithmetic average.

638 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 41-42; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, pp. 40-41.

639 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 41-42.

Table E12 Estimates of the TAMRP - Assuming a 5-Year Term (where possible) of the Risk-free Rate for 2010

Methodology	NZ	US	Other	All
Ibbotson[640] *	7.27%	7.67%	7.50%	
Siegel *	6.40%	7.30%	6.60%	
Cornell	5.20%	6.80%		
Survey	8.20%	6.90%		
Median	6.84%	7.10%	7.05%	7.09%
Mean	6.77%	7.17%	7.05%	6.98%
* The Ibbotson estimate for "Other" and Siegel estimates in this table are for a 10-year risk-free rate term not a 5-year term. It is not possible to adjust the Ibbotson estimate for "Other" due to the lack of a suitable proxy. It is not possible to adjust the results from the Siegel method due to the lack of a term structure for inflation-proof bonds.				

E7.80 As a reasonableness check on the results from Table E12, the Commission evaluated the change to the mean TAMRP by adjusting the Ibbotson result for the difference between the five-year and 10 years risk-free rates as estimated by PwC (for ENA) and PwC (for Telecom). This resulted in an average TAMRP of 6.98%.[641]

Overseas regulators current estimates of the MRP

E7.81 Table E13 below shows MRP estimates adopted by overseas regulators. The MRP used by overseas regulators is not directly comparable to the TAMRP used in the New Zealand context. MRP is used in the classical CAPM whereas the simplified Brennan-Lally CAPM requires the tax adjusted version of MRP, (i.e. the TAMRP). The table below therefore also shows the conversion of the overseas MRP estimates to their corresponding TAMRP equivalents.

[640] Estimated using data from Dimson, E., P. Marsh and M. Staunton, 2010, Global Investment Returns Yearbook 2010, Credit Suisse and London Business School. Dimson, Marsh and Staunton estimated the MRP for New Zealand. The MRP is related to the TAMRP by using the formula MRP = TAMRP – $R_f(T)$, where R_f is the risk free rate of return and T is the investor tax rate (30%). The Dimson et al estimate for the US MRP of 6.0% is adjusted by 0.24 to reflect a five year MRP (Commission estimate). The average five-year risk-free rate for July 2010 (from Bloomberg) is 4.76% and the associated tax rate is 30%.

Conversion of US Ibbotson estimate to five-years

Raw US MRP	6.0%
Adjustment for difference between US five-years and 10 year risk-free rate	0.24%
NZ Investor Tax Rate	30%
NZ five-year risk-free rate	4.76%
TAMRP	7.67%

[641] The Ibbotson equivalent TAMRP estimate for the US is derived using the MRP from Dimson et al estimate for the US MRP of 6.0% the PwC adjustment to this estimate to reflect a five-year MRP is 0.08%. The average five-year risk-free rate for July 2010 (from Bloomberg) is 4.76% and the associated tax rate is 30%.

Table E13 MRP (and TAMRP equivalent) for Regulators in the UK and Australia

Regulator	MRP	TAMRP equivalent
Ofgem	4-5%	5.8-6.8%
Competition Commission/CAA	2.5-4.5%: Heathrow/Gatwick Airport 3-5%: Stansted Airport	4.3-6.8% (Full range)
Ofcom	4-5%, 5% used	6.8%
Ofwat	5.4%	7.2%
Australian Energy Regulator (AER)	6.5%	6.9%
ACCC (Rail) and QCA	6%	6.4%
IPART (NSW)	5.5-6.5% (Preliminary view)	5.9-6.9%

E7.82 The table above illustrates that a TAMRP estimate of 7%, as adopted in previous decisions by the Commerce Commission, is higher than those adopted by most overseas regulators.

Conclusion - the long-term TAMRP estimate

E7.83 The Commission considers that Dr Lally's estimate of 7% for the expected TAMRP derived in the context of the Gas Authorisation in 2008 is robust. This estimate is consistent with the range of TAMRP estimates used by New Zealand market participants. This estimate is higher than those adopted by most overseas regulators. The Expert Panel also advised that a TAMRP estimate of 7% is reasonable in the New Zealand context.

E7.84 In deriving and updating the 2008 estimate the Commission considers there is no evidence to support changing the TAMRP estimate of 7%.

E7.85 For these reasons, the IM specifies a TAMRP relative to five-year risk-free rate of 7%. However, it is possible that the GFC has, at least temporarily, increased the TAMRP. This issue is discussed in detail below.

Commission's reasons - the TAMRP estimate and the recent GFC

Views of submitters – impact of the GFC

E7.86 Submitters sought an increase in the TAMRP due to the GFC. A number of submitters on the Revised Draft Guidelines and IM Discussion Paper contended that, due to the GFC, the TAMRP proposed by the Commission was too low, and it should be in the range of 7.5% to 8%.[642] As support for this increase, submitters

642 NZ Airports, *Submission by NZ Airports Association on the Commerce Commission Input Methodologies Discussion Paper*, 31 July 2009, p. 80; Auckland Airport, *Submission to the Commerce Commission on Input Methodologies Discussion Paper*, 7 August 2009, p. 75; Wellington International Airport Limited, *Submission to the Commerce Commission on Input Methodologies*, 7 August 2009, p. 59; Christchurch International Airport Limited, *Submission on Commerce Commission Input Methodologies Discussion Paper, 7 August 2009*, p. 27; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report prepared for the NZAA, 31 July

referenced the AER's increase in the MRP estimate from 6% to 6.5% as a consequence of the GFC.[643]

E7.87 At the Cost of Capital Workshop there was general agreement between the experts that, both from a theoretical and a practical point of view, the TAMRP had probably risen due to the GFC, and there was a reasonable consensus that over time it would revert to its long-term historical average. There was no consensus on how long the period of time to revert to historical averages would be. However, several parties suggested that the Commission should not conclude prematurely that markets have returned to their long-term historical averages.[644]

E7.88 However, when asked at the Cost of Capital Workshop if the practitioners had changed their estimate of the TAMRP due to the GFC, only KPMG indicated that it had made an explicit adjustment (of 0.25%) to the underlying TAMRP that it had previously used when advising clients.

E7.89 Table E14 summarises what advisors indicated at the Cost of Capital Workshop was their current advice on the TAMRP to clients and whether the advice included an adjustment to reflect the GFC.

Table E14 Summary of Advisors Current TAMRP Advice to Client

Organisation	TAMRP Recommendation	Was TAMRP adjusted due to the GFC?
KPMG	7.75%	Yes (from 7.5%)
Ireland, Wallace and Associates (Mr Ireland)	7.5%	No
Uniservices (Dr. Marsden)	7.5%	No
LECG (Prof Van Zijl)	7.5%	No
PwC NZ (Mr Redmayne)	7.5%	No

2009, pp. 26-27; Unison Networks Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Castalia Strategic Advisors, *Submission on Input Methodologies: Regulatory Cost of Capital: a report prepared for Unison Limited, 13 August 2009*, pp. 8-9; Electricity Networks Association, Comments on the Commerce Commission's proposed approach to estimating the cost of capital, 11 August 2009, pp. 17-18; Maui Development Limited, Submission on the Input Methodologies Discussion Paper, July 2009, p. 19; Powerco Limited, *Input Methodologies Discussion Paper*, 14 August 2009, pp. 29-30; PricewaterhouseCoopers, *Revised Draft Guidelines - Submission to Commerce Commission, Report on behalf of Powerco*, August 2009, pp. 14-17; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009 , pp. 9-10; Vector Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Synergies Economic Consulting, *Initial Weighted Average Cost of Capital Review: prepared for Vector Limited*, 13 August 2009, pp. 35-43; Telecom, *Annex B: Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009, Annex B; Transpower, *Submission to the Commerce Commission on: Transpower Process and Recommendation Discussion paper Input Methodologies Discussion Paper*, August 2009, pp. 25-27; Unison, *Appendix: Submission on Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital*, 14 August 2009, p. 7; Vector, *Submission to Commerce Commission on Input Methodologies Discussion Paper*, 14 August 2009, p. 91; Wellington Electricity, *Submission to the Commerce Commission on its Input methodologies Discussion Paper*, 14 August 2009, p. 27.

643 Using a risk-free rate of 6% (based on the 10 year New Zealand government bond rate averaged over January 2010) and an investor tax rate of 30%, these values convert to a TAMRP of 6.4% and 6.9%. For the conversion process of the Australian based MRP estimates see Lally, M., *International Comparison of Regulatory Cost of Capital for Gas Distribution Businesses*, Report to the New Zealand Commerce Commission, 28 October 2008, p. 12.

644 Commerce Commission, *Cost of Capital Workshop Transcript*, pp. 88-96.

Organisation	TAMRP Recommendation	Was TAMRP adjusted due to the GFC?
PwC Aus (Mr Balchin)	7.5%	No change in Australia
NZIER (Dr Layton)	7%	No
Synergies Economic Consultancy (Professor Bowman)	9%	No consideration given to the issue

E7.90 In post-workshop submissions, suppliers suggested that there was persuasive evidence for a higher TAMRP due to the GFC.[645] These suggestions are displayed in Table E15.

Table E15 Recommendations to the Commission on the TAMRP due to the GFC

Organisation	TAMRP Recommendation
AECT	9% (the Commission should increase the TAMRP to 7.5%, then add an increase above this for the GFC)
MDL	7.75%
Synergies Economic Consulting (for Vector)	9%
Unison	8.2%
Vector	9% (at least 1.5% increase above 7.5%)

E7.91 The Commission notes that many submitters have continued to urge the Commission to maintain the 0.5% uplift in the TAMRP for the GFC but only KPMG has actually altered its TAMRP estimate because of the GFC.[646]

645 Auckland Energy Consumer Trust, *Cross Submission to the Commerce Commission on Cost of Capital Workshop*, 2 December 2009, p. 26; Maui Development Limited, *Cost of Capital Workshop 12th-13th November 2009 – Cross-Submission by Maui Development Limited*, 2 December 2009, p. 22; Vector, *Cross Submission to the Commerce Commission on the Weighted Average Cost of Capital Workshop*, 2 December 2009, p. 4 and pp. 11-12; Synergies Economic Consulting for Vector, *Cost of Capital Cross Submission*, 2 December 2009, pp. 15-16; Unison, *Post Workshop Submission: Weighted Average Cost of Capital*, 2 December 2009, p. 12.

646 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 46; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 45; Electricity Networks Association, Cost of Capital Cross Submission on EDBs and GPBs (Input Methodologies) Draft Determination and Reasons Paper, 3 September 2010, p. 2; KPMG, Cross-Submission on GPBs (Input Methodology) Draft Reasons Paper, Cost of Capital, 13 August 2010, pp. 15-17; PricewaterhouseCoopers on behalf of 20 Electricity Distribution Businesses, Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, 13 August 2010, pp. 15-16; Wellington Electricity Lines Limited, Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers, 13 August 2010, p. 11; Vector Ltd., Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital, 13 August 2010, p. 27; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*,

E7.92 In a submission on the Transpower Draft Reasons Paper, Officer and Bishop (for Transpower), using evidence on Australian and New Zealand stock market return volatility and implied MRP from Australian forward markets contracts, considered that the TAMRP should be increased by 2%.[647]

E7.93 The Commission considers that Officer and Bishop's measure provide some evidence that the prevailing short-term Australian MRP may be above its long-term historical level. However, it does not follow that the New Zealand TAMRP over the full five-year regulatory period is above its long-term historical level. Officer and Bishop also submitted their approach to the AER which did not accept the approach.[648]

Expert Panel's view - Impact of the GFC

E7.94 Consultation with the Expert Panel on the TAMRP was completed prior to the full impact of the GFC being realised and this was highlighted in a statement by Dr Lally at the Cost of Capital workshop.[649]

E7.95 Given the significance of the matter, following the Cost of Capital workshop the Commission requested the Expert Panel to review the 7% estimate of the TAMRP outlined in the RDG and IM Discussion Paper in light of the GFC.

E7.96 The Expert Panel prepared a report for the Commission addressing this issue.[650] In its report, the Expert Panel assessed whether an increase in the previously recommended estimate of the TAMRP of 7% was required, and carefully examined the issue of backward-looking versus forward-looking estimation techniques in light of the GFC.

E7.97 The Expert Panel agreed that historical (backwards-looking) estimation techniques do not pick up short-term shocks very quickly, and to the extent that they do recognise them, they will initially, (i.e. until a longer term of data affected by the GFC is available), (wrongly) result in lower estimates of the market risk premium as

Attachment: Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 24-30; Marlborough Lines, Submission on EDBs (Input Methodology) Draft Determination and Reasons Paper, Draft Reasons Paper and Associated Draft Determination - Cost of Capital, 13 August 2010, p. 4; Transpower New Zealand Ltd., Submission on Transpower (Input Methodologies) Draft Reasons Paper, Cost of Capital Decisions, August 2010, p. 11; Transpower New Zealand Ltd., Submission on Transpower (Input Methodologies) Draft Reasons Paper and Individual Price-Quality Path, Attachment: R. R. Officer & S. Bishop - Independent Review of Commerce Commission's WACC Proposals for Transpower, 5 August 2010, pp. 14-22.

647 Officer and Bishop based the New Zealand MRP on Australian data as they considered the Australian market to be comparable. See Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 14-22.

648 AER, *Final decision: Electricity transmission and distribution network service providers – Review of the weighted average coat of capital (WACC) parameters*, May 2009, pp. 233-234.

649 Commerce Commission, *Cost of Capital Workshop Transcript*, p. 95.

650 Franks, J., Lally, M., Myers, S., *Recommendation to the New Zealand Commerce Commission on whether or not it should change its previous estimate of the tax-adjusted market risk premium as a result of the recent global financial crisis,* 14 April 2010.

a result of the GFC.[651] They also agreed that forward-looking models are problematic to apply.

E7.98 The Expert Panel agreed that, as a result of the recent GFC, the market risk premium and therefore the TAMRP was likely to have increased at least temporarily, due to increased levels of financial market volatility and investors' perception of the world as a much riskier place. However, the Expert Panel was unsure as to how long these increased levels of the market risk premium would persist.

E7.99 Professor Franks noted that, after a period of rapid revaluation of asset prices in late 1987 (also referred to as 'Black Monday'), financial market volatility decreased rapidly, within around 13 weeks, after the event. However, in more recent years, he considered that financial market volatility has tended to persist over longer periods of time.

E7.100 Professor Myers commented that since the height of the recent GFC approximately one year before (at the time of his advice), financial market volatility has decreased markedly and asset prices have recovered. However, Professor Myers considered that investors still faced substantial macro economic uncertainties. Professor Myers considered that the MRP remains above its long-term historical average.

E7.101 Professor Myers recommended that the Commission set a range for the MRP. He considered that the bottom of the range for the MRP should be 5%, and the top of the range should be a long-term historical arithmetic average MRP over long-term government returns, (which Dr Lally later estimated represented a MRP of 5.7%).[652] The Commission should then use the top of the range for the TAMRP until the world economy returns to normalcy and stable growth. Based on Dr Lally's estimate of the upper bound, the recommendation of Professor Myers yields a proposed MRP of between 5% and 5.7%, which implied a range for the TAMRP of 6.8% to 7.5%.

E7.102 Professor Franks recommended that the Commission consider an increase of 0.5% to 1% to the TAMRP estimate, but suggested it should take the form of a temporary adjustment. Professor Franks did not provide a timeframe for the temporary increase.

E7.103 In responding to Professor Franks' recommendation to increase the TAMRP temporarily, Dr Lally indicated that updating the TAMRP estimate to reflect temporary changes in market volatility would require a robust estimation technique to determine both the magnitude of the change to the TAMRP and the speed of reversion back to the historical level. Dr Lally noted that quantitative models (for example as proposed by Merton[653]) could potentially be used for this purpose.

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651 The historical methods rely on the assumption that the outturns observed regarding achieved returns will be a reliable indication of investors' expected (required) returns only when periods of above expected performance are cancelled out by periods of below expected performance.

652 Franks, J., Lally, M., Myers, S., *Recommendation to the New Zealand Commerce Commission on whether or not it should change its previous estimate of the tax-adjusted market risk premium as a result of the recent global financial crisis,* 14 April 2010, p. 6.

653 This refers to: Merton, R., On Estimating the Expected return on the Market. An Exploratory Investigation, *Journal of Financial Economics*, Vol. 8, 1980, pp. 323-361.

However, there would be serious questions around the reliability of any such model and its parameter values.

E7.104 The alternative is to use judgement, but Dr Lally is wary about doing so because of the inevitable lack of transparency in such a process. Dr Lally also noted that making temporary adjustments to the TAMRP, in view of the problems noted here, would not necessarily prevent regulated suppliers from earning their cost of capital over the life of their investments. This is because periods in which the TAMRP estimate is temporarily understated (through not temporarily raising the estimate) would tend to be offset by periods in which the TAMRP is temporarily overstated (through not temporarily lowering the estimate). On this basis, Dr Lally did not favour a change in the TAMRP estimate as a result of the GFC.

Overseas regulators and the GFC

E7.105 UK and Australia. regulators have also considered the impact of the GFC on the cost of capital. In each of these decisions consideration has been given as to whether the MRP should be adjusted in light of the effect of the GFC. Table E16summarises the MRP outcomes in recent decisions taking into account the GFC.

Table E16 MRP for Regulators in the UK and Australia

Regulator	MRP: Previous Views (Pre GFC)	MRP: Recent Views (Post GFC)	TAMRP equivalent (Post GFC)
Ofgem[654]	4-5%	No range quoted, but figure appears the same	5.8-6.8%
Competition Commission/CAA	2.5-4.5% Heathrow/Gatwick Airport[655]	3-5% Stansted Airport[656]	4.8-6.8%
Ofcom[657]	4-5%, 4.5% used	4-5%, 5% used	6.8%
Ofwat[658]	4-5%	5.4%	7.2%
AER[659]	6%	6.5%	6.9%
ACCC (Rail) and QCA[660]	6%	6%	6.4%
IPART (NSW)[661]	5.5-6.5%	6% (Preliminary view)	5.9-6.9%

654 Ofgem, *Electricity Price Control Review Final Proposal*, 7 December 2009, pp. 52-53.

655 BAA Ltd, *A report on the economic regulation of the London airport companies (Heathrow Airport Ltd and Gatwick Airport Ltd)*, 28 September 2007, Appendix F, p. F29.

656 CAA, *Airport Regulation Economic Regulation of Stansted Airport 2009-2014 – CAA Decision*, March 2009, p. 62; Competition Commission, Review of Stansted Airport Q5 price control, October 2008, Appendix L, p. L24.

657 Ofcom, *Ofcom's approach to risk in the assessment of the cost of capital*, August 2005, p. 36; Ofcom, *A New Pricing Framework for Openreach – Annexes*, 22 May 2009, pp. 161-162.

658 Ofwat, *Future Water and Sewerage Charges 2010-2015 – Final Determination*, April 2009, pp. 128-129.

659 AER, Final decision: Electricity transmission and distribution network service providers – Review of the weighted average coat of capital (WACC) parameters, May 2009, pp. 46-47.

660 ACCC, *Australian Rail Track Corporation Limited – Hunter Valley Coal Network Access Undertaking – Draft Decision*, 5 March 2010, pp. 565-570; QCA, *Draft Decision – QR Network 2009 Draft Access Undertaking*, December 2009, pp. 13-15.

661 IPART, *IPART's Cost of Capital after the AER's WACC Review – Lessons from the GFC*, November 2009, p. 39-40; IPART, *Final Decision: New South Wales Rail Access Undertaking – Review of rate of return and remaining mine life from 1 July 2009*, August 2009, p. 7.

E7.106 The regulators in Australia and the UK appear to have used different justifications for the approaches they have taken to account for the GFC. For example:

- Ofgem (December 2009) noted that there had been a strong recovery in equity prices since the low point of April 2009 and that many commentators and the Bank of England had indicated that the cost of equity had returned to normal levels in recent months. On that basis, Ofgem maintained that there was no reason to believe that there had been a fundamental departure from the long-term trend in the MRP generally estimated to be between 3-5%;[662]

- Ofcom (May 2009) reviewed evidence from market commentators and the Bank of England. It suggested that the prolonged downturn in equity markets and higher levels of volatility suggested the MRP had increased in recent years. It maintained that setting an MRP too low (which could lead to discretionary investment being discouraged) was worse than the downside of setting an MRP too high, and therefore favoured setting an MRP at the upper end of the 4-5% range. It subsequently chose a point estimate of 5% as a response to the increased market volatility and turbulence. This is above its 2005 point estimate of 4.5%;[663]

- Ofwat (April 2009) used a figure of 5.4%, which is at the high end of the Dimson, Marsh and Staunton series data for the long-term MRP and above its previous range of 4-5%. It outlined that this reflected its view that it should assume a high equity risk premium given the economic conditions within which the cost of capital was set. It acknowledged, however, that recent analysis suggested that the future long-run risk premium would be less than the historical average which it had used;[664]

- The AER (May 2009) increased its MRP figure from 6% to 6.5% on the basis that relatively stable market conditions did not presently exist, and there was uncertainty surrounding the GFC;[665]

- AER (October 2010) noted that they maintain the view that the long run historic MRP is 6%, and that this should be adopted as market conditions return to those seen pre GFC. The AER considered that a MRP of 6.5% may be considered conservative when accounting for improved financial conditions since the onset of the GFC. However, recovery in the global economy and conditions in global capital markets remained fragile.[666]

- ACCC (March 2010) notes that it and AER increased their MRP estimate to 6.5% in late April 2009 based upon capital market and global economic conditions at the time. However, the ACCC considered that economic and

662 Ofgem, *Electricity Price Control Review Final Proposal*, 7 December 2009, pp. 52-53.

663 Ofcom, *A New Pricing Framework for Openreach – Annexes*, 22 May 2009, pp. 161-162.

664 Ofwat, *Future Water and Sewerage Charges 2010-2015 – Final Determination*, April 2009, pp. 128-129.

665 AER, *Final decision: Electricity transmission and distribution network service providers – Review of the weighted average coat of capital (WACC) parameters*, May 2009, pp. 46-47.

666 AER, *Final decision Victorian electricity distribution network service providers Distribution determination 2011-2015*, October 2010, pp. 484 and 489.

capital market conditions had significantly improved since that time and the arguments that the MRP used by investors' remains above 6% are extremely weak. An important feature of the decision was that the ACCC drew a distinction between its position and the previous AER WACC position of having an MRP of 6.5%.[667]

- IPART (August 2009) applied an MRP estimate of 6% in its determination of the rate of return applicable to the Hunter Valley Coal Network in 2009;[668]

- IPART (November 2009) outlined that even though current market conditions indicated that the MRP may be higher than the MRP based on a long-term time series, this does not necessarily suggest that this would be the case in the near future. In particular, it noted that given the medium term pricing decision made by the regulator, it needed to ensure that the MRP is representative of the MRP during the regulatory period. IPART's preliminary view was that the MRP range should not be changed. It noted that as financial markets were quite volatile in the short-term, reliance on forward-looking estimates could lead to significant variance in MRP estimates between cost of capital decisions and would not provide regulatory certainty;[669]

- Queensland Competition Authority (QCA) (December 2009) in its draft decision for Queensland Rail Network also applied an MRP of 6%. The QCA did not propose to adopt the AER's change in MRP estimate because it considered that 6% was a reasonable estimate. It argued that any adjustment made for short-term fluctuations in market conditions is inherently subjective, in terms of both the scale of the adjustment that is required and the period of the adjustment over which the adjustment is made. The QCA also highlighted that if it were to increase the MRP now it would be inconsistent as the QCA had not lowered the MRP estimate in previous decisions when less volatile market conditions were evident and some stakeholders had sought reductions in the MRP.[670]

E7.107 Table E16 shows that some regulators increased their MRP estimates as a result of the GFC. However, when calculating the equivalent TAMRP corresponding to the post GFC MRPs set by overseas regulators, in all but one instance these estimates would have been below the 7% estimate suggested by the Commission as being appropriate in the RDG and the IM Discussion Paper. Further, in more recent decisions or draft decisions by these regulators, (i.e. the decisions made by Ofgem, IPART, QCA and the ACCC since August 2009), the MRP has not been adjusted upwards to account for the GFC.

E7.108 Despite the increase in the estimated MRP to take into account the GFC by regulators, it appears in most instances the overall cost of capital has either remained unchanged or decreased between regulatory decisions. This has been due to

667 ACCC, *Australian Rail Track Corporation Limited – Hunter Valley Coal Network Access Undertaking – Draft Decision*, 5 March 2010, pp. 565-570.

668 IPART, *Final Decision: New South Wales Rail Access Undertaking – Review of rate of return and remaining mine life from 1 July 2009*, August 2009, p. 7.

669 IPART, *IPART's Cost of Capital after the AER's WACC Review – Lessons from the GFC*, November 2009, pp. 39-40.

670 QCA, *Draft Decision – QR Network 2009 Draft Access Undertaking*, December 2009, pp. 13-15.

reductions in other parameters, such as the estimated risk-free rate, and in the case of the AER, the estimated equity beta.

E7.109 Finally, the matters leading Ofcom to adopt the upper bound of the MRP range, have typically been considered by the Commission when assessing what percentile it should use for the overall cost of capital, rather than for assessing the TAMRP in isolation. (For more on the range of the cost of capital, see Appendix E11).

Options for the Commission in dealing with the TAMRP for the GFC

E7.110 In light of submissions, the Expert Panel advice and the approach taken by other regulators in response to the GFC, the Commission considered the following two options:

- keep the TAMRP at 7.0%, as recommended by Dr Lally;
- raise the TAMRP temporarily to (i.e. for a fixed duration), as recommended by both Professor Myers and Professor Franks.

E7.111 The IM provides for a temporary adjustment to 7.5%.

E7.112 Despite the GFC there are strong arguments for maintaining a long-term TAMRP estimate at 7% (see evidence in Table E14 post GFC). That is, while other regulators have increased the MRP in response to the GFC, the higher MRP they have set corresponds to a TAMRP measure that is generally below the 7%. Further, a number of more recent decisions have reverted to historical per-GFC estimates of the MRP. Ofgem noted in its December 2009 decision that many commentators and the Bank of England had indicated that the cost of equity had returned to normal levels in recent months after the share market lows of April 2009.

E7.113 However, that there are good arguments for temporarily increasing the TAMRP to 7.5% in response to the GFC. Whilst there was no unanimous agreement by the Expert Panel on how to deal with the GFC, there was agreement that the TAMRP was likely to have increased, at least temporarily, due to the increased levels of financial market volatility and investors' perception of the world as much riskier for investors.

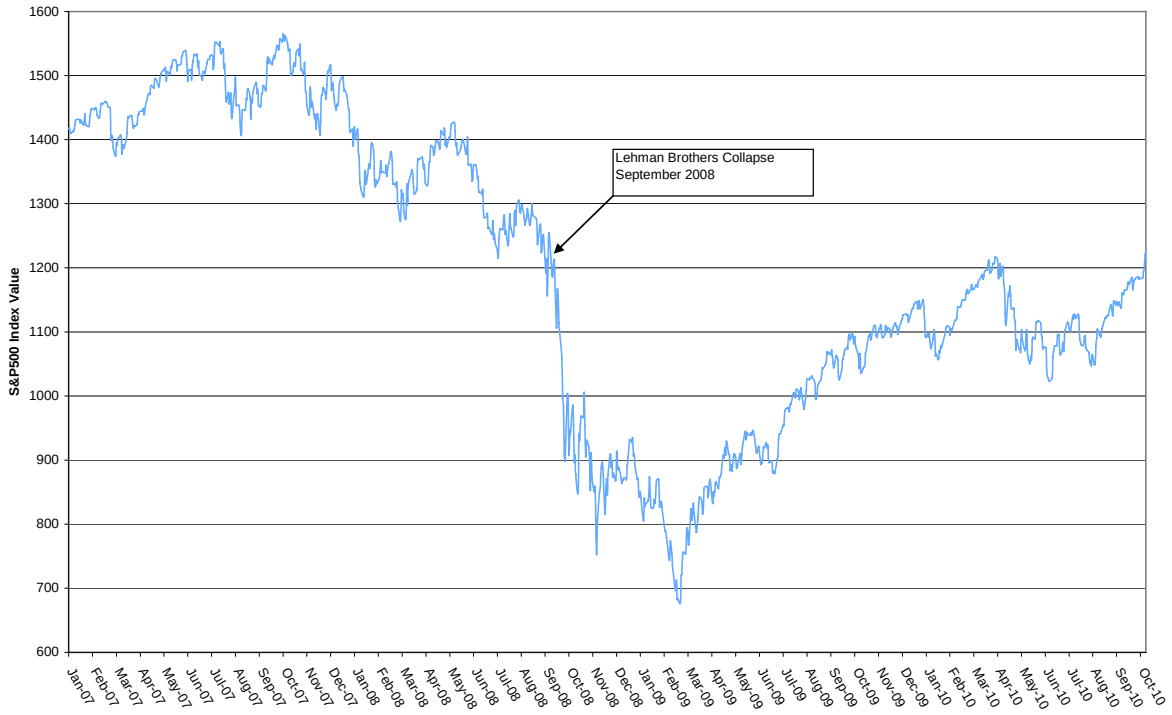
E7.114 Crises eventually pass but the timing of the return to normalcy is uncertain. When estimating the TAMRP for a regulatory period, the Commission needs to reflect its best estimate of the average conditions over the complete disclosure/regulatory period.

E7.115 Taking into account the original shock and the subsequent partial recovery of the markets, in the context of the regulatory period over which the TAMRP will apply, it is appropriate to temporarily increase the TAMRP before reverting to its long-term TAMRP estimate of 7%. Specifying in advance the quantum and period of the temporary increase provides regulatory certainty.

E7.116 In assessing the appropriate time period for the adjustment in the TAMRP, the Commission has examined the behaviour of the S&P 500 equity index of US stocks from a point in time prior to the significant events that occurred in the debt capital and equity capital markets until the time of making final decisions (i.e. January 2007

until October 2010). The behaviour of the S&P 500 equity index during this period is shown in Figure E7 below.

Figure E7 Value of the S & P 500 January 2007 to October 2010



Source: Yahoo Finance http://finance.yahoo.com/

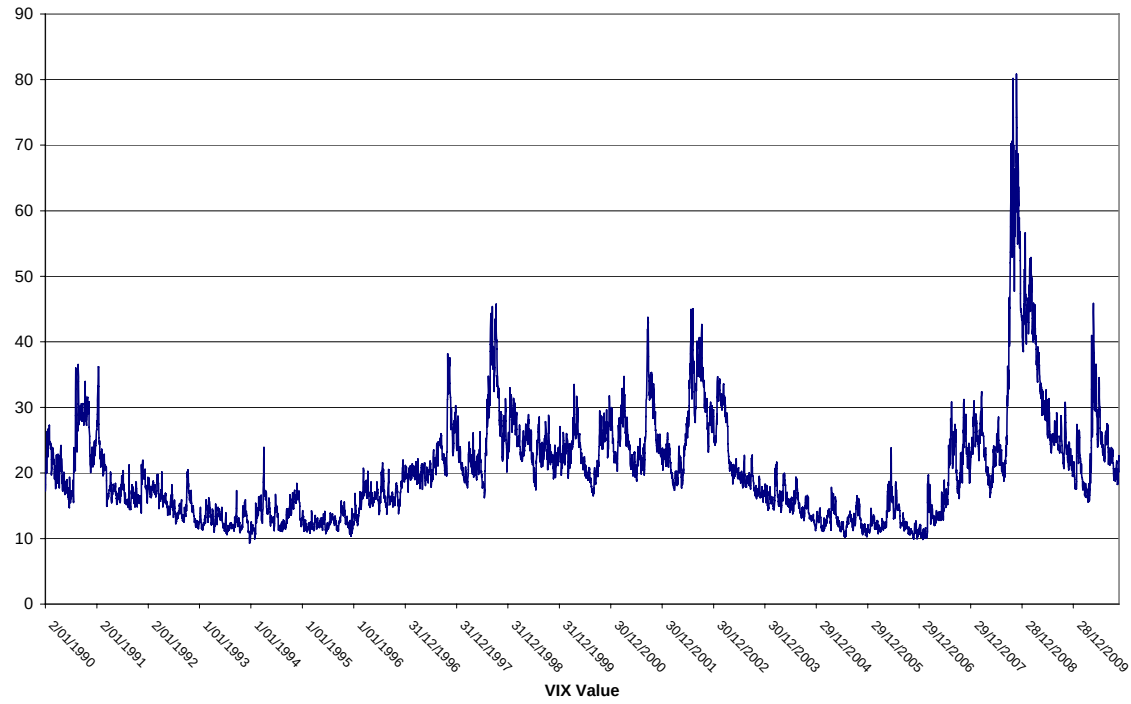
E7.117 Whilst the events in the debt capital markets commencing in July 2007 and the events surrounding Bear Stern in March 2008 had some (relatively short lived) effect on the equity capital markets, it is the events surrounding Lehman Brothers in September 2008 (leading to Lehman Brothers filing for bankruptcy on 15 September 2008) which triggered the massive fall in the equity capital markets.

E7.118 From the low point reached in March 2009, the S&P 500 equity index has since recovered almost to the level that it was at immediately prior to Lehman Brothers filing for bankruptcy. In light of the above events, the GFC effect on the equity markets essentially began on the date when Lehman Brothers filed for bankruptcy. The market has also recovered quickly from other subsequent shocks such as the default by Greece, with no apparent lasting effect.

E7.119 From its high point reached in late 2008, the volatility implied by the VIX has quickly reverted to its long-term trading range, as displayed in Figure E8.[671]

[671] VIX is the ticker symbol for the Chicago Board Options Exchange's Volatility Index. The VIX is a key measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices. Higher levels of the VIX indicate greater expected market volatility, while lower VIX levels indicate a more benign outlook.

Figure E8 Volatility of the S&P500 Index (VIX)



Source: Yahoo Finance http://finance.yahoo.com/

E7.120 Although the equity index has substantially recovered and volatility has reverted to its long-term trading range, it is prudent to be cautious in assessing whether the effects of the GFC, insofar as they affect the TAMRP, are now behind us. Therefore, consistent with the Commission erring on the side of caution, it is prudent to maintain the adjustment in the TAMRP until June 2011. This cannot be interpreted to imply that the Commission is stating that the effects of the GFC will be over at a particular point in time. The Commission accepts that the effects of the GFC in terms of slow economic growth may last beyond June 2011, but with respect to the TAMRP the relevant issue is the GFC's effect on the size of the premium investors seek for holding risky assets. On this, there is good evidence that the increase in the TAMRP from the GFC was temporary and is reverting to its long-term level (that is, around 7%). In particular, the Commission notes:

- the New Zealand share market and global share markets have stabilised and are at levels well above their GFC-induced lows;
- the VIX, a key short-term indicator of investor risk aversion, has fallen significantly and is back to its average longer-term levels;
- some regulators who increased their MRP estimates after the GFC have ceased adding the increase to their long-run estimates of the MRP to allow for the GFC (specifically the ACCC);

- annual surveys of the level of MRP among companies and analysts who use in their CAPM models exhibit a decline since GFC;[672] and

- many New Zealand market participants did not increase their TAMRP estimates during or after the GFC (for example, only one of the advisors at the Cost of Capital Workshop had increased its TAMRP estimate). Some New Zealand market participants have subsequently reduced the temporary increase they made to their TAMRP estimates during the GFC (e.g. First NZ Capital).

Conclusion - the TAMRP estimate

E7.121 The long-term TAMRP is set at 7%. However, due to the effect that the GFC has had on the equity markets, it is appropriate for the TAMRP to be temporarily increased to 7.5%. This temporary increase will apply for the regulatory year-ends falling in the calendar years 2010 and 2011, before the TAMRP reverts to its long-term level of 7%.

E7.122 The TAMRP is expressed as a composite rate over a five-year period. Further, the higher TAMRP only applies if the regulatory period covers the entire year when the uplift to account for the GFC applies. Therefore, for a cost of capital estimated for five years commencing on 1 April 2010, the TAMRP is 7.1% (estimated by $(7.5 \times 1 + 7.0 \times (5 - 1)) \div 5$).

E7.123 Following this approach in the context of information disclosure in 2010 - 2011 the five-year TAMRP is 7.1%, and in 2011-2012 would be 7%.

Approach - Standard Error of the TAMRP

E7.124 The standard error of the TAMRP is 1.5%.

Commission's reasons – approach to estimating the standard error of the TAMRP

Previous estimates of the standard error of the TAMRP used by the Commission

E7.125 To estimate the TAMRP and its standard deviation[673] in the Gas Control Inquiry, Electricity Distribution – Control of Unison and the Gas Authorisation, Dr Lally reviewed *ex post* approaches,[674] *ex ante* approaches,[675] and survey evidence from both New Zealand and foreign markets.[676]

E7.126 Dr Lally, in Appendix 2 of the Gas Authorisation, demonstrates the process to estimate the standard deviation of the TAMRP estimate.[677] As with the TAMRP

672 See for example Fernandez, P, and del Campo, J., *Market Risk Premium used in 2010 by Analysts and Companies: a survey with 2,400 answers*, 21 May 2010. In the survey reported in that paper three times as many respondents had reduced their MRP estimates in 2010 when compared to their estimates in 2009, than those that had increased their estimates (at pp.3-4, and 6-7).

673 The Commission notes that the estimates of the standard deviations referred to by Dr Lally are standard errors.

674 *Ex post* estimation techniques evaluated were Morningstar (Ibbotson) and Siegel types, the constant reward to risk methodology of Merton.

675 *Ex ante* approaches were Cornell, and survey evidence.

676 Lally, M., *The weighted average cost of capital for gas pipeline businesses*, paper prepared for the Commerce Commission, 24 November 2004, pp. 10-26; Lally, M., *The weighted average cost of capital for electricity lines businesses*, September 2005, pp. 10-29; Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, pp. 16-38.

677 Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, Appendix 2, pp. 166-169.

estimate, Dr Lally has concerns with the reliability of the standard deviation estimate from the Merton methodology and therefore does not use the Merton result in the estimation of the standard deviation of the TAMRP estimate. In addition, survey evidence is not amenable to estimation of a standard deviation. Therefore, the process places equal weight on the standard deviation estimates from the Ibbotson, Siegel and Cornell approaches based on New Zealand data, the Ibbotson, Siegel and Cornell estimates from the US data, and the Ibbotson and Siegel estimates of 16 other countries' estimated standard deviations of the estimated TAMRP.

E7.127 From this information Dr Lally estimates a standard deviation of 1.5% for the estimated TAMRP.[678] As this estimate is relatively recent the Commission adopts that estimate as the standard error of the TAMRP in the IM.

E7.128 Research by Fernandez and del Campo provides an estimate of standard deviation of the MRP in a survey of analysts and companies. For US analysts, the standard deviation of the MRP is 1.1%. For US companies, the standard deviation of the MRP is 1.8%.[679] This supports the reasonableness of the 1.5% estimate of the standard error specified in the IM.

Views of submitters – standard error of the TAMRP

E7.129 Professor Guthrie on behalf of Transpower submits that the standard deviation of the TAMRP of 1.5% estimated by Lally is subject to a number of errors or questionable assumptions, particularly with respect to assumptions regarding the correlation between the different estimators. Professor Guthrie provides his own estimate of 3.1% for the standard deviation of the TAMRP.[680]

E7.130 The Commission asked Dr Lally to review Professor Guthrie's submission. Dr Lally refutes Professor Guthrie's points and advises that the estimate of the standard deviation of the TAMRP of 1.5% does not require alteration.[681]

Conclusion – standard error of the TAMRP

E7.131 The standard error of the TAMRP is 1.5%.

E8 Asset and Equity Betas

Decision - asset and equity betas

E8.1 The IM specifies an asset beta for Airports of 0.60. Combining this estimate with a notional leverage of 17% equates to an equity beta for Airports of 0.72.

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678 Lally, M., *The weighted average cost of capital for gas pipeline businesses*, paper prepared for the Commerce Commission, 24 November 2004, p. 18; Lally, M., *The weighted average cost of capital for electricity lines businesses*, September 2005, pp. 20-21; Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, p. 27 and Appendix 2.

679 Fernandez, P., and J. del Campo *Market Risk Premium used in 2010 by Analysts and Companies: a survey with 2,400 answers*, 21 May 2010. The standard errors for European and UK analyst estimates were 1.3% and 1.4% (p.2); and were 1.5% and 1.8% for European and UK company estimates (p.5).

680 Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Guthrie G., *Measurement Error and Regulated Firms' Allowed Rates of Return: a report prepared for Transpower New Zealand Limited*, 14 August 2010, pp. 15-17.

681 Lally, M., *Comments on Measurement Error and Regulated Firms' Allowed Rates of Return*, 13 September 2010, pp. 2-11.

E8.2 In finalising the IM the Commission:

- uses comparable entity analysis as its primary approach to estimating the regulated service wide equity beta and performs a sense check of the resulting equity beta estimate against other New Zealand market equity betas;
- converts equity beta estimates into asset beta estimates (and vice versa) using the tax-neutral formula. It applies the tax-neutral formula regardless of the tax regime that exists in the country from which the equity beta estimates are drawn;
- makes no adjustment for regulatory differences to Airports' asset beta estimates, although these have been derived using some overseas comparators;
- makes no adjustments of a Blume or Vasicek type;
- performs a sense check of the resulting asset beta estimate against other estimates of Airports' asset betas; and
- determines the standard error for Airports' asset beta is 0.16.

Commission's reasons - asset and equity betas

E8.3 The equity beta measures a security's sensitivity to market risk (i.e. beta is a measure of exposure to systematic risk). As neither asset nor equity betas are directly observable, they need to be estimated. For firms with traded stocks, the equity beta for the firm can be estimated directly from the historical returns on those stocks, relative to the market's return.

E8.4 In many cases direct estimation may not be feasible because no traded returns are available. For example, the firm may be unlisted, or the Commission may be interested in estimating the beta of only a single division within a multipart company - the supplier of regulated services.

E8.5 Moreover, even when traded returns are available, firm-specific beta estimates are often statistically imprecise. To help overcome these problems, the Commission estimates a regulated service wide equity beta using individual beta estimates of a portfolio of comparable businesses.

E8.6 Due to the uncertainty associated with beta estimates the Commission estimates the standard error for the asset beta from the portfolio of comparable firms used to estimate the asset beta.

Equity betas – service-specific or supplier-specific

Experts' advice

E8.7 In the Expert Panel report Professor Myers and Dr Lally recommended that service-specific[682] betas should be estimated, i.e. separate betas for Airports, EDBs, GPBs and Transpower. Dr Lally was doubtful whether reliable adjustments could be made

[682] The expert panel referred to a regulated service (service-specific) as an industry. Under Part 4 of the Act the Commission regulates services not industries. Therefore a service-specific asset beta refers to the average beta of that service.

to service-specific betas to account for intra-service variations (i.e. variations across individual airports, or EDBs, or GPBs) in factors other than financial leverage.[683]

Submitters' views

E8.8 In submissions on the RDG and IM Discussion Paper all submitters associated with the Airports sector disagreed with an Airport service-wide cost of capital.[684] They argued that there are differences in each Airport. These differences relate to risk profiles, customer base, pricing structures and leverage.[685]

Commission decision

E8.9 The Commission agrees that as the equity beta measures an asset's or a security's sensitivity to market risk and airport services may face different levels of systematic risk, different equity betas could apply, in principle, to different airports.

E8.10 However, the Commission notes that estimating asset betas for an industry (or specific service) is inherently imprecise and involves a significant degree of judgement. Estimating supplier-specific equity betas would require an even greater degree of judgement than estimating service-specific equity betas.

E8.11 Two of the three airports, subject to regulation under Part 4, are not listed and there is no reliable information available to the Commission to enable it to estimate supplier-specific beta estimates.

E8.12 The Commission notes too that no submission attempted to estimate supplier-specific betas.

E8.13 In the context of information disclosure for Airports, the Commission considers a service or Airport-specific asset/equity beta to be more appropriate as making supplier-specific estimates is not practical or necessary, and would require even greater judgement than making service-specific estimates.

Commission's approach to estimating equity betas

E8.14 The steps the Commission has followed in estimating equity betas can be summarised as follows:

- Step 1: identify a sample of relevant comparator firms. This may include:
  - New Zealand firms from the service in question;
  - New Zealand firms from industries with a similar risk profile;

683 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, pp. 24-26.

684 Air New Zealand Limited, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 69; NZ Airports Association, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 79; Auckland International Airport Limited, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 74; Wellington International Airport Limited, *Submission on the Input Methodologies Discussion Paper*, 7 August 2009, p. 58; Board of Airline Representatives New Zealand Incorporated, *Submission on the Input Methodologies Discussion Paper*, 31 July 2009, p. 58.

685 Commerce Commission, *Cost of Capital Workshop Transcript*, p. 41 and p. 43; New Zealand Institute of Economic Research, *Cost of Capital – Report for Post-Workshop Submission*, Report to BARNZ, 28 November 2009, p. 8; NZ Airports Association, *Submission on the Revised Draft Guidelines*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, 2 December, pp. 17-18.

- overseas firms from the service; and
- overseas firms from industries with a similar risk profile.

- Step 2: estimate the equity beta for each firm in the sample;
- Step 3: de-lever each equity beta estimate to get an estimated asset beta for each firm in the sample;
- Step 4: calculate an average asset beta for the sample;
- Step 5: apply any adjustments for regulatory differences or differences in systematic risk across services to the average asset beta for the sample;
- Step 6: re-lever the average asset beta for the sample to an equity beta estimate using the Commission's assumed notional leverage.

Asset betas – draft reasons

E8.15 In the Airports Draft Reasons Paper the Commission followed the six step process outlined above.[686] This resulted in 10 comparator airport companies identified (as shown in) and analysed over one five-year period using monthly frequency data. This analysis estimated an asset beta of 0.65 as the average asset beta for these Airports

E8.16 Combining this estimate with the notional leverage of 40% equated to an equity beta for Airports of 1.08.

Table E17 Comparative Airports from Drafts Reasons Paper

Country	Name
France	Aeroports de Paris
Thailand	Airports of Thailand
New Zealand	Auckland International Airport
Germany	Fraport
Austria	Flughafen Wien
Switzerland	Flughafen Zuerich
Mexico	Grupo Aeroportuario del Centro Norte
Mexico	Grupo Aeroportuario del Pacifico
Mexico	Grupo Aeroportuario del Sureste
Australia	Macquarie Airports

Standard error of the asset beta

E8.17 In the Airports Draft Reasons Paper the Commission estimated the standard error for the asset beta. This estimate used the Lally (2008) methodology, and using the comparative companies sample the Commission estimated a standard error of 0.04 for Airports asset beta.

[686] See Commerce Commission, *Input Methodologies Airport Services, Draft Reasons Paper*, paragraphs 6.9.1-6.9.64.

Submitters views on the Commission's approach to estimating the asset beta.

E8.18 The Commission received a number of submissions discussing the Commission's approach and results for the asset beta in the Airports Draft Reasons Papers. These are summarised below.

Submitters views on comparative sample selection (Step 1)

E8.19 NZIER (for BARNZ) considered that the Commission should not use comparator airports from countries were there is low gross domestic product (GDP) per capita (namely Thailand and Mexico). NZIER argued that such countries are more sensitive to macroeconomic risk factors. NZIER and BARNZ considered that using comparative companies from these countries would overstate the unadjusted systematic risk faced by New Zealand Airports.[687]

E8.20 In a cross submission, PwC (for NZAA) considered the evidence provided by NZIER for the exclusion of Mexican airports was indirect and inadequate. PwC considered that NZIER's analysis provided no direct, reliable evidence that Mexican airport betas were inappropriate comparators for New Zealand airports.[688]

Submitters views on estimating the asset beta (Steps 2-4)

E8.21 In submissions on the Draft Reasons Papers a number of the submitters highlighted that when estimating betas there are a number of issues to be aware of. These issues included: the choice of the market index; size of the comparable firms; thin trading; estimation period which may include market stress events or outliers (i.e. tech bubble); day of the week or month the estimation is taken on; and estimation period.[689]

E8.22 In submissions of the Airports Draft Reason paper, CIAL and Uniservices (for NZAA) welcomed the focus on empirical evidence on asset betas for Airports and that the recognition that the cost of capital may vary materially across regulated sectors.[690]

E8.23 Suppliers of airport services considered that the Commission's estimate of the asset beta (0.65) was appropriate.[691]

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687 Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Information Disclosure (Airport Services) Draft Reasons Paper and Draft Determination*, Attachment: NZIER, *Asset Beta for New Zealand's International Airports - Comments on the Commerce Commission's Airport Draft Reasons Paper - Report to BARNZ*, 11 July 2010, pp. 8-11 ; Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 17.

688 NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Analysis of Airport Betas: a report prepared for New Zealand Airports Association*, 3 August 2010, pp. 12-13.

689 Commerce Commission, *Cost of Capital Workshop Transcript*, pp. 185-203; Electricity Networks Association, *Submission on EDBs (Input Methodology) Draft Determination and Reasons Paper*, PricewaterhouseCoopers *Submission on the Cost of Capital Parameter Estimates*, 13 August 2010, pp. 47-48.

690 Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, p. 41; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 35-36.

691 Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, p. 41; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the*

E8.24 Air NZ and BARNZ were concerned about the asset beta estimate provided by the Commission considering it was too high, and that therefore it would overstate the cost of capital for airport services.[692]

E8.25 Air NZ submitted two expert reports, from Europe Economics and SFG, which evaluated the Commission's estimation of the airports asset beta.[693]

E8.26 Europe Economics (for Air NZ) mirrored the Commission's analysis and concluded that the asset beta would be more likely be around 0.66 but recommended 0.60 was more reflective of the asset beta used by other regulators.

E8.27 SFG (for Air NZ) increased the size of the comparator sample (from that used by the Commission in the Draft Reasons Paper). Using the same approach as outlined by the Commission SFG concluded that the Commission's estimate of beta was overstated and that a more appropriate asset beta value was in the order of 0.50.

E8.28 In its cross-submission NZZA supplied an expert report from PwC which critiqued Air NZ's expert reports on the asset beta.[694]

E8.29 PwC found two technical errors in the SFG analysis, a gearing measurement that was not consistent with the Commission's approach and anomalies in a number of SFG's beta estimates. PwC considered that remedying these errors alone would raise the asset beta estimate using SFG's preferred method and Air NZ's preferred sample from approximately 0.50 to approximately 0.70. PwC also disagreed with SFG's estimation of equity betas using a very long period of observations and using its preferred set of comparable entities, generated an asset beta estimate of approximately 0.70 (this was also comparable to the asset betas derived by the Commission and Europe Economics). The Commission identified similar technical issues with the NZIER and SFG expert reports on the asset beta analysis.

Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA, 12 July 2010, pp. 35-36; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 12; Christchurch International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers,* 3 August 2010, p. 4; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 39; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, p. 16.

692 Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper,* 12 July 2010, pp. 45-46; Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, pp. 10 and 17.

693 Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, Attachment: Europe Economics, *Report for Air New Zealand - Critique of Commerce Commission's asset beta analysis*, 9 July 2010; Air New Zealand Limited, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, Attachment: Strategic Finance Group, *Airport beta estimates - Report prepared for Air New Zealand*, 11 July 2010.

694 NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Analysis of Airport Betas: a report prepared for New Zealand Airports Association*, 3 August 2010.

The GFC and the asset beta

E8.30 In consultation on the cost of capital for IM some submissions recommended the Commission should adjust its asset beta estimate in light of the impact of the GFC.

E8.31 In the context of airports, BARNZ obtained advice from NZIER who recommended that the global financial crisis has likely led to short-term increases in airport asset betas suggesting that the rise in the average unadjusted asset betas of airport companies measured post 2007 was unrepresentative of their likely future performance. NZIER considered that the five year period adopted by the Commission in the Draft Reasons Paper for measuring airport asset betas arguably has an unrepresentative higher asset beta period without an offsetting lower period.[695]

E8.32 In other submissions relating to beta estimates PwC (for ENA) submitted that the sample period chosen by the Commission, in the EDBs and GPBs Draft Reasons Paper (2005-2010), encompasses the GFC (same period as that for the airports estimate). This raises the possibility of producing unrepresentative beta estimates. PwC recommended that in line with best practice of other regulators that the Commission should exclude the period of the GFC when estimating the asset beta.[696]

E8.33 The Commission notes that the report from PwC (for NZAA) used the same sample period as the Commission's Draft Reasons Paper, which incorporates the GFC, and did not make any recommendations concerning adjustments for the GFC.[697] PwC did not provide any reasons for its different approach to the GFC in estimating asset betas for Airports.

E8.34 In contrast to the PwC (for ENA) submission, CEG (for Vector) submitted that the Commission should give greater weight to beta estimates during the GFC, as beta matters most to investors when risk is high.[698]

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695 Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Information Disclosure (Airport Services) Draft Reasons Paper and Draft Determination*, Attachment: NZIER, *Asset Beta for New Zealand's International Airports - Comments on the Commerce Commission's Airport Draft Reasons Paper - Report to BARNZ*, 11 July 2010. pp. 13-15 ; Board of Airline Representatives New Zealand Inc, *Submission on Airports Draft Reasons Paper and Draft Determination - Effect of valuation date*, 12 July 2010, p. 17.

696 Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, pp. 54-55. The Commission notes, however, PwC advice is inconsistent with advice from its colleagues' from other countries. That is in its advice to Ofgem UK on the cost of capital for the UK electricity distribution businesses (December 2009), PwC UK did not propose to exclude the period of the GFC when estimating the asset beta (see PwC, *Advice on the cost of capital analysis for DPCR5, Final Report to the Office of Gas and Electricity Markets*, 28 July 2009). In its advice to the NZAA on the asset beta estimate for Airports as part of NZAA submission's on the Draft Airports Reasons Paper PwC Australia did not exclude or propose to exclude the period of the GFC (see NZ Airports *Association, Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Analysis of Airport Betas: a report prepared for New Zealand Airports Association*, 3 August 2010).

697 NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Analysis of Airport Betas: a report prepared for New Zealand Airports Association*, 3 August 2010.

698 Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, 13 August 2010, pp. 29-30; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, Attachment:

Submitters views on making adjustments to the estimated the asset beta (Step 5)

E8.35 Uniservices (for NZAA) agreed that adjustments for different regulatory regimes may not be necessary when determining a service-specific cost of capital estimate for Airports for the purpose of information disclosure only.[699]

E8.36 PwC (for NZAA) noted that there was an absence of empirical evidence to support either the proposition for, or magnitude of, any such adjustment for the difference between the asset beta of an airports regulated aeronautical services and an airports non-regulated services.[700]

Submitters views on the standard error of the asset beta

E8.37 CIAL, NZAA and Uniservices (for NZAA) considered that the Commission had understated the uncertainty associated with the cost of capital, as it had proposed to use an implausibly low standard error for the asset beta of 0.04. CIAL and Uniservices (for NZAA) suggested that 0.15 would be more reasonable.[701]

E8.38 Uniservices (for NZAA) considered the Commission should not rely solely on its empirical estimate of the standard error for beta drawn from its comparable company analysis, but exercise some judgement in its choice of the standard error for the asset beta.[702]

Commission's response to submissions

E8.39 The Commission has carefully considered the submissions received and has undertaken further analysis on the appropriate beta, and the standard error for the asset beta. In particular, the Commission has:

- explained in greater detail its approach to applying its six-step process;
- identified additional comparable airport companies for inclusion in the analysis;

Competition Economists Group, *Cost of Capital Input Methodologies: a report prepared for Vector Limited*, 15 August 2010, pp. 15-23.

699 NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, p. 36.

700 NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Analysis of Airport Betas: a report prepared for New Zealand Airports Association*, 3 August 2010, pp. 2-3.

701 Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010. p. 41; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 45-46; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 41; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, pp. 5 and 17-18.

702 NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, p. 46.

- expanded its analysis to cover a greater range of return periods (including weekly return data) and more sampling periods; and
- considered again the estimate of the standard error for the asset beta.

E8.40 The Commission's application of the six step process and the estimation of the standard error are outlined below.

Step 1: Identifying a sample of comparable firms

E8.41 The first step is to identify relevant comparable firms for inclusion in the sample. Here, 'comparable' means, firms that have very similar exposure to market risk. In practice, in most New Zealand industries, it is difficult to find a sufficient number of comparable businesses to implement such an approach based solely on domestic data. Indeed, in some cases (e.g. electricity transmission), the entire industry consists of a single natural monopoly supplier. As a result, it is likely that the sample of comparable firms will include similar firms from overseas jurisdictions. This may include firms from the industry in question, or other sectors with a comparable risk profile.

E8.42 The only New Zealand airport that is listed on a stock exchange is Auckland International Airport Ltd. The Commission therefore included overseas firms that operate airports in its sample of comparable firms. Given the size of the resulting sample, the Commission did not consider it necessary to consider overseas firms from other industries with a similar risk profile.

Comparative sample selection

E8.43 Overseas firm that operate airports were identified based upon the Bloomberg classifications "Airport Development/Maintenance" and "Transport – Services". Any firms with either insufficient history as a listed entity (i.e. too few available data points) or a market value of equity below US$100 million (i.e. small entities) were excluded from the sample.[703]

E8.44 For the remaining firms in the sample, to further assess comparability, Bloomberg's "Segment Analysis" information was used to assess the nature and extent of aeronautical versus non-aeronautical services provided. As a result, any firms which the Commission did not consider were sufficiently comparable were also excluded from the sample. Table E18 displays the selected comparative airports sample.

Table E18 List of Comparable Firms

Name	Country	Why is it Comparable?
Aerodrom Ljubljana	Slovenia	Operates Ljubljana airport, providing a range of airport and ground handling services
Aeroporto di Firenze	Italy	Manages Florence airport and provides services to airlines, retailers and other concessionaires

[703] Small firms may affect the empirical estimates of the asset beta due to the potential effect from thin trading volumes.

Name	Country	Why is it Comparable?
Aeroports de Paris	France	Manages all of the civil airports near Paris and provides air transport related services and business related services
Airport Facilities	Japan	Manages and leases airport facilities at Haneda airport (Tokyo city), and manages Narita airport facilities
Airports of Thailand	Thailand	Operates Bangkok airport and the main provincial airports, and provides services to airlines, retailers and other concessionaires
Auckland International Airport Limited	New Zealand	Operates Auckland airport and provides a range of services to airlines, retailers and other concessionaires
Australian Infrastructure	Australia	Principally owns a number of Australian provincial airports
Beijing Capital International Airport	China	Provides both aeronautical and non-aeronautical services at Beijing airport
Flughafen Wien	Austria	Manages, maintains and operates Vienna airport, providing terminal, air-side and ground-side services
Flughafen Zuerich	Switzerland	Operates Zurich airport, providing flight operation and security services and leasing airport facilities to commercial entities
Fraport	Germany	Operates Frankfurt airport, providing traffic and terminal management, ground handling, security and facilities management services
Gemina	Italy	Operates Rome airports (Fiumicino and Ciampino), providing airport rights, handling, security, retail and parking services
Grupo Aeroportuario del Centro Norte	Mexico	Operates international airports in the northern and central regions of Mexico, providing aeronautical and non-aeronautical services
Grupo Aeroportuario del Pacifico	Mexico	Operates airports in the Pacific and central regions of Mexico, providing air transport support and commercial services
Grupo Aeroportuario del Sureste	Mexico	Manages airports in southern Mexico, providing a range of airport and commercial services

Name	Country	Why is it Comparable?
Kobenhavns Lufthavne	Denmark	Owns and operates Copenhagen airport providing services to airlines and concessionaires
Guangzhou Baiyun International Airport	China	Operates Guangzhou Baiyun airport, providing ground, passenger, aircraft maintenance, food and space rental services
Hainan Meilan International Airport	China	Operates Hainan Meilan airport, providing airfield, terminal facilities, ground handling, passenger, cargo, retail and car parking services
Japan Airport Terminal	Japan	Manages and maintains passenger terminals and airport facilities at Haneda and Narita airports
MAP Group	Australia	Owns Sydney airport and stakes in some other airports
Malta International Airport	Malta	Manages Malta airport, providing aircraft landing / parking, ground handling and concessionaire services
SAVE	Italy	Operates Venice airport, providing airport, infrastructure management and retail services
Shanghai International Airport	China	Operates Shanghai airport, providing air traffic control, terminal management, ground handling and space rental services
Shenzhen Airport	China	Operates Shenzhen airport, providing ground operation, logistics and space rental services
Xiamen International Airport	China	Operates and maintains Gaoqi airport, providing air transport support, space rental, logistics and car parking services

Step 2: Estimating the equity beta of comparable firms

E8.45 The second step in the estimation process is to estimate econometrically the equity beta of each firm in the sample by regressing historical individual firm returns on historical market returns.[704] Each of these ordinary least squares estimators will be an unbiased estimator of the true equity beta of that firm, and the standard error of the estimate—a measure of its statistical precision—is readily obtained from the regression output.

[704] The Commission notes that consistent with the CAPM specification the correct methodology for estimating the equity beta would involve regressing excess returns of the individual firm against the excess returns of the market index. The estimation technique outlined in this paragraph is used by Bloomberg and is consistent with the estimation techniques used by many market practitioners. The returns of each firm in the sample are regressed against the market returns from the jurisdiction within which it is listed.

E8.46 The Commission notes that, in the context of the Expert Panel report on the cost of capital, Professor Myers and Dr Lally recommended that for mature firms, the Commission check beta estimates, for example with a plot of rolling five-year betas, to reveal any short-term anomalies.[705]

E8.47 This is consistent with previous advice to the Commission on estimating asset betas by Dr Lally.[706] In previous advice Dr Lally used different periods to evaluate the asset beta. Ultimately the Commission considers it is important to ensure that the beta is a fair measure of the underlying risk associated with the supply of a service and not a product of a host of other possible measurement problems, such as infrequent trading.

E8.48 Therefore, for each firm in the sample of comparable firms, the Commission obtained from Bloomberg[707] the unadjusted[708] equity beta estimate, the standard error of the estimate and the reported average leverage,[709] for the following periods and observation intervals:[710]

- five year period to 31 May 2005 using weekly and monthly observations;
- five year period to 31 May 2006 using weekly and monthly observations;
- five year period to 31 May 2007 using weekly and monthly observations;
- five year period to 31 May 2008 using weekly and monthly observations;
- five year period to 31 May 2009 using weekly and monthly observations;
- five year period to 31 May 2010 using weekly and monthly observations.

E8.49 The Commission's overall approach is to estimate the equity beta over a range of periods which include and exclude the GFC (accepting the fluctuations of the markets as they actually are), without taking a view on whether or not the effects of the GFC will continue. While there is some evidence that equity betas showed some

705 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, pp. 24-26.

706 Lally, M., *The weighted average cost of capital for gas pipeline businesses*, November 2004; Lally, M., *The weighted average cost of capital for electricity lines businesses*, September 2005; Lally, M., *The weighted average cost of capital for gas pipeline businesses*, October 2008.

707 Bloomberg is a worldwide provider of financial and market information.

708 The term 'unadjusted' refers to the absence of a Blume or Vasicek adjustment.

709 The average leverage was calculated as the unweighted arithmetic average of leverage at each financial year end for the same period as the observations used for the equity beta estimate (using the book value of net interest bearing debt and market value of equity).

710 Prior to the five year period to 31 May 2005, the number of entities for which data is available rapidly declines to a very small sample. The following table briefly summarises the number of entities by period:

Five year period to:	Entities
31 May 1995	2
31 May 2000	6
31 May 2005	15
31 May 2010	24

modest increases during the GFC, the equity betas were generally stable across the period. This is consistent with the approach for estimating the equity beta for EDBs, GPBs and Transpower.

Step 3: Turning the equity betas into asset betas

E8.50 The third step is to remove from each firm's unadjusted equity beta estimate the effect of that firm's average leverage by de-levering the equity beta estimate to arrive at an estimate of the firm's unadjusted asset beta. Having an asset beta estimate for each firm allows the asset beta estimates to be directly compared with each other without the effects of different leverage levels.

E8.51 A range of formulae have been developed as possible ways to de-lever and re-lever beta estimates. All of these formulae rely on making assumptions, including how firms manage their debt and the tax environment of the country in which the firm operates.

E8.52 The two principal formulae that could be used in the current context are the Hamada formula and the tax-neutral formula.

E8.53 The formula advocated by Hamada[711] assumes that (a) debt is fixed in dollar terms, and (b) that a classical tax system applies. The tax-neutral formula assumes that dividend imputation is fully effective and that capital gains are tax free. Miles and Ezzell[712] extended the formula advocated by Hamada to allow the assumption that leverage is fixed (rather than debt is fixed in dollar terms), whilst still assuming that a classical tax system applies. Removing the tax parameter from the Miles and Ezzell formula results in a tax neutral formula.

E8.54 The key concern raised by parties in relation to the de-levering and re-levering of betas was consistency in the formula used for doing so.[713]

Conclusion - the approach to de-levering and re-levering

E8.55 The Commission has previously used the Hamada formula to de-lever overseas betas, and a tax-neutral formula (equivalent to the Miles and Ezzell formula without taxes) to re-lever New Zealand betas, based upon the respective tax systems in New Zealand. The Commission has however reconsidered this issue taking into account the assumptions used in the respective formulae regarding debt policy.

E8.56 The Commission now considers that a formula without a tax term is appropriate because:

i. inclusion of the tax term requires not only a classical tax regime but that debt is fixed in dollar terms (as opposed to leverage being fixed); and

711 Hamada, R. S., The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks, *Journal of Finance*, Vol. 27, No. 2, 1972, pp. 435–452.

712 Miles, J. A. and Ezzell, J. R., The Weighted Average Cost of Capital, Perfect Capital Markets and Project Life: A Clarification, *Journal of Finance and Quantitative Analysis*, September, 1980, pp. 719-730.

713 Commerce Commission, *Cost of capital Workshop Transcript*, pp. 100-101; Charles River Associates, *Leverage and the Cost of Capital, Report on behalf of Unison*, 2 December 2009, pp. 2-5; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, Appendix 2 and 3, pp. 82-91.

ii. the assumption that leverage rather than the dollar level of debt being fixed is the better assumption, which leads to the Miles-Ezzell model, and this model in turn is close to a model without a tax term.

E8.57 Expressed in terms of estimating an asset beta (i.e. in a form suitable for de-levering an equity beta estimate), the tax-neutral formula takes the form:

$$\beta_a = \beta_e(1-L) + \beta_d L$$

where B_a is the asset beta, β_e is the equity beta, β_d is the debt beta, and L is the leverage.

E8.58 Expressed in terms of estimating an equity beta (i.e. in a form suitable for re-levering an asset beta estimate), the tax-neutral formula takes the form:

$$\beta_e = \beta_a + (\beta_a - \beta_d)L/(1-L)$$

E8.59 Applying this approach results in the average unadjusted asset beta estimates, over all sampling periods, set out in the Table E19 below.

Table E19 Airports Comparable Companies Average Unadjusted Asset Betas

Name	Average Unadjusted Asset Beta Monthly Observations	Average Unadjusted Asset Beta Weekly Observations
Aerodrom Ljubljana	1.08	0.88
Aeroporto di Firenze	0.59	0.34
Aeroports de Paris	0.69	0.71
Airport Facilities	0.32	0.37
Airports of Thailand	0.74	0.69
AIAL	0.75	0.79
Australian Infrastructure	0.76	0.65
Beijing Capital International Airport	1.02	1.19
Flughafen Wien	0.78	0.59
Flughafen Zuerich	0.49	0.25
Fraport	0.62	0.60
Gemina	0.49	0.35
Grupo Aeroportuario del Centro Norte	1.04	0.82
Grupo Aeroportuario del Pacifico	0.64	0.74
Grupo Aeroportuario del Sureste	0.85	0.51
Kobenhavns Lufthavne	0.39	0.30
Guangzhou Baiyun International Airport	0.56	0.54

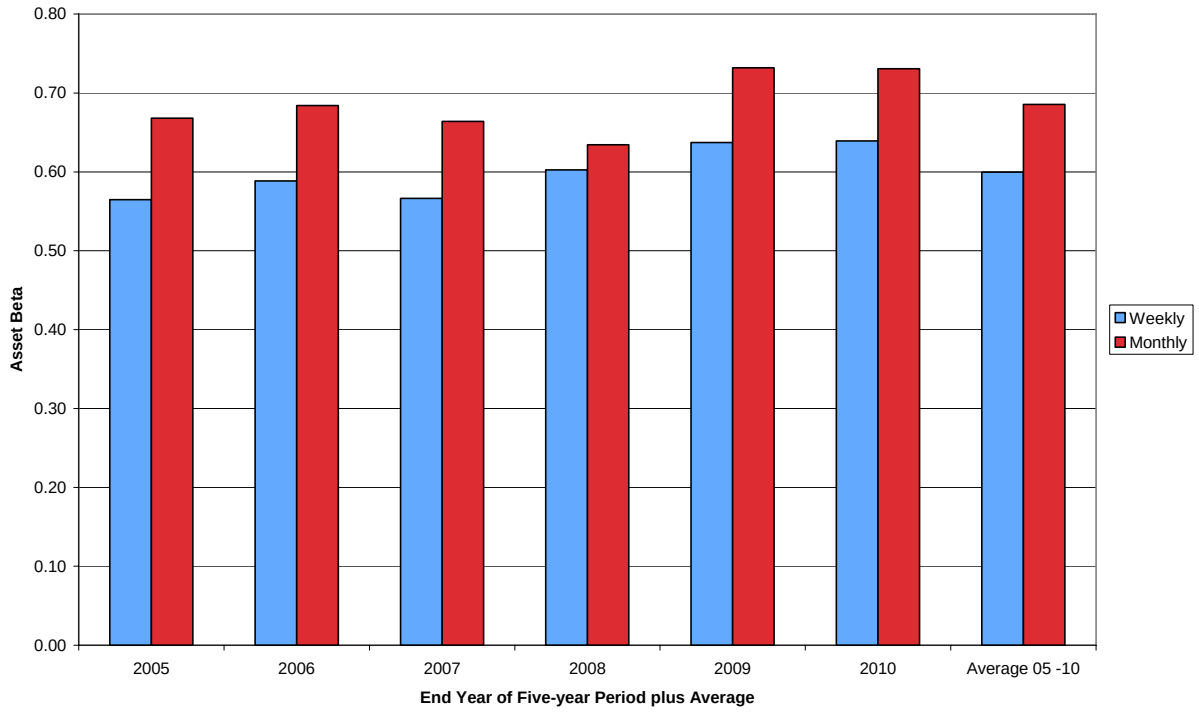
Name	Average Unadjusted Asset Beta Monthly Observations	Average Unadjusted Asset Beta Weekly Observations
Hainan Meilan International Airport	1.29	0.62
Japan Airport Terminal	0.58	0.72
MAP Group	0.66	0.61
Malta International Airport	0.47	0.39
SAVE	0.82	0.54
Shanghai International Airport	0.70	0.73
Shenzhen Airport	0.82	0.84
Xiamen International Airport	0.75	0.74
Mean (of all observations)	**0.72**	**0.62**

Step 4: Calculate the average asset beta of comparable firms

E8.60 The fourth step is to estimate a 'service-wide' asset beta by taking an average of the individual unadjusted asset beta estimates of the comparable firms. As a starting point, each estimate receives an equal weighting.

E8.61 As outlined in paragraph E8.48 above, the Commission investigated the effect on the asset beta estimate of different time periods and different observation intervals within each time period. These results are displayed in Figure E9 below.

Figure E9 Airports Comparable Companies Unadjusted Asset Betas



E8.62 This analysis results in an average of the unadjusted asset beta estimates using monthly observations of 0.69 and using weekly observations, 0.60. The monthly (weekly) asset beta estimate ranged from 0.63 to 0.73 (0.57-0.64).

E8.63 Applying equal weight to the monthly and weekly estimates derived from the above analysis results in an asset beta of 0.65 for the systematic risk of aeronautical services.

Previous decisions - Airports' asset betas

E8.64 The Commission received expert advice on the asset beta for the Airports Inquiry by Dr Lally.[714] Dr Lally estimated the asset betas for all three Airports to be 0.50 (with a band of 0.40 to 0.60). Dr Lally considered asset betas from New Zealand publicly listed international airports, foreign international airports, publicly listed ports and other transport services and a combination of US electricity utilities. Dr Lally relied primarily on the US utilities companies for his estimate of the Airports' asset beta. The approach was used as there was a lack of data for airports, and Dr Lally had concerns about the effect of regulation for the airports that were available. The Commission adopted an asset beta of 0.5.[715]

Overseas regulators - airports' asset betas

E8.65 In the 2007 Heathrow and Gatwick price control review, the UK Competition Commission estimated the asset betas (using debt beta of 0.1) of the two airports to

714 Lally, M., *The cost of capital for the airfield activities of New Zealand's international airports*, June 2001.

715 Commerce Commission, *Final report Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports*, 1 August 2002.

be 0.47 and 0.52 respectively.[716] As a cross check, the UK Competition Commission evaluated asset betas from other international airports. The average asset beta from these other international airports was 0.44 with a range of 0.20 to 0.88.[717]

E8.66 The Commission notes that its own beta estimates for airports differ from those estimated by the UK Competition Commission. Although all estimates have been derived using the same econometric techniques, the time horizons and periodicities differ. Specifically, the UK Competition Commission used one year worth of weekly observation covering the period July 2006 to July 2007.

E8.67 In a report to the UK CAA on the 2008 Stansted price control review, the UK Competition Commission estimated the asset betas of Stansted to be 0.61.[718] As a cross check, the Competition Commission evaluated asset betas from other international airports. The average asset beta from these other international airports was 0.46.[719]

E8.68 In its 2009 price review of the Dublin Airport Authority the Commission for Airport Regulation decided that an asset beta for airports was in the range of 0.5 to 0.7 and decided on a 0.61 point estimate of the asset beta in estimating the cost of capital for Dublin Airport Authority.[720]

Conclusion

E8.69 In coming to its decision on the value of the unadjusted asset beta for Airports (and before any adjustments reviewed in Step 5) the Commission puts primary weight on the analysis from this paper using a range of time periods and monthly and weekly observation intervals within each time period.

E8.70 The Commission notes that the empirical analysis includes periods covering the GFC.

E8.71 In order to ensure that the asset beta is a fair measure of the underlying risk associated with Airport services, the IMs considers it appropriate to accept an unadjusted asset beta monthly estimate of 0.69 (weekly of 0.60) before any other adjustments are considered.

Step 5: Undertaking adjustments

E8.72 The Commission accepts the principle that there may be grounds for (a) making adjustments to multi-divisional asset betas estimates, (b) adjusting asset beta estimates sourced from overseas for differences in systematic risk due to regulatory

716 The UK Competition Commission estimate the historical equity beta for BAA to be approximately 0.74, combining this with leverage of 0.34 and the debt beta of 0.1 resulted in an asset beta of 0.52. If the equity beta is de-levered without the use of the debt beta the resulting asset beta is 0.49. See UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, pp. F27-F29.

717 ibid, Appendix F, Table 7, p. F30.

718 Competition Commission, *Review of Stansted Airport Q5 price control*, October 2008, Appendix L, p. L24.

719 ibid, Appendix L, Table 8, p. L21.

720 Commission for Aviation Regulation, *Determination on Maximum Levels of Airport Charges at Dublin Airport*, 4 December 2009, pp. 116-118.

differences, and (c) adjusting asset beta estimates due to differences in systematic risk between services.

E8.73 In the case of Airports, an adjustment for (c) is not required as the Commission has made its decision by using comparators that are exclusively suppliers of airport services. The Commission in the following sub-sections outlines how each of the considerations (i.e. Step 5(a) and Step 5(b)), is used in sequence to adjust the basic asset beta estimate from Step 4.

Step 5(a): Making adjustments to multi-divisional asset betas estimates

E8.74 A company's overall beta can be viewed as a weighted average of the betas of its component businesses. The risk attached to a company's different businesses may vary considerably, and the weighted average gives the overall risk of the firm. Where multi-division firms are used in the Commission's analysis, it may be necessary to extract an estimate of beta for a specific type of regulated service from the overall group beta.

E8.75 The task of estimating divisional betas is complicated by the fact that there are no traded returns for individual business units. Nevertheless, a number of approaches for estimating divisional betas have been proposed in the finance literature.[721] Of these, the Commission has narrowed the set to three possibilities:

i. the 'pure play' approach;
ii. the full information approach; and
iii. econometric prediction based on risk-drivers.

E8.76 Under the 'pure play' approach, the Commission would identify traded standalone firms[722] that are very similar across the fundamental risk drivers discussed above, and benchmark the division's beta to, for example, the average beta of a sample comprising these standalone firms. The main drawback of the 'pure-play' approach is that it requires 'pure-play' companies. In the case of Airports, such 'pure-play' companies do not exist.

E8.77 The full-information approach exploits the idea that a multi-product firm is simply a portfolio of projects, and so its overall beta is a weighted average of the unobservable betas of its individual business units.[723] The asset betas are then estimated using econometric techniques.

E8.78 The third technique—the econometric investigation of risk-drivers—involves estimating a beta equation, specified as a function of potential drivers of asset betas.

721 See, for example, Fuller, R. J., and Kerr, H. S., Estimating the Divisional Cost of Capital: An Analysis of the Pure-Play Technique, *Journal of Finance*, Vol. 36, No. 5, 1981, pp. 997–1009; Ehrhardt, M. C., and Bhagwat, Y. N., A Full-Information Approach for Estimating Divisional Betas, *Financial Management*, Vol. 20, No. 2, 1991, pp. 60–69; Grinblatt, M., and Titman, S., *Financial Markets and Corporate Strategy*, 2nd edition, McGraw-Hill: New York, 2002, pp. 390-391; Brealey, R., and Myers, S. C., *Principles of Corporate Finance*, 7th ed., McGraw-Hill/Irwin: New York, 2003, pp. 237-238.

722 Stand-alone firm refers to a firm that only supplies the service that is being considered and no other.

723 Ehrhardt, M. C., and Bhagwat, Y. N., A Full-Information Approach for Estimating Divisional Betas', *Financial Management*, vol.20, Summer, 1991, pp. 60–69; Wood, R. A., Mcinish, T. H., and Lawrence, K. D., Estimating Divisional Betas with Diversified Firm Data, *Review of Quantitative Finance and Accounting*, Vol. 2, No. 1, 1992, pp. 89–96; Kaplan, P. D., and Peterson, J. D., Full-Information Industry Betas, *Financial Management*, Vol. 27, No. 2, 1998, pp. 85–93.

E8.79 The main disadvantage of the full information approach and econometric prediction based on risk-drivers is that they require a large amount of high-quality data.

E8.80 The applicability and performance of these techniques will depend on the data available, so no one approach can be recommended in all instances.

E8.81 In the case of Airports, the Commission considers the comparative firms are generally not pure plays. That is, they have a mix of regulated and non-regulated activities. The services that would not be subject to regulation under part 4 are a significant proportion of an airports total business risk. On average, therefore, the asset beta for these comparative firms is likely to reflect a higher degree of systematic risk as could be expected for stand-alone airport services.

E8.82 However, the Commission considers that the necessary data is not available for any of the available options above to estimate the difference in systematic risk between the unregulated and regulated services.

E8.83 Therefore, the Commission considers that the multi-divisional asset beta of 0.65 for Airports is likely to overstate the asset beta associated with the provision of regulated services. The Commission considers this is too high as the estimates include both regulated and unregulated services. Unregulated services such as retail shopping services are generally considered more risky than regulated services such as provision of airfields as there is less demand uncertainty. This requires a downward adjustment of the average asset beta for the regulated service.

E8.84 This view is consistent with the view expressed by AIAL in an issues brief concerning its 2006/2007 pricing consultation with airline customers and their representative BARNZ. AIAL stated:[724]

> … over 50 per cent of AIAL's revenue is sourced from its non-aeronautical (market contestable) business activities where earnings are potentially higher than aeronautical activities because of the higher WACC hurdle rate associated with the higher risk, commercial side of the airport business. Aeronautical activities, on the other hand, demand a much higher proportion of an airport's fixed assets and operating expenses, but are capped at a lower aeronautical WACC return.

E8.85 In forming its view on the appropriate downward adjustment to the average asset beta for New Zealand Airports, the Commission has exercised its judgement having regard to the following:

- previous Commission regulatory decisions that considered Airports' asset betas;
- overseas regulatory experience in considering airports' asset betas; and
- evidence from submitters.

[724] Auckland International Airport Limited, *Airport regulation and pricing, Issue Brief*, November 2006, p. 5 (http://www.aucklandairport.co.nz/Corporate/NewsAndMedia/Publications/~/media/Files/Corporate/Project%20Profiles/Regulation%20and%20pricing%202006.ashx).

Previous decisions - Airports' asset betas

E8.86 The Commission received expert advice on the asset beta for the Airports Inquiry by Dr Lally.[725] Dr Lally estimated the asset betas for all three Airports to be 0.50 (with a band of 0.40 to 0.60). Dr Lally considered asset betas from New Zealand publicly listed international airports, foreign international airports, publicly listed ports and other transport services and a combination of US electricity utilities. Dr Lally relied primarily on the US utilities companies for his estimate of the Airports' asset beta. The approach was used as there was a lack of data for airports, and Dr Lally had concerns about the effect of regulation for the airports that were available. The Commission adopted an asset beta of 0.5.[726]

Overseas regulators - airports' asset betas

E8.87 In its 2007 Heathrow and Gatwick review the UK Competition Commission had to set an asset beta for each of the two individual airports.[727] The UK Competition Commission considered that the estimated beta for the combined entity, BAA group, was not reflective of the individual risks faced by the aeronautical services of Heathrow and Gatwick.

E8.88 The UK Competition Commission disaggregated BAA group into three components parts, Heathrow, Gatwick and BAA's other activities and estimated the asset beta for each component. In assessing the asset beta for each component the UK Competition Commission considered a number of relevant factors that affect the systematic risk of each component part.

E8.89 Pulling the evidence together, the UK Competition Commission considered that Heathrow was likely to be perceived as the lowest risk BAA airport. After Heathrow, Gatwick was likely to be perceived as less risky than the remainder of the BAA group. Both airports were considered to be less risky as they were both regulated business, subject to five-yearly resets of price caps.

E8.90 The UK Competition Commission considered that, together with the 0.52 estimate for the BAA group asset beta as a whole, it was sufficient to estimate asset betas for the individual component businesses, as follows:[728]

i. Heathrow – 0.47, with a standard error of +/–0.025;
ii. Gatwick – 0.52, with a standard error of +/–0.03; and
iii. other businesses – 0.61.

Step 5(b): Adjusting for differences in systematic risk due to regulatory differences

E8.91 Because of the very limited number of relevant listed firms in New Zealand, i.e. one airport operator, the Commission has also looked to comparable firms listed overseas. The Commission has considered the asset betas of twenty four overseas airports. These overseas airports are likely to be subject to regulatory regimes in

[725] Lally, M., The cost of capital for the airfield activities of New Zealand's international airports, 2001.

[726] Commerce Commission, *PartIV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, Final report, 2002*.

[727] Competition Commission, *Report on the economic regulation of the London airport companies*, September 2007, Appendix F, pp. F28-F29.

[728] The Commission notes that the asset betas reported of 0.52 was estimated using a debt beta of 0.1. Therefore, the individual asset betas reported also reflects this.

their own country. Inevitably, the regulatory regimes applied to a sector differ between different countries. A key question relevant to beta estimation, and the transportability of these beta estimates, is whether these differences in regulatory regime affect the supplier of regulated services in terms of their sensitivity to systematic risk and, if so, in what way. In theory, if the structure of the regulatory regime has the effect of lowering the systematic risk faced by the supplier of regulated services then the asset beta should also be lower, and vice versa.[729]

E8.92 The Commission considers it is not feasible to: (a) adequately assess the structure of the regulatory regime that each of these airports is subject to; and (b) meaningfully compare those regimes against the one that applies to New Zealand Airports with sufficient precision to robustly inform the magnitude of an adjustment for differences in regulatory regimes. The Commission does not consider it necessary to make an adjustment to the unadjusted asset beta estimates for Airports for differences in systematic risk due to regulatory differences. The Commission's decision is to not make any adjustments for regulatory differences.

Conclusion – Airports asset beta from Step 5

E8.93 The Commission notes that there are a wide range of estimates. Using its own analysis, with monthly and weekly frequency data, the Commission arrived at an average asset beta for airports of 0.65. The Commission considers this estimate to be an upper bound as it includes both regulated and unregulated services, the latter of which it considers to be more risky than the former.

E8.94 The UK Competition Commission has previously estimated an average asset beta for international airports of 0.44 (in 2007) to 0.46 (in 2008). It has also applied asset beta estimates for Heathrow, Gatwick (in 2007), and Stansted (in 2008) of 0.47, 0.52, and 0.61, respectively. As outlined previously, the Commission considers that these estimates are based on data covering a rather short timeframe.

E8.95 In its 2007 review of Heathrow and Gatwick the UK Competition Commission applied lower asset beta estimates for the regulated aeronautical services of BAA group (Heathrow and Gatwick airports) relative to the other non-regulated services of the BAA group.

E8.96 In making its decision on the asset beta for airports services the Commission has attributed primary consideration to:

i. the more recent beta estimates for overseas airports;
ii. the analysis on the difference of the beta estimate between regulated aeronautical services relative to non-aeronautical services from the UK; and
iii. the extensive unregulated activities of airports which are considered by other regulators and suppliers of airports services to have a higher asset beta.

[729] For a summary of the effect of regulation on the systematic risk see Commerce Commission, *Input Methodologies Reasons paper for EDBs and GPB*, 2010, Appendix H8.

E8.97 Therefore, the Commission considers that an asset beta estimate for airport services of 0.60 is appropriate. The Commission notes that this is the same as the estimated asset beta using the weekly frequency data.

Step 6: Turning the adjusted asset betas into equity betas

E8.98 The final step in estimating equity betas is to convert the estimated 'service-wide' asset beta to an equity beta that can be applied in the CAPM. In making its decision for Airports, the Commission has undertaken the conversion process by applying step three (turning equity betas into asset betas) in reverse.

Other possible adjustments - Blume and Vasicek

E8.99 Blume and Vasicek (together referred to as 'Bayesian') adjustments are designed to reflect equity beta mean reversion tendencies over time. Applying the Blume adjustment implies a belief that the equity beta will trend over time towards the market average equity beta of one. However, this trend says nothing about the tendencies of the asset beta, particularly for a specific regulated service. Applying the Vasicek adjustment implies a prior belief about the true value of the equity beta which, if valid, should be used in the first place. Again, this says nothing about the tendencies of the asset beta, particularly for a specific regulated service.

E8.100 Neither the Blume nor the Vasicek adjustment has been applied in any of the Commission's previous regulatory decisions.

E8.101 Of the Expert Panel, Dr Lally considered Bayesian adjustments inappropriate as these types of adjustments lead to an upward bias for low beta industries. Dr Lally recommended that the Commission not make Blume adjustments to equity betas; even Vasicek adjustments are undesirable if beta estimates are sought for more than one firm in an industry because it will lead to different estimates for different firms in the same industry.[730]

E8.102 Professors Franks and Myers agreed that some form of Bayesian adjustment to beta estimates may be sensible, "but did not strongly recommend a specific adjustment method".[731]

E8.103 In submissions on the RDG, some submitters considered that the Commission should either apply, or at least maintain an open mind, to using Bayesian adjustments to beta estimates.[732] Unison submitted:[733]

> … but they do not alter the fact that given the current specification of the CAPM returns for low beta companies are higher than predicted by the CAPM. One way to correct for this downward bias would be to employ blume adjusted betas. Blume adjusted betas

730 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, p. 27.

731 ibid.

732 Powerco Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: PricewaterhouseCoopers, *Commerce Commission's Revised Draft Guidelines and aspects of the Input Methodologies Discussion Paper relating to Cost of Capital prepared for Powerco Limited*, 14 August 2009, pp. 26-29; Powerco Limited, *Submission on the Input Methodologies Discussion Paper*, 14 August 2009, p. 30; ; NZ Airports Association, *Submission on the Revised Draft Guidelines*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, 2 December 2009, p. 31.

733 Unison, *Post-Conference Submission on the Weighted Average Cost of Capital*, 2 December 2009.

might not be part of a clean theoretical model, but they more accurately reflect the returns that are actually earned by firms in real world workably competitive markets.

Conclusion - Blume and Vasicek adjustments

E8.104 The Commission considers that the reasons given by submitters for requiring Blume and Vasicek adjustments can be explained by a range of factors other than any tendencies of the asset betas, particularly for a specific service.

E8.105 The equity beta for Airports is 1.0 therefore no adjustment is needed.

E8.106 For this reason, the Commission's decision is that Blume or Vasicek adjustments should not be made in determining the cost of capital for suppliers of airport services.

Standard error of the asset beta

E8.107 Due to the uncertainty associated with the asset beta estimation the Commission has estimated a standard error for the asset beta based on quantitative and qualitative judgement.

E8.108 Dr Lally, in Appendix 3 of the Gas Authorisation, demonstrates the process to estimate the standard error of the asset beta estimate.[734] The Commission followed this process to estimate the standard error of the asset beta for Airports. In the Draft Reasons Paper, the Commission estimated a standard error for the asset beta of 0.04.

E8.109 The Commission notes that the standard error of the asset beta in the Draft Reasons Paper was comparable to the standard error of the asset beta applied to London airports by the UK Competition Commission in its review of BAA in 2007 (i.e. Heathrow standard error 0.025, Gatwick standard error 0.03).[735]

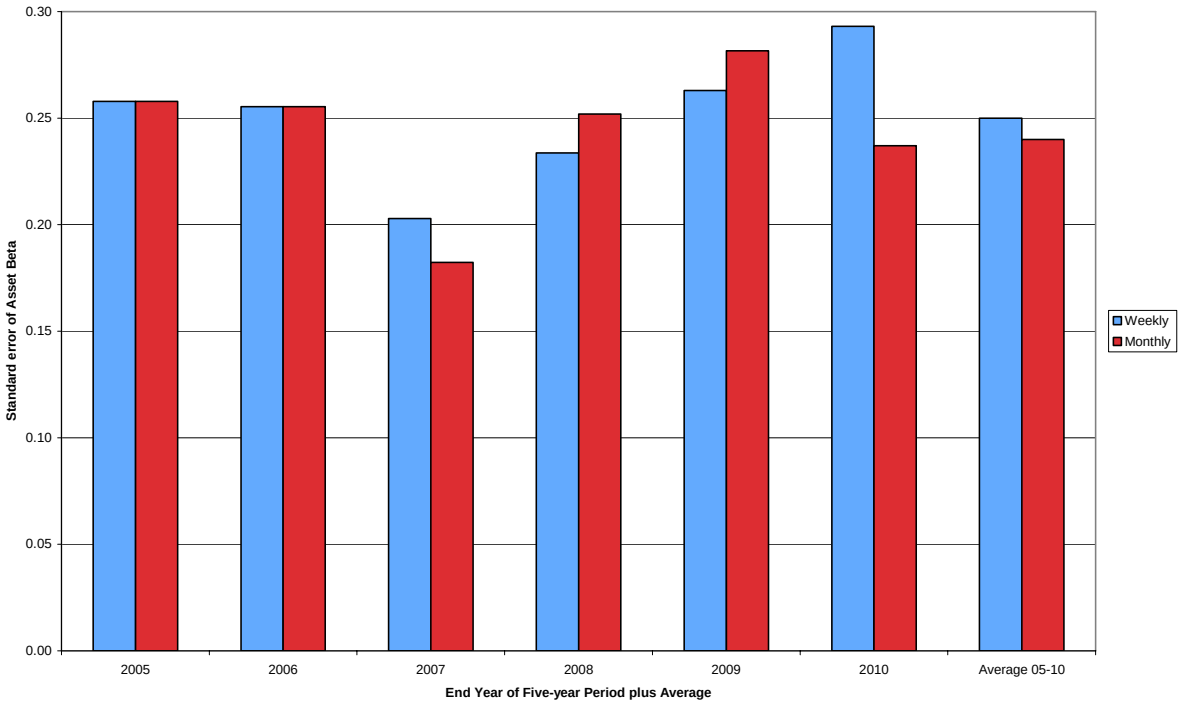
E8.110 Uniservices (for NZAA) called this estimate "implausibly low". The Commission has re-checked this estimate and confirms that the original sample of 10 comparator airport companies did have a standard error of 0.04.

E8.111 Subsequent to the Draft Reasons Paper, the Commission has also estimated the standard error of the asset beta using the enlarged sample, data frequencies, and sampling periods identified above. This produced a range of estimates, which are displayed in for each of the five-year periods and total average.

[734] Lally, M., *Weighted average cost of capital for gas pipeline businesses*, 28 October 2008, Appendix 3, pp. 170-178.

[735] UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, p. F29.

Figure E1 Asset Beta Standard Errors from Comparative Firms Analysis



E8.112 In advice on the Gas Authorisation, Dr Lally considered that the estimate of the standard error of the asset beta requires data on a set of firms over a period of years. However, the results in are for all of the comparative firms where some firms have limited data periods available.

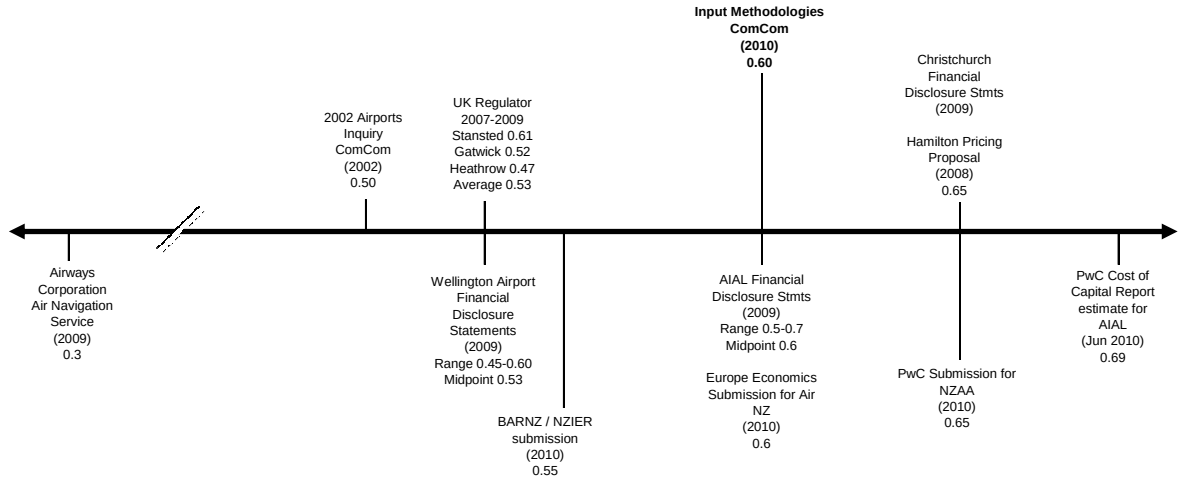
E8.113 The Commission estimated the standard error of the comparative firms that had data for every period. The average estimate was approximately 0.24, versus the 0.04 estimated at the time of the Draft Reasons Paper.

E8.114 The Commission accepts the original estimate of 0.04 is too low, but considers a revised estimate of 0.24 is too high and would provide an implausible result. Having regard to these estimates, the purpose of information disclosure, and submissions from airports, the Commission proposes to adopt an estimate of the standard error for the asset beta of 0.16.

Reasonableness checks on the estimated asset beta

E8.115 The Commission compares the results of its asset beta analysis between services, and across a range of estimates of the asset beta from other sources. The result of this comparison is shown in the below.

Table E20 Reasonableness Checks on the Asset Beta



E8.116 The above diagram shows the Commission's 0.60 estimate of the asset betas for Airport services fall within the range of comparable information. The Commission also notes that despite the differing approaches to estimating the asset beta, most of the estimates reported above fall within a reasonably tight range, (and with the Commission's estimate near the middle of the range). This supports the Commission's view that its estimate of the asset beta for airport services is reasonable.

Overall conclusion - equity betas

E8.117 The Commission notes that estimation of the asset beta is not a precise science and produces a range of estimates. The Commission has considered issues raised in submissions on the Draft Reasons Papers and has therefore:

i. set out its practical application of the six-step methodology for estimating the equity beta in detail;

ii. increased its sample size;

iii. excluded small companies to minimise the risk of bias from thin trading;

iv. estimated the asset beta using monthly and weekly data;

v. estimated asset betas over a wide range of periods using monthly and weekly data from 2000 to 2010;

vi. considered what adjustment may be required to the empirical estimate of the asset beta; and

vii. tested the reasonableness of its asset beta against other estimated asset betas.

E8.118 Having considered the above factors, which include previous advice, decisions and its current analysis, the Commission through using Steps 1-4 has estimated an unadjusted asset beta of 0.65 (using monthly data an asset beta of 0.69 and 0.60 using weekly data from its comparative firm's sample).

E8.119 Taking into account the potential adjustments to the asset beta (i.e. Step 5), the Commission considers that no adjustments should be made for regulatory differences between New Zealand and overseas. It does consider an adjustment is required for the difference in risk between the regulated aeronautical services and

non-regulated service of suppliers of airports services. Therefore, an adjustment downwards is appropriate to reflect this difference in systematic risk between the regulated and non-regulated activities of Airports.

E8.120 Applying the 6 step approach outlined above for airport services results in an asset beta estimate for Airports of 0.60. Combining this asset beta estimate with a notional leverage of 40% equates to an equity beta for Airports of 1.00 with a standard error of 0.16.

E9 Debt Beta

Decision - debt beta

E9.1 The IM assumes a debt beta of zero.

Commission's reasons – debt beta

Overview

E9.2 The debt beta measures a firm's systematic risk associated with borrowing, and is measured by the sensitivity of the returns on corporate debt to movements in returns on the market portfolio of all assets.[736]

E9.3 Debt betas can affect cost of capital estimates in three ways: first, when converting estimated asset betas to equity betas; second, when converting estimated equity betas of comparators into asset betas; and, third, when estimating the firm's cost of debt (in particular, the debt premium).

E9.4 Whereas considerable attention has been given to investigating the riskiness of common stocks, little empirical work has been done to measure the systematic risk of debt. The Commission recognises that the greater the riskiness of debt the more it resembles equity and therefore the greater the systematic risk of debt due to market conditions, the greater is the debt beta. Therefore, in principle, debt betas should be included in the cost of capital calculation.

E9.5 The Commission notes that the Expert Panel recommended that the Commission should take account of empirical estimates of debt betas and if debt betas are significant they should be included in the cost of capital estimation.[737]

E9.6 The use of debt betas to address the counter-intuitive relationship between the cost of capital and leverage when applying the simplified Brennan-Lally CAPM was discussed in Appendix E3 (from paragraph E3.49). As noted in that discussion, an assumption of a specific level for the debt beta could remove this anomaly. This feature of the cost of capital when applying the simplified Brennan-Lally CAPM could be viewed as suggesting that in considering what value for the debt beta should be used in the simplified Brennan-Lally CAPM a joint consideration of the empirical estimation of the debt beta and of its interaction with leverage in the

[736] In principle, the market portfolio should encompass all assets in the economy, including debt and equity securities, as well as those assets that are traded and untraded.

[737] Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, December 2008, pp. 23-24.

simplified Brennan-Lally CAPM would be appropriate. The analysis considered here focuses on:

i. the prior issue of the empirical estimation of the debt beta;
ii. the results for the equity beta given a non-zero debt beta; and
iii. leverage and the results on the cost of capital.

Practical difficulties when estimating the debt beta

E9.7 There are three common approaches to estimating the debt beta:

i. estimate the debt beta using the structure of the CAPM (i.e. the systematic risk component of all outstanding debt with the same maturity, tenor and credit rating characteristics as the companies debt;
ii. consider the systematic risk component of the company's debt; and
iii. assume that the debt beta is either zero or a positive non-zero point estimate.

E9.8 Using the CAPM based approach (approach i) debt betas can be estimated using a portfolio of traded corporate bonds aggregated by rating class and by maturity, and regressing the returns to this portfolio, against the returns of the overall market portfolio. The coefficient on the market factor would be the estimated beta for that risk and maturity class of bonds.

E9.9 However, even the portfolio approach, which pools together information from several traded debt instruments, can be difficult to implement for small, thinly-traded markets such as New Zealand. Paucity of data can be a major hindrance to obtaining reasonably precise debt beta estimates.

E9.10 In its submission for NZAA, LECG stated that, in practice, it would be very difficult to obtain a market estimate of the debt beta, especially when, as in New Zealand, there are few frequently traded debt securities on issue.[738]

E9.11 Dr Lally advised the Commission that using a debt beta that flattened the line entirely may be inappropriate as not all of the debt premium is entirely due to systematic risk.[739]

E9.12 With regard to estimating equity betas, the Commission noted that these would be inherently imprecise and involve a significant degree of judgement. Given the difficulty associated with obtaining reliable data for a portfolio of traded corporate bonds, the Commission considers that the estimation of debt betas would be even more imprecise and require an even greater degree of judgement.

E9.13 An indirect method to estimate the debt beta involves decomposing the observed cost of debt into a number of smaller components to leave an estimate of the

738 LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of NZAA, 31 July 2009, p. 27.

739 Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.

premium that lenders require as compensation for bearing systematic risk (approach ii).[740] The debt beta estimate would be decomposed using the following formula:

Debt premium = liquidity premium + default premium + systematic risk premium

$$= \text{liquidity premium} + \text{default premium} + \beta_d \text{ . MRP}$$

E9.14 This method involves a significant degree of judgement as it would require the Commission to attribute values to each of the parameters used.

E9.15 The third approach, to assume a positive value for the debt beta, that would make the cost of capital invariant to leverage, would also require a significant degree of judgement from the Commission. As the Commission's debt premium is based on promised yields the estimate of the debt beta would need to reflect that not all of the risk associated with the debt margin is systematic.

E9.16 Dr Lally advised the Commission that even if the debt beta were estimated to accurately capture the true systematic risk component of the debt premium, the cost of capital/leverage relationship might still be positive. This was because there was a liquidity premium for corporate debt (for which there is no counterpart in the cost of equity) and debt incurs bankruptcy costs which increase as leverage does (but again equity does not incur such costs). Furthermore, Dr Lally recommended that if debt betas were used the Commission should define the cost of debt as the expected yield (not the promised yield) plus an allowance for bankruptcy costs.[741]

E9.17 The Commission notes that the majority of Australian and UK regulators apply a debt beta of zero in regulatory determinations.

E9.18 In Australia, the Queensland Competition Authority has consistently applied a positive debt beta. The QCA applies a mid-point debt beta value of approximately 0.1 as it considers that the historical debt beta estimate of 0.2, using the CAPM method, would overstate the estimate of systematic risk.[742]

E9.19 The UK Competition Commission applied the second approach in the assessment of the appropriate debt beta to be used in both its decisions on the price reviews of Heathrow/Gatwick in 2007 and Stansted in 2008.[743] This approach resulted in a range for the debt beta of 0.09 to 0.19 in 2007 and 0.10 to 0.22 in 2008. The UK Competition Commission considered that the appropriate point estimate of the debt beta was 0.10 in both decisions.

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740 The debt margin a borrower is required to pay primarily reflects three types of risk. These are default premium (credit risk of the borrower), liquidity premium (compared to government bonds) and uncertainty premium (compensation for lack of diversification).

741 Lally, M., *WACC and Leverage*, Report to the Commerce Commission, 17 November 2009.

742 For decisions relating to the use of debt betas see Queensland Competition Authority, *Gladstone Area Water Board: Investigation of Pricing Practices*, Final report, June 2010 and Queensland Competition Authority, *QR Network's 2010 DAU - Tariffs and Schedule F, Draft Decision*, June 2010.

743 UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, pp. F21-F26; UK Competition Commission, *Stansted Airport Ltd - Q5 price control review*, 23 October 2008, Appendix L, pp. L33-L35.

E9.20 The majority of submissions considered that the estimation of debt betas for New Zealand firms is problematic and probably not feasible at present and preferred that the Commission set debt betas to zero. [744]

A non-zero debt beta

E9.21 BARNZ noted that the Commission described 0.1 as a conservative estimate of the debt beta; therefore adopting an estimate of zero is extremely conservative and highly favourable to the regulated suppliers.[745]

E9.22 In a submission on the EDBs Draft Reasons Paper, Officer and Bishop (for Transpower) considered the assumption that the beta of BBB+ debt was zero was unrealistic. Officer and Bishop proposed a debt beta of 0.2.[746]

E9.23 A debt beta of 0.2 is consistent with the debt beta recommendation of UK CAA to the UK Competition Commission in the assessment of the cost of capital for Heathrow and Gatwick airports in 2007.[747] However, as discussed above, the UK Competition Commission used a debt beta of 0.1.[748]

Overall Conclusion - debt beta

E9.24 In principle, the Commission considers the use of non-zero debt betas as conceptually sound. Debt premiums do have an exposure to systematic risk, and the use of non-zero debt betas addresses the anomaly that post-tax WACC can increase with leverage. That is, non-zero debt betas make the post-tax WACC estimate for an individual service less variant or invariant to leverage.

E9.25 However, there are practical difficulties in accurately estimating the debt beta, though these are offset by the regulatory precedents noted offshore for the use and level of non-zero debt betas.

E9.26 For the reasons set out in the Leverage section (see paragraphs E3.49 to E3.67), the Commission has assumed a zero debt beta in the cost of capital IM.

E10 Taxation

Decision - taxation

E10.1 The Commission's decision is that the corporate tax rate used in calculating the cost of capital should mirror the statutory tax rates. This will be 30% until the regulatory period that starts on or after 1 April 2011 when the corporate tax rate will be 28% (until any change in the statutory corporate tax rate).

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744 References to submissions on debt betas are noted in paragraph E3.50.

745 Board of Airline Representatives New Zealand Inc, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 18.

746 Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Officer R. and Bishop S., *Independent Review of Commerce Commission WACC proposals for Transpower*, 5 August 2010, pp. 22-24 and p. 37.

747 UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, paragraphs 88-90, Table 1, p. F6.

748 UK Competition Commission (UK), *A report on the economic regulation of the London airports companies (Heathrow Airport Ltd and Gatwick Airport Ltd), Appendix F - Cost of Capital*, 28 September 2007, paragraphs 88-90, pp. F24-26.

E10.2 The investor tax rate has been set to reflect the maximum prescribed investor rate under the PIE regime. The PIE regime enables individuals to limit tax liability on interest to a maximum of 30% until 30 September 2010, and 28% from 1 October 2010 (until any change to the maximum tax rate applicable to the PIE regime). Those rates are therefore used in determining the investor tax rate.

E10.3 The IM Determination allows for any future changes in tax rates to flow through to the calculation of the cost of capital.

E10.4 No account is taken of individual tax circumstances (accumulated tax losses, inability to use imputation credits) as the cost of capital under Part 4 must be consistent with outcomes in workably competitive markets. As discussed in paragraphs 6.2.2 to 6.2.7, this means the relevant cost of capital is that of an efficient industry cost of capital, rather than the cost of capital which reflects the tax situation of individual suppliers or investors.

Commission's reasons – corporate tax rate

E10.5 The corporate tax rate is the statutory tax rate for business entities set by the New Zealand government. The corporate tax rate enters the cost of capital estimation when estimating a post-tax cost of capital.

E10.6 The statutory corporate tax rate is 30% until the regulatory period that starts on or after 1 April 2011 when the corporate tax rate will be 28%. The Commission's decision is to therefore adopt these rates when estimating the cost of capital.

E10.7 A provision has been added to the IM Determination that links the corporate tax rate to the statutory tax rate, thereby allowing for future possible corporate/statutory tax rate changes.

Commission's reasons – investor tax rate

E10.8 The investor tax rate is the average personal tax rate across all investors in the economy. It enters the cost of capital estimation (as t_i) in the simplified Brennan-Lally version of the CAPM.

E10.9 This adjustment to the classical CAPM is incorporated to reflect the fact that the New Zealand tax regime permits the use of imputation tax credits (attached to dividend payments) to offset personal tax obligations and the fact that most investors are exempt from tax on capital gains, with the result that equity returns are essentially tax free whilst interest income is not.

Determining the investor tax rate

E10.10 The Commission considers that an assumed investor tax rate of 30% until 30 September 2011 and reduced to 28% thereafter recognises that whilst there are a range of statutory tax rates for interest earned by individuals, depending upon their respective total taxable income, the utilisation of the Portfolio Investment Entity ('PIE') regime effectively enables individuals to limit their tax liability on interest earned to a maximum of 30% until 30 September 2010 and this has been reduced to

28% from 1 October 2010.[749] The Commission' decision is to lower the investor tax rate from 1 October 2011.

E10.11 A provision has been added to the Determinations which will allow for changes in the investor tax rate for future possible changes to the PIE regime on an ongoing basis.

E10.12 In a regulatory period that straddles 1 October 2010 the investor tax rate will be applied as a blended rate incorporating the proportion of the regulatory year the investor tax rate was at 30% and the proportion of the regulatory year that the investor tax rate was at 28%.

E10.13 Whilst applying the figures of 30% until 30 September 2010 and 28% from 1 October 2010 would not be reflective of the true position for all investors in suppliers of regulated services under Part 4, the Commission has previously noted that the effect of any difference is likely to be relatively small.

Conclusion - investor tax rate

E10.14 The Commission recognises that whilst there is a range of statutory tax rates for interest earned by individuals, depending upon their respective total taxable income, the utilisation of the PIE regime effectively enables individuals to limit their tax liability on interest earned to a maximum of 30% until 30 September 2010 and 28% thereafter. The Commission concludes that the reduction of the top marginal tax rate from 38% to 33% does not change the logic that has been applied in arriving at the estimates for the investor tax rates, as investors can continue to shelter income at the PIE rate.

E10.15 The Commission notes that, while there is some uncertainty as to what the true average investor tax is, this uncertainty has little effect on suppliers' cost of capital as a small difference in this tax rate is likely to be immaterial to the final allowed rate of return.

E10.16 Therefore, the Commission will use an investor tax rate of 30% until 30 September 2010. This estimate has been reduced to 28% from 1 October 2010.

E10.17 A provision has been added to the Determinations which will allow for changes in the investor tax rate for future possible changes to the PIE regime on an ongoing basis.

E11 The Cost of Capital Range

Decision - the cost of capital range

E11.1 The IM estimates a cost of capital range by estimating and combining individual parameters' standard error.

[749] A PIE is a type of entity, such as a managed fund that invests the contributions from investors in different types of investments. For more information on PIE see New Zealand IRD at http://www.ird.govt.nz/toii/pie/companies/about/pie-investors-companies-about.html.

E11.2 In the case of Airports, for information disclosure, the Commission considers it appropriate to take a range between the 25th to 75th percentiles. In assessing profitability for the Airports an appropriate starting point for any assessment is the 50th percentile (mid-point) on the range.

Commission's reasons - the cost of capital range

E11.3 The cost of capital must be estimated as it cannot be observed directly. This raises the prospect of error since it is not possible to know the true cost of capital. The Commission has to make a judgment call as to how the IM should address the consequences of potential error.

E11.4 Typically, the Commission is faced with uncertainty when it estimates the cost of capital. These uncertainties include, for example, choice of the models to estimate and the statistical error surrounding individual parameter estimates.

E11.5 When the true value of an estimate is unknown model error relates to the choice of a particular model used in the estimation, while parameter error is the error between the (unknown) best approximation and the true value of a parameter estimate. These two errors are closely related especially in trying to estimate the true cost of capital when it is unknown. That is, both relate to the difficulty in estimating the true cost of capital when one cannot observe the true cost of capital, or its components.

E11.6 The IM accounts for uncertainties in parameter estimates by deriving a plausible range for the cost of capital (rather than a single point estimate) that reflects the possible spread between estimated and true parameter values underlying the cost of capital. Selecting an appropriate point estimate within this range for application under each regulatory instrument will then depend on the particular regulatory instrument under which the cost of capital is applied (i.e. information disclosure, DPP, CPP, and IPP). The Commission has addressed model error through its reasonableness checking in section E13. It considers reasonableness checking preferable to adding an ad hoc margin for model error.

E11.7 The Commission must make an allowance for the potential errors that are reasonable in the particular circumstance in which the cost of capital is to be used, but without producing a range that is so broad as to be meaningless and of no practical use in assessing profitability or determining price-quality paths.

Estimating the cost of capital range - four possible approaches

E11.8 In principle, there are two approaches that can be used to estimate the cost of capital range: an analytical approach and a simulation approach. Each of these can be relatively simple or relatively complex (when compared to each other), bringing the total number of approaches to four. These are defined below as the simple analytical approach, complex analytical approach, simple simulation approach and complex analytical approach.

E11.9 Each of the four approaches starts by grouping the underlying cost of capital parameters (i.e. the risk-free rate, debt premium, leverage, asset betas, TAMRP, and corporate and investor tax rates) into those that have and those that do not have significant uncertainty associated with them.

E11.10 The parameters that the Commission considers may have significant uncertainty associated with them are the asset beta, debt premium, and the TAMRP. This is because the Commission considers the procedures that are required to estimate these parameters are more complex due to the variability of the data needed to estimate them compared to the other relevant parameters. For this reason, these parameter estimates are likely to be subject to a significantly larger degree of variability than the other parameters, and this variability needs to be accounted for when estimating the cost of capital.

E11.11 In contrast, the risk-free rate, leverage, and corporate and investor tax rates do not have the same degree of uncertainty associated with them. This is because they are either: (i) readily observable such as the corporate tax rate; (ii) relatively simple to estimate such as the risk-free rate; or (iii) take an assumed value that is fixed such as 'notional' leverage.

The 'simple analytical approach'

E11.12 The simple analytical approach would require the IM to determine an upper and lower bound alike for each of those parameters that the IM considers has uncertainty associated with it. These bounds are determined based on qualitative judgment.

E11.13 The next step is to estimate the cost of capital using only the upper bound values of the underlying parameters and then to estimate the cost of capital using only the lower bound values. The resulting cost of capital estimates are then the upper and lower bound of the cost of capital range.

E11.14 The advantages of the simple analytical approach to estimate the cost of capital range are that it is readily understandable, intuitive and easy to replicate.

E11.15 The main disadvantages of this approach are that:

i. it relies on judgment when determining the upper and lower bounds of individual parameters;
ii. it does not make use of some statistical information that is readily available and that could be used to provide some guidance regarding the extent of uncertainty surrounding parameter estimates;
iii. the underlying assumption of parameters being uniformly distributed is unrealistic; and
iv. it expands the range associated with the cost of capital estimate, and thus may not appropriately account for the uncertainty that underlies the estimates.

E11.16 The simple analytical approach is the approach used by UK regulators e.g. Ofgem.

The 'complex analytical approach'

E11.17 The complex analytical approach can be broken down into the following steps:

- use the estimates of all parameters to derive an overall cost of capital estimate;
- group the cost of capital parameters into those that have and those that do not have significant uncertainty associated with them;

- estimate a statistical measure of the uncertainty for each parameter that the Commission considers has significant uncertainty associated with it (this measure is called the standard error and can be estimated using the parameter estimates' underlying data);[750]
- combine these standard errors to derive an overall level of uncertainty for the cost of capital estimate; and
- derive a cost of capital range, at a given percentile, by applying the overall estimate of uncertainty to the estimated cost of capital.

E11.18 The standard error of the post-tax cost of capital is estimated using the following formula: [751]

$$\sqrt{\begin{aligned}&\text{var}\left(\hat{TAMRP}\right)\text{var}(\hat{\text{B}}_a) + E^2(\hat{TAMRP})\,\text{var}(\hat{\text{B}}_a) + E^2(\hat{\text{B}}_a)\,\text{var}(\hat{TAMRP}) \\ &+ (1-T_c)^2\left[\text{var}(\hat{p})\,\text{var}(\hat{L}) + E^2(\hat{p})\,\text{var}(\hat{L}) + E^2(\hat{L})\,\text{var}(\hat{p})\right]\end{aligned}}$$

where:

$\text{var}\left(\hat{TAMRP}\right)$ is the square of the standard error of the estimated tax-adjusted market risk premium;

$E^2(\hat{TAMRP})$ is the square of the estimated tax-adjusted market risk premium;

$\text{var}(\hat{\text{B}}_a)$ is the square of the standard error of the asset beta;

$E^2(\hat{\text{B}}_a)$ is the square of the estimated asset beta;

T_c is the corporate tax rate;

$\text{var}(\hat{p})$ is the square of the standard error of the debt premium;

$E^2(\hat{p})$ is the square of the estimated debt premium;

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750 The standard error of a sample, denoted by s_n is defined as follows:

$$s_n = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}\left(x_i - \bar{x}\right)^2}$$

where:

N is the number of sample observations;

x_i are the observed values of the sample items; and

$\bar{x}$ is the mean value of these observations.

751 For a detailed description of the process to derive the standard error of the cost of capital from the individual parameter standard errors see Lally, M., *The weighted average cost of capital for gas pipeline businesses*, 28 October 2008, Appendix 6.

$\text{var}(\hat{L})$ is the square of the standard error of leverage; and

$E^2(\hat{L})$ is the square of leverage.

E11.19 For the purpose of the formula for determining the standard error of the cost of capital, it is assumed that the parameters are uncorrelated to each other and are normally distributed.

E11.20 The advantages of the complex analytical approach are: (i) that it makes greater use of statistical information regarding the level of uncertainty of individual parameter estimates; and (ii) that it is transparent and still easy to replicate.[752]

E11.21 The main disadvantages of this approach are that, although greater use is made of statistical information, the use of such information might create a sense of precision that is not warranted. Also, some degree of judgment is still involved when applying this approach. Finally, the assumption of the overall cost of capital estimate being normally distributed is unlikely to be satisfied in reality.

E11.22 This is the approach favoured by the Commission in recent energy related decisions e.g. Gas Authorisation and Electricity Control Inquiry of Unison.

Simulation approach

E11.23 Under a simulation approach, for each parameter that the IM considers has uncertainty associated with it, the Commission would randomly select a large number of values drawn from a distribution with the same underlying statistical properties (in terms of mean and standard error) as the parameter itself. A simulation approach may have the ability to be as simple or complex as required. An example of this approach is the Monte Carlo method.[753]

The 'simple simulation approach'

E11.24 The IM's parameter estimates and standard errors are to be combined to generate a large number of random cost of capital estimates. The statistical properties of this random sample of cost of capital estimates can then be used to derive an overall measure of uncertainty of that estimate, which in turn informs the cost of capital range at any given percentile.

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752 Guthrie (for Transpower) notes this point submitting that:

> … I appreciate that use of a mathematical formula has transparency benefits that may offset some of its disadvantages. In particular, a much wider range of interested parties will be able to test the impact of parameter assumptions on the level of the increment using a published formula than using a Monte Carlo simulation.

See Transpower Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Guthrie G., *Measurement Error and Regulated Firms' Allowed Rates of Return: a report prepared for Transpower New Zealand Limited*, 14 August 2010, p. 22.

753 Monte Carlo method is a technique used to estimate the probability distribution of a random variable. Monte Carlo simulates the results of a model or process by accumulating average results of thousands of random draws from the probability distributions of input variables. Monte Carlo simulation can accommodate complex stochastic process.

E11.25 Similar to the complex analytical approach, the simple simulation approach assumes that the underlying cost of capital parameters are not correlated.

E11.26 A simulation approach is particularly useful for models, where the parameters are related in a complex fashion due to feedback loops or correlations. In such a case, it might not be feasible to derive an analytical solution to the problem.

E11.27 The main disadvantage of the simple simulation approach is that it is more complex to implement than analytical approaches. More importantly, in the current context where an analytical approach is feasible, the two approaches result in the same outcomes as they are subject to the same assumptions. In this case, the simple simulation approach adds unnecessary complication while adding no significant benefit.

The 'complex simulation approach'

E11.28 The difference between the simple and complex simulation approach is that the latter relaxes the assumptions on the distribution and correlations of the underlying cost of capital parameters.

E11.29 The advantage of the complex simulation approach is that it relaxes some of the restrictive assumptions of the previous approaches. However, this is, at the same time, a disadvantage as relaxing those assumptions would add a significant degree of complexity.

E11.30 The Commission is not aware of any UK or Australian regulator that uses a Monte Carlo or other simulation approach.

Expert advice

E11.31 The Expert Panel agreed with using the approach described as the complex analytical approach of estimating standard errors for each variable underlying the cost of capital. Further, Professor Myers and Dr Lally consider that there would be no significant additional benefit to the Commission (over the complex analytical approach) in employing a simulation approach to estimate cost of capital distributions.[754]

Submissions

E11.32 In submissions on the RDG and IMs parties either explicitly or implicitly agreed with the Commission's view to specify a range of possible cost of capital values.[755]

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754 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, pp. 34-35.

755 Aurora Energy Limited, *Submission to the Commerce Commission on its Discussion paper on Input Methodologies*, 14 August 2009, p. 6; Unison Networks Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Castalia Strategic Advisors, *Submission on Input Methodologies: Regulatory Cost of Capital: a report prepared for Unison Limited*, 13 August 2009, pp. 7-9; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of ENA, 11 August 2009, pp. 7-12; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report for NZAA, 31 July 2009, pp. 23-26; Christchurch International Airport Limited, *Submission on Commerce Commission Input Methodologies Discussion Paper*, 7 August 2009, p. 27; Christchurch International Airport Limited, *Submission on the Revised Draft Cost of Capital Guidelines*, 3 August 2009, pp. 3-4; Orion, *Submission on Input Methodologies Discussion Paper*, 14 August 2009, p. 29; Powerco Limited, *Input Methodologies Discussion Paper*, 14 August 2009, p. 32 Powerco Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: PricewaterhouseCoopers, *Commerce*

E11.33 However, a wide variety of submissions were made on the Commission's choice of approach to estimating a range. The views regarding how to arrive at such a range varied widely among submitters with some favouring the simple analytical approach,[756] some favoured the complex analytical approach,[757] while other favoured the complex simulation approach.[758]

Commission's Revised Draft Guidelines and aspects of the Input Methodologies Discussion Paper relating to Cost of Capital prepared for Powerco Limited, 14 August 2009, p. 36; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, pp. 14-15; PricewaterhouseCoopers, *Submission on the Input Methodologies Discussion Paper*, Report prepared for 19 EDBs, 14 August 2009, p. 39; Telecom, *Annex B: Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009; Vector Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Vector Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Synergies Economic Consulting, *Initial Weighted Average Cost of Capital Review*: prepared for Vector Limited, 14 August 2009, pp. 44-45; Vector, *Submission to Commerce Commission on Input Methodologies Discussion Paper*, 14 August 2009, p. 92, Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: LECG, *Response to Commerce Commission's Draft Cost of Capital Input Methodology: a report prepared for the Electricity Networks Association*, 13 August 2010, pp. 15-16; PricewaterhouseCoopers on behalf of 20 Electricity Distribution Businesses, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p. 19, Telecom Limited, *Submission on the Draft Input Methodologies (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 9 August 2010; Telecom, *Submission on Input Methodology Draft Reasons Papers*, Comments by Graeme Guthrie, 12 August 2010, pp. 11-13; KPMG, *Cross-Submission on GPBs (Input Methodology) Draft Reasons Paper, Cost of Capital*, 13 August 2010. pp. 9-12; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 56.

[756] Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: LECG, *Response to Commerce Commission's Draft Cost of Capital Input Methodology: a report prepared for the Electricity Networks Association*, 13 August 2010, pp. 15-16; PricewaterhouseCoopers on behalf of 20 Electricity Distribution Businesses, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p. 19.

[757] At the cost of capital workshop and in further consultation the following parties agreed with the Commission's approach to estimating the range (complex analytical approach) - Dr Layton (NZIER advising BARNZ), Mr Hoogland (Transpower), Mr Balchin (PwC advising Powerco), Mr Redmayne (PwC advising 17 EDBs and Telecom), Mr Best (Saha advising AECT), Mr Shelly (CRA advising Unison), Mr Carvell (Vector) and Mr Goodeve (Powerco). See Commerce Commission, *Cost of Capital Workshop Transcript*, pp. 206-226; Auckland Energy Consumer Trust, *Cross Submission to the Commerce Commission on Cost of Capital Workshop*, 2 December 2009, p. 27; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, pp. 73-74; Vector Limited, *Post-Workshop Submission on the Cost of Capita*l, Attachment: Synergies Economic Consulting, *Cost of Capital Cross Submission*, 2 December 2009, pp. 16-18; Vector, *Cross Submission to the Commerce Commission on the Weighted Average Cost of capital Workshop*, 2 December 2009, pp. 20-23; Major Electricity Users' Group, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, Appendix.

[758] LECG, *Comments on the Commerce Commission's Proposed Approach to Estimating the Cost of Capital*, Report on behalf of ENA, July 2009, p 8; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report for NZAA, 31 July 2009, pp. 23-26; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, pp. 14-15; Unison, *Appendix: Submission on Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital*, 14 August 2009, p. 9; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, pp. 73-74; Telecom Limited, *Submission on the Draft Input Methodologies (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons* Papers, 9 August 2010; Telecom, *Submission on Input Methodology Draft Reasons Papers*, Comments by Graeme Guthrie, 12 August 2010, pp. 11-13; KPMG, *Cross-Submission on GPBs (Input Methodology) Draft Reasons Paper, Cost of Capital*, 13 August 2010. pp. 9-12; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input*

E11.34 Some submissions criticised the Commission's approach as implying greater precision than was possible in practice.[759]

E11.35 A number of submitters argued that the Commission should utilise the Monte Carlo simulation instead of, or as a cross-check to, its present complex analytical approach when developing cost of capital ranges. They considered that if different distribution types and/or partial correlations were assumed for different parameters, then Monte Carlo would (in many cases) be simpler to apply than trying to analytically derive the distribution function for the resulting cost of capital.[760]

E11.36 In short, there was no consensus on what a better methodology for establishing a range would be. The Expert Panel generally supported the Commission's statistical approach and considered there would be no significant additional benefit by the Commission employing Monte Carlo simulation techniques to estimate the cost of capital.

Conclusion - calculating the cost of capital range

E11.37 As evidence by the diversity of approaches favoured by submissions it is a matter of judgement as to which approach is best. For the purpose of IMs, the decision is to estimate the cost of capital range using the complex analytical approach where it estimates and combines individual parameters' standard error (i.e. their level of uncertainty) into a plausible cost of capital range.

E11.38 This approach involves less judgement than the simple analytical approach, makes greater use of statistical information to guide the IM's decision, is more transparent and can be replicated by interested parties.

E11.39 The Commission considers that a simple simulation approach would add no significant gains for the purpose of estimating the cost of capital. Simulation

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Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited, 13 August 2010, p. 56.

759 LECG, *Comments on the Commerce Commission's Proposed Approach to Estimating the Cost of Capital*, Report on behalf of ENA, July 2009, p 8; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report for NZAA, 31 July 2009, pp. 23-26; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, pp. 14-15; Unison, *Appendix: Submission on Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital*, 14 August 2009, p. 9

760 LECG, 2009, *Comments on the Commerce Commission's Proposed Approach to Estimating the Cost of Capital*, Report on behalf of ENA, p 8; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report for NZAA, 31 July 2009, pp. 23-26; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, pp. 14-15; Unison, *Appendix: Submission on Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital*, 14 August 2009, p. 9; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, pp. 73-74; Telecom Limited, *Submission on the Draft Input Methodologies (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 9 August 2010; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Guthrie G., *Comments on the Commerce Commission's Input Methodologies Draft Reasons Papers: a report prepared for Telecom New Zealand Limited*, 12 August 2010, pp. 11-13; KPMG, *Cross-Submission on GPBs (Input Methodology) Draft Reasons Paper, Cost of Capital*, 13 August 2010. pp. 9-12; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on Cost of Capital Material In the Commerce Commission's Draft Input Methodologies Determination and Reasons Paper: a report prepared for Telecom New Zealand Limited*, 13 August 2010, p. 56.

techniques are typically used to evaluate a system in which variables interact in a complex manner, due to feedback loops or correlations, and therefore obtaining an analytical solution to the system is not feasible. This is not the case when estimating the cost of capital.

E11.40 The Commission does not see any feedback loops or significant correlations in the interaction between costs of capital variables that warrant the use of simulation techniques; nor have any submitters provided persuasive evidence on this point. The Commission considers that it is feasible to obtain direct estimates and reasonable ranges for the cost of capital without simulation techniques; employing such techniques would add unnecessary complexity and less transparency to the estimation process without offering significant additional benefit.

Applying the 'complex analytical approach'

E11.41 Details of the IM's proposed approach for estimating the cost of capital range in the context of Part 4 of the Act are set out in, for example, Lally (2008, Appendix 6; pp. 92–93). Broadly, the approach involves the following steps:

i. Estimate each of the individual cost of capital parameters and their associated standard errors using the procedures discussed above. In some cases the standard errors will be readily available (e.g. if the parameters have been econometrically estimated); in other instances, the Commission must rely on qualitative judgment to specify plausible values.[761]

ii. Combine each of the point estimates for the individual parameters using the relevant cost of capital equation (e.g. pre-tax, post-tax or vanilla cost of capital depending on circumstances) to obtain an overall cost of capital estimate (the so-called 'midpoint' of the cost of capital range).

iii. Make some reasonable assumptions about the degree of correlation between the individual cost of capital parameters.

iv. Combine the estimated standard errors for the individual parameters and correlations between them to estimate a 'standard error' for the cost of capital.

v. Apply this standard error to either side of the cost of capital estimate to derive a plausible cost of capital range.

Applying the 'complex analytical approach' to Airports

E11.42 Estimating each of the individual cost of capital parameters and their associated standard errors using the procedures discussed above gives the following results:

Table E21 Parameter Point Estimates and their Standard Error

Parameter	Point estimate	Standard error
Leverage	17%	0
Risk-free rate	To be estimated	0

[761] Sometimes, even when statistically-estimated standard errors are available, in order to account for any uncertainties (e.g. model uncertainty) that cannot readily be quantified, it may be desirable to augment or attenuate these estimates using qualitative judgment.

Parameter	Point estimate	Standard error
Debt premium	To be estimated	To be estimated, with a minimum value of 0.0015
Debt issuance cost	0.35%	0
Asset beta	0.60	0.16
Tax-adjusted market risk premium	7% -7.5%	0.015
Corporate and investor tax rate	28% - 30%	0

E11.43 As discussed above, in some cases the standard errors will be readily available (e.g. if the parameters have been econometrically estimated); in other instances, the Commission must rely on qualitative judgment to specify plausible values.

Leverage

E11.44 In the case of leverage, the IM assumes a standard error of zero.[762]

E11.45 As discussed in Section E3 on Leverage, due to the anomaly associated with the simplified Brennan-Lally CAPM the Commission applies a notional leverage estimate based on the average leverage of the comparative firm sample. This notional level of leverage is necessary to make the cost of capital invariant to changes in leverage. If the Commission were to assume a non-zero estimate for the standard error for leverage the estimate of the cost of capital would vary with leverage. This would contradict the reason the Commission is applying notional leverage i.e. the cost of capital would change due to leverage.

Risk-free rate

E11.46 The risk-free rate also has a zero standard error. Although the risk-free rate does vary on a day-to-day basis, there is no uncertainty as to what the rate actually is at any one time.

E11.47 Professor Guthrie (for Transpower and Telecom) disagreed with the assumption that the standard error for the risk-free rate should be zero. Professor Guthrie argued that

[762] A number of submitters disagreed with the assumption that the standard error for leverage should be zero and considered that it should be 10%-11%. For example see Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: PricewaterhouseCoopers, *Submission on the Cost of Capital parameter estimates in the Commerce Commission's Draft Electricity Distribution Services Input Methodology Determination: a report prepared for Electricity Networks Association*, 13 August 2010, p. 15; Transpower New Zealand Ltd., *Submission on Transpower (Input Methodologies) Draft Reasons Paper and Individual Price-Quality Path, Attachment*: Graeme Guthrie, *Measurement Error and Regulated Firms' Allowed Rates of Return*, 14 August 2010, pp. 14-15; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Guthrie G. *Comments on the Commerce Commission's Input Methodologies Draft Reasons Papers: a report prepared for Telecom New Zealand Limited*, 12 August 2010, p10-11; Unison Networks Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p.19; Vector Limited, *Submission in response to the Commerce Commission's Input Methodologies Draft Reasons and Determinations for Electricity Distribution Businesses and Gas Pipeline Businesses Cost of Capital*, 13 August 2010, pp. 28-29.

the cost of capital was affected by intra-cycle variance in the risk-free rate during the regulatory period.[763]

E11.48 Dr Lally reviewed Professor Guthrie's submission. He concludes that intra-cycle variations in the risk-free rate are "… so much less significant than that of estimation errors in respect of other parameters [the market risk premium and the equity beta] that it can reasonably be ignored."[764] Further, the Commission notes that there are a number of instruments available in the financial markets to allow a supplier of a regulated service to manage any intra-cycle variation in risk-free rates during (and beyond) the regulatory period.

Debt issuance costs and tax rates

E11.49 As for debt issuance costs, the corporate and investor tax rate, the Commission considers that these parameters are not associated with significant levels of uncertainty. See the respective sections for the explanations.

Debt premium, TAMRP and asset beta

E11.50 As outlined above, the debt premium, TAMRP and asset beta usually have uncertainty associated with their estimation due to the estimation techniques used, and should therefore have a standard error greater than zero attached to them. The estimation of the standard error of each of these parameter estimates are covered in their respective appendices:

i. debt premium (see paragraphs E5.71 to E5.74);
ii. TAMRP (see paragraphs E7.124 to E7.131); and
iii. Asset beta (see paragraphs E8.107 to E8.114).

Selecting the cost of capital range

E11.51 If the cost of capital is set too low it might incorrectly suggest that a supplier of regulated services was not limited in its ability to extract excessive profits. If the supplier were to reduce prices as a response to such an incorrect indication of excessive profitability, this might prevent the supplier from attracting sufficient capital to undertake efficient investment. This would be inconsistent with s 52A(1)(a) of the Act and would not be in the long term interests of consumers. Equally, a cost of capital that is set too high would mask the regulated supplier's ability to extract excessive profits over the medium or long-term.[765] This would be inconsistent with s 52A(1)(d) of the Act.

E11.52 In balancing the risk between setting the cost of capital too high or too low, the Commission has to make an assessment as to the consequences of error. The consequences depend on the regulatory context in which the estimate of the cost of

[763] Transpower New Zealand Ltd., *Submission on Transpower (Input Methodologies) Draft Reasons Paper and Individual Price-Quality Path*, Attachment: Graeme Guthrie, *Measurement Error and Regulated Firms' Allowed Rates of Return*, 14 August 2010, pp. 14-15; Telecom Limited, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: Guthrie G., *Comments on the Commerce Commission's Input Methodologies Draft Reasons Papers: a report prepared for Telecom New Zealand Limited*, 12 August 2010, pp. 6-11.

[764] Lally, M., *Comments on measurement error and regulated firms' allowed rates of return*, 13 September 2010, pp. 11-13.

[765] The Commission notes that, in the short-term, suppliers of regulated services may achieve above-normal profits if they outperform the objectives set by the regulator.

capital is being used. In some regulatory contexts a cost of capital estimate below the midpoint might be considered,[766] in other contexts the midpoint is appropriate, in other contexts a cost of capital estimate that is above the midpoint maybe recommended.

E11.53 The Commission's choice over the precise percentile estimate of the cost of capital that is used for each regulatory instrument is informed by a number of factors, including considering:

- that the purpose of Part 4 is to promote the long term benefit of consumers, including:
  - i. ensuring suppliers of regulated services have incentives to invest and innovate, which will benefit consumers over time;
  - ii. ensuring suppliers of regulated services are limited in their ability to extract excessive profits;
- that in workably competitive markets the risks are borne by the party that is best equipped to manage these risks. That is not all risks can be passed on to the consumer and that firms will have to manage some of the risks themselves;
- the risk that the true (but unobservable) cost of capital is above the estimated mid-point WACC;
- the risk that CAPM and the simplified Brennan-Lally CAPM may under-estimate the returns on low beta stocks;
- the risk that the use of a domestic CAPM (simplified Brennan-Lally) may lead to higher estimates of the cost of capital than the international CAPM and that international investors can be view as the key marginal investors;
- the impact on potential subsequent investment by service users and the potential impacts on dynamic efficiency; and
- considering the risk of error in estimating individual parameters of the simplified Brennan-Lally CAPM including beta and the TAMRP. For example, the Commission has considered the risk that the values for some parameters may be above their true (but unobservable) level including, for example, the estimated asset beta, debt issuance costs.

Information disclosure regulation - the cost of capital range for Airports

E11.54 All suppliers of regulated services are subject to information disclosure regulation. The purpose of information disclosure regulation is to provide interested persons with sufficient information to assess whether the Part 4 Purpose is being met.

[766] IPART notes this point in their cost of capital review, see IPART, *Alternative approaches to the determinations of the cost of equity – other industries discussion paper*, November 2009, p. 18. Such an approach may be appropriate in setting the cost of capital for a service, if there is a significant subsequent investment by a user of that service, which is likely to bring greater benefits to end-users, relative to any investment by the original service provider.

E11.55 In the Draft Reasons Paper the Commission considered that the appropriate range for information disclosure would be between the 25th to 75th percentiles.

E11.56 Suppliers of regulated services considered the range was too narrow and did not adequately cover risks, and market frictions.[767] Some recommended a range between the 5th to the 95th percentile.[768]

E11.57 The Commission notes that a number of the criticisms of the cost of capital range were directed at a parameter's standard error (e.g. asset beta, TAMRP and debt premium). These issues are covered in the respective sections for the parameter.

E11.58 Airports are subject to information disclosure regulation. It is a matter of judgement as to what is the appropriate range of the cost of capital to be applied in assessing excess profits. The Commission considers that it needs to balance all of the considerations above and recognises that returns in competitive markets often fall below or exceed the mid-point of the cost of capital. In assessing profitability for the Airports an appropriate starting point for any assessment is the 50th percentile (mid-point) on the range.

E11.59 Given the uncertainty associated with some of the parameters, as well as the measurement of suppliers' actual level of profitability, the Commission considers it appropriate to take a range between the 25th to 75th percentiles.

E11.60 The use of this range recognises uncertainty in the estimation of the cost of capital. It also recognises that profitability measures (such as ROI) can fluctuate on a yearly basis.

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767 Christchurch International Airport Ltd., *Submission on Input Methodologies and Information Disclosure Draft Determinations and Reasons Papers for Airport Services*, 12 July 2010, p. 41; NZ Airports, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 9; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 38-46; Wellington International Airport Ltd., *Submission on the Draft Input Methodologies & Information Disclosure (Airport Services) Determinations and Draft Reasons Papers*, 12 July 2010, p. 19; Auckland International Airport Limited, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 12; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, 3 August 2010, p. 41; NZ Airports Association, *Cross Submission on the Draft Input Methodologies (Airport Services) Determinations and Draft Reasons Papers*, Attachment: Uniservices, *Comments on Air New Zealand's and Board of Airline Representatives New Zealand Incorporated's Submissions to the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper: report prepared for New Zealand Airports Association*, 3 August 2010, pp. 17-18; Electricity Networks Association, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, Attachment: LECG, *Response to Commerce Commission's Draft Cost of Capital Input Methodology: a report prepared for the Electricity Networks Association*, 13 August 2010, pp. 9-15; PricewaterhouseCoopers on behalf of 20 Electricity Distribution Businesses, *Submission on the Draft Input Methodologies Cost of Capital (Electricity Distribution Businesses and Gas Pipeline Businesses) Determinations and Draft Reasons Papers*, 13 August 2010, p. 19; KPMG, *Cross-Submission on GPBs (Input Methodology) Draft Reasons Paper, Cost of Capital*, 13 August 2010, pp. 13-14.

768 NZ Airports, *Submission on Draft Input Methodologies Determination and Draft Reasons Paper*, 12 July 2010, p. 9; NZ Airports Association, *Submission on Draft Information Disclosure Determination and Draft Reasons Paper*, Attachment: *Uniservices, Comments on the Commerce Commission's Approach to estimate the Cost of Capital in its Input Methodologies Draft Reasons Paper - Report for NZAA*, 12 July 2010, pp. 38-46; KPMG, *Cross-Submission on GPBs (Input Methodology) Draft Reasons Paper, Cost of Capital*, 13 August 2010, pp. 13-14.

E12 Possible Adjustments to the Cost of Capital for Asymmetric Risk

Decision - possible adjustments to the cost of capital

E12.1 The IMs do not make any adjustments to the cost of capital for asymmetric risk. However, the Commission does consider that it may be appropriate to deal with asymmetric risks through some other forms of adjustment or mechanisms, such as adjustments to regulatory cash flows with the use of flexible depreciation (e.g. a front-loaded depreciation profile in the event that asset standing becomes apparent).

Commission's reasons - possible adjustments to the cost of capital

E12.2 The IM's approach is to apply a 'benchmark' or service-specific cost of capital for all suppliers of a regulated service. If the Commission were to apply an ad-hoc adjustment to the service-wide cost of capital it would imply that all suppliers of a particular service are exposed to the same level of asymmetric risk. However, suppliers of a regulated service are exposed to different levels of asymmetric risks and at possibly different time periods. If the IMs were to make an ad-hoc adjustment for asymmetric risks in the service-wide cost of capital it may over-compensate some suppliers and possible under-compensate other suppliers.

E12.3 A firm faces asymmetric risk when its distribution of returns is truncated at one extreme without an offsetting truncation at the other. In other words, the firm's payoffs are 'asymmetric'. For example, in competitive markets with sunk costs existing firms may be exposed to the risk of new entry that would erode upside returns when the market is profitable. However, when the market is unprofitable entrants are unlikely to arrive so incumbent firms are left to entirely bear any losses. This type of cost is specific to the individual supplier and is not compensated for in the standard cost of capital estimations. Similarly, in monopolised markets regulation can cap potential profits without providing commensurate insulation from downside risk. All firms may also be exposed to stranding risk (e.g. through technical obsolescence, unfavourable demand shocks), and large catastrophic events such as natural disasters.

E12.4 For clarity, it is useful to distinguish two categories of asymmetric risk:

- Type I risks are risks that are generally unrelated to the day-to-day operations of the firm, and arise through infrequent events that could produce large losses. Examples include natural disasters; pandemics; terrorist threats; or large, unexpected policy shifts that could force the shutdown of operating plant before the end of its economic life.

- Type II risks are risks that derive from such events as the threat of competitive entry or expansion. That is, there tends to be a cap on any significant upside to the firm, but typically not the significant downside risk that it faces. On the downside, assets can become stranded through technical innovations that unexpectedly lower operational costs or through negative demand shocks.

E12.5 The treatment for each of these types of risk differs, and so the discussion below deals with each separately.

Type I asymmetric risk

E12.6 The events that give rise to Type I risk are events that firms would naturally wish to insure against. Insurance markets typically provide no cover for catastrophic risks, so firms — even those operating in competitive markets — are often left to self-insure.[769]

E12.7 The lumpy and extreme nature of events that give rise to Type I risk means it is often unfeasible for firms in workably competitive markets to recover the cost of catastrophic events after the fact. Often, the only option available to firms is to self-insure in advance. Since one aim of regulation is to mimic outcomes that are consistent with those of workably competitive markets, any scheme designed to deal with Type I risk should ideally allow some *ex ante* recovery. On the other hand, regulators are in the unique position of being able to make *ex post* adjustments with the benefit of hindsight. Therefore, a scheme that permits some flexibility in this regard is desirable.

E12.8 A number of suppliers of regulated services have put to the Commission that an allowance for asymmetric risks should be included within the cost of capital.[770] Some of these submitters considered that the Commission could make allowance by adopting a point estimate at the upper end of the estimated plausible range. However, other submitters argued that choosing a point on the higher end of the range did not make any allowance for asymmetric risks.[771]

E12.9 The Commission recognises that choosing a point estimate at the upper end of the range would be difficult to quantify and would risk becoming conflated with the unrelated issue of recognising the potential asymmetries arising from estimation uncertainty. In addition, whilst allowing an uplift to the cost of capital might provide firms with the necessary revenues to undertake self insurance, without any form of 'ring fencing' arrangements in place, it is unlikely to provide consumers with any guarantee that the additional funds would be employed for that purpose.

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769 Froot, K. A., *The Financing of Catastrophic Risk, NBER Project Report Series*, University of Chicago Press: Chicago & London, 1999, p. 3.

770 Auckland Energy Consumer Trust, Submission to the Commerce Commission on Input Methodologies, 14 August 2009, pp. 18-19; Auckland Airport, Commerce Commission Draft WACC Guidelines Paper, 31 July 2009, p. 3; Unison Networks Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Castalia Strategic Advisors, *Submission on Input Methodologies: Regulatory Cost of Capital: a report prepared for Unison Limited*, 13 August 2009, pp. 6-7; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital, Report on behalf of ENA*, 11 August 2009, pp. 13-15; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital, Report prepared for the NZAA*, 31 July 2009, p. 26; Maui Development Limited, *Submission to the Commerce Commission on the Input Methodology Discussion Paper*, July 2009, p. 20; NZ Airports, *Submission by NZ Airports Association on the Commerce Commission Input Methodologies Discussion Paper*, 31 July 2009, p. 81; Orion, *Submission on Input Methodologies Discussion Paper, 14 August 2009, p. 30;* Powerco Limited, *Input Methodologies Discussion Paper*, 14 August 2009, p. 6; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, p. 4 and pp. 15-16; PricewaterhouseCoopers, *Revised Draft Guidelines – Submission to Commerce Commission*, Report on Behalf of Powerco, August 2009, pp. 37-38; Telecom, *Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009, pp. 6-7; Unison, *Appendix: Submission on Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital*, 14 August 2009, pp. 10-11.

771 PricewaterhouseCoopers, *Revised Draft Guidelines – Submission to Commerce Commission*, Report on Behalf of Powerco, August 2009, pp. 37-38; Unison Networks Limited, *Submission on the Input Methodologies Discussion Paper*, Attachment: Castalia Strategic Advisors, *Submission on Input Methodologies: Regulatory Cost of Capital: a report prepared for Unison Limited*, 13 August 2009, pp. 6-7.

The Commission's decision is therefore to not make any adjustments to the cost of capital for Type I asymmetric risk.

E12.10 With these issues in mind, the Expert Panel in their report proposed a hybrid scheme that mixes *ex ante* and *ex post* allowances. In particular, they recommended that the Commission handle Type I risks by allowing regulated firms to charge an 'insurance premium' that is invested in a reserve fund, which would pay out in the event of a Type I occurrence (effectively, a form of self-insurance that simulates what might otherwise occur, absent regulation). *Ex post* adjustments could be made if the fund proves inadequate or too generous.

E12.11 The Commission considers that such a scheme has potential benefits in securing continuity of services, and reducing the need for firms to demand significant price increases in the event that such a risk were to crystallise. However, the Commission acknowledges that there would be a number of practical challenges in implementing such a scheme, not least the requirement to calculate an appropriate annual premium. In addition, it will need to explore further the practicalities of creating such a fund under existing legislation.

E12.12 An alternative approach might be to require the firm to set-up its own self-insurance fund, with payments into the fund allowed to be borne as an operational expense subject to pre-determined conditions on the management and operation of the fund.

Conclusion - compensating supplier for Type I asymmetric risk

E12.13 The Commission's decision is not to make any adjustments to the cost of capital for Type I asymmetric risk. However, the Commission may in some circumstances make an allowance for such risk in the cash flows.

Type II asymmetric risk and real options

E12.14 Type II asymmetric risks are potentially large in industries that are: (i) characterised by long-lived, irreversible (large sunk cost) investments; and (ii) subject to substantial uncertainty over such things as future demand and costs.

E12.15 Real options theory suggests that in industries with such features, firms will not enter or invest unless the (conventionally calculated) expected rate of return is above normal.[772] Instead, firms will wait until expected profits are large enough to cover both the cost of capital and the type II asymmetric risks associated with entry. Such delay can occur in workably competitive markets that are characterised by significant uncertainty and a high degree of sunk costs, and can be efficient. Hence, the presence of type II asymmetric risk creates a timing decision and suggests that there potentially should be either a mark up on the standard cost of capital estimate or some upward adjustment to allowed revenues.

E12.16 Uniservices (for NZAA) and LECG (for ENA) indicated that new investments by regulated suppliers were sunk and irreversible, which may provide incentives for a supplier to delay making those investments.[773] LECG further submitted that the

[772] 'Conventionally calculated' refers to ordinary procedures, which assume symmetric payoff distributions.

[773] LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of ENA, 11 August 2009, pp. 12-15; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, p. 67.

Commission should increase suppliers' allowed rate of return as a result of real options. LECG argued that such an outcome would be consistent with outcomes expected in workably competitive markets where suppliers tend to set hurdle-rates for new investments that are above the normal rate of return.

E12.17 The Commission notes that it was not clear from arguments presented by submitters that their request for an increased allowed rate of return was because of the existence of an asymmetric risk. At the same time, the Commission acknowledges that suppliers might set hurdle-rates for new investments above the normal rate of return on a project-by-project basis. However, as some of these projects are likely to perform better than others, the Commission considers that, on average, and suppliers will achieve a normal rate of return on the long-term and this will be reflected in their long-term expectations. Further, such policies used by firms may not be a reflection of asymmetric risk faced by firms, but the need of the business to discipline overly optimistic forecasts by project managers.

E12.18 In a submission on behalf of Telecom, Professor Guthrie argued that it was appropriate for the Commission to account for real options, and drew attention to the real options/investment timing model developed by McDonald and Siegel.[774] While Professor Guthrie noted that in the McDonald and Siegel model the firm holds a perpetual option to develop a project (and thus had some market power over the project), he considered that the model could easily be modified so that the development option was not perpetual.

E12.19 Specifically, Professor Guthrie outlined that a workably competitive market outcome could be captured by taking into account the potential for the threat of pre-emption and extinguishing the option at some unknown future date. In particular, he argued that:[775]

- Under perfect competition, the firm can be expected to be pre-empted if it delayed investing - even for an instant - when the asset created by investment is worth more than the capex required. In this case, the expected time until pre-emption is zero.
- At the other extreme, if the firm is the only one able to invest, it could delay indefinitely without any threat of pre-emption. In this case, the expected time until pre-emption is infinite.
- Workable competition will lie somewhere between these two extremes.

E12.20 In arguing for real options to be taken into account, Professor Guthrie did not argue for an increment to the cost of capital. Instead, in his submissions and at the Cost of Capital Workshop, he maintained that the Commission should take real options into account by employing a service-specific multiplier on the value of the RAB. He suggested that this would potentially solve the problem of requiring a mark-up on

774 McDonald, R., and Siegel, D., The Value of Waiting to Invest, *Quarterly Journal of Economics*, Vol. 101, 1986, pp. 707–728.

775 Guthrie, G., *Further Notes on Incorporating Real Options in Regulated Prices, Submission to the New Zealand Commerce Commission on behalf of Telecom New Zealand Ltd*, 2 December 2009, p. 11.

the cost of capital as a regulated supplier would only ever be earning its cost of capital.[776]

E12.21 A number of parties including the AECT, Uniservices (for NZAA), Wellington Electricity and PwC (for Telecom) supported the process of augmenting the RAB by Professor Guthrie's real option multiplier rather than adding an increment to the cost of capital.[777]

E12.22 NZIER (for BARNZ) argued against the adoption of a real options approach. It highlighted that advocates did not provide the Commission with any practical guidance as to how it could identify or value real options among the firms it was required to regulate, and did not identify any other regulators that have allowed for real options to be taken into account. Further, NZIER submitted that for Airports subject to information disclosure real options had no relevance, and was sceptical that real options were even relevant for price-path regulation.[778]

E12.23 As part of the Expert Panel's advice, Professor Myers recommended that timing options in the face of symmetric risk are a manifestation of market power, and regulators should not provide compensation for these. However, timing options extinguished in the face of Type II risk (asymmetric options) should be compensated for by the regulator. Dr Lally agreed that options exercised in the face of symmetric risk were a manifestation of market power that should not be compensated for and agreed that Type II asymmetric risk potentially warranted compensation. However, he considered that a crucial feature of the Type II risk was asymmetry of the cash flows, rather than the presence of a timing option. Professor Franks recommended that any allowance for extinguished timing options be made through the regulatory cash flows.[779]

E12.24 The Commission, in assessing real options, recognises that in order for such an approach to apply, investments need to be both irreversible and uncertain. While a significant proportion of investments in industries that provide regulated services (such airports, gas and electricity) are sunk, there is often a question as to whether regulated services have the requisite degree of demand and supply side uncertainty to warrant the use of such an approach.

E12.25 In practice, most regulatory systems do not expose the returns on investments to the large fluctuations that might arise in current market current conditions. Instead,

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776 For full discussion between Professor Guthrie and the Commission on real options see the transcript from the Cost of Capital Workshop, *Cost of Capital Workshop Transcript*, pp. 65-71, (http://www.comcom.govt.nz/IndustryRegulation/Part4/DecisionsList.aspx#1312). For Professor Guthrie's submission see http://www.comcom.govt.nz//IndustryRegulation/Part4/ContentFiles/Documents/Telecom%20-%20Graeme%20Guthrie%20-%20WACC%20sub%20-%20881160_1.pdf

777 Auckland Energy Consumer Trust, *Cross Submission to Commerce Commission on Cost of Capital Workshop*, 2 December 2009, p. 17; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, p. 66; Wellington Electricity, *Post-Workshop Submission for the Commerce Commission's Cost of Capital Workshop, November 12 and 13, 2009*, 3 December 2009, p. 4; Telecom Limited, *Post-workshop Submission on the Cost of Capital*, Attachment: PricewaterhouseCoopers, *Cross Submission to the Commerce Commission on the Cost of Capital Workshop*, 2 December 2009, p. 7.

778 NZIER, *Cost of Capital, Report for Post-Workshop Submission, Report on behalf of BARNZ*, 28 November 2009, pp. 4-5.

779 Franks, J., M. Lally and S. Myers, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology, Report prepared for the Commerce Commission*, 18 December 2008, pp. 39-41.

regulation tends to take a long-term approach, akin in many ways to long-term contracting, in that the regulator sets the value of assets when they enter the regulatory asset base, and does not adjust them thereafter. As long as businesses are allowed to earn a return of and on capital, with appropriate treatment of stranded assets, investors will (in theory) not have incentives to delay investment. In such circumstances, option values should disappear.[780]

E12.26 The ability of long-term contracts to remove the need to explicitly account for real options in the presence of sunk costs and uncertainty is also highlighted by those advocating a real options approach in telecommunications access regulation. They note long-term contracting arrangements remove the uncertainties associated with cost recovery for sunk investments subject to uncertainty.[781]

E12.27 To the extent there may be an issue of uncertainty and irreversibility of the investment in relation to the asset base, this is addressed in the regulatory regime through the roll forward mechanism that assesses new investments on an *ex ante* basis, e.g. 'prudence reviews' or requirements that investments be efficiently incurred. However, rather than delay investment, this approach often creates the risk of excessive investment by the regulated supplier, and investments being incurred ahead of the socially optimal time.

E12.28 Even if there were risks such as asset stranding for the Commission to consider, these can be dealt with in the roll forward mechanism for the RAB by allowing for a depreciation profile that front loads the allowed returns as stranding becomes apparent or allow the stranded asset to remain in the RAB. Presently, the Commission provides for such flexibility in its treatment of the RAB.

E12.29 The Commission notes that a real option to wait only has value where a firm has some level of market power. While in theory it has been shown that a single firm in a competitive market subject to sunk costs may have some incentive to delay investments, the real option value of waiting will be equal to zero.[782] Further, even in environments where there are only a small number of firms, provided one has a first-mover advantage, then it has been demonstrated in theory that a firm's ability to delay investment will be undermined by the fear of pre-emption. In such a scenario the traditional neoclassical NPV approach should be used to assess investments as opposed to a real options approach.[783]

E12.30 Presently, the Commission is not aware of any regulatory authority that has allowed for a real option surcharge to deal with asymmetric risk. In particular, concerns have been expressed by regulators about the potential for the regulator to compensate the regulated supplier for some form of market power. To the extent that there have

780 Yarrow, G., Cave, M., Pollitt, M., Small, J., *Asset Valuation in Workably Competitive Markets - A Report to the New Zealand Commerce Commission*, May 2010, pp. 16-17.

781 See California Public Utility Commission, *Interim Decision Setting Final Prices for Network Elements Offered by Pacific Bell, California Public Utility Commission, Decision 99-11-050*, 18 November 1999, pp. 24-25 and footnote 26.

782 See Leahy, J., Investment in Competitive Equilibrium: The Optimality of Myopic Behavior, *Quarterly Journal of Economics*, Vol. 108, No. 4, 1993, pp. 1105-1133 and Dixit, A. K. and Pindyck, R. S., *Investment under Uncertainty*, Princeton: Princeton, New Jersey, 1994, Chapter 8.

783 Weeds, H., Strategic Delay in a Real Options Model of R&D Competition, *Review of Economic Studies*, Vol. 69, No. 3, 2002, pp. 729-747.

been concerns about asset stranding these have instead been dealt with through allowing accelerated or front loading of the depreciation profiles as stranding becomes apparent.

E12.31 While the Commission outlined in the RDG and IM Discussion Paper that it would be open to submissions from suppliers that can prove, with substantive evidence, that Type II errors are a material issue and should be recognised, it does not consider that any party has met this threshold.[784]

E12.32 Submitters argued the Commission's approach imposed (and proposes to continue imposing) too high a 'burden of proof' on regulated firms such that no explicit allowance or recognition would ever actually be made.[785] The Commission maintains the view that this burden of proof is appropriate. The Commission considers that suppliers of regulated services are in a better position to provide information about the sunk nature of new investments and the likely uncertainty in the market place compared to the regulator. This position is consistent with the approach taken by other regulators that have considered this issue.[786]

Conclusion - compensating supplier for Type II asymmetric risk and real options

E12.33 The IM's approach is to apply a 'benchmark' or service-specific cost of capital for all suppliers of a regulated service. If the Commission were to apply an ad-hoc adjustment to the service-wide cost of capital it would imply that all suppliers of a particular service are exposed to the same level of Type II asymmetric risk. However, suppliers of a regulated service are exposed to different levels of Type II asymmetric risks and at possibly different time periods. If the IM were to make an ad-hoc adjustment for Type II asymmetric risks in the service-wide cost of capital it may over-compensate some suppliers and possibly under-compensate other suppliers.

E12.34 The Commission considers that regulated suppliers have not provided evidence to demonstrate that a Type II asymmetric risk exists and needs to be compensated using a real options approach. On this basis, the Commission considers a real options approach that provides for a mark up in the cost of capital (or regulatory asset base) is not appropriate for dealing with Type II asymmetric risks.

E12.35 The Commission has more general concerns about the applicability of real options to all services regulated under Part 4. In particular:

- regulated firms are unlikely to be subject to the requisite degree of uncertainty for a real options approach to apply due to the long-term nature of regulation

[784] Commerce Commission, *Revised Draft Guidelines - The Commerce Commission's Approach to Estimating the Cost of Capital*, 19 June 2009, p. 59.

[785] Auckland Airport, *Commerce Commission Draft WACC Guidelines Paper*, 31 July 2009, p. 3; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report on behalf of ENA, 11 August 2009, p. 14; LECG, *Comments on the Commerce Commission's proposed approach to estimating the cost of capital*, Report prepared for the NZAA, 31 July 2009, p. 26; PricewaterhouseCoopers, *Submission to the Commerce Commission on the Revised Draft Guidelines – The Commerce Commission's Approach to Estimating the Cost of Capital*, Report on behalf of 17 EDBs, 14 August 2009, p. 15; Telecom, *Submission on Commerce Commission Revised Draft Guidelines for estimating the Cost of Capital*, August 2009, p. 7; Uniservices, *Comments on the Commerce Commission's Approach to estimate the Cost of Capital*, Report on Behalf of NZAA, 2 December 2009, p. 66.

[786] Ofcom, *Ofcom's Approach to Risk in the Assessment of the Cost of Capital: Final Statement*, 18 August 2005, p. 43.

(comparable in many ways to a long-term contract) where an asset value is fixed at the moment it enters the RAB, and suppliers are allowed to earn a return on and of that investment. In workably competitive markets with sunk costs and uncertainty, the existence of long-term contracts mitigates the need for a real options approach;

- assigning a positive value to real options could reward a regulated supplier for its position of market power, which would be inconsistent with the Part 4 Purpose;

- there is no regulatory precedent for taking into account real options in the cost of capital (or asset base) even though other regulators have previously considered such arguments; and

- to the extent that any Type II asymmetric risk does exist, the Commission considers this is better dealt with through front loading of the depreciation profile or cash flows, or allowing stranded assets to remain in the RAB, as has been done by other regulators.

E12.36 The Draft Reasons Paper noted the Commission remained open to receiving evidence from regulated suppliers, that Type II risks exist in the case of Airports and that real options are a particular concern for them. However, Airports would need to provide evidence of the Type II risk and demonstrate how real options could be incorporated. Limited submissions were received on this point, and the IM does not make allowance for these items.

E13 Reasonableness Checks on the WACC

E13.1 This section reports the estimates of the WACC as at July 2010 when applying the IM and then compares these with a range of comparative information to test the IM estimate are reasonable and realistic in light of the other available information.

The estimated WACC for Airports as at July 2010

E13.2 Each regulatory instrument specifies when the WACC is to be calculated under that regulatory instrument. For AIAL and CIAL, the WACC is to be calculated as at 1 July 2010.

E13.3 For the purposes of testing the reasonableness of the WACC estimates produced by applying the IM, the Commission estimates the WACC as at 1 July 2010. This coincides with the period of the first estimate for AIAL and CIAL under information disclosure. If the IM produces reasonable estimates at that date, the Commission considers it is also likely to produce reasonable estimates at other dates since the risk-free rate and debt premium will be linked to market rates and updated annually.

E13.4 Table E22 summarises the values of the fixed parameter as specified in the IM and shows estimates of the five year risk-free rate and five year debt premium as at 1 July 2010 (using data from the month of June 2010).

Table E22 Parameter Point Estimates and their Standard Error as at 1 July 2010

Parameter	Point estimate	Standard error
Leverage	17%	
Debt issuance costs	0.35%	
Asset beta	0.60	0.16
Equity beta	0.72	
Tax-adjusted market risk premium	7.1%	0.015
Average corporate tax rate	28.4%	
Average investor tax rate	28.1%	
Debt premium (as at 1 July 2010)	1.75%	0.0015 (minimum)
Risk-free rate (as at 1 July 2010)	4.96%	

E13.5 Based on the parameter estimates in Table E22, Table E23 displays the resulting estimates of the mid-point (i.e. 50th percentile) vanilla and post-tax WACCs as at 1 July 2010.

Table E23 Estimated WACCs Using the Parameters Specified

Type of WACC	WACC estimate
Vanilla WACC	8.4%
Post-tax WACC	8.1%

E13.6 Most New Zealand market participants use the post-tax WACC and most comparative information is of post-tax WACC estimates. To assist easy comparability, the reasonableness discussion below focuses on the post-tax WACC estimate reported in the above table.

Will the cost of capital IM produce reasonable and commercially realistic estimates of the WACC?

E13.7 The Commission has tested the estimate of the post-tax WACC of 8.1% for airport services produced using the IM against a range of other information to ensure those estimates are reasonable and commercially realistic.

E13.8 The comparative information the Commission tested the IM estimates of the post-tax WACC against includes:

- estimates of the long-run historical returns earned by New Zealand investors on investments of average risk (over the period 1900-2009);
- estimates of future returns expected by New Zealand investors on investments of average risk;

- estimates of the post-tax WACC for airports regulated services in other regulatory contexts especially in New Zealand and the United Kingdom;
- independent estimates of the post-tax WACC for New Zealand airports; and
- estimates of the post-tax WACC using other approaches, including using the classical CAPM.

E13.9 The conclusions from this comparative analysis are that the estimate of the post-tax WACC for Airports using the IM is reasonable and commercially realistic for suppliers of regulated airport services. This is because the post-tax WACC estimate of 8.1% produced under the IM:

- is below the long-term historical and the forecast return on New Zealand investments of average risk (which are 8.5% and 9.0% respectively). This is consistent with expectations, as specified airport services have a below average exposure to systematic risks;
- is within the range of estimates for airports regulated services by overseas regulators (7.4% - 8.2%);
- is close to the range of publicly available independent estimates of post-tax WACC for AIAL's entire business (including unregulated services which would be expected to have a higher post-tax WACC, as AIAL itself has acknowledged in the past[787]). For example, the IM post-tax WACC estimate is below PwC's estimate of the post-tax WACC for AIAL (8.9%) and its estimate for the ports sector (comprising seaports and airports) of 8.6%, close to the average broker forecast of 8.3%, but above Airways Corporation's estimate of its post-tax WACC for its Air Navigation Service monopoly; and
- is close to the estimate produced when applying the classical CAPM (8.4%).

Long-run returns earned by New Zealand investors on investments of average risk

E13.10 The actual returns earned historically by New Zealand investors provides one means of testing whether an estimate of a future rate of return (post-tax WACC) is realistic. The advantage of looking at historic returns is that they can be calculated without the need for an analytical tool such as CAPM. That is, it is independent of analytical model, does not require a number of assumptions that such models require, and can be estimated without a consideration of systematic and unsystematic risk.

E13.11 Dimson, Marsh and Staunton of the London Business School are generally regarded as having produced the most authoritative source of historical returns to investors.[788] Dimson, Marsh and Staunton have analysed returns to investors in over 20 countries. Dimson, Marsh and Staunton's data for New Zealand covers the period from 1900 to 2009. That is, over 100 years.

787 Auckland International Airport Limited, *Airport regulation and pricing - Issues Brief*, November 2006, p. 5.

788 Dimson, E., P. Marsh, and M. Staunton, *2010 Global Investment Returns Yearbook 2010*.

E13.12 Dimson, Marsh and Staunton estimate that the average return to New Zealand equity investors over the period 1900-2009 was 9.8%.[789] This is a nominal, pre-investor tax return. Over the same period, the return on government bonds was 5.8%.[790] The return on corporate debt is not calculated by Dimson, Marsh and Staunton, but for the purposes of this analysis it is assumed it falls midway between the return on Government debt and the average for NZ equities (that is, 7.8%). At a corporate tax rate of 30%, assuming market-wide leverage of 30%, and no investor taxes on equity returns, this implies a WACC estimate of around 8.5% for an investment of average risk.[791]

E13.13 This approach makes no adjustment to the nominal returns on New Zealand investments despite these having likely been inflated during periods when New Zealand experienced high rates of inflation.

E13.14 This implies the historic New Zealand market average return, at 8.5%, is slightly above the estimated post-tax WACC for airports (8.1%).

Future returns expected by New Zealand investors on investments of average risk

E13.15 The future return expected from the market can be estimated using CAPM. By definition, the market has an average equity beta of 1. The analysis also assumes a TAMRP of 7.1%, market-wide leverage of 30%, a risk-free rate of 4.96%, a debt premium of 2.5%, issue costs of 0.35% per annum and a corporate and investor tax rate of 28%. The higher leverage and debt premiums reflect those for an average listed New Zealand firm. Under these assumptions, the estimated post-tax WACC as at 1 July 2010 is 9.1% (under both the classical and simplified Brennan-Lally CAPM).

E13.16 The Cost of Capital Report is published quarterly by PwC and is a long-standing and well-known report to many users.[792] It includes estimates of the post-tax WACC for around 70 New Zealand listed companies. The approach used by PwC is similar to the IM in a number of respects, including the use of the simplified Brennan-Lally CAPM and a five year term for the risk-rate (of 4.9% as at June 2010).

E13.17 In the June 2010 Cost of Capital Report, PwC estimate that the average post-tax WACC for the approximately 70 companies they analyse, is 8.4%.

E13.18 Table E24 below summarises the information discussed above on the market average post-tax WACC, on a historic and forecast basis. It also shows the current five year government bond post-tax rate (that is a proxy of the return on an investment with no default risk) and the post-tax cost of A- corporate bonds.

789 ibid, p. 27.

790 ibid.

791 This assumes a return on debt halfway between the return on government debt and the return on an equity investment of average risk.

792 The report can be found at http://www.pwc.com/nz/en/cost-of-capital.

Table E24 Market Estimates of Return on NZ Investments of Average Risk

Approach	Estimate of post-tax WACC
Historical returns on New Zealand market for a firm of average risk	8.5%
Expected return on New Zealand market for a firm of average risk (using a five year risk-free rate as at 1 July 2010)	9.1%
New Zealand market weighted average post-tax WACC (PwC calculation). i.e. average risk	8.4%
Five year government bond (post-tax)	3.5%
Five year A- rated corporate debt (post-tax)	4.8%
Commission's estimate of the post-tax WACC for an Airport (as at 1 July 2010).	8.1%

E13.19 The estimates shown in the top part of Table E24 relate to the market average firm. That is, they are indicative of the post-tax WACC for a firm of average risk. The IM estimate of Airport's WACC is shown in the bottom line.

E13.20 Airports regulated services have below average risk. While they have considerable pricing power, and have users with limited alternatives, they are exposed to a number of demand risks which are a function of systematic factors.

E13.21 As would be expected, the estimates of the post-tax WACC for Airports using the IM are below the estimates of the post-tax WACC for a New Zealand firm of average risk. This is consistent with the Commission's expectations.

Estimates of the WACC in other regulatory contexts

E13.22 This section looks at estimates of the WACC for airports in prior regulatory decisions, in New Zealand, the United Kingdom, and Ireland.

New Zealand

E13.23 The estimated post-tax WACC for Airports was previously considered by the Commission in 2002 in the Airports Inquiry. The Commission has updated this estimate to reflect the estimate of the five-year risk-free rate and the debt premium as at 1 July 2010. The resulting updated estimate of the post-tax WACC was 7.6%, or around 0.5% below the estimate produced when applying the IM. This reflects the assumptions in the IM for a higher asset beta, lower leverage, and lower taxes, which is partly offset by a lower TAMRP. The Commission prefers the estimates for these values in the IM, over those used in the 2002 Inquiry, as:

- the asset beta in the 2002 Inquiry was based on making adjustments to the estimated asset beta for EDBs, rather than a direct (empirical) estimate of the asset beta for Airports;

- the notional leverage assumption in the IM relies on a direct (empirical) observation of the average leverage of the comparator company sample of airports;
- New Zealand's statutory tax rates have fallen since 2002; and
- most applications of the simplified Brennan-Lally CAPM use estimates of the TAMRP below 8% and the evidence is that the TAMRP is around 7%.

E13.24 The Commission has also produced cost of capital IMs for EDBs and Transpower. The estimated post-tax WACC for those companies is 6.7% (mid-point estimate) and 7.4% (at the 75th percentile) based on the risk-free rate as at 1 July 2010. Regulated airport services face greater systematic risks than EDBs and Transpower. In particular, Airports are much more exposed to volume risk than EDBs and Transpower as air travel has a higher income elasticity of demand. The Commission therefore considers the higher post-tax WACC for Airports relative to EDBs and Transpower to be appropriate.

United Kingdom

E13.25 The UK Competition Commission has issued three point estimates of WACC for UK airports in recent years, namely for Heathrow, [793] Gatwick,[794] and for Stansted.[795] To enable comparison, the Commission has converted these estimates (which used the classical CAPM) into nominal post-tax WACCs.[796] The resulting nominal, post-tax WACCs are 7.4% for Heathrow, 7.6% for Gatwick, and 8.1% for Stansted.

Ireland

E13.26 In Ireland, the Commission for Aviation Regulation set a WACC for Dublin Airport.[797] This converts to a nominal, post-tax WACC of 8.2%.[798]

E13.27 The post-tax WACC from applying the IM is 8.1%. The IM estimate of post-tax WACC is around the estimate for Stansted and Dublin, but above that for the other UK airports.

E13.28 Table E25 summarises the estimates from the regulatory decisions discussed above. The estimates produced via the IM are comparable to, or slightly above, the estimates in other regulatory decisions.

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793 Competition Commission, *Report on economic regulation of Heathrow and Gatwick airports*, September 2007, Appendix F, p. F36.

794 ibid.

795 Competition Commission, *Stansted Airport Ltd - Q5 price control review*, presented to the CAA, 23 October 2008, Appendix L, p. L27.

796 Using a taxation rate of 28%, the Fisher function and an inflation rate of 2.8% consistent with the inflation expectation noted in the UK Competition Commission's report on Stansted (see p. L8), and its report on Heathrow/Gatwick (see p. F10).

797 Commission for Aviation Regulation, Determination on Maximum Levels of Airport Charges at Dublin Airport, Dec 2009.

798 Assuming taxation of 12.5% an Irish inflation expectation of 2%, and uses the Fisher function. The Commission for Aviation Regulation does not state an inflation expectation in its report, but NERA in a submission to the Commission for Aviation Regulation suggested this was around 2%, hence that estimate is used. See, NERA, *The Cost of Capital for Dublin Airport , A Report for Dublin Airport Authority*, March 2009, Appendix A2.

Table E25 WACCs in Previous Airport Regulatory Decisions

Approach	Estimate of post-tax WACC
Updated Airports Inquiry (2002)	7.6%
UK Competition Commission - Heathrow	7.4%
UK Competition Commission - Gatwick	7.6%
UK Competition Commission - Stansted	8.1%
Commission for Aviation Regulation – Dublin Airport	8.2%
Commission's estimate of the post-tax WACC for an Airport (as at 1 July 2010).	8.1%

Independent estimates of the WACC for NZ airports and related companies

E13.29 The Commission is aware of several publicly-available estimates of the post-tax WACC for New Zealand airports and related companies that have been produced independently of the regulatory context. These are discussed below.

E13.30 PwC includes estimates of the post-tax WACC for AIAL in its June 2010 Cost of Capital Report. PwC estimates an 8.9% post-tax WACC for AIAL's entire business (including unregulated services which would be expected to have a higher post-tax WACC[799]). For the ports sector (comprising AIAL and four seaports) PwC estimate an average post-tax WACC of 8.6%.[800] These estimates are above the IM mid-point estimate of the post-tax WACC (of 8.1%).

E13.31 A number of New Zealand investment banks publish research on New Zealand listed companies. A number of brokers have estimated the post-tax WACC of AIAL, as an input into valuing a share in the ownership of that company. The post-tax WACC estimates range from 7.0% to 9.1% with an average of 8.3%. The average is similar to the Commission's mid-point estimate. The broker's post-tax WACC estimates covers all of AIAL including unregulated activities (the post-tax WACC of the regulated services would be expected to be lower than for the overall company) and is for the life of AIAL's cash flows (while the IM seeks to estimate the post-tax WACC for the term of the regulatory period). Therefore, the Commission considers the brokers estimates of AIAL's post-tax WACC would likely be higher than the IM estimates of the post-tax WACC for a five year period.

E13.32 The broker estimates support the reasonableness of the estimate produced using the IM.

E13.33 The NZ Airways Corporation, through its Air Navigation Service (ANS), is a monopoly provider of essential air transportation services. The Airways Corporation estimates the ANS' post-tax WACC at 5.9% (Pricing Proposal June 2009). This is significantly below the Commission's estimate of the post-tax WACC for Airports.

799 A point AIAL itself has acknowledged. See, Auckland International Airport Limited, *Airport regulation and pricing - Issues Brief*, November 2006, p. 5.

800 PricewaterhouseCoopers, *The Cost of Capital Report*, June 2010, p. 3.

E13.34 Independent post-tax WACC estimates for New Zealand airports are summarised in below. The estimates produced via the IM are within the range of estimates made by independent parties for AIAL and similar companies.

Table E26 Independent Estimates of Post-tax WACCs for New Zealand Airports

Approach	Post-tax WACC Estimate
PwC estimate for AIAL (June 2010)	8.9%
PwC estimate for NZ ports sector (June 2010)	8.6%
New Zealand Broker estimates for AIAL (Jun-Jul 2010)	7.0%-9.1% Average 8.3%
Airways Corporation Air Navigation Service	5.9%
Commission's estimate of the post-tax WACC for an Airport (as at 1 July 2010).	8.1%

New Zealand Airport's estimates of their own WACC

E13.35 New Zealand airports also disclose estimates of their own post-tax WACC in their annual financial disclosure statements, and in pricing proposals to airport users. Many of these post-tax WACCs were estimated at the start of their current pricing agreements when risk-free interest rates were higher than they are currently.

E13.36 Table E27 below summarises the estimates of post-tax WACCs by AIAL, CIAL, WIAL, and Hamilton International Airport and an updated estimate based on the Commission's estimate of the current risk-free rate.

Table E27 New Zealand Airports Estimates of their own Post-tax WACCs

Approach	Post-tax WACC Estimate	Estimate updated to reflect July 2010 risk-free rate
AIAL estimate[801]	8.7% - 11.0%	7.3% - 9.5%
CIAL estimate[802]	9.7%	8.7%
Hamilton Airport estimate[803]	8.7% - 10.2%	8.6% - 10.2%
WIAL estimate[804]	8.3% - 9.5%	7.9% - 9.1%
Commission's estimate of the post-tax WACC for an Airport (as at 1 July 2010)		8.1%

801 Auckland International Airport Limited, *Auckland International Airport Limited Identified Airport Activities Disclosure Financial Statements*, 30 June 2010, p. 49. This uses a 7.26% risk-free rate and a 1.29-1.38% debt premium.

802 Christchurch International Airport Limited, *Disclosure Financial Statements for the year ended 30 June 2009*, p. 42. Uses a 6.4% risk-free rate and 1.5% debt premium.

803 Hamilton International Airport Limited, *Landing Charges Pricing Methodology*, March 2008, p. 15. Uses a 5.97% risk-free rate and 1.25% debt premium.

804 Wellington International Airport Limited, *Identified Airport Activities Disclosure Financial Statements*, 31 March 2010, p. 30.

Testing reasonableness using other models

E13.37 Professor Myers and Professor Franks recommended the Commission estimate the post-tax WACC using the classical CAPM. While not favoured by submissions, and not adopted by the Commission as the model specified in the IM, this is a potentially useful reasonableness test on the results from the Simplified Brennan-Lally CAPM.

E13.38 Using the same data as set out in Table E22 and an MRP of 5.7%, the classical CAPM produced a mid-point post-tax WACC estimate of 8.4%. As expected, given the classical CAPM assumes all forms of investment income are taxed at the same rate (e.g. it ignores the value of imputation credits), this is modestly above the estimate from the simplified Brennan-Lally CAPM.

E13.39 Professors Myers and Franks recommended the use of the Fama-French three-factor model and the DCF model as reasonableness checks on CAPM estimates, "provided that necessary data are available and that the model's assumptions are reasonably satisfied".[805] However, there is very little New Zealand data available to robustly estimate a cost of equity using these methods and the Commission notes that no submission provided estimates of the cost of equity in New Zealand using either of these models. Accordingly, the Commission does not believe that it is practical to use either of these models as reasonableness tests in a New Zealand context.

E13.40 Professor Franks also recommended the use of the international CAPM. This would require estimates of the MRP appropriate to international investors, and the estimation of the relative riskiness of New Zealand regulated suppliers to an internationally diversified investor (beta). Such data is not readily available, and the Commission therefore does not consider that the international CAPM can be readily or reliably used. As discussed in paragraphs 6.4.32 to 6.4.34, the best view of the estimates of the cost of equity from an international investor's perspective is that it is likely to be at or below the level estimated from a domestic investor's perspective.

E13.41 Table E28 below summarises the estimates of post-tax WACC for Airports using methods and approaches other than that specified in the IM. The estimates produced via the other approaches are close to those estimated using the Simplified Brennan-Lally CAPM (with leverage of 17% and no debt beta).

Table E28 Estimated WACCs Using Other Models and Approaches to Estimate the Cost of Equity

Approach	Post-tax WACC Estimate
Airports WACC estimated using the classical CAPM (50th percentile)	8.4%
Airports WACC estimated using Fama French and dividend growth model	Not practical
Airports WACC estimated using International CAPM	Not practical but evidence suggests it will be lower than domestic CAPM estimate
Commission's estimate of the post-tax WACC for an Airport (as at 1 July 2010)	8.1%

[805] Franks, J., Lally M., & Myers S, *Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology*, 2008, p. 8.

Conclusions – reasonableness of WACC estimates for regulated airports

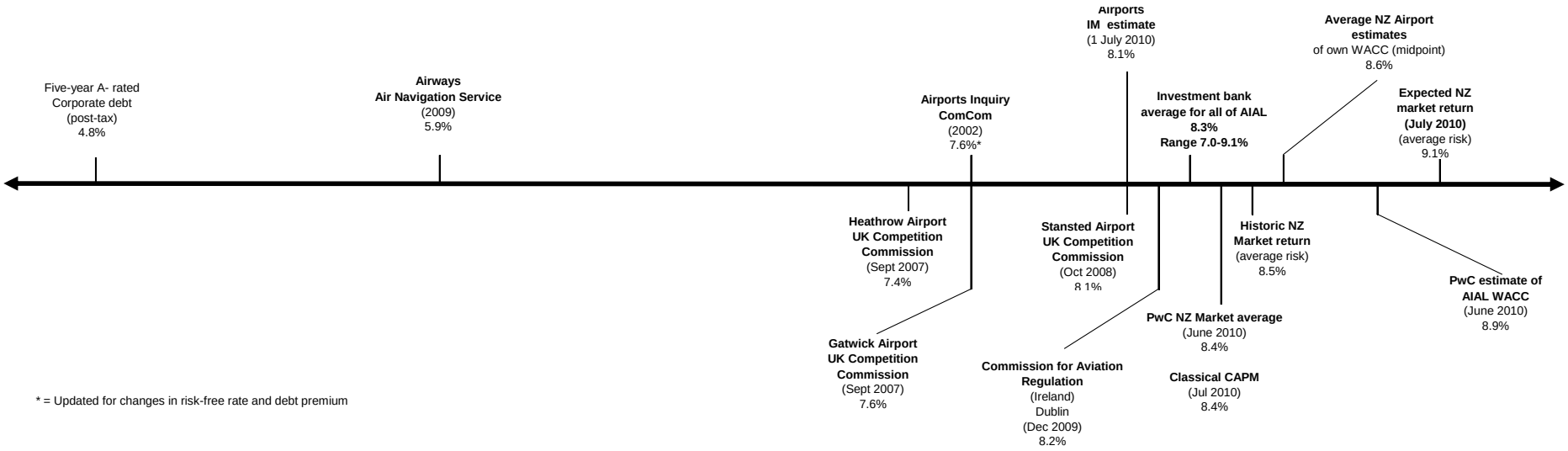
E13.42 Figure E2 below summarises the information outlined above to test the reasonableness of the post-tax WACC estimated under the IM as at 1 July 2010.

E13.43 The IM estimate of the post-tax WACC falls within the range of the comparative information. The mid point estimate of post-tax WACC is above estimates from a number of other sources, including UK regulatory decisions for Heathrow and Gatwick, and close to that for Stansted and Dublin airports. It is below the estimated post-tax WACC for a New Zealand firm of average risk based on historic and expected return information. It is also above the estimated post-tax WACC for EDBs and Transpower, reflects the lower systematic risks faced by EDBs and Transpower compared to Airports.

E13.44 The estimated post-tax WACC is close to the average New Zealand broker estimate of the post-tax WACC for AIAL, below PwC's estimate of the post-tax WACC for AIAL and the port sector, but above the estimated post-tax WACC for the Air Navigation Service.

E13.45 On balance, the Commission considers this information supports the conclusion that the IM produces reasonable and commercially realistic estimates of the post-tax WACC for the regulated services of Airports.

Figure E2 Summary of Information Considered in Reasonableness Tests



E14 Application of the Cost of Capital IM to Information Disclosure

Information disclosure

E14.1 The IM requires the vanilla and post-tax WACC for Airports to be estimated as follows:

- the values of leverage, the tax-adjusted market risk premium, betas, and debt issuance costs are fixed in the IM Determination and will not be updated;
- corporate tax rates are linked to the prevailing rate of company tax rates as set by legislation;
- the investor tax rate is linked to the maximum prevailing rate of the prescribed investor rate as set by legislation;
- the WACC is estimated over a period of five years.
- the Commission's estimates of the risk-free rate of return and the debt premium will be for a five-year period. The Commission will update the estimates of the risk-free rate of return and the debt premium annually for each WACC estimation;
- the methodology for estimating the risk-free rate of return and the debt premium estimates is set out in the IM Determination. This methodology makes explicit allowance for the small number of New Zealand bonds that are publicly traded;
- the WACC estimates for Airports will be estimated by the Commission as at the first working day of the disclosure period for each airport. This is the first working day of April in the case of WIAL, and the first working day of July for AIAL and CIAL; and
- the Commission will publish its annual estimates within one month of the start of the disclosure period.

E14.2 Airports can calculate and disclose the amount of the term credit spread differential (including the costs of entering an interest rate swap) in respect of debt issues with a term which exceeds five years where the supplier's overall debt portfolio has an initial tenor which exceeds five years. This is a separate allowance under information disclosure and is not part of the cost of capital IM. This allowance is defined in the ID Determination.

E14.3 The Commission's estimates will be in the form of a WACC range for each of the vanilla and post-tax WACC. In the case of Airports, this range will be from the 25th to 75th percentile. The WACC ranges will be estimated in accordance with the methodology set out in the IM Determination. In assessing profitability for the Airports an appropriate starting point for any assessment is the 50th percentile (mid-point) on the range.

APPENDIX F: RESPONSE TO TECHNICAL SUBMISSIONS ON SCHEDULE A OF THE IM DETERMINATION (AIRPORT LAND VALUATION METHODOLOGY)

Key Issue Raised	Commission's Response
MVAU Valuation Guidelines – Schedule A	
Chung, Seagar and Stanley on behalf of NZAA provided a redlined Land Valuation Schedule A and submitted that: ▪ the definition of MVAU and Highest and Best Alternative Use (HBAU) can be extended; ▪ the applicable professional valuation standards is IVS 1 rather than IVS 2 as specified by the Commission; ▪ Explanatory Notes are required in respect of the Commission's directions for an orderly sale of land in economically manageable parcels, and other practical valuation steps.[i]	The Commission agreed that this was a helpful clarification and therefore it has been included. The Commission considers that the appropriate standard is IVS 2 The Commission noted that some clarification was required and therefore some of the drafting suggestions were adopted.
Air NZ identified five factors which in its view raise problems, by providing scope for subjectivity and manipulation.[ii]	The Commission is satisfied that the processes involved in the professional valuations were as objective as could be reasonably expected and notes that valuations will be scrutinised by interested parties under the ID requirements.
Dougal Smith from Property Advisory Limited on behalf of BARNZ and BARNZ[iii] identified four areas where Schedule A could be improved: ▪ the definition of MVAU. Mr Smith has recommended an alternative definition;[iv] ▪ aggregation of land. Mr Smith considers that the MVAU valuation of land cannot be carried out in isolation from other development land held. He recommends the addition of a clause to the Explanatory Notes that valuers need to explicitly include and reference other development holdings held by the Airport;[v] ▪ contingent liabilities. Mr Smith recommends that existing quantified liabilities for remediation and cleanup costs of contamination and transformation costs associated with surplus or redundant assets be able to be taken into account by the valuer when preparing the valuation;[vi] and	The Commission accepted the suggestions and made the relevant changes. The Commission has provided that development land holdings attributable to specified airport services are to be aggregated. This part of the submission is addressed in paragraphs 4.3.73 to 4.3.75

▪ use of tainted sales. Mr Smith recommends an additional Explanatory Note be added to direct that sales transactions should be used that are unaffected by existing airport influences.[vii]	The Commission accepted this suggestion and the relevant changes have been made.

[i] Chung, Seagar and Stanley, *Expert Valuation Advisors Response Draft Commerce Act (Specified Airport Services Input Methodologies) Determination 2010: Schedule A – Airport Land Valuation on Behalf of NZAA*, 12 July 2010, pp. 1-4.

[ii] Air New Zealand, *Submission to the Commerce Commission on the Input Methodologies Airport Services Draft Reasons Paper*, 12 July 2010, pp. 39-41, paragraphs 150-152.

[iii] BARNZ, *Submission on Commerce Commission Input Methodologies (Airport Services) Draft Reasons Paper and Draft Determination*, 12 July 2010, p. 20.

[iv] Property Advisory Group, *Schedule A – Draft Airport Land Valuation for BARNZ*, 8 July 2010, p. 2, paragraph 9.

[v] Property Advisory Group, *Schedule A – Draft Airport Land Valuation for BARNZ*, 8 July 2010, p. 4, paragraphs 16-19.

[vi] Property Advisory Group, *Schedule A – Draft Airport Land Valuation for BARNZ*, 8 July 2010, p. 5, paragraphs 20-25.

[vii] Property Advisory Group, *Schedule A – Draft Airport Land Valuation for BARNZ*, 8 July 2010, p. 5, paragraph 26.