DRAFT

Update on Asset Beta for Fonterra's New Zealand-based Commodity Manufacturing Businesses and Specific Risk Premium for Fonterra's Notional Business

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Report prepared for:
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Acknowledgments

The assistance of Ernst & Young in the preparation of certain aspects of this report is acknowledged. However, all opinions in this report are the author's alone.

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Auckland UniServices 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 the 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.

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Update on Asset Beta for Fonterra's New Zealand-based Commodity Manufacturing Businesses and Specific Risk Premium for Fonterra's Notional Business

Executive Summary

Introduction

E.1 This report updates Auckland UniServices Ltd ("**Auckland UniServices**" or "**UniServices**")[1]

- Independent assessment of the asset beta for:
    - The risks borne by the "capital providers" of Fonterra Co-operative Group Limited ("**Fonterra**" or "**Company**") New Zealand-based commodity milk powders manufacturing business (hereafter also "**Fonterra's Notional Business**" or "**Notional Business**"), under the assumption that the business manufactured and sold milk powder-based commodity products (referred to in the Farmgate Milk Price Manual as "**Reference Commodity Products**", or "**RCPs**") both on and off Global Dairy Trade ("**GDT**");[2] and
    - The risks borne by the "capital providers" of Fonterra's total New Zealand-based commodity manufacturing business. That is, a business that includes the portions of Fonterra's business relating to the manufacture and sale of both RCPs and commodity products not included in the Farmgate Milk Price Manual's reference commodity basket, such as cheese, casein and milk protein concentrate (hereafter also "**Fonterra's Actual Business**" or "**Actual Business**").

and

- Provides further commentary on the increment to the weighted average cost of capital ("**WACC**") for Fonterra's Notional Business as compensation for expected losses associated with asset stranding.

[1] This report is written by Dr Alastair Marsden on behalf of Auckland UniServices Ltd. References in this report to "we" or "our" refer to the opinions of Dr Alastair Marsden.

[2] Under this definition, the "Notional Business" is largely Fonterra's milk powder manufacturing business, scaled up to process all milk supplied to Fonterra in New Zealand. This "Notional Business" is exposed to some risks – for example, with respect to variability in returns to sales off GDT – that the purely notional processor set up in the Milk Price Manual is not exposed to.

E.2 Fonterra has requested Auckland UniServices update our report titled "Asset beta for Fonterra's New Zealand-based Commodity Manufacturing Businesses and Specific Risk Premium for Fonterra's Notional Business" dated 2 December 2014 (hereafter "**Prior Report"**) further to:

- The Commerce Commission New Zealand's ("Commerce Commission" or "Commission") final report (Public version) titled "Review of Fonterra's 2014/15 base price milk calculation: Dairy Industry Restructuring Act 2001", dated 15 September 2015;
- Lally (2016a), "Questions for Fonterra", dated 13 February 2016; and
- Submissions by Synlait Ltd, Open Country Dairy Ltd and Miraka Ltd on the Commerce Commission's (2015) report on Fonterra's 2014/15 base price milk calculation.

E.3 For both Fonterra's Notional Business and Actual Businesses the raw input "cost of milk" or the farmgate milk price is set in accordance with the Farmgate Milk Price Manual (hereafter also "**Milk Price Manual**" or "**Manual**").[3]

Business Risks

E.4 Under the Farmgate Milk Price Manual, the farmgate milk price is determined "ex-post" as a residual amount at the end of the relevant financial year, being calculated based upon actual (ex-post) revenues assuming almost all sales are "on GDT" from a commodity milk powders manufacturing business *less* notional (efficient) cash costs and a forward looking fair return "on" and "of" capital. We describe this business as the "**Milk Price Manual Purely Notional Business**" or Fonterra's **"Purely Notional Business":**[4]

E.5 Fonterra's Notional Business is exposed to the following additional key risks compared to the Milk Price Manual Purely Notional Business:

- Under-recovery or over-recovery of actual costs relative to the Milk Price Manual Purely Notional Business' costs (some of which, however, reflect Fonterra's actual costs);
- Pricing risk, in respect to both its off-GDT contracts and longer dated contracts of (generally) between 6 to 8 months;
- The consequences of differences between Fonterra's actual RCP's asset base and the Milk Price Manual Purely Notional Business' asset base; and

[3] Our report is based on the Milk Price Manual as at the Effective date of 1 August 2015. However, we understand there have been no material changes to the Manual from 1 August 2014 that would impact on our assessment of the beta for Fonterra's Notional and Actual Businesses or any assessment of an increment to WACC.

[4] For the Milk Price Manual's Purely Notional Business in excess of 90 percent of product is assumed to be sold on GDT.

- The consequence of differences between Fonterra's actual funding decisions (and therefore its cost of capital) and that of the Milk Price Manual Purely Notional Business.

E.6 Fonterra's broader New Zealand-based commodity or Actual Business is also exposed to 'stream return' risk ("**Stream Risk**"), in respect of variances between returns to commodity products not included in the milk price basket of RCPs and returns to RCPs.

Asset Beta

E.7 The table below summarises key factors that we consider relevant in updating our Prior Report and our estimate of the asset beta for Fonterra's Notional and Actual Business.

Factor / Consideration	Indicative beta range	Comment
In Auckland UniServices' view asset betas for regulated electricity businesses provide a useful guide to the asset beta for Fonterra's Notional and Actual Business.	Commerce Commission (2010) estimate of electricity lines businesses ("ELBs") of **0.34** for price capped firms. Hird (2016) – updated estimates for revenue cap / decoupled and price capped electricity firms of circa **0.34** to **0.39**.[5]	Lally (2016a) suggests Fonterra's Notional and Actual Business has features of a "cost reimbursement operation", which suggests a lower beta than ELBs. However, there is no reliable statistical evidence that asset betas differ between price cap and revenue cap / decoupled businesses [Hird (2016)]. Lally (2016b) also reports no clear empirical evidence of the effect of regulation on differences in asset betas for rate of return, revenue capped and price capped businesses. This is notwithstanding theoretical expectations that the asset beta should be higher for price-capped businesses.
"Comparative" company evidence	**0.41 – 0.61**	Unlike Fonterra's Notional and Actual Business, we understand that the "comparable" set of companies do not have the ability to make ex-post adjustments to pass through variances between the forecast and the actual milk price. Asset beta for Fonterra's Notional and Actual Businesses should be lower than "comparable" commodity exposed and commodity/ brand exposed companies.
Recent broker estimate	**0.45**	Only one recent broker estimate of beta for Fonterra's Ingredients business. We understand, however, the 'ingredients' business referenced to by brokers is broader than our definition of Fonterra's Actual Business. For example, Fonterra's actual ingredients business also manufactures dairy products in countries other than NZ (e.g. Australia & Chile).
Fonterra's ability to override the Milk Price	Not applicable	Pressure on Fonterra's Notional and Actual Businesses to provide farmer support given the latest forecast farmgate milk price of $3.90 kgMS.

[5] Range as per Table 1 of Hird (2016).

Manual.		Farmer support by way of interest free loans represents a cost to Fonterra's Notional and Actual Business, where Fonterra intends to make no adjustment for this cost by way of a reduced farmgate milk price to farmers. In our view, this is likely to be a systematic risk factor (given the importance of the dairy industry to NZ's GDP) and increase the asset beta for Fonterra's Notional and Actual Businesses compared to a pure cost reimbursement operation. We note, however, that Fonterra will likely be mindful of its own credit rating in deciding on the level of any additional support that the Notional or Actual Businesses may provide to farmers.
Asset stranding risk	Not applicable	The risk of asset stranding can have a systematic component where some demand shocks are systematic (Boyle et al, 2006). In our view systematic risks relating to asset stranding will be higher where there is an increased risk of a long-term downturn in dairy commodity milk prices for milk produced in NZ and NZ milk production volumes substantially decrease in response to this negative shock. Under the Manual, however, risks are mitigated where any asset optimisation or stranding only occurs at intervals of four years (unless the Milk Price Panel determines otherwise). In addition the Manual specifically requires that any independent reviewer must consider the necessity of maintaining a prudent level of buffer capacity to cover variations in year on year supply. Thus, a short to medium term downturn in milk prices related to systematic risk factors, which negatively impact the volume of milk produced by NZ farmers, will not automatically justify an immediate optimisation of assets. In addition, the risk of any long-term structural fall in milk prices that significantly and negatively impacts the volume of milk production by NZ farmers may still be low. For example, the RBNZ Financial Stability Report (Nov 2015, page 31) expresses medium / longer term confidence in NZ's dairy industry. Farmers may also respond to lower prices by continuing to cut costs of milk production and /or increase productivity of their farms.
Stream Risk in relation to non-RCP product sales	Not applicable	We are unable to conclude Stream Risk is systematic. There should be no difference in the point estimate asset beta between Fonterra's Notional and Actual

by Fonterra's Actual Business.		Business.

Conclusion on Asset Beta

E.8 Our updated estimates of the asset beta for Fonterra's Notional and Actual Businesses are:[6]

Business	Base case point estimate of asset beta	"Low" and "High" range of a point-estimate asset beta[7]
Fonterra's Notional Business	**0.375**	0.30 to 0.45
Fonterra's Actual Business	**0.375**	0.30 to 0.45

E.9 In summary:

- Our point estimate asset beta for Fonterra's Notional Business lies within the range of updated asset betas (0.34 – 0.39) estimated by Hird (2016) for regulated electricity businesses. As noted, Hird (2016) and Lally (2016b) finds no strong conclusive empirical evidence of differences in asset betas for price capped and revenue capped electricity businesses. [8]
- While a cost reimbursement operation may have a lower asset beta than a regulated electricity company subject to a revenue or price cap, in Auckland UniServices' view, Fonterra's Notional and Actual Businesses face greater systematic risks compared to a pure cost reimbursement operation. This is given the importance of the dairy industry to New Zealand's economy / GDP and where:
  - Fonterra's latest forecast farmgate milk price of $3.90 kgMS is below the estimated breakeven cost for the average farmer of circa $5.25 to $5.40 kgMS (see Dairy NZ, 2015).[9];
  - Fonterra's Directors may be under greater pressure to override the Manual and provide additional farmer support (for example, by way of further interest free loans) if milk prices do not improve in the medium term. We understand the cost of additional farmer support by way of interest free loans would negatively impact the earnings of Fonterra's Notional and Actual Businesses; and
  - Fonterra's Notional and Actual Businesses face some (albeit likely to be relatively small) systematic risk exposure to asset stranding or optimisation.

[6] This compares to the point estimate of the asset beta in our Prior Report of:
- 0.375 for Fonterra's Notional Business; and
- 0.475 for Fonterra's Actual Business.

[7] These estimates of a "low" and "high" range are not absolute values of any low or high range or indicative of any percentile ranges. In this respect we have not undertaken any detailed statistical or other analysis to estimate any standard error around a point estimate of asset beta.

[8] As already noted, this is despite Dr Lally's belief that a price capped business should likely have a higher asset beta (by an unknown amount) compared to a revenue capped business (see Lally, 2016b)

[9] See http://www.dairynz.co.nz/news/latest-news/another-tough-season-ahead-for-farmers/ published 28 January 2016.

- In Auckland UniServices' view, the systematic risk exposure facing Fonterra' Notional and Actual Businesses associated with the current low milk commodity prices and a low milk payout (kgMS) has increased since our Prior Report. However, offsetting this is our acknowledgement that 'costs' may have both 'negative' and 'positive' beta components.

- Our point estimate asset beta estimates for Fonterra's Notional and Actual Businesses are still below the empirical range of asset betas (0.41 to 0.61) for "comparator" companies. This is where "comparators" do not have the ability, unlike Fonterra, to make ex-post adjustments to pass through variances between the forecast and actual milk price.

E.10 We adopt the same point estimate of the asset beta for Fonterra's Notional and Actual Businesses, where we are unable to conclude any Stream Risk is systematic.

E.11 Estimation of beta ultimately involves some element of judgement. Overall, in our view, the point estimate asset betas that we derive for Fonterra's Notional and Actual Business are reasonable in terms of our understanding of the systematic risks faced by the owners of these businesses.

Specific risk premium for Fonterra's Notional Business

Quantification of asset stranding risk

E.12 Under a model based on input parameters or assumptions around the probability of asset stranding and the percentage of assets that may become stranded, we derive an increment to the weighted average cost of capital ("WACC") as compensation for expected losses.[10]

E.13 We are not able to provide robust empirical evidence with respect to the probabilities associated with the range of possible events that may result in assets becoming stranded and/or the percentage of assets that may become stranded in any one event. Our range of assumptions with respect to the probability of asset stranding and the percentage of assets that may become stranded are *subjective*.

E.14 In the absence of robust empirical evidence to support an appropriate increment to WACC as compensation for any expected loss for asset stranding, a nil WACC increment might be adopted. Effectively this would assume the possibility of asset stranding from all possible adverse type events is either nil and/or any compensation for expected losses is not material in the context of Fonterra's overall WACC for the Notional Business.

E.15 Adopting *subjective* inputs with respect to the probability of asset stranding (between 0% and 5%) and the percentage of assets that may become stranded (1.0% to 12.5%), we derive an

[10] It is assumed any additional compensation by way of an increment to WACC for an expected loss from asset stranding is not already included as a "cost" in the cashflows to calculate the milk price.

increment to WACC for Fonterra's Notional Business of between circa **0.0**% and **0.2**% as compensation for expected losses associated with asset stranding.

E.16 Under Fonterra's constitution, Fonterra's board has ultimate responsibility for setting the milk price and may therefore wish to exercise its own judgement on the size of any increment to the WACC or the "equivalent" increment to the cost of equity as compensation for expected losses associated with asset stranding.

E.17 The conclusions in this executive summary should be read subject to our more detailed report that follows.

Update on Asset Beta for Fonterra's New Zealand-based Commodity Manufacturing Businesses and Specific Risk Premium for Fonterra's Notional Business

1 Introduction

1.1 This report updates Auckland UniServices Ltd ("**Auckland UniServices**" or "**UniServices**")[11]

- Independent assessment of the asset beta for:
  - The risks borne by the "capital providers" of Fonterra Co-operative Group Limited ("**Fonterra**" or "**Company**") New Zealand-based commodity milk powders manufacturing business (hereafter also "**Fonterra's Notional Business**" or "**Notional Business**"), under the assumption that the business manufactured and sold milk powder-based commodity products (referred to in the Farmgate Milk Price Manual as "**Reference Commodity Products**", or "**RCPs**") both on and off Global Dairy Trade ("**GDT**");[12] and
  - The risks borne by the "capital providers" of Fonterra's total New Zealand-based commodity manufacturing business. That is, a business that includes the portions of Fonterra's business relating to the manufacture and sale of both RCPs and commodity products not included in the Farmgate Milk Price Manual's reference commodity basket, such as cheese, casein and milk protein concentrate (hereafter also "**Fonterra's Actual Business**" or "**Actual Business**").

and

- Provides further commentary on the increment to the weighted average cost of capital ("**WACC**") for Fonterra's Notional Business as compensation for expected losses associated with asset stranding.

[11] This report is written by Dr Alastair Marsden on behalf of Auckland UniServices Ltd. References in this report to "we" or "our" refer to the opinions of Dr Alastair Marsden.

[12] Under this definition, the "Notional Business" is largely Fonterra's milk powder manufacturing business, scaled up to process all milk supplied to Fonterra in New Zealand. This "Notional Business" is exposed to some risks – for example, with respect to variability in returns to sales off GDT – that the purely notional processor set up in the Milk Price Manual is not exposed to.

1.2 For both Fonterra's Notional Business and Actual Business, the raw input "cost of milk" or the farmgate milk price is set in accordance with the Farmgate Milk Price Manual (hereafter also "**Milk Price Manual**" or "**Manual**").[13]

Scope of our Work

1.3 Fonterra has requested Auckland UniServices update our report titled "Asset beta for Fonterra's New Zealand-based Commodity Manufacturing Businesses and Specific Risk Premium for Fonterra's Notional Business" dated 2 December 2014 (hereafter "**Prior Report"**) further to:

- The Commerce Commission New Zealand's ("Commerce Commission" or "Commission") final report (Public version) titled "Review of Fonterra's 2014/15 base price milk calculation: Dairy Industry Restructuring Act 2001", dated 15 September 2015;
- Lally (2016a), "Questions for Fonterra", dated 13 February 2016; and
- Submissions by Synlait Ltd ("Synlait"), Open Country Dairy Ltd ("Open Country Dairy") and Miraka Ltd ("Miraka") on the Commerce Commission's (2015) report on Fonterra's 2014/15 base price milk calculation.

1.4 Fonterra has also requested that we:

1.4.1 Provide additional analysis that may (or may not) support the concluded asset betas in our Prior Report for Fonterra's Notional and Actual Businesses.

1.4.2 Discuss the impact of the Interest Free Loans to farmers on the risks to Fonterra's Notional and Actual Businesses.

1.4.3 Present updated empirical evidence of the asset betas for:

i. The comparator sample of companies (including Fonterra and Synlait Ltd); and
ii. Brokers' estimates of Fonterra's beta.

1.4.4 Determine, if possible, whether or not the "comparator" companies are subject to any form of regulatory oversight or have a Milk Price Manual or milk pricing regime "similar" to Fonterra (focusing particularly on whether, like Fonterra, they have the ability to make ex-post adjustments to pass through variances between forecast and actual performance to the milk price).

[13] Our report is based on the Milk Price Manual as at the Effective date of 1 August 2015. However, we understand there have been no material changes to the Manual from 1 August 2014 that would impact on our assessment of the beta for Fonterra's Notional and Actual Businesses or any assessment of an increment to WACC.

1.4.5 Recast the specific risk premium analysis in our Prior Report as an increment to the cost of equity rather than an increment to the WACC.

1.4.6 Consider if there may be any circumstances under which it is not reasonable to assume the oldest plant in a region would be stranded in the event of a permanent decrease in milk supply or a change in the RCP basket.

Limitations on the Scope of our work

1.5 The scope of Auckland UniServices' work is limited to that described in paragraphs 1.3 and 1.4 above under the "Scope of our Work".

1.6 Our work does not extend to wider considerations in estimating the cost of capital for Fonterra's Notional and Actual Businesses. Specifically, our scope does not include the estimation of any other parameter inputs into the cost of capital and/or the purpose considerations contained in the Dairy Industry Restructuring Act 2001. Our beta estimate assumes the milk price is set in accordance with the Manual.

1.7 This report is also subject to our disclaimer and "Important Notice" on page 2 of this report.

Reference to our Prior Report

1.8 We refer to our Prior Report for:

- Our understanding of the pricing methodology and building blocks approach used to set the farmgate milk price under the Manual;
- A description of Fonterra's Notional and Actual Businesses and key differences between these businesses in product mix and risks faced (subject to any clarification of the definitions as described later in this report and also at Appendix 1);
- An overview of the approaches to the estimation of beta and consideration of the asset beta for Fonterra's Notional and Actual Businesses with reference to first principles analysis; and
- The model we apply to estimate the quantum of any specific risk premium to the WACC for Fonterra's Notional Business. In this report we provide, however, a more detailed explanation of this model to determine the specific risk premium.

Structure of this Report

1.9 The rest of our report is structured as follows:

- Section 2 seeks to clarify our understanding of Fonterra's Notional and Actual Business.

- Section 3 provides further analysis that may (or may not) support the concluded asset betas in our Prior Report for Fonterra's Actual Business and Notional Business.

- Section 4 reviews the discretion of Fonterra's Board to override the Manual and also seeks to quantify the impact of the Interest Free Loans to farmers on Fonterra's Notional and Actual Businesses.

- Section 5 provides updated beta estimates for global dairy businesses or "comparator" companies that may be relevant to the determination of an appropriate beta estimate for Fonterra's Notional and Actual Businesses.

- Section 6 provides updated brokers' estimates of the cost of capital for Fonterra.

- Section 7 comments on points raised in submissions and /or discussions relevant to the estimation of the asset beta for Fonterra's Notional and Actual Businesses and which we have not already addressed earlier in this report by:

    a. The Commerce Commission (2015) and Lally (2016a); and
    b. Synlait, Open Country and Miraka on the Commerce Commission's report on Fonterra's 2014/15 base price milk calculation.

- Section 8 further discusses the model adopted in our Prior Report to determine any increment to WACC as compensation for expected losses due to asset stranding. We also (i) recast the specific risk premium analysis as an increment to the cost of equity rather than an increment to the WACC; and (ii) consider if there may be circumstances under which it is not reasonable to assume the oldest plant in a region would be stranded in the event of a permanent decrease in milk supply or a change in the RCP basket.

- Section 9 concludes.

- Appendix 1 provides further detail on the differences between Fonterra's Purely Notional and Fonterra's Notional Business.

- Appendix 2 provides details on the asset betas for the comparator sample of global companies with dairy interests.

- Appendix 3 describes in more detail our model to determine an increment to WACC as compensation for expected losses due to asset stranding.

2 Fonterra's Notional and Actual Business

Definition of Fonterra's Notional and Actual Businesses

2.1 Lally (2016, a & b) provides a useful framework to clarify the definition of Fonterra's Notional and Actual Businesses. We adopt and expand on Lally's (2016a) notation as set out in the table below.

2.2 For simplicity we assume (i) a one period model (of time *t*); and (ii) Fonterra's Notional and Actual Businesses have *no assets*. Accordingly, the definition of net cash flow (NCF) allowance does not include any allowance for the return "*on*" and return "*of*" capital. In Appendix 1 we expand the analysis in respect of Fonterra's Notional Business to provide for capital returns on assets employed in the business.

Notation

Term	Definition
NCF	Net cash flow
$RevRCP_{ON\ GDT}$	Actual (ex-post) revenues of a business selling only RCPs and all sales on GDT.[14]
MIL	The purchase price of milk. Under our assumptions of no fixed or operating assets owned by the business this equals $RevRCP_{ON\ GDT} - EOTHRCP_{ON\ GDT}$
$EOTHRCP_{ON\ GDT}$	Ex-ante efficient other costs for a business that sells RCPs only with all sales on GDT.
$RevRCP_{ON\ +\ OFF\ GDT}$	Revenues of a business selling only RCPs with sales both "on" and "off" GDT.
$AOTHRCP_{ON\ +\ OFF\ GDT}$	Actual other costs for a business selling only RCPs with sales both "on" and "off" GDT.
$EOTHRCP_{ON\ +\ OFF\ GDT}$	Ex-ante efficient other costs for a business selling only RCPs but sales both "on" and "off" GDT.
$RevRCPnonRCP_{ON\ +\ OFF\ GDT}$	Revenues of a business selling both RCPs and non-RCPs with sales both "on" and "off" GDT.
$AOTHRCPnonRCP_{ON\ +\ OFF\ GDT}$	Actual other costs for a business selling both RCPs and non-

[14] For simplicity we assume all sales "on GDT". In practice we note that for the Milk Price Manual Purely Notional Business in excess of 90 percent of product is assumed to be sold on GDT.

	RCPs with sales both "on" and "off" GDT.
$EOTHRCPnonRCP_{ON + OFF\ GDT}$	Ex-ante efficient other costs for a business selling both RCPs and non-RCPs with sales both "on" and "off" GDT.

Setting of the Milk Price under the Manual

2.3 We use the term Fonterra's "**Purely Notional Business**" or "**Milk Price Manual Purely Notional Business"** to describe the business where the milk price is set under the Manual for a business that sells RCPs all on-GDT.

2.4 The NCF for this business is:

$$NCF = RevRCP_{ON\ GDT} - MIL - EOTHRCP_{ON\ GDT}$$

$$NCF = RevRCP_{ON\ GDT} - [RevRCP_{ON\ GDT} - EOTHRCP_{ON\ GDT}] - EOTHRCP_{ON\ GDT}$$

where $MIL = RevRCP_{ON\ GDT} - EOTHRCP_{ON\ GDT}$

2.5 Thus, under the Farmgate Milk Price Manual, the farmgate milk price for the Purely Notional Business is determined "ex-post" as a residual amount at the end of the relevant financial year, based upon actual (ex-post) revenues assuming sales are "on GDT" from a commodity milk powders manufacturing business *less* notional (efficient) cash costs.[15]

Fonterra's Notional Business

2.6 For Fonterra's Notional Business, the MIL (milk price) is determined in accordance with the Manual (i.e. Fonterra's "Purely Notional Business") as above.

2.7 Fonterra's Notional Business sells RCPs only but sales may be both on and off GDT.

2.8 The NCF for Fonterra's Notional Business is:

$$NCF = RevRCP_{ON + OFF\ GDT} - MIL - AOTHRCP_{ON + OFF\ GDT}$$

$$NCF = RevRCP_{ON + OFF\ GDT} - [RevRCP_{ON\ GDT} - EOTHRCP_{ON\ GDT}] - AOTHRCP_{ON + OFF\ GDT}$$

[15] In reality where Fonterra's Purely Notional Business, Notional Business and the Actual Business also own assets, the farmgate milk price would also be after a return "on" and "of" capital. See Appendix 1.

$$NCF = \underbrace{[RevRCP_{ON+OFF\ GDT} - RevRCP_{ON\ GDT}]}_{\text{Difference in revenues of a business with RCP sales both on and off GDT compared to a business with actual (ex-post) revenues with on GDT sales only.}} + \underbrace{EOTHRCP_{ON\ GDT} - AOTHRCP_{ON+OFF\ GDT}}_{\text{Difference in efficient costs for a business selling RCPs on GDT and actual costs for a business selling RCPs both on and off GDT.}}$$

Fonterra's Actual Business

2.9 For Fonterra's Actual Business, the MIL or milk price is also determined in accordance with the Manual (i.e. also Fonterra's "Purely Notional Business").

2.10 However, Fonterra's Actual Business sells both RCPs and non-RCPs with sales both on and off GDT.

2.11 Thus the NCF for the Actual Business is:

$$NCF = RevRCPnonRCP_{ON+OFF\ GDT} - MIL - AOTHRCPnonRCP_{ON+OFF\ GDT}$$

$$= RevRCPnonRCP_{ON+OFF\ GDT} - [RevRCP_{ON\ GDT} - EOTHRCP_{ON\ GDT}] - AOTHRCPnonRCP_{ON+OFF\ GDT}$$

$$= [RevRCPnonRCP_{ON+OFF\ GDT} - RevRCP_{ON\ GDT}] + [EOTHRCP_{ON\ GDT} - AOTHRCPnonRCP_{ON+OFF\ GDT}]$$

$$NCF = \underbrace{[RevRCPnonRCP_{ON+OFF\ GDT} - RevRCP_{ON+OFF\ GDT}]}_{\text{Difference in revenues of a business with RCP and non-RCP sales both on and off GDT compared to a business with RCP sales only both on and off GDT.}} + \underbrace{[RevRCP_{ON+OFF\ GDT} - RevRCP_{ON\ GDT}]}_{\text{Difference in revenues of a business with RCP sales both on and off GDT compared to a business with actual (ex-post) revenues with on GDT sales only.}}$$

$$+ \underbrace{EOTHRCP_{ON\ GDT} - AOTHRCP_{ON+OFF\ GDT}}_{\text{Difference in efficient costs for a business selling RCPs on GDT and actual costs for a business selling RCPs both on and off GDT.}}$$

$$+ \underbrace{AOTHRCP_{ON+OFF\ GDT} - AOTHRCPnonRCP_{ON+OFF\ GDT}}_{\text{Difference in actual costs of a business with}}$$

RCP sales both on and off GDT compared to the actual costs of a business with RCP and non-RCP sales both on and off GDT.

Summary of differences between Fonterra's Purely Notional Business, Notional Business and Fonterra's Actual Business.

2.12 In summary, Fonterra's Notional Business is exposed to the following additional risks compared to the Milk Price Manual Purely Notional Business:

- Under-recovery or over-recovery of actual costs relative to the Milk Price Manual Purely Notional Business efficient costs (some of which, however, may reflect Fonterra's actual costs).
- Pricing risk, in respect to both its off-GDT contracts and longer dated contracts of (generally) between 6 to 8 months.
- The consequences of any differences between Fonterra's actual RCP asset base and the Milk Price Manual Purely Notional Business asset base (see Appendix 1 for further details).
- The consequence of differences between Fonterra's Notional Business' funding decisions (and therefore its cost of capital) and that of the assumed Milk Price Manual's Purely Notional Business.

2.13 Fonterra's broader New Zealand-based commodity or Actual Business is also exposed to 'stream return' risk ("**Stream Risk**"), in respect of variances between returns to commodity products not included in the milk price basket of RCPs and returns to RCPs.

3 Additional analysis that may (or may not) support the concluded asset betas in our Prior Report for Fonterra's Notional Business and Actual Business.

Does Fonterra's Notional and Actual Businesses have features similar to regulated entities?

3.1 Lally (2016a) in his "Questions for Fonterra" suggests that:

- Fonterra's Notional Business is akin to a revenue-capped firm. However, because milk costs are over 80% of the costs, Fonterra's Notional Business faces differences between actual and efficient non-milk costs and thus the business is closer to a cost reimbursement operation. Where Fonterra's Notional Business lies between the business of a revenue capped firm and a costs reimbursement operation, this would exert a downward effect on the beta relative to the electricity lines businesses ("ELBs") (Lally 2016a, p4); and

- Fonterra's Notional Business is exposed to risks that efficient costs differ to the actual costs of the business. In this respect actual expenses are more likely to be high (low) when GDP is high (low). Market returns are also high (low) when GDP is high (low). Thus 'beta' can be

negative as the net cash flows of the firm are higher (lower) when market returns are low (high) (Lally (2016a, p3).

3.2 On this basis Lally (2016a) suggests the asset beta for Fonterra's Notional Business should be less than that of ELBs.[16]

UniServices' Comment

3.3 We agree with Dr Lally's (2016a) assessment that:

- Fonterra's Notional Business exhibits some features of a cost reimbursement operation and that the business may lie between the business of a revenue capped firm and a cost reimbursement operation; and
- Fonterra's commodity business may have negative (as well as positive) exposure to systematic risk factors arising from "efficient" costs differing to the actual costs of the business.

Differences in asset betas and type of regulation

3.4 In Auckland UniServices' view, asset betas for regulated utilities provide a relevant benchmark to assess the asset beta for Fonterra's Notional Business. However, it is not clear what adjustments if any should be made for the impact of the type of regulation, or in the case of Fonterra's Notional and Actual Businesses an adjustment for the "cost reimbursement" nature of the operation, where the farmgate milk price is set in accordance with the Milk Price Manual.

3.5 Lally (2016b) provides an overview of the effect of regulation on beta. He concludes there is no empirical study that provides any strong conclusive evidence that asset betas are lower for rate of return and revenue capped businesses compared to price capped businesses. In the absence of a sufficiently large number of suitable firms to assess any beta differential, Lally (2016b) therefore recommends use of the same asset beta for revenue capped businesses and price capped (DPP) businesses. We again note, however, this is notwithstanding Dr Lally's belief that price capped businesses should likely have a higher asset beta (by an unknown amount) compared to a revenue capped business.[17]

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[16] Lally (2016a, page 4) states:
"So, since any beta increment for market weight would be less than that suggested by Marsden, and a beta deduction to reflect the regulatory scenario would be at least this amount, the beta of the Notional Business should be less than that of the ELBs."

[17] In our Prior Report (para 6.12) we also noted that:
"*The Commerce Commission in its Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper (2010) also reference work by Joskow (2005) and others, which suggests there are only relatively small differences between the regulatory regimes in respect of revenue cap regulation in the UK and cost-of-service regulation in the US".*

3.6 In a recent submission to the Commerce Commission, Hird (2016) also reports there is no reliable evidence of any statistical difference in asset betas between price capped and revenue capped / decoupled businesses. Hird (2016, page 2) also notes that the Commerce Commission's current Input Methodology asset beta estimates for Electricity Distribution Businesses of 0.34 is towards the lower end of his range for the average asset beta estimates in the sample of companies employed in his study using monthly, weekly and daily data for periods ending 31 May 2010/2015 and 30 November 2010/2015.

Other Differences between a Pure Cost Reimbursement Business and Fonterra's Notional and Actual Businesses

3.7 Unlike a pure cost reimbursement operation Fonterra's Notional and Actual Businesses are exposed to:

- Price achievement risk relating to that portion of RCPs sold off-GDT at a price above GDT prices (Fonterra's Notional Business);
- Stream Risk (Fonterra's Actual Business); and
- Circumstances where Fonterra's Board may decide to pay either a higher or lower price than the milk price calculated in accordance with the Milk Price Manual.

3.8 We discuss the first two bullet points below. We discuss the implications of the Board's discretion to override the Manual in Section 4 of this report.

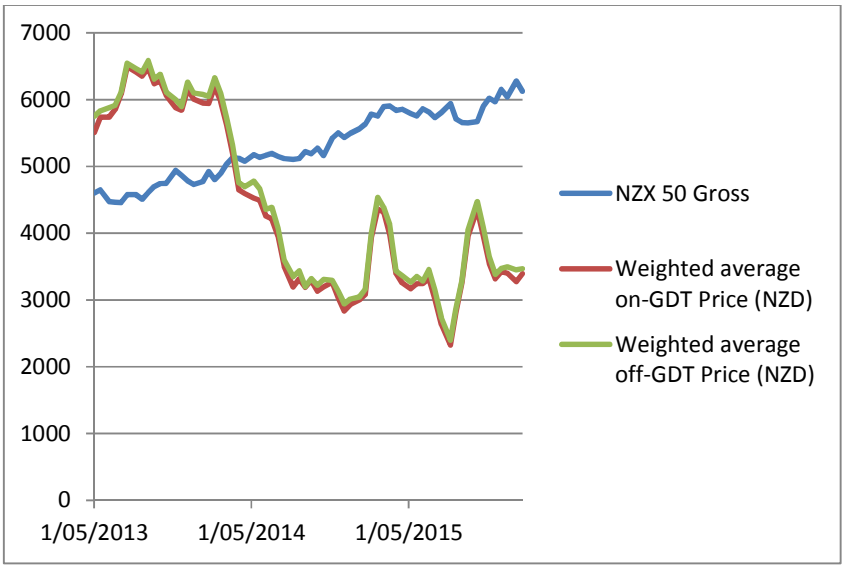
Price achievement risk for Fonterra's Notional Business (excess of off-GDT over on-GDT prices)

3.9 As already noted, Fonterra's Notional Business is exposed to additional pricing risk, in respect of its off-GDT contracts and longer dated contracts compared to the Milk Price Manual's Purely Notional Business.

3.10 We have sought to analyse in more detail if this risk is systematic or non-systematic.

3.11 In Figure 1 below we plot the values of the NZX 50 Gross index, the weighted average Whole Milk Powder ("WMP") on-GDT prices in New Zealand Dollars ("NZD") and the weighted average WMP off-GDT prices for the period 1 May 2013 to 19 Jan 2016.[18] The data points are fortnightly intervals.

[18] All data supplied by Fonterra and Ernst and Young



Source: Data supplied by Fonterra and Ernst and Young.

3.12 The figure suggests that:

- There is no clear relationship between NZX 50 Gross index and the level of the on-GDT WMP in NZD; and
- Off-GDT prices always exceed on-GDT prices by a small margin.

Price Achievement Risk

3.13 We define "**Price Achievement**" as follows:

Price Achievement = Weighted average WMP off-GDP price for RCPs – Weighted average WMP on-GDP price for RCPs

3.14 To gain some insight on whether or not Price Achievement risk is systematic or non-systematic, we undertake an ordinary least squares (OLS) regression as follows:[19]

$$\% \text{ Change in Price Achievement} = \alpha + \beta \times \% \text{ Change in NZX 50 Gross Index} + \varepsilon$$

3.15 The results of our regression analysis are as follows:

Regression parameter	Value	t-stat (p-value)
Intercept	0.235	2.13 (p-value = 0.04)
β coefficient	0.379	0.07 (p-value = 0.95)
Adjusted R^2	-0.016	
N= 65, fortnightly return data over time interval 1 May 2013 to 29 Jan 2016.		

[19] Returns are all calculated using discrete returns.

3.16 The β coefficient is not statistically significant at standard confidence levels and the adjusted R^2 of the regression is low.[20]

3.17 In Auckland UniServices' view, caution must be exercised in interpreting these OLS regression results when on-GDT and off-GDT prices reflect achieved prices,[21] whereas the NZX index (and changes in this index) will reflect ex-ante forward looking expectations. Overall, however, we find no strong evidence that Price Achievement risk is systematic risk.

Fonterra's Actual Business: Stream Risk from non-RCP product streams

3.18 In addition to Price Achievement risk, Fonterra's Actual Business is also exposed to Stream Risk, in respect of variances between returns to commodity products not included in the milk price basket of RCPs and returns to RCPs.

3.19 In this respect the Commerce Commission's Final Report 2014/15 notes (para. 6.21):

> *"We are unable to conclude on the practical feasibility of the asset beta. In particular, we were not able to understand the reduction in the asset beta from 0.48 for Fonterra's actual business to 0.38 for the notional producer. The independent reviewer notes that Fonterra's actual business is exposed to 'stream return' risk for commodities not included in the milk price basket. It is not clear to the Commission that the stream return risk is systematic, or that this risk justifies the adjustment to the asset beta that is made."*

3.20 Castalia (2015, page 3) also consider that stream risk return is likely to be non-systematic. This is because the risk that non-RCP products that Fonterra produces perform better or worse than RCPs is diversifiable.

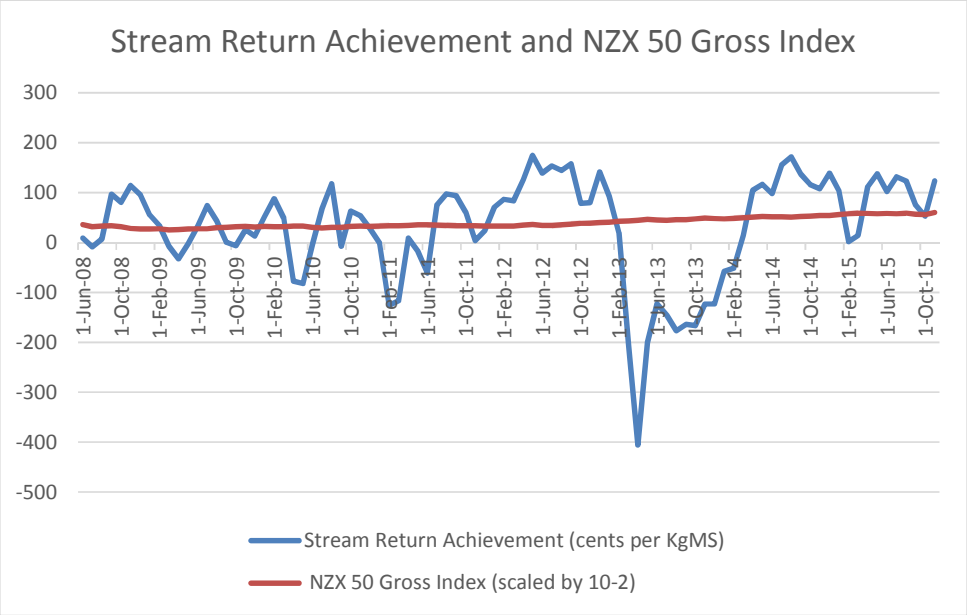
Is Stream Risk systematic?

3.21 We define Stream Return Achievement as follows:

Stream Return Achievement = Weighted average non-RCP price - Weighted average RCP price

3.22 In Figure 2 below we plot the level values of Stream Return Achievement and the values of the NZX 50 Gross index[22] for the period 1 June 2008 to 1 November 2015. The data points are at monthly intervals.

[20] We also performed regressions winsorizing the % Change in Price Achievement and the % Change in NZX 50 Gross Index to the 5 percent and 95 percent values. The β coefficient was still not statistically significant at standard confidence levels.
[21] Some of these prices may also be set under prior contracts.
[22] The NZX 50 Gross index has been scaled downwards by dividing by 100



Source: Data supplied by Fonterra and Ernst and Young

3.23 To gain insight on whether or not Stream Return Achievement is systematic or non-systematic risk, we undertake an ordinary least squares (OLS) regression as follows: [23]

$$\%\ \text{Change in Stream Return Achievement} = \alpha + \beta \times \%\ \text{Change in NZX 50 Gross Index} + \varepsilon$$

3.24 The results of our regression analysis are as follows:

Regression parameter	Value	t-stat (p-value)
α = Intercept	1.000	0.614 (p-value = 0.54)
β coefficient	11.404	0.245 (p-value = 0.81)
Adjusted R^2	-0.011	
N= 89, monthly return data over time interval 1 June 2008 to 1 Nov 2015.		

3.25 The β coefficient is not statistically significant at standard confidence levels and the adjusted R^2 of the regression is low. [24]

3.26 In summary, we find no strong evidence that Stream Return Achievement risk is systematic.

[23] Returns are all calculated using discrete returns.
[24] We also performed regressions winsorizing the % Change in Stream Return Achievement and the % Change in NZX 50 Gross Index to the 5 percent and 95 percent values. The β coefficient was still not statistically significant at standard confidence levels.

Market Weights

3.27 In our Prior Report we suggested that a small uplift in asset beta for Fonterra's Notional and Actual Businesses was warranted where these businesses are not listed on the NZX.

3.28 Lally (2016a) notes in respect of our Prior Report that:

- An increment of 0.035 to the asset beta for ELBs of 0.34 implies an implicit ratio of 1.40 for the variance of returns for Fonterra's Notional Business to that of the market;
- Given the Notional Business is close to a cost reimbursement operation, it seems likely that that the variance ratio will be below one and therefore there is no justification for a beta increment; and
- The calculations in our Prior Report (footnote 40) assume that ELBs (with a beta of 0.34) have zero weight. This is not the case and therefore exaggerates the adjustment for Fonterra's market weight.

UniServices' Comment

3.29 We agree with Lally (2016a) that ELBs in the NZ market do not have a zero weight. The largest listed ELB is Vector Limited ("Vector"). However, according to the website of Standard & Poor's, Vector with a current market capitalisation of circa $3,266 million[25] is still not included in the top 10 companies that are constituents in the NZX index.[26] This is despite Vector having a total market capitalisation greater than some of the top 10 stocks in the S&P/NZX All Index, but where in the index the stock's weight is determined by:[27]

"….. *its float-adjusted market capitalization. This is a function of current shares outstanding, the latest available stock price and the IWF. The IWF represents the float-adjusted portion of a stock's equity capital. Therefore any strategic holdings that are classified as either corporate, private or government holdings reduce the IWF which, in turn, results in a reduction in the float-adjusted market capital".*

3.30 However, the set of "comparator" companies used to benchmark the asset beta for Fonterra's Notional and Actual Businesses are listed entities and at least some of these entities will likely have some weight in their respective market indices.

3.31 We therefore acknowledge that any uplift in the asset beta on account of market weight will likely be relatively small and may be less than any adjustment suggested in Footnote 40 of our Prior Report.

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[25] According to https://www.nzx.com/markets/NZSX/securities/VCT as at 14 March 2016

[26] According to http://us.spindices.com/indices/equity/sp-nzx-all-index the top 10 companies as at 29 Feb 2016 are Spark New Zealand Ltd, Auckland Intl Airport Ltd, Fisher & Paykel Healthcare Corporation Limited, Fletcher Building Ltd, Ryman Healthcare Group Ltd, Contact Energy Ltd, Meridian Energy Ltd, SkyCity Entertainment Group, Z Energy Limited and Infratil Ltd.

[27] According to S&P/NZX New Zealand Indices, Methodology, October 2015, S&P Dow Jones Indices: Index Methodology (page 7), Sourced http://us.spindices.com/indices/equity/sp-nzx-all-index on 14 March 2016.

Expansion Options from off-GDT sales

3.32 As noted in our Prior Report, Lally (2008) suggests that the presence of growth options should increase the sensitivity of the firm's revenues and profits to positive economic shocks and hence increase beta.

3.33 Prima-facie the presence of growth options (for example, the building of new plant by Fonterra's Notional and Actual Businesses) will be more likely to be exercised when economic conditions are positive. This may occur when whole milk prices are high (positive for the NZ economy) and farmers increase milk production in response to higher prices. The ability of Fonterra's Notional and Actual Businesses to sell milk off-GDT at a premium to on-GDT prices raises the possibility the businesses may earn "excess" returns during periods of economic uplift, where the farmgate milk price is determined with reference to all sales on-GDT under the Manual.

3.34 However, in Auckland UniServices view, any uplift in asset beta on account of expansion options for Fonterra's Notional and Actual Businesses will be small, where we understand (based on discussions with Fonterra) that at the margin any increase in milk supply is likely to be sold on-GDT.

4 Board discretion to over-ride the Milk Price Manual and the impact of the Interest Free Loans to farmers on Fonterra's Notional and Actual Businesses

Circumstances where the Fonterra board may override the Manual

4.1 The Commerce Commission (2015, para 6.22) notes that it was not clear in our Prior report:

> *"the extent to which any Fonterra Board decision (or the ability to make such a decision) to subordinate (ie, reduce) milk price payments to farmers in favour of the returns to capital providers has been reflected in the asset beta".*

4.2 Under Fonterra's constitution, Fonterra's board has ultimate responsibility for setting the milk price, and therefore for determining whether any circumstances exist that warrant paying either a higher or a lower price than the price calculated in accordance with the Manual.

FY 14 adjustment

4.3 In our Prior Report (paragraph 3.16) we noted that for FY14, Fonterra announced that due to 'unprecedented' volatility in global commodity markets, coupled with other circumstances specific to FY14, it will pay a milk price below the price calculated under the Manual, with the forecast adjustment being circa 55 cents per kilogram of milksolids (kgMS), or approximately $870m in total.

4.4 We understand a significant factor in the Board's decision for FY14 to override the Milk Price Manual was in relation to Stream Risk and the large unexpected volatility and price differential between RCPs' and non-RCPs' stream returns.

4.5 In Section 3 of this report we have been unable to conclude that Stream Risk is systematic risk. This suggests there is no difference in the asset beta between Fonterra's Notional and Actual Businesses on account of Stream Risk.

Interest free loans

4.6 In our Prior Report (paragraph 3.19) we noted that:

> *"In principle, Fonterra's board could also elect to pay a milk price higher than the price calculated under the Manual. Fonterra advise that it is highly probable that given its fiduciary responsibilities the board would only elect to pay a higher amount if it could be demonstrated that this would be of long-term benefit to shareholders (rather than suppliers), for example to prevent assets otherwise becoming permanently stranded. Fonterra also advise that to date, Fonterra have struggled to conceive of circumstances where the "of long-term benefit to shareholders" test would in fact be satisfied."*

4.7 However, since our Prior Report there has been a large drop in commodity prices and the milk solid kgMS payout to farmers has continued to come under pressure. To illustrate, Fonterra's forecast farmgate milk price as at 24 September 2014 was $5.30 kgMS compared to the current forecast as at 8 March 2016 of $3.90 kgMS.[28]

4.8 In response to a low farmgate milk prices, Fonterra announced on 7 August 2015 an interest free loan from Fonterra to its share backed farmers.[29] This payment would comprise an additional 50 cents per shared-up kilogram of milk solids to support farmers this season. In this announcement the chairman of Fonterra, Mr John Wilson noted:

> *"This support is all about standing together as a Co-operative and using our collective strength to help our farmers get through these tough times".*

4.9 The Fonterra announcement noted that all its share backed farmers would have the opportunity to apply for the additional 50 cents per shared-up milk solids production for the season. The payment would be interest free for two years and repayable when the farmgate milk price moves above $6.00 per kgMS. [30]

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[28] See http://www2.fonterra.com/our-financials/farmgate-milk-prices

[29] See http://www.fonterra.com/nz/en/hub+sites/news+and+media/media+releases/fonterra+forecasts+total+payout+available+to+farmers+for+201516+and+announces+fonterra+co-op+support/fonterra+forecasts+total+payout+available+to+farmers+for+201516+and+announces+fonterra+co-op+support

[30] Ibid.

4.10 In a subsequent announcement on 10 December 2015, Fonterra maintained a forecast farmgate milk price of $4.60 per kgMS and also stated that:[31]

"Fonterra's Board also reviewed the Fonterra Co-operative Support loan. The loan was made available on production from 1 June to 31 December. The loan of 50 cent per kgMS is interest-free until 31 May 2017 with repayments triggered when the Farmgate Milk Price exceeds $6 per kgMS.

Mr Wilson said the Board's scheduled review had weighed up the improved Farmgate Milk Price and higher Earnings Per Share forecast since the loan was launched, when the milk price was at $3.85, and the need for financial discipline from the Co-operative. The Board had decided not to continue the Co-operative Support loan for milk collected after 31 December, but will monitor conditions and assess the need to continue the support if market conditions changed later in the season."

Cost of the Interest Free Loans

4.11 We understand the cost of the interest free loans are not included as a cost in the Manual to calculate the farmgate milk price[32]. In this respect, Fonterra's (2016)[33] submission to the Commerce Commission noted that:

"We would not in any case consider it appropriate to fund these costs from the aggregate amount payable for milk calculated under the Milk Price Manual, and therefore do not intend making any provision in the calculation of the base milk price."

4.12 Moreover, Fonterra (2016, footnote 2) noted that:

"If a provision was made in the base milk price calculation for the cost of funding the support payments, the practical effect would be to reduce the calculated base milk price by the average support payment funding cost per kgMS of milk supplied. The consequence would be that, in aggregate, Fonterra would not be providing any support to its suppliers (or, equivalently, that the support payments to the 76% of shareholders who have taken advantage of the payments were being funded, in part, through payment of a lower milk price to the 24% of shareholders

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[31] http://www.fonterra.com/wps/wcm/connect/Fonterra_NewZealand_en/Fonterra/Hub%20Sites/News%20and%20Media/Media%20Releases/FONTERRA%20MAINTAINS%20201516%20FORECAST%20FARMGATE%20MILK%20PRICE/FONTERRA%20MAINTAINS%20201516%20FORECAST%20FARMGATE%20MILK%20PRICE?pageID=Z6QReDe5RDA3R065RCCMMC6G1CIJMG6K9P6JM8CJPD4JMG6J1E43OGCJ9C46QG643 Website of Fonterra. http://www2.fonterra.com/

[32] We note the Fonterra announcement on 7 August 2015 stated "*Fonterra Co-operative Support for the first half of the season (June to December) is estimated to be up to $430 million, depending on take-up rates, and will be funded by one-off savings generated by changes the business is making, such as improving working capital."*

[33] Fonterra "Submission to the Commerce Commission on 'Process and issues paper – Review of 2015/16 base milk price calculation,'18 December 2015" dated 5 February 2016.

who have not applied for support payments. This would clearly be counter to Fonterra's objective of supporting its shareholders in the current low milk price environment."

4.13 Fonterra advise that the total amount of current annualised cost to Fonterra's Notional and Actual Businesses in relation to the interest free loans is circa $19.2 million per annum on a pre-tax basis or circa $13.8 million on an after-tax basis, equivalent to circa 0.95 cents per kgMS.

4.14 Relative to historical Net Profit after Tax ("NPAT") for Fonterra's Purely Notional Business of circa $379 million for the FY15 year, this represents 3.64% of NPAT.

Updated Milk Payout for 2015/16 Season

4.15 Fonterra announced on 28 January 2016 that it had reduced its forecast farmgate milk price for the 2015/16 season to $4.15 per kgMS.[34] This is down from Fonterra's payout of $8.40 kgMS for the 2013/14 season and $4.40 kgMS for the 2014/15 season.[35]

4.16 In its announcement on 28 January 2016, the Chairman of Fonterra, John Wilson, noted that:

"*Key factors driving dairy demand are declining international oil prices which have weakened the spending power of countries reliant on oil revenues, economic uncertainty in developing economies and a slow recovery of dairy imports into China. In addition, the Russian ban on European Union dairy imports continues to push more product on to the world market."*

"There is still an imbalance between supply and demand which continues to put pressure on global milk prices. Since last September, prices on GlobalDairyTrade for Whole Milk Powder (WMP) have fallen 12 per cent, and Skim Milk Powder (SMP) prices are down 8 per cent."

4.17 On 8 March 2016 Fonterra announced a further reduction in its forecast farmgate milk price for the 2015/16 season from $4.15 per kgMS to $3.90 per kgMS.[36] In this announcement the Chairman of Fonterra, Mr Wilson is quoted as stating:

"Management is fully focused on reducing cost and generating cash right across the business. The continuing lift in financial performance and our balance sheet strength will provide

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[34] See http://www2.fonterra.com/files/2016-01/mp-announcement.pdf

[35] According to http://www.interest.co.nz/rural-news/79996/westpac-economists-now-see-milk-price-just-460-2017-another-fall-dairy-prices-looms dated 15 February 2016 Westpac economists have reduced their year-ahead forecast for the farmgate milk price to $4.60 per kilogram of milk solids for 2017. ANZ has also reduced milk price forecast for the current season to just $3.95 and is forecasting $5.00 for 2017. http://www.interest.co.nz/rural-news/79873/anz-slashes-its-fonterra-milk-price-forecast-395-warns-farmers-will-have-wait-until

[36] See http://www.fonterra.com/nz/en/hub+sites/news+and+media/media+releases/fonterra+revises+201516+forecast+milk+price+2/fonterra+revises+201516+forecast+milk+price sourced 9 March 2016

opportunities to support our farmers' cash flows. We will provide an update on this at our interim results on March 23."

4.18 According to a NZ Herald article on 9 March 2016: [37]

"*Farmer support could take the form of another "soft" loan scheme similar to the one offered last year, when the forecast went as low as $3.85, or paying out a greater proportion of the company's dividend*".

4.19 We note, however, that Fonterra in announcing its interim results for the 2015/16 period did not offer any additional interest free loans to farmers. Rather it declared that, subject to Board approval and financial performance targets on earnings per share, it would bring forward remaining dividends of 20 cents per share to 10 cents in May and 10 cents in August. This was to help support farmers facing cash flow constraints. Fonterra noted that::[38]

"The timing of these payments is a specific response to the current, very challenging, financial conditions farmers are facing and does not signal any intention to move away from our normal practice of twice-yearly dividends paid in April and October."

Impact on Financial Stability

4.20 The Reserve bank of New Zealand ("RBNZ") Financial Stability Report, November 2015, page 30 notes that:

"Most farmers have sufficient financial capacity to absorb a period of negative cash flow, and banks have helped distressed farmers by expanding working capital facilities."

4.21 The RBNZ (Financial Stability Report, November 2015, page 31) also expresses longer term confidence in NZ's dairy industry, where it states:

"*Over the medium term, increasing consumption of dairy products in China and emerging markets is expected to support dairy prices that are significantly higher than current levels. Exports of dairy products to China have declined significantly in recent years, due to a run-down in inventories that had built up during the 2013-14 season. While there is uncertainty as to timing, China is likely to deplete its inventories and return to the market within the next year. Eventually, slower global production growth is also likely to support milk prices. New Zealand dairy farms have low costs of production compared to international competitors, and are well placed to benefit from higher milk prices.*"

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[37] See "Fonterra remains sound, says CFO" NZ Herald article by Jamie Gray, business reporter for the NZ Herald. Sourced 9 March 2016
http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11602379

[38] See http://www2.fonterra.com/entry/fonterra-interim-result-2015-16-frequently-asked-questions sourced 30 March 2016.

4.22 In a more recent announcement, dated 16 March 2016, the RBNZ [39]also concluded that the banking system would be robust to a severe dairy stress test. This includes a severe scenario where the farmgate milk price was assumed to fall to $3 kgMS in 2015/16 and remain below $5 kgMS until the 2019/20 season. Under this severe scenario land prices would also fall by 40 percent.

Impact on beta

4.23 In Auckland UniServices' view, the current low dairy prices increase the systematic risk of Fonterra's Notional and Actual Businesses compared to a "cost reimbursement operation". This is where:

- Fonterra's latest forecast milk payout of $3.90 kgMS is below the estimated breakeven milk price for the average farmer. According to Dairy NZ (2015),[40] the breakeven milk price for the average farmer is $5.40 kgMS (reduced to $5.25 kgMS).[41] The financial broker OMF (15 February 2016) is also reported as stating that the average New Zealand dairy farmer may lose $140,760 this season, with the next year also forecast to be difficult;[42]
- Low commodity dairy prices would be expected to negatively impact on GDP, where the dairy industry exports are a major contributor to New Zealand's exports. According to Statistics NZ for the year ended 31 December 2015, dairy remained NZ's main export commodity, earning New Zealand $11.5 billion in 2015. This compares to travel exports which earned $9.7 billion;[43] and
- Concern is also being expressed about the high level of farm debt and values.[44]

4.24 In summary returns to the owners of Fonterra's Notional and Actual Businesses may be lower during periods of low commodity dairy prices, and where Fonterra considers it important to provide additional support to farmers in periods where the milk payout is below the estimated

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[39] See http://www.rbnz.govt.nz/news/2016/03/banking-system-robust-to-severe-dairy-stress-test sourced 17 March 2016

[40] See http://www.dairynz.co.nz/news/latest-news/another-tough-season-ahead-for-farmers/ published 28 January 2016.

[41] According to http://www.interest.co.nz/rural-news/80338/dairynz-cuts-breakeven-milk-price-higher-expected-production-lowers-costs-farmers

[42] See http://www.scoop.co.nz/stories/BU1602/S00455/broker-warns-average-dairy-farmer-may-lose-140k-this-season.htm

[43] See http://www.stats.govt.nz/browse_for_stats/industry_sectors/imports_and_exports/GoodsServicesTradeCountry_HOTPYeDec15.aspx

[44] The RBNZ's Financial Stability Report dated November 2015 also notes (Chapter 4, Financial Risks to the New Zealand economy, page 25) that:

> "*Low milk prices are resulting in a second consecutive season of negative cash flow for many dairy farms. There is an elevated risk that highly indebted farms could come under significant financial stress, especially if farm land values decline. While milk prices are expected to recover over the medium term, global supply dynamics could slow the rate of recovery.*"

Available website of the Reserve Bank of New Zealand http://www.rbnz.govt.nz/

breakeven milk price for the average farmer. We consider that this downside risk, where Fonterra's Board may consider it necessary to provide additional farmer support during periods of low milk commodity prices, is likely to be at least partly systematic in nature. This will raise the asset beta for Fonterra's Notional and Actual businesses compared to a pure cost reimbursement operation.

4.25 In Auckland UniServices' view, Fonterra's Notional and Actual Businesses also face some systematic risks relating to asset stranding, where there is a possibility of a long-term downturn in commodity milk prices due to a structural / long-term shock and NZ milk production volumes substantially decrease in response to this negative shock.

4.26 While the quantum of any increment to the asset beta over and above a cost reimbursement operation is difficult to determine and, in our view, ultimately a matter of some judgement, the size of any increment is likely to be relatively small given:

- Notwithstanding the recent reduction in the farmgate milk price, we understand, based on our discussions with Fonterra, that the weighted average price for RCPs would need to fall by circa 70% (from the already current low prices) before Fonterra's Notional and Actual Businesses would be unable to cover fixed and variable costs (including a return on capital at WACC for assets employed).[45]

  This is based upon an indicative weighted average RCP of circa $5.60 kgMS equivalent (net of lactose costs) and total non-milk expenses (including depreciation and a return on capital) of circa $1.80 kgMS);

- Fonterra will likely also be mindful of its own credit rating in deciding on the level of any additional support the Notional or Actual Businesses may provide to farmers[46]; and

- The risk of asset optimisation or stranding only occurs at intervals of four years (unless the Milk Price Panel determines otherwise). In addition the Manual specifically requires that any independent reviewer must consider the necessity of maintaining a prudent level of buffer capacity to cover variations in year on year supply. Thus, a short to medium term downturn in milk prices related to systematic risk factors, which

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[45] Fonterra forecasts milk collection for the 2015/16 season to be down by 4% in volume. See https://www.nzx.com/files/attachments/232204.pdf sourced 22 March 2016. This is a relatively small volume decline and therefore the GDT price will be the main determinant on whether or not Fonterra's Notional Business would be able to recover costs for the 2015/16 season.

[46] Fonterra's submission to the Commerce Commission in support of the FY14 milk price included the following comment:

> "*Holders of Fonterra's debt, and agencies that rate that debt, place significant reliance on the effective subordination of milk payments. If they lost confidence that such payments would remain subordinate to debt obligations, Fonterra's ability to access debt, and its cost, would be materially affected*".

See Fonterra Reasons Paper on Review of 2013/14 base milk price calculation, 2 July 2014. Website NZ Commerce Commission.

negatively impact the volume of milk produced by NZ farmers, will not automatically justify an immediate optimisation of assets.[47]

5 Updated beta estimates for Global Dairy Businesses

5.1 The table below provides a summary of updated rolling asset betas over the period 31 December 2014 to 31 December 2015 for a sample of companies with some broad characteristics that are similar to Fonterra's commodities and ingredients business.[48]

Table: Summary of Beta Estimates					
DAILY 1 YEAR BETA (NO TAX)	31-Dec-15	30-Sep-15	30-Jun-15	31-Mar-15	31-Dec-14
MATERIAL COMMODITY EXPOSURE					
Average	0.47	0.48	0.45	0.46	0.45
Median	0.48	0.50	0.44	0.47	0.47
BOTH COMMODITY & BRAND EXPOSURE					
Average	0.51	0.51	0.48	0.49	0.51
Median	0.60	0.55	0.47	0.48	0.58
BRAND EXPOSURE					
Average	0.69	0.67	0.64	0.63	0.61
Median	0.76	0.68	0.60	0.59	0.60
WEEKLY 2 YEAR BETA (NO TAX)	31-Dec-15	30-Sep-15	30-Jun-15	31-Mar-15	31-Dec-14
MATERIAL COMMODITY EXPOSURE					
Average	0.41	0.43	0.41	0.45	0.46
Median	0.45	0.44	0.42	0.42	0.45
BOTH COMMODITY & BRAND EXPOSURE					
Average	0.42	0.45	0.47	0.53	0.57
Median	0.47	0.48	0.49	0.50	0.58
BRAND EXPOSURE					
Average	0.59	0.60	0.61	0.59	0.57
Median	0.64	0.58	0.60	0.56	0.60
MONTHLY 5 YEAR BETA (NO TAX)	31-Dec-15	30-Sep-15	30-Jun-15	31-Mar-15	31-Dec-14
MATERIAL COMMODITY EXPOSURE					
Average	0.56	0.55	0.57	0.54	0.53
Median	0.61	0.59	0.57	0.58	0.61
BOTH COMMODITY & BRAND EXPOSURE					
Average	0.47	0.48	0.47	0.48	0.47
Median	0.49	0.49	0.47	0.51	0.55
BRAND EXPOSURE					
Average	0.51	0.49	0.45	0.43	0.46
Median	0.54	0.51	0.42	0.47	0.50

[47] See Prior Report, paragraph 6.26.
[48] Data and analysis provided by Ernst and Young.

5.2 The comparable asset betas are estimated using the Hamada formula with the tax rate set to zero and average leverage rates over the relevant measurement period.[49] OLS regressions are used to estimate equity betas over the following periods:

- One year daily data;
- Two year weekly data; and
- Five year monthly data.

5.3 The sample of comparative companies have been split into three broad groups. These are companies with:

- Material commodity exposure;
- Both commodity and brand exposure; and
- Brand exposure.

We understand that all the companies in the three groups above have both commodity and non-commodity exposures. However, in general, the weight of the non-commodity exposure increases as we move from "material commodity exposure" to "commodity / brand exposure" and to the "brand exposure" group.

5.4 Appendix 2 provides details on the betas for the individual companies within each of these three broad groups.

Key Points

5.5 There is a trade-off between the number of observations, trading frequency and timeliness of the data in the choice between daily, weekly and monthly beta estimates. The use of daily and weekly data enables an increase in the number of more recent observations to empirically measure beta. However, particularly for small firms which are more likely to exhibit periods of non-trading, the use of daily data may result in downward biased beta estimates using standard OLS regression.

5.6 The table below summarises the range of the average (median) estimates over the rolling periods 31 December 2014 to 31 December 2015.

[49] This formula is:

$$\beta_A = \beta_L / \left[1 + \frac{D}{E}\right]$$

where: β_L = levered or geared beta, β_A = asset or unlevered beta and D/ E = ratio of market value of debt to market value of equity

SAMPLE GROUP	Daily average (median) range	Weekly average (median) range	Monthly average (median) range
MATERIAL COMMODITY EXPOSURE	0.45-0.48 (0.44-0.50)	0.41-0.46 (0.42-0.45)	0.53-0.57 (0.57-0.61)
BOTH COMMODITY & BRAND EXPOSURE	0.48-0.51 (0.47-0.60)	0.42-0.57 (0.47-0.58)	0.47-0.48 (0.47-0.55)
BRAND EXPOSURE	0.61-0.69 (0.59-0.76)	0.57-0.61 (0.56-0.64)	0.43-0.51 (0.42-0.54)

5.7 The number of observations in the comparator data set is relatively small and there is evidence of some noise in the data. Using daily and weekly beta estimates, the companies with "material commodity exposure" have the lowest daily/weekly average (median) betas between 0.41 – 0.48 (0.42 – 0.50). The average (median) daily/weekly asset betas for the companies with "both commodity and brand exposure" is between 0.42 – 0.57 (0.47 – 0.60) and for companies with "brand exposure" the average (median) daily/weekly asset beta is 0.57 – 0.69 (0.56 – 0.76).

5.8 Using monthly data, the companies with "brand exposure" have the lowest average (median) asset beta of between 0.43 – 0.51 (0.42 – 0.54). For the companies with "material commodity exposure", the average (median) asset beta is between 0.53 – 0.57 (0.57 – 0.61) using monthly data.

Do the comparator companies have a Milk Price Mechanism similar to Fonterra?

5.9 In the sample of our "material commodity exposure" companies we understand there are no truly comparative companies that set prices for their raw commodity under a price setting arrangement and "rules based" Milk Price Manual similar to Fonterra's commodity based Notional and Actual Businesses. In particular, and also based on discussions with Fonterra, we are not aware of any companies that, like Fonterra, have the ability to make ex-post adjustments to pass through variances between forecast and actual performance to the milk price.

5.10 We note that Bega Cheese Ltd, an Australian listed company on the ASX with business interests in dairy products, is still exposed to competition for milk and must pay a market-determined price.[50]

[50] In Bega's 2015 Annual Report the Chief Executive Officer states (page 12):

"*Notwithstanding the fact that the vast majority of milk supply was committed for three years, Bega Cheese Group had to meet the competition in relation to the milk price it paid in FY2015. Bega Cheese Group is pleased that its milk suppliers received a highly competitive farm gate milk price in addition to the support they received under the Milk Sustainability and Growth Program positioning both the farmer suppliers and the Company well for the future.*"

Source: http://www.begacheese.com.au/wp-content/uploads/2012/10/04-2015-ANNUAL-REPORT.pdf

Conclusion on empirical evidence

5.11 In Auckland UniServices' view the updated empirical evidence suggests a point estimate asset beta (using the Hamada no-tax formula) for a dairy company with both commodity and value added components would likely fall in the range of between 0.41 and 0.61. This estimate broadly spans the range of the rolling average / median asset betas using daily, weekly and monthly data in the table above for the "Material Commodity Exposure" and "Both Commodity & Brand Exposure" sample groups.

5.12 However, as noted in our Prior Report we consider this asset beta would overstate the level of systematic risk for Fonterra's Notional Business, where returns under the Manual are calculated with reference to ex-post revenues before the determination of the farmgate milk price to farmers (suppliers).

6 Updated Brokers' estimates of beta for New Zealand Dairy Processors

6.1 The table below provides updated beta estimates extracted from NZ Brokers' reports.

Analyst	Date	Stated Asset Beta in brokers report	WACC	Notes:
Macquarie	1-Dec-15	0.65 for Ingredients and Global Value Add business	8.8% for Ingredients and Global Value Add business	Asset beta of 0.65, Risk free rate of 3.6%, Post-tax market risk premium of 7.0%, target D/V of 50% and WACC of 8.8%. Page 2 of the Macquarie Report.
Forsyth Barr	28-Jan-16	n.p.	8.7% for Ingredients and Global Value Add business	Equity beta of 0.86, Risk free rate of 4.5% and WACC of 8.7%. Page 7 of the Forsyth Barr Report.
Credit Suisse	11-Dec-15	0.45 for Ingredients Business	8.2% for Ingredients and Global Value Add business	Use an asset beta of 0.60 (down from 0.65 on refinement of the mix between Ingredients contribution where Credit Suisse use a 0.45 asset beta and Global value add where Credit Suisse use a 0.75 asset beta). Page 12 of the Credit Suisse Report. Apply a FY16 WACC of 8.2% (risk free rate of 5%, market risk premium of 7%, asset beta of 0.60). Page 15 of the Credit Suisse Report.
UBS Investment Research	31-Jan-13	0.55	n.p.	UBS comment on the fact that the asset beta of 0.45 is considered too low based on observed beta's in the US and Europe closer to 0.60 to 0.70, however also noting that the observed betas may carry a commodity price risk and not be a tolling type operation akin to NZ Milk Products. They assigned a beta of 0.55 to the NZ Milk Products business

Source: Brokerage Reports provided by Fonterra.

n.p. = not provided.

6.2 The only broker in the table above that provides a specific (and recent) estimate for the Ingredients Business of Fonterra is Credit Suisse with a point estimate of 0.45. The Macquarie beta estimate of 0.65 is for Fonterra Shareholder's Fund, which we understand comprises both the ingredients and the global value added businesses. In our Prior Report (paragraph 10.2) we also noted that UBS Investment Research in January 2013 assigned an asset beta of 0.55 to Fonterra's Milk Products business.

6.3 In discussions with Fonterra, we understand the 'Ingredients Business' referenced to by brokers will be broader than our definition to Fonterra's Actual Business, in at least one, and possibly two, ways:

- Geographic scope: Fonterra's Actual Business only manufactures commodity-type ingredients products from NZ milk, whereas Fonterra's actual Ingredients Business also manufactures in other countries (e.g. Australia & Chile); and
- Product range: Fonterra's Ingredients Business' product range also includes food service and nutritional products.

6.4 In summary, the brokers' estimates for Fonterra's actual commodity based businesses are between 0.45 and 0.55. These estimates fall within the range of our comparative company evidence for the "material commodity exposure" and "both commodity and brand exposure" sample groups in Section 5 of our report.

6.5 However, as already noted, we understand that none of these comparators have the ability, like Fonterra, to make ex-post adjustments to pass through variances between forecast and actual performance to the milk price. In Auckland UniServices' view the brokers' estimates of Fonterra's commodity based business overstate the asset beta for Fonterra's Notional and Actual Businesses based upon our assessment of:

- Fundamental risk factors that impact on beta for Fonterra's Notional and Actual Businesses; and
- The broader comparative company empirical evidence on asset betas in Section 5 of our report.

7 Comment on submissions relevant to asset beta by Open Country, Synlait and Miraka

Submissions on asset beta by Open Country and Castalia

7.1 The submission by Open Country (2015) to the Commerce Commission states that our Prior Report for Fonterra on the notional processor's asset beta (page 2): [51]

- "*Provides little basis for the point estimates reached*
- *Underplays the volatility in demand faced by the notional processor*
- *Overplays the strength of regulation in reducing asset beta; and*
- *Overplays the distinctions between Fonterra and the notional processor in creating a 'notional processor discount' of 0.1 to the asset beta that is not explained*."

[51] Open Country submission published on the website of the Commerce Commission 31 August 2015 headed "Submission on the Commerce Commission's Draft Report – Review of Fonterra's 2014/15 Milk Price Calculation. Source: website of the NZ Commerce Commission.

7.2 The Castalia Submission (2015) commissioned by Open Country also argues that Fonterra's Notional Asset point estimate asset beta should be higher than the asset beta in our Prior Report for at least two additional factors (Castalia Submission, page 2).

- *"A significant proportion of demand for dairy products (particularly to China) should be characterised as discretionary purchases with a higher price elasticity of demand", and*
- *Our Prior Report overstates the impact of regulation on Fonterra."*

7.3 In support of these arguments the Castalia Submission further notes (page 2):

- *"Dr Marsden states that a factor indicating a low beta is that the milk products Fonterra and the notional processor produce (and the products for which they are inputs) have a relatively low [price] elasticity of demand compared to discretionary goods or services. As we discussed in our earlier letter to the Commission this approach fails to consider that a significant proportion of value-added dairy products are discretionary—particularly when purchased in countries like China. It is widely understood that the growth in real incomes in China—the rise of the 'middle class'—has been a significant driver for the increase in demand New Zealand's dairy industry has experienced in recent years. As NZIER states, as economies such as China experience higher living standards, they replace staples like rice, lentils and beans with higher protein foods—particularly dairy products. Given the volatility currently being experienced in the Chinese economy (most visibly in its stock markets), it will be interesting to see how changes in the wealth of the Chinese middle class translates into demand for dairy products. The reality is that these effects are unknown—and likely more volatile than Dr Marsden suggests.*
- *In addition, Dr Marsden relies significantly on Fonterra being under a heavy form of regulation to justify a low beta. For example, Dr Marsden considers that the regulation applied to the notional business shares characteristics with other regulated infrastructure, for example electricity distribution businesses. Given that the Commission has no powers to set prices and can only comment on whether or not the milk price is consistent with DIRA's objectives, this does not seem an appropriate comparison. In fact, the regulatory responsibilities and powers of the Commission differ significantly under DIRA and Part 4 of the Commerce Act."*

UniServices' Comment

Discretionary nature of value added Products

7.4 We agree with Castalia's claim that a significant proportion of value-added dairy products may be discretionary, particularly when purchased in countries like China.

7.5 However, in our view this demand risk is relevant to Fonterra's value-added business. Under the Milk Price Manual, the milk price is a "residual" payment and calculated after actual (ex-post) revenues are known or determined. The ex-post or actual farmgate milk price revenue is determined based upon (also see Appendix 1 of our Prior Report):

- Farmgate milk price production; and
- Sales of the basket of RCPs predominantly on-GDT.

7.6 Thus in the absence of Fonterra's choosing to over-ride the Manual to set the milk price, Fonterra's Notional and Actual Businesses are substantially insulated from fluctuations in milk demand and price. This is in addition to the price-setting mechanism under the Manual also insulating Fonterra's Notional and Actual Businesses from earnings risk related to volatility in the volume of milk supply.

Prior Report overstates the impact of Regulation

7.7 We agree with Castalia that the regulatory responsibilities and powers of the Commerce Commission differ under DIRA and Part 4 of the Commerce Act.

7.8 However, in Auckland UniServices' view, the rules under the Milk Price Manual provide a price-setting mechanism for the milk price that has features similar to the price-setting mechanism for regulated businesses.

7.9 Shareholders in companies subject to revenue cap regulation are exposed to risks that efficient operating costs are different to actual operating costs.[52] The 'owners' of Fonterra's Notional and Actual Businesses also face this type of risk, but similar to revenue-capped firms are insulated from price and volume risk.

7.10 Hence, in Auckland UniServices' view, asset betas for regulated industries are relevant in forming a view on the appropriate asset beta for Fonterra's Notional and Actual Businesses, where the farmgate milk price is set in accordance with the Manual.

Discount on asset beta for the Notional Business

7.11 The Open Country Submission (page 2) and the Castalia Submission (page 3) also state that the discount of 0.1 applied in our Prior Report to Fonterra's Actual Business beta to estimate the beta for Fonterra's Notional Business is too large and only a limited discount is appropriate. Specifically, the Castalia submission states (page 3).

"*As discussed by the Commission, no supporting evidence is provided for how this discount has been derived, so it is difficult to understand Dr Marsden's rationale. However, what appears to be driving the discount is that Dr Marsden considers Fonterra to face five additional business risks compared to the notional processor:*

- *Fonterra's revenues depend on both returns to reference commodity products (RCPs) as well as non-RCPs*
- *Fonterra may under-recover or over-recover actual costs relative to the notional processor (whose costs are a mix of notional and Fonterra's actual costs)*
- *Pricing risk related to off-GDT contracts and longer dated contracts*
- *The consequences of differences between the asset bases of Fonterra and the notional processor*
- *The consequences of differences between the cost of capital of Fonterra and the notional processor."*

[52] Also see Lally (2016a).

7.12 The Castalia Submission (page 3) considers that:

- The first bullet point in the paragraph above is not relevant for the purposes of estimating asset beta because the risk that non-RCP products that Fonterra produces perform better or worse than RCPs is diversifiable. The Commission has also expressed support for this position; and
- The other four bullet points in the paragraph above would likely be limited in their effect in driving any discount.

UniServices' Comment

7.13 In Section 3 of this report, we present some analysis on whether or not the risk that non-RCP products perform better or worse than RCP is diversifiable and/or correlated with market returns.

7.14 The results of this analysis are inconclusive. Accordingly, we accept Castalia's proposition that any difference in relative price risk for the sale of non-RCP and RCP products or Stream Risk is likely to be diversifiable risk and hence should not impact on our assessment of the asset beta for Fonterra's Actual Business.

7.15 As already noted, we therefore adopt the same point estimate of the asset beta for Fonterra's Notional and Actual Business, where we are unable to conclude any Stream Risk is systematic.

Submissions on asset beta by Synlait

7.16 The Synlait (2015) submission to the Commerce Commission notes (Paragraph 24.1) that:

> *"The notional producer is effectively assumed to always be the price setting participant in the (notional) wholesale milk market, and therefore to be naturally hedged in relation to commodity price volatility. We do not believe this is practically feasible in an actual wholesale market, and therefore the notional producer should be assumed to have an asset beta and WACC consistent with it having some exposure to earnings volatility as a result of the milk pricing actions of its competitors."*

UniServices' Comment

7.17 This report and our Prior Report seeks to determine an appropriate asset beta for Fonterra's Notional and Actual Businesses where the milk price is set in accordance with the Manual.

7.18 In Auckland UniServices' view, the question of whether or not the concept of Fonterra's Notional Business is "practically feasible" is outside the scope of our Prior Report or this Report.

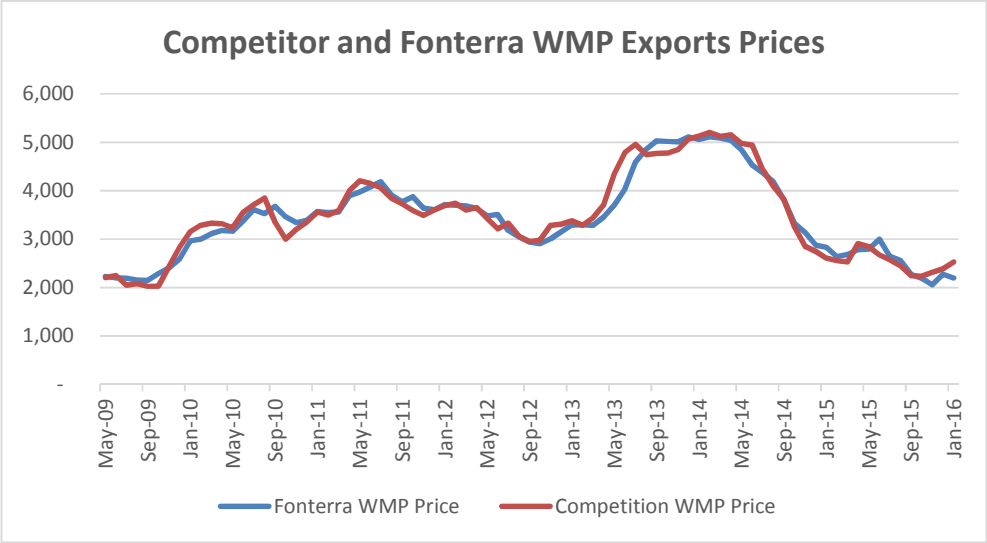
7.19 In our Prior Report (paragraphs 11.4 to 11.6) we noted, however, that:

> "*In our view, Synlait is correct in its assertion that other processors will face some incremental risk relative to Fonterra, due to other processors' inability to perfectly match*

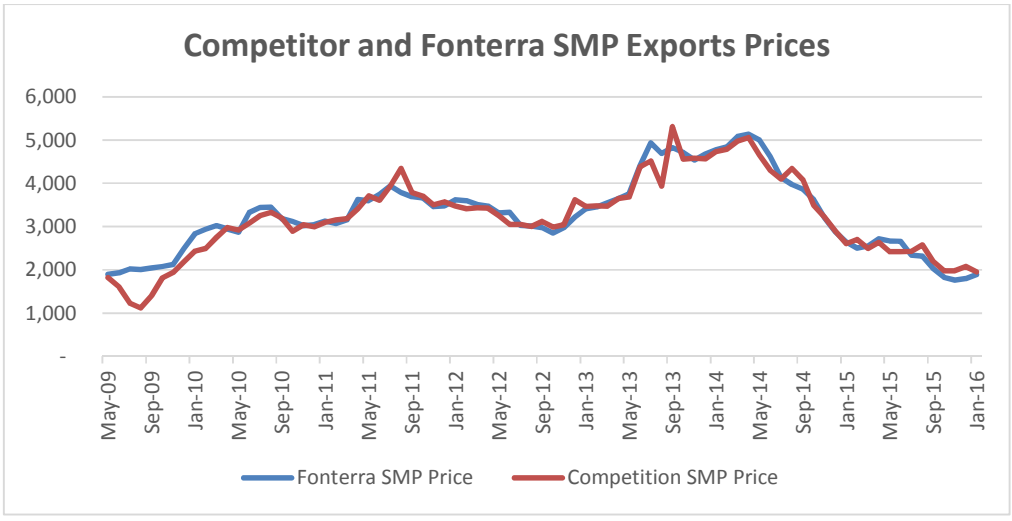
factors such as Fonterra's sales phasing and foreign exchange rate conversion profiles in the absence of perfect information." (paragraph 11.4); and

"*We note, however, that at least some of this risk may be diversifiable and have both "under" and "overs" depending on the other processors actual sales phasing and foreign exchange conversion rates*". (paragraph 11.5);

7.20 To further investigate if the risks relating to other milk processors' inability to perfectly match factors such as Fonterra's sales phasing and foreign exchange rate conversion profiles in the absence of perfect information (hereafter described as "**Phasing Risk**") are systematic or non-systematic, we plot below the average monthly export prices reported by Fonterra and other competitor NZ milk processors (in aggregate) for WMP and SMP.[53]



Source: Monthly data between May 2009 and Jan 2016 provided by Fonterra.



[53] All data soured from Fonterra.

Source: Monthly data between May 2009 and Jan 2016 provided by Fonterra.

7.21 Caution must be exercised in interpreting the figures above where differences between Fonterra's and other processors' average prices will reflect some combination of differences in the times at which products were contracted for sale and differences in prices achieved in given contracting months. In addition, whereas Fonterra contracts product for sale both on and off-GDT, we understand that all other NZ processors solely contract off-GDT. However, the figures above suggest that Fonterra's export prices for WMP and SMP closely match prices achieved by other NZ processors.

7.22 We also undertook OLS regressions whereby we regressed the "delta" (being the percentage change in the difference between the competitor WMP or SMP export prices less Fonterra's WMP or SMP export prices respectively) against the % change in the NZX 50 index. In our regressions the "beta" coefficient on the % change in NZ 50 index variable was not significant at standard statistical confidence levels.[54]

7.23 In summary, based upon our analysis above, we find no strong evidence that Phasing Risk is systematic in nature.

Miraka Submission

7.24 The submission by Miraka (2015) notes that:

- *"The Report notes that Fonterra has commissioned an assessment of the WACC for these two notional businesses, but does not explain why they are relevant to the WACC for the FGMP. Given Fonterra has used the report to justify a change in the WACC for the FGMP, it must be assumed that Fonterra considers either or both these notional businesses to be relevant for the "practical feasibility" test. The Commission appears to accept this assumption, or more specifically does not contest the relevance of these new notional business concepts"* (Paragraph 4.2);

- *"The analytical framework laid out in the Report is unclear and inadequately defined. Of some concern, it posits (yet more) notional business concepts:*
  - *The "Fonterra Notional Business", which is distinct from the "Notional Producer" business on which the FGMP is based; and*
  - *The "Fonterra Actual Business" which is in fact not Fonterra's actual business, but a notional entity which comprises that part of Fonterra's New Zealand business which manufactures and sells dairy commodities*. " (Paragraph 4.1);

[54] Regressions were again based on monthly data between May 2009 and Jan 2016 provided by Fonterra. We also performed regressions winsorizing the % change in the price difference between competitors and Fonterra and the % change in NZX 50 Gross Index to the 5 percent and 95 percent values. The β coefficient was still not statistically significant at standard confidence levels. The adjusted R^2 for the regressions was also low.

- "*The new notional businesses are only broadly described in the Report*" (Paragraph 4.2); and

- "*The Commission is asked to seek an explanation from Fonterra and from Dr Marsden of the relevance of the Fonterra Notional Business to determining the FGMP WACC. The Commission is then requested to consider whether the Fonterra Notional Business is in fact appropriate for determining the FGMP WACC or its practical feasibility in accordance with Section 150A of the DIRA*" (Paragraph 4.7).

UniServices' Comment

7.25 As already noted above, the scope of our Prior Report and this report is restricted to the determination of the asset beta for Fonterra's Notional and Actual Businesses (where the milk price is set in accordance with the Manual).

7.26 Also, as noted by Miraka (2015) in paragraph 4.8 of its submission, the relevance of Fonterra's Notional Business to determining the FGMP WACC is a framing issue and is outside the scope of both our Prior Report and this report.

7.27 In respect of Miraka's comments that the new notional business was only broadly described in our Prior Report, we have sought to clarify the definitions of Fonterra's Notional and Actual Businesses in section 2 and Appendix 1 of this report.

8 Specific Risk Premium

Purpose of our Model

8.1 In our Prior Report we sought to apply a relatively simple model to quantify the increment to WACC in respect of asset stranding or optimisation of Fonterra's Notional Business Assets. This is in lieu of any specific allowance for expected losses due to asset stranding not included in the expected cash flows under the mechanism to set the farmgate milk price in the Manual.

8.2 In Auckland UniServices' view, assets could become stranded for a variety of reasons. For example, this might include:[55]

- A localised but serious outbreak of "Foot and Mouth" disease in the area where Fonterra has a milk processing plant. Milk supply within this area completely stops and effectively the area is "quarantined" meaning Fonterra cannot divert alternative milk supplies to the plant in the quarantined area;

[55] In our Prior Report (paragraph 6.30) we suggested that the risk of asset stranding from a change in RCPs is low. This is where the risk of any significant changes to the RCPs is likely to be relatively low and Fonterra's Notional Business has some protection against the risk of asset optimisation from adjustments to RCPs under Rule 30 of the Manual.

- A localised and ongoing volcanic eruption that may not destroy Fonterra's plant but pollute the land, significantly reduce output and workers migrate to other areas. It is also not economic to divert alternative milk supply to the plant from other sources;
- Localised disease and/or persistent drought that impacted a specific region;
- Localised alternative land use that encourage widespread conversion away from dairy use and milk production; and
- Biological terror type event.

Model Calculations

8.3 Lally (2016a) also requested further details of our calculations of the figures in Column 2 of Table 10 at para 5.10 of our Prior Report.

8.4 Appendix 3 of this report provides further explanation of our model and the construction of the tables used to determine any compensation for expected losses by way of an increment to WACC for the possibility of asset stranding.

Order of any Asset Optimisation

8.5 In our Prior Report (Appendix 2, paragraph 5.11) we noted that factors in accordance with the rules in the Manual, which reduce or mitigate the risks associated with asset stranding and optimisation include:

- The asset base is only reviewed every 4 years; and
- The plant with the earliest deemed acquisition date will be removed from the farmgate milk price asset base.

8.6 In terms of the Manual we now understand that Fonterra would allocate any allowance for asset stranding across the oldest North or South Island plant (depending upon which Island is subject to the adverse event).[56]

8.7 To illustrate our understanding of the "allocation" under the Manual in respect of asset stranding, assume a hypothetical localised disaster in the North Island of New Zealand, where this is not covered by insurance and/or is not insurable and where there is no ex-ante compensation for any expected loss in the cashflows. This is a highly significant event and leads to asset stranding in the localised area surrounding the "disaster". The asset stranded is one of Fonterra's newest plants, which has just recently been constructed. It is also not practical to divert milk to this plant from other areas outside the area of the localised disaster.

8.8 In the absence of Rule 31 in the Manual, this new asset in the localised area would be removed from the farmgate milk price asset base.

[56] However, at this stage we have not sought to modify our model for this added complexity where asset stranding may be specific to one Island. This is beyond the scope of our report and would require more detailed information on Fonterra's plant breakdown between its North and South Island operations.

8.9 We understand, however, that in respect of the scenario above Fonterra would apply Rule 31 of the Manual as follows. The plant capacity over Fonterra's North Island milk processing plants will be assessed and productive capacity starting with the oldest plant (i.e. with the earliest deemed acquisition date) will be removed from the farmgate milk price asset base. Thus, the new plant in the localised area of the "disaster" would still be included in the asset base of Fonterra's Notional Business.

8.10 This "old plant" will have a lower deemed remaining asset value under the tilted annuity approach and "Annual Capital Recovery Amount" under Rule 34 of the Manual, compared to the asset value of the plant which is actually stranded.

Circumstances under which it is not reasonable to assume the oldest plant in a region would be stranded

8.11 Fonterra has requested that we consider if there may be circumstances under which it is not reasonable to assume the oldest plant in a region would be stranded in the event of a permanent decrease in milk supply or a change in the RCP basket.

8.12 In discussions with Fonterra, we understand that, in practice, in the event of a significant reduction in milk supply, Fonterra (and by implication Fonterra's Notional and Actual Businesses) would consider closing entire sites. However, the business case of shutting down new plant would still be against the counterfactual of shutting down the oldest plant. In many cases it may be more practical and cost effective to divert milk supplies to favour utilisation of Fonterra's newest plant.

Review of Probability of Stranding and Percentage of Assets Stranded

8.13 The Commerce Commission Final Report 2014/15 notes that (paragraph 6.25, page 59).

> *"Although we agree with the independent reviewer that there should be quantification of an allowance for the asset stranding risk, we are unclear if the quantification was made on an empirical basis or by using subjective assumptions. It is not clear how Fonterra has selected 0.15% from the independent reviewer's suggested range of values."*

8.14 Lally (2016a) also notes that our Prior Report in respect of stranding risk:

> *"seems to have adopted entirely arbitrary assumptions about the probability of stranding and the percentage of assets stranded in the event of a stranding. Some reference should be made to the empirical experience of both variables. If there is no such experience, this should be acknowledged and then at least continuous distributions for both variables should be adopted*"; [57]

UniServices' Comment

[57] In respect of Lally's (2016a) comment that continuous distributions for *both* variables should be adopted, we consider this adds greater complexity to the model. Given the subjective nature of a number of the assumptions we have not attempted at this stage to modify our model in this regard.

8.15 In making our assessment of the increment to WACC for asset stranding or optimisation risk in our Prior Report, we noted this increment was subjective. For instance:

> *"In Auckland UniServices view, assessment of the probability of asset stranding and the percentage of the asset base that may become stranded is subjective"* (See Prior Report, Appendix 2, paragraph 5.15).

> *"Under a relatively simplistic model and our subjective set of assumptions, we derive an increment to the cost of capital for asset stranding risk of between* ***0.08%*** *and* ***0.19%****. (*See Prior Report, Appendix 2, paragraph 6.4).

Insurance against Asset Stranding Risk

8.16 Fonterra advises it has [ ] insurance cover against loss of profits in the event a site cannot be operated due to events such as a volcanic eruption or a biosecurity event.

Foot and Mouth Disease

8.17 An outbreak of foot and mouth disease may have serious consequences for New Zealand's economy.

8.18 A now dated study by Sanson (1993) states in relation to foot-and-mouth disease (FMD)

> *"A number of studies were conducted to assess the risk of FMD entry into New Zealand, and examine the potential for disease spread through normal farm movement patterns. The best current estimate of the risk of an FMD outbreak is about once in 50 years (0.0199). The mean expected number of FMD infected secondary properties under MAF's exotic diseases and pests responses programme is 61 (median 33, range 1 to 1103). In order to contain 95% of the movements that might occur off an index farm prior to diagnosis, an infected area would have to have a radius of 100 km around the property."*

8.19 While the probability of an outbreak of a foot and mouth in New Zealand may now have reduced with improved biosecurity controls, the website of the Ministry of Primary Industries states:[58]

> *"To date, New Zealand has never had an outbreak of FMD. Due to our geographical isolation and strict border controls, the risk of it arriving here is low. However, because it is highly contagious and risk can never be eliminated, there is always the possibility of an outbreak here. In recent years, the United Kingdom, Japan and the Republic of Korea have had FMD outbreaks, and FMD is now well-established in many parts of Africa, Asia, the Middle East and South America.*

[58] See (sourced 9 March 2016)
http://www.biosecurity.govt.nz/pests/foot-and-mouth

An outbreak of FMD in New Zealand would seriously impact New Zealand's economy through the suspension of all trade in animal products and major disruption to primary industry businesses (such as farms, animal product processing businesses, rural contracting businesses and transport)."

Conclusion on the Increment to WACC

8.20 In the table below we provide an updated range of any WACC increment based upon subjective assumptions on the probability of asset stranding and the percentage of assets that may become stranded,[59] The table below presents the WACC increment based upon:

- The probability of asset stranding between 1.0% and 5.0%; and
- % of assets that may be stranded between 1.0% and 12.5%.

8.21 Our calculations in the table below adopt the same set of key assumptions as detailed in Appendix 2, Paragraph 5.9 of our Prior Report. [60] The increment to WACC in the table below ranges between 0.0% and 0.2%.

Table: Increment to WACC					
		Probability of Stranding			
		1.0%	2.0%	3.0%	5.0%
% asset standing	1.0%	0.001%	0.003%	0.004%	0.007%
	2.5%	0.003%	0.007%	0.010%	0.017%
	5.0%	0.009%	0.018%	0.027%	0.045%
	7.5%	0.016%	0.033%	0.049%	0.082%
	10.0%	0.026%	0.052%	0.078%	0.129%
	12.5%	0.038%	0.076%	0.114%	0.189%

8.22 We are not, however, able to provide robust empirical evidence with respect to the possible events and probabilities of each event that may result in assets becoming stranded. Our range of assumptions with respect to the probability of asset stranding and the percentage of assets that may be stranded are subjective.

8.23 In the absence of robust empirical evidence to support an appropriate increment to WACC as compensation for any expected loss for asset stranding, a nil WACC increment might be adopted.

8.24 Effectively this would assume the probability of asset stranding from all possible adverse or asymmetric type events is either nil or any compensation for expected losses is not material in

[59] As already noted, it is assumed any additional compensation by way of an increment to WACC for an expected loss from asset stranding is not already included as a "cost" in the cashflows to calculate the milk price.

[60] In our Prior Report we stated the assumed WACC was 6.8%. This should have read 6.9%. However, the difference between use of a 6.8% or 6.9% WACC assumption has no material impact on our calculations or results in our Prior Report.

the context of Fonterra's overall WACC for the Notional Business. Under our model an increment to WACC of zero would be warranted where the assessed probability of asset stranding was [say] 2.0% or less and the percentage of assets stranded was also small at only [say] 2.5% or less.

8.25 Fonterra's board has ultimate responsibility for setting the milk price and may therefore wish to exercise its own judgement on the size of any increment to the WACC[61] as compensation for expected losses of asset stranding.

Equivalent Increment to the Cost of Equity Capital

8.26 Fonterra has also requested we restate our range of any possible increment to WACC as an equivalent increment to the cost of equity. The table below provides the equivalent cost of equity increment assuming leverage (ratio of debt to total value) of 40%.

Table: Increment to Cost of Equity					
		Probability of Stranding			
		1.0%	2.0%	3.0%	5.0%
% asset stranding	1.0%	0.002%	0.005%	0.007%	0.011%
	2.5%	0.006%	0.011%	0.017%	0.028%
	5.0%	0.015%	0.030%	0.045%	0.074%
	7.5%	0.027%	0.055%	0.082%	0.137%
	10.0%	0.043%	0.086%	0.129%	0.215%
	12.5%	0.063%	0.126%	0.189%	0.315%

9 Summary and Conclusion

Conclusion on asset beta

9.1 Estimation of beta ultimately involves some element of judgement.

9.2 Our updated estimates of the asset beta for Fonterra's Notional and Actual Businesses are:

Business	Base case point estimate of asset beta	"Low" and "High" range of a point-estimate asset beta[62]
Fonterra's Notional Business	**0.375**	0.30 to 0.45
Fonterra's Actual Business	**0.375**	0.30 to 0.45

[61] Or an "equivalent" increment to the cost of equity capital.

[62] These estimates of a "low" and "high" range are not absolute values of any low or high range or indicative of any percentile ranges. In this respect we have not undertaken any detailed statistical or other analysis to estimate any standard error around a point estimate of asset beta.

9.3 We refer to paragraphs E7 to E11 in our Executive Summary that explains in more detail the reasons behind our updated estimates of the asset beta for Fonterra's Notional and Actual Businesses.

Increment to Cost of Capital (WACC) for Fonterra's Notional Business

9.4 Under a relatively simplistic model and our subjective set of assumptions (see Appendix 3), we derive a range for the increment to the cost of capital (WACC) as compensation for expected losses from an adverse type event that results in asset stranding, determined with reference to:

- The probability of asset stranding; and
- % of assets that may be stranded.

9.5 We are not able to provide any robust empirical evidence with respect to the possible events and probabilities of each event that may result in assets becoming stranded.

9.6 Fonterra's board has ultimate responsibility for setting the milk price and may therefore wish to exercise its own judgement on the size of any increment to the WACC or an equivalent increment to the cost of equity as compensation for expected losses of asset stranding.

10 References

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11 Appendix 1: Further detail on the differences between Fonterra's Purely Notional and Fonterra's Notional Business

11.1 Assume a one period model, with all assets also having a one period life only.

Notation [in addition to the notation in Section 2 of our report]:

V_{PNB} = opening asset value for Fonterra's Purely Notional Business in accordance with the Milk Price Manual
V_{NB} = opening asset value for Fonterra's Notional Business
$WACC_{PNB}$ = weighted average cost of capital for Fonterra's Purely Notional Business
$WACC_{NB}$ = weighted average cost of capital for Fonterra's Notional Business

Setting of the Milk Price under the Manual for Fonterra's Purely Notional Business

11.2 The NCF for Fonterra's Purely Notional Business assuming a one period model is:

$$NCF = RevRCP_{ON\ GDT} - MIL - EOTHRCP_{ON\ GDT}$$
$$= RevRCP_{ON\ GDT} - [RevRCP_{ON\ GDT} - V_{PNB}(1 + WACC_{PNB}) - EOTHRCP_{ON\ GDT}] - EOTHRCP_{ON\ GDT}$$

Where:

$$MIL = RevRCP_{ON\ GDT} - V_{PNB} \times (1 + WACC_{PNB}) - EOTHRCP_{ON\ GDT}$$

11.3 Under the Farmgate Milk Price Manual, the farmgate milk price for the Purely Notional Business is determined "ex-post" as a residual amount at the end of the relevant financial year. This is calculated with reference to actual (ex-post) revenues assuming almost all sales are "on GDT" from a commodity milk powders manufacturing business *less* notional (efficient) cash costs and a forward looking fair rate of return "on" and "of" capital.

Fonterra's Notional Business

11.4 The NCF for Fonterra's Notional Business is:

$$NCF = RevRCP_{ON + OFFGDT} - MIL - AOTHRCP_{ON + OFFGDT}$$
$$= RevRCP_{ON+OFFGDT} - [RevRCP_{ON\ GDT} - V_{PNB}(1 + WACC_{PNB}) - EOTHRCP_{ON\ GDT}] - AOTHRCP_{ON + OFFGDT}$$
$$= \underbrace{RevRCP_{ON + OFF\ GDT} - RevRCP_{ON\ GDT}}] + \underbrace{EOTHRCP_{ON\ GDT} - AOTHRCP_{ON + OFF\ GDT}}$$

Difference in revenues of a business with RCP sales both on and off GDT compared to a business with actual (ex-post) revenues with on GDT sales only.

Difference in efficient costs for a business selling RCPs on GDT and actual costs for a business selling RCPs both on and off GDT.

$$+ V_{NB}(1 + WACC_{NB}) + \underbrace{[V_{PNB}(1 + WACC_{PNB}) - V_{NB}(1 + WACC_{NB})]}$$

- Consequences of any differences between Fonterra's Notional Business RCP asset base and the Milk Price Manual Purely Notional Business asset base; and
- Differences between Fonterra's Notional Business' actual funding decisions (and $WACC_{NB}$) and the Milk Price Manual Purely Notional Business ($WACC_{PNB}$).

Appendix 1 – Cont. (This table has been prepared by Ernst and Young in consultation with Fonterra).

	Purely Notional Milk Price Business (PNMPB) per Manual	Incremental Earnings risk to Fonterra's RCP business (Notional Business)	Incremental earnings risk faced by Fonterra's RCP & non-RCP Business (Actual Business)
Revenue:			
Prices	Prices, and assumed timing of sales, are those actually achieved by Fonterra on GDT for sales contracted for shipment between 1 - 5 months after auction.	'Price achievement risk' on off-GDT sales of milk price products. While Fonterra will only ever sell off GDT for positive incremental returns, the magnitude of these total returns varies between years, with approximately $29m in FY11, $141m in FY12, $99m in FY13 & $76m in FY14. (Fonterra also incurs additional costs, which are largely fixed, to achieve these incremental returns.) Relative price risk on sales contracted on GDT for shipment more than 5 months after GDT event. Fonterra advises the relevant volumes are relatively minor (7% of GDT sales in calendar 2015).	Relative price risk on non-Milk Price products. Can be very significant – Fonterra estimates at > ($600m) in FY14, ($60m) in FY13 & positive in prior years. (The FY14 result was, however, passed through in full to the milk price.)
FX	Hedging gains / losses are based on Fonterra's actual hedging profile, so no exposure to earnings risk.	Profile of powder-related cash receipts varies a little to PNMPB's, given inclusion of both price achievement revenue and revenue from sales contracted less than 1 month or more than 5 months from GDT event.	Profile of non-RCP related cash receipts differs signficantly from RCP profile.
Volumes	The assumed 'yields' of finished product per kgMS are based on notional assumptions around good operating performance, which are assumed to be achieved by the PNMPB.	Fonterra is exposed to relative performance risk against the PNMPB assumptions (both upside, in that the yield assumptions can be bettered in practice, and downside). Fonterra advise there is probably a little more downside risk. Indicatively, Fonterra estimates the downside risk will be circa $30m & the upside risk circa $10m.	Per powder business, but with additional yield performance risk on non-RCPs. (Note that non-RCP manufacturing plants are on average materially older than RCP manufacturing plants.)
Cash costs:			
Lactose	The Milk Price calculation assumes a unit lactose purchase price equal to the lesser of Fonterra's actual average unit cost and the average unit cost of other NZ processors as reported to NZ Customs.	In FY14, use of other processors' average cost resulted in Fonterra's actual lactose costs being circa NZD 6m higher than the equivalent provision in the Milk Price calculation, compared to NZD 3m in FY13. This exposirer is partially within Fonterra's ability to control.	Non-RCP production includes the production of lactose for external sale (in addition to the 'internal sales' from non-RCP to RCP production.
Operating costs	Unit costs (for labour, energy & packaging) are Fonterra's. Number of required units (e.g. required kw of electricity and tonnes of steam per MT of WMP) are based on manufacturer specifications, confirmed (or modified) by reference to monitoring of actual Fonterra performance. Overall Fonterra estimate an approximate exposure is circa + / - NZD 20m.	No exposure on unit costs. Both upside & downside exposure to variance against NMPB in number of required units. Overall Fonterra estimates an approximate exposure is circa + / - NZD 20m. This exposure is within Fonterra's ability to control.	Further incremental exposure on non-RCP costs.
Admin & other overhead costs	A notional allowance calibrated to a subset of Fonterra's actual costs is established each 4 years, and adjusted by inflation in the intervening period.	Fonterra consider that the business has input into and the opportunity to challenge the reasonableness of the initial provision, so earnings exposure will not be significant – say + / - 20m. (The Notional Business benefits from savings relative to the benchmark provision within the four yearly reset period, providing the potential for higher earnings.)	Same
Capital costs:			
Assumed replacement costs	Asset replacement costs calculated, effectively, by reference to recent Fonterra costs.	More upside than downside earnings potential for Fonterra (due to the assumption of average Fonterra capacity for the Notional Business plants, Fonterra benefits from economies of scale attaching to larger plants).	Exposed to any difference in cost of RCP vs non-RCP assets (though differences will be factored into initial investment decision).
Effective lives	Set by capital equipment values, after which plants are notionally replaced.	Fonterra considers milk powder dryers (in particular) have very long physical lives, & Fonterra therefore benefits from upside to the extent plants are not economically obsolete at the end of assumed lives. Fonterra advises that technology in this area is not developing rapidly, and plants are therefore generally still viable at the end of their lives.	N/A
Working capital	Working capital profile materially reflects the profile Fonterra would face if it only manufactured RCPs and sold these on GDT. Fonterra therefore only faces an earnings exposure to the extent it chooses to manufacture non milk price products or to sell product off GDT.	Minor variances due to differences in timing / quantums around off-GDT pricing and incremental costs.	Phasing of sales (& therefore inventory volumes & timing of cash receipts) is significantly different for non-RCPs.

12 Appendix 2: Comparable Company Asset Betas

Betas estimated using one year daily data

Asset betas - summary: 1 year daily - unlever without tax		Asset betas	Asset betas	Asset betas	Asset betas	Asset betas
COMPANY	**CAP IQ TICKER**					
		31-Dec-15	**30-Sep-15**	**30-Jun-15**	**31-Mar-15**	**31-Dec-14**
MATERIAL COMMODITY EXPOSURE						
Bega Cheese Limited	ASX:BGA	0.77	0.83	0.76	0.85	0.91
GrainCorp. Ltd.	ASX:GNC	0.45	0.53	0.50	0.46	0.48
Warrnambool Cheese And Butter Factory Company Holdings L	ASX:WCB	0.11	0.12	0.09	0.10	0.05
Glanbia plc	ISE:GL9	0.53	0.48	0.38	0.30	0.25
Fonterra Co-Operative Group Ltd.	NZSE:FCG	0.14	0.20	0.13	0.15	0.06
Synlait Milk Limited	NZSE:SML	0.40	0.44	0.40	0.48	0.32
Wilmar International Limited	SGX:F34	0.50	0.37	0.41	0.46	0.46
Tate & Lyle plc	LSE:TATE	0.51	0.53	0.56	0.54	0.69
Archer-Daniels-Midland Company	NYSE:ADM	0.81	0.78	0.83	0.81	0.77
Bunge Limited	NYSE:BG	0.45	0.57	0.48	0.47	0.56
MG Unit Trust	ASX:MGC	n/a	n/a	n/a	n/a	n/a
Average		**0.47**	**0.48**	**0.45**	**0.46**	**0.45**
Median		**0.48**	**0.50**	**0.44**	**0.47**	**0.47**
BOTH COMMODITY & BRAND EXPOSURE						
BRF S.A.	BOVESPA:BRFS3	0.34	0.50	0.51	0.54	0.59
Vigor Alimentos S.A.	BOVESPA:VIGR3	0.07	(0.00)	(0.05)	(0.05)	(0.12)
Bright Dairy & Food Co., Ltd	SHSE:600597	0.65	0.55	0.34	0.46	0.60
Inner Mongolia Yili Industrial Group Co., Ltd	SHSE:600887	0.92	0.84	0.76	0.67	0.64
Savencia SA	ENXTPA:SAVE	0.02	0.06	0.11	0.17	0.14
Kerry Group plc	ISE:KRZ	0.60	0.60	0.60	0.54	0.50
NH Foods Limited	TSE:2282	0.68	0.61	0.60	0.57	0.59
Olam International Limited	SGX:O32	0.21	0.35	0.36	0.37	0.43
Associated British Foods plc	LSE:ABF	0.90	0.97	1.08	1.00	1.00
Dairy Crest Group plc	LSE:DCG	0.34	0.35	0.41	0.48	0.55
ConAgra Foods, Inc.	NYSE:CAG	0.55	0.46	0.41	0.39	0.35
Dean Foods Company	NYSE:DF	0.64	0.56	0.47	0.47	0.58
Ingredion Incorporated	NYSE:INGR	0.77	0.71	0.70	0.74	0.79
Average		**0.51**	**0.51**	**0.48**	**0.49**	**0.51**
Median		**0.60**	**0.55**	**0.47**	**0.48**	**0.58**
BRAND EXPOSURE						
Goodman Fielder Pty Limited	iqt25068654	n/a	n/a	n/a	n/a	0.17
JBS S.A.	BOVESPA:JBSS3	0.30	0.49	0.58	0.57	0.68
Saputo Inc.	TSX:SAP	0.71	0.62	0.59	0.53	0.47
China Mengniu Dairy Co. Ltd.	SEHK:2319	0.82	0.79	0.73	0.73	0.86
Want Want China Holdings Ltd.	SEHK:151	0.67	0.68	0.58	0.70	0.73
Chr. Hansen Holding A/S	CPSE:CHR	0.78	0.77	0.68	0.65	0.62
Danone	ENXTPA:BN	0.92	0.68	0.64	0.59	0.55
Parmalat SpA	BIT:PLT	0.08	0.07	0.06	0.04	0.05
Yakult Honsha Co. Ltd.	TSE:2267	1.12	1.09	1.06	1.00	1.07
Grupo Lala, S.A.B. de C.V.	BMV:LALA B	0.77	0.76	0.60	0.54	0.49
Gloria S.A.	BVL:GLORIAI1	n/a	n/a	n/a	n/a	n/a
Emmi AG	SWX:EMMN	0.43	0.45	0.48	0.50	0.45
Nestlé S.A.	SWX:NESN	0.81	0.79	0.78	0.78	0.73
Unilever plc	LSE:ULVR	0.92	0.88	0.86	0.70	0.71
General Mills, Inc.	NYSE:GIS	0.60	0.55	0.53	0.49	0.52
Kellogg Company	NYSE:K	0.48	0.48	0.55	0.57	0.58
Mead Johnson Nutrition Company	NYSE:MJN	0.74	0.83	0.96	1.05	1.09
Mondelez International, Inc.	NasdaqGS:MDLZ	0.78	0.68	0.66	0.69	0.70
The Hershey Company	NYSE:HSY	0.63	0.66	0.58	0.55	0.58
The Kraft Heinz Company	NASDAQGS:KHC	0.87	0.87	n/a	n/a	n/a
Average		**0.69**	**0.67**	**0.64**	**0.63**	**0.61**
Median		**0.76**	**0.68**	**0.60**	**0.59**	**0.60**

Source: Data and Analysis provided by Ernst and Young

Betas estimated using two year weekly data

Asset betas - summary: 2 year weekly - unlever without tax		Asset betas	Asset betas	Asset betas	Asset betas	Asset betas
COMPANY	**CAP IQ TICKER**					
		31-Dec-15	**30-Sep-15**	**30-Jun-15**	**31-Mar-15**	**31-Dec-14**
MATERIAL COMMODITY EXPOSURE						
Bega Cheese Limited	ASX:BGA	0.77	0.81	0.70	0.54	0.51
GrainCorp. Ltd.	ASX:GNC	0.46	0.54	0.50	0.60	0.59
Warrnambool Cheese And Butter Factory Company Holdings Limited	ASX:WCB	(0.11)	(0.11)	(0.00)	0.17	0.18
Glanbia plc	ISE:GL9	0.42	0.41	0.44	0.43	0.31
Fonterra Co-Operative Group Ltd.	NZSE:FCG	0.03	0.01	(0.02)	0.19	0.19
Synlait Milk Limited	NZSE:SML	0.16	0.32	0.27	0.26	0.28
Wilmar International Limited	SGX:F34	0.56	0.45	0.39	0.41	0.41
Tate & Lyle plc	LSE:TATE	0.50	0.58	0.53	0.52	0.68
Archer-Daniels-Midland Company	NYSE:ADM	0.85	0.90	0.96	0.97	0.98
Bunge Limited	NYSE:BG	0.44	0.42	0.36	0.37	0.50
MG Unit Trust	ASX:MGC	n/a	n/a	n/a	n/a	n/a
Average		**0.41**	**0.43**	**0.41**	**0.45**	**0.46**
Median		**0.45**	**0.44**	**0.42**	**0.42**	**0.45**
BOTH COMMODITY & BRAND EXPOSURE						
BRF S.A.	BOVESPA:BRFS3	0.47	0.50	0.49	0.54	0.62
Vigor Alimentos S.A.	BOVESPA:VIGR3	(0.10)	(0.07)	(0.03)	(0.01)	(0.05)
Bright Dairy & Food Co., Ltd	SHSE:600597	0.15	0.11	(0.20)	0.50	0.64
Inner Mongolia Yili Industrial Group Co., Ltd	SHSE:600887	0.68	0.65	0.68	0.49	0.50
Savencia SA	ENXTPA:SAVE	0.09	0.09	0.09	0.16	0.18
Kerry Group plc	ISE:KRZ	0.55	0.58	0.57	0.58	0.58
NH Foods Limited	TSE:2282	0.41	0.48	0.47	0.45	0.45
Olam International Limited	SGX:O32	0.15	0.24	0.41	0.42	0.42
Associated British Foods plc	LSE:ABF	0.89	1.12	1.13	1.10	1.19
Dairy Crest Group plc	LSE:DCG	0.55	0.63	0.63	0.64	0.73
ConAgra Foods, Inc.	NYSE:CAG	0.33	0.32	0.33	0.29	0.33
Dean Foods Company	NYSE:DF	0.47	0.43	0.58	0.76	0.90
Ingredion Incorporated	NYSE:INGR	0.79	0.83	0.93	0.94	0.90
Average		**0.42**	**0.45**	**0.47**	**0.53**	**0.57**
Median		**0.47**	**0.48**	**0.49**	**0.50**	**0.58**
BRAND EXPOSURE						
Goodman Fielder Pty Limited	iqt25068654	n/a	n/a	n/a	n/a	0.12
JBS S.A.	BOVESPA:JBSS3	0.34	0.42	0.44	0.46	0.52
Saputo Inc.	TSX:SAP	0.65	0.55	0.53	0.53	0.52
China Mengniu Dairy Co. Ltd.	SEHK:2319	0.83	0.86	0.63	0.53	0.63
Want Want China Holdings Ltd.	SEHK:151	0.43	0.58	0.53	0.65	0.72
Chr. Hansen Holding A/S	CPSE:CHR	0.64	0.66	0.60	0.42	0.42
Danone	ENXTPA:BN	0.64	0.53	0.51	0.39	0.35
Parmalat SpA	BIT:PLT	0.10	0.09	0.06	0.13	0.10
Yakult Honsha Co. Ltd.	TSE:2267	1.07	1.08	1.04	1.18	1.14
Grupo Lala, S.A.B. de C.V.	BMV:LALA B	0.88	0.74	0.68	0.64	0.65
Gloria S.A.	BVL:GLORIAI1	n/a	n/a	n/a	n/a	n/a
Emmi AG	SWX:EMMN	0.22	0.24	0.48	0.42	0.38
Nestlé S.A.	SWX:NESN	0.78	0.77	0.77	0.76	0.73
Unilever plc	LSE:ULVR	0.67	0.68	0.67	0.69	0.78
General Mills, Inc.	NYSE:GIS	0.46	0.51	0.59	0.56	0.56
Kellogg Company	NYSE:K	0.37	0.38	0.46	0.44	0.43
Mead Johnson Nutrition Company	NYSE:MJN	0.72	0.76	0.85	0.71	0.70
Mondelez International, Inc.	NasdaqGS:MDLZ	0.70	0.72	0.80	0.77	0.80
The Hershey Company	NYSE:HSY	0.48	0.57	0.68	0.66	0.63
The Kraft Heinz Company	NASDAQGS:KHC	n/a	n/a	n/a	n/a	n/a
Average		**0.59**	**0.60**	**0.61**	**0.59**	**0.57**
Median		**0.64**	**0.58**	**0.60**	**0.56**	**0.60**

Source: Data and Analysis provided by Ernst and Young

Asset betas estimated using five year monthly data

5 year monthly - unlever without tax		Asset betas	Asset betas	Asset betas	Asset betas	Asset betas
COMPANY	**CAP IQ TICKER**					
		31-Dec-15	**30-Sep-15**	**30-Jun-15**	**31-Mar-15**	**31-Dec-14**
MATERIAL COMMODITY EXPOSURE						
Bega Cheese Limited	ASX:BGA	0.70	0.57	0.56	0.48	0.60
GrainCorp. Ltd.	ASX:GNC	0.74	0.74	0.75	0.69	0.65
Warrnambool Cheese And Butter Factory Company Holdings Limited	ASX:WCB	0.63	0.64	0.59	0.72	0.67
Glanbia plc	ISE:GL9	0.53	0.61	0.51	0.49	0.49
Fonterra Co-Operative Group Ltd.	NZSE:FCG	0.30	0.26	0.70	0.74	0.74
Synlait Milk Limited	NZSE:SML	0.27	0.30	0.37	0.17	(0.05)
Wilmar International Limited	SGX:F34	0.62	0.56	0.52	0.59	0.56
Tate & Lyle plc	LSE:TATE	0.26	0.26	0.39	0.31	0.41
Archer-Daniels-Midland Company	NYSE:ADM	0.96	0.90	0.73	0.68	0.63
Bunge Limited	NYSE:BG	0.61	0.68	0.61	0.57	0.65
MG Unit Trust	ASX:MGC	n/a	n/a	n/a	n/a	n/a
Average		**0.56**	**0.55**	**0.57**	**0.54**	**0.53**
Median		**0.61**	**0.59**	**0.57**	**0.58**	**0.61**
BOTH COMMODITY & BRAND EXPOSURE						
BRF S.A.	BOVESPA:BRFS3	0.40	0.41	0.44	0.46	0.52
Vigor Alimentos S.A.	BOVESPA:VIGR3	(0.43)	(0.43)	(0.49)	(0.56)	(0.58)
Bright Dairy & Food Co., Ltd	SHSE:600597	0.57	0.49	0.39	0.61	0.60
Inner Mongolia Yili Industrial Group Co., Ltd	SHSE:600887	0.62	0.55	0.52	0.47	0.39
Savencia SA	ENXTPA:SAVE	0.33	0.41	0.44	0.39	0.36
Kerry Group plc	ISE:KRZ	0.59	0.54	0.47	0.47	0.39
NH Foods Limited	TSE:2282	0.49	0.53	0.50	0.51	0.55
Olam International Limited	SGX:O32	0.47	0.49	0.68	0.74	0.74
Associated British Foods plc	LSE:ABF	0.82	0.83	0.76	0.72	0.65
Dairy Crest Group plc	LSE:DCG	0.53	0.62	0.63	0.60	0.57
ConAgra Foods, Inc.	NYSE:CAG	0.22	0.28	0.25	0.30	0.33
Dean Foods Company	NYSE:DF	0.45	0.43	0.44	0.54	0.56
Ingredion Incorporated	NYSE:INGR	1.04	1.04	1.03	1.01	1.02
Average		**0.47**	**0.48**	**0.47**	**0.48**	**0.47**
Median		**0.49**	**0.49**	**0.47**	**0.51**	**0.55**
BRAND EXPOSURE						
Goodman Fielder Pty Limited	iqt25068654	n/a	n/a	n/a	n/a	0.82
JBS S.A.	BOVESPA:JBSS3	0.76	0.75	0.74	0.75	0.74
Saputo Inc.	TSX:SAP	0.47	0.51	0.54	0.37	0.43
China Mengniu Dairy Co. Ltd.	SEHK:2319	0.57	0.50	0.38	0.47	0.50
Want Want China Holdings Ltd.	SEHK:151	0.16	0.15	0.04	(0.01)	0.08
Chr. Hansen Holding A/S	CPSE:CHR	0.36	0.33	0.25	0.24	0.22
Danone	ENXTPA:BN	0.49	0.41	0.34	0.32	0.29
Parmalat SpA	BIT:PLT	0.54	0.54	0.50	0.48	0.53
Yakult Honsha Co. Ltd.	TSE:2267	0.60	0.59	0.42	0.50	0.43
Grupo Lala, S.A.B. de C.V.	BMV:LALA B	0.26	0.13	0.27	0.27	0.54
Gloria S.A.	BVL:GLORIAI1	n/a	n/a	n/a	n/a	n/a
Emmi AG	SWX:EMMN	0.59	0.56	0.83	0.72	0.53
Nestlé S.A.	SWX:NESN	0.68	0.68	0.69	0.62	0.64
Unilever plc	LSE:ULVR	0.55	0.58	0.52	0.52	0.49
General Mills, Inc.	NYSE:GIS	0.28	0.28	0.16	0.14	0.13
Kellogg Company	NYSE:K	0.41	0.41	0.38	0.39	0.40
Mead Johnson Nutrition Company	NYSE:MJN	0.98	0.87	0.77	0.69	0.66
Mondelez International, Inc.	NasdaqGS:MDLZ	0.77	0.72	0.62	0.58	0.56
The Hershey Company	NYSE:HSY	0.23	0.31	0.25	0.20	0.22
The Kraft Heinz Company	NASDAQGS:KHC	n/a	n/a	n/a	n/a	n/a
Average		**0.51**	**0.49**	**0.45**	**0.43**	**0.46**
Median		**0.54**	**0.51**	**0.42**	**0.47**	**0.50**

Source: Data and Analysis provided by Ernst and Young

13 Appendix 3: Model to determine an increment to WACC for Fonterra's Notional Business

Model to Determine the WACC Increments

13.1 In this Appendix we provide more details of the calculations behind our model to determine the increment to WACC. This is further to Lally's (2016a) request for more details on the calculations of the figures in our Prior Report (in particular Col. 2 or the Table in Appendix 2, paragraph 5.10).

Key Assumptions

13.2 We start with the same key assumptions in Appendix 2, paragraph 5.9 of our Prior Report.

13.3 The tilted annuity formula (Manual, Rule 34) is used to calculate an annual recovery amount in respect of Fonterra's assets assuming:

- A post-corporate tax WACC of 6.9%.[63]
- An average asset life of 30 years, with assets acquired evenly over a 30 year time horizon. That is 1/30th of the asset base has a remaining life of 1 year, 1/30th has a remaining life of 2 years, etc.).
- A current (starting) replacement cost for each asset of $1, so the entire asset base has a replacement cost of $30.
- Fonterra is assumed to process 1.6 billion kgMS of Annual Milk Supply, with costs per kgMS calculated with reference to a total asset base for Fonterra's businesses of $6.88 billion.
- An inflation rate of 2.0% per annum.

13.4 In addition, we assume a nil residual asset value and no future capital expenditure required to maintain the asset's productive capacity for its projected economic life.

13.5 We first construct a series of cash flows being Annual Capital Recovery Amounts in respect of each year of the assets assessed economic life in accordance with the Manual formulae as detailed below.

$$A_i = V(r - i)\frac{(1+r)^N}{(1+r)^N - (1+i)^N}, \text{ and}$$

A_s = *Prior year's Capital Recovery Amount* × (1 + i),

Where

A_i *is the initial Capital Recovery Amount.*

[63] In our Prior Report we stated the assumed WACC was 6.8%. This should have read 6.9%. However, the difference between use of a 6.8% or 6.9% WACC assumption has no material impact on our calculations or results in our Prior Report.

A_s *is the Capital Recovery Amount in respect of a year subsequent to the initial year (and ending in the year which corresponds to the final year of the asset's assessed economic life).*

r *is the current WACC, calculated using inputs which are consistent with the Review Period.*

N *is the assessed economic life.*

V *is the calculated present value of (a) the asset's initial cost (b) the amount calculated under Rule 24 in respect of future capital expenditure required to maintain the asset's productive capacity for its projected economic life, and (c) a reasonable provision for a residual value.*

i *is a reasonable estimate of the long-run annual rate of increase in the nominal cost of the Reference Asset.*

13.6 The following table is then constructed.

Table: Calculation of Annual Capital Recovery Amount

Column	2	3
Time	Cash flow	Present Value of Cash flow
0	-1.0000	-1.0000
1	0.0649	0.0607
2	0.0662	0.0579
3	0.0675	0.0553
4	0.0688	0.0527
5	0.0702	0.0503
6	0.0716	0.0480
7	0.0731	0.0458
8	0.0745	0.0437
9	0.0760	0.0417
10	0.0775	0.0398
11	0.0791	0.0380
12	0.0807	0.0362
13	0.0823	0.0346
14	0.0839	0.0330
15	0.0856	0.0315
16	0.0873	0.0300
17	0.0891	0.0286
18	0.0908	0.0273
19	0.0927	0.0261
20	0.0945	0.0249
21	0.0964	0.0237
22	0.0983	0.0227
23	0.1003	0.0216
24	0.1023	0.0206
25	0.1044	0.0197
26	0.1064	0.0188
27	0.1086	0.0179
28	0.1107	0.0171
29	0.1130	0.0163
30	0.1152	0.0156
Total	**$1.00**	**0.000**

13.7 To illustrate consider the first cash flow at time period 1 of \$0.0649.

13.8 In accordance with the annuity formula and value of A_i this equals:

$$\$0.0649 = 1 \times (0.069 - 0.02) \times \frac{(1 + 0.069)^{30}}{[(1 + 0.069)^{30} - (1 + 0.02)^{30}]}$$

13.9 For time period 2 … 30, the formula A_s is then applied to calculate the remaining Capital Recovery Amounts. For example:

- Cash flow at T = 2 is \$0.0662 = \$0.0649 × (1 + 0.02)
- Cash flow at T = 3 is \$0.0675 = \$0.0662 × (1 + 0.02)

13.10 The last column in the table above provides the proof that the NPV (net present value) of these cash flows is zero.

13.11 For example,

- T = 1, PV of cash flow = \$0.0607 = $\frac{\$0.0649}{(1 + 0.069)}$
- T = 2, PV of cash flow = \$0.0579 = $\frac{\$0.0662}{(1+ 0.069)^2}$

13.12 The sum of the PV of all cash flows from T = 1 … 30 equals \$1. After subtracting the initial cost of \$1 the outcome is a NPV = 0 investment.

13.13 The next step is to calculate the deemed opening and closing asset values for each year. The calculations are provided in the table below.

Table: Calculation of opening and closing asset values				
Column	2	3	4	5
Time	Open Bal	Return on Capital	Cash Inflow	Close
0				1
1	1.0000	0.0690	-0.0649	1.0041
2	1.0041	0.0693	-0.0662	1.0072
3	1.0072	0.0695	-0.0675	1.0092
4	1.0092	0.0696	-0.0688	1.0100
5	1.0100	0.0697	-0.0702	1.0095
6	1.0095	0.0697	-0.0716	1.0075
7	1.0075	0.0695	-0.0731	1.0040
8	1.0040	0.0693	-0.0745	0.9987
9	0.9987	0.0689	-0.0760	0.9916
10	0.9916	0.0684	-0.0775	0.9825
11	0.9825	0.0678	-0.0791	0.9712
12	0.9712	0.0670	-0.0807	0.9576
13	0.9576	0.0661	-0.0823	0.9414
14	0.9414	0.0650	-0.0839	0.9224
15	0.9224	0.0636	-0.0856	0.9004
16	0.9004	0.0621	-0.0873	0.8752
17	0.8752	0.0604	-0.0891	0.8466
18	0.8466	0.0584	-0.0908	0.8141
19	0.8141	0.0562	-0.0927	0.7777
20	0.7777	0.0537	-0.0945	0.7368
21	0.7368	0.0508	-0.0964	0.6912
22	0.6912	0.0477	-0.0983	0.6406
23	0.6406	0.0442	-0.1003	0.5845
24	0.5845	0.0403	-0.1023	0.5225
25	0.5225	0.0361	-0.1044	0.4542
26	0.4542	0.0313	-0.1064	0.3791
27	0.3791	0.0262	-0.1086	0.2967
28	0.2967	0.0205	-0.1107	0.2065
29	0.2065	0.0142	-0.1130	0.1078
30	0.1078	0.0074	-0.1152	0.0000

13.14 To illustrate:

- At time period T = 1 cash inflow is $0.0649 (as calculated in the prior table). The required return on the opening capital is:
  = Opening Capital × WACC
  = $1 × 0.069
  = $0.0690
- Thus: Closing asset value = Opening asset value + Return on Capital – Cash inflow
  i.e., $1.0041 = $1.00 + $0.0690 – $0.0649
- At time period T = 2 cash inflow is $0.0662 and required return on the opening capital is:

$1.0041 × $0.0690 = $0.0693
Thus the closing asset value is:
$1.0072 = $1.0041 + $0.0693 – $0.0662

13.15 At the end of year 30, the asset has an expected zero value.

13.16 The next step is to then calculate the table which was provided at Appendix 2, paragraph 5.10 of our Prior Report. This is reproduced below.

Table: Potential Costs associated with Asset Stranding

Remaining Life	PV Remaining Annuities	% Value	% Capacity	Cumulative value %	Cumulative Capacity %	PV of all costs per kgMS
Column	2	3	4	5	6	7
1	$0.108	0.46%	3.33%	0.46%	3.33%	0.020
2	$0.206	0.87%	3.33%	1.33%	6.67%	0.057
3	$0.297	1.25%	3.33%	2.58%	10.00%	0.111
4	$0.379	1.60%	3.33%	4.19%	13.33%	0.180
5	$0.454	1.92%	3.33%	6.11%	16.67%	0.263
6	$0.523	2.21%	3.33%	8.32%	20.00%	0.358
7	$0.585	2.47%	3.33%	10.79%	23.33%	0.464
8	$0.641	2.71%	3.33%	13.50%	26.67%	0.580
9	$0.691	2.92%	3.33%	16.42%	30.00%	0.706
10	$0.737	3.12%	3.33%	19.53%	33.33%	0.840
11	$0.778	3.29%	3.33%	22.82%	36.67%	0.981
12	$0.814	3.44%	3.33%	26.26%	40.00%	1.129
13	$0.847	3.58%	3.33%	29.84%	43.33%	1.283
14	$0.875	3.70%	3.33%	33.54%	46.67%	1.442
15	$0.900	3.81%	3.33%	37.35%	50.00%	1.606
16	$0.922	3.90%	3.33%	41.25%	53.33%	1.774
17	$0.941	3.98%	3.33%	45.23%	56.67%	1.945
18	$0.958	4.05%	3.33%	49.28%	60.00%	2.119
19	$0.971	4.11%	3.33%	53.39%	63.33%	2.296
20	$0.983	4.15%	3.33%	57.54%	66.67%	2.474
21	$0.992	4.19%	3.33%	61.73%	70.00%	2.655
22	$0.999	4.22%	3.33%	65.96%	73.33%	2.836
23	$1.004	4.24%	3.33%	70.20%	76.67%	3.019
24	$1.008	4.26%	3.33%	74.46%	80.00%	3.202
25	$1.009	4.27%	3.33%	78.73%	83.33%	3.385
26	$1.010	4.27%	3.33%	83.00%	86.67%	3.569
27	$1.009	4.27%	3.33%	87.27%	90.00%	3.753
28	$1.007	4.26%	3.33%	91.53%	93.33%	3.936
29	$1.004	4.25%	3.33%	95.77%	96.67%	4.118
30	$1.000	4.23%	3.33%	100.00%	100.00%	4.300
Total	**$23.65**	**100.00%**	**100.00%**			

13.17 To illustrate our calculations in Column 2

- Where the remaining life of the asset is 3 years, the present value of the remaining cash flows is $0.297.

This equals the (PV) present value of cash flows of $0.1107 in year 28, $0.1130 in year 29 and $0.1152 in year 30, in the immediately prior table above (at paragraph 3.13, column 4).

That is:

$$\$0.297 = \frac{\$0.1107}{(1.069)^1} + \frac{\$0.1130}{(1.069)^2} + \frac{\$0.1152}{(1.069)^3}$$

$$\$0.297 = \$0.1036 + \$0.0988 + \$0.0943$$

- Similarly, where the remaining life of the asset is 4 years, the present value of the remaining cash flows is $0.379.

  That is:

$$\$0.379 = \frac{\$0.1086}{(1.069)^1} + \frac{\$0.1107}{(1.069)^2} + \frac{\$0.1130}{(1.069)^3} + \frac{\$0.1152}{(1.069)^4}$$

$$\$0.379 = \$0.1016 + \$0.0969 + \$0.0925 + \$0.0882$$

13.18 In summary:

- Column 2 of the table shows the present value of the remaining cash flows for the aged profile of assets with remaining asset lives between 1 and 30 years.

- Column 3 of the table shows the percentage by total value for each asset with remaining life between 1 and 30 years.

  For example, assume a remaining asset life of 6 years. The PV of any remaining annuity is $0.523 and the total PV of all annuities is $23.65.

  Thus

$$2.21\% = \frac{\$0.523}{\$23.65}$$

- Column 4 of the table shows the percentage of asset capacity. Each asset of a particular year vintage is assumed to provide the same milk processing capacity. With a 30 year expected asset life each year contributes 3.33% (1/30) of milk processing capacity.

- Columns 5 and 6 of the table show the cumulative value (col. 3) and the cumulative capacity % (col. 4) respectively.

- Column 7 of the table shows the Present Value ("PV") of all costs per kgMS on an after-tax basis.

  This is calculated assuming Fonterra processes 1.6 billion kgMS of Annual Milk Supply with a total asset base of $6.88 billion. Thus, the calculation for each asset with a remaining life of between 1 and 30 years equals:

$$\frac{Asset\ base\ \times Cumulative\ value\ \%}{Annual\ Milk\ Supply}$$

For example, at T = 6:

$$\$0.358 = \frac{\$6.88 \times 0.0832}{1.60}$$

Allowance for Asset Stranding

13.19 The table below adopts the same probabilities as in our Prior Report and provides the assessed cost in $ per kgMS for a probability of asset stranding between 2.5% and 10% and between 2.5% and 15% of the asset base being stranded. For example, if we assume the probability of stranding is 5.0% (7.5%) and the percentage of assets stranded is 7.5% (10%); the level of compensation for asset stranding will equal $0.0035 ($0.0083) per kgMS.

Table: Costs of asset stranding per Kg MS					
	Probability of Stranding				
		2.5%	5.0%	7.5%	10.0%
% asset standing	2.5%	0.0004	0.0007	0.0011	0.0015
	5.0%	0.0010	0.0019	0.0029	0.0038
	7.5%	0.0018	**0.0035**	0.0053	0.0071
	10.0%	0.0028	0.0056	**0.0083**	0.0111
	12.5%	0.0041	0.0081	0.0122	0.0163
	15.0%	0.0055	0.0111	0.0166	0.0221

13.20 To further illustrate the calculations, assume the % of assets stranded is 7.5%. From the table immediately prior to the table above we have:

Cumulative capacity %	PV of all costs per kgMS
6.67%	0.057
10.0%	0.111

13.21 Thus, if 7.5% cumulative capacity of assets is assumed to be stranded, we interpolate on a straight line basis as follows:

$$Y = 0.057 + \frac{(7.5\% - 6.67\%) \times (0.111 - 0.057)}{(10.0\% - 6.67\%)}$$

$$Y = 0.057 + 0.014 = 0.071$$

13.22 Thus, if the probability of asset stranding is 5% (and the % of assets stranded is 7.5%), then:

$$0.0035 = 0.05 \times 0.071$$

13.23 On an asset base of $6.88 billion and assuming Fonterra processes 1.6 billion kgMS and for illustrative purposes only (in accordance with the table at paragraph 5.16 of our Prior Report):

- The probability of asset stranding is between 5% and 7.5%; and
- The % of assets stranded is between 7.5% and 10.0%.

then the required increment to WACC will equal:

$$WACC = \frac{1.6\ billion\ kgMS \times \$0.0035}{\$6.88\ billion} \quad \text{to} \quad = \frac{1.6\ billion\ kgMS \times \$0.0083}{\$6.88\ billion}$$

$$= 0.08\% \text{ to } 0.19\%$$