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The New Zealand Commerce Commission's natural gas control inquiry

Comments by Geoffrey Horton

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Experience and qualifications

I am Geoffrey Robert Horton, an independent consultant specialising in advice on economic regulation to regulatory bodies and regulated companies. I hold an MA degree in Philosophy, Politics, and Economics from Oxford University and an MSc in the Economics of Public Policy from London University.

I have worked as an economist or regulator for more than thirty years. The first half of my career was spent mainly as a macroeconomist at the United Kingdom Treasury, in consultancy or as a university lecturer but, for the last sixteen years, I have been involved in economic regulation, particularly in the electricity industry.

As Senior Economic Adviser in the UK Department of Energy from 1988-90, I was responsible for all economic advice on electricity, coal, and the environment and played a leading role in the redesign and reorganisation of the electricity industry before the new companies were vested and subsequently floated.

From 1990 to 1995, as Director of Regulation and Business Affairs at the British Office of Electricity Regulation, I was responsible to Professor Littlechild for all aspects of the price controls, issues of price discrimination, and advice on economics and accounting. In that role I conducted reviews of the price control licence conditions for the National Grid Company, the public electricity supply businesses, and the public electricity supplier distribution businesses.

From 1992 to 1995, I was simultaneously Director General of Electricity Supply for Northern Ireland. This is an independent statutory appointment, entirely separate from the Office of Electricity Regulation in Great Britain, with responsibility for the regulation of the electricity industry in Northern Ireland.

From 1995 to 1998 I was Director of Consumer Affairs at the UK Office of Fair Trading, responsible for the half of the office discharging the Director General's consumer protection responsibilities. Since 1998, as a regulatory consultant, I have worked on many topics, including matters relating to price control or asset valuation in electricity, railways, gas, banking, postal services, water, bus transport and pharmaceuticals.

I have advised energy regulators or regulated companies in England & Wales, Scotland, Northern Ireland, the Republic of Ireland, Turkey, Russia, Singapore, Thailand, Ukraine, Australia, Brazil, the Philippines and, through UK Trade and Investment, China, Taiwan, Saudi Arabia and Abu Dhabi.

I recently gave evidence to the Commerce Commission on the draft electricity distribution optimal deprival valuation handbook.

1 Summary

I have been asked to comment on the New Zealand Commerce Commission's Gas Control Inquiry's draft report. This considers whether control of various companies' gas pipeline prices should be introduced by assessing competition and conducting a cost benefit analysis of imposing controls. The basic cost benefit analysis concentrates on changes in overall economic welfare. By also considering transfer payments between parties the study derives estimates of benefits to New Zealanders and to purchasers of gas transmission and distribution services.

The scope of the study is impressive but it faces a major uncertainty in the appropriate treatment of asset values and depreciation, which makes it difficult to derive conclusions from the comparisons, and the Commission appears to have taken an optimistic view of the ability of regulation to promote allocative and productive efficiency.

As regards competition, with possible exceptions in some areas served with liquid petroleum gas, gas pipelines constitute markets in their geographic areas. There is little competition and, even where there is bypass, an oligopolistic game equilibrium might be expected.

It is not easy to conduct a cost benefit analysis comparing situations where control is introduced with others in which it is not. Unlike many cost benefit analyses, which compare an existing situation with a counterfactual, both these scenarios are forward looking and need to be estimated. They also need to consider what has happened in the past. The Commission's study does not do this but, in effect, elects to compare present prices (and those prevailing in the last six years and forecast for the next three) with a counterfactual. However, if the Commission assesses returns to assets on a different basis to that used by a company to set prices, then any finding of excess returns in those years may be misleading.

Moreover, the cost benefit analysis is between the present situation and one of control, which given the uncertainty, error and lack of information inherent in regulation, is likely to diverge from efficient prices. Therefore, another set of estimates, of the likely cost of regulatory errors, has to be made to place on the cost side of the CBA balance, which the Commission has attempted to do.

The social cost benefit analysis compares likely gains in allocative, productive and dynamic efficiency between the two scenarios with the direct costs of regulation. Allocative efficiency gains depend in large part on the extent from which present prices diverge from ones that reflect marginal cost. However, marginal cost prices may not recover average costs and provide an expectation of financial capital maintenance (FCM), which is necessary for the long term health of the industry. The divergence of present prices from an average cost price is therefore examined.

However, the estimate of the counterfactual prices is done using asset values derived from either historic cost (HCA) or optimal deprival (ODV) methods. No sensible conclusions can be derived from HCA returns without examining the assets' inflation history. The ODV approach is confusing because it seems to assume one thing in a counterfactual thought experiment, but then to apply it to a real world where that is not the case.

If a company's price were regulated by an authority according to strict ODV principles it would face risks more like those in a commodity market and would need to consider accelerated depreciation or a higher return. However, a company with market power (or even subject to a real world threat of entry) and not subject to control would face less pricing risk. It might not need to accelerate depreciation to the same extent but could use a pricing path using ex ante returns. If the risk was realised and depreciated ODV values did fall, the ex post recorded return would be above the WACC and might

appear excessive even if it merely provided FCM. Therefore a high ODV return does not necessarily imply prices above FCM levels.

Whatever valuation method is used, all assets necessary to produce the output should be valued unless they are already accounted for by an operating cost charge, including non-system physical assets such as property and vehicles and intangible assets such as easements. It is not clear that this has been done and, where it has, that consistent valuation methods have been applied to all types of assets, or that the purchase cost of assets in takeovers has been considered.

The assessment of the price gap from a "competitive" level and of the existence of "excess returns" is highly uncertain. Judgements of the extent to which control is likely to achieve allocative, productive, and dynamic efficiency to a greater extent than in its absence are necessarily subjective. The Commission's judgements are not self-evident.

- The view that control would get 80% of the way to the allocatively efficient price depends in large part on how wide the gap is thought to be at present. If the gap is small it will be within the margin of error of the assessment and little or no improvement would be likely. An 80% figure presupposes a large gap.
- The view that a competitive industry would achieve 1% pa greater productivity growth and control could realise two thirds of that seems optimistic for private sector companies at least.
- I am unclear how the dynamic efficiency/ service quality costs are estimated.

I therefore doubt whether the analysis is sufficient to demonstrate the existence of a gap in price between the two scenarios. It would be helpful if the range of uncertainty could be illustrated by considering ranges of a number of important variables - e.g. asset values using different techniques, depreciation, WACC, operating costs, productivity gains, demand elasticities, regulatory direct costs, regulatory indirect productive and allocative costs.

Given the low elasticity of demand for gas pipelines and the consequently small displacement of volumes, it is not surprising that estimates of the welfare benefits of control are often exceeded by its costs, even if it is judged that there is a gap in price.

A price divergence will have a much larger impact on transfer payments than on welfare so, if it is considered that there is a divergence, cost benefit calculations from the point of view of purchasers, or perhaps (depending on the assumptions used) New Zealanders, are more likely to show a positive balance.

2 The questions asked

The New Zealand Commerce Commission has been asked to advise the Minister of Energy on:

A. Whether gas services may be controlled in terms of section 52 of the Commerce Act, which in turn poses the questions whether:

   i. Competition in those markets is limited

   ii. Control is desirable in the interests of acquirers of gas services

B. The appropriate method of valuation of pipelines

C. The net benefit to the public of control

D. Any other matter the Commission may think relevant

The Commission has sensibly re-arranged these questions slightly so that it asks

I. whether there is competition (Ai) and

II. what would be the overall net benefit of control through a cost benefit analysis, which in turn requires an answer to the appropriate asset valuation method (B).

Consideration of changes in income distribution, that is in transfer payments between the parties, enables a judgement under II to inform Aii and C. Addition to the overall net benefit of the net transfers from foreigners gives the net benefit to the New Zealand public (C) and addition of net transfers from acquirers gives the net benefit to acquirers (Aii).

This note therefore briefly considers the analyses of competition (section 3), cost benefit (sections 4-6) and transfers (section 7) before returning to the basic questions in section 8.

3 Competition

The competition analysis consists of first defining the market and then assessing the degree of competition within it.

3.1 Defining the market

The Commission uses the standard "hypothetical monopolist" or "small but significant non-transitory increase in price (SSNIP)" test. This test defines a market (which might be separated by product, geographically or by time) as that in which, if one firm held the whole market so defined, it could profitably raise prices above competitive levels by a significant amount for a sustained period. The price rise tested is normally about 5-10% for about a year, although one might argue that both size and time parameters err on the low side.

Price increases may be unprofitable because:

- consumers stop purchasing products of that type
- consumers switch to other substitute products
- other firms (e.g. firms supplying similar products in adjacent areas or other countries) start supplying an effective substitute to the product. This is known as supply-side substitution.

The Commission argues plausibly that, in the relatively short run, elasticities of demand for energy and of substitution between different fuels are such that it would normally be the case that a SSNIP would be profitable in gas pipeline provision. That might be the case whether or not inter-fuel substitution elasticities were sufficiently high for gas retail (or even, if it existed, vertically integrated gas supply) not to be considered a separate market from that of other fuels.

Supply side substitution is unlikely because of the necessary scale of entry and sunk costs. Gas pipelines therefore normally constitute markets in their geographic areas. However, I understand that there are substantial areas in New Zealand where supply is only of liquid petroleum gas and that the market there may include other forms of delivery of LPG, particularly for customers with seasonal demand.

3.2 Competition in gas pipelines

There is little competition in gas pipeline markets. Even where there is bypass an oligopolistic game equilibrium might be expected.

4 Cost Benefit Analysis

It is not easy to conduct a cost benefit analysis comparing situations where control is introduced with others in which it is not. Unlike many cost benefit analyses, which compare an existing situation with a counterfactual, both these scenarios are forward looking and need to be estimated.

In effect, the Commission study elects to compare present (plus recent past and forecast near future) efficiency and prices with a counterfactual, although it does concede that this may lead to error. For example, in para 6.24 when discussing asset valuation, the draft says, "If the Commission assesses returns on a different basis to that used by the company to set prices, then the assessment of excess returns part way through the life of the assets may result in misleading findings of excess or deficient returns even though the NPV of the business' earnings over the life of the assets might be zero……., for example…..because the returns of capital profile are different".

Another difficulty is that the initial comparison made is between present prices and an estimate of efficient or competitive prices. But the cost benefit analysis is between the present situation and one of control, which given the uncertainty, error and lack of information inherent in regulation, is likely to diverge from efficient prices. Therefore, another set of estimates, of the likely cost of regulatory errors, has to be made to place on the cost side of the CBA balance.

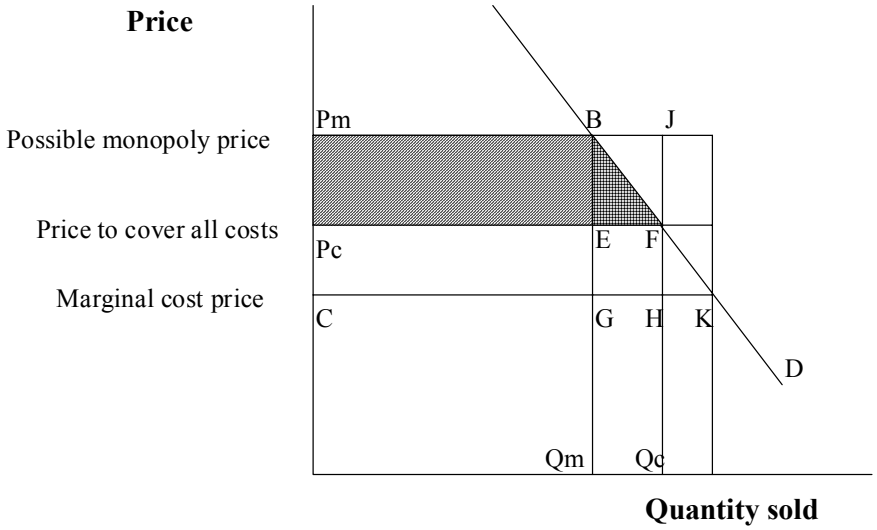
Bearing this in mind we turn first to how a divergence of prices from efficient levels might affect allocative efficiency together with a discussion of the assessment of whether there is such a divergence. This is followed by short sections on productive and dynamic efficiency.

5 Benefits

5.1 Allocative efficiency

Paragraph 5.13 of the draft report presents a diagram that illustrates the loss in allocative efficiency (when prices are such that the goods and services are produced are not those whose consumption would maximise consumer welfare).

Allocative efficiency loss (BEF) and transfer from acquirers (PmBEPc)



The diagram, similar to that above, shows a marginal cost price, a price to cover costs (including the cost of capital) and a possible monopoly price. The marginal cost price would maximise allocative efficiency but, if there were economies of scale or short run excess capacity, would not cover total costs or enable the company to invest and provide the service. There is an extensive literature on the most efficient method of pricing to cover costs when average cost exceeds marginal cost but, in aggregate, price will equal average cost. Therefore, it is sensible to consider a difference between a price that would cover costs and the present price.

If the present price (Pm) were to be above such a price (Pc), the quantity sold (Qm) would be lower (than Qc) and consumers would lose the triangle BEF, which represents the amount above its cost they would have been prepared to pay for what they are no longer buying. The size of this triangle depends on the price elasticity of the demand and the slope of the line D. The greater the slope and the more inelastic the demand, the smaller is the allocative loss for any given price difference because less custom is lost by the price rise. The Commission has used an elasticity of -0.3 for distribution and –0.1 for transmission based on an overall gas price elasticity of –0.7 and the average shares of distribution and transmission in the total price. This seems reasonable[1] unless there are significant divergences from the average shares in individual distribution or transmission areas.

[1] Although, in the longer run, inter-fuel substitution may be greater.

5.1.1 Efficient prices

The key question is then the estimate of Pc, the price that would cover costs. It is the divergence of this from the actual price that, when multiplied by the quantity sold and (half) the elasticity, gives the allocative loss and, when multiplied by the quantity sold, the transfer value[2].

The Commission takes a building block approach to calculating this price, essentially the same approach as would be taken to calculate a controlled price, except that a controlled price would be based on the estimated costs of a normally efficient operator whereas this assessment is based on actual costs and the judgement on productive efficiency is made elsewhere.

5.1.2 Building blocks

The revenue required is calculated as operating expenditure plus the weighted average cost of capital times the value of capital employed plus depreciation of that capital value.

Operating costs

While there are many practical difficulties in assessing actual operating expenditure for this purpose, including those concerning common costs or internal company transfers, I am not able to comment on the details in New Zealand and there are few issues of principle.

Asset values and depreciation

As regards asset values, however, there are several important issues of principle.

The Commission argues that the cost of an asset is the opportunity cost, the value of its best alternative use. In the case of these specialised assets that value is low. However, use of such low values would not produce financial capital maintenance (FCM), companies would not invest, and the product would not be provided. Therefore it prefers the use of historic cost values (apparently, and unusually, not indexed for inflation) to ensure an expectation of FCM and that efficient investment earns the cost of capital. Unfortunately, historic cost values are often unavailable and so optimal deprival values (ODVs) as adjusted by the Commission have normally been used instead.

This argument seems to me to be mistaken. The efficient price being calculated is one that reflects the cost of an increase in output (from Qm to Qc). It should therefore be based on an expansion[3] of assets, not a reduction and an implicit attempt to sell them for another use. This requires a modern equivalent asset (MEA) valuation, the cost of purchasing an asset to accommodate the increased output[4].

This is an estimate of the marginal cost, which may differ from the average cost. The draft report several times refers to gas networks as being characterised by "sunk costs and economies of scale" but

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[2] These two sums (the allocative loss and the transfer value) are then combined with the productive and dynamic efficiency effects, which can all then be compared with the similar losses and transfers under control and with the direct costs of control.

[3] There will often be spare capacity and so no need to install new assets for a small increment of output. However, on other occasions, a small increment would require a very large expenditure. For this reason it is normally sensible to assume a large increment to calculate an average marginal cost, rather than attempt to calculate a marginal cost for each situation. It is inappropriate to attempt to value the opportunity cost of surplus capacity assets that would be used at a lower price without also considering the occasions when additional demand requires lumpy new investment. Considering a large increment averages the two.

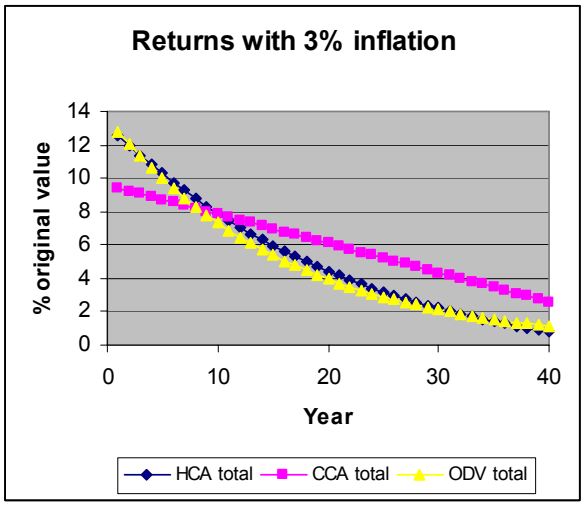
[4] The HCA, or indexed HCA, value will not provide a good estimate of the cost to be incurred. Neither will an ODV estimate. Not only are there general problems with the approach, as discussed later in this section, but, since additional demand will be met from an expansion of the existing system and not an optimised one, if MEA and ODV estimates differ, it is MEA that will more closely reflect the marginal cost.

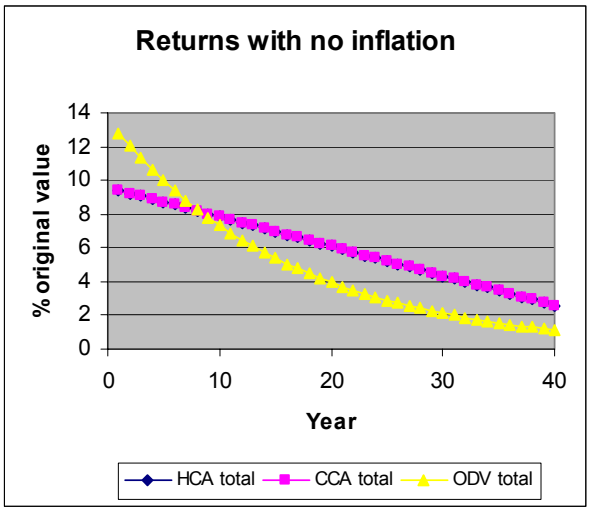
without quantification of such effects. While it seems intuitively reasonable that networks have economies of scale (and one can derive such outcomes from plausible modelling assumptions) there is no clear consensus and the Commission's own consultants disagree with the view with respect to electricity distribution networks[5].

If the average cost differs from the marginal cost, the price estimate should be based on an average cost that produces an expectation of FCM. Indexed historic cost with some depreciation assumption can produce FCM but so can other valuation methods (including MEA and ODV) providing that year to year revaluations are included as adjustments to depreciation or ex ante estimates of accelerated depreciation used to adjust the rate of return. The different methods can have the same net present value but different cost recovery profiles and, to repeat para 6.24, "If the Commission assesses returns on a different basis to that used by the company to set prices, then the assessment of excess returns … may result in misleading findings".

It is informative to consider this in the context of the two approaches to estimating a return on assets mentioned in draft para 4.32 – multiplying historic cost asset values by a nominal WACC (and presumably adding historic cost depreciation) or multiplying ODV by a nominal WACC and adjusting depreciation by revaluation gains or losses.

Both methods front-load returns compared with the conventional indexed approach (labelled CCA here and calculated assuming constant depreciation and a constant return on the declining balance). The charts below show total returns to the three methods assuming a 7% real return, 2.5% straight line depreciation under HCA and CCA, and 2.5% technical progress plus 2.5% asset redundancy under ODV. With 3% inflation (and given these particular assumptions) HCA is similar to ODV. With no inflation, of course, HCA is the same as CCA.

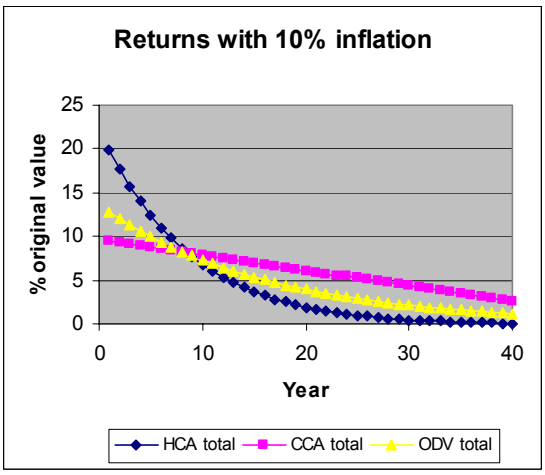


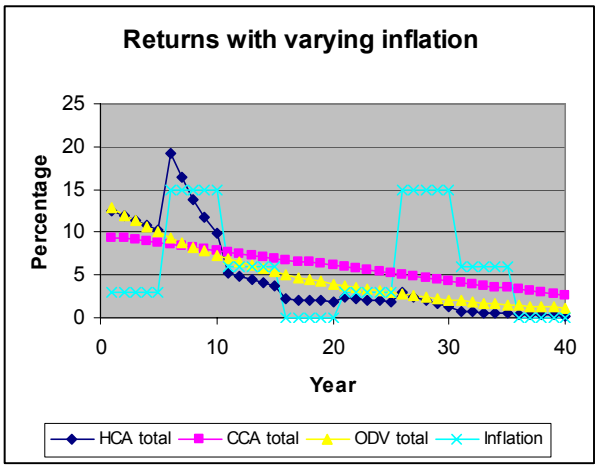


Some companies' asset bases will contain assets purchased some time ago when New Zealand, like many other countries, experienced high inflation: prices rose by over 15% in six of the last thirty years. High inflation causes even larger differences between the results of the different methods as the next two charts, showing 10% and variable inflation respectively, show.

[5] "Scale of operations also does not appear to be a major determinant of average [multilateral total factor productivity] MTFP levels" *Regulation of Electricity Lines Businesses, Analysis of Lines Business Performance – 1996–2003* Report prepared by Meyrick and Associates for Commerce Commission, Wellington, New Zealand December 2003

As the draft report points out, these differences will be lessened by the fact that companies will have a portfolio of assets of different ages and averaging over them will tend to make estimates by different methods converge. Also calculations have been made for a number of different, albeit consecutive, years. However, the potential for error is still significant. In particular, no sensible conclusions can be derived from HCA returns without examining the assets' inflation history.





ODV valuation, the method used in most cases, is also problematic. It does not value the equipment in place at today's prices (and multiply it by the undepreciated portion of the asset), which is the MEA method, but applies that method to an estimate of the assets that would be required in a newly optimised and configured system[6].

The object appears to be to mimic the operation of a competitive market and to hypothesise what would happen if a competitor, or several competitors, were able to enter the market to produce the required output using present day technology. This mimics a competitive market by valuing assets employed as if their value was determined in a market where the product price is set by competitors entering, or threatening to enter, with new assets.

However, the implicit assumption is not of entry with new assets because ODV asset values are *depreciated* MEA estimates of the reconfigured system. The implicit assumption is that competitors come in with a mix of kit of a similar age distribution as that of the incumbent. It is unrealistic to think that this is a way of representing a situation where competitors enter with new equipment but base their prices on a constant charge throughout its life: not only is this improbable behaviour but the charge estimated from the depreciated ODV assets would be lower than such an annuity[7]. The implicit argument appears to be that there is a general market for this equipment, where all the second-hand prices are determined from new prices. So, the incumbent has to compete with an entrant with both new and second-hand equipment. But the method of deriving the second hand value implicitly assumes zero (or much reduced) transport and installation costs.

This is not the case for the incumbent who is unable to move equipment from a place where it has been stranded to another place. Therefore, the ODV approach is confusing because it seems to assume a perfect second-hand market in the counterfactual thought experiment, but then to apply it to a real world where that is not the case. What that seems likely to produce is something that is more like a

[6] Although methods used in practice sometimes restrict the permitted degree of reoptimisation.

[7] In the example in the charts above the annuity charge would need to be 50% higher than that calculated from the depreciated ODV values of a company with an evenly distributed profile of assets over time.

commodity market than a utility, where prices may change suddenly in response to technological change or shifts in the location of demand. This would be more like a commercial market where firms are looking for payback within a fairly small number of years, not a forty year life span, and so might warrant accelerated depreciation.

That degree of risk might apply to a company whose prices were regulated by an authority according to strict ODV principles but a company with market power (or even subject to a real world threat of entry) would face less pricing risk. It might not need to accelerate depreciation to the same extent but could use a pricing path with ex ante returns similar to or slightly higher than those in the charts above. However, if the risk was realised and depreciated ODV values did fall, the ex post recorded return would be above the WACC and might appear excessive even if it merely provided FCM.

Therefore, a high ODV return does not necessarily imply prices above FCM levels.

Whatever valuation method is used, all assets necessary to produce the output should be valued unless they are already accounted for by an operating cost charge, including non-system physical assets such as property and vehicles and intangible assets such as easements. It is not clear that this has been done and, where it has, that consistent valuation methods have been applied to all types of assets.

It also appears that the purchase cost of assets in takeovers has not been considered. The transfer price is an indication of economic value and so of the depreciation that had taken place by that time. Given the absence of historical data and the difficulty of estimating depreciation by other means, the information should be of value. Use of the transfer value is also necessary to maintain the financial capital of the purchasing shareholders. If that is not done, it may result in a subsequent increase in the industry's cost of capital.

There is, however, a concern that transfer values may have been inflated by including the expected value of monopoly rent in addition to a normal asset value. This would only have been the case to the extent that it was expected that monopoly rents could be extracted under the regulatory system, which is unlikely to have been large.

Weighted average cost of capital (WACC)

I have not considered the WACC calculations in detail but my understanding of the Commission's assumptions and calculations is set out in the table below.

The Commission's Assumptions	Low case	Middle case	High case		Low case	Middle case	High case
Risk free rate	5.00	5.00	5.00	Corporate tax	33.0%	33.0%	33.0%
Debt premium	1.20	1.20	1.20	Personal tax	33.0%	33.0%	33.0%
Total debt cost	6.20	6.20	6.20				
After shield	4.15	4.15	4.15	WACCS			
				post-tax WACC	6.07	7.17	8.47
Equity risk premium	6.00	7.00	8.00	pre-tax WACC	9.06	10.70	12.64
Asset beta	0.40	0.50	0.60	vanilla WACC	6.89	7.99	9.29
Gearing	0.40	0.40	0.40				
Equity beta	0.67	0.83	1.00	Adjusted for inflation of	2.00%		
Post tax cost of equity	7.35	9.18	11.35	post-tax WACC	3.99	5.07	6.34
Tax wedge	1.49	1.49	1.49	pre-tax WACC	6.92	8.53	10.44
Pre tax cost of equity	10.97	13.71	16.94	vanilla WACC	4.79	5.87	7.15

The post-tax WACC is the rate of gearing (leverage) times the total debt cost - net of the tax deductible 33% shield - plus the remaining proportion times the post tax cost of equity, which is calculated as the risk free rate (net of 33% personal tax) plus the equity beta (calculated from the asset beta using the

Miller method) times the equity risk premium. Pre-tax rates can be calculated by multiplying by 1/(1-0.33) and I have also calculated real WACCs using an inflation assumption of 2% (slightly higher than the present 1.5% and the 1.7% average for 1997 to date).

CAPM calculations give an appearance of precision but there is room for considerable debate about most of the main of the parameters (risk free rate, debt premium, equity premium, beta) and the form of the calculations, particularly those relating to tax. I do not comment on these but merely compare them with ranges presently being used for UK utility networks. The initial proposal for WACC for electricity distribution, published by Ofgem today, was for a real vanilla[8] WACC of 5.1-5.9%, which is slightly lower than the centre of the Commission's 4.8-5.9-7.1% range, while the water proposals are for a post tax 5-5.9% (rather higher than the midpoint of the 4-5.1-6.3% range here).

There are two differences between these utility price control calculations and the situation dealt with in the draft report on gas pipelines:

- The report is asking whether control is desirable whereas the price control is attempting an estimate of a price;
- Pricing decisions in New Zealand have been made by companies in the absence of a system of control whereas those in the UK are (on average) dictated by a regulatory system.

It has been argued that the former point warrants the use of a higher WACC in New Zealand, because the question is one that should be settled beyond a level of reasonable doubt rather than a search for a single best estimate, and the latter also merits a higher WACC because of greater (and asymmetric) risk in an unregulated system.

There seems to me to be something in the first point but that raising the WACC may not be the best way to deal with it. The cost benefit calculations are uncertain and, given the range, it may not be sufficient for its midpoint to be positive to give a positive answer to the question. The range of uncertainty could be illustrated by assigning ranges to many of the key variables - e.g. asset values using different techniques, depreciation, WACC, operating costs, productivity gains, demand elasticities, regulatory direct costs, regulatory indirect productive and allocative costs – and examining the range of results.

The second point is discussed by the Commission and their consultant, Dr Lally. They both mention that adjustments could be made to revenue in the event of such risks, for example of stranded assets or other ODV shocks, being realised. However, this seems to me to mistake the comparison that is being made. While it may be true that a regulatory system can deal with these shocks by adjustments when they occur, the pricing that is being assessed is that of a company which is setting prices knowing that such adjustments would be difficult and so is likely to make an ex ante adjustment to deal with them. If these shocks have not been present in the recent past[9] the recorded return may appear excessive.

ODV valuation shocks[10] may make a return wrongly appear excessive in two ways. Firstly, as stated in the previous paragraph, they may not be recorded as a cost in the period being considered: secondly, as described earlier, if they have happened before the period being considered, they may make reasonable FCM returns look high by devaluing the asset base.

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[8] The vanilla WACC abstracts from tax and combines the pre-tax debt and post-tax equity rates.

[9] They are absent by assumption from the future years analysed.

[10] These can be erratic. The Commission has averaged them over the years for which it has made calculations. It is not clear why. Simple presentation of the results would illustrate the (highly relevant) fluctuation in the outcomes, albeit only over a short period.

5.2 Productive efficiency

Judgements of utilities' relative productive efficiency are difficult to make. Not only are there problems in obtaining comparable data but, when data are obtained, they are normally for a small number of companies with significant differences in the outputs they produce and the environment in which they operate. The number of possible explanations of divergent unit costs often exceeds the number of data points available to estimate the size of the impacts of the explanatory factors.

However, the comparison needed for the cost benefit analysis is of efficiency with or without control. Both may fall short of the level that might be achieved in a competitive market but it is doubtful whether it could be claimed that the introduction of control would improve the situation.

Publicly owned utilities are not subject to profit maximising incentives but, under an unregulated system, there is as much incentive on private companies to improve productive efficiency to maximise profit as in a competitive market. However, the overall incentive may be reduced because there is less fear of bankruptcy and because there may be concern that a maximised profit would be noticed by regulatory authorities and control introduced.

Under control, however, incentives to efficiency may also be blunted. RPI-X provides incentives but its pre-determined sharing of efficiency gains between company and customers may mean that many more difficult gains are no longer worth the company's while to achieve. Moreover the regulatory process may provide perverse incentives, such as to delay gains to provide a higher base mark for a subsequent review or to divert expenditure from capital to current or vice versa.

There is no obvious reason to expect that control would bring an improvement and I have not been able to understand the reasons for the report's assumption that control would bring a net extra ⅔% pa productivity growth, other than in publicly owned utilities.

5.3 Dynamic efficiency

Dynamic efficiency may be lower under control than without it. Private monopolies have an incentive to invest less than the optimal amount to improve quality[11] but establishing and incentivising "correct" levels of investment under price control systems is notoriously difficult. The topic has been a major theme in recent UK energy network reviews.

5.4 Quality

It would in theory be possible to estimate a demand for quality of service function, assess the extent (if any) to which it is underprovided and value the lost consumer surplus.

However, the report appears to assume that control would produce deterioration in service quality, perhaps as a result of greater dynamic inefficiency.

[11] A seminal article is A.M. Spence *"Monopoly, quality, and regulation"*, Bell Journal of Economics 1975

6 Costs

The costs to be offset against the benefits are direct regulation and compliance costs and the likely (and sometimes greater) failure of control to achieve the calculated benefits.

6.1 Direct

I have not examined these costs in detail but am surprised that compliance costs to companies appear to be no larger than costs to the regulator.

6.2 Indirect

The judgement of the extent to which control is likely to achieve allocative, productive, and dynamic efficiency to a greater extent than in its absence is subjective.

The view that control would get 80% of the way to the allocatively efficient price depends in large part on how wide the gap is thought to be at present. If the gap is small it will be within the margin of error of the assessment and little or no improvement would be likely. An 80% figure presupposes a large gap.

The view that a competitive industry would achieve 1% pa greater productivity growth and control could realise two thirds of that seems optimistic for private sector companies at least.

I am unclear how the dynamic efficiency/ service quality costs are estimated.

7 Transfers

As can be seen from the figure in section 5.1 transfers are likely to be large compared with welfare losses.

7.1 From acquirers

Estimates of the transfers from acquirers follow directly from estimates of the cost related price relative to the present price. From this should be deducted the extent to which control is likely not to achieve the cost related price. It is unclear to me whether this has been done.

7.2 To foreigners

Estimates of transfers to foreigners (that are deducted to find the NZ public benefit) depend on the price estimate relative to the present price and on assumptions about the extent to which those paying or receiving the price are (and will be in future) foreign. The assumption appears to be that the only transfer to foreigners is from gas transmission and distribution company profits and that the proportion of foreign ownership will remain fixed.

The second assumption is perhaps a reasonable way of estimating the mean of a wide distribution of possible outcomes for each company. The argument for the first is that other parts of the industry are competitive and that variations in gas transmission and distribution prices would be fully reflected in prices. I do not know whether that is the case but, even if it is, some of the beneficiaries of the lower price might be partially foreign owned companies and their gain should be subtracted from the total gain to obtain the benefit to New Zealanders.

8 Answers to the questions

I have not looked at the detailed calculations, am not in a position to assess the numerical estimates made and, in any case, have only seen the public version of the report with many figures omitted. I therefore do not have definite views as to the answers to the questions posed.

The scope of the study is impressive but it faces a major uncertainty in the appropriate treatment of asset values and depreciation and appears to have taken an optimistic view of the ability of regulation to promote allocative and productive efficiency.

8.1 Is competition limited?

I do not disagree with the view that competition in gas pipelines is limited, with possible exceptions where there exist bypass and excess capacity or in some LPG markets.

8.2 Does control have a net benefit?

I doubt whether the analysis is sufficient to demonstrate the existence of a gap in price between the two scenarios because of uncertainties in the assessment of the competitive price, particularly relating to asset values, and of the errors that would stem from the process of control.

Given the low elasticity of demand and consequently small diversion of demand if the price is wrong, it is not surprising that estimates of the welfare benefits of control are generally exceeded by its costs, even if a price gap were demonstrated.

If there is a divergence between the estimate of price and the actual price the largest impact will be on transfers.

8.3 Does control have a net benefit to New Zealanders?

If one were to conclude that there was significant price divergence, and the assumption that lower prices would not benefit foreigners, control is likely to be found to benefit New Zealanders where there is a high degree of foreign ownership of the gas distribution or transmission company.

8.4 Does control have a net benefit to acquirers?

Similarly, if one were to conclude that there was significant price divergence, consideration of total transfers is likely to conclude that purchasers would benefit from control that imposed the lower estimated price.