Asset beta for gas pipelines in New Zealand

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INCENTA
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1. Executive Summary

1.1 Purpose

We have been engaged by First State Investments to comment on Professor Lally's findings in relation to the relativity between the asset betas for gas and electricity network businesses. The focus of this report is the expected relativity between the asset beta for a New Zealand gas pipeline business[1] and the asset beta the Commission is expected to derive empirically (i.e., absent any adjustment) for the New Zealand energy networks. Like in 2010, the firms that comprise the set of comparable entities for this exercise are expected to be dominated by US electricity distribution businesses, followed by US gas distributors.

1.2 Professor Lally's advice

In the 2010 Input Methodologies, the Commerce Commission applied a differential of 0.1 between the asset betas for gas pipeline (and gas distribution) businesses and the electricity network businesses, adopting values of 0.44 and 0.34 respectively. The Commission's reasons for doing so – which were based on the advice of Professor Lally at the time – were that, compared to electricity distribution businesses:

- Gas pipelines have greater options to expand, which may raise their cost of capital, and
- The proportion of commercial and industrial demand that is served by a gas pipeline business (whether directly or indirectly through being used to generate electricity) is higher than for electricity networks, which may raise the asset beta of gas pipeline businesses because demand by the latter (Professor Lally assumed) tends to be more responsive to movements in the economy:
  - One caveat to this was that Professor Lally did not think that the demand by Methanex would be likely to be related to movements in the New Zealand economy, but rather to be affected by overseas shocks
  - Professor Lally also noted that if a substantial amount of the gas used in electricity generation was for producing variable supply (rather than base load supply), then a higher asset beta may result. However, he found that a substantial proportion of gas was used for base load supply, and so this would not apply.

It was also accepted that gas pipeline businesses were subject to greater competition than electricity networks, although the effect of this on the asset beta was considered to be ambiguous.

In his recent advice to the Commission, Professor Lally has revised his previous opinion and recommended no differential in the asset beta that is applied to gas pipeline businesses and electricity networks. His reasons for this are that:

- The effect of "real options" on the cost of capital is muted where the entities are subject to full control, and

[1] We use the terms 'gas pipelines' and 'gas transmission' interchangeably in this report to refer to the high-pressure delivery system, as distinct from the gas distribution networks.

- In contrast to his earlier view, the greater share of industrial and commercial demand for gas pipeline businesses relative to electricity networks is not sufficient to generate a materially higher asset beta for gas pipeline businesses (he considered that the asset beta associated with industrial and commercial customers would have to be implausibly higher than that associated with residential customers to generate a material differential).

1.3 Comment on Professor Lally's advice

1.3.1 Estimates of asset betas for gas pipelines relative to US energy (principally electricity) distribution

Introduction

In two places in his recent report for the Commission, Professor Lally states that the empirical evidence on the size of the differential that exists between gas pipelines and electricity transmission/distribution is 'inconclusive', but provides no reference to the analysis used to make this finding.[2] We consider that an empirical analysis of this question is important to the issue at hand, and have therefore undertaken a comparative empirical analysis to directly address whether gas transmission pipeline business are observed to have a higher asset beta than the asset beta the Commission is expected to derive for the New Zealand energy networks (which is expected to be dominated by beta estimates for US electricity distribution businesses). In our view, the empirical evidence supports the proposition that the asset beta for gas pipeline businesses is higher than an electricity distribution asset beta.

Selecting the sample businesses

The comparison of relevance is between the characteristics of the New Zealand gas pipeline businesses (and gas transmission specifically for this comment) and the characteristics of the firms that are in the set of comparable entities that will be used to estimate the asset beta for the New Zealand energy networks. Assuming that the Commission adopts a similar approach to its analysis in 2010, the set of comparable entities used for estimating the asset beta for the New Zealand energy networks is expected to be dominated by US electricity distribution firms, with a smaller number of US gas distribution firms.

Based on the sample employed by the Commission in 2010, CEG has recently derived a current sample of 64 businesses that is predominantly US based, and predominantly involved in electricity distribution (70 per cent),[3] with a lesser involvement in gas distribution (30 per cent).[4] To derive the target sample of regulated gas pipeline businesses we examined 129 businesses listed as 'Midstream oil and gas' by Bloomberg, rejecting those that were not listed businesses with a majority of assets

2 Martin Lally, (25 February, 2016), *Review of WACC Issues*, report prepared for the Commerce Commission, pages 3 and 37.

3 Most of the firms are integrated, which means that they undertake a combination of activities that may comprise electricity distribution, electricity transmission, gas distribution and generation, but where electricity distribution is typically the dominant activity. Where the relevant firms undertake generation, the associated activities are typically regulated (i.e., firms for which merchant generation is substantial are not included).

4 CEG (February, 2016), *Asset Beta*, report prepared for ENA.

being deployed in regulated natural gas transmission pipelines. This left a sample of 6 natural gas pipeline businesses, with all of them being located in the US.[5]

Methodology and empirical findings

For consistency, our methodology followed the approach employed by CEG, which has recently produced asset beta estimates up to November 2015 for the updated sample of 64 regulated energy distribution businesses likely to serve as the reference for the Commission's current beta review. Like CEG, we estimated the 5 year asset beta up to 30 November 2015, of our sample in three different ways depending on the return interval:[6]

- *Monthly return interval* – using 21 alternative definitions of a 'month' up to -10 and +10 days centred on 30 November (each with 60 monthly observations);
- *Weekly return interval* – using 5 alternative definitions of a 'week' centred on Monday 30 November (each with 260 weekly observations); and
- *Daily return interval* – using 1,258 daily return observations up to 30 November, 2015.

A summary of our findings, compared with the findings reported by CEG, is displayed in Table ES.1 below. The estimates using all three return intervals have been averaged, consistent with CEG's approach. For the 5 year period to 30 November 2015, CEG estimated an average asset beta of 0.35 for regulated energy distribution businesses. For the same period our results show average / median asset beta estimates of 0.49/0.47 for regulated gas pipelines.[7] The implied difference in asset beta, i.e. the premium between regulated energy distribution and regulated natural gas pipelines is approximately 0.11 to 0.14.

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5 We did not target a sample of firms solely from the US, rather it was the result of applying the screening criteria. However, having a sample comprising solely US firms will mean that a sample of US gas pipeline businesses is being compared to a sample (the Commission's) that is comprised almost exclusively of US firms.

6 While CEG also estimated asset betas for a longer period of 10 years up to November 2015, there were too few businesses in our sample of gas pipeline businesses to allow a comparable exercise for gas transmission.

7 CEG's method involved (i) estimating the monthly, weekly and daily asset betas for each firm by taking the mean of the asset betas estimated for the different return intervals (noting this is an average of one value for the daily estimate), (ii) calculating separate monthly, weekly and daily asset betas for the set of comparable entities as the mean of the step (i) values, and (iii) calculating the overall asset beta as the mean of the monthly, weekly and daily asset betas for the set of comparable entities. We applied the same method, except in relation to step (ii) where we have reported both the mean values across the set of comparable entities and the median values (so that our step (iii) results comprise both a 'mean of means' and a 'mean of medians'). We have drawn attention to the median as well as the mean for our set of comparable gas transmission firms because of the much smaller size of our sample.

Table ES.1: Summary of asset beta estimates for regulated gas pipelines vs regulated energy (5 years to 30 November, 2015)

	Regulated energy distribution (CEG)			Regulated gas pipelines	
	Previous 5 year beta	Last 5 year beta	Last 10 year beta	Last 5 year beta	Last 5 year beta
	Average	Average	Average	Average	Median
Data to:	2010	2015	2015	2015	2015
Monthly	0.35	0.30	0.33	0.50	0.47
Weekly	0.38	0.36	0.37	0.51	0.50
Daily	0.39	0.40	0.40	0.47	0.45
Average	**0.37**	**0.35**	**0.37**	**0.49**	**0.47**

Source: CEG, Bloomberg and Incenta analysis

A further question that arises is whether the relative risk of US gas pipelines is indicative of the relative risk of New Zealand gas pipelines, given the difference in the nature of the markets. We note that there are differences between the markets that may move the beta in both directions; however, a common feature to each is a much more substantial exposure to industrial and commercial customers than electricity distributors and thereby to the effects of economic cycles and material 'stranded asset risk' (we discuss the difference in customer composition below). We consider it reasonable to use the asset beta differential observed between US gas pipelines and electricity distributors as indicative of the differential in asset betas that would be expected in New Zealand.

Conclusion

We have found that for the most recent 5 year period to 30 November, 2015, the estimated asset beta for the set of gas pipeline businesses was 11 to 14 points higher than the corresponding average asset beta estimates for the sample of 64 regulated energy businesses that is likely to be employed by the Commission when deriving its base (i.e., pre adjustment) asset beta for the New Zealand energy businesses. These findings provide support for the current approach of providing an uplift to the asset beta for gas pipelines of 0.10.

1.3.2 Qualitative arguments

Introduction

We have also reviewed the qualitative factors to which Professor Lally has referred to ascertain whether those factors are consistent with the quantitative evidence presented above. In contrast to Professor Lally's conclusions, our review of those factors lend support to the quantitative evidence presented above.

Comparison of customer bases

We disagree with Professor Lally's use of demand (measured as energy throughput) as a basis for comparing the relative shares of the different segments of the customer base of a firm. The appropriate indicator of the make-up of the customer base for a business when evaluating the asset beta is the relative value of the different segments and, absent this, the relative revenue associated with the different segments is a superior indicator. Gas pipelines tend to have a much greater share of revenue associated with industrial and commercial customers than electricity or gas distribution businesses. The reasons for this are that:

- the largest energy consumers typically take supply from gas pipelines (the transmission network), so the proportion of energy supplied through a distribution network consequently would typically have a lower share of industrial throughput, and

- while pipeline charges are typically the same or similar for all customers (albeit often with a distance component), charges for the use of the distribution network are typically much higher for residential customers than for larger commercial and industrial customers – this just reflects the fact that residential customers use (and pay for) the whole of the distribution network, whereas larger customers take supply from higher capacity (i.e., voltage or pressure) components of the network.

We have compared the composition of revenue for gas pipelines in New Zealand with the New Zealand electricity distributors, and we assume that the composition in revenue of the New Zealand gas pipelines and electricity distributors businesses is approximately the same as the US electricity distributors. We find that the proportion of revenue from industrial and commercial customers for gas pipelines is substantially higher than the proportion of revenue from these customers to an electricity distribution business, and that the Commission's current asset beta differential for a gas pipelines can be achieved with a very plausible difference between the industrial and commercial customer and residential customer asset betas.

These conclusions suggest that a gas transmission business in the US would be expected to have a higher asset beta than a US electricity distribution business, the latter of which dominates the set of comparable entities. Moreover, an implicit assumption in this analysis is that the asset beta for residential gas demand in New Zealand is the same as the asset beta of residential electricity demand in the US. We note that if the income elasticity of residential gas demand in New Zealand was found to be higher than that of residential electricity demand (a result that has been found in Australia),[8] our results suggest that the asset beta for a New Zealand gas pipeline would be higher again.[9] That is:

- Gas pipelines would have a higher asset beta than US electricity distribution because of the higher proportion of industrial and commercial demand, assuming that the US income elasticity of demand figures for electricity also apply to gas in New Zealand.

- However, if residential gas demand in New Zealand were found to exhibit a greater relationship to economic cycles than observed for residential electricity demand in the US this would mean the New Zealand gas pipeline asset beta would be higher again than reflected in the comparable (US)

8 Akmal, A. and Stern. D, (October, 2001) 'Residential energy demand in Australia: an application of dynamic OLS', *Working papers in ecological economics*.

9 To be clear, we think it is quite plausible that the asset beta for US industrial and commercial electricity demand is approximately the same as the asset beta for New Zealand industrial and commercial electricity demand, and that it is plausible that this is also approximately the same as the asset beta for New Zealand industrial and commercial gas demand. In addition, we think it is quite plausible that the asset beta for US residential electricity demand is approximately the same as the asset beta for New Zealand residential electricity demand. However, given the differences in the nature of the residential gas markets between New Zealand and the US, it is quite plausible for the asset beta for New Zealand residential gas consumption to differ to the asset beta for both US residential gas consumption and New Zealand and US residential electricity consumption.

entities, albeit with a much more muted effect given the small share of revenue for gas pipelines that is derived from residential customers.

Methanex

We have also tested empirically Professor Lally's belief that the gas demand associated with the Methanex plants is unlikely to be related to the New Zealand economy. We find that, contrary to the assumption of Professor Lally, the price of methanol – which is likely to be important for decisions about the prospect of expansion or risk of contraction in Methanex's demand – has a statistically significant relationship to the New Zealand economy. This finding is not surprising – one of the principal uses for methanol is as an alternative transport fuel, the prices of methanol and crude oil have a very strong relationship, and there is a strong statistical relationship between the crude oil price and the New Zealand economy.[10]

Real option from expanding networks

When the Commission made the Input Methodologies determination in 2010, gas transmission (and distribution) pipelines were subject to the same regulatory regime (i.e., price control) as applies currently. Accordingly, there has not been a change in the presence of "real options" that justifies a revision to the asset beta.

We also note that, even where prices are controlled, the ability to expand a network may give rise to "real options" where the growth project is able to be undertaken at a lower cost than assumed in the regulatory allowance. However, we are unable to test the materiality of such an effect on the asset beta.

1.4 Conclusions

While Professor Lally has suggested the empirical evidence is 'inconclusive', our analysis of the asset beta of 6 US natural gas pipeline businesses indicates an asset beta that is 0.11 to 0.14 higher than that of a sample of 64 predominantly US electricity transmission-distribution businesses. This observed differential provides clear support for the Commission's current approach of applying a 0.10 uplift for gas pipeline businesses.

When we assessed the qualitative arguments presented in Professor Lally's recent report, we reach different conclusions to Professor Lally, namely that those factors provide conceptual support for our empirical finding. In particular, we find that Professor Lally:

- Has incorrectly used energy volumes when comparing the relative importance of residential and industrial/commercial customers between gas transmission and electricity distribution businesses, whereas relative revenue is the more relevant measure when assessing the effect on systematic

10 Professor Lally has also commented that while Methanex's throughput is high, the amount of revenue it contributes is low (due to the fact that it is located comparatively close to its supply sources), suggesting that including the Methanex volumes overstates the importance of the industrial load. We do not agree that the amount of revenue that Methanex contributes is immaterial; however, we note that as we use relative revenue as our preferred measure of the relative importance of the residential and industrial/commercial customer bases, we have automatically corrected the bias that Professor Lally considered to exist (i.e., the weighting we apply to Methanex is the relative revenue it contributes rather than the energy it transports).

risk. When relative revenues are used for this purpose, our analysis indicates that an uplift in the asset beta of 0.1 for gas transmission over electricity distribution can be generated with a very plausible differential between the asset beta associated with residential and industrial/commercial customers.

- That Professor Lally's claims about the importance of Methanex are also incorrect, since this component is material and its revenue is linked to the cyclicality of the New Zealand economy, and can therefore be expected to contribute to the asset beta uplift currently applied by the Commission.

Our empirical findings are also consistent with the fact that the market analysts we spoke to indicated that they consider the asset beta of gas transmission businesses is higher than for energy distribution.[11] It is also consistent with the fact that the US interstate pipeline regulator (FERC) adopts a higher ROE for natural gas pipelines relative to electricity transmission-distribution.[12]

11 See Appendix A.

12 See Appendix B. We have focussed in the decisions of US regulators for this purpose because the US is the one market in the world where it is feasible to distinguish the asset beta associated with gas pipelines from distribution. This is consistent with the fact that virtually all of the comparable entities that are employed to estimate the asset betas for energy networks and gas pipelines in the work referred to or undertaken in this report are US firms.

2. Scope of Work and Outline of Report

First State Investments engaged Incenta Economic Consulting (Incenta) to respond to the analysis of the Commission's adviser, Professor Martin Lally, which has proposed that the Commission depart from its current approach of applying a 0.1 asset beta uplift to gas pipeline businesses relative to electricity transmission and distribution businesses.[13] This issue has arisen in the context of the New Zealand Competition Commission's review of the asset beta that is applied to gas pipeline businesses in New Zealand.

Our analysis is divided into two sections:

- In Chapter 3 we undertake a quantitative analysis that estimates the premium that is observed between the estimated asset betas of regulated gas pipeline businesses and the asset beta the Commission is expected to derive for the regulated New Zealand energy distribution businesses (i.e., prior to any adjustments).

- In Chapter 4 we undertake an analysis of the qualitative factors referred to in the recent work of Professor Lally to assess whether these factors support the empirical results derived in the previous section. We also present a very brief survey of the opinions of market analysts and US regulatory decisions that we undertook to provide a further sense-test of the empirical results.

[13] Martin Lally, (25 February, 2016), *Review of WACC Issues*, report prepared for the Commerce Commission.

3. Empirical estimates of gas pipeline asset betas

3.1 Introduction

In this chapter we report the findings of our empirical analysis of the asset beta of natural gas transmission pipelines, and compare this with the most recent analysis of asset betas using the Commission's sample. That analysis was undertaken by Competition Economists Group (CEG), which was engaged by the New Zealand Energy Networks Association (ENA).[14] Since the latter utilises a sample of regulated energy businesses (mainly integrated and distribution businesses), it affords the opportunity to compare directly the asset beta estimated by CEG with that of regulated gas pipelines.[15]

3.2 The Commerce Commission's sample of regulated energy businesses

CEG has updated the Commerce Commission's 2010 sample of regulated energy businesses, and due to de-listings, has obtained a final sample of 64 firms, as shown in Table 3.1 below. As can be observed, the sample is mainly comprised of integrated electricity businesses, with purely gas businesses comprising only 30 per cent of the total. In addition, we note that most of the gas businesses are involved in distribution, with only three being equivalent to our definition of 'gas pipelines'.[16] US firms accounted for just over 90 per cent of the businesses (58 firms). Hence, the resulting asset beta is likely to largely reflect the asset beta of integrated US electricity businesses and US gas distribution businesses.[17]

Table 3.1: Commerce Commission (updated CEG) sample of regulated energy businesses

	Number of firms	By Sector	Per cent of total
Gas pipelines	3		4.7%
Gas distribution	16		25.0%
Total Gas		**19**	**29.7%**
Electricity distribution	2		3.1%
Electricity transmission	1		1.6%
Electricity business	1		1.6%
Electricity and gas distribution	1		1.6%
Electricity - integrated	40		62.5%
Total Electricity		**45**	**70.3%**
Grand total		**64**	**100%**

Source: CEG (February, 2016), pp. 34-36.

14 CEG (February, 2016).

15 The one firm that was common to the sample of gas pipelines that we derive below and CEG's sample was Spectra Energy Corp.

16 We have aggregated CEG's categories of 'gas transmission' and 'gas pipelines'.

17 'Integrated' energy business can include generation, transmission and distribution of electricity, and sometimes includes natural gas distribution. Where the relevant firms undertake generation, the associated activities are typically regulated (i.e., firms for which merchant generation is substantial are not included). Electricity distribution typically dominates the activities.

CEG estimated asset betas for 5 and 10 year terms ending in November 2015, using monthly, weekly and daily rate of return intervals. In addition, CEG employed alternative definitions of weeks and months, where the:

- Weekly interval betas were estimated using alternative ending business days (Friday to Thursday counting forward); and
- Monthly interval betas were estimated using the last day of the month (day 0) and counting 10 days forward and 10 days back from that day.

Using these approaches and averaging the results for monthly weekly and daily data, CEG obtained an estimated asset beta of 0.35 and 0.37 for the period ending with 30 November 2015 for the 5 and 10 year terms respectively.

3.3 Empirical estimation of a benchmark asset beta for gas pipelines

3.3.1 Deriving a comparator sample for regulated gas pipelines

We have used the Bloomberg Financial Services data base (Bloomberg), and considered that Bloomberg's industry sector labelled 'Midstream oil and gas' is most likely to incorporate regulated natural gas transmission (pipeline) businesses. We accessed Bloomberg on 9 March 2016, and downloaded data for all firms in the Midstream oil and gas industry sector, which comprised a group of 129 firms. We filtered the natural gas pipeline sample by looking for a listed business where the majority of assets are classified as regulated natural gas pipelines. Our process was to examine each business in the following manner:

- Read the Bloomberg industry description, eliminating those that are obviously not in the target sample
- Examine the revenue shares that are provided in Bloomberg, eliminating those firms where gas pipelines obviously do not constitute a majority of assets, and
- For remaining firms examine additional data sources such as 10-K Forms, DBRS ratings analysis, and investment bank analysis to derive the target sample.

The sample of businesses obtained by using this approach was (showing Bloomberg ticker and description of operations):

- *Williams Companies (WMB US Equity)* – The Williams Companies, Inc. is an energy infrastructure company focused on connecting North America's hydrocarbon resource plays to growing markets for natural gas, natural gas liquids (NGLs) and olefins. The Company owns and operates midstream gathering and processing assets, and interstate natural gas pipelines.
- *TC Pipelines (TCP US Equity)* – TC Pipelines, LP acquires, owns, and participates in the management of United States-based pipeline assets. The Company owns interest in the Northern Border Pipeline Company, the owner of an interstate pipeline system that transports natural gas from the Montana-Saskatchewan border to natural gas markets in the Midwestern United States.

- *Boardwalk Pipeline Partners (BWP US Equity)* – Boardwalk Pipeline Partners, LP transports, gathers, and stores natural gas. The Company owns and operates interstate pipeline systems that either serve customers directly or indirectly throughout the northeastern and southeastern United States.

- *Spectra Energy Corporation (SE US Equity*) – Spectra Energy Corporation transmits, stores, distributes, gathers, and processes natural gas. The Company provides transportation and storage of natural gas to customers in various regions of the northeastern and southeastern United States, the Maritime Provinces in Canada and the Pacific Northwest in the United States and Canada, and the province of Ontario, Canada.

- *Spectra Energy Partners (SEP US Equity)* – Spectra Energy Partners LP owns and operates natural gas transportation and storage assets. The Company owns interstate natural gas pipeline systems located in the southeastern United States and natural gas storage facilities in Texas and Louisiana. We note that Spectra Energy Corporation owns 77 per cent of the equity of Spectra Energy Partners.[18]

- *Kinder Morgan Inc (KMI US Equity)* – Kinder Morgan Inc. is a pipeline transportation and energy storage company. The Company owns and operates pipelines that transport natural gas, gasoline, crude oil, carbon dioxide and other products, and terminals that store petroleum products and chemicals and handle bulk materials like coal and petroleum coke.

The sample of firms that we selected using this approach relatively closely matches the samples that have been applied by FERC in its rate cases for natural gas pipelines in the US. For example, in El Paso Natural Gas Co (2013), it stated that:[19]

> *For return on equity, the FERC affirmed the presiding judge's selection of Boardwalk Pipeline Partners LP, TC Pipelines LP, Spectra Energy Partners LP and Williams partners LP as the proper proxy group.*

3.3.2 Estimation methodology

The CEG report applied a particular methodology for estimating asset betas, which we have adopted for consistency. However, the sample of US natural gas transmission businesses that we have derived has too few members with enough data to estimate a 10 year asset beta, and so we have restricted our comparison to the 5 years up to 30 November, 2015.[20]

The equity beta was estimated using the following regression approach:

$$(RETn_t - Rf_t) = \propto_n + \beta_n.(RETm_t - Rf_t) + \varepsilon_{nt}$$

18 It could be argued that this represents double counting. However, we find that excluding either one of Spectra Energy Corporation or Spectra Energy Partners does not change the average gas pipeline asset beta that we estimate, and in either case reduces the median asset beta estimate by 0.02.

19 FERC (March, 2014), p.21. The only business in our sample that is clearly missing is Kinder Morgan, which in 2013 incorporated the assets of El Paso, the business that the FERC was seeking comparators for. We assume that this was the reason it was not used as a comparator by the FERC.

20 Only two of the selected businesses have data to enable a 10 year beta to be estimated.

Where, $RETn_t$ is the return on the nth stock, measured as the continuously compounded rate of return for period t, where:

$$RETn_t = ln\left(\frac{Pn_t}{Pn_{t-1}}\right)$$

$RETm_t$ is the total return on the S&P500 market index (SPXT), for period t (defined variously as a day, a week or a month), similarly calculated;

P_t is the price of the share at time t, and P_{t-1} is the price of the share at time t-1,

α_n is the intercept, β_n is the systematic risk (equity beta) coefficient for the nth stock, and ε_{nt} is the stochastic error term.

To derive an asset beta from the equity beta estimate we have applied the following formula (which assumes a zero debt beta:

$$Asset\ beta = (1 - leverage) * equity\ beta$$

The firm's leverage at any date is calculated as:

$$\frac{net\ debt}{net\ debt + market\ capitalisation}$$

We obtained net debt and market capitalisation for each day in the test period from Bloomberg.[21] Since net debt for the sample was available only on a quarterly basis, we interpolated the net debt value for each day in the period from these quarterly figures and were therefore able to calculate interpolated leverage for each day in the period. Like CEG, we applied the S&P total returns index (SPXT) and applied the day before values if the values on a required day were absent due to no trading (e.g. if the end of a week day fell on 4 July, we used the values from the day before).

3.3.3 Empirical results for regulated gas pipelines

Our empirical results for monthly returns are displayed in Table 3.2 below. The asset beta estimates show a reasonable degree of variability for individual firms depending on where the definition of a month begins. In the cases of Kinder Morgan (KMI) and Spectra Energy Partners (SEP) the average asset beta using the range of definitions of a month is 0.07 higher than the conventional end of month estimate, and in other cases the difference is 0.05 or lower. The overall average asset beta estimate is only marginally higher than the conventional end of month estimate (0.50/0.47 vs 0.48/0.45).[22]

21 We used the "NET_DEBT" and "HISTORICAL_MARKET_CAP" fields in Bloomberg.

22 As discussed above, CEG's method involved (i) estimating the monthly, weekly and daily asset betas for each firm by taking the mean of the asset betas estimated for the different return intervals (noting this is an average of one value for the daily estimate), (ii) calculating separate monthly, weekly and daily asset betas for the set of comparable entities as the mean of the step (i) values, and (iii) calculating the overall asset beta as the mean of the monthly, weekly and daily asset betas for the set of comparable entities. We applied the same method, except in relation to step (ii) where we have reported both the mean values across the set of comparable entities and the median values (so that our step (iii) results comprise both a 'mean of means' and a 'mean of medians'). We have drawn attention

For the same time period (60 months to 30 November, 2015) CEG found a range of asset beta outcomes from 0.20 to 0.43, which average at 0.30. Hence, using monthly return intervals our average asset beta estimate of 0.50 (median of 0.47) for regulated gas transmission businesses is 0.20 (0.17) higher than the estimate for regulated energy utilities that are mainly integrated electricity businesses or gas distribution businesses.

Table 3.2: Monthly beta estimates for regulated gas transmission (5 years to 30 November, 2015)

Days relative to month end:	WMB	TCP	BWP	SE	SEP	KMI	Average	Median
-10	0.86	0.38	0.49	0.46	0.53	0.41	0.52	0.48
-9	0.76	0.41	0.40	0.43	0.54	0.42	0.49	0.43
-8	0.71	0.43	0.38	0.46	0.43	0.47	0.48	0.44
-7	0.74	0.55	0.50	0.41	0.49	0.44	0.52	0.49
-6	0.75	0.47	0.41	0.40	0.44	0.45	0.49	0.44
-5	0.72	0.54	0.40	0.45	0.40	0.49	0.50	0.47
-4	0.68	0.59	0.40	0.42	0.29	0.44	0.47	0.43
-3	0.73	0.53	0.43	0.43	0.35	0.42	0.48	0.43
-2	0.86	0.59	0.43	0.53	0.46	0.42	0.55	0.49
-1	0.88	0.55	0.54	0.55	0.62	0.42	0.59	0.55
0	0.80	0.45	0.35	0.53	0.45	0.33	0.48	0.45
1	0.74	0.31	0.23	0.49	0.37	0.30	0.41	0.34
2	0.77	0.39	0.31	0.53	0.46	0.29	0.46	0.42
3	0.71	0.33	0.16	0.50	0.42	0.32	0.41	0.38
4	0.65	0.38	0.11	0.48	0.45	0.32	0.40	0.42
5	0.63	0.35	0.23	0.50	0.53	0.34	0.43	0.42
6	0.63	0.45	0.51	0.55	0.67	0.39	0.53	0.53
7	0.69	0.37	0.50	0.54	0.78	0.44	0.55	0.52
8	0.68	0.35	0.40	0.54	0.75	0.34	0.51	0.47
9	0.88	0.50	0.48	0.56	0.69	0.39	0.58	0.53
10	0.95	0.63	0.65	0.59	0.81	0.49	0.69	0.64
Average	0.75	0.45	0.40	0.49	0.52	0.40	0.50	0.47

Source: Bloomberg and Incenta analysis

The weekly return interval results are shown in Table 3.3. The average/median asset beta estimates using weekly return intervals are 0.51/0.50, which is only a few points higher than for the monthly interval estimates (0.50/0.47).

to the median as well as the mean for our set of comparable gas transmission firms because of the much smaller size of our sample.

Table 3.3: Weekly beta estimates for regulated gas transmission (5 years to 27 November, 2015)

Weeks commencing:	WMB	TCP	BWP	SE	SEP	KMI	Average	Median
Monday	0.73	0.34	0.33	0.51	0.51	0.39	0.47	0.47
Tuesday	0.86	0.54	0.33	0.62	0.53	0.56	0.57	0.56
Wednesday	0.73	0.39	0.29	0.57	0.44	0.44	0.47	0.44
Thursday	0.75	0.48	0.33	0.54	0.56	0.46	0.52	0.52
Friday	0.77	0.35	0.34	0.54	0.52	0.40	0.49	0.49
Average	0.77	0.42	0.33	0.56	0.51	0.45	0.51	0.50

Source: Bloomberg and Incenta analysis

CEG found that for alternative definitions of a 'week', the average asset beta of their sample was 0.36 (ranging from 0.34 to 0.39). On the basis of weekly data, we conclude that asset beta estimate for regulated gas transmission businesses (average/median of 0.51/0.50) is 0.15 (0.14) higher than the estimate for regulated energy utilities that are mainly integrated electricity businesses or gas distribution businesses.

The results using daily data are shown in Table 3.4, which produce an average asset beta across the comparable entities of 0.47 and a median value of 0.45. The median produced using daily data is the lowest asset beta estimate (the average using daily data is the equal second lowest estimate), which is due to the daily interval asset beta estimates for three businesses (TCP, BWP and SEP) being materially lower than the monthly and weekly interval estimates. One problem with using daily return intervals is that the sensitivity of stock prices to the market are likely to be affected by thin trading, which would have the effect of artificially reducing the observed asset beta estimate. For this reason, caution is typically applied prior to using daily beta estimates in regulatory applications.

Table 3.4: Daily beta estimates for regulated gas transmission (5 years to 30 November, 2015)

	WMB	TCP	BWP	SE	SEP	KMI	Average	Median
Asset beta	0.67	0.40	0.36	0.52	0.45	0.45	0.47	0.45

Source: Bloomberg and Incenta analysis

Table 3.5 below summarises our empirical findings and compares the results to those obtained by CEG. CEG averaged its findings using monthly, weekly and daily return intervals, and for the 5 year period to 30 November 2015, an average across the monthly, weekly and daily asset betas of 0.35 was estimated for regulated energy. Our analogous results for the same period are average / median asset beta estimates of 0.49/0.47 for regulated gas transmission. This implies that the difference in asset beta is approximately 0.11 to 0.14.

Table 3.5: Summary of asset beta estimates for regulated gas transmission vs regulated energy (5 years to 30 November, 2015)

	Regulated energy distribution (CEG)			Regulated gas pipelines	
	Previous 5 year beta	Last 5 year beta	Last 10 year beta	Last 5 year beta	Last 5 year beta
	Average	Average	Average	Average	Median
Data to:	2010	2015	2015	2015	2015
Monthly	0.35	0.30	0.33	0.50	0.47
Weekly	0.38	0.36	0.37	0.51	0.50
Daily	0.39	0.40	0.40	0.47	0.45
Average	**0.37**	**0.35**	**0.37**	**0.49**	**0.47**

Source: CEG, Bloomberg and Incenta analysis

We note that in our results, the estimated asset beta of Williams Companies (WMB) is materially higher than those for the other firms. If this observation were removed from the sample, the differential to the CEG asset betas would fall slightly, but not sufficiently to change the inferences drawn (i.e., that a differential of 0.10 is supported). We do not favour removing this firm from the sample, however, given that WMB is used by FERC as a valid comparator when it assesses the risk of natural gas pipelines.[23]

In addition, we note that as Spectra Energy Corporation (SE US Equity) owns 77 per cent of Spectra Energy Partners (SEP US Equity), there may be a concern that including both may amount to an element of "double counting". If one were to be removed, we would favour removing the smaller entity (Spectra Energy Partners), and if that is done, our estimated differential increases marginally. In contrast, removing the larger entity would result in a slight reduction in the differential.[24] In either case, the conclusions drawn from the analysis would be unchanged.

3.4 Applicability of US gas pipeline beta estimates to New Zealand

A question that arises is whether the asset beta estimates we have derived for US gas pipelines are appropriate to apply in the New Zealand context, given the difference in the nature of the markets.

A further question that arises is whether the relative risk of US gas pipelines is indicative of the relative risk of New Zealand gas pipelines and regulatory regimes. We note that there are differences between the markets that may move the beta in either direction, for example:

- US pipelines tend to be subject to more pipeline-on-pipeline competition than in New Zealand, but US pipelines also tend to have long term contracts and mostly fixed charges that would mute the impact of this factor. In contrast, we understand that contracts in New Zealand are typically short in duration and variable charges apply to material segments of the transmission network.

- the US gas market is a very mature market and comprises a large and interconnected network of pipelines serving a diversified customer base and drawing upon many sources of supply. In

23 The differential would become 0.09/0.09.

24 Removing the smaller entity results in a differential of .14/.09, and removing the larger entity results in a differential of .13/.09.

contrast, the New Zealand gas market supplies a relatively narrow range of industries and relies heavily upon relatively few sources of supply.

However, a common feature to each is a much more substantial exposure to industrial and commercial customers than electricity distributors and thereby to the effects of economic cycles and material ‘stranded asset risk’ (we discuss the difference in customer composition below). We consider it reasonable to use the asset beta differential observed between US gas pipelines and electricity distributors as indicative of the differential in asset betas that would be expected in New Zealand.

In addition, we have not made adjustments for US market composition and US market gearing levels relative to New Zealand, and neither did CEG (i.e. the asset differential between the two samples is independent of these factors). Professor Lally’s report notes that one Australian study found that in any case the effects of these two factors tended to cancel one another out, so that there was little net impact.[25] We are not aware of any similar studies comparing the New Zealand and US markets.

3.5 Conclusion

Having estimated the asset beta of six regulated gas transmission businesses, we find that for the most recent 5 year period to 30 November, 2015, these are 11 to 14 points higher than the corresponding asset beta that CEG estimated for the sample of 64 regulated energy businesses that is likely to be employed by the Commission when deriving its base (i.e., pre adjustment) asset beta for the New Zealand energy businesses. These findings lend support to the current approach in which an uplift of 0.10 is applied to the electricity distribution asset beta for gas pipelines.

25 ACG, (2008), *Beta for Regulated Electricity Transmission and Distribution*, report prepared for the ENA, Grid Australia and APA.

4. Qualitative analysis

4.1 Introduction

In this chapter we address a number of Professor Martin Lally's propositions with respect to the nature of gas transmission loads, and the implications for the systematic risk of gas transmission activity in New Zealand.

4.2 Lally's position

Currently, the Commission applies a 0.10 premium to the asset beta of gas pipelines relative to electricity networks,[26] which is based on previous advice from its adviser, Professor Martin Lally. Professor Lally's earlier advice had recommended that gas pipelines are distinguished from electricity networks by two features:[27]

- Gas pipelines have expansion options that are not shared by electricity networks; and
- A higher proportion of gas is used in commercial/industrial applications than for electricity.

As a result, Professor Lally was previously of the opinion that gas pipelines require an asset beta premium relative to electricity networks, and the Commission determined this to be 0.10. In his current advice to the Commission, Professor Lally has reviewed the two factors above, and has changed his opinion based on the following views:[28]

- Previously gas pipelines were only subject to potential cost regulation, while now the regulation is explicit, which means that any expansion options will be subject to cost-based regulation, and therefore cannot be a source of economic rent; and
- The proportion of transported gas that is ultimately used by commercial/industrial customers is approximately 83 per cent, and 68 per cent of electricity load is commercial / industrial. Even assuming the asset beta of these users is higher than for residential customers due to greater sensitivity to the economic cycle, the impact on the asset beta of gas transportation businesses is relatively small, and not likely to justify a 0.10 premium for the asset beta of a gas pipeline business.

Professor Lally also makes the following claims with respect to the Methanex business:[29]

> *Oil and methanol price is set in international markets and therefore has no systematic component. Colonial First State (2016, section 2) also refers to the volatility in the demand for gas by Methanex in support of a higher asset beta for GPBs. However, as noted in Lally (2008, section 5.2), the transmission of gas to Methanex contributes little to the revenues of*

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[26] Commerce Commission (2010), *Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper*.

[27] Martin Lally, (2008), *The Weighted Average Cost of Capital for Gas Pipeline Businesses*, report prepared for the Commerce Commission.

[28] Martin Lally, (25 February, 2016), *Review of WACC Issues*, report prepared for the Commerce Commission, pp. 6-7.

[29] Martin Lally, (25 February, 2016), p.9.

the gas businesses because the distance that the gas is piped is so short. In addition, since most of Methanex's output is exported, its demand is sensitive to GDP shocks in its export markets rather than in New Zealand.

That is, Associate Professor Lally believes that value of the Methanex operation is immaterial, and that the price of methanol (and therefore Methanex's revenue) is independent of the New Zealand business cycle.

4.3 Responses to Lally

4.3.1 Shares of industrial/commercial and residential load

Professor Lally considers that the income elasticity of demand is an important determinant of relative systematic risks of different revenue streams. However, Lally's analysis weights the different customer segments by the proportion of energy transported. The weights should reflect the relative market values of the different segments and, in the absence of this, a better proxy is the relative revenue. The choice of weights is material when comparisons are being made between gas pipelines and electricity distribution.

In Table 4.1 we show the relative splits of residential vs commercial/industrial loads in New Zealand that were assumed by Lally that were based upon energy transported to the relativities based upon revenue that our research indicates.

In his analysis Professor Lally assumed that 83 per cent of the gas transmission volume is for commercial/industrial consumption. We find that 92 per cent of gas transmission revenue is commercial/industrial, with only 8 per cent being associated with residential customers. In electricity distribution, on the other hand, there is a more significant differential between Lally's assumption and our findings. Lally's analysis assumes that 68 per cent of electricity load is purchased by commercial/industrial customers, while we find that only 46 per cent of load is commercial/industrial. More importantly, however, we find that only 33 per cent of electricity network revenue is commercial/industrial,[30] which, as shown below, makes a material difference to Lally's analysis.

Table 4.1: Shares of industrial/commercial and residential load (2014)

	Revenue	Volume	Lally (Volume)
Gas transmission:			
Residential	8.0%	3.9%	17.0%
Commercial / Industrial	92.0%	96.1%	83.0%
Electricity distribution:			
Residential	66.0%	54.0%	32.0%
Commercial / Industrial	33.0%	46.0%	68.0%

Source: Lally (2016), p.7, Commission supporting data to 2015-20 DPP Decision, based on average of all 17 price regulated EDBs, Commerce Commission summary and analysis of EDB performance 2008-2011, p.21.

30 This relates only to distribution business revenue.

Letting βp denote the beta for residential users, Lally expresses the Commission's 0.34 asset beta estimate for electricity distribution as:

$$0.34 \;=\; \beta_p(0.32) + \;\beta_p K(0.68)$$

Where K is the scaling factor that converts the beta for residential users into the beta for commercial/industrial users, and 0.32 and 0.68 are the respective volume shares of residential and commercial/industrial electricity consumers. Assuming that K=2, Lally solves his first expression for β_p = 0.20, and substitutes this into his second expression, reproduced below, which calculates the asset beta of gas businesses (β_G).

$$\beta_G \;=\; \beta_p(0.17) + \;\beta_p K(0.83)$$

With K=2 and β_p = 0.20, Lally's volume-based assumptions result in a gas transmission asset beta of 0.366, which is only 0.026 more than the 0.34 asset beta that the Commission has adopted for electricity distribution. If a K multiplier of 3 is applied, the differential is only 0.033. Lally therefore concludes that the current uplift of 0.10 for gas transmission is unjustified.

However, if the actual *revenue* splits shown in Table 4.1 are applied, and we wish to show what K factor and asset betas are consistent with an electricity asset beta of 0.34 and a gas transmission asset beta of 0.44 (i.e. the current position) a different picture emerges.

$$0.34 \;=\; 0.28(0.67) + \;0.28 \times 1.6(0.33)$$

And therefore:

$$\beta_G = 0.44 = \;0.28(0.08) + \;0.28 \times 1.6(0.92)$$

That is, we find that a K factor of 1.60 and an asset beta of 0.28 for residential electricity consumption are consistent with a 0.44 asset beta for gas transmission. Both of these figures are highly plausible, which provides support to the Commission's current approach, and our empirical findings. On the other hand, if the K factor range suggested by Professor Lally were to be applied in the above formulas with revenue shares: a K factor of 2 would imply a gas pipeline asset beta of 0.49 (0.15 uplift); and a K factor of 3 would imply a gas pipeline asset beta of 0.58 (0.24 uplift).

In addition, we note that Professor Lally's analysis is based on the differential between the asset beta for residential electricity demand, and the asset beta for commercial/industrial electricity demand (i.e. through the K factor). By simply applying the correct revenue share weights for the domestic and commercial/industrial components, as we have done, we have shown that if it is assumed that the asset beta for residential gas and residential electricity are the same, the K factor required for a 0.1 asset beta differential for a gas pipeline is highly plausible (1.6). However, if the asset beta for residential gas were found to be larger than the asset beta for residential electricity, the 0.10 differential for a gas pipeline would be higher again.[31]

31 Owing to the relatively small share of gas pipeline revenue from transport for residential customers, the additional uplift would not be large. For example, if an 'L factor' was applied to inflate the asset beta of residential gas relative to the asset beta of residential electricity, and this was assumed to be 2, the

4.3.2 Systematic nature of Methanex revenue

As noted above, Professor Lally's analysis dismisses the systematic risk implications of the Methanex business on grounds that this is an immaterial proportion of gas revenue,[32] and that in any case, methanol prices are determined in world markets and have no systematic relationship to the New Zealand economic cycle. We find that both these propositions are incorrect.

We understand that capacity nominations on the Maui pipeline suggest that Methanex accounted for around 15 percent of revenue for that gas transmission system in 2015. In addition, we find that the demand for Methanex's product (methanol) is systematic in nature, being determined by GDP (i.e. the economic cycle), and is highly correlated with the oil price (which is similarly related to GDP growth and the economic cycle).

Methanol is an actual or potential substitute for oil in several activities, and we should therefore expect there to be a relationship between the prices of these two fuels. The demand for fuel increases when economic activity increases, so that we would expect to find a positive relationship between methanol/oil prices, and economic activity and therefore between methanol and oil prices/revenue.

Methanol price and GDP

In Table 4.2 we report the results of regressing the natural log of New Zealand GDP on the natural log of the Methanol Price. As expected, we find a positive relationship. While the adjusted r-square is only 0.072 (7.2 per cent of the variability in methanol price is determined by GDP), the coefficient of 0.312 is statistically significant at better than the 95 per cent confidence interval. That is, there is a less than 5 per cent probability that the positive association between these two variables occurred by chance. The advantage of a log/log function is that the coefficients are elasticities rather than slopes. Hence, the coefficient of 0.312 indicates that a 1 per cent change in New Zealand GDP will be associated with a 0.312 per cent change in the methanol price. That is, methanol is systematically linked to the New Zealand economic cycle.

Table 4.2: New Zealand – regression of quarterly GDP on quarterly methanol price (2003-2015)

Dependent variable	No. of obs	Intercept	T-statistic	Ln (GDP)	T-Statistic	Adj-R-square
Ln (Methanol Price)	49	2.689	1.734	0.312	2.172	0.072

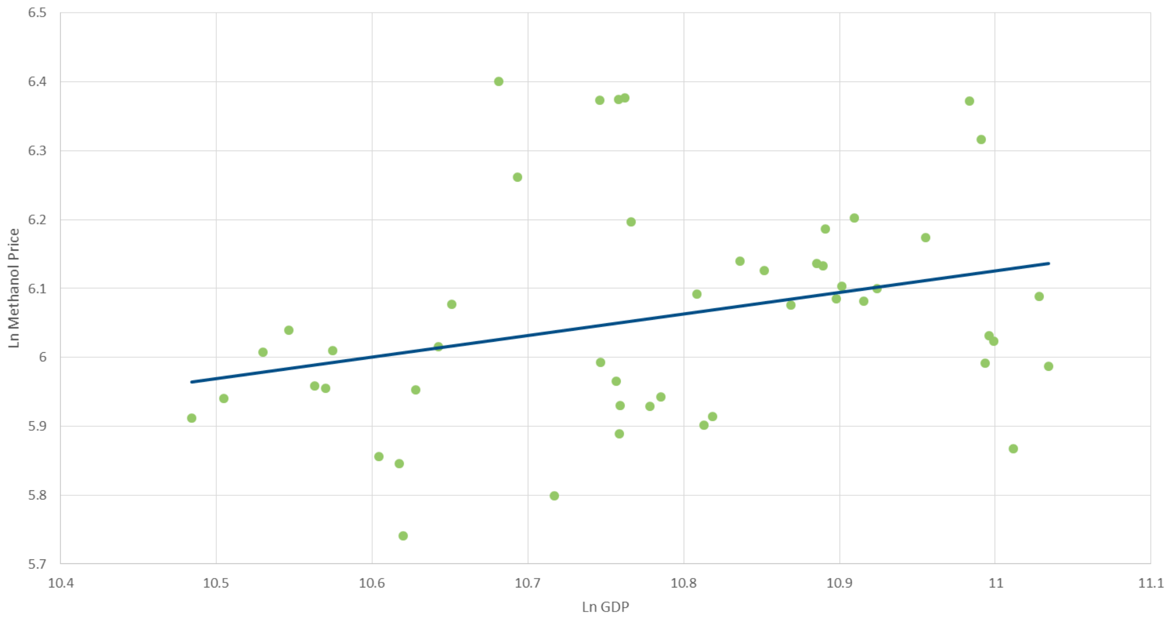
Source: Bloomberg

That the methanol price and GDP are systematically related can also be observed in Figure 4.1 below. While the scatter of observations indicates that other variables are also associated with the price of methanol, New Zealand GDP has a material association.

gas pipeline asset beta relative to electricity distribution would increase to 0.12. With an L factor of 3, the gas pipeline differential would increase to 0.15.

32 We do not agree that the amount of revenue that Methanex contributes is immaterial; however, we note that as we use relative revenue as our preferred measure of the relative importance of the residential and industrial/commercial customer bases, we have automatically corrected the bias that Professor Lally considered to exist (i.e., the weighting we apply to Methanex is the relative revenue it contributes rather than the energy it transports).

Figure 4.1: New Zealand – Methanol price vs GDP (2003-2015)



Source: Bloomberg and Incenta analysis

Methanol price vs oil price

Since oil and methanol are substitutes in certain applications, we expect to find a strong relationship between the prices of these fuels. Table 4.3 shows that this is in fact the case. We regressed 153 months of oil price data against the respective methanol price (both in NZD) and found a relatively strong adjusted r-squared coefficient of 0.324.[33] In addition we found that the oil price coefficient has the expected positive slope, which is highly statistically significant (at beyond the 99 per cent confidence interval). The oil price coefficient of 1.370 indicates that an increase in the oil price from $100 to $150 (a 50 per cent rise) would be associated with an expected increase of $68 in the methanol price (from $417 to $485, i.e. an increase of 16 per cent).

Table 4.3: New Zealand – regression of monthly oil price on monthly methanol price (2003-2016)

Dependent variable	No. of obs	Intercept	T-statistic	Oil Price	T-Statistic	Adj-R-square
Methanol Price	153	279.601	15.353	1.370	8.598	0.324

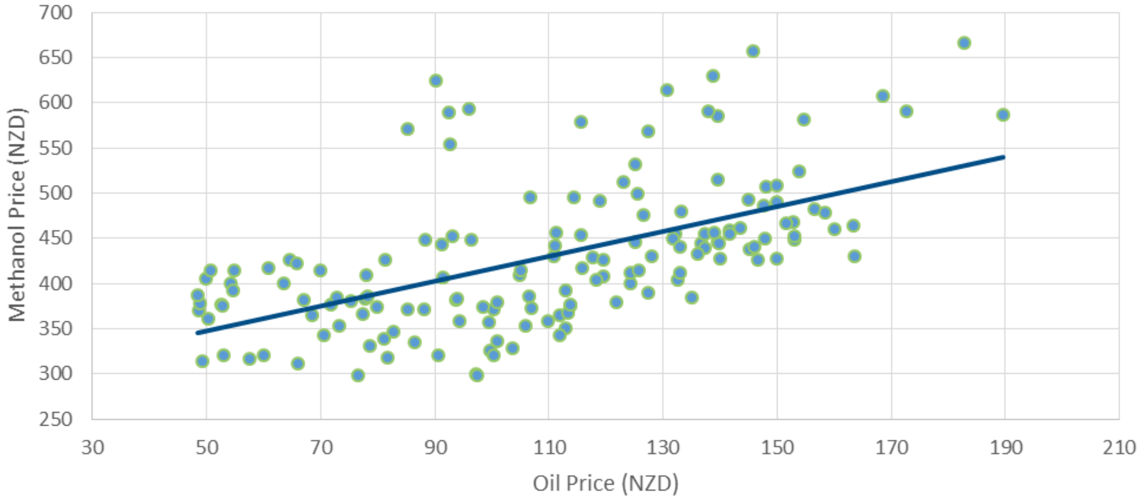
Source: Bloomberg and Incenta analysis

The visual representation of the association between the methanol price and the oil price is displayed in Figure 4.2 below. For the most part it is shown to be a relatively tight, although there are some periods, particularly as the oil price increases, when the association is not as tight (possibly due to the

33 We expected this relationship to be linear, given that the substitutability between ethanol and oil will be governed by a technical relationship.

greater importance of substitution opportunities as the oil price increases relative to the methanol price).

Figure 4.2: Methanol Price vs Oil Price (2003-2015)



Source: Bloomberg and Incenta analysis

Oil price and GDP

Methanol prices are available only from 2003, but we have oil prices from 1993. Since we have found a relatively close association between the oil price and methanol price, we consider that oil prices can be used as a proxy for methanol prices over the period from 1993. In Table 4.4 below we show the results of regressing the natural log of New Zealand GDP on the natural log of New Zealand oil price.

Table 4.4 shows a strong positive relationship between GDP and oil price, with a high degree of explanatory power (an adjusted r-square of 0.799, or almost 80 per cent of the variability in oil price being dependent on GDP) and a highly statistically significant coefficient on the independent variable (Ln(GDP)) of 17.614.[34] The Ln(GDP) coefficient of 1.765 indicates that a 1 per cent change in GDP will on average be associated with a 1.765 per cent change in the price of oil, which is not surprising since they are both strongly influenced by macro conditions / the business cycle.

Table 4.4: New Zealand – regression of quarterly GDP on quarterly oil price (1996-2015)

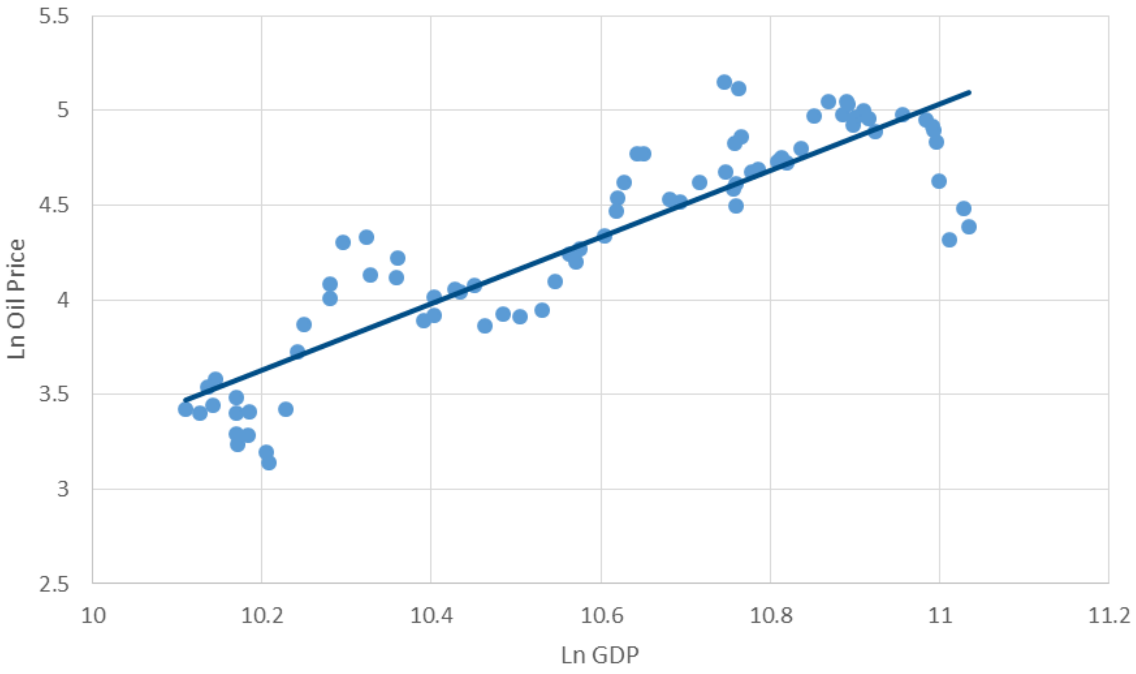
Dependent valriable	No. of obs	Intercept	T-statistic	Ln GDP	T-Statistic	Adj-R-square
Ln Oil Price	79	-14.377	-13.546	1.765	17.614	0.799

Source: Bloomberg

A visual representation is provided in Figure 4.3.

34 The T-statistic of 17.614 is statistically significant at well beyond the 99 per cent confidence level.

Figure 4.3: New Zealand - Oil price vs GDP (1996-2015)



Source: Bloomberg, and Incenta analysis

In summary, we can conclude that demand for methanol is systematically linked to the New Zealand economic cycle (GDP) and to the oil price, which is itself systematically linked to the New Zealand economy (and which reinforces our finding of a systematic association between the methanol price and New Zealand's economic cycle). Hence, we would expect the potential for expansions in methanol activities – or the risk of a reduction – to be related to economic cycles and so comprise a systematic risk.[35]

4.4 Conclusions and implications

In this chapter we have addressed the main points put forward by Professor Lally to justify a revision of the Commission's current approach of applying a 0.10 asset beta premium to gas transmission businesses. We have shown that when Professor Lally's analysis of the effect of differences in the shares of the residential vs. industrial commercial segments is applied using relative revenue as the measure of the segment share rather than energy throughput – which we think should be preferred – a premium of 0.10 for the gas pipeline asset beta over the electricity distribution asset beta is quite plausible.

In addition, we found that both the points raised by Professor Lally with respect to Methanex are incorrect:

- We understand that capacity nominations on the Maui pipeline suggest that Methanex accounted for around 15 percent of revenue for that gas transmission system in 2015, which means that this

35 We note that the US-listed Methanex Corporation (the owner of the New Zealand plants) has an asset beta of 1.65 (based on Bloomberg beta for 5 years of monthly observations up to November, 2015).

demand can have a material impact on systematic earnings volatility if the customer's demand is correlated with the economic cycle; and

- The methanol price is found to be systematically linked to the New Zealand economic cycle (i.e. changes in GDP) and to the oil price (which is also systematically related to GDP).

Finally, our empirical findings and the outcome of our qualitative analysis are consistent with the opinion of market analysts that we surveyed, and with the regulatory decisions of the FERC in the US, which applies an ROE premium to gas pipeline businesses.[36]

[36] See Appendix A and Appendix B below.

A. Views of market analysts

To examine the views of market practitioners, we have surveyed a number of analysts based at investment banks in Australia. The views of these analysts are important given that they influence the perceptions of investors, and are influenced by their observation of the return requirements of investors in the market.

In Australia we sought the views of three investment analysts based at the following institutions:

- Macquarie Bank
- RBC Capital Markets
- UBS

Each analyst was asked two questions:

- 'When valuing gas transmission pipeline businesses using the CAPM approach, would you apply a higher asset beta than the one you would apply when valuing a gas or electricity network distribution business?'
- 'If so, what are the reasons you would apply an asset beta uplift for gas transmission pipelines'?
- 'If so, what premium would you apply to a gas transmission pipeline business?'

All three analysts expressed an opinion that a regulated gas pipeline requires a higher asset beta owing to greater systematic risk stemming from contracting, competition and stranding risks. One analyst noted that an uplift of 50 basis points is justified for a regulated pipeline business relative to a gas distribution business.

B. FERC regulation of gas transmission pipelines

We have focussed on the decisions of US regulators because the US is the one market where there is sufficient capital market data to permit an empirical test of whether the relative risk of gas pipelines differs to electricity distribution and US gas distribution.[37]

The differential between the systematic risk of natural gas transmission pipeline companies and local distribution companies (LDCs) that has been commented upon by the market analysts we surveyed has also been observed in the regulatory decisions of FERC. When FERC asked expert witness Robert H. Hevert, 'Do you believe that the natural gas transmission and distribution business segments are of similar risk?' he answered:[38]

> *No. As the U.S. Supreme Court and the Commission have both noted in prior decisions, in establishing the proxy group to be used in determining the appropriate ROE for a natural gas pipeline, one of the most important issues is the comparability of risk. There is little question that regulatory commissions and investors historically have perceived greater risk in interstate pipeline operations than in LDC operations. This is evidenced by a review of authorized returns for LDCs. As shown in Exhibit No. MNE-13 over the past year, the average authorized Return on Equity for LDCs was 10.36 percent, which is well below any reasonable estimate of the cost of equity for a natural gas pipeline company and considerably below the range of ROEs authorized for natural gas pipeline companies.*

It has also been noted by the FERC Natural Gas Regulation Committee that in the El Paso Natural Gas Co rate case:[39]

> *The FERC determined that El Paso's financial and business risk did not warrant placing it well above the median return on equity (ROE) for the proxy group companies and set El Paso's allowed ROE at 10.55%, the median ROE of the proxy group of companies.*

For comparison, the 21 gas utility (LDC) cases that the FERC decided in 2013 had an average ROE of 9.68 per cent, a difference of 87 basis points.[40]

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37 The US decisions cited here provide a comparison of the relative risk of US gas pipelines and US gas distribution. We think it is likely that the relative risk of US gas distribution is comparable to the relative risk of New Zealand electricity distribution (the empirical evidence suggests that gas and electricity distribution have similar risk in the US). However, given the material differences between the US and New Zealand gas markets, it is quite plausible that the relative risk of gas distribution will differ between the US and New Zealand.

38 FERC, *Maritimes & Northeast Pipeline LLC*, Docket No. RP09-000, Exhibit No MNE-10, page 19 of 54.

39 FERC (March, 2014), pp.21-22.

40 Regulatory Research Associates (15 January, 2015), 'Major Rate Case Decisions – Calendar 2014', *Regulatory Focus*, p.3.