

UHT MILK VALUE CHAIN

Part of the NZPECC dairy value chain project

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Coriolis is a boutique management consulting firm that focuses on food, consumer packaged goods, retailing and foodservice.

Coriolis advises clients on strategy, operations, organization, and mergers and acquisitions. We develop practical, fact-based insights grounded in the real world that guide our clients decisions and actions. Founded in 1999, Coriolis is based in Auckland, New Zealand and works on projects across the Asia Pacific region..

WHAT WE DO

We help our clients assemble the facts needed to guide their big decisions. We make practical recommendation. Where appropriate, we work with them to make change happen.

HOW WE DO IT

Our style is practical and down-to-earth. We try to put ourselves in our clients' shoes and focus on actions. We listen hard, but we are suspicious of the consensus. We provide an external, objective perspective. We are happy to link our fees to results.

WHO WE WORK WITH

We only work with a select group of clients we trust. We build long term relationships with our clients and more than 80% of our work comes from existing clients. Our clients trust our experience, advice and integrity.

Typical assignments for clients include...

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MARKET ENTRY: We help clients identify which countries are the most attractive - from a consumer, a competition and a channel point-of-view. Following this we assist in developing a plan for market entry and growth.

VALUE CREATION: We help clients create value through revenue growth and cost reduction.

TARGET IDENTIFICATION: We help clients identify high potential acquisition targets by profiling industries, screening companies and devising a plan to approach targets.

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This research was commissioned by the New Zealand Board of the Pacific Economic Cooperation Council (NZPECC). The research is designed to improve understanding of Global Value Chains (GVCs) which are an important feature of how business organises itself globally.

How do you define a global value chain?

For this research, GVC is taken to mean the chain of market interactions along which returns from the final consumer of a product are divided among all participants that have contributed to that final product. Different terms are used. "Supply chain" can be taken to emphasise the physical logistic systems involved in international commerce; "value chain" is more common in business contexts but can be confused with rhetoric about "added value" and reasonable questions about what is "value" and what is "cost"; Asian discussions are increasingly using "international production networks" which has the virtue of not privileging any part of an international production system.

Why is the research being conducted?

Improved understanding of GVCs is potentially crucial for New Zealand's attempts to lift exports' share of GDP. A better understanding of where and how our exports are used as 'inputs' to the production and exports of other countries, whether simply as food or more directly as inputs that form part of other final products, and the options for maximising return to the New Zealand economy, can inform policy to grow New Zealand exports. On top of this a more in-depth understanding and focus on GVCs has the potential to re-frame the trade policy debate - away from: imports are bad, exports are good; to recognition by our trading partners that competitively priced imports are *essential* for a country to be a successful participant in the modern global economy. NZPECC needs to get a better appreciation of the possible trade policy implications of these trends and developments.

Against this background, NZPECC has commissioned this research, which is designed to focus on commercial realities and implications for companies and government policies.

What is the structure and scope of the research?

Specifically the research must address the following four broad questions:

(A) Detailed and comprehensive description and analysis of the value chain in *some representative* key NZ exports, particularly in the Asia-Pacific. In relation to dairy, the research would focus on:

A representative basic commodity powder namely Milk Powder in the Asia Pacific region.

Considering the same product through two different value chains: i.e. as a commodity product that feeds into further manufacturing in another country and the same product that undergoes further manufacturing in New Zealand to the stage where it is delivered and ready to consume in another market. The two commodities to be analysed are:

- UHT milk
- Infant formula

Analysis will include the mapping of respective GVC's, calculation of representative costs through identification then sourcing of all relevant and material individual components e.g. capital investments, materials sourcing, financing, supply chain and if appropriate brand development costs.

(B) Analysis of factors that motivate the choice of position in respective GVC's of the representative products identified above and why that is it judged to be optimal.

(C.1) Drawing on the results of the preceding analysis, and building on existing research, identify the barriers for NZ firms/industries to move to grow their value or capture a bigger share of the total available value; highlight how firms have become engaged in GVCs; and

(C.2) Drawing on all the foregoing, and to the extent possible, identify the main implications for future government policy, especially in the areas of services and regulatory reform; how a coordinated 'think value chain' approach might be pursued across policy issues under negotiation; and where business could appropriately be involved to help identify policy constraints and provide critical data.

About NZPECC

The Pacific Economic Cooperation Council (PECC) is a non-governmental body, serving as a regional forum for cooperation and policy coordination in the Asia Pacific to promote regional economic growth and development. The New Zealand Committee of the Pacific Economic Cooperation Council is a founding and active member of the PECC community. It works to gain strong business and institutional links into the Asia Pacific market and to tie public policy theory and research into practical business outcomes for New Zealand.

PECC was formed in 1980 and now has 26 Member Committees. Each Member Committee brings together leading thinkers, and decision makers from government, academia and business in an informal setting to discuss and formulate ideas on the most significant challenges facing the Asia Pacific.

While this document acts as a stand-alone analysis of the global UHT Milk value chain relevant to New Zealand, it is part of a wider NZPECC project; this part of the research looks at the strategic situation



- What is the big picture?
- What is the global situation?
- Where are New Zealand firms currently positioned?
- Why are New Zealand firms positioned where they are?
- What barriers do New Zealand firms face in UHT milk specifically?

Client brief section B and parts of C1

- Develop a detailed and representative value chain for New Zealand milk powder from the farm through to retail sale of UHT milk to the consumer
 - Non-New Zealand production
 - New Zealand production
- Mapping, modelling and costing

Client brief section A

UHT milk is a large, well developed and competitive global market

For 99.99% of human history milk was a fresh, perishable product removed from cows in calf on a daily basis and consumed on farm or sold in the local catchment. In many parts of the world (e.g. rural India) this is still the case today. Areas without cows had no access to milk.

With the invention and spread of the home refrigerator and the milk carton in the early 20th Century, milk could be distributed further and held for longer. However, the product was still highly perishable.

This changed in 1961 when Dr. Ruben Rausing of Sweden launched the Tetra-Pak, the world's first laminated aseptic product. Five year old dairy start-up Parmalat - founded by Calisto Tanzi of Parma, Italy - recognised the potential of the Tetra-Pak package and launched the world's first UHT milk in 1966. On the back of this invention, Parmalat grew rapidly in Italy, Southern Europe, South America and then throughout the dry and tropical centre of the planet. By 1997, 33 years after it was founded, Parmalat consisted of 62 companies, 84 plants, and 14,000 employees in 22 countries and had sales of almost \$5b.

Other dairy companies around the world - seeing the success of Parmalat - launched their own UHT milk products. UHT worked well in dry and tropical countries but was less successful in regions with a strong existing fresh milk industry and widespread refrigerators. Generally, given a choice, consumers prefer the taste of fresh not UHT.

Today UHT milk is a well understood dairy product available in every country on earth. Effectively every #1 and #2 dairy firm in every market

of any size in the world has the ability to make UHT milk. In addition, Tetra-Pak equipment has spread worldwide and the world is awash in UHT packaging capacity, for dairy and a range of other aseptic liquids. Firms in many countries have large-scale production capacity and low production costs (e.g. UHT milk at Sainsbury in the UK for NZ\$1).

UHT milk has low barriers to entry; it can be produced either (1) from fresh milk in a dairy producing region or (2) from reconstituted dry milk anywhere on the planet. As a result, UHT milk has become a low-margin commodity sold worldwide primarily on price. In addition, the price of UHT milk is constrained by and sold at a discount to the price of fresh milk in most markets. There is only a thin sliver for premium/niche (e.g. organic).

Most fluid milk - UHT or otherwise - is consumed in the country of production. Very little (0.1% of volume) crosses borders in a fluid form (outside the EU/NAFTA trade regions).

While it is a tiny sliver of a market, the global trade in UHT milk is robust and competitive. Trade is primarily from milk surplus regions in New Zealand, Australia and Germany, disposing of excess seasonal milk. Key players in the global trade are currently almost exclusively co-operatives that have been making UHT for a long time and have lots of equipment, mostly depreciated.

While New Zealand is a major global supplier to in-market UHT manufacturers, retail-ready UHT exports were relatively quiescent until the melamine crisis in China kicked off new investment

Whole milk powder

New Zealand is the largest exporter of whole milk powder (WMP) in the world, with 54% of all cross-border trade. This WMP goes to countries with cow-unfriendly climates where it is reconstituted into whole milk and made into UHT milk (among other things).

In this trade New Zealand is deeply embedded in every value chain it can access and competes with Australia, Argentina and the EU.

UHT Milk

In 1981 – fifteen years after Parmalat invented the product - the Canterbury Dairy Farmers Co-operative in Christchurch installed the first UHT milk packing line in New Zealand. Ambury Milk in Auckland followed with a line of its own. At the time the industry believed the product would never be a major export.

Products were targeted at the domestic market – particularly small packs for children’s lunches – and for export. There is low domestic demand for UHT milk – as New Zealand consumers have refrigerators and drink fresh milk – leading to low domestic scale in UHT production (100+ lines installs are common in other large markets). This lack of scale means domestic shelf prices for UHT milk are high by global standards. For example UHT milk is currently +60% more expensive in New Zealand than in the UK (including GST).

Since the 80’s, the NZ industry has had slow but steady growth in UHT exports. Both major producers, across all their various owners, have responded to ongoing regular market signals by gradually increasing

capacity between 1981 and 2007. Key export markets until recently were largely the Pacific Islands, the Philippines and a range of other small, primarily island, markets around the world.

Following the melamine crisis in the Chinese dairy industry in 2008, China began suddenly to draw in significant amounts of UHT milk from other producing countries around the world. New Zealand UHT milk export to China have grown 22 times since then – from NZ\$1m in 2007 to NZ\$22m in 2012.

This increased demand from China has triggered investment in new UHT milk capacity in New Zealand.

- Fonterra Brand’s Takanini site has increased capacity from 27m litres in 2005 to 90m litres today
- Fonterra is constructing a new greenfields UHT milk site in Waitoa at a cost of \$123m that will double total Fonterra capacity (to 180m?)
- Goodman Fielder’s Meadow Fresh operation is expanding capacity at its UHT plant in Christchurch
- Miraka is building a new 2 line UHT plant as part of a venture with Shanghai Pengxin

Today New Zealand exports NZ\$106m worth of UHT milk to 37 countries, with strong growth to China, but limited growth elsewhere. Only two countries take over \$10m

The Philippines	\$40m
China	\$22m
35 other countries	\$44m

The current strategic situation in the New Zealand UHT industry is driven by both the global situation and NZ firms strategic directions; this sections explores these

GLOBAL SITUATION

The vast majority of milk consumed globally by consumers in a liquid form is fresh not UHT

Milk can be packed from raw milk or from reconstituted powder

Has become a low margin, commodity line sold on price;

Only a thin sliver for premium/niche (e.g. organic)

Firms in many countries have large-scale production capacity and low production costs (e.g. retail price of UHT milk at Sainsbury in the UK of NZ\$1)

Low barriers to entry; can be made anywhere with a TetraPak machine and milk powder

Effectively every #1 and #2 dairy firm in every market of any size in the world has the ability to make UHT

Key players in global trade currently all co-operatives that have been making UHT for a long time and have lots of depreciated equipment

Trade is primarily from Australia and Germany, disposing of excess milk (particularly seasonal peaks)

NZ FIRMS SITUATION

New Zealand - along with Australia and the EU - a major supplier of the raw material milk powder used to make UHT in market

NZ Dairy Board/NZ industry has been toying with UHT milk since the early 1980's; never achieved scale due to low demand in home market (vs. EU players)

Low domestic demand; NZ consumers have refrigerators and drink fresh milk; therefore domestic firms do achieve scale in domestic production; domestic shelf prices high by global standards (UHT milk in NZ +60% vs. UK)

NZ probably has around 10 lines; putting in more; GF/Meadow Fresh has 5-6 lines; Fonterra similar

New Zealand exports a mid-sized amount (NZ\$106m), though growing; only two countries take over \$10m

The Philippines	\$40m
China	\$22m
35 other countries	\$44m

Range of start-ups entering or looking at entering NZ production; success will depend on in-market leverage

WHAT IS IT?

Milk comes in many forms; UHT milk is milk, either fresh or reconstituted from powder, that has been heated at an “ultra-high temperature” to kill bacteria and then placed in a gas impermeable package to give long life

EXAMPLES: Ingredients in Coles Australia UHT milk
2013



Ingredients:
Ultra Heat Treated Full
Cream Milk (100%)

Price:
A\$1.00

Examples of other forms of milk for sales at Coles



Regular milk
Plastic jug
A\$2.00/2l



Regular milk
Barrier carton
A\$1.25/1kg



Dry milk
Plastic bag
A\$6.49/1kg



Condensed milk
Can
A\$2.91/395g



Flavoured dry
Tin
A\$6.28/450g



Flavoured RTD
Plastic
A\$3.00/500ml

PRICE CONSTRAINED BY FRESH

UHT milk pricing is defined and constrained by the price of fresh milk (including soy milk in Asia)

EXAMPLE: Retail price range of UHT milk vs. regular milk in Hong Kong
NZ\$, as of Aug 2013

UHT

Fresh



First Choice (store brand)
UHT Milk
HK\$11/litre

Retail: NZ\$2.06



Anchor (Fonterra)
UHT Milk
HK\$12.95/litre

Retail: NZ\$2.42



Pak Foods
Fresh Soy Milk
HK\$12.90/946ml

Retail: NZ\$2.41



Vita
Fresh Milk
HK\$15.90/946ml

Retail: NZ\$2.97



Nestle
Fresh Milk
HK\$18.50/946ml

Retail: NZ\$3.46

FACTORS - UHT A COMMODITY

One litre cartons of UHT milk are a global commodity item; there appears to be little potential to charge a premium; it is currently +60% more expensive at retail in New Zealand than in England

Retail price of a 1L carton of UHT milk across select countries: lowest price on shelf

Local currency; NZ\$; actual; August 2013



Sainsbury
United Kingdom
£0.53
(0 rated for VAT)



Woolworths
Australia
A\$0.99
(0 rated for GST)



Puregold
Philippines
P60
(VAT 9%)



NTUC Fairprice
Singapore
S\$1.80
(GST 7%)



Countdown
New Zealand
NZ\$1.99
(15% GST)



Wellcome
Hong Kong
HK\$10.90
(No GST/VAT)

Retail NZ\$ ex-tax	NZ\$1.06	NZ\$1.14	NZ\$1.57	NZ\$1.67	NZ\$1.69	NZ\$1.81
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Retail price of select 1L carton of UHT milk at NTUC Fairprice in Singapore by select brand

S\$; actual; August 2013



Australia
S\$1.80
(Store brand)



Malaysia
S\$2.00



Australia
S\$2.05



Australia
S\$2.10



Australia
S\$2.10



Switzerland
S\$3.25



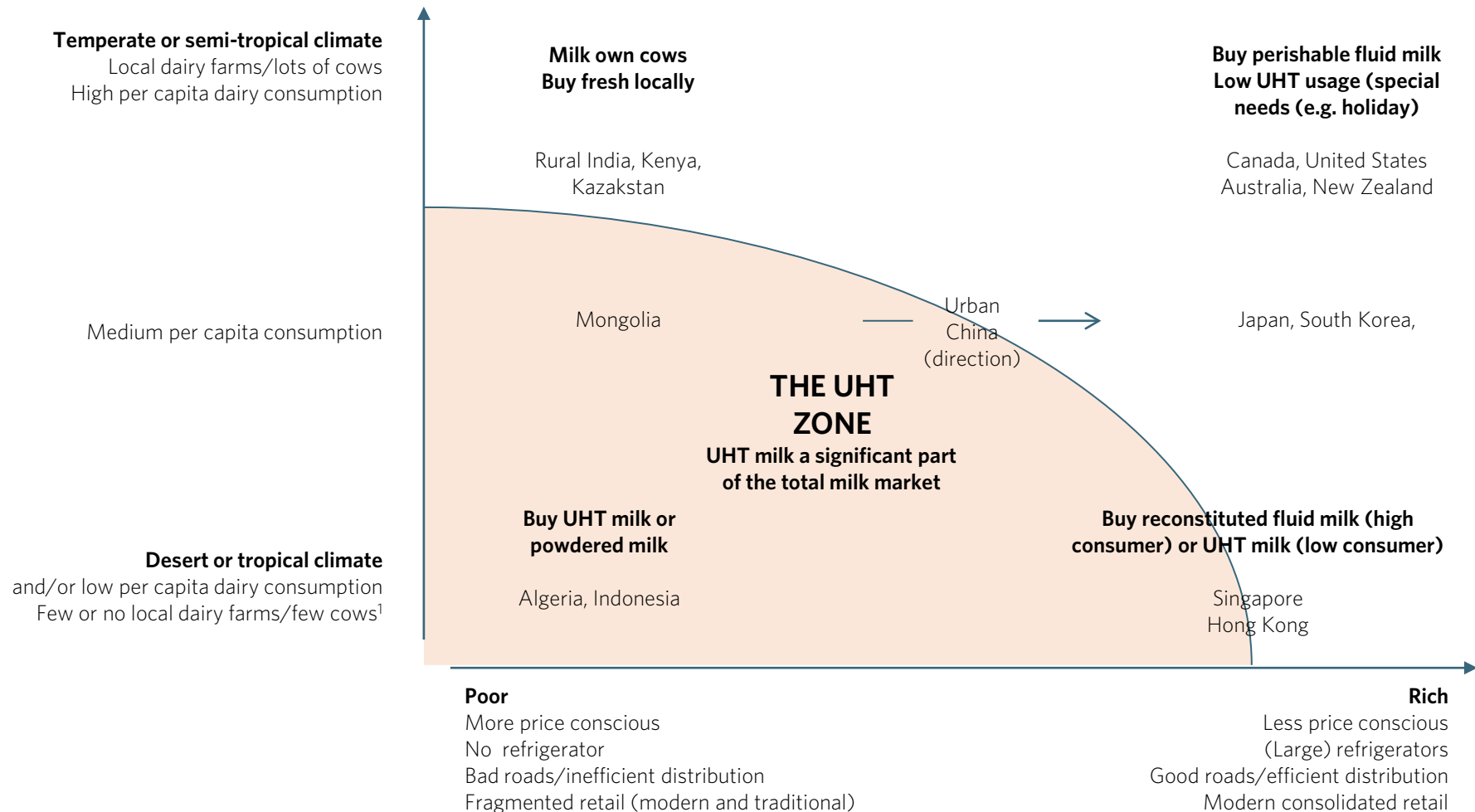
Australia
S\$3.35

UHT ONLY IMPORTANT IN SOME MARKETS

Consumers only drink significant amounts of UHT milk in inhospitable environments for dairy cattle and/or where distribution is poor and/or where people don't have refrigerators

Milk purchase form based on average income and climate

Model; 2013

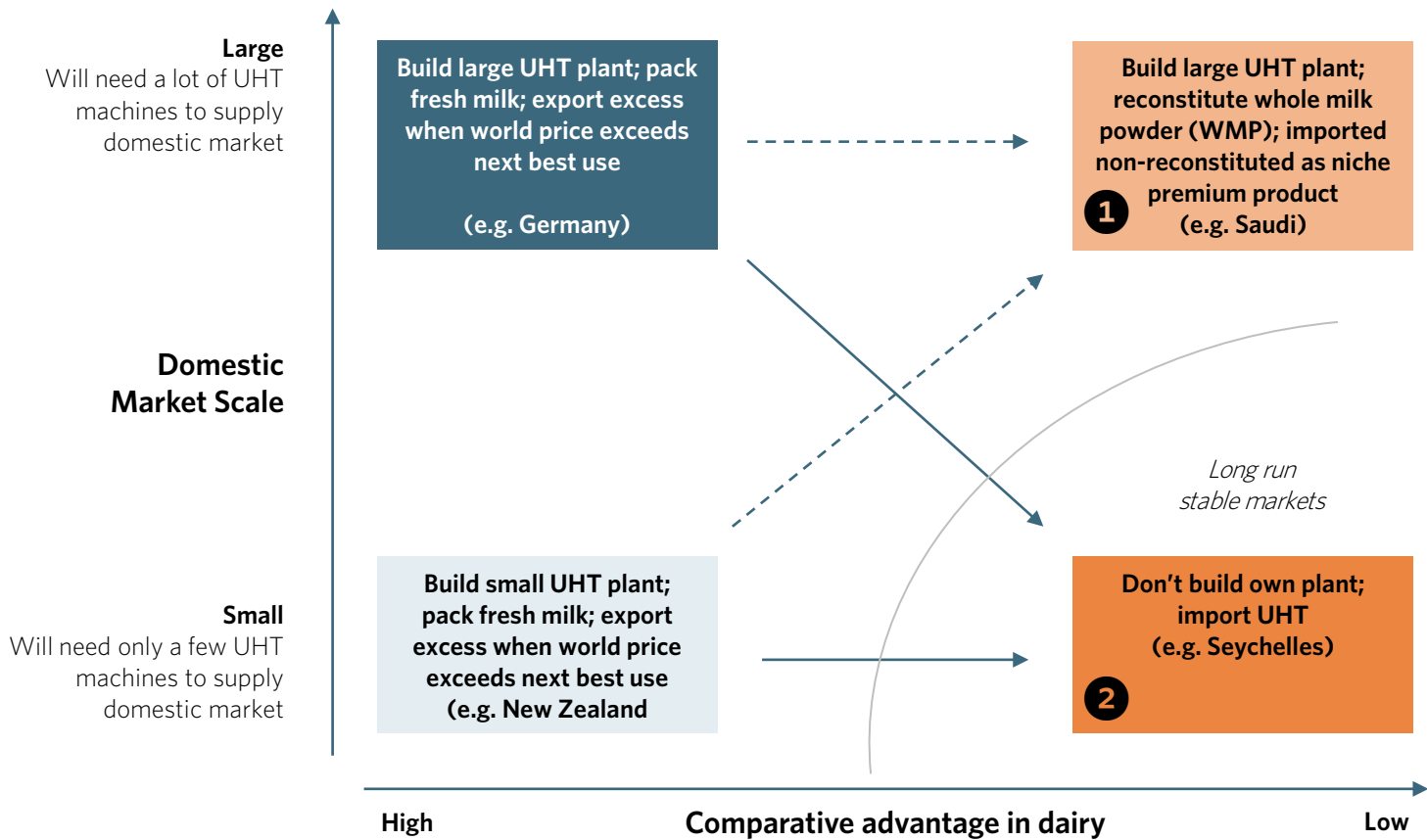


1. Or high cost production by air conditioned cows in the desert; and trade barriers in place; Source: Coriolis

WHO IMPORTS UHT AND WHY?

We propose the following simplified model for when the UHT milk in a country is (1) primarily made in market from reconstituted whole milk powder (WMP) and (2) when it is primarily imported

Simplified model of world export market for UHT milk based on market size and comparative advantage in dairy
Model; 2013



Obviously need to overlay other factors such as:

- Market risk/political stability
- Penetration of refrigerators
- GDP/capita; sophistication of consumers
- Politics, particularly involving domestic dairy industry
- Relative tariffs on UHT vs. powder per reconstituted litre

OPTION 1

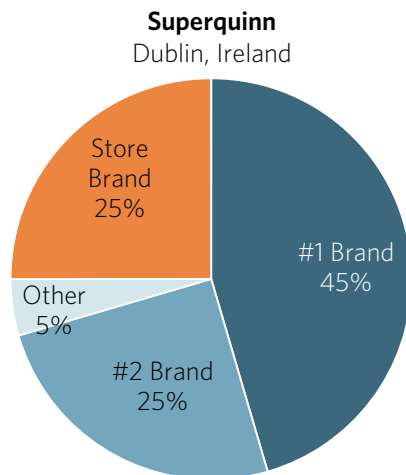
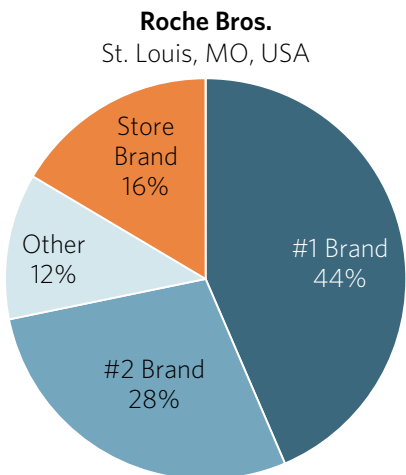
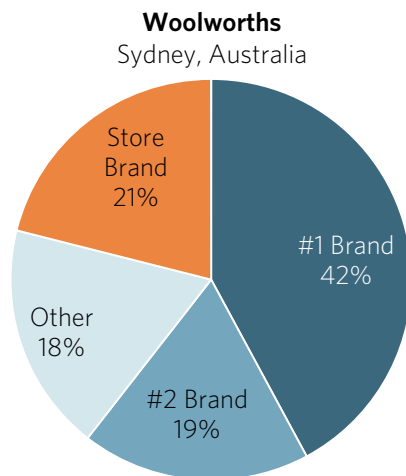
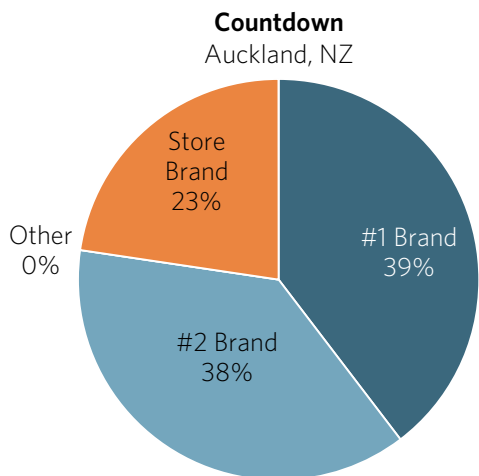
The first value chain we need to consider is in-market production using imported whole milk powder

1 Build large UHT plant; reconstitute whole milk powder (WMP); imported non-reconstituted as niche premium product

2 Don't build own plant; import UHT

In any given region, milk is typically a regional duopoly and retailer store brand

EXAMPLE: Share of fluid milk items on shelf by firm across four countries
% of SKU; August 2013



Key drivers of natural duopoly nature of perishable dairy distribution
Model; 2013



Channels	Products
Need to deliver multiple times a week to all outlets within the region	Need to offer the full range of dairy products to customers
<ul style="list-style-type: none"> - Supermarkets - Convenience stores - Petrol stations - Other retailers - Coffee shops & cafés - Restaurants - Other food away - Schools - Other institutional (e.g. prisons) - Vending - Commercial (e.g. airlines) 	<ul style="list-style-type: none"> - Milk (whole, low-fat, flavoured) - Cream - Sour cream/cottage cheese - Yoghurt - Butter - Cheese - Refrigerated desserts - Non-dairy beverages

However, the dairy industry in most developing markets is still in the process of developing

Comparison of the typical structure of the dairy industry: developed country vs. developing

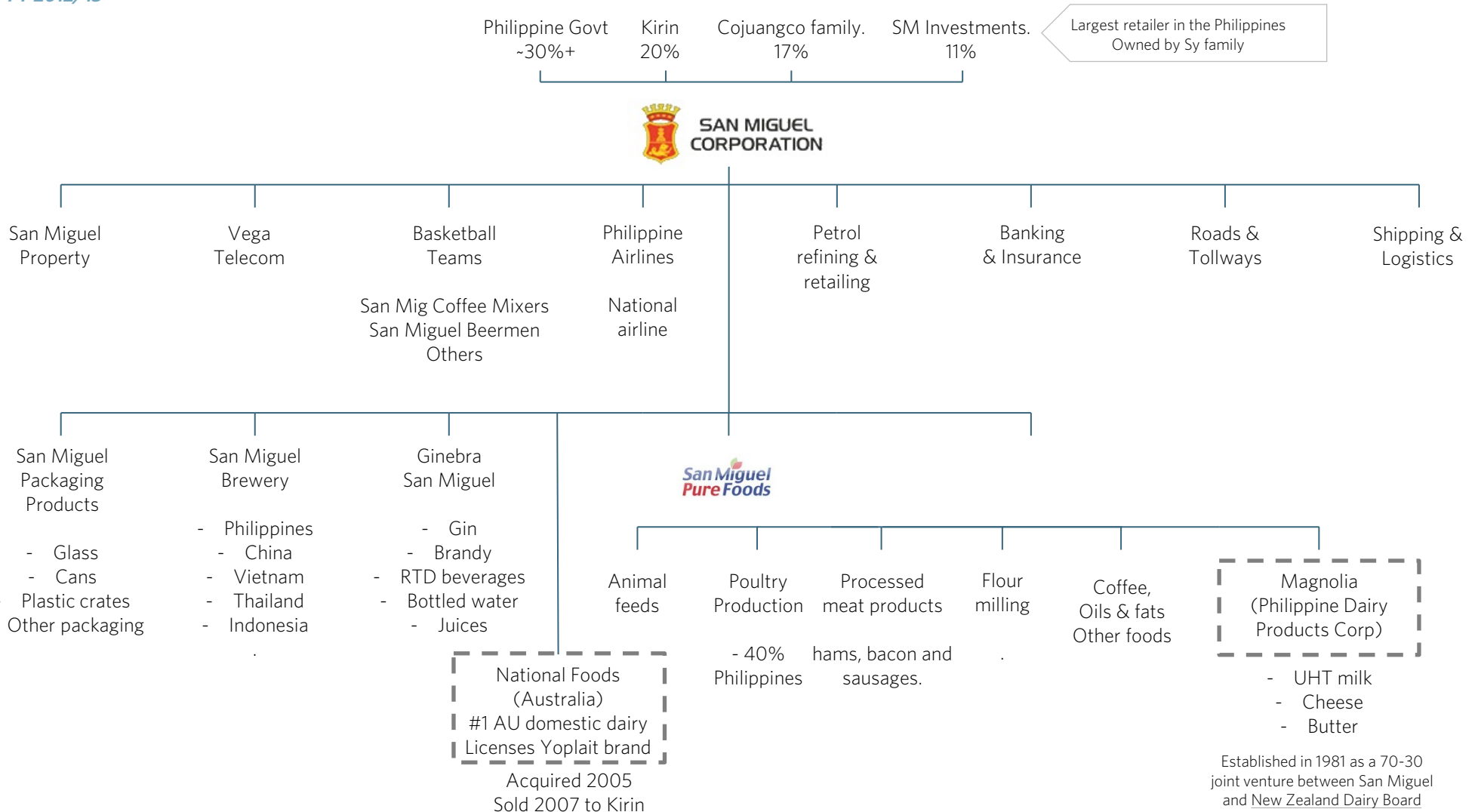
Model

Situation	Developed countries	Developing countries
Product	- Perishable	- Historically shelf-stable (powder, UHT) transitioning to perishable
Source of raw materials	- Typically produced locally - Local dairy collection from farmers a natural monopsony	- Typically imported or produced inefficiently locally under government protection (“cows in the desert”)
Trade	- High tariffs and trade barriers prevent competition from imports	- Often either freely imported or with “manageable” tariffs
Consumption per capita	- High	- Historically very low across many countries
Market growth	- Mature, low growth industry	- Growing rapidly off a low base
Channel structure	- Sold primarily through consolidated supermarket sector	- Sold through fragmented retail channels (though consolidation is occurring rapidly in many markets)
Capital required	- High capital intensity but typically mature plant & equipment - Relatively expensive and capital intensive distribution	- Varies but can be relatively low (powder to UHT); growing capital requirement
Intellectual property	- Limited IP; low defensibility across most products (well understood technology)	- IP and required skills easily importable
Retailer store brands	- Power rests with retailers - High store brand share and growing	- Power rest in control of distribution - Low/no presence of store brands; limited growth
Role of government	- High level of government interest, involvement and interference - Regular use of protection to protect regional/national industry	- High level of government interest, involvement and interference - Regular use of protection to induce development of local industry
Observed outcome	- Listed multinationals with wide scope exiting business long term other than defensible segments (yoghurt, infant formula) - Farmer owned co-operatives taking control of manufacturing - Low innovation/low new product development (NPD) - Falling expenditure on advertising (as a % of sales) - Falling return on capital; co-operatives not listed firms	- Listed multinationals in high IP/defensible categories - Sprawling local conglomerates have dairy as part of a wider portfolio - Need to sell a much wider range of products than dairy - Importance of ability to manage local politics - Regular innovation and new product development (often copied) - Growing returns; typically listed with cornerstone shareholder

IN DEVELOPING WORLD DAIRY TYPICALLY PART OF A WIDER PORTFOLIO

In many developing markets sprawling local conglomerates - with a strong in-market presence and weight - are the local market dairy leaders, as this example from the Philippines demonstrates

EXAMPLE: San Miguel (largest firm in the Philippines) business activities and companies including dairy
 FY 2012/13

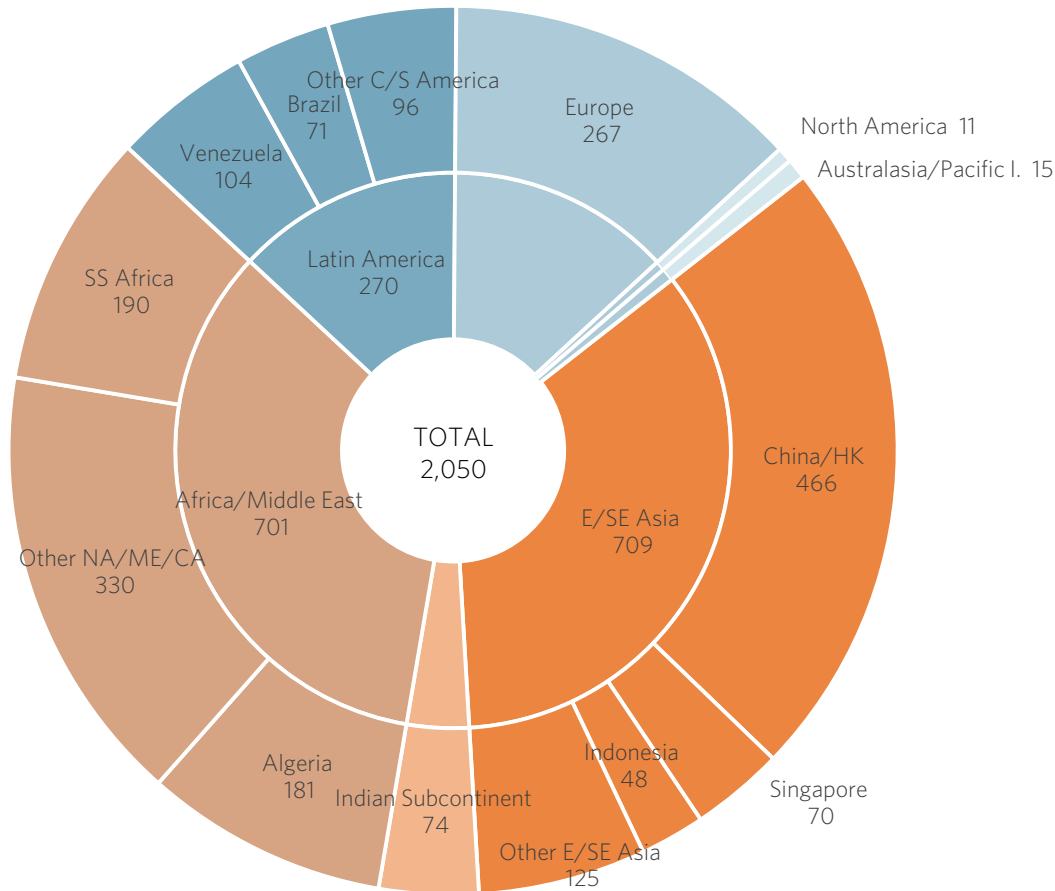


GLOBAL WMP IMPORT VOLUME

While a wide range of countries import whole milk powder – for UHT and a wide range of other uses – the market is primarily dry and tropical countries near the equator; China is the main exception

Global whole milk powder (HS040221) import volume by receiving country or region

Kg; millions; 2011 or 2012 as available

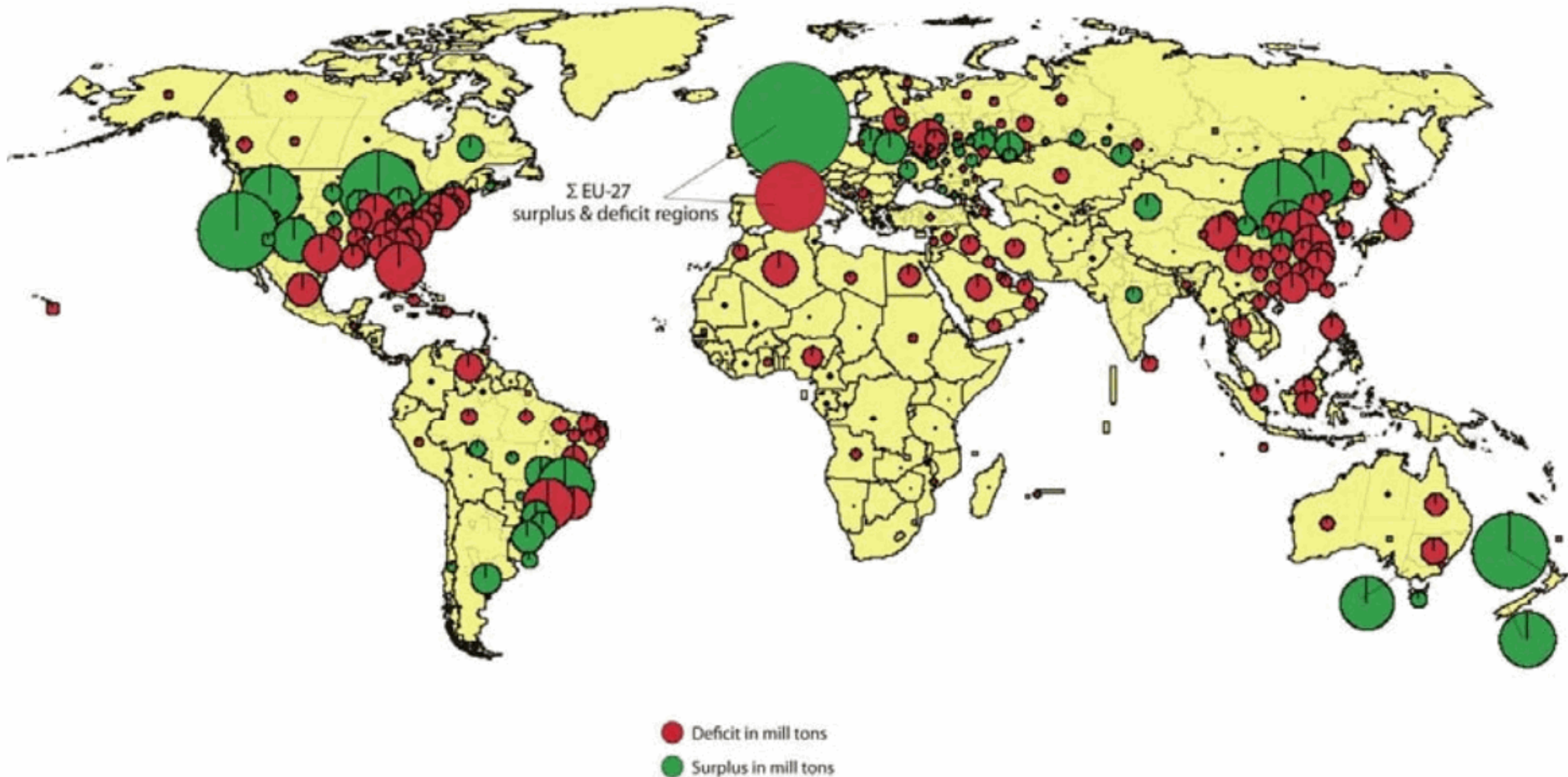


NOTE: Global import volume and export volume do not match for understood reasons (e.g. mix of 2011 and 2012 data by reporter; timing of shipments, underreporting; different classification; treat as directional; Source: UN Comtrade database (custom job); Coriolis analysis and classification

MILK POWDER - GLOBAL

Milk is produced in temperate regions with more cows than people and exported as milk powder to tropical or dry areas close to the equator

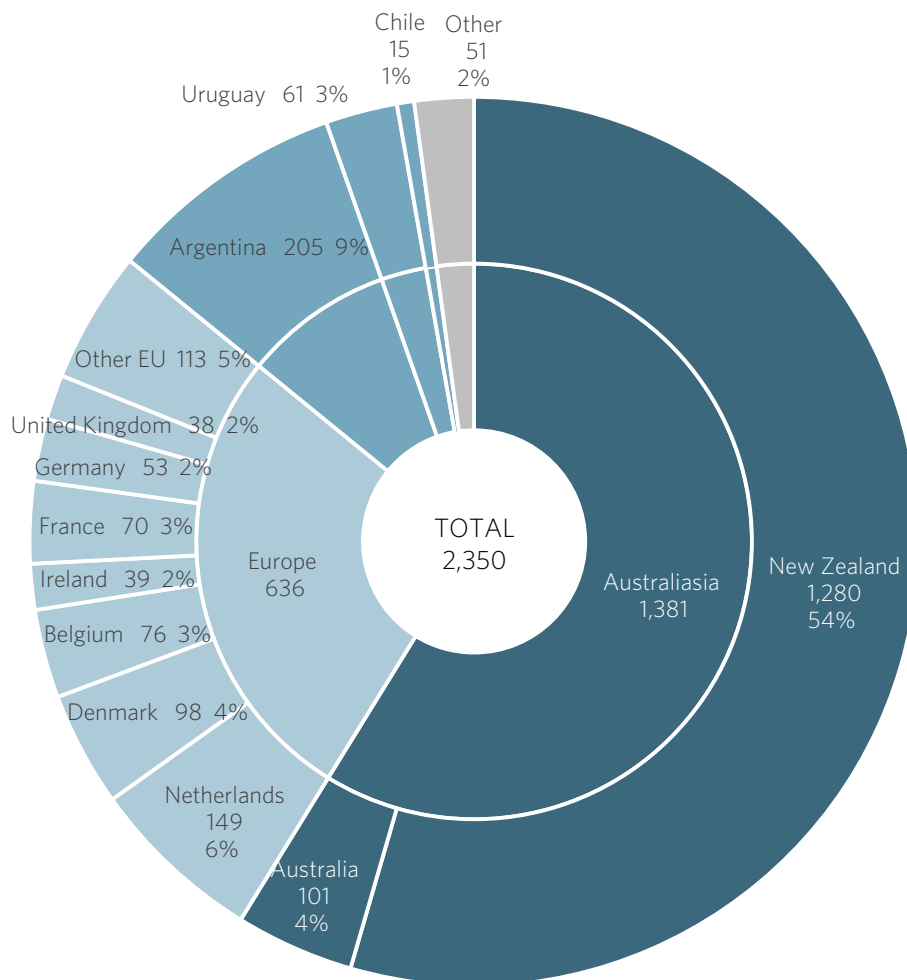
Milk surplus and deficit worldwide
(2007 or 2008)



New Zealand is the global market leader in whole milk powder exports - exporting 54% of global cross-border volume

Global whole milk powder export volume by sending country

Kg; millions; 2011 or 2012 as available

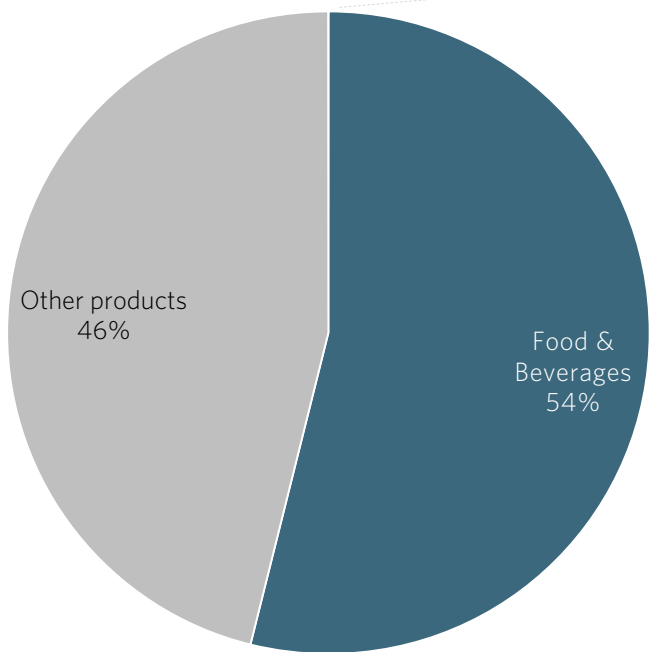


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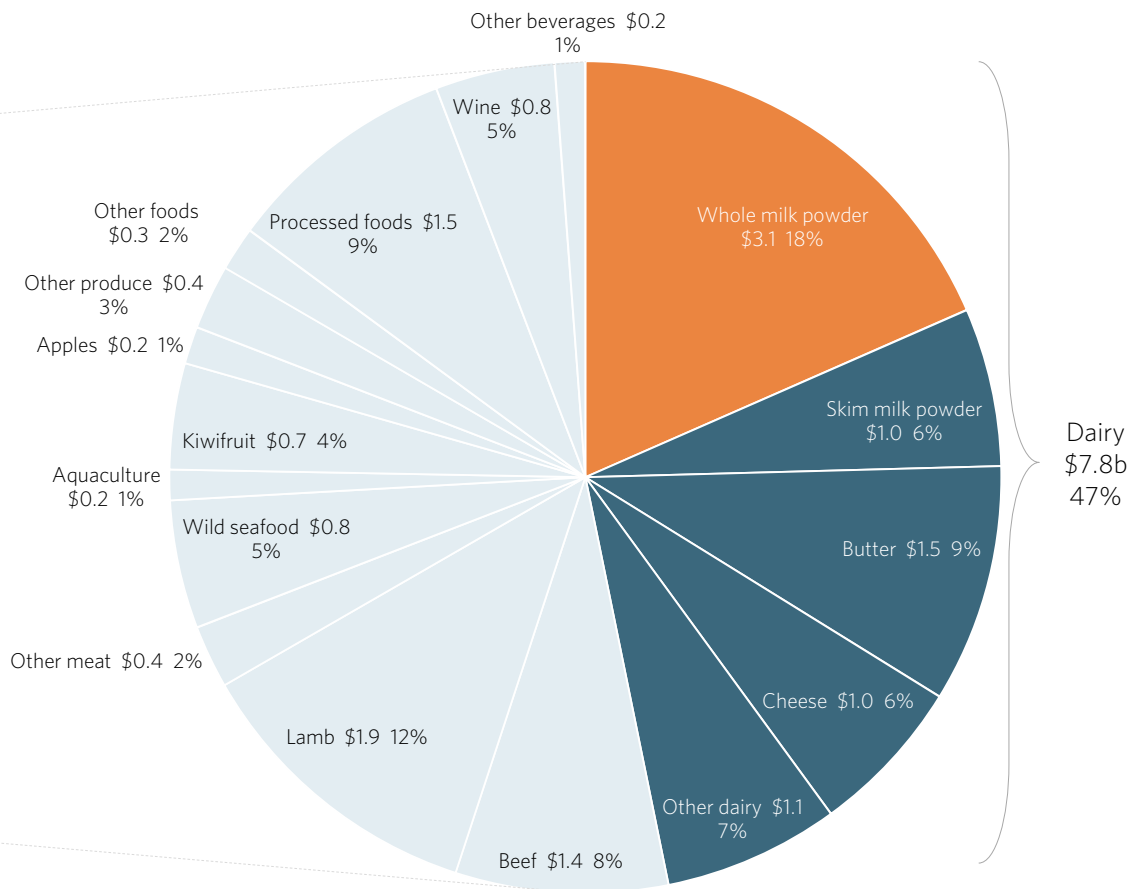
NZ EXPORTS BY TYPE

Whole milk powder is New Zealand's single largest export, accounting for 18% of total food & beverage exports and about 10% of total country exports in 2010

Food & Beverages as a percent of total NZ export value
(%; 2010)



New Zealand F&B export value by major segment
(US\$b; 2010)



OPTION 2

The second value chain we need to consider is the global trade in UHT milk

1 Build large UHT plant; reconstitute whole milk powder (WMP); imported non-reconstituted as niche premium product

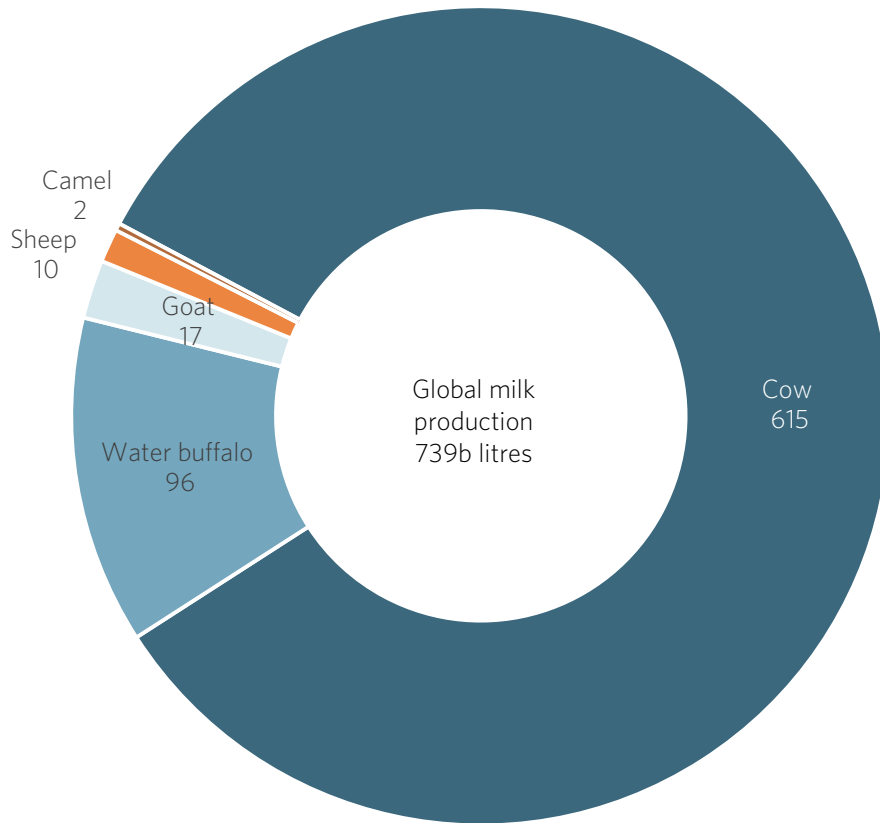
2 Don't build own plant; import UHT

GLOBAL MILK PRODUCTION & DISPOSITION

Only a very, very small (0.1%) amount of global milk production crosses borders in a fluid form

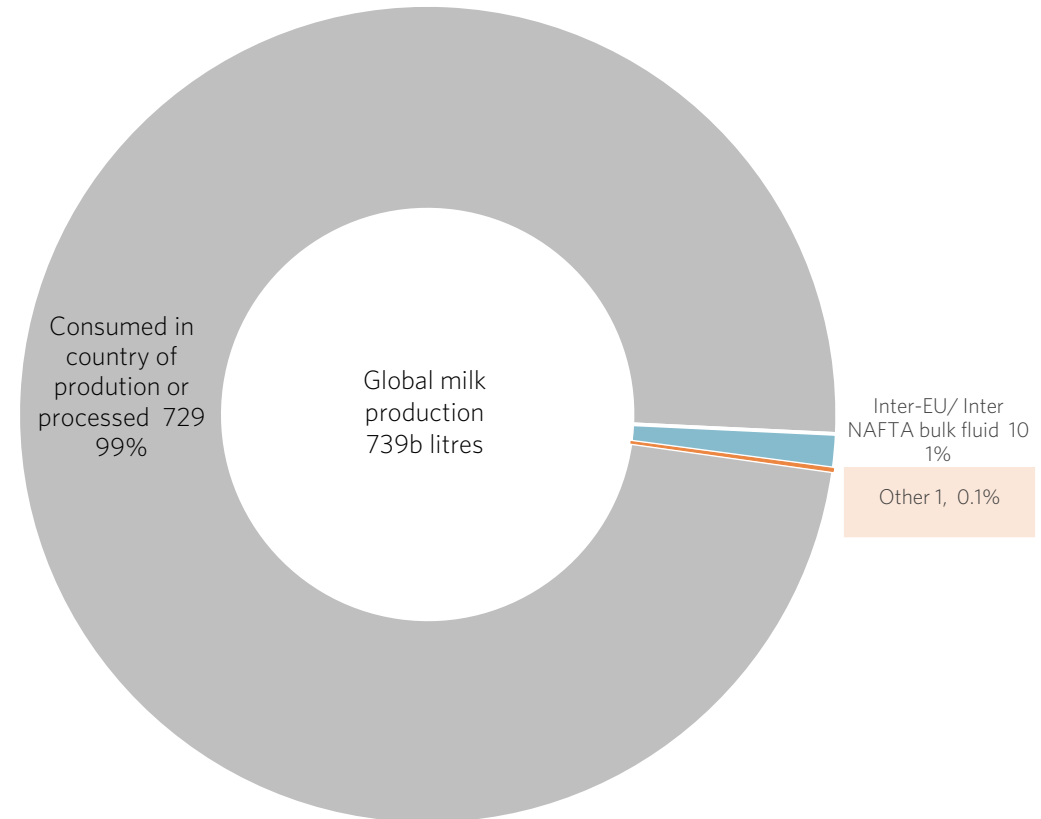
Global milk production volume by species

Litres; billions; 2011



Global milk production by disposition

Litres; billions; 2011

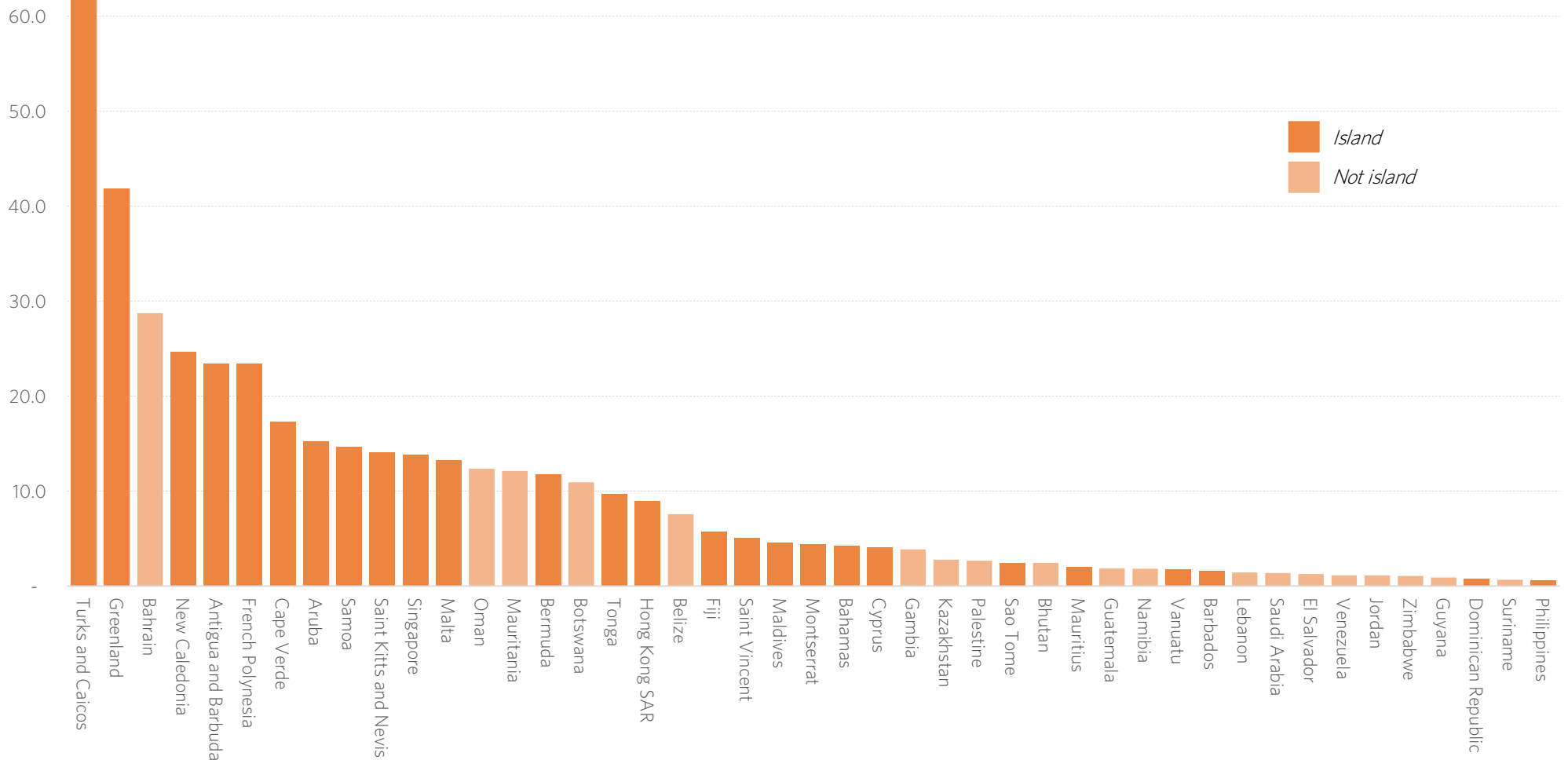


Note: as an example of inter-EU imagine a German farm on the Dutch border sending its daily milk to the local factory next door in the Netherlands;
Source: UN FAO AgStat database; UN Comtrade database; Coriolis analysis and classifications

WHO IMPORTS THE MOST PER CAPITA?

On a per capita basis, fluid milk (in UHT form or otherwise) is primarily imported by small islands, desert countries and certain tropical nations

Fluid milk (HS0401) imports per capita (excluding Europe and NAFTA)
Litres/person; 2011

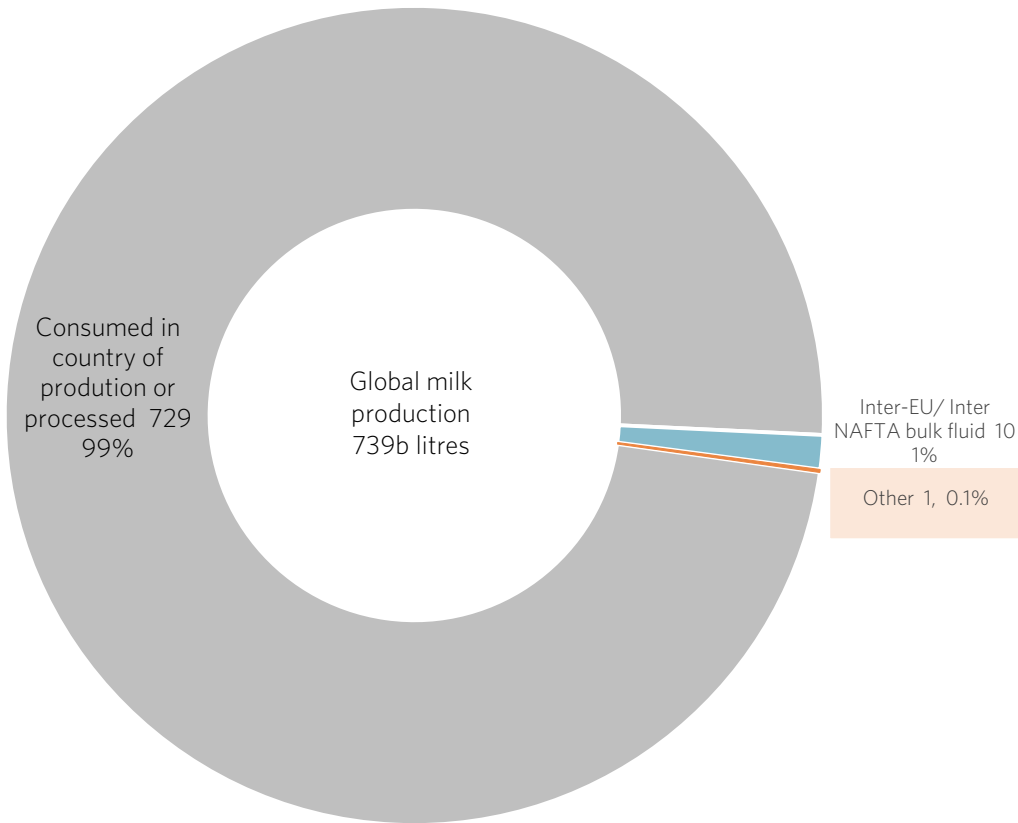


Source: UN Comtrade database (custom job); Coriolis analysis and classification

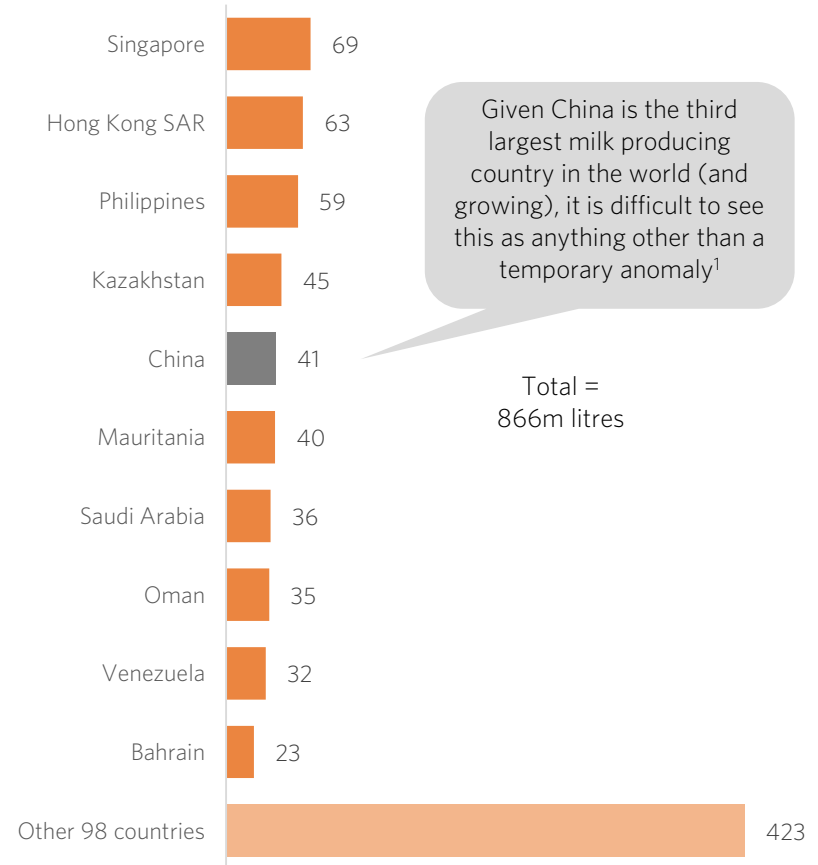
CROSS-BORDER FLUID LIQUID MILK TRADE

Only a few countries import any significant total amount of fluid liquid milk (HS0401), primarily Asian islands and oil-rich desert states; beyond the top 10, the market is fragmented into a large number of small markets

Global milk production by disposition
Litres; billions; 2011



Global fluid liquid milk (HS0401) imports by top 10 countries²
Litres; refrigerated, UHT and otherwise; millions; 2011



1. Albeit a temporary anomaly that may last twenty years; 2. Excluding inter-EU/NAFTA discussed earlier; Source: UN FAO AgStat database; UN Comtrade database; Coriolis analysis and classifications

FACTORS - LOTS OF EXISTING PLAYERS

There are already a large number of existing players in UHT milk globally, typically very large dairy players; for example Friesland (co-op), Fonterra (co-op), Parmalat (corp), Lactalis (corp), and many others

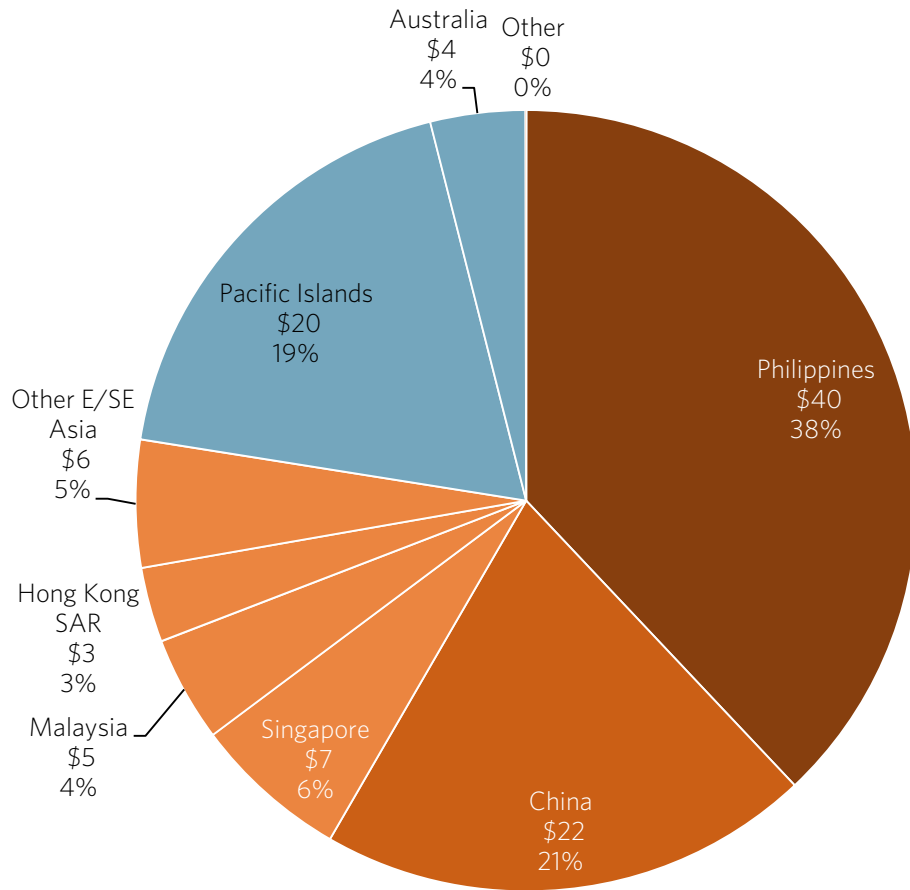
EXAMPLES: Select UHT milk products
(2010)



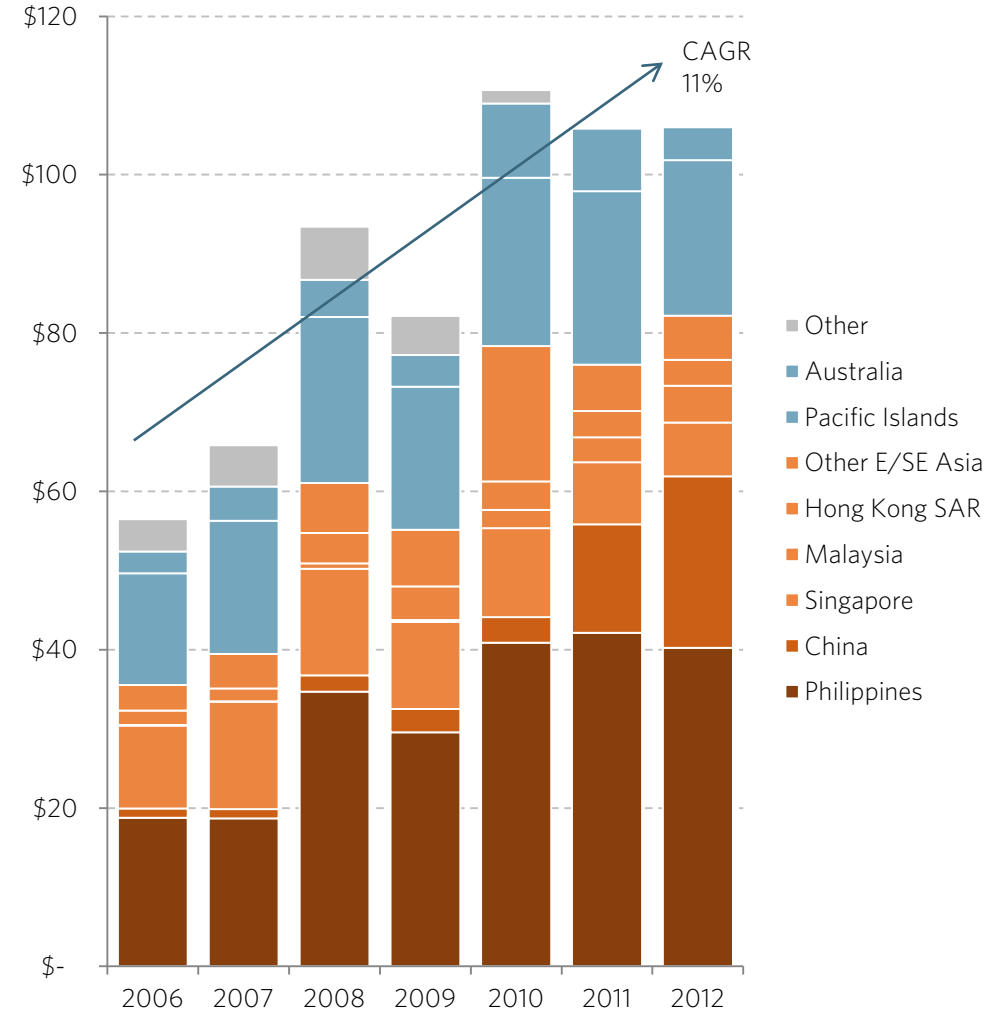
FACTORS - LIMITED MARKETS/LIMITED TRACTION

New Zealand currently exports UHT milk to a large range of countries (37); the Philippines and China account for almost two thirds; Asia in total takes ~75% and the Pacific Islands and Australia the rest

New Zealand UHT Milk (HS0401200901) export value by destination
NZ\$m; 2012



New Zealand UHT Milk (HS0401200901) export value by destination
NZ\$m; 2006-2012



FACTORS - STRONG MARKETING IN PLACE

Meadow Fresh - the current New Zealand export leader - is pushing a strong New Zealand position



INVESTMENT IN NEW & EXPANDED UHT PLANT

UHT milk production began in New Zealand in the 80's; following a long period of low/no major investment, there has been a surge in new investment in the last 3+ years driven by growing demand from Asia

Identified investments in UHT milk production plant and capacity in New Zealand

1980-2013+

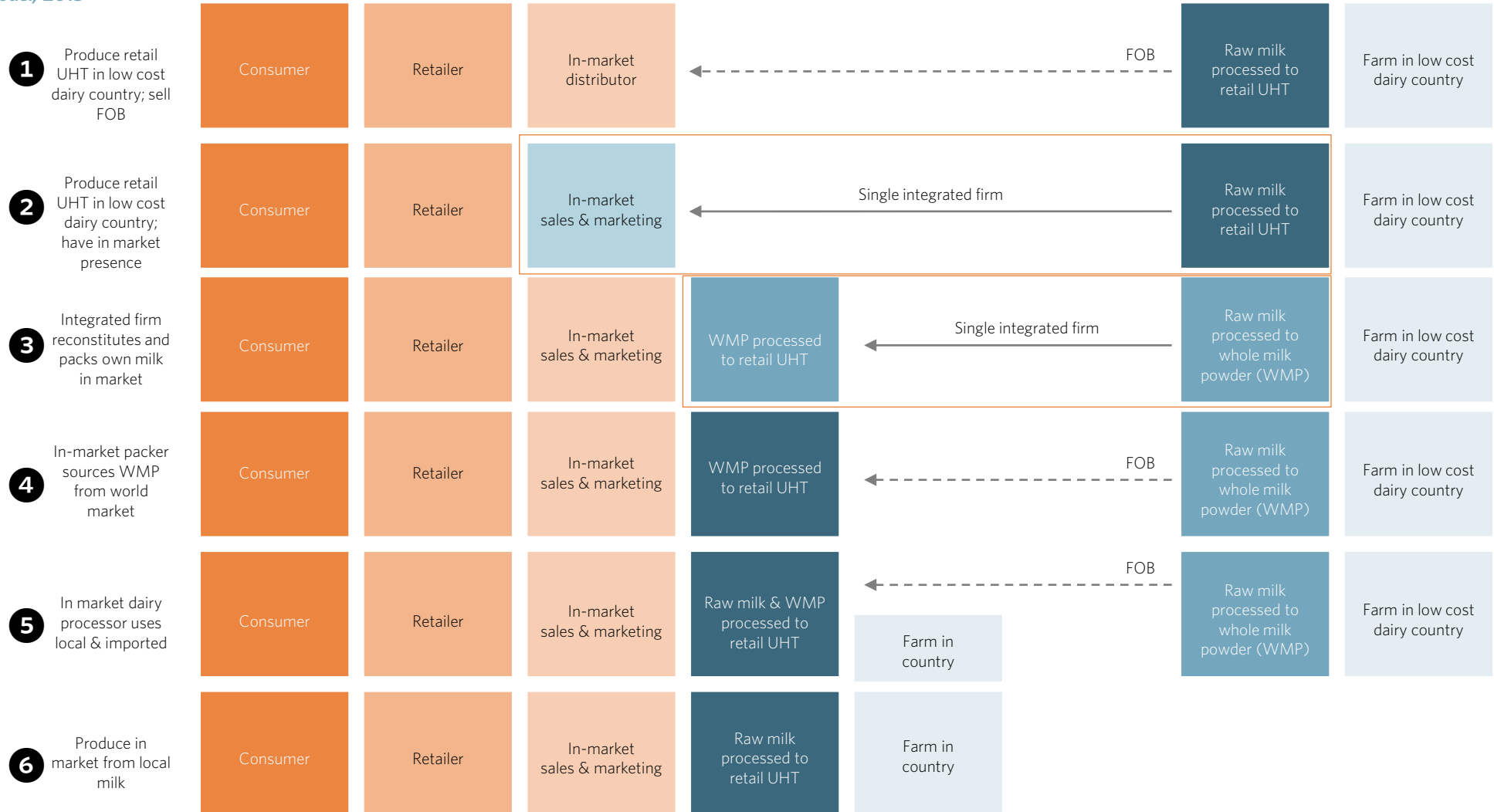
Date	Firm	Plant location	Investment	Action
1980's	Canterbury Dairy Farmers Co-operative (now Meadow Fresh)	Christchurch	N/A	- Began producing UHT milk in Tetra in Christchurch
1981	Ambury Milk (now Fonterra Brands)	Takanini	N/A	- Began producing UHT milk in Tetra at Takanini (originally 1 line doing 5m litres)
2005-2009	Fonterra Brands	Takanini		- "Increasing demand from Asia and the Pacific saw us more than double our production from 27 million litres in 2005 to 60 million litres last year (2009)" Fonterra 2010
2010	Fonterra Brands	Takanini	\$8m	- \$8 million upgrade of its Ultra Heat Treated (UHT) milk processing plant in Takanini, Auckland provides a 30 percent increase in capacity (to 90m Litres)
2011	Etika (JV with local investors)	Hawkes Bay	~\$20m	- UHT Aseptic PET (Polyethylene terephthalate) bottling line for milk and 100% juice products
2013	Miraka	Mokai, Taupo	\$25m	- Building a new 2 line UHT plant alongside existing milk powder plant - Will produce "high value" 250ml packs of UHT milk for export and distribution in China by Shanghai Pengxin
2013	Fonterra	Waitoa	\$123m	- Greenfields new plant will contain five new UHT lines - Increases Fonterra's UHT capacity "by 100 per cent over the next few years" - Will produce a range of products including UHT white milk and UHT cream for the foodservice sector, and double Fonterra's UHT production capacity. - Requirements of the new plant will require a 50% rise in winter milk production in the region
2013	Goodman Fielder Meadow Fresh	Christchurch	N/A	- Expansion of UHT plant capacity for export to Asia

"Proposals for new UHT plant have come before the board every two or three years over the last 10 to 15 years... It's only been in the last two years that the market has changed so dramatically that you have got enough margin to be able to drive this kind of investment." *John Wilson, Chairman, Fonterra, April 2013*

We propose the following six potential value chain integration strategies for manufacturing UHT milk

EXAMPLE: Simplified model of six potential value chains for UHT production

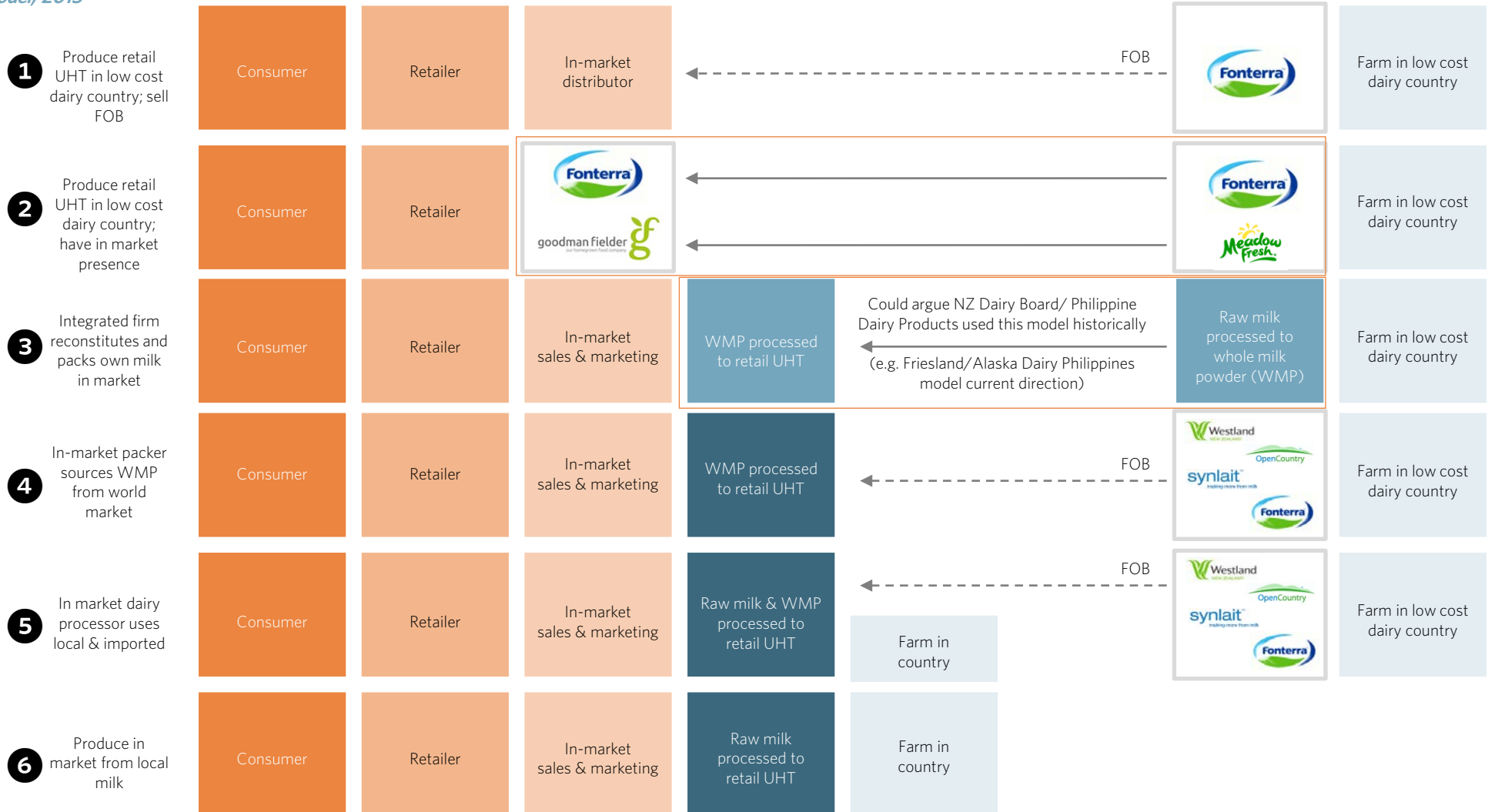
Model; 2013



New Zealand firms currently only execute on four of the potential six value chain integration models

EXAMPLE: Simplified model of six potential value chains for UHT production

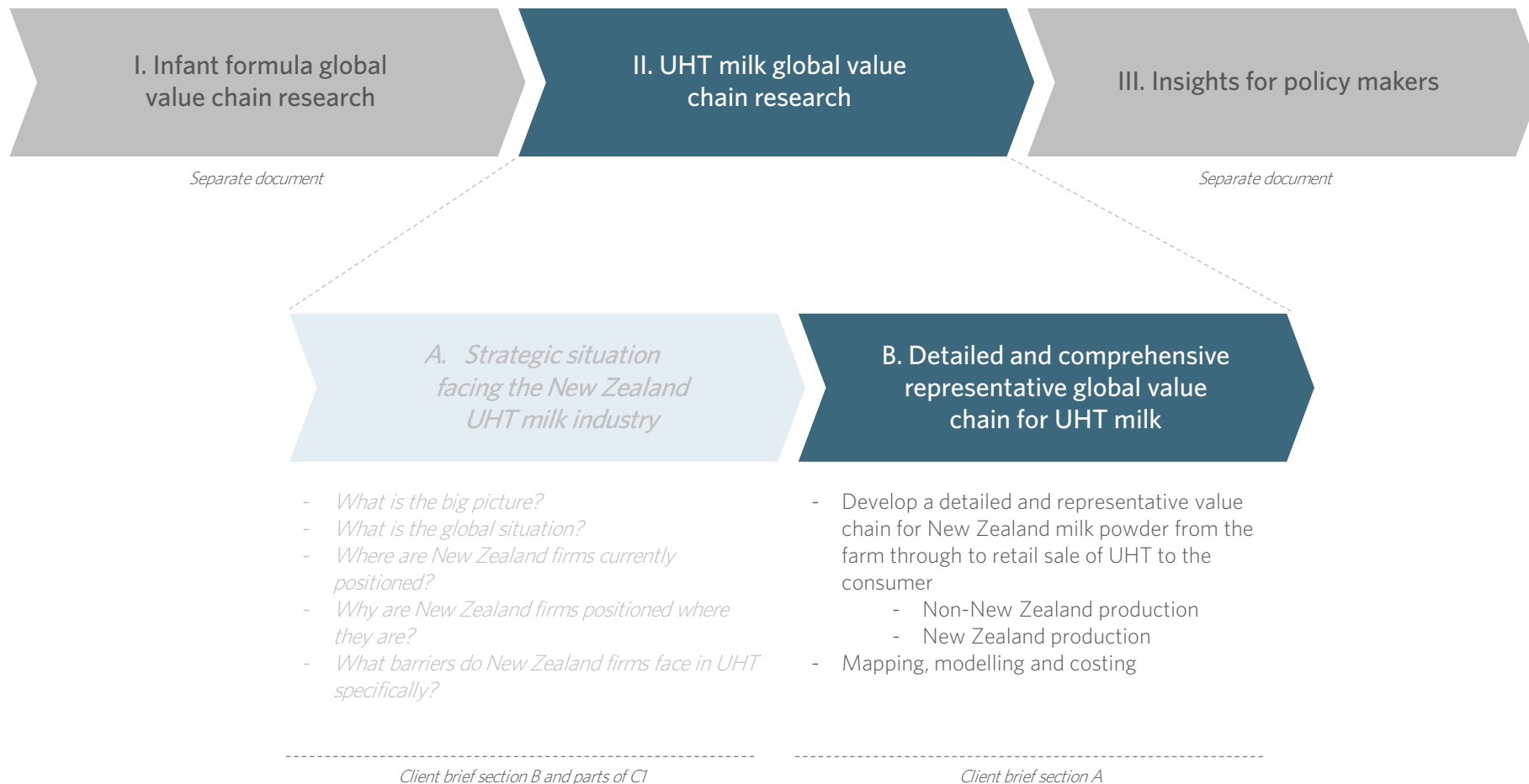
Model; 2013



None of the six models is clearly superior - there is no one size fits all; all have strengths and weaknesses

	Value chain integration model	Strengths	Weaknesses
1	Produce retail UHT in low cost dairy country; sell FOB to in-market wholesaler/distributor	<ul style="list-style-type: none"> - Packed fresh tastes better - No double handling - Get paid promptly - No additional staff/overhead in market - Can access a large number of markets quickly 	<ul style="list-style-type: none"> - Shipping water around the world - Long lead times; inventory in pipeline - Highly competitive for relatively low margins - Low defensibility; "here today, gone tomorrow"
2	Produce retail UHT in low cost dairy country; have in market presence	<ul style="list-style-type: none"> - Packed fresh tastes better - No double handling - Make higher margins - Control in-market branding and marketing - Leverage in-market to sell other products 	<ul style="list-style-type: none"> - Shipping water around the world - Long lead times; inventory in pipeline - Additional staff/overhead in market - High overheads relative to competitors (esp. initially)
3	Integrated dairy firm reconstitutes and packs own milk in market	<ul style="list-style-type: none"> - More profitable; two bites of the cherry - Flexible production close to demand - Make higher margins; may reduce variability across chain - Control in-market branding and marketing 	<ul style="list-style-type: none"> - Need to invest hard cash in capital - Risk (country, exchange rate, etc.) - Expected to buy from self; competitiveness can change - Different skill set to being low cost dairy operator - High overheads relative to competitors with broader range
4	In-market packer sources WMP from world market	<ul style="list-style-type: none"> - Play the market for whole milk powder - Flexible production close to demand - Can use machine for other beverages (e.g. juice) - Can leverage any wider business strengths/portfolio 	<ul style="list-style-type: none"> - No clear "origin" story - Exposed to global milk price (no natural hedge) - Product reconstituted not packed fresh
5	In market dairy processor uses local & imported	<ul style="list-style-type: none"> - Balance seasonal swings - Balance production - Manage/moderate impact of tariffs 	<ul style="list-style-type: none"> - Exposed to global milk price - Product partly reconstituted - May dilute brand and "origin" story
6	Produce in market from local milk	<ul style="list-style-type: none"> - Low overall transport time/logistics - May potentially get a premium - Packed fresh tastes better - No double handling - No foreign exchange risk 	<ul style="list-style-type: none"> - Exposed to local milk price - May be uncompetitive on price

The second section of this report looks at the a representative global value chain for UHT milk



The value chain for UHT milk is simple and straightforward and every participant earns their returns

A range of key findings and conclusions come out of this analysis of the global UHT value chain:

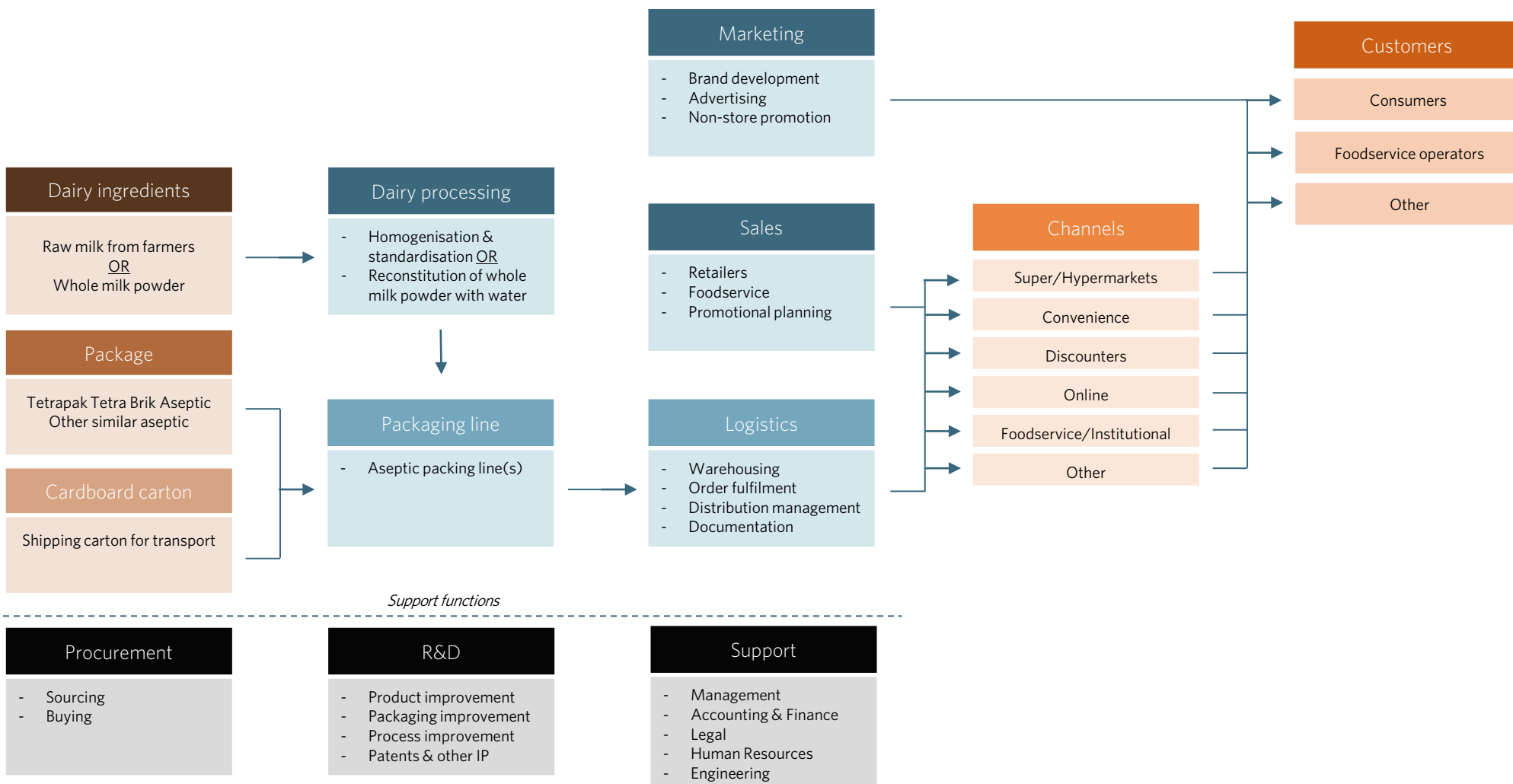
1. The value chain for UHT milk starts with the consumer not the primary producer of the milk. The whole value chain moves, responds and adapts based on day-to-day purchase decisions made by millions of global consumers. Obviously these signals become muffled the further one gets from the consumer, but they cannot be ignored. All other things being equal, consumer would like fresh milk. Where this is not possible, for whatever reason, they settle for UHT.
2. Most food & beverage categories are not like wine. In most categories, including UHT milk, the consumer signals to the retailer that what they want is to choose from among a small number of large, well marketed brands manufactured by well known and trusted dairy companies or trusted retailer store brands.¹
3. The value chain for UHT milk is very simple and relatively short. All firms in the value chain have clearly defined roles and responsibilities. There is a common industry structure and value chain globally - with the same roles occurring everywhere - signalling strong forces creating this structure. The only main regional variable is the source of the milk used (powder or fresh).
4. There is no wide and undefended pool of profitability sitting anywhere along the value chain just waiting to be devoured. At all stages of the chain, firms earn their profits through hard work, innovation, and execution. Shareholder's return are generally proportional to assets, particularly across an economic cycle.
5. Relative to infant formula (and many other dairy products) making UHT milk in New Zealand for export has a relatively unattractive value chain. The product is primarily water and the domestic market is tiny by global standards. In-market production from powder is straight forward, barriers to entry are low and the competitors in the global trade are farmer-owned dairy co-operative who are notorious soft-sellers. Anyone who disagrees with this assessment should take a hard look at the cost structure of RFM Corp in the Philippines.
6. Stages of the chain beyond the farm gate and basic dairy processing are typically structured - in any given market or segment - as a small number of large firms, rather than a large number of small firms, signalling strong economies of scale.
7. The main barrier to exporting more UHT milk is identifying a way to do so and make a profit, particularly once the Chinese market normalises.

1. This is not to say the retailer does not have an incentive to reduce range but fundamentally in any given category the depth of choice offered is driven by the consumer

The value chain for UHT milk can be represented by the following simplified model

Simplified value chain for UHT milk manufacturer

Model; 2013



UHT MILK VALUE CHAIN - MODEL

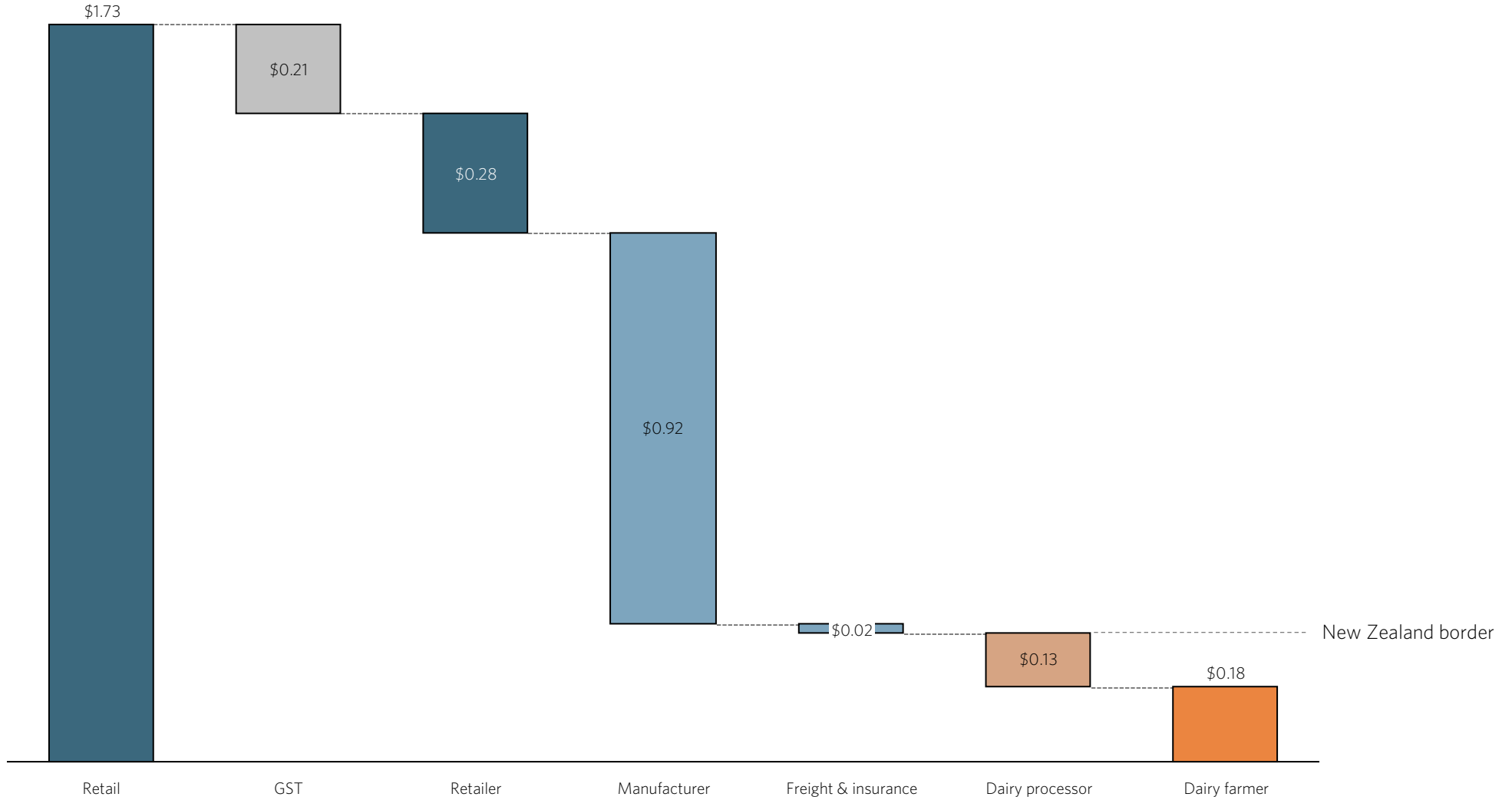
This analysis of the UHT milk value chain uses a simplified value chain from the consumer in Asia through to the dairy farmer in New Zealand; at key stages as far as possible we use real firm's financials as models



UHT MILK VALUE CHAIN - MARKUP BY STAGE

Preliminary analysis of the UHT milk value from retail in Asia through to the farm gate return shows most of the value being added beyond the New Zealand border

Waterfall chart of value chain from retail shelf price of a carton of UHT milk through to farm gate value to dairy farmer in New Zealand
NZ\$, actual, 2012

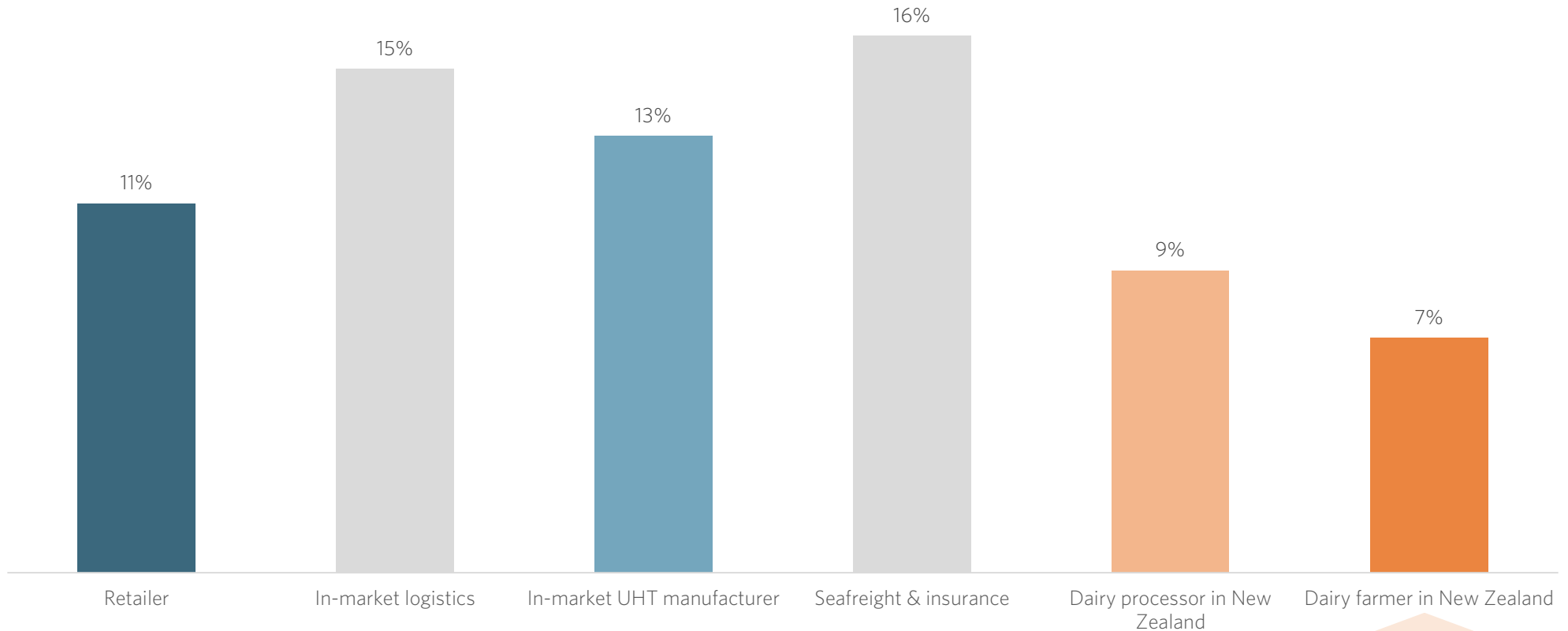


RETURN ON ASSETS

Looking at return on assets we find that all members of the value chain earn their returns

Return on assets by stage of the given UHT milk value chain

%; EBITDA to total assets; model



Excludes returns on land value which have been very significant over the past decade; suggest factoring in land value returns over the last decade would double this number.

Our model value chain for UHT milk starts with the consumer; in this case “the Santos family”, a typical middle class family in Manila in the Philippines



John Paul, Angelica, Nicole, Angel, Mariel & Christian Santos

A typical middle class Filipino family

They are a dual income household with two working parents and four children. He works as an line manager and she works in retail.

They make the average middle class Manila household income, which is about P260,000 after tax (NZ\$7,500).

They rent a small apartment in a suburb of Manila.

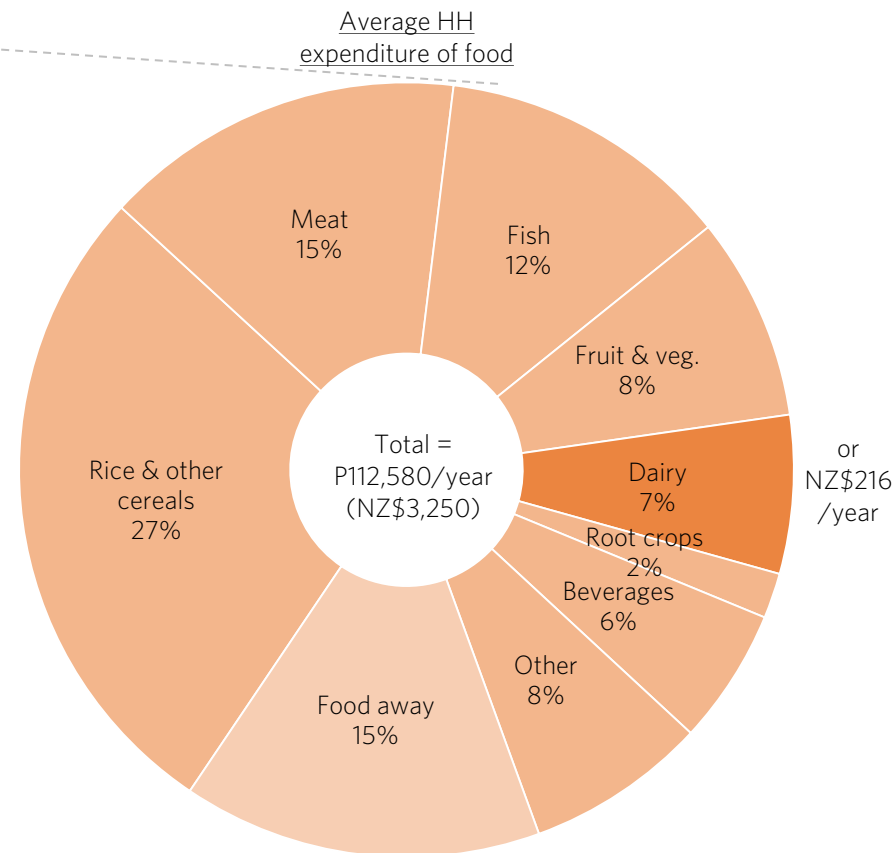
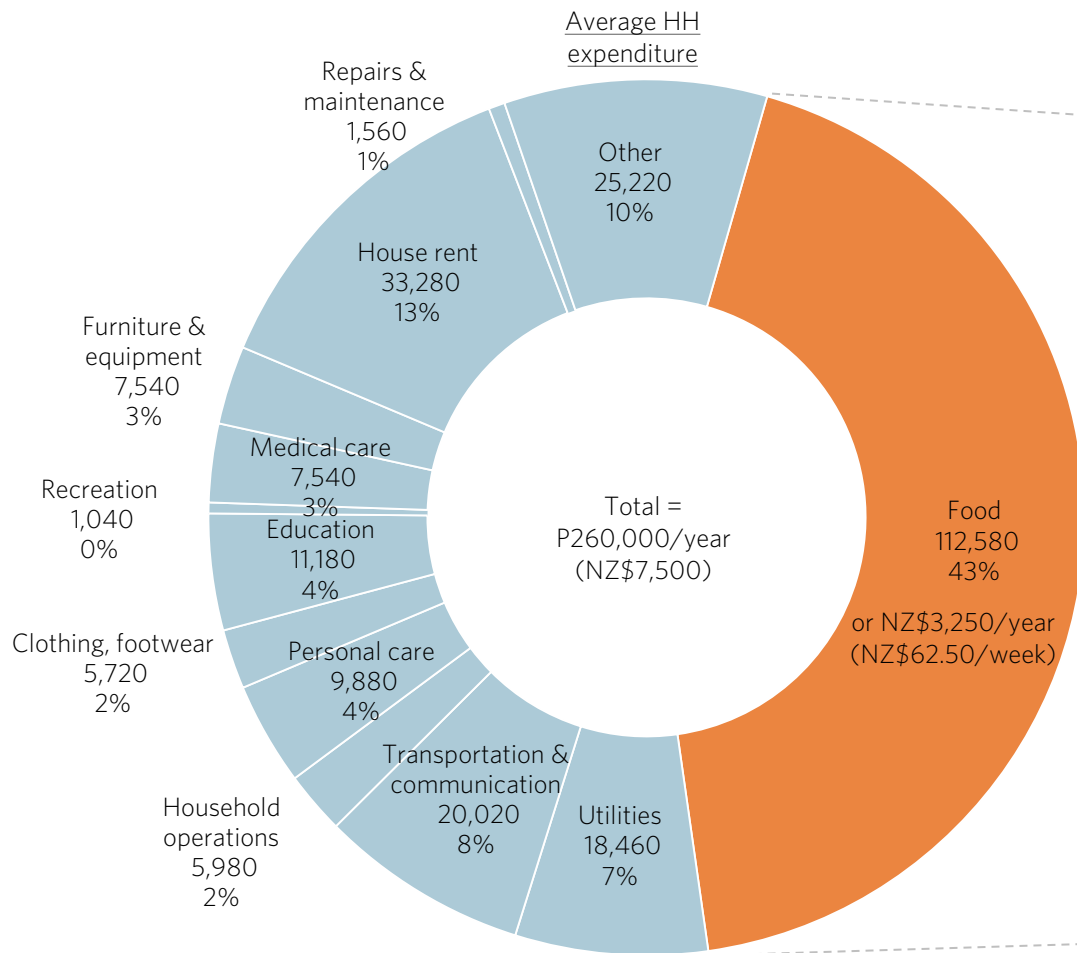
Angelica regularly buys UHT milk as she likes her children to have dairy.

AVERAGE HOUSEHOLD EXPENDITURE

The average middle class Manila household spends about NZ\$7,500 per year; 43% goes on food; 75% of food expenditure is on “at home” consumption; 7% of food expenditure is on dairy

Average annual Manila, Philippines middle class household expenditure by type

P Peso; % of P; 2006 adjusted to 2012



WHERE THEY SHOP

Like most people, the Santos family shop at the closest supermarket to their home - in their case a Puregold Extra Supermarket that opened last year near their house



PUREGOLD

The Santos family's local supermarket

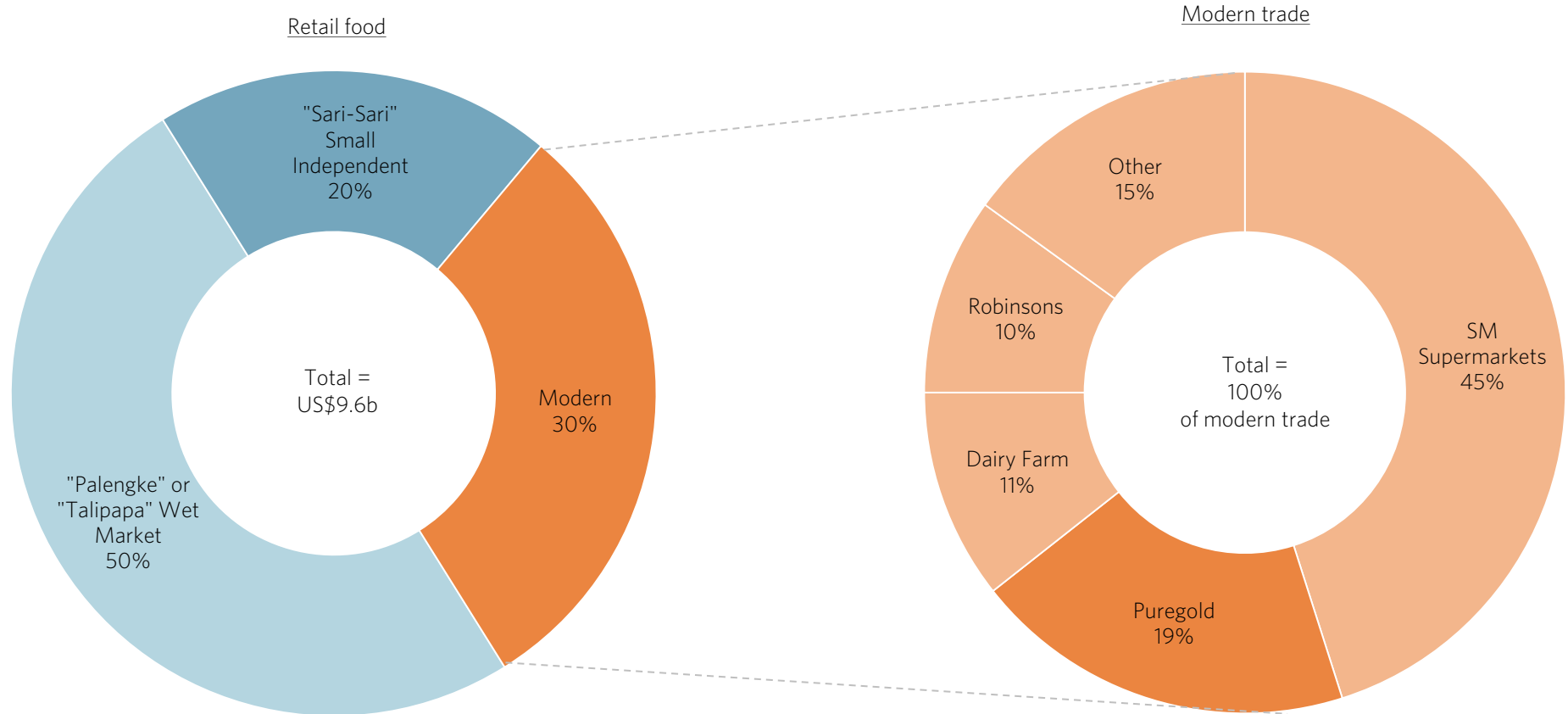
Puregold
San Andres, Manila
Opened July 2012

WHERE THEY SHOP

Puregold is the #2 chain in the Philippines; Angelica shops at the local Puregold for groceries, but still buys most of her perishables (e.g. meat, seafood, fruit & veg) at the local wet market run by the regional council

Retail food sales in the Philippines by channel type

% of food and beverage sales; 2012












Data here excludes home or small farm domestic production for own consumption (still the primary source of food in rural areas)

The “modern” trade in the Philippines is consolidating rapidly into a handful or large chains

Major “modern trade” chain retail food store operators in the Philippines

(2012)

Group	Group retail sales	# of super/hyper-market stores	Formats	Ownership	Website/notes
 	P161.2b	202	SM Supermarkets 37 Save More 82 SM Hypermarkets 37 SM Department stores 46 Shopping malls 52	Publicly listed Philippines Stock Exchange (Majority Henry Sy & family)	http://www.sminvestments.com/ Acquired SHV Makro stores Acquired 50% of WalterMart 2013
	US\$300m	17	Supermarkets 17	50% SM Investment 50% Wilson Lim & family	http://www.waltermart.com.ph
	P57.5b	156	Puregold Hypermarkets & supermarkets 131 Discount stores S&R Membership Shopping 6 Parco department store 19	Publicly listed Philippines Stock Exchange (68% Lucio Co & family)	http://puregold.com.ph/ Acquired Kareila/S&R (P16.5b); itself originally a JV with Price Smart Acquired Gant Group/Parco (2013)
	N/A	72	Supermarkets Department stores Home Improvement Toys R US Electronics	Private Gokongwei family	www.robinsons-supermarket.com.ph/
  	N/A	58	Rustan Supercenter 29 Rustan's Fresh/Express 22 Shopwise 7 Watson's	Listed; Hong Kong	http://www.rustansfresh.com http://www.shopwise.com.ph/
	N/A	17	Ever Supermarket 17	Private	http://www.ever.ph

REGULARLY ADVERTISED

One litre UHT milk is regularly advertised by all the main supermarkets in the Philippines and it is a “known value item” (KVI) targeting the P60 price point

EXAMPLES: 1l UHT milk from various Manila supermarket advertising circulars August 2013



TWO MAIN DOMESTIC SUPPLIERS

There are three major domestic manufacturers of UHT milk in the Philippines - RFM/Selecta, San Miguel/Magnolia and Freisland/Alaska; Angelica begins the value chain by spending P60 (NZ\$1.73) on a carton of Selecta



Established in 1981 as a 70-30 joint venture between San Miguel and the New Zealand Dairy Board

Fonterra divested its 30% share in 2002

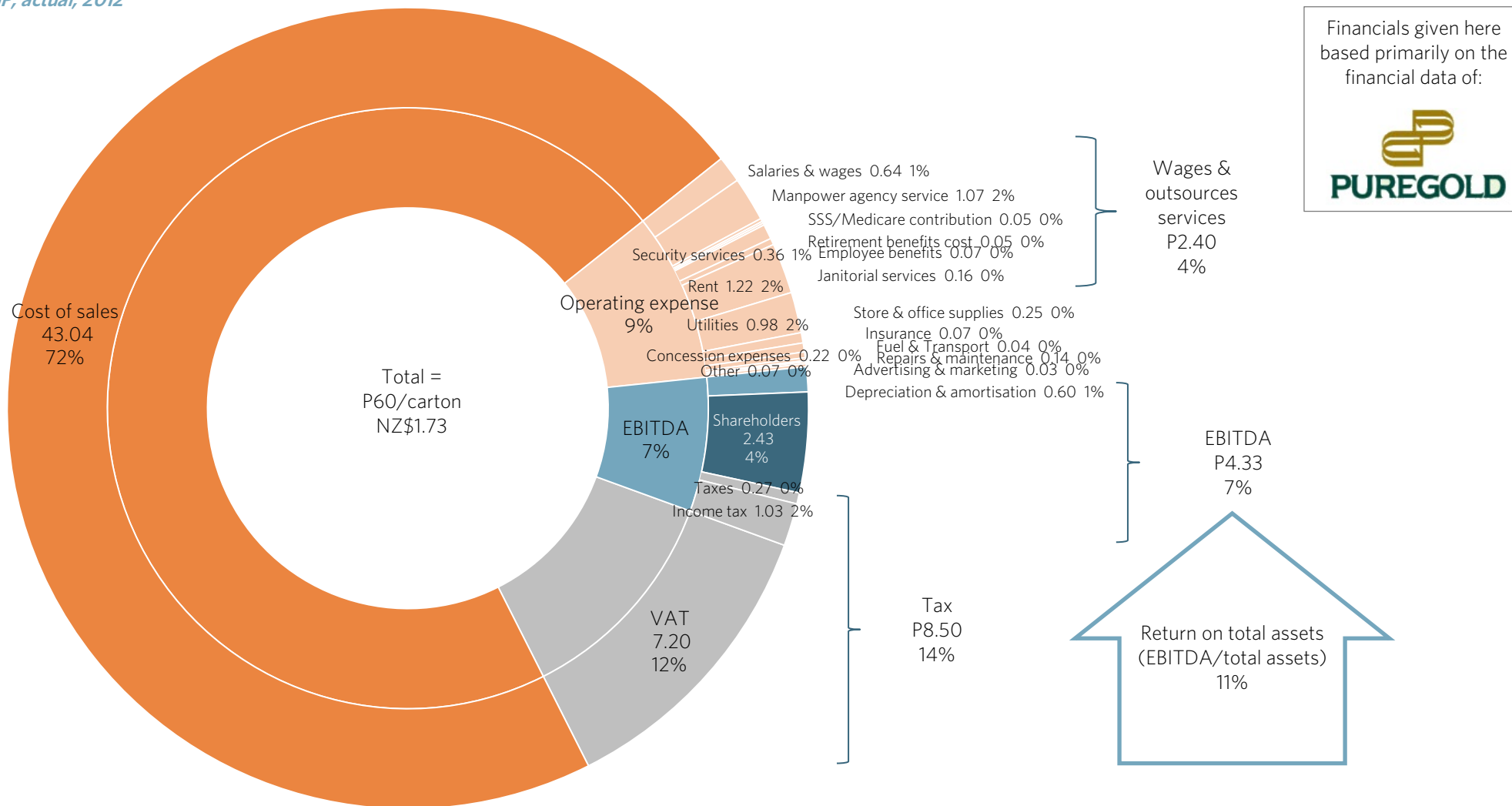
Friesland (#5 global dairy/#2 coop) acquired

69% of Alaska (#1 perishable dairy firm in the Philippines) in Mar 2012

MODEL COST STRUCTURE - SUPERMARKET IN ASIA

Almost three quarters (72%) of the selling price goes to the supplier, 9% goes to pay for the staff, rent, utilities and other costs; a 4% net profit goes to shareholders and 14% goes to government

RETAILER MODEL: Estimated net selling price through to shareholders return of a carton of UHT milk sold through a supermarket in the Philippines
PhP; actual; 2012



Financials given here based primarily on the financial data of:



The model cost structure used for the retail component of 1L UHT milk was built using the following sources and assumptions

RETAILER MODEL: Details of key elements and assumptions in model cost structure

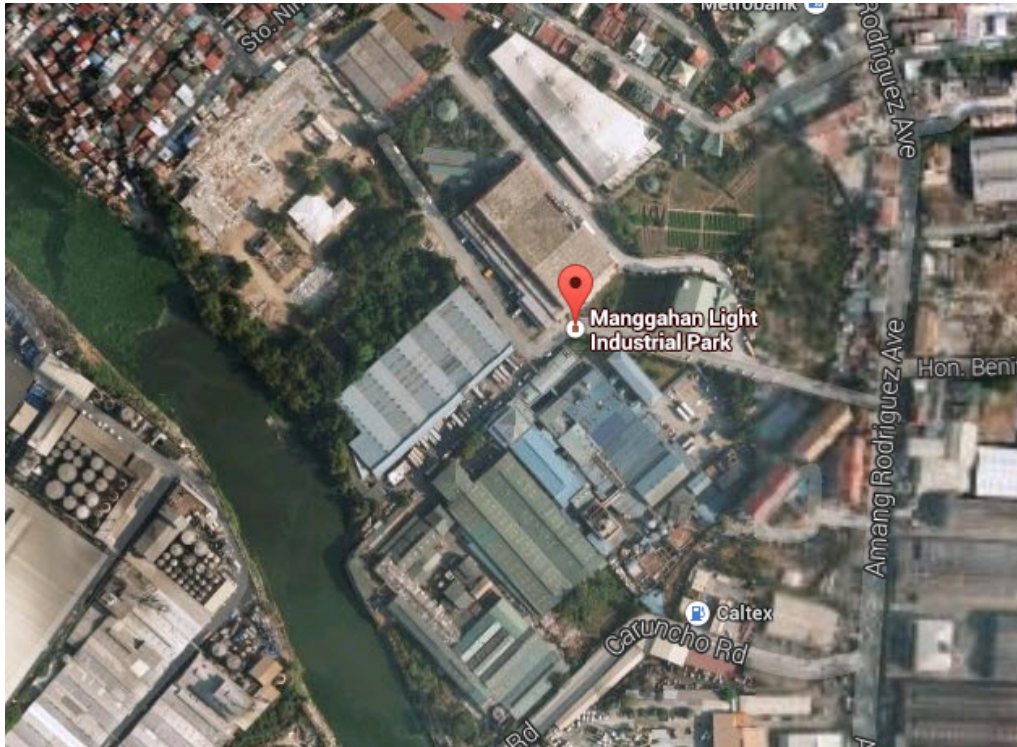
2012/13

Issue	Details
Key data source(s) used	<ul style="list-style-type: none"> - Puregold Annual Report 2012 (Puregold is #2 supermarket retailer in The Philippines) - Puregold website and advertising - Other Philippine retailer's annual reports, websites and advertising; various published articles - Industry interviews; guidance from reviewers
Key assumptions	<ul style="list-style-type: none"> - Modelling a net net price of PhP43.04 as average annual wholesale price paid by the retailer based on a shelf price of PhP60/carton and a retail gross margin of 28% (16% retailer; 12% VAT) - VAT of 12% applies to retail shelf price of UHT milk in the Philippines; ignoring VAT from here on in the value chain (assuming it is a wash) - The overall retail P&L cost structure and profitability of a retailer selling 18,000-20,000 items can be used to represent pro rata the cost structure of a specific item (1L UHT milk) from sales value (ex. tax) through to shareholder return - Sales consist of the net value of goods sold to customers, net of returns, discounts and sales taxes
Not modelled	<ul style="list-style-type: none"> - Promotional and advertising allowances not modelled, as from the point-of-view of the retailers accounting sales are net of these (in other words we are assuming an average annual net net price)
Transport from stage prior	<ul style="list-style-type: none"> - Assuming product is delivered to store by truck - Cost paid by retailer is inclusive of delivery - Delivery is paid by supplier (see 4% freight & handling in UHT manufacturer P&L)

MANUFACTURING PLANT

The carton of UHT milk that Angelica purchased was produced by RFM Corporation in their milk and juice plant in Manggahan, Pasig City; the whole industrial park is owned by RFM

RFM Corporation Manggahan Light Industry Park, Pasig City, the Philippines
2013



"A milk and juice plant is located in Manggahan, Pasig City, and has a rated capacity of 9.7 million packs per month. The milk and juice Tetra plant currently has four (4) production lines, of which two (2) are owned and two (2) are under financing lease. Lines are running at 15 hours operation per line for 25 days." RFM Corporation annual report 2012

Also located in the complex is Unilever-RFM Ice Cream Corporation "a joint venture enterprise owned 50%-50% by RFM Corporation and Unilever Philippines Inc. It is engaged in the business of manufacturing, marketing, distributing and selling, importing and exporting of ice cream, ice cream desserts and ice cream novelties, and similar food products."

RFM Corporation is listed on the Philippines Stock Exchange and makes a wide range of food and beverages, including UHT dairy

Corporate structure of RFM Corporation of the Philippines
FY2102



Publicly listed on Philippines Stock Exchange

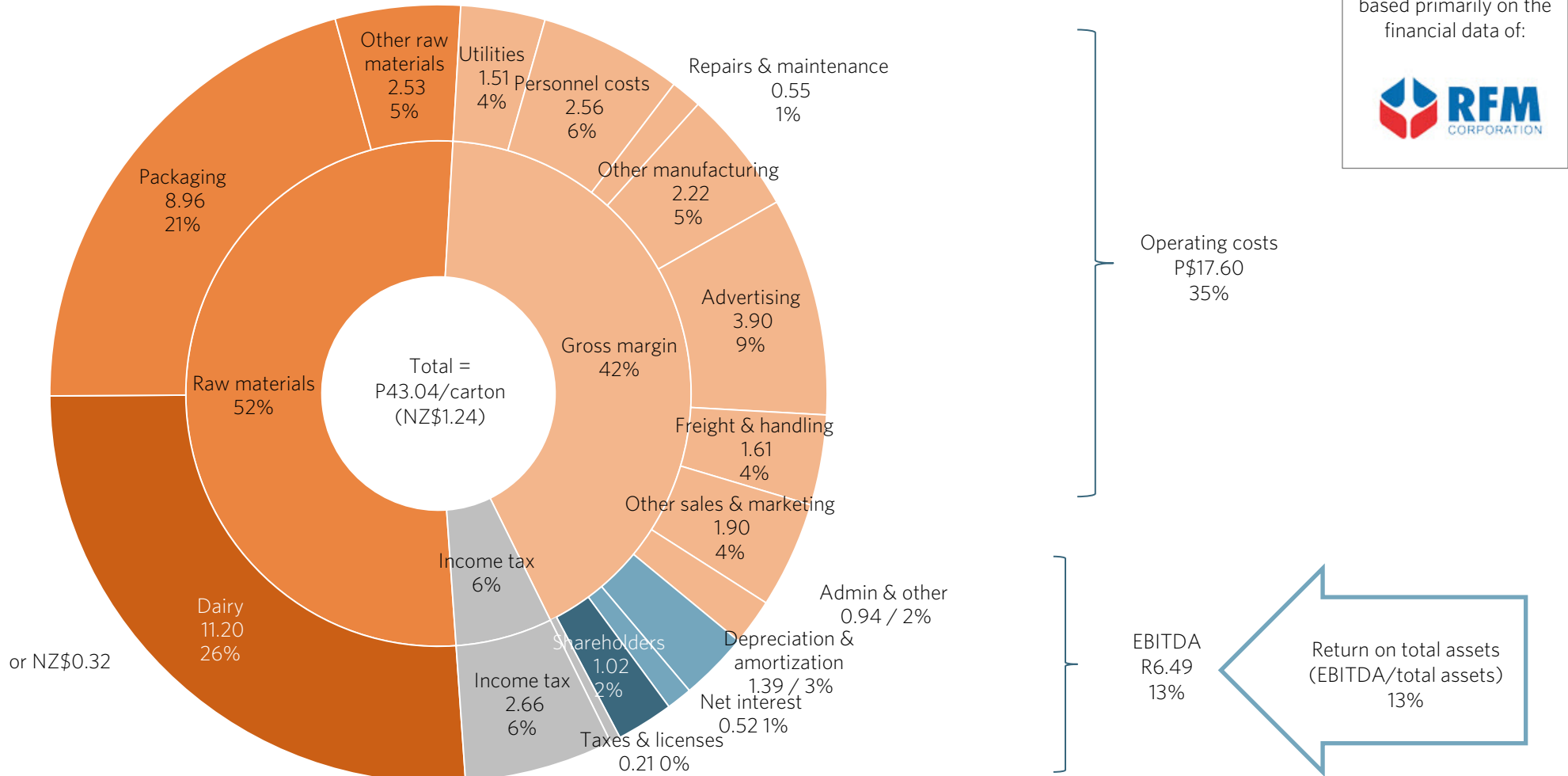
Sales P11.0b
EBT: P0.9b



MODEL COST STRUCTURE - UHT MILK MANUFACTURER IN ASIA

About half (52%) of the wholesale price of a carton of UHT milk goes to pay for the product, a third (35%) to operating costs and only 2% to shareholders and retained earnings

MANUFACTURER MODEL: Estimated wholesale price (including local logistics) through to shareholders return of a carton of UHT milk
Php; actual; 2012



The model cost structure used for the manufacturing component of 1L UHT milk was built using the following sources and assumptions

MANUFACTURER MODEL: Details of key elements and assumptions in model cost structure

2012/13

Issue	Details
Key data source(s) used	<ul style="list-style-type: none"> - RFM Corporation Annual Report 2012 (RFM is #1 UHT milk manufacturer in the Philippines by volume) - RFM and Selecta website and promotional materials - Checked against various San Miguel and subsidiary annual reports (San Miguel is the #2 dairy firm in the Philippines) - Other Philippine dairy manufacturers annual reports, websites and advertising; various published articles - Industry interviews; guidance from reviewers
Key assumptions	<ul style="list-style-type: none"> - The overall retail P&L cost structure and profitability of a food manufacturer with significant dairy operations can be used to represent pro rata the cost structure of a specific item (1L UHT milk) from sales value through to shareholder return - Cost of raw materials is ~50% dairy; 40% packaging and 10% all other - Sales consist of the net value of goods sold to customers, net of returns, discounts and sales taxes - We are assuming <u>all</u> dairy ingredients came from New Zealand; in practice the RFM annual report states "The company imports from the US (wheat,), New Zealand (anhydrous milk fat), India and Australia (skimmed milk powder), Switzerland, Spain and other countries." (i.e. reality is more complex) - Assuming net effect of payment terms (RFM AR: "The payment forms vary for each supplier. It ranges from Letter of Credit, drawn against payment, down payment, and various credit terms offered by supplier")
Not modelled	<ul style="list-style-type: none"> - Complex item level costs
Transport from stage prior	<ul style="list-style-type: none"> - Assuming dairy ingredients are received by ship into Manila and delivered to the factory - Assuming all costs ex-dock paid by manufacturer and included in given cost structure - Ingredient dairy price is CIF - Cost of insurance and freight for transport from New Zealand dock to the Philippines is assumed to be the difference between NZ FOB (\$/kg) and Philippines CIF (\$/kg)

For the purposes of this value chain we are assuming that the dairy products used in Angelica's carton of UHT milk came from Westland Co-operative dairy on the West Coast of the South Island of New Zealand

Westland Milk Products factory in Hokitika, New Zealand
2012



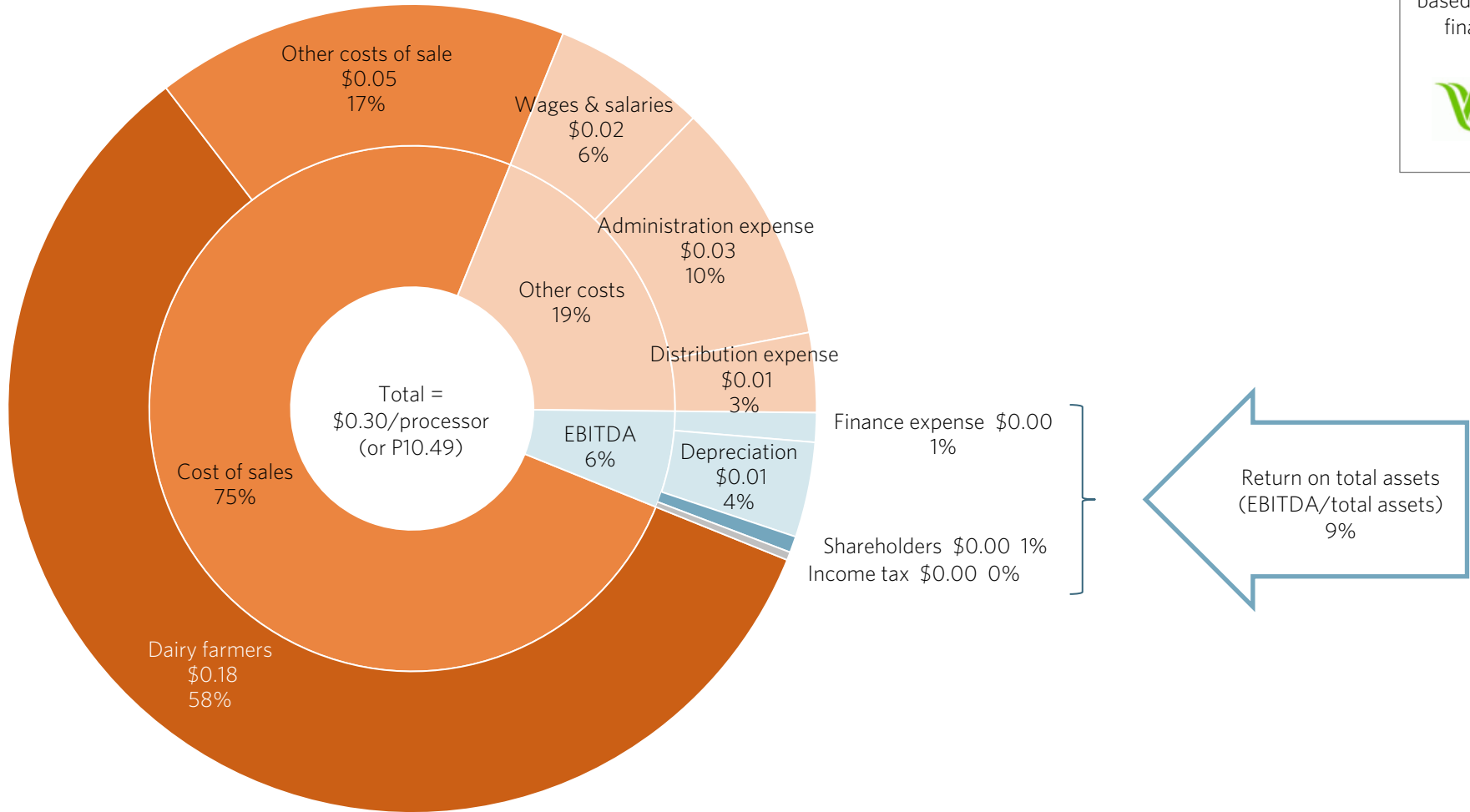
Location:	Hokitika New Zealand
Key operations:	Wet processing Evaporation Spray drying Blending Packaging
Produced:	Milk powder Milk proteins (whey, casein, other) Butter Colostrum, lactoferrin Milk fats Dairy nutritionals
Brands:	Westland Milk Products, Westgold, Westpro Ingredients, EasiYo
Employment:	200+ people
Volume:	515m litres of milk (2012)
Suppliers:	330+ dairy farmers (Co-operative owners)

MODEL COST STRUCTURE - DAIRY PROCESSOR IN NEW ZEALAND

Almost 60% of the receipts of the dairy processor go to farmers; operational and administrative costs (e.g. advertising, R&D) are minimal as Westland primarily produces commodities

DAIRY PROCESSOR MODEL: Estimated selling price through to shareholders return on dairy component of a carton of UHT milk
NZ\$; actual; 2012

Financials given here based primarily on the financial data of:

The model cost structure used for the dairy processor component of 1L UHT milk was built using the following sources and assumptions

DAIRY PROCESSOR MODEL: Details of key elements and assumptions in model cost structure

2012/13

Issue	Details
Key data source(s) used	<ul style="list-style-type: none"> - Westland Annual Report 2012 (Westland is #2 New Zealand dairy processor by sales and volume) - Westland website and promotional materials - Checked against other key New Zealand dairy processor's annual reports - Other New Zealand dairy processor websites and advertising; various published articles - Industry interviews; guidance from reviewers
Key assumptions	<ul style="list-style-type: none"> - The overall retail P&L cost structure and profitability of a dairy processor can be used to represent pro rata the cost structure of a specific item (1L UHT milk) from sales value through to shareholder return - Cost of raw materials is ~50% dairy; 40% packaging and 10% all other - Sales consist of the net value of goods sold to customers, net of returns, discounts and sales taxes - We are assuming <u>all</u> dairy ingredients came from New Zealand (we are aware reality is more complex) - Assuming no Philippines specific net effect of payment terms/letter of credit, etc. (i.e. no risk premium) - Assuming dairy ingredients are sold FOB New Zealand - Ingredient dairy price is FOB; in-market manufacturer pays CIF - Cost of insurance and freight for transport from New Zealand dock to the Philippines is assumed to be the difference between NZ FOB (\$/kg) and Philippines CIF (\$/kg)
Not modelled	<ul style="list-style-type: none"> - Complex item level costs
Transport from stage prior	<ul style="list-style-type: none"> - Assuming all internal New Zealand transport costs paid by dairy processor and included in given cost structure (given distribution expense)

A WEST COAST FARMER

The milk that Westland processed was supplied by its 330+ co-operative shareholder farmers



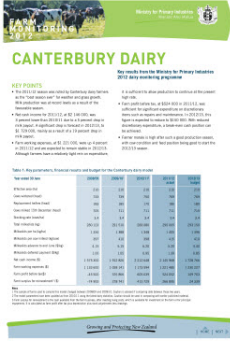
Location:	West Coast region New Zealand
# of dairy cows:	173,651 (132,716 in milk or calf) [June 2012]
# of herds:	374 (464 total cows/herd; 355 cows/herd in milk)
Area farmed:	67,364 effective hectares
Cows/hectare:	2.6
Volume:	587m litres of milk
Milk/herd:	1.57m litres
Milk/cow:	4,423l/cow in milk (or 85 families buying 1L of milk per week)
Suppliers:	330+ dairy farmers (Co-operative owners)

MODEL COST STRUCTURE - DAIRY FARMER IN NEW ZEALAND

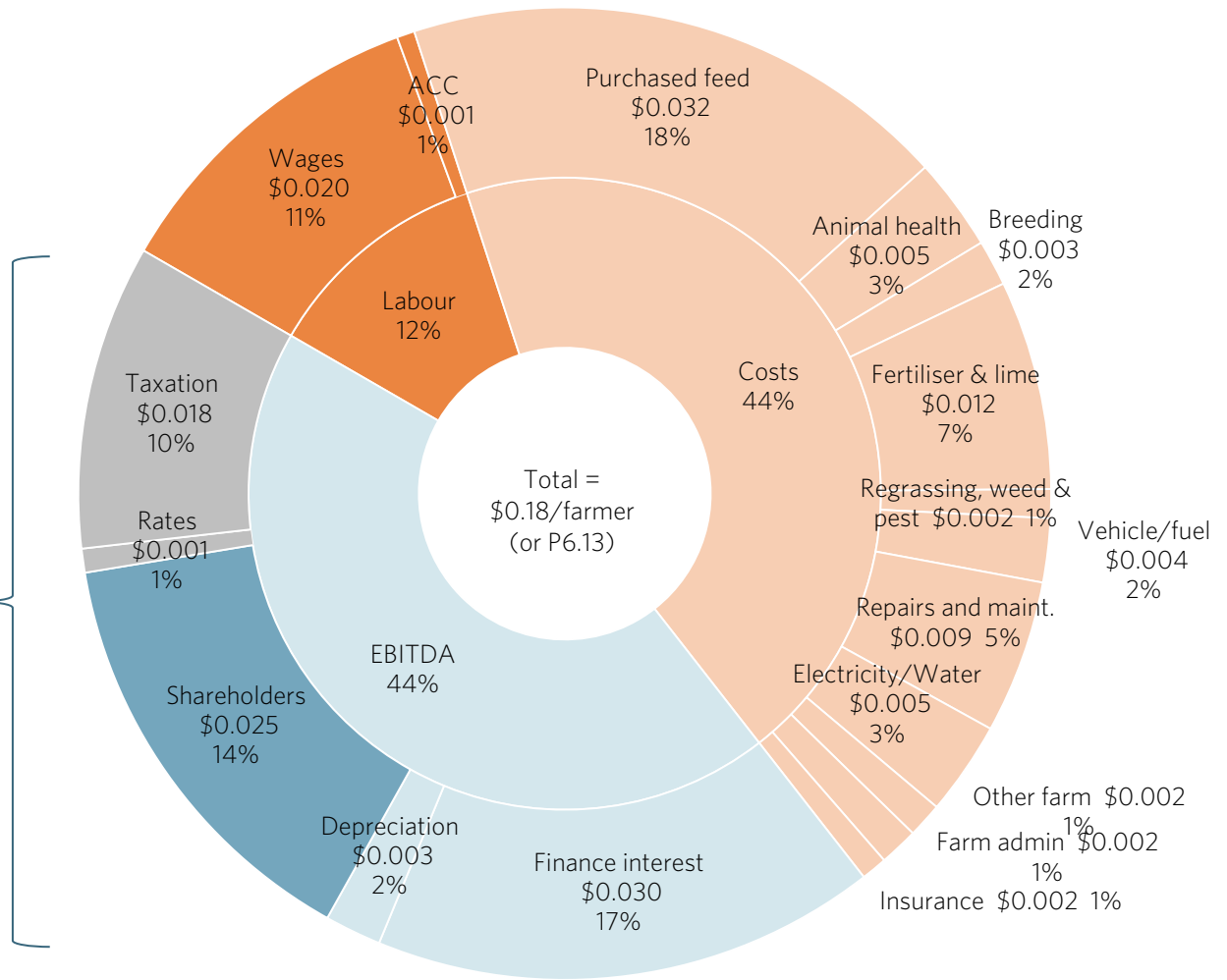
Slightly more than half (56%) of the farm gate price goes to costs; farm EBITDA margin is 44%, which is split amongst banks, shareholders and the government

DAIRY FARMER MODEL: Estimated farm gate price through to shareholders return on the dairy component of a carton of UHT milk
NZ\$; actual; 2012

Financials given here based primarily on the financial data from:



CANTERBURY DAIRY
 Key Points:
 - 100% owned and operated by shareholders
 - 100% of the milk produced is sold to processors
 - 100% of the milk produced is sold to processors
 - 100% of the milk produced is sold to processors



MODEL COST STRUCTURE - DAIRY FARMER - SOURCES & KEY ASSUMPTIONS

The model cost structure used for the dairy farmer component of 1L UHT milk was built using the following sources and assumptions

DAIRY FARMER MODEL: Details of key elements and assumptions in model cost structure

2012/13

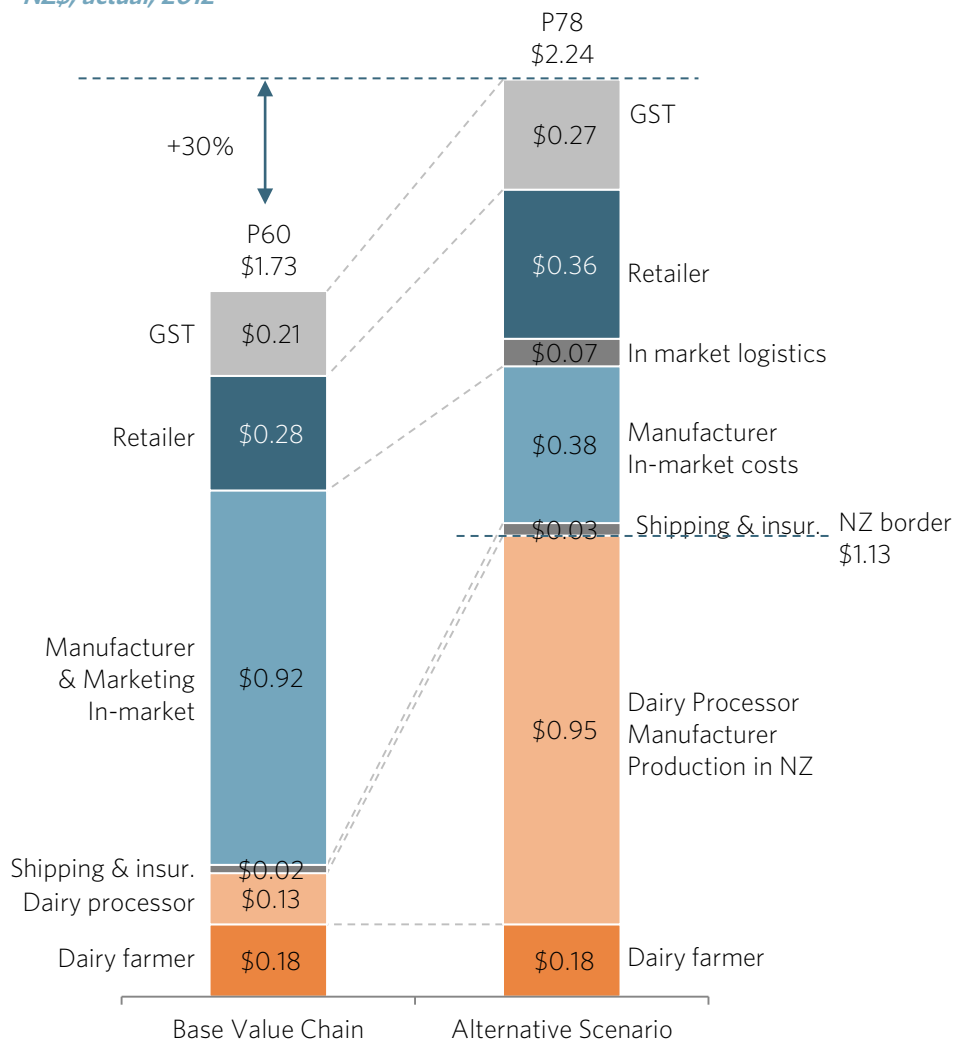
Issue	Details
Key data source(s) used	<ul style="list-style-type: none">- New Zealand Ministry for Primary Industries (MPI) Farm Monitoring 2012 Canterbury dairy report- Checked against other New Zealand dairy regions and national- Industry interviews; guidance from reviewers
Key assumptions	<ul style="list-style-type: none">- A model Canterbury dairy farm can be used as a model West Coast dairy farm (as MPI does not produce a West Coast Model); perhaps it is a new supplier to Westland's Canterbury expansion- Dairy farmer is a member shareholder of a co-operative dairy company- Assuming dairy collection is paid out of dairy processor P&L- The overall retail P&L cost structure and profitability of a dairy farmer can be used to represent pro rata the cost structure of a specific item (1L UHT milk) from sales value through to shareholder return
Not modelled	<ul style="list-style-type: none">- Relative profitability of components of milk, both those that go into UHT milk and those sold elsewhere- Complex item level costs
Transport from stage prior	<ul style="list-style-type: none">- None

VALUE CHAIN - ALTERNATIVE SCENARIO - PRODUCTION IN NZ

Moving to the alternative scenario - New Zealand branded production and export - we currently model that the product would cost 30% more on shelf in market

Value chain of a 1L carton of UHT milk from Philippine retail through to farm gate value in New Zealand: base and alternative scenario

NZ\$, actual, 2012

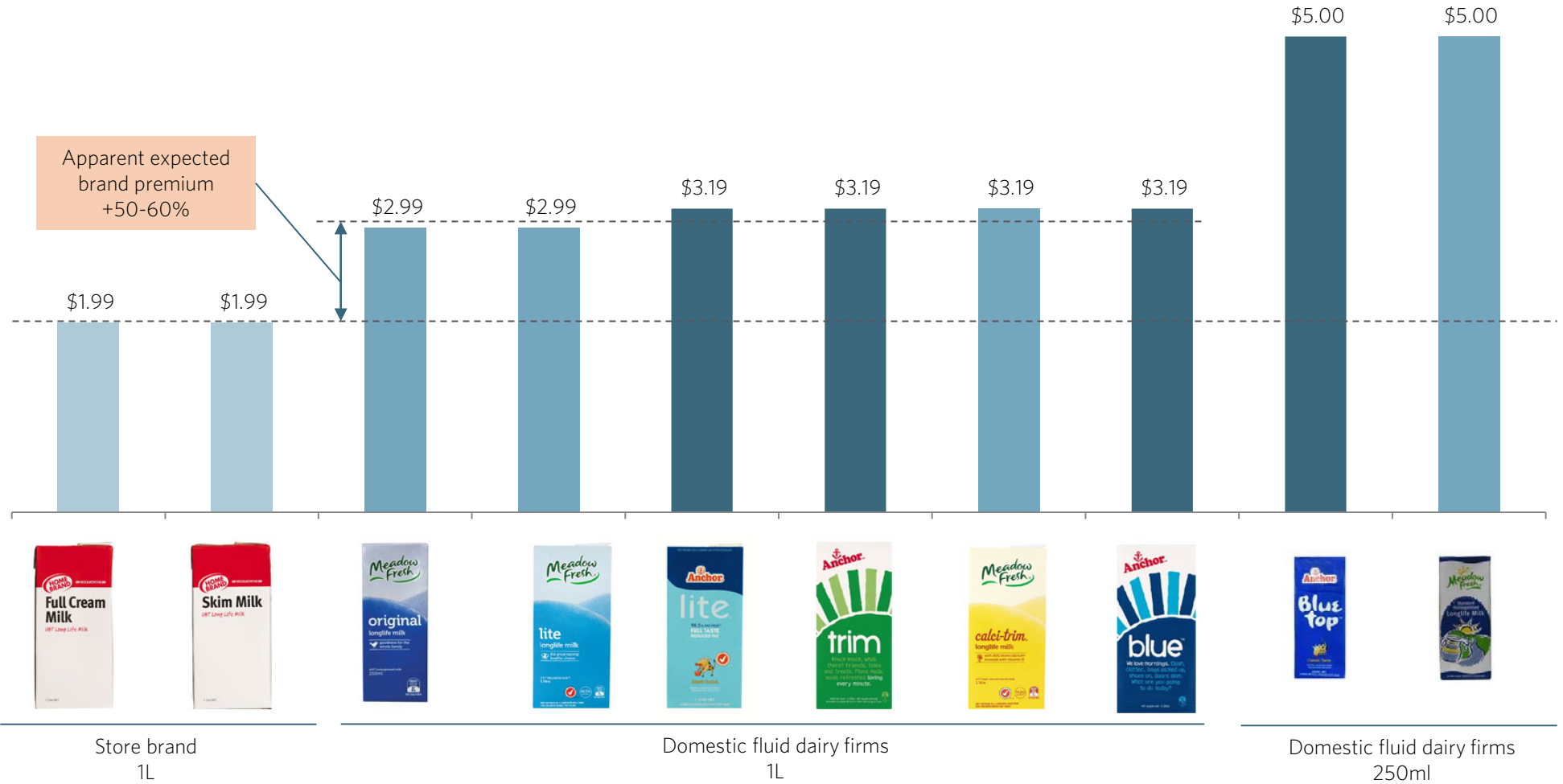


Alternative Scenario: Branded product made in New Zealand by listed firm	
Concept	- Existing major New Zealand dairy firm with UHT capacity produces and exports UHT milk to the Philippines
What changes?	- Location of production - Cost structure - Overheads and margin expectations
What stays the same?	- Product size - Product (though shift to fresh pack from reconstituted)
Outcomes for New Zealand	- Exports of UHT milk increase - Increased value per kg/litre of dairy exports - More value added in New Zealand - Increased industry employment
Arguments for	- Reduce double handling - Potential to label "product of New Zealand" - Premium product packed fresh not reconstituted from powder
Arguments against	- Distance to market (speed to market, etc.) - Shipping cardboard and packaging (rather than bulk powder) - Tariff and trade barriers into some markets
Key assumptions	- Using declared NZ\$ FOB/l as at border value - Assuming exporter need to achieve or seeks to achieve a +30% price premium on shelf (margin expectations and high startup in-market costs) - Not factored for source of ingredients

APPARENT BRAND PREMIUM

New Zealand retail shelf prices suggest that New Zealand dairy brands expect a +50-60% brand premium; current scenario delivers +30% in Philippines

Retail shelf prices per litre of UHT milk sold in Countdown supermarket in New Zealand
 NZ\$/litre; August 2013



The goodness of
New Zealand in a carton



The advertisement features a central image of a large Meadow Fresh carton of New Zealand Pure Milk, full cream, set against a backdrop of a lush green New Zealand landscape with rolling hills, a cow grazing, and snow-capped mountains under a blue sky. A splash of milk is shown at the bottom left. Below the main carton, three smaller cartons of Meadow Fresh milk are displayed. The text '100% Pure New Zealand Milk' is prominently displayed at the bottom, along with a small paragraph of descriptive text.

New Zealand
Pure Milk
full cream

*Pure and straight from the source,
in healthy New Zealand.*

100% Pure New Zealand Milk

Meadow Fresh New Zealand Pure Milk is made with 100% fresh milk sourced from certified farms in New Zealand. It contains protein for growing bodies and calcium for building strong bones and teeth. Meadow Fresh, it's naturally nutritious, it's naturally New Zealand.

CORIOLIS 

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