

# **Asset Beta for Notional Processor: Response to the CEPA Report dated 16 July 2018 and the Commerce Commission’s “Review of Fonterra’s 2017/18 base milk price calculation: Dairy Industry Restructuring Act 2001”.**



The University of Auckland

**Report prepared for:**

FONTERRA CO-OPERATIVE GROUP  
LIMITED  
Private Bag 92032,  
Auckland  
New Zealand

**By**

Dr Alastair Marsden  
Department of Accounting and Finance  
The Business School  
The University of Auckland  
Email: [a.marsden@auckland.ac.nz](mailto:a.marsden@auckland.ac.nz)  
Ph (64) (9) 3737-599 Ext. 88564

**30 August 2018**

## Important Notice

Reports and results from The University of Auckland (“UOA”) should only be used for the purposes for which they were commissioned. If it is proposed to use a report prepared by UOA for a different purpose or in a different context from that intended at the time of commissioning the work, then UOA should be consulted to verify whether the report is being correctly interpreted. In particular, it is requested that, where quoted, conclusions given in UOA’s reports should be stated in full.

UOA will not be liable for any loss or damage to any party that may rely on our report other than Fonterra Co-operative Group Limited (“Fonterra”). In addition, we have no obligation to update our report or to revise the information contained therein because of events and transactions occurring subsequent to the date of this report.

In preparing this report we have also relied on information supplied by Fonterra and other parties. Our duties, while involving an assessment of information provided and commenting as necessary, do not extend to verifying the accuracy of the information, and we have assumed its authenticity and completeness. We have not audited the information provided, nor have we been required to do so.

The analysis assumes that Fonterra has no information or knowledge of any facts or material information not specifically noted in our report that would reasonably be expected to affect its conclusions.

The University of Auckland  
Private Bag 92019  
Auckland

## Table of Contents

1	Executive Summary.....	4
2	Introduction.....	6
3	Asset stranding risk .....	6
4	Growth Options .....	9
5	Decomposition of asset beta into short-term cash flow risk and longer-term risk and growth options.....	12
6	Other comments .....	13

# 1 Executive Summary

## Asset Stranding Risk

- 1.1 The CEPA Report (page 2) considers that rather than prescriptively removing the oldest assets from the Notional Processor's ("NP") asset base, the NP should first remove assets that generate the least value. This assumption does not accord to the rules in the Milk Price Manual, which should inform the basis to assess the expected losses from asset stranding.
- 1.2 The Commerce Commission ("CC Report"), paragraph B48, contradicts the prior view of the Commission, where in its report titled "Review of Fonterra's 2015/16 base milk price calculation: Dairy Industry Restructuring Act 2001", the Commission states (paragraph 4.64) that it considers more often than not, the oldest plant or approximately the oldest plant in an island would be removed first.
- 1.3 Both the CEPA Report and the CC Report do not clearly articulate why in their view regulated ELBs have a RAB that is effectively guaranteed through regulation or why they consider the NP's RAB has a less effective guarantee than ELBs. To be "guaranteed", the regulator must provide ex-post protection against all adverse events that may impact on the value of the RAB.
- 1.4 CEPA (2018a, Table 2.1, page 16) states that their analysis, while not definitive, does "*suggest that dairy commodity price risk may not be significantly systematic*". The CC Report also favours this view. In this case, asset stranding risk should also be largely non-systematic. That is, where a fall in dairy prices leads to a reduction in milk supply and under the CEPA Report and Commission's assumption on dairy price risk, this is not due to systematic risk factors or related to general macro-economic conditions.

## Growth Options

- 1.5 UOA agrees that investors value growth options. However, the CEPA Report (and prior reports by CEPA) do not provide any specific empirical or other evidence to support their statement that "*investors do value growth in regulated industries*" and this is a material component of the overall beta of a regulated entity.
- 1.6 In UOA's view, the CEPA Report also does not clearly articulate or explain:
  - (a) Why growth options (if any) that exist for the NP are likely to be relatively large in value compared to the existing value of assets in place of the NP, where future growth in milk supply is forecast to be modest (or even decline); and
  - (b) Why it disagrees with UOA that growth opportunities to the NP are restricted to growth in milk supply, and any growth options and excess returns are largely "owned" by the land owner and not the NP (see UOA (2018a, b).

- 1.7 As noted above, CEPA and the Commission consider that dairy commodity price risk may be largely non-systematic. Thus, undertaking new investment opportunities or crystallisation of any growth options available to the NP from an increase in milk supply, when dairy prices rise, will not be correlated to general macro-economic conditions. It is not clear to UOA how growth options available to the NP (if any) can make a material contribution to asset beta, when dairy commodity price risk is considered to be largely non-systematic.
- 1.8 In UOA's view, the CC Report does not clearly articulate or explain why they agree with the CEPA Report's view in respect of growth options and the impact on the NP's asset beta, when this view differs to the Commission's statements in its Input Methodologies paper. In its Input Methodologies (2016a, Topic Paper 4, Cost of Capital Issues, Chapter 4, paragraph 344, page 703 of 1128) paper, the Commission notes that "regulation" significantly limits the value of growth options.
- 1.9 The CEPA Report states (pages 3 and 4) that use of the 67<sup>th</sup> WACC percentile by the Commission should afford companies an excess return and if "*investment activity are correlated with economic activity, there would be a positive contribution to systematic risk*". First, the use of the 67<sup>th</sup> percentile is not relevant to the asset beta of the NP, where a 50<sup>th</sup> percentile point estimate is required. Second, as noted above, if CEPA consider dairy price risk to be largely non-systematic, this suggests investment activity by the NP will not be correlated with economic conditions or contribute to systematic risk.
- 1.10 Overall, in UOA's view the CEPA Report provides no empirical or other evidence to support their view that future opportunities must make a material contribution to beta of the NP, subject to the rules under the Milk Price Manual.

## **Other**

- 1.11 UOA remains of the view that there is prima-facie no strong reason to exclude Fonterra from the CB sample, either on earnings outlook, liquidity grounds or any seasonality (if it exists) in the share price (see UOA, 2018b).

## **Limitations**

- 1.12 Our executive summary should be read in conjunction with our full report.
- 1.13 This report is also subject to our disclaimer and "Important Notice" on page 2 of this report.

# **Asset Beta for Notional Processor: Response to the CEPA Report dated 16 July 2018 and the Commerce Commission’s “Review of Fonterra’s 2017/18 base milk price calculation: Dairy Industry Restructuring Act 2001”.**

## **2 Introduction**

2.1 Fonterra Co-operative Group Limited (“**Fonterra**” or “**Company**”) has requested The University of Auckland (“**UOA**” or “**we**” or “**our**”)<sup>1</sup> to briefly comment on the reports titled:

- (a) “Re: Dairy asset beta – response to the second round of submissions” written by Cambridge Economic Policy Associates Pty Ltd (“**CEPA**”) dated 16 July 2018 (“**CEPA Report**” or “**Report**”); and
- (b) The New Zealand Commerce Commission (“**Commerce Commission**” or “**Commission**”) “Review of Fonterra’s 2017/18 base milk price calculation: Dairy Industry Restructuring Act 2001” dated 15 August 2018 (“**CC Report**”).

## **3 Asset stranding risk**

### **CEPA Report**

3.1 In respect of asset stranding risk, the CEPA Report (page 2) considers that rather than prescriptively removing the oldest assets from the Notional Processor’s (“**NP**”) asset base, the NP should first remove assets that generate the least value.

3.2 The CEPA Report does not clearly explain what is meant by “...assets that are forecast to generate least value”. However, in UOA’s view:

- (a) The assumptions that CEPA appear to adopt in relation to asset stranding risk faced by the NP (and by implication its assessment of the asset beta for the NP) are not in accordance with the Milk Price Manual (“**Milk Price Manual**” or “**Manual**”); and
- (b) If “least value” is interpreted as meaning “lowest expected future net cash flows”, then the least value assets will in any case be the oldest assets in the NP’s asset base, given that all WMP and SMP plants (which Fonterra advises comprise more than 80% of the NP’s manufacturing assets by value) are assumed to manufacture the same products, and that the oldest plants are assumed to have the highest operating costs, lower capacity and shortest remaining useful lives.

---

<sup>1</sup> This report is written by Dr Alastair Marsden on behalf of UOA. References in this report to “we” or “our” refer to the opinions of Dr Alastair Marsden.

- 3.3 In the case of the NP, the CEPA Report also provides no commentary or acknowledgement of the other rules in the Manual (in addition to removal of the oldest assets first), which reduce or mitigate the risks associated with asset stranding. These are (see UOA, 2018 a, b):
- (a) Review of the asset base only every four years before any decision on asset stranding is made;
  - (b) The requirement that any independent reviewer must consider the necessity of maintaining a prudent level of buffer capacity to cover variations in year on year supply;
  - (c) Where assets are removed from the fixed asset base due to a change in the RCPs, the financial implications of removing these reference assets will be deducted from the farmgate milk price; and
  - (d) The use of a tilted annuity approach to recover an annual capital recovery amount using an updated WACC and an updated estimate of long-run inflation.
- 3.4 For the comparator sample of firms in prior CEPA reports, losses from asset stranding may arise from factors such as loss of market share, a decrease in general demand for speciality products driven by macroeconomic factors (these being at least in part systematic factors) and factors such as changes in consumers' tastes and preferences (which may be largely non-systematic factors). In contrast, the NP does not face these asset stranding risks where it produces RCPs and the NP is able to sell these products at the going market price.
- 3.5 The NP does face potential losses from asset stranding in the event there is a significant decline in the supply of milk, which means plant becomes redundant. However, for the reasons noted above, in UOA's view, returns to investors in the NP are largely insulated (albeit not effectively guaranteed) against expected losses or risks of asset stranding (also see UOA 2018 a, b).<sup>2</sup>
- 3.6 In addition, UOA (2018b) notes that to compensate for expected losses from asset stranding, Fonterra adds a 0.15% per annum increment to the WACC, and part of this allowance may reflect systematic risk factors.

### **The CC Report**

- 3.7 The CC Report (paragraph B48) also states that it considers the removal of the oldest assets is not how processors (including Fonterra) would make decisions to asset stranding risk in the real world.
- 3.8 In UOA's view, paragraph B48 of the CC Report contradicts the prior view of the Commission, where in its report titled "Review of Fonterra's 2015/16 base milk price calculation: Dairy Industry Restructuring Act 2001", the Commission states (paragraphs 4.63 and 4.64):

---

<sup>2</sup> In UOA's view, both the NP and ELBs will have a low systematic risk profile to asset stranding risk (see UOA, 2018a).

4.63 “For stranded asset costs to be material, multiple plants would need to be removed. In order for this happen, the loss of milk supply would most likely be spread across an island rather than a particular region.

4.64 We accept that in some cases the oldest plant may not be the plant that is removed, as there would be consideration given to Fonterra's optimisation strategy. **However, we consider that more often than not, the oldest plant or approximately the oldest plant in an island would be removed first.** Therefore, on balance, we consider that the approach taken by Dr Marsden is consistent with the contestability dimension” (emphasis added).

- 3.9 The Commission does not explain in any detail the reasons for its change of view in the removal of oldest plant first in the event of any asset stranding. This is unless the Commission considers removal of oldest first from the asset base is consistent with the “contestability dimension”, but is not “practically feasible”. In UOA’s view, however, it is not reasonable for the Commission to assess the asset beta for the NP for the 2017/2018 base milk price calculation on a different assumption with regards to asset stranding risk to that which is provided in the Milk Price Manual.

#### ***Does regulation guarantee the RAB?***

- 3.10 The CEPA Report (page 2) considers that ELBs have a RAB that is effectively guaranteed by regulation. The CC Report (paragraph B51) also states that in the Commission’s view:
- (a) “.....UOA and Fonterra have not provided appropriate reasons why ELBs’ and the NP’s asset stranding requirements would respond to the movement in the market returns in the same way” and
  - (b) “Regulated ELBs have a RAB that is effectively guaranteed through regulation”.
- 3.11 As already noted, if the Commission considers dairy price risk is likely to be largely non-systematic risk, then in UOA’s view asset stranding risk faced by the NP should also be largely non-systematic.
- 3.12 In UOA’s view, both the CEPA Report and the CC Report do not clearly explain how regulation means the RAB is “effectively guaranteed”. In UOA’s view, the only effective way to “guarantee” the RAB is through ex-post protection or compensation if an adverse event causes a fall in the value of the RAB. Ex-ante protection does not effectively guarantee the RAB. For example, under revenue or price cap regulation the regulator may allow “ex-ante” protection against an expected fall in the economic value of the RAB through an accelerated depreciation charge, but this does not guarantee the regulatory asset base.

## 4 Growth Options

### The CEPA Report

4.1 In UOA (2018a,b) we noted that the value of the firm can be expressed as:

$$\text{Firm Value} = \text{Value of Assets in Place} + \text{Present Value of Growth Opportunities}$$

and that CEPA had not clearly explained their view of the term “growth opportunity” or “growth option”.

4.2 The CEPA Report (page 3) states that:

*“There is evidence that suggests that investors do value growth in regulated industries”.*

4.3 UOA agrees that investors value growth options. However, the CEPA Report (and prior reports by CEPA) do not provide any specific empirical or other evidence to support their statement that *“investors do value growth in regulated industries”* and this is a material component of the overall beta of a regulated entity. Moreover, the type of regulation differs across different industries. The CEPA Report does not explain or provide evidence how the type of “regulation” that applies to the NP impacts on the value that investors will place on growth opportunities (if any) and the asset beta.

4.4 In UOA’s view, the CEPA Report also does not clearly articulate or explain:

(a) Why growth options (if any) that exist for the NP are likely to be relatively large in value compared to the existing value of assets in place of the NP, where future growth in milk supply is forecast to be modest (or even decline); and

(b) Why it disagrees with UOA that growth opportunities to the NP are restricted to growth in milk supply, and any growth options and excess returns are largely “owned” by the land owner and not the NP (see UOA (2018a, b).

4.5 CEPA considers that strong commodity exposure and price pass-through abilities do not materially impact on companies’ asset betas (CEPA, 2018 a, b). CEPA (2018a, Table 2.1, page 16) also states that their analysis, while not definitive, does *“suggest that dairy commodity price risk may not be significantly systematic”*. Thus, undertaking new investment opportunities or crystallisation of any growth options available to the NP from an increase in milk supply, when dairy prices rise, will not be correlated with general macro-economic conditions. In this case, it is not clear how growth options available to the NP (and similarly asset stranding risk) can make a material contribution to asset beta, when dairy price risk is considered to be largely non-systematic.

4.6 In arguing that growth options are valuable to investors in the NP, the CEPA Report states (pages 3 and 4):

*“Firstly, the Commission has made a judgement that “the consequences for consumers of under- and over-estimating the WACC are asymmetric”, and so sets the allowed return based on the 67th percentile of the probability distribution of WACC estimates.<sup>3</sup> This means that on average it should afford companies an excess return over investor requirements i.e. have a positive NPV even before any consideration of outperformance of regulatory expectations. This implies that if expectations of investment activity are correlated with economic activity, there would be a positive contribution to systematic risk.”*

- 4.7 UOA’s assessment of the NP’s asset beta is a point estimate (in essence a 50<sup>th</sup> percentile estimate).<sup>4</sup> The asset beta for the NP has not been assessed by UOA on the basis that growth options are positive by reason that the allowed return is based upon the 67<sup>th</sup> percentile of the WACC distribution. The arguments in the CEPA Report are also “circular”. That is, applying the reasoning in the CEPA Report, adoption of the 67<sup>th</sup> percentile would create positive net present value (“NPV”) investment growth options, which increases the point estimate of asset beta. An increase in asset beta then increases the 67<sup>th</sup> percentile WACC estimate, which in turn increases the value of any growth options to investors.
- 4.8 The assumption in the CEPA Report, with respect to the use of the 67<sup>th</sup> percentile WACC, to support its view that the NP has valuable growth options is also contrary to the position in the CC Report. This is where the CC Report states (paragraph B33) that:

*“The Commission accepts that concluding incorrectly that an asset beta was not practically feasible could have adverse consequences for Fonterra’s ability to compete for milk in an increasingly competitive market. On the other hand, the price set for farm gate milk may only need to be set marginally too high to undermine efficient entrants and erode contestability. On balance, we recognise that there is a high level of uncertainty around the outcomes arising from either an asset beta that is too high or an asset beta that is too low. Accordingly, we do not rely on the argument about the consequences of error in the draft paper”.*

## **The CC Report**

- 4.9 The CC Report states that:
- (a) While DIRA is in place the NP does not have the option to expand its portfolio of products beyond RCPs. However, in the longer term, if the DIRA regulation is relaxed, the portfolio of growth options available to the NP would include offering a wider range of products, similar to other dairy producers (paragraph B54); and
  - (b) The Commission considers that CEPA provide strong arguments that investors do in fact value growth options (paragraph B56).

---

<sup>3</sup> New Zealand Commerce Commission (2016a) IM review final reasons papers, quoting the 2014 WACC percentile decision.

<sup>4</sup> UOA understands that the tax-adjusted market risk premium estimate into the NP’s WACC is also a 50<sup>th</sup> percentile estimate.

- 4.10 UOA understands the rule based ‘Milk Price Manual’ was introduced by Fonterra in 2008, prior to the introduction of DIRA in 2012. Fonterra intends to retain a rule-based manual to set the milk price even if DIRA oversight was changed or removed. The Commission has previously recognised this point, noting “*We consider that there would not be significant changes to Fonterra’s milk price setting if the DIRA Regulation is removed and that Fonterra would retain most aspects of the current milk price setting process, including its Milk Price Manual and milk price governance arrangements.*”<sup>5</sup>
- 4.11 UOA agrees that investors value growth options. However, the value of any growth options are reduced for entities subject to regulation. Also, as already noted, in UOA’s view CEPA Report does not clearly explain: (i) why growth options are valuable to the NP under the “regulatory type” rules in the Milk Price Manual, (ii) why the NP processor owns these growth options (and not the suppliers of milk), and (iii) how these growth options (if any) give rise to significant positive NPV investments to the NP under the building blocks approach in the Milk Price Manual and how changes in the value of these growth options make a material contribution to asset beta.
- 4.12 Moreover, if one accepts the view in the CC Report that there is little systematic risk in dairy prices (for example, see CC Report, paragraph B23), then growth options (if any) held by the NP would have little impact on the NP’s asset beta.<sup>6</sup> This is because growth options that might crystallise or be undertaken by the NP from an increase in milk supply, when dairy prices rise, would not be correlated with positive economic conditions and market returns. Similarly, asset stranding risk would not be a systematic risk factor as asset stranding associated with a reduced milk supply, if dairy prices fall, would again not be correlated with economic conditions.
- 4.13 In UOA’s view, the CC Report does not clearly articulate or explain why they agree with the CEPA Report’s view in respect of growth options and impact on the NP’s asset beta, when this view also differs to the Commission’s statements in its Input Methodologies papers. That is, the Commerce Commission in its Input Methodologies (2016a, Topic Paper 4, Cost of Capital Issues, Chapter 4, paragraph 344, page 703 of 1128) paper notes that “regulation” significantly limits the value of growth options. In reaching its decision on whether or not to apply an upward adjustment to the asset beta for Gas Pipeline Businesses, the Commission states (para 344.2):

*“A low proportion of New Zealand households are connected to gas, relative to other countries in our comparator sample. This potentially increases the risk of economic network stranding for GPBs (which is likely to be at least partly systematic in nature) relative to EDBs/Transpower,<sup>240 7</sup> and suggests that greater growth options will exist (although the value*

---

<sup>5</sup> New Zealand Commerce Commission (2016b), Review of the state of competition in the New Zealand Dairy Industry, Final Report, paragraph 5.111.

<sup>6</sup> In UOA (2018b, paragraph 3.10) we noted that the NZ Institute of Economic Research (2017, page 14) considers that the dairy sector plays an important role in supporting other activities in the New Zealand economy and there may likely be additional flow on effects from farmers spending on discretionary items such as entertainment, clothing and holidays

<sup>7</sup> “*However, it is not clear to us whether this risk has materially increased for GDBs since we set the IMs in 2010, as discussed in the emerging technology topic paper. Commerce Commission “Input methodologies review decisions, Topic paper 3: The future impact of emerging technologies in the energy sector” (20 December 2016).*”

*of these growth options will be significantly limited by regulation, once prices are reset for the following regulatory period).*<sup>2108</sup>(emphasis added).

- 4.14 The Commerce Commission in its Input Methodologies (2016a, Topic Paper 4, Cost of Capital Issues, Chapter 4, para 346.5, page 704 of 1128) paper also notes that the value of growth options for gas businesses will be significantly limited once they are regulated. As argued by UOA (2018 a, b), the NP is subject to the rules in the Manual that will also significantly limit the value of growth options.

## **5 Decomposition of asset beta into short-term cash flow risk and longer-term risk and growth options**

- 5.1 UOA disagrees with the assertions in the CEPA Report that UOA’s hypothesis is a theoretical one, where we draw conclusions on how we consider “*investors should invest rather than how they actually do*” (CC Report, page 3).
- 5.2 Errors in setting the discount rate can transmit to movements in the value of a regulated entity both through its impact on short term cash flows and also more significantly on the value of  $V_e$  (the value of the business at the end of the regulatory period). This arises because the possibility of regulatory error introduces uncertainty into the value of  $V_e$  at the next price review date and this uncertainty in value is due to the impact on the longer term (i.e., not short-term) cash flows (see UOA 2018b).
- 5.3 Appendix One provides a simple example to illustrate this point.
- 5.4 The CEPA Report (page 3) also notes that changes in the market risk premium may impact on the value of assets yet to be built.
- 5.5 UOA agrees that regulatory error and failure to correct changes in the market risk premium may change the value of assets yet to be built. However, exercise of a growth opportunity (if owned by the firm) is at the option of the firm. In UOA’s view the NP does not own any significant growth options. That is, growth opportunities to the NP may not materialise even in the event that macro-economic conditions improve, which typically makes a growth option more valuable.
- 5.6 Any “growth option” that arises due to regulatory error from failure to recognise a reduction in the market risk premium will also be limited until such time as the regulatory error is corrected. As noted by UOA (2018b), compared to the NP it appears reasonable to assume all the comparators in the CEPA Sample will target growth opportunities that have expected NPVs that materially exceed zero.
- 5.7 Lastly, the CEPA Report states (page 4) that:

---

<sup>8</sup> “As noted in paragraph 426 below, the relatively low penetration of gas in New Zealand means that gas pipelines are closer to the ‘death spiral’ tipping point, where gas networks could lose enough customers to make getting the remainder to pay infeasible. This suggests investors’ perception of stranding risk may be more correlated with the market for gas than electricity, leading to a higher asset beta.”

*“Thirdly, the evidence from asset betas in regulated industries indicates that these are sufficiently high that changes in the value of the business in the long-term must be the main contributor to the asset beta. This is because the NPV of short term cash flows is low compared to the value of the business. The size of the “long-term” beta is also too large to be caused by regulatory errors in the cost of capital lasting for a regulatory period or two. So, changes in the value of future opportunities must make a material contribution to beta”.*

- 5.8 In UOA’s view, the CEPA Report provides no evidence to support this conclusion in respect of regulated industries and more particularly for the type of “regulation” that governs returns to the NP. We also refer to our earlier comments in this report.

## **6 Other comments**

### **Is dairy / commodity price risk systematic?**

- 6.1 As noted, the CEPA and the Commission consider that it is likely that dairy price risk and commodity price pass-through risk is non-systematic. If this is correct, then growth options and asset stranding risk should be largely non-systematic as well.
- 6.2 It is therefore not clear to UOA how CEPA and the Commission could explain average weekly and 4-weekly asset beta estimates of between 0.48 and 0.59 for dairy companies, commodity exposed companies and cost pass through companies (CC Report, Table B1, paragraph B138) if dairy / commodity price risk is not systematic.

### **Confidence interval estimates around asset beta**

- 6.3 The CC Report (paragraph B29) calculates confidence intervals for beta using sub-samples in the sample of firms analysed by CEPA. In UOA’s view, confidence intervals drawn from the sample of firms in the prior CEPA reports are of limited value only. This is where UOA considers the NP has a significantly different (lower) systematic risk profile compared to CEPA’s comparator sample of firms.

### **Inclusion of Fonterra’s asset beta in the sample**

- 6.4 The CC Report (paragraph B39) acknowledges that the ANZ Report (2018) does not offer a definitive conclusion on asset beta.
- 6.5 UOA remains of the view that there is prima-facie no strong reason to exclude Fonterra from the CB sample, either on earnings outlook, liquidity grounds or any seasonality (if it exists) in the share price (see UOA, 2018b).

## References

ANZ Report, (2018), AgriFocus We have Lift Off”, June 2018.

Cambridge Economic Policy Associates Pty Ltd, (2018a), Dairy Notional Processors’ Asset Beta: New Zealand Commerce Commission” written by Cambridge Economic Policy Associates Pty Ltd in association with Freshagenda Pty Ltd, dated 28 March 2018 <http://www.comcom.govt.nz/>

Cambridge Economic Policy Associates Pty Ltd, (2018b), Dairy Notional Processor’s Asset Beta – Response to Submissions: New Zealand Commerce Commission” written by Cambridge Economic Policy Associates Pty Ltd in association with Freshagenda Pty Ltd, dated 4 June 2018, <http://www.comcom.govt.nz/>

Cambridge Economic Policy Associates Pty Ltd, (2018c), “Re: Dairy asset beta – response to the second round of submissions” written by Cambridge Economic Policy Associates Pty Ltd dated 16 July 2018, <http://www.comcom.govt.nz/>

Commerce Commission, (2016a), Input Methodologies review decisions, dated 20 December 2016, <http://www.comcom.govt.nz/>

Commerce Commission (2016b), Review of the state of competition in the New Zealand Dairy Industry, Final Report, paragraph 5.111.

Commerce Commission, (2018), Review of Fonterra’s 2017/18 base milk price calculation: Emerging views on asset beta” dated 14 June 2018, <http://www.comcom.govt.nz/>

NZ Institute of Economic Research, (2017) Dairy trade’s economic contribution to New Zealand NZIER report to DCANZ February 2017 [https://nzier.org.nz/static/media/filer\\_public/29/33/29336237-3350-40ce-9933-a5a59d25bd31/dairy\\_economic\\_contribution\\_update\\_final\\_21\\_february\\_2017.pdf](https://nzier.org.nz/static/media/filer_public/29/33/29336237-3350-40ce-9933-a5a59d25bd31/dairy_economic_contribution_update_final_21_february_2017.pdf)

The University of Auckland, (2018a), Asset Beta for Notional Processor: Response to the Cambridge Report, <http://www.comcom.govt.nz/>

The University of Auckland, (2018b), Asset Beta for Notional Processor: Response to the Cambridge Report dated 4 June 2018 and the Commerce Commission’s Emerging Views on Asset Beta dated 14 June 2018, <http://www.comcom.govt.nz/>

## Appendix

Assume a regulated entity. The following simplifying assumptions are made.

### Regulator's Valuation

The regulator sets an allowed expected return of \$6 per annum on a regulatory asset base (RAB) of \$100. The regulatory period is 5 years, when prices are next reviewed and re-set by the regulator. The RAB value (from the perspective of the regulator) does not change over time, where inflation is zero and new capital expenditure exactly offsets depreciation.

Application of the regulator's assessment of WACC (6%) also means the NPV of the entity (Enterprise Value) as determined by the regulator is \$100 (see table below). This equals the opening RAB, consistent with the NPV=0 construct.

Enterprise Value (Regulator's Valuation)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 5
Cash Flows	\$6	\$6	\$6	\$6	\$6	
Terminal RAB (Economic Value) - as predicted by Regulator						\$100
Total	\$6	\$6	\$6	\$6	\$6	\$100
Discount factor	0.9434	0.8900	0.8396	0.7921	0.7473	0.7473
Present value	\$5.66	\$5.34	\$5.04	\$4.75	\$4.48	\$74.73
Present value - Cash flows years 1-5	\$25.27					
Present value - Terminal Value Year 5	\$74.73					
<b>Enterprise Value / Economic Value of the RAB</b>	<b>\$100.00</b>					

### Investors' Valuation

Assume the investors only require 5.75% on the regulated assets. This reflects failure of the regulator to recognise a fall in investors' risk aversion and a fall in the market risk premium. Also, assume that investors expect this "regulatory error" will persist into the future.

Investors will value the regulatory cashflows to now equal \$104.35 (as shown in the table below).

Enterprise Value (Investors' valuation)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 5
Cash Flows	\$6	\$6	\$6	\$6	\$6	
Terminal RAB (Economic Value) to Investor						\$104
Total	\$6	\$6	\$6	\$6	\$6	\$104
Discount factor	0.9456	0.8942	0.8456	0.7996	0.7561	0.7561
Present value	\$5.67	\$5.37	\$5.07	\$4.80	\$4.54	\$78.90
Present value - Cash flows years 1-5	\$25.45					
Present value - Terminal Value Year 5	\$78.90					
<b>Enterprise Value / Economic Value of the RAB</b>	<b>\$104.35</b>					

The table above shows that the impact of the "regulatory" error is more pronounced through the value impact of longer terms cash flows (i.e. difference between the Present Value of the Terminal Year 5 value of the regulator's valuation of \$74.73 and the Present Value of the Terminal Year 5 value of the investors' valuation of \$78.90),<sup>9</sup> compared to the difference in the value attributed by the regulator and the investor (\$25.27 and \$25.45 respectively) to short term cash flows (Years 1 to 5).

<sup>9</sup> At year 5, investors value the RAB = \$104 = \$6 / 0.0575.

### *Regulatory error corrected at a subsequent review period*

A more realistic assumption might be that the regulator error is subsequently corrected over the next one or two regulatory periods. Assuming the regulatory error (in our simple example) is corrected at the end of year 10 and the regulator now correctly sets a WACC equal to 5.75%, investors will value the regulatory cash flows today at \$101.86

Enterprise Value (Investors' valuation)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 10
Cash Flows	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$6
Terminal RAB (Economic Value) to Investor											100
Total	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$6	\$100
Discount factor	0.9456	0.8942	0.8456	0.7996	0.7561	0.7150	0.6761	0.6394	0.6046	0.5717	0.5717
Present value	\$5.67	\$5.37	\$5.07	\$4.80	\$4.54	\$4.29	\$4.06	\$3.84	\$3.63	\$3.43	\$57.17
Present value - Cash flows years 1-5	\$25.45										
Present value - Years 6-10	\$76.42										
<b>Enterprise Value / Economic Value of the RAB</b>	<b>\$101.86</b>										

Even under the assumption that any regulatory error is corrected at the next subsequent review period (i.e., the regulator adjusts the cash flows at year 10 in the example above to reflect the correct cost of capital = 5.75%), the impact of “regulatory error” in NPV terms is greatest in the present value of the longer-term cash flows in years 6-10.

In the examples above, the impact of regulatory error on the equity value of the firm will be greater than the impact on Enterprise Value for the levered firm, where the market value of debt should not materially change.