

Targeted amendments to the Cost of Capital Input Methodologies for Airports – equity beta and related parameters

Draft decisions reasons paper

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Commerce Commission

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Executive Summary

- X1 This paper sets out our draft decision on potential amendments to the input methodologies (IMs) for airport services.¹ The proposed amendments relate to equity beta and leverage.
- X2 Our draft decision is to change the value of leverage in the IMs from 23% to 29% and to leave the value of equity beta at 0.87.
- X3 We last set the IMs for airport services in December 2023. We are now redetermining the IMs because of errors in the R code we used in 2023 to account for the ongoing effect of pandemics on the cost of capital for airport services.
- X4 We have not made a mechanical correction of the errors identified in the 2023 IMs.² Our assessment, based on analyses of updated data, is that if we were to apply the method we used in the 2023 IMs, but corrected for the calculation errors that were made, we would not identify values of equity beta and leverage that reflect current market conditions and expectations, or that would be useful for the profitability assessments that we undertake as part of our Information Disclosure function.
- X5 Instead, we have undertaken a new assessment of equity beta and leverage. This draft decision takes into account updated data and considers the most appropriate method to account for how the cost of capital for airport services has been affected by the Covid-19 pandemic. Our draft decision is to calculate equity beta and leverage by using market data for the three years to 1 February 2026. We consider that this approach best reflects current market conditions and expectations, and therefore best promotes the long-term interests of consumers.
- X6 The updated data indicate that:
- X6.1 airport firms have, on average, increased their leverage since Covid-19 - this increase in leverage was not evident when we set the 2023 IMs; and
 - X6.2 the asset beta of airport firms has, on average, decreased since Covid-19. The asset beta is a measure of business risk independent of how a firm is financed.
- X7 The method we relied on for this draft decision is different from the method we used in the 2023 IMs. The 2023 method involved combining an estimate of the pre-Covid-19 asset beta with an estimate of a premium that was intended to account for the ongoing effect of pandemics on airport services.

¹ Commerce Act (Specified Airport Services Input Methodologies) Determination 2010 (as amended).

² We have set out in Attachment B how we would estimate the equity beta and leverage if we were to just correct the errors in the R code used for the 2023 IMs (and not update the data or method). This is for background purposes only.

- X8 We have not used that method because it does not adequately allow for an increase in leverage and a decrease in asset betas, which is what we have observed in the market since the 2023 decision was made. We had expected the pandemic premium to be positive, reflecting the view that Covid-19 provided new information that would cause investors to revise upwards the ongoing risks associated with investing in airport services. However, that has not happened.
- X9 At the 2023 IM review we were attempting to identify the ongoing effect of a pandemic while the share values of airport firms were still being disrupted by Covid-19.
- X10 We now consider that Covid-19 had a disruptive effect on the relative risk of airport services compared to the market that lasted for three years from February 2020 to early 2023.
- X11 We have three years of data post-Covid-19 (from early 2023 to early 2026) that we can use to improve our understanding of how equity betas, asset betas and leverage values have been affected by the Covid-19 pandemic, and to inform our assessment of the values that should be included in the IMs.
- X12 The following table illustrates how the values of equity beta, asset beta and leverage have changed between the pre- and post-Covid periods (it excludes the three years when Covid-19 disrupted these estimates):

Table X1 Pre- and post-Covid average values of equity beta, leverage and asset beta

Indicator	1 October 2007 – 31 January 2020 (pre-Covid)	1 February 2023 – 31 January 2026 (post-Covid)
Raw equity beta ³	0.90	0.87
Leverage	0.23	0.29
Asset beta	0.66	0.62

- X13 We acknowledge that the use of three years of data differs from our standard practice of using data over longer periods.⁴ We have considered an alternative, which is to use the average values for the pre- and post-Covid periods.
- X14 However, on balance we consider we should place most weight on post-Covid-19 data because we would otherwise not be identifying values of equity beta or leverage that reflect current market conditions and expectations.

³ Raw equity beta is the estimate of beta calculated directly from the data for each firm. This value is then converted to an asset beta by using the firm's leverage.

⁴ For example, in the 2023 IMs for EDBs, GPBs and Transpower we used the last two five-year periods to estimate values of equity beta and leverage. See Commerce Commission "[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)" (13 December 2023), paragraph 4.318.

- X15 Our draft decision is to use an updated value of asset beta (0.62) and updated value of leverage (29%) to calculate an equity beta of 0.87 for airports.
- X16 To test whether the shorter period used to establish the equity beta and leverage estimates is likely to be robust, we have compared our estimates of beta and leverage against those made by market analysts. This has given us confidence that our approach is reasonable and in the long-term interests of consumers.
- X17 The following table shows the indicative Weighted Average Costs of Capital that are calculated using the 2023 IMs, the corrected values from fixing the errors in the R code we used in the 2023 IMs, and by applying the values consistent with this draft decision.

Table X2 Indicative WACCs⁵

Indicator	2023 IMs	2023 method corrected	2026 draft decision
Asset beta	0.67	0.71	0.62
Leverage	0.23	0.23	0.29
Equity beta	0.87	0.92	0.87
Indicative post-tax WACC ⁶	8.54%	8.82%	8.25%

⁵ The weighted average cost of capital (WACC) is the expected financial return investors require from an investment given its risk. The WACC reflects the cost of debt and the cost of equity, and the respective portion of each that is used to fund an investment.

⁶ These indicative WACCs have been calculated using the market data for our assessment of [Wellington Airport's 2024-2029 Price Setting Event](#), published in September 2025.

Chapter 1 Introduction

Background

- 1.1 We reviewed the IMs for airport services as part of the 2023 IM Review and published our final decision paper and determination for the cost of capital for airport services on 13 December 2023.⁷
- 1.2 Aspects of that final decision were subsequently challenged by way of merits appeals and a judicial review.⁸ During those proceedings, the following issues were identified in the R code that informed our final IMs decisions on cost of capital for airports.
 - 1.2.1 The first error involved the calculation of the pre-Covid asset beta. We intended to take the average of weekly and four-weekly observations but, in error, took the average of weekly observations only.
 - 1.2.2 The second error was in the calculation of the pandemic premium. We used weights applied to the regression technique of Ordinary Least Squares rather than using the method of Weighted Least Squares.
 - 1.2.3 The third error was also in the calculation of the pandemic premium. It involved an incorrect set of “weights” being used in the regression when calculating the 30-month scenarios forming the upper bound of the pandemic premium.
- 1.3 Attachment A provides further detail on the errors and their implications.
- 1.4 We have accepted that these errors occurred and committed to undertake an amendment process (including addressing the errors, if still relevant).

Legal grounds for this amendment process

- 1.5 All IMs must be reviewed at least once every seven years, as mandated by s 52Y of the Commerce Act (the **Act**).⁹ When considering IM amendments, we must have regard to the Part 4 purpose as set out in s 52A of the Act. The other purpose statements within Part 4 are relevant matters, but they should be applied consistently with s 52A.

⁷ Commerce Commission “[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)” (13 December 2023); [Airport Services Input Methodologies \(IM Review 2023\) Amendment Determination 2023](#) [2023] NZCC 34.

⁸ New Zealand Airports Association Incorporated, Auckland International Airport Limited, Wellington International Airport Limited, and Christchurch International Airport Limited lodged merits appeals against the Commission’s Airport Services Input Methodologies (IM Review 2023) Amendment Determination. Air New Zealand Limited, Qantas Airways Limited, and Board of Airline Representatives New Zealand Incorporated filed an application for judicial review of the same determination. Updates on that litigation can be found [here](#).

⁹ Unless otherwise stated, all section references in this paper are to the Commerce Act.

- 1.6 We do not generally consider it appropriate to consider significant changes to fundamental IMs outside the statutory IM review cycle. Fundamental IMs are generally those that define the foundational building blocks listed in s 52T(1)(a), and that are central to defining the balance of risk and benefits between suppliers and consumers.
- 1.7 However, we can and have reconsidered fundamental IMs in the past where there were compelling and urgent reasons for doing so.¹⁰ We typically focus on two types of amendments outside the statutory IM review cycle:¹¹
- 1.7.1 those that support incremental improvements to PQ paths; and
 - 1.7.2 those that enhance certainty about, or correct technical errors in, the existing IMs.
- 1.8 Our draft decision is that targeted amendments to the Cost of Capital IMs for airport services are necessary to address issues, including errors, with the method used to calculate equity beta and leverage in the existing IMs, and that this is a sufficiently urgent and compelling reason to amend the IMs outside of the statutory review cycle.
- 1.9 Moreover, given the errors were raised in the course of litigation and we provided a commitment to the Court to consider amending the IMs to correct for the errors, we do not consider that this update is unexpected or that it materially reduces predictability and certainty.
- 1.10 We acknowledge that the IMs for airport services are the subject of ongoing litigation. However, we consider it appropriate for the existing IMs to be amended, particularly because two regulated airports are undertaking price-setting events in 2027.
- 1.11 We have chosen to proceed directly to a draft decision rather than to publish a Process and Issues Paper first. Given the extent to which the issues covered by this draft decision have been canvassed in the 2023 IMs and in the appeal proceedings, while interested parties may have different opinions on the appropriate solutions, the issues themselves are well known and understood. We consider that interested parties will have sufficient opportunity to provide their views in submissions and cross-submissions, which we will consider in reaching our final decision.

How you can provide your views

- 1.12 We are seeking your input on this draft decisions reasons paper and draft amendment determination.

¹⁰ A prior example is the reconsideration of the Part 4 Weighted Average Cost of Capital (WACC) percentile decision for electricity lines services and gas pipeline services in 2014. The compelling reason for that IM amendment was criticism by the High Court of that decision in the 2013 IM merits appeal process, and the urgency was due to the upcoming default price-quality path and individual price-quality path resets for electricity distribution businesses and Transpower New Zealand Limited, respectively.

¹¹ Commerce Commission “[Part 4 Input Methodologies Review 2023 – Framework paper](#)” (13 October 2022).

- 1.13 If you would like to provide your views, please send a submission in word or pdf document format to: Hristina Dantcheva c/o infrastructure.regulation@comcom.govt.nz with “Submissions on Airports Cost of Capital IMs Amendments”.
- 1.14 Submissions are due by **5pm on Tuesday 16 June 2026**.
- 1.15 We will publish public versions of all submissions we receive on our website and will invite cross submissions by **5pm on Thursday 2 July 2026**.

Confidentiality

- 1.16 The protection of confidential information is something the Commission takes seriously. The process requires you to provide (if necessary) both a confidential and non-confidential/public version of your submission.
- 1.17 When including commercially sensitive or confidential information in your submission, we offer the following guidance.
- 1.17.1 If it is necessary to include confidential material in a submission, the information should be clearly marked, with reasons why that information is considered to be confidential.
- 1.17.2 Where commercial sensitivity is asserted, submitters must explain why publication of the information would be likely to unreasonably prejudice their commercial position or that of another person who is the subject of the information.
- 1.17.3 Please provide clearly labelled confidential and public versions. We intend to publish all public versions on our website.
- 1.17.4 The responsibility for ensuring that confidential information is not included in a public version of a submission rests entirely with the party making the submission.
- 1.18 Please note that all submissions we receive, including any parts that we do not publish, can be requested under the Official Information Act 1982. This means we would be required to release material that we do not publish unless good reason existed under the Official Information Act 1982 to withhold it. We would normally consult with the party that provided the information before any disclosure is made.

Chapter 2 The airport equity beta in the 2023 IMs and other recent decisions

Cost of Capital

- 2.1 The cost of capital is the expected 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 the return they would expect to get from a different investment of similar risk.
- 2.2 There are two main types of capital: debt and equity capital. Both have a cost from the perspective of the entity that is seeking funds from investors. For debt, it is 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 sometime in the future.
- 2.3 The Weighted Average Cost of Capital (**WACC**) reflects the cost of debt and the cost of equity, and the respective portion of each that is used to fund an investment. A more detailed explanation of what the WACC is, the role it plays in Part 4 regulation, and how it is calculated is presented in the 2016 IM Review Topic Paper.¹²

Equity beta

- 2.4 The equity beta is one of the WACC parameters specified in the IMs. It represents the total systematic risk that an entity carries. Under normal economic conditions, both financial and business risk determine the systematic risk of the firm.¹³
- 2.5 In the 2023 IM Review cost of capital topic paper (**Topic Paper**) we explained the six-step process to estimate the equity beta.¹⁴ The steps were:
- 2.5.1 Step 1. Identify a set of relevant comparator firms;
 - 2.5.2 Step 2: Estimate the equity beta for each firm in the comparator set;
 - 2.5.3 Step 3: Convert the equity beta for each firm in the comparator set to an estimate of asset beta (by removing financial risk);
 - 2.5.4 Step 4: Calculate an average asset beta for the comparator set;
 - 2.5.5 Step 5: Apply any adjustments for regulatory differences or differences in systematic risk across services to the average asset beta for the comparator set; and

¹² Commerce Commission “[Input methodologies review decisions – Topic paper 4: Cost of capital issues](#)” (20 December 2016).

¹³ The financial risk of a firm is the risk associated with funding the firm through debt. The business risk is the risk assuming the firm is funded entirely by equity (represented by asset beta).

¹⁴ Commerce Commission “[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)” (13 December 2023), paragraph 4.54.

2.5.6 Step 6: Re-lever the average asset beta for the sample to an equity beta estimate using the Commission’s assumed notional leverage.

2.6 These steps were applied in the 2023 IMs, with the result that the equity beta for airports was calculated as 0.87 based on an asset beta of 0.67 and leverage of 0.23.¹⁵

The effect of Covid-19 on asset beta

2.7 The consideration of the airport equity beta during the 2023 IM Review was complicated by the COVID-19 pandemic. The pandemic resulted in a spike in airport equity betas as future airport revenue became uncertain due to government restrictions and self-imposed limitations on air travel.

2.8 At the time, we considered it likely that:

COVID-19 provided new information that had not been included in the market’s assessment of the airport asset beta, that the spike in the asset beta during the early stages of COVID-19 would be repeated in future pandemics, and that investors have repriced and reweighted airports in their efficient portfolio of investments.¹⁶

2.9 In other words, we considered an airport stock’s ongoing variation relative to the market will have incorporated the new information about the effects of a pandemic and prospects of another pandemic occurring.

2.10 In the 2016 IM Review we had determined the asset beta for airports by placing greater weight on the average values for the most recent two five-year periods.¹⁷ In the 2023 IM Review, we considered that if we were to use the average of the last two five-year periods, we would give too much weight to the pandemic on an ongoing basis.

2.11 Instead, we considered the most appropriate way of setting the asset beta in the circumstances was to:

2.11.1 apply a premium to the pre-COVID-19 long term average asset beta; and

2.11.2 compare this value against the value of the asset beta for the post-Covid period (to the extent possible based on the available data at the time).

¹⁵ The equity beta was calculated by dividing the asset beta by (1-leverage): $0.87 = 0.67/(1-0.23)$.

¹⁶ Commerce Commission “[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)” (13 December 2023), paragraph 4.97.

¹⁷ Commerce Commission “[Input methodologies review decisions – Topic paper 4: Cost of capital issues](#)” (20 December 2016), paragraph 473.

- 2.12 Our approach to determining the airport equity beta in the 2023 IMs was challenged through a merits appeal in the High Court. The appellants challenged on appeal our selection of comparator airport companies, the pandemic uplift we made to the pre-Covid asset beta, and the way in which we calculated notional leverage. They also challenged the way in which we proposed to deal with the admitted errors. The appellants were unsuccessful in their appeal, as the Court was not satisfied that any materially better IM would arise if approaches of the type promoted by the appellants (on the comparator firms and/or on the pandemic uplift and leverage time period) were supported by the Court.¹⁸

Interaction with other recent airport decisions

- 2.13 The equity beta in the 2023 IMs was applied by Wellington Airport in its 2024-2029 Price Setting Event.¹⁹ Wellington Airport adopted a carry forward mechanism to account for the potential outcome of their appeal of the 2023 IMs, and for any subsequent amendments to the equity beta that we might undertake to correct the coding errors.²⁰
- 2.14 In our assessment of the cost of capital applied by Wellington Airport, we considered the carry forward mechanism was an appropriate way to deal with the outcome of the appeal and correction to equity beta, with adjustments made to the opening investment value for their next price setting event.²¹
- 2.15 We also considered the issue of coding errors in our assessment of Auckland Airport's 2022-2027 Price Setting Event.²² Although the 2016 IMs applied at the time of that price setting event, Auckland Airport considered the estimate of equity beta in those IMs was outdated and chose to recalculate the value.
- 2.16 In our assessment, we considered that Auckland Airport was justified in updating its estimate of the equity beta because COVID-19 was likely to have caused investors and market analysts to revise their assessment of the relative risk of Auckland Airport relative to the broader NZ market.

¹⁸ *New Zealand Airports Association Inc v Commerce Commission* [2025] NZHC 239. This decision has been appealed to the Court of Appeal.

¹⁹ Commerce Commission "[Review of Wellington Airport's 2024-2029 Price Setting Event - Final Report](#)" (29 September 2025).

²⁰ If we use up-to-date data when finalising this decision, it could complicate the implementation of the carry forward mechanism as the parties may decide to calculate the adjustment using different values of the equity beta prior to this decision and post this decision (when finalised). For example, the adjustment for the period of the Price Setting Event that is prior to this decision could be set with regard to the equity beta calculated using the same data as was used for the 2023 IM determination whereas the adjustment for the period that is post this decision could be set with regard to the equity beta and leverage values calculated using updated data.

²¹ Commerce Commission "[Review of Wellington Airport's 2024-2029 Price Setting Event - Final Report](#)" (29 September 2025), paragraph 2.14.

²² Commerce Commission "[Review of Auckland Airport's 2022-2027 Price Setting Event - Final Report](#)" (31 March 2025).

- 2.17 As part of our assessment, we considered our analysis from the 2023 IM Review, which had been published, modified for corrections to the coding errors. We considered the correction for the coding errors would result in a range of asset beta from 0.69 – 0.74.²³ We assessed Auckland Airport’s cost of capital using a value of 0.715, which represented the mid-point of that range.²⁴ In response to our final assessment, Auckland Airport revised its prices.²⁵

Relationship with other WACC reviews

- 2.18 We are currently reviewing how we estimate the cost of capital as part of our review of the Fibre Input Methodologies.²⁶ As part of that work we are also reviewing elements of the cost of capital IMs that are common with services regulated under Part 4 (airports, electricity lines, and gas pipelines), so that our approach is aligned where possible.
- 2.19 However, that broader review of the cost of capital IMs is not assessing the equity beta or leverage for airports as the wider review is limited to elements of the cost of capital that are common across regulated services.

²³ Commerce Commission “[Review of Auckland Airport’s 2022-2027 Price Setting Event - Final Report](#)” (31 March 2025), paragraph 2.139.

²⁴ Ibid, paragraph 2.140.

²⁵ Auckland Airport [media release](#) (31 March 2025).

²⁶ For further information on this review, see Commerce Commission “[Common cost of capital input methodologies review \(fibre and regulated suppliers under Part 4\) - Draft decision reasons paper](#)” (10 March 2026).

Chapter 3 Updated values of equity beta and related parameters

- 3.1 Our draft decision is that:
- 3.1.1 0.62 is a reasonable estimate of the asset beta for airports, based on data from 1 February 2023 to 31 January 2026;
 - 3.1.2 29% is a reasonable estimate of the updated value of leverage;
 - 3.1.3 for an asset beta of 0.62, the corresponding equity beta value for airports, based on leverage of 29%, is 0.87; and
 - 3.1.4 based on a standard error of the asset beta for airports of 0.25, the standard error of the mid-point estimate of the post-tax WACC for airports is 0.0202.
- 3.2 Our reasons for this draft decision are set out below.

Method

- 3.3 We have applied the six-step method, as described in paragraph 2.5, in updating the values of equity beta and leverage. The steps that require particular attention include:
- 3.3.1 Step 1. Identify a set of relevant comparator firms;
 - 3.3.2 Step 4: Calculate an average asset beta for the comparator set;
 - 3.3.3 Step 6: Re-lever the average asset beta for the sample to an equity beta estimate using the Commission’s assumed notional leverage.
- 3.4 Steps 2 and 3 are largely mechanical and are not discussed below. We have published the R code alongside this draft decision for stakeholders to review how the calculations have been made.
- 3.5 Step 5 is where we apply any adjustments for regulatory differences or differences in systematic risk across services to the average asset beta for the comparator set. In the 2023 IM review we discontinued a 0.05 downward adjustment to the asset beta under this step.²⁷ That adjustment had been made in the 2016 IM review based on the view that the average asset beta from the comparator sample was too high because it was affected by non-aeronautical activities, which had a higher asset beta than aeronautical activities.²⁸ In the 2023 IM review we considered that we no longer had grounds for making that adjustment. For this draft amendment decision, we are not aware of any reasons for making an adjustment to the asset beta, and maintain the

²⁷ Commerce Commission “[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)” (13 December 2023), paragraphs 4.212 – 4.220.

²⁸ Commerce Commission “[Input methodologies review decisions - Topic paper 4: Cost of capital issues](#)” (20 December 2016), paragraph 483.

rationale we provided in the 2023 IM review. We have not discussed this matter further in the discussion below.

- 3.6 We have also calculated the standard error that is consistent with the updated value of asset beta.

Step 1. Identify a set of relevant comparator firms

- 3.7 In the 2023 Topic Paper, we identified a set of nine comparator firms. These firms are shown in the following table.

Table 3.1 Comparator set used in 2023 IMs

Ticker	Name
357 HK Equity	Hainan Meilan International Airport
694 HK Equity	Beijing Capital International Airport
ADP FP Equity	Aéroports de Paris
AENA SP Equity	AENA
AIA NZ Equity	Auckland International Airport
AOT TB Equity	Airports of Thailand
FHZN SW Equity	Flughafen Zurich
FRA GR Equity	Fraport
SYD AU Equity	Sydney Airport

- 3.8 We formed the comparator set in the 2023 IM review by starting with a set of 24 firms that were identified by Cambridge Economic Policy Associates Ltd (CEPA) by applying our 2016 method and then removing firms based on considerations of illiquidity, negative leverage and market comparability.²⁹ The judgements we made in forming the comparator set were challenged during the merit appeal proceedings in the High Court and the outcome was that the appellants could not demonstrate that a materially better IM would arise from a different comparator set.

²⁹ Commerce Commission “[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)” (13 December 2023), chapter 4.

- 3.9 The 2023 comparator set included Sydney Airport even though it had delisted in February 2022. At the time we considered we had enough data to include it, and we considered it an appropriate comparator for NZ airports.
- 3.10 As part of this amendment process, we have considered whether we should continue to include Sydney Airport in our analysis because its inclusion now makes it more difficult to compare the pre-Covid and post-Covid data.
- 3.11 We note that the pre-Covid estimates are not overly affected by the exclusion of Sydney Airport, as shown in the following table.

Table 3.2 Beta and leverage estimates pre-Covid-19 (1 October 2007 – 31 January 2020)

Indicator	Including Sydney Airport	Excluding Sydney Airport
Equity beta	0.89	0.90
Leverage	0.25	0.23
Asset beta	0.64	0.66

- 3.12 There is no other new information that we are aware of that would cause us to revisit the comparator set that was formed in the 2023 IM review.
- 3.13 Our draft decision is to use the comparator set that was formed for the 2023 IM review but exclude Sydney Airport.

Step 4. Calculate an average asset beta for the comparator set

- 3.14 For the 2023 IMs, our estimate of an average asset beta was based on judgment informed by a pre-Covid estimate of asset beta for the years 2007-2020, a pandemic adjustment calculation, and a post-Covid estimate of asset beta for the year to September 2022.³⁰
- 3.15 The method we used had errors in the code underpinning the pandemic adjustment calculation. We have provided our corrected calculations in Attachment B.
- 3.16 During the 2023 IM review we took into account the post-Covid estimate because we considered the latest data would help us to better understand the effect of Covid-19 on the cost of capital for airport services. This view was not uncontentious. We were presented with alternative views during the 2023 IM review on what asset betas measure.

³⁰ Commerce Commission “[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)” (13 December 2023), paragraphs 4.205 – 4.211.

- 3.17 In cross-submissions for the 2023 IM Review CEG argued the latest data on asset betas would not be very useful for understanding the ongoing effect of pandemics:

In short, they [asset beta observations] measure how the stock market reacted to the actual shocks that hit the economy in the relevant estimation window – and do not measure the exposure to risks that did not actually eventuate.³¹

- 3.18 TDB Advisory, on the other hand, considered the latest data on asset betas would be very useful:

The stock price of any entity – along with its measured beta in any period – will respond not just to actual events affecting the entity concerned, but also to changing perceptions of risk that could affect the company’s performance and prospects – whether or not such risks actually materialise. For example, defence, transport and other stocks will reflect changing perceptions of the probability of a war over Taiwan, even though no war has occurred to date. Heightened uncertainty and perceptions of risk surrounding a particular stock that cause it to fluctuate more widely – including in relation to the market benchmark – are likely to be reflected in an increase in its beta, again whether or not the actual shocks or other sources of concern eventuate.³²

- 3.19 We stated in the 2023 IM review that we agreed with TDB Advisory’s view:

We agree with TDB Advisory's view and consider that a stock’s ongoing variation relative to the market will have incorporated the new information about the effects of a pandemic and prospects of another pandemic occurring. We consider it is relevant to take into account the evidence that the asset beta of the comparator sample for the year to 30 September 2022 was slightly lower than our estimate of the pre-Covid asset beta, even though we note that asset beta information estimated over a short period should be used cautiously.³³

- 3.20 Our view on what an asset beta measures was supported in the decision on the merit appeal of the 2023 IMs:

The Commission’s task is to estimate the relevant forward-looking asset beta that would apply for airports operating in workably competitive markets over the seven years from 2023 to 2030. The best data for the Commission to use to determine the post-Covid asset beta would be market data from the period after the pandemic had ceased to directly impact airports and capital markets. This post-pandemic market data would take into account any revised information and expectations held by participants in capital markets that had arisen due to the experience of the Covid-19 pandemic. However, the Commission only had highly limited post-Covid market data available to it when it made its final determination. Placing excessive reliance on a small time series of post-pandemic data would raise the same issues of variance as those discussed in [195] above. In such a situation, it is reasonable for the

³¹ Competition Economists Group "[Review of submissions on asset beta estimates for airports](#)" (report prepared for NZ Airports Association, 9 August 2023), paragraph 92.

³² TDB Advisory "[Cross-submission on specific matters for the IM Review 2023 Cost of capital](#)" (report prepared for BARNZ, 7 September 2023), p. 5.

³³ Commerce Commission "[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)" (13 December 2023), paragraph 4.198.

Commission to use an alternative approach to try and take account of the impact of the pandemic on the forward-looking asset beta.³⁴

- 3.21 The method used to estimate a pandemic premium in 2023 was necessary in the circumstances (where very limited post-Covid market data was available), but it carried with it some uncertainty and risk given it had not been tested over a long period of time. As noted by the Court, the best data for the Commission to use would have been market data from the period after the pandemic had ceased to directly impact airports and capital markets. While that data was not available during the 2023 IM review, it is available now. Using updated data means that we can apply conventional, well-understood methods for calculating the asset and equity beta, rather than relying on the more bespoke method used in 2023.
- 3.22 On this basis, we consider this draft decision should take into account updated data which reflects current market conditions and expectations, rather than a mechanistic correction of the errors in the 2023 code. We consider that basing this draft decision on all the information currently available to us will result in a materially better decision, for the long-term benefit of consumers, than using only the data available in 2023. This is because this approach:
- 3.22.1 provides the most accurate estimate for the cost of capital as of the decision date, thereby providing the correct incentives for regulated companies to innovate and to invest (in line with s 52A(1)(a)); and
 - 3.22.2 limits the airports' ability to extract excessive profits (in line with s 52A(1)(d)) by estimating a cost of capital in line with prevailing market conditions at the time of the decision.
- 3.23 We are satisfied that the post Covid data has settled sufficiently for us to be confident that it represents appropriate beta values going forward, and this view has been validated by our reasonableness checks against estimates by market analysis and other regulators.
- 3.24 The following table shows the annual estimates of equity beta, leverage and asset betas from 2019 to 2026.

³⁴ New Zealand Airports Association Inc v Commerce Commission [2025] NZHC 239, paragraph 235.

Table 3.3 Beta and leverage estimates for years commencing 1 February

Indicator	1 Feb 2019 – 31 Jan 2020	1 Feb 2020 – 31 Jan 2021	1 Feb 2021 – 31 Jan 2022	1 Feb 2022 – 31 Jan 2023	1 Feb 2023 – 31 Jan 2024	1 Feb 2024 – 31 Jan 2025	1 Feb 2025 – 31 Jan 2026
Raw equity beta	0.82	1.42	0.79	1.12	0.84	0.95	0.67
Leverage	0.19	0.22	0.23	0.25	0.29	0.30	0.29
Asset beta	0.67	1.08	0.61	0.83	0.55	0.66	0.52

3.25 This table shows the first wave of the pandemic affecting airport betas in the year from 1 February 2020 to 31 January 2021, then a year where betas dropped back, and then a second wave associated with the Omicron variant of Covid-19 affecting betas in the year from 1 February 2022 to 31 January 2023.

3.26 The following table shows the equity beta, asset beta and leverage for different assumptions about the length of the Covid-19 period.

Table 3.4 Beta and leverage estimates for varying assumptions about the duration of Covid-19, commencing 1 February 2020

Indicator	28 Feb 2021	30 Jun 2021	30 Sep 2021	31 Dec 2021	28 Feb 2022	31 Jan 2023
Raw equity beta	1.36	1.34	1.34	1.32	1.29	1.26
Leverage	0.22	0.22	0.23	0.23	0.23	0.23
Asset beta	1.03	1.02	1.02	1.01	0.98	0.95

3.27 Based on these tables, we consider it is reasonable to assume Covid-19 had a disruptive effect on betas until 31 January 2023.

3.28 The resulting pre-Covid-19 and post-Covid-19 estimates are shown in the following table.

Table 3.5 Beta and leverage estimates pre and post Covid-19

Indicator	1 Oct 2007 – 31 Jan 2020	1 Feb 2023 – 31 Jan 2026
Raw equity beta	0.90	0.87
Leverage	0.23	0.29
Asset beta	0.66	0.62

3.29 The asset beta values for various periods, by frequency, are shown in the following table.

Table 3.6 Asset betas for various periods by frequency

Frequency	1 Oct 2007 – 31 Jan 2020	1 Feb 2020 – 31 Jan 2023	1 Feb 2023 – 31 Jan 2026
Daily	0.59	0.86	0.62
Weekly	0.64	0.95	0.61
Four weekly	0.69	0.96	0.63
Average weekly and four weekly	0.66	0.95	0.62

3.30 At the 2023 IM review, we were attempting to identify the ongoing effect of a pandemic while Covid-19 was still disrupting the share values of airport firms. We now consider, based on the tables above, that Covid-19 had a disruptive effect on betas that lasted for three years from February 2020 to early 2023.

3.31 In 2023 the method we used to account for pandemics assumed the Covid-19 period in the five-year sample lasted for either 17 months or 30 months. However, the data above indicates it is more appropriate to assume the effect lasted for 36 months.

3.32 We have provided the results of our recalculation of the pandemic adjustment method using updated data in Attachment C. However, we have not relied on those updated values for this draft decision.

- 3.33 An issue with the pandemic adjustment method used in the 2023 IM Review is that it is additive: it adds the pandemic premium to the non-Covid asset beta. It does not provide for the situation where the post-Covid asset beta is lower than the non-Covid asset beta. This is a problem because the asset beta has decreased since Covid-19. The decrease in asset beta is due to the combined effect of a decrease in the average raw equity beta and an increase in average leverage.
- 3.34 If we were to apply the pandemic adjustment method we used in the 2023 IMs but corrected for the calculation errors that were made and updated for the latest data, we would not be identifying values of equity beta or leverage that reflect current market conditions and expectations.
- 3.35 We have therefore not put any weight on the values of equity beta and leverage that are calculated by applying the pandemic adjustment method but corrected for the calculation errors.
- 3.36 Instead, we consider we have sufficient post-Covid-19 data to inform our calculation of the revised equity beta and leverage. As explained at paragraph 3.16 above, we consider that basing this draft decision on all the information currently available to us will result in a materially better decision, for the long-term benefit of consumers, than using only the data available for the 2023 IMs.
- 3.37 The observation that the post-Covid raw equity beta is lower than the pre-Covid raw equity beta indicates that Covid-19 does not appear to have increased investor exposure to systematic risk.
- 3.38 We have considered whether the post-Covid outcomes have been affected by any unusual outcomes for individual firms in the comparator set. There are some significant changes for individual firms, such as the large increase in leverage for Hainan Meilan International Airport (from 0.02 to 0.34) and for Fraport (from 0.38 to 0.66). However, the data do not indicate that we should exclude a particular firm from the analysis.

Table 3.7 Asset Beta and leverage estimates pre and post Covid-19 by firm

Name	Asset beta		Leverage	
	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid
Hainan Meilan International Airport	0.78	0.73	0.02	0.34
Beijing Capital International Airport	0.69	0.55	0.27	0.42
Aéroports de Paris	0.55	0.51	0.25	0.40
AENA	0.46	0.65	0.28	0.18
Auckland International Airport	0.75	0.69	0.23	0.14
Airports of Thailand	0.93	1.22	0.15	0.05
Flughafen Zurich	0.63	0.42	0.22	0.16
Fraport	0.50	0.21	0.38	0.66
Average	0.66	0.62	0.23	0.29

3.39 We acknowledge that the use of three years of data differs from our standard practice of using data over longer periods.³⁵ We have considered two alternatives.

3.40 One alternative is to use the average values for the pre- and post-Covid periods. These values are 0.88 for equity beta, 0.26 for leverage and 0.64 for asset beta.

3.41 However, we prefer to place most weight on post-Covid-19 data because it appears that there has been an increase in leverage and a decrease in the asset beta for airports in the post-Covid-19 period. It is unclear what is driving this reconfiguration in leverage and asset beta, but it may be that investors and financiers consider demand is resilient to shocks, lessons learned from Covid-19 will be applied in future, and government support has reduced business risk.

³⁵ In prior decisions we have often used the last two five-year periods to estimate values of equity beta and leverage, as we did in the 2023 IMs for calculating the equity beta and leverage for EDBs, GPBs and Transpower. See Commerce Commission “[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital topic paper](#)” (13 December 2023), paragraph 4.318.

- 3.42 Another alternative is to use the average values of the last two five-year periods. These values are 1.04 for equity beta, 0.24 for leverage and 0.79 for asset beta. However, we consider these values place too much weight on the period when airport services were disrupted by Covid-19.
- 3.43 For the reasons explained above, our draft decision is that the average value of asset beta for the comparator set is 0.62, which is the average asset beta for the three years to 31 January 2026.
- 3.44 We note that the asset beta value of 0.62 is below the value of 0.715 (and range of 0.69 to 0.74) that we applied in our assessments of the recent price setting events for Auckland Airport and Wellington Airport.³⁶ As explained above, the lower asset beta in this draft decision reflects our assessment of updated data, and was not anticipated when we undertook our assessments of Auckland and Wellington airports' price setting events. In comparison, the asset beta values we used in those assessments were based on our view at the time of what the values would be if the R code errors made in the 2023 IMs were corrected.

Step 6. Re-lever the asset beta to an equity beta using notional leverage

- 3.45 The updated data allows us to consider how firms in the comparator set have adjusted their leverage post-Covid. As shown in Table 3.7 above, the average leverage of the comparator set has increased from 23% pre-Covid to 29% post-Covid. It is possible that this is related to the matters we referred to in paragraph 3.41.
- 3.46 For the 2023 IMs we applied judgement to make our estimate of average leverage because we had applied judgment associated with the ongoing effect of a pandemic to make our estimate of asset beta. However, as our draft decision is that we calculate the average asset beta directly from the comparator set for the last three years, we can revert to our standard approach of calculating the average leverage directly from the comparator set for the last three years, and we do not see any reasons to depart from this standard approach.
- 3.47 This is our standard method of converting asset betas to equity betas, as it avoids the use of debt betas in the conversion process. A detailed explanation of debt beta can be found in our previous IMs Reasons Papers.³⁷
- 3.48 Our draft decision is to use the updated value of leverage, 29%, to calculate an equity beta of 0.87 for airports.

³⁶ Commerce Commission "[Wellington Airport's 2024-2029 Price Setting Event - Final Report](#)" (29 September 2025); Commerce Commission "[Review of Auckland Airport's 2022-2027 Price Setting Event - Final Report](#)" (31 March 2025).

³⁷ Commerce Commission "[Input Methodologies \(Electricity Distribution and Gas Pipeline Services\) Reasons Paper](#)" (December 2010), Section H.9.

Reasonableness of our estimates

- 3.49 We have assessed the reasonableness of our equity beta and leverage estimates for airports by comparing these against estimates by market analysts and other regulators.
- 3.50 We received estimates of beta and leverage for Auckland Airport from Craigs Investment Partners, Forsyth Barr, Jarden and Macquarie.
- 3.50.1 The estimates of asset beta for Auckland Airport’s aeronautical activities are (in ascending order): 0.55, 0.60 and 0.715 and the estimates for the whole business are 0.53, 0.55, 0.60 and 0.60. Our estimate of 0.62 falls within the range for aeronautical services.³⁸
- 3.50.2 The estimates of equity beta for Auckland Airport’s aeronautical activities are (in ascending order): 0.74, 0.88 and 0.91 and the estimates for the whole business are 0.65, 0.74, 0.83 and 0.84. Our estimate of 0.87 falls within the range for aeronautical services.
- 3.50.3 The estimates of leverage for Auckland Airport are (in ascending order): 19%, 28%, 29% and 35%. Our estimate of 29% falls within this range.
- 3.51 Overall, the estimates used by market analysts indicate our estimates of asset beta, equity beta and leverage are reasonable.
- 3.52 The relevant regulatory decisions were made more than three years ago and are therefore of limited use because they were made soon after Covid-19.
- 3.52.1 The UK Civil Aviation Authority’s final decision on Heathrow Airport in March 2023 set the asset beta in the range of 0.44 to 0.62.³⁹ Their values for equity beta (0.95-1.47) and leverage (0.6) are not comparable because they use a notional leverage approach rather than set leverage based on the average leverage of the comparator set.
- 3.52.2 The Commission for Aviation Regulation in Ireland in December 2022 set a range for the asset beta of 0.59 – 0.61.⁴⁰ They also used a notional leverage approach so their values of equity beta (a range of 1.11 – 1.15) and leverage (0.45 - 0.55) are not directly comparable.
- 3.53 Nevertheless, we note that our estimate of asset beta of 0.62 is at the upper end of the range used by the UK Civil Aviation Authority and just beyond the upper value used by the Commission for Aviation Regulation.

³⁸ We received three sets of estimates for Auckland Airport’s aeronautical services and four sets of estimates for the whole of Auckland Airport’s business.

³⁹ UK Civil Aviation Authority “[Economic regulation of Heathrow Airport Limited: H7 final decision, section 3: financial issues and implementation](#)” (March 2023).

⁴⁰ Commission for Aviation Regulation “[Decision on an interim review of the 2019 determination in relation to 2023-2026](#)” (23 December 2022).

Updated standard error for airports

- 3.54 We considered whether a revised value of the asset beta would change the standard error of the WACC. The standard error can be used to determine the distribution of the WACC estimate and allow us to determine the range that we must publish under the current IMs. However, the mid-point estimate of the WACC remains our best estimate and is the benchmark when assessing airports’ targeted profitability, so we would expect no impact on pricing if we were to update the standard error.
- 3.55 In the Topic Paper (at paragraph 5.81) we indicated we had applied judgment in deciding on a standard error of the asset beta of 0.19, which was calculated for the 2017-20 period (the period immediately prior to Covid-19). We have calculated that the value for the 2007-20 period is 0.18, which is similar to the three-year period prior to Covid-19.⁴¹
- 3.56 In the Topic Paper, we decided to use a standard error of the asset beta of 0.19 because we considered the updated value of 0.28 was unreasonable, as it was influenced by the Covid-19 period.⁴²
- 3.57 Our updated estimates of the standard error of the asset beta for various periods and frequencies are shown in the following table.

Table 3.8 Standard error estimates for various frequencies and periods

Frequency	1 Oct 2007 – 31 Jan 2020	1 Oct 2017 – 31 Jan 2020	1 Feb 2020 – 31 Jan 2023	1 Feb 2023 – 31 Jan 2026
Daily	0.19	0.28	0.37	0.30
Weekly	0.16	0.21	0.33	0.25
Four weekly	0.20	0.13	0.18	0.39
Average weekly and four weekly	0.18	0.17	0.26	0.32

- 3.58 This table indicates that the asset beta has become less precise and more uncertain in the post-Covid period compared to before Covid.⁴³

⁴¹ The standard error for the asset beta for airports is averaged across weekly and four-weekly asset beta standard errors for the final comparator sample for the 2017-2020 sample period.

⁴² Commerce Commission “[Part 4 Input Methodologies Review 2023 – Final decision: Cost of capital Topic Paper](#)” (13 December 2023), paragraphs 5.80 – 5.81.

⁴³ Given our draft asset beta of 0.62, a standard error of 0.32 means that an asset beta of 0.94 is one standard deviation above our midpoint estimate.

- 3.59 Our standard practice for calculating the standard error of the asset beta is to use the average of the weekly and four-weekly estimates. On this basis, the standard error would have increased from 0.17 in the three years prior to Covid, to 0.26 during Covid, and to 0.32 for the post-Covid period.
- 3.60 However, the increase in average standard error between the Covid and post-Covid period appears to be overly influenced by the four-weekly data. In comparison, the standard error of the daily and weekly asset betas decreased after Covid, which is more consistent with our expectations.
- 3.61 Our draft decision is to update the standard error of the asset beta for airports from 0.19 to 0.25, by using only the standard error of the weekly asset beta. We consider this is likely to be a more reasonable estimate of the standard error of the asset beta than the average of the weekly and four-weekly standard errors.⁴⁴
- 3.62 The standard error of the asset beta is driven by the standard error of the equity beta as the standard error of leverage is assumed to be zero (noting that asset beta is formed by using equity beta and leverage). We consider that our draft decision on asset beta reflects the observed increase in average leverage, and is therefore a reasonable reflection of current market conditions, even though it is less precise and more uncertain compared to the pre-Covid asset beta.
- 3.63 The value of the standard error of the WACC in the airport IMs is calculated by using the standard errors of the asset beta, Tax Adjusted Market Risk Premium (TAMRP) and debt premium.⁴⁵ In the Topic Paper our estimates of the standard errors of the TAMRP and debt premium were 0.015 and 0.0015.⁴⁶
- 3.64 Based on a standard error of the asset beta of 0.25, our draft decision is to revise the standard error of the mid-point estimate of the post-tax WACC for airports in the IMs from 0.0169 to 0.0202.⁴⁷

⁴⁴ We also note that the average asset beta of weekly data (0.61) is similar to the average asset beta of weekly and four weekly data (0.62), which means the choice of frequency does not have a significant effect on the asset beta selected for this draft decision.

⁴⁵ See paragraph 5.49 of the Topic paper for the formula for the standard error of the WACC. The standard error of the WACC is also affected by the standard error of leverage; however, we assume the standard error of leverage is zero. See paragraphs 5.90 and 5.91 of the Topic Paper.

⁴⁶ See paragraphs 5.85 and 5.86 of the Topic Paper.

⁴⁷ We use a TAMRP value of 7.0% and a debt premium of 0.96% to derive the standard error of the WACC. These values are from the most recent cost of capital determination for airports available at the time of making this draft decision: [Cost of capital determination for disclosure year 2026 for information disclosure regulation – for Transpower, GasNet, Vector, Auckland International Airport and Christchurch International Airport](#) [2025] NZCC 16.

Attachment A Technical explanation of errors in the Topic Paper

A1 This attachment explains the errors in the method we used in the 2023 IMs when accounting for the ongoing effect pandemics could be expected to have on the cost of capital for airport services.

Pre-Covid asset beta

A2 Table 4.4 of the Topic Paper indicated that the weekly and 4-weekly data was used to calculate the pre-Covid asset beta. However, the value in that table was an average of weekly values for the period 1 October 2007 to 28 February 2020. The weekly value was 0.63, while the weekly and 4-weekly value is 0.65.

Weighted least squares

A3 Asset betas are estimated by using a method of statistical analysis called a regression, which is a method of identifying the extent of a statistical relationship between two variables. The two variables used in this case are the change in the share price and the change in the market index.

A4 Our method of statistical analysis involved weighting the data for the Covid and non-Covid periods within the five-year sample period so that it could be used to estimate what the asset beta would be for different frequencies and durations of a pandemic.

A5 For the Topic Paper, we created new variables that were weighted versions of the original variables. We then used these variables in a regression of Ordinary Least Squares to estimate the asset betas for the different scenarios.⁴⁸

A6 The correct method is to use the regression method of Weighted Least Squares rather than Ordinary Least Squares. The Weighted Least Squares method transforms the data by using the square root of the desired weight.

A7 For a detailed explanation of this error, refer to the paper prepared by CEG for the New Zealand Airports Association.⁴⁹

Inconsistent weighting of pandemic scenarios

A8 The intention in the Topic Paper (as indicated in paragraph 4.190) was to model two scenarios to provide upper and lower bounds of the pandemic adjustment.

⁴⁸ Ordinary Least Squares is a method used in statistics to find the straight line that best fits a set of data points. The line of best fit is the one that minimises the total squared difference between predicted values on the straight line and actual data values.

⁴⁹ Competition Economists Group "[Responding to Coding errors made by NZCC](#)" (1 April 2024).

- A8.1 The lower bound scenario assumes a pandemic lasts for 17 months and occurs either once in 20 years or once in 50 years (with the lower bound calculated using the average of the 20-year and 50-year results).
- A8.2 The upper bound scenario assumes a pandemic lasts for 30 months and occurs either once in 20 years or once in 50 years (with the upper bound calculated using the average of the 20-year and 50-year results).
- A9 The scenarios were formed using data from the 5-year sample period of 1 August 2017 to 26 August 2022. For the lower bound, the assumption was that the Covid period in the 5-year sample had a duration of 17 months from 1 February 2020 to 30 June 2021. For the upper bound the assumption (as indicated in paragraphs 4.188.2 and 4.191 of the Topic Paper) was that the Covid period in the 5-year sample had a duration of 30 months from 1 February 2020 to 31 July 2022.
- A10 The lower bound scenario was formed consistently for the Topic Paper, by reweighting the 17 months of asset beta data in the 5-year sample to form scenarios where the pandemic represented a 17-month period occurring once in either 20 years or 50 years.
- A11 The upper bound scenario was formed inconsistently for the Topic Paper, because it applied the incorrect weights when reweighting the 30 months of asset beta data in the 5-year sample to form scenarios where the pandemic represented a 30-month period occurring once in either 20 years or 50 years.
- A12 The corrected range for the pandemic premium, using Auckland Airport data, is 0.07 – 0.09 rather than 0.02 – 0.08.
- A13 The corrected range for the pandemic premium, using comparator set data, is 0.044 – 0.046.⁵⁰
- A14 An alternative would have been to assume the Covid period in the sample lasted for 17 months for both the lower bound and upper bound. There was some discussion of this option during the appeals as it was the assumption made by the UK Civil Aviation Authority. The pandemic adjustment for this alternative, using Auckland Airport data, is 0.07 – 0.12, and using comparator set data, is 0.05 – 0.10.

⁵⁰ Note that the upper bound scenario produced a value of 0.044 and the lower bound scenario produced a value of 0.046.

Attachment B Corrected asset beta for airports based on 2023 data

B1 For completeness, this attachment explains how we would consider estimating the values for equity beta and leverage for airports if we were to correct the errors in the calculations we used in the 2023 IMs and not update the data or method.

Correcting the errors in the calculations for estimating equity beta using 2023 data

B2 We consider that this less-preferred approach would result in a value of 0.71 as the estimate of the “corrected” asset beta, which compares to a value of 0.67 in the Topic Paper. This value is:

B2.1 within the range that we would consider reasonable for this less-preferred approach (0.69 to 0.73);

B2.2 just below the value of the comparator set for the year to 30 September 2022 (0.72);

B2.3 below the value we consider to be the upper bound for this exercise (0.74), which is the average of the last two five-year periods;⁵¹ and

B2.4 below the average of the last three five-year periods (0.73).

B3 For an asset beta of 0.71, the corresponding equity beta value, based on leverage in the IMs of 23%, would be 0.92.

B4 In the Topic Paper we determined a value of 0.67 for the asset beta for airports, which was just below the mid-point of the pandemic-adjusted range of 0.65 – 0.71.

B5 The following table gives the corrected information, without updating the data or method.

⁵¹ As explained in paragraph 2.10, we considered in the Topic Paper that if we had used the average of the last two-five year periods we would give too much weight to the pandemic on an ongoing basis, and therefore consider this average value (0.74) to be an upper bound (see paragraph 4.209 of the Topic Paper).

Table B1 Data to inform a corrected value of asset beta

Indicator	Topic Paper	Corrected
Pandemic adjustment method – combination of comparator set and Auckland Airport		
Pre-Covid asset beta (comparator set, weekly and 4-weekly)	0.63	0.65
Pandemic premium (Auckland Airport, weekly)	0.02 – 0.08	0.07 – 0.09
Pandemic-adjusted asset beta	0.65 – 0.71	0.72 – 0.74
Pandemic adjustment method - comparator set		
Pandemic premium (comparator set weekly)	0.01 – 0.03	0.044 – 0.046
Pandemic-adjusted asset beta	NA	0.69
Post-Covid asset betas (year to 30 September 2022)		
Comparator set (weekly and 4-weekly)	0.72	0.72
Comparator set excluding Hainan (weekly and 4-weekly)	0.61	0.61
Auckland Airport (weekly and 4-weekly)	0.84	0.84
Average asset betas – comparator set		
Last two 5-year periods (weekly and 4-weekly)	0.74	0.74
Last three 5-year periods (weekly and 4-weekly)	0.73	0.73

B6 Based on the corrected information on the pandemic-adjusted asset beta using the comparator set (0.69), an asset beta of 0.73 (the figure calculated using the pandemic-adjustment method in the Topic Paper) is likely to be too high for this exercise.

B7 Overall, we consider a reasonable range for the corrected asset beta under this less preferred approach would be 0.69 to 0.73, which has as the lower value the pandemic-adjusted asset beta from the comparator set and as the upper value the point just below the value that we consider the upper bound for this exercise (0.74).

- B8 It is possible that the corrected value of 0.71 is an over-estimate of the asset beta for New Zealand airport services, given the post-Covid asset beta for the comparator set excluding Hainan is 0.61, which indicates the sensitivity of the comparator set to the inclusion of Hainan.
- B9 It is also possible that the corrected value of 0.71 is an underestimate given that the post-Covid asset beta for Auckland Airport value is 0.84. However, we have less confidence in that value because of the relative size of Auckland Airport on the New Zealand exchange and extent of competition facing New Zealand airports (see paragraphs 4.180 – 4.181 of the Topic Paper).
- B10 Overall, we consider that using the less-preferred option of correcting the errors without updating the data or method would lead us to an estimate of asset beta of 0.71.

Attachment C Updated calculation of the pandemic adjustment method

- C1 This attachment provides the values for the pandemic adjustment method using updated data.
- C2 The pandemic adjustment method involves using the information in the sample period, which encompasses the assumed Covid-19 period, and re-estimating the asset beta by, in effect, reweighting the data to achieve the assumption that a pandemic occurs either once every 20 years or once every 50 years.
- C3 The assumptions we have used for our updated pandemic adjustment calculation are as follows.
- C3.1 The Covid period is from 1 February 2020 to 31 January 2023.
- C3.2 The data is from 1 August 2017 to 31 January 2026.
- C3.3 The data is the comparator set.⁵²
- C3.4 The pandemic period in the sample is the same as the pandemic period in the scenario period of either 20 years or 50 years.
- C3.5 The non-Covid estimate from the sample period is the average asset beta for the period we assume is not affected by Covid-19. This is the estimate to which a pandemic premium is added.⁵³
- C3.6 The lower bound pandemic premium assumes a pandemic occurs once in 50 years while the upper bound pandemic premium assumes a pandemic occurs once in 20 years.
- C4 The asset beta range produced by the pandemic adjustment method described above is 0.69 to 0.73 (rounded) based on:
- C4.1 a non-Covid asset beta of 0.64; and
- C4.2 a pandemic premium range of 0.04 to 0.09.
- C5 In comparison, the post-Covid asset beta is 0.62, which is significantly lower than the asset beta produced by the pandemic adjustment method.

⁵² For the 2023 IM Review we used Auckland Airport data for the pandemic premium calculation and the comparator set data for the pre-Covid value, partly because the R code error resulted in unreliable results when we used the comparator set data for the pandemic premium.

⁵³ Note that the use of the non-Covid value is different to the use of the pre-Covid value in the 2023 IM Review. The non-Covid value of asset beta is 0.02 lower than the average asset beta for the pre-Covid period of 1 October 2007 to 31 January 2020. We have used the non-Covid value because it is the reference point for which the pandemic adjustment is calculated, and because it has a weekly frequency which is the same frequency as the pandemic adjustment calculation (whereas the pre-Covid value is a combination of weekly and four-weekly data).

- C6 For completeness, we have also applied the pandemic adjustment method to raw equity betas, rather than asset betas, as this avoids the direct use of leverage (which is needed to convert raw equity betas to asset betas).
- C7 The raw equity beta range is 0.92 to 0.98 based on:
- C7.1 a non-Covid raw equity beta of 0.86 (which is the same as the pre-Covid estimate); and
 - C7.2 a pandemic premium range of 0.06 to 0.12.
- C8 In comparison, the post-Covid equity beta is 0.87, which again, is significantly lower than the value produced by the pandemic adjustment method.

Attachment D Corrections to the R Code used in the 2023 IMs

D1 We have published the R code associated with this draft decision alongside the decision.

D2 For transparency, we are providing here the changes made to the version of the R code published with the Topic Paper for the purpose of calculating the corrected values in Attachment B.⁵⁴

D2.1 Pre-Covid asset beta

```
PreCovid1A = mean(WeeklyP1A.mean,FourWeeklyP1A.mean) * 1826/4533  
PreCovid2A = mean(WeeklyP2A.mean,FourWeeklyP2A.mean) * 1826/4533  
PreCovid3A = mean(WeeklyP4A.mean,FourWeeklyP4A.mean) * 880/4533
```

```
PreCovid1A = mean(c(WeeklyP1A.mean,FourWeeklyP1A.mean)) * 1826/4533  
PreCovid2A = mean(c(WeeklyP2A.mean,FourWeeklyP2A.mean)) * 1826/4533  
PreCovid3A = mean(c(WeeklyP4A.mean,FourWeeklyP4A.mean)) * 880/4533
```

```
PreCovidA = sum(PreCovid1A,PreCovid2A,PreCovid3A)
```

D2.2 WLS regression

```
Data$weight <- ifelse(Data$date < "2020-02-01", Event, ifelse(Data$date >  
as.Date(Covid_date), Event, 1))
```

```
Data$WIndex <- Data$INDEX_PX_LAST_weekly_change * Data$weight
```

```
Data$WPrice <- Data$PX_LAST_weekly_change * Data$weight
```

```
RegressionResults <- Data %>% group_by(Code, Weekday) %>% do(model = lm(WPrice ~  
WIndex, data = .))
```

```
RegressionResults <- Data %>% group_by(Code, Weekday) %>% do(model =  
lm(PX_LAST_weekly_change ~ INDEX_PX_LAST_weekly_change, data = ., weights = weight))
```

D2.3 17-month and 30-month Covid periods in sample (17-month and 30-month pandemic periods):

```
EventsW <- list(2.33,3.68,5.04,13.16,26.7,2.9,4.84,6.77,18.39,37.75)
```

```
Covid_dates <- list("2021-06-30","2021-06-30","2021-06-30","2021-06-30","2021-06-30","2022-  
07-31","2022-07-31","2022-07-31","2022-07-31","2022-07-31")
```

⁵⁴ Note that for presentation purposes here we have shown the deleted R code with a strike through. The actual R code has these lines ignored using the # symbol at the start of each line.

D2.4 17-month Covid period in sample (17-month and 30-month pandemic periods)

```
EventsW <- list(2.33,3.68,5.04,13.16,26.7,1.14,1.90,2.66,7.22,14.83)
```

```
Covid_dates <- list("2021-06-30","2021-06-30","2021-06-30","2021-06-30","2021-06-30","2021-06-30","2021-06-30","2021-06-30","2021-06-30","2021-06-30")
```