

UNDERSTANDING THE INFANT FORMULA VALUE CHAIN

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CORIOLIS
research · consulting · strategy



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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..

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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.

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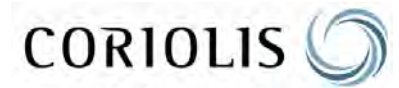
MARKET ENTRY: We help clients identify which countries are the most attractive - from a consumer, a competition and a channel point-of-view. Following this we assist in developing a plan for market entry and growth.

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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

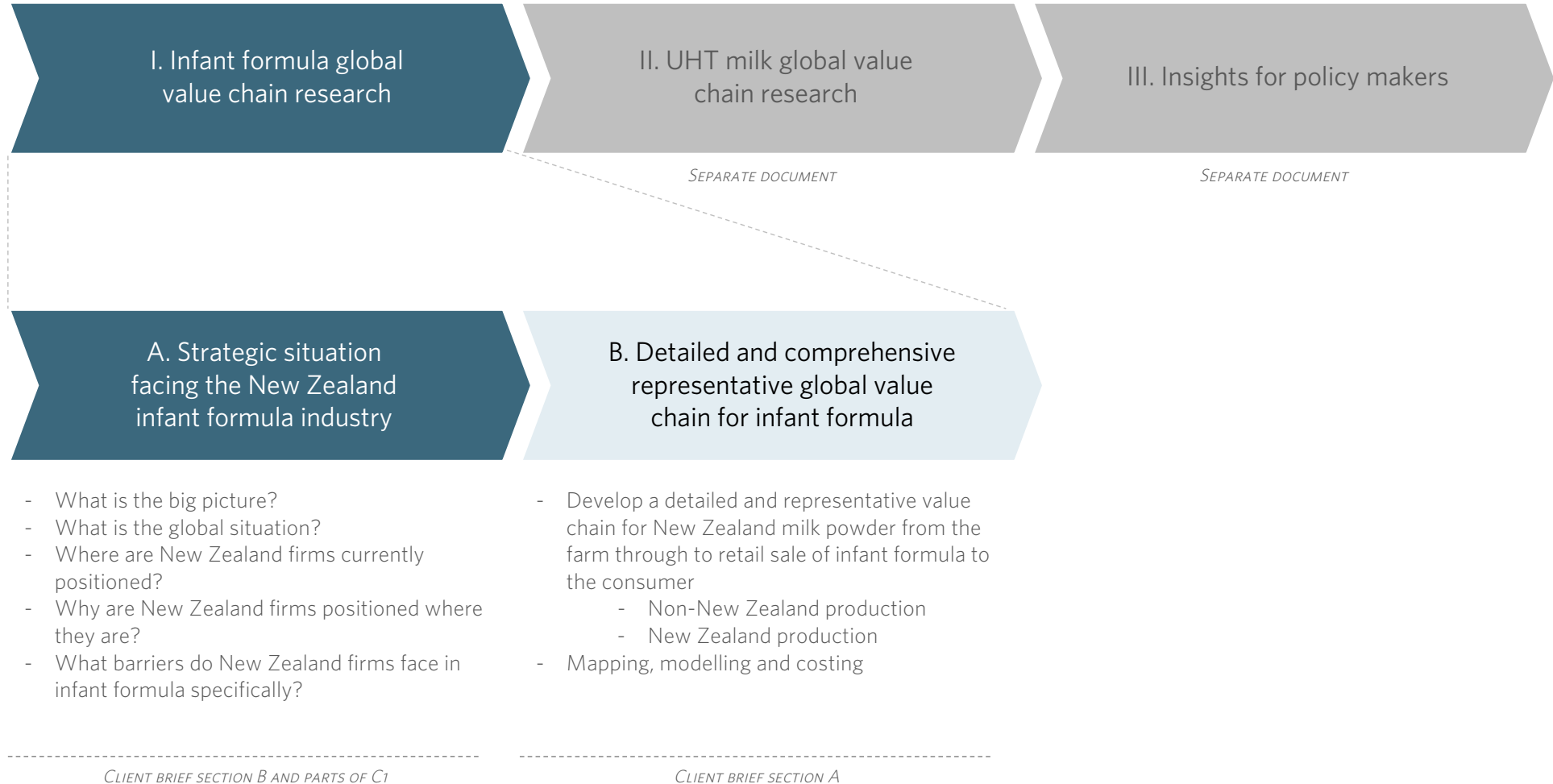
(C.2) Drawing on all the foregoing, and to the extent possible, identify the main implications for future government policy, especially in the areas of services and regulatory reform; how a coordinated 'think value chain' approach might be pursued across policy issues under negotiation; and where business 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 infant formula value chain relevant to New Zealand, it is part of a wider NZPECC project; the first section of this research looks at the strategic situation



Infant formula is a tough industry, with strong barriers to entry, undergoing consolidation; China is the main exception, but signs there point to a rapidly normalising playing field

Infant formula is one of the most complex foods in existence. It is an engineered food designed to mimic human breast milk as closely as possible. Infant formula sits on the dividing line between food and pharmaceuticals. This is indicated by the fact that the industry has historically been dominated by major pharmaceuticals firms (Abbott, Wyeth, BristolMyersSquibb, GlaxoSmithKlein, Numico).

From a business point-of-view infant formula is a highly attractive activity, as it is a highly defensible category. This defensibility derives from (1) product complexity, (2) economies of scale, (3) patents and other intellectual property, (4) the importance of doctors in the sales process, (5) global regulations (e.g. bans on advertising) and (6) widespread government market intervention (e.g. two-thirds of all infant formula in the United States is purchased by the United States Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants and Children (WIC)).

This defensibility has led to a highly consolidated global market dominated by a handful of multinational companies. Consolidation is even more pronounced at the national or regional level with almost all markets structured as three or four key firms, typically some subset of the global firms and, perhaps some vestigial regional brands, and a few small niche brands (e.g. organic, goat).

The industry is currently undergoing terminal consolidation with the multinational companies merging also including the remaining small regional players until stopped by competition authorities. Recent major

deals include Nestle buying Pfizer's infant nutrition unit for US\$11.9b in 2012 (Pfizer having itself bought Wyeth) and Danone buying Numico/Nutricia for €12.3b in 2007 (Numico itself being the result of a decade plus industry roll-up). To put these numbers in perspective, Fonterra has a current market capitalisation of US\$8.7b.

The main exception to this ongoing consolidation is China, which is similar to developed markets 100 years ago. In China a wide range of players competing, including all the major global multinationals, the major local dairy firms (Mengniu, Yili, others), regional start-ups (BeingMate, Biostime, others) and a huge range of smaller firms. Much, if not all, of the current action and excitement in the New Zealand infant formula industry can be seen as a result of this situation in China.

However the Chinese government appears to be "taking steps" to bring order to the market:

"According to local reports, the Ministry of Industry and Information Technology (MIIT) has indicated that it hopes to reduce the number of manufacturers to 3-5 firms with revenues exceeding CNY50bn (US\$8b) by 2018." JUST-FOOD, AUGUST 16, 2013

The industry dynamic is also changing. As product innovation has slowed and as production technology has diffused more widely, the industry is becoming more similar to other foods and barriers to entry are falling. The future looks set to be a battle between the multinationals leaders and the primarily Chinese newcomers for control of Asia.

New Zealand is in the midst of an infant nutrition boom and the industry has attracted strong investment

New Zealand has a long history of integration into global infant nutrition value chains. Historically (and still in volume terms) New Zealand has primarily been a supplier of dairy ingredients to the industry rather than a producer of finished product. New Zealand is the largest exporter of low/no fat milk powder in the world (and has been among the top five exporters for the past 50 years). All major infant nutrition firms in the world buy raw materials from New Zealand. In the 1950's, when Wyeth and Mead Johnson built infant nutrition plants in the Philippines, the New Zealand Dairy Board was a trusted supplier. As a more recent example of the importance of New Zealand to the global infant formula value chains, Abbott disclosed that its plant in Guangzhou, China uses 100% NZ milk.

While the Glaxo ("The food that builds bonnie babies") part of GlaxoSmithKlein was founded in Bunnythorpe, New Zealand in 1904 to make infant milk products, the firm exited domestic production in the mid 20th century. Up until 2003 New Zealand produced a small amount of infant formula domestically, had minimal infant formula exports and export growth was low. Global #2 Nutricia (now Danone) acquired and operated locally founded Karicare, but the industry was decidedly sleepy.

The situation changed in around 2003 when Fonterra invested in improved/upgraded wet processing and contract packing operations.

Over the next decade the New Zealand infant formula industry experienced rapid growth. Fonterra has moved strongly up the value chain from ingredient milk powder into (1) bulk base infant formula powder, (2) contract packing retail product for others (e.g. Nestle) and

(3) is now moving into retail of Fonterra-branded products.

The success of Fonterra encouraged other New Zealand dairy firms to move into infant nutrition. Westland, Synlait, Sutton Group and New Image now also manufacture bulk infant formula powder.

More recently three of the four largest dairy companies in China - Yili (greenfields), Mengniu (greenfields), and Bright (Synlait) - have invested in infant formula plants in New Zealand.

The availability of bulk infant formula in wholesale quantities in New Zealand from Fonterra, etc. has led to the rapid emergence of a canning industry populated with a nimble and efficient group of contract packers. This in turn - in combination with the "Wild West" conditions in the Chinese market - has led to the emergence of a huge number (100+) of smaller "pure play" firms selling and marketing infant formula from New Zealand.

At the same time, the Dairy Goat co-operative has quietly been pursuing a successful niche strategy building on the unique properties of goat infant formula.

The New Zealand infant nutrition industry is an interesting microcosm and one of the best examples of the country's ongoing move up the value chain. There has been significant investment in the industry over the past decade - in the order of \$900m to \$1b - and exports continue to grow. While the future is full of opportunities, there are clouds on the horizon, particularly in China.

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

GLOBAL SITUATION

Highly defensible category

Dominated globally by a handful of multinationals and some vestigial regional brands

In terminal consolidation (multinationals rolling up remaining small regional players until stopped by competition authorities)

Except in China which is similar to developed markets 100 years ago where a wide range of players are competing

- Global category leaders (Nestle, Danone, Abbott & Mead Johnson)
- Local dairy firms (Mengniu, Yili, others)
- Regional start-ups
- Local small firms (Rats & mice)

However the Chinese government appears to be "taking steps" to bring law and order to the market

NZ FIRMS STRATEGIC DIRECTIONS

Co-ops moving up the value chain from ingredient milk powder into base infant formula powder

Fonterra moving into contract packing finished product for multinational companies

Fonterra planning to move into selling branded infant formula in Asia

Three large Chinese dairy firms investing in integrated wet/dry IF plants in New Zealand

Dairy Goat co-op pursuing a successful niche strategy

A few better financed start-ups dry blending or wet/dry blending (e.g. Sutton, New Image, GMP)

Huge number of smaller "pure play" sales and marketing only firms (100+)

WHAT IS INFANT FORMULA?

Infant formula is made from a mixture of dairy and other ingredients and is designed to mimic human breast milk as closely as possible; while made to a common international codex, formulations & ingredients do vary

EXAMPLES: Ingredients in Abbott Similac and Nestle NAN HA Gold 2 infant formula
(2012)



Water, **NONFAT MILK**, **LACTOSE**, High Oleic Safflower Oil, Soy Oil, Coconut Oil, Galactooligosaccharides, **WHEY PROTEIN CONCENTRATE**.

Less than 2% of the Following: (43 listed ingredients)

C. Cohnii Oil, M. Alpina Oil, Beta-Carotene, Lutein, Lycopene, Ascorbic Acid, Soy Lecithin, Monoglycerides, Potassium Citrate, Calcium Carbonate, Potassium Chloride, Carageenan, Ferrous Sulfate, Magnesium Chloride, Choline Chloride, Choline Bitartrate, Taurine, m-Inositol, Calcium Phosphate, Zinc Sulfate, Potassium Phosphate, d-Alpha-Tocopheryl Acetate, Niacinamide, Calcium Pantothenate, L-Carnitine, Vitamin A Palmitate, Cupric Sulfate, Thiamine Chloride Hydrochloride, Riboflavin, Pyridoxine Hydrochloride, Folic Acid, Manganese Sulfate, Phylloquinone, Biotin, Sodium Selenate, Vitamin D3, Cyanocobalamin, Salt, Potassium Hydroxide, and Nucleotides (Adenosine 5'-Monophosphate, Cytidine 5'-Monophosphate, Disodium Guanosine 5'-Monophosphate, Disodium Uridine 5'-Monophosphate).



ENZYMATICALLY HYDROLYSED WHEY PROTEIN (MILK), maltodextrin, vegetable oils,








minerals (calcium phosphate, magnesium chloride, calcium chloride, potassium chloride, sodium chloride, ferrous sulphate, zinc sulphate, copper sulphate, calcium carbonate, manganese sulphate, potassium iodide, sodium selenate), omega LCPUFAs (DHA from fish oil, AA), acidity regulator (citric acid), L -phenylalanine, vitamins [sodium ascorbate (vit C), d-l alpha tocopheryl acetate (vit E), retinyl acetate (vit A), niacinamide (niacin), phylloquinone (vit K), cholecalciferol (vit D3), calcium pantothenate, thiamine mononitrate (vit B1), pyridoxine hydrochloride (vit B6), riboflavin (vit B2), folic acid, cyanocobalamin (vit B12), biotin], L-histidine, nucleotides (cytidine 5 -monophosphate, uridine 5 -monophosphate, adenosine 5-monophosphate, guanosine 5 monophosphate), culture (bifidus, thermophilus), L-carnitine, antioxidant (ascorbyl palmitate).

HOW IS IT SEGMENTED?

Infant formula is typically defined as “birth to six months”; the product is then renamed for a range of reasons (primarily to avoid regulation and restrictions on advertising)

Five stage segmentation of infant/child nutrition products

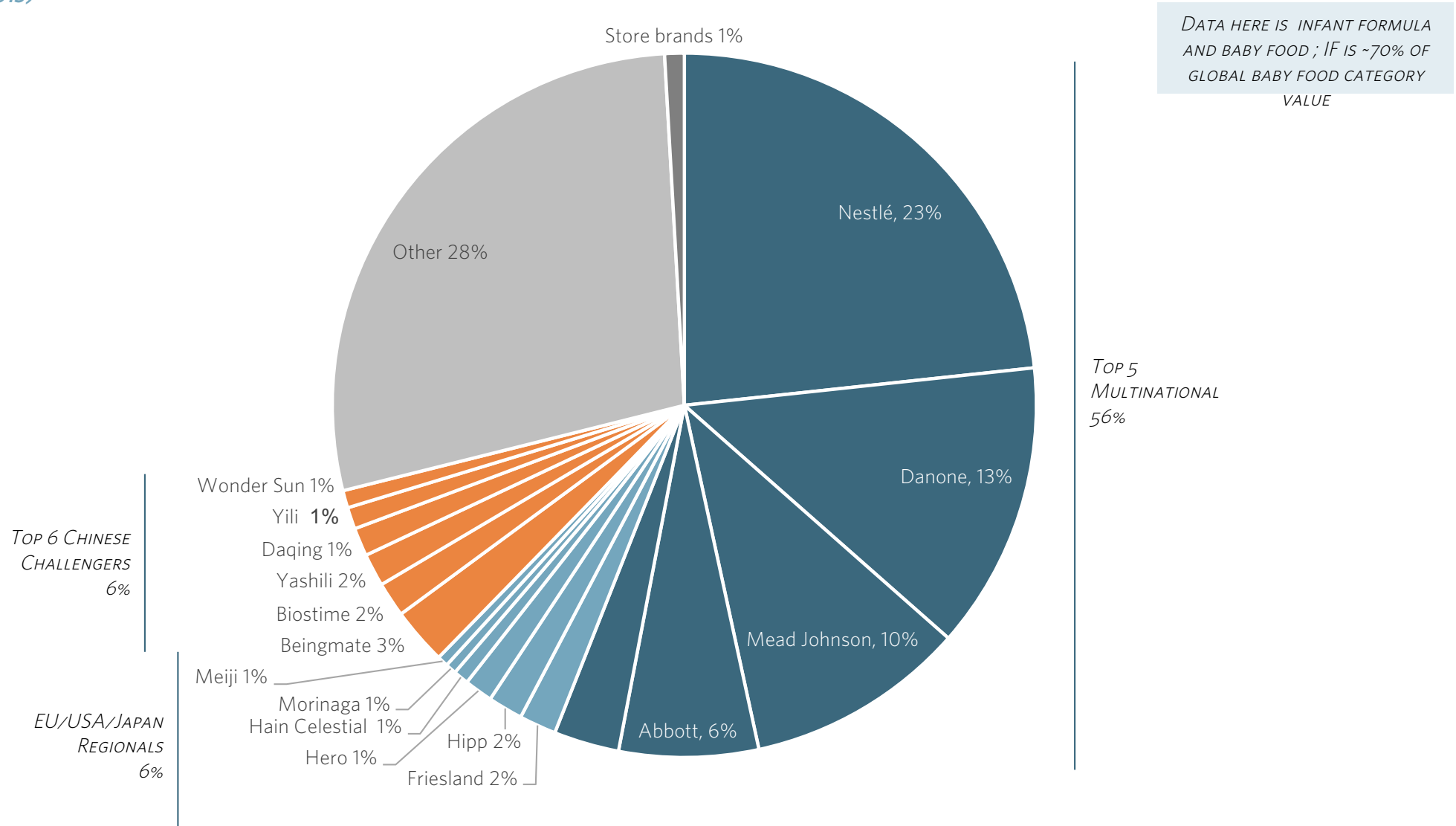
Model; 2013

	STAGE 1/STEP 1	STAGE 2/STEP 2	STAGE 3/STEP 3	STAGE 4/STEP 4	STAGE 5/STEP 5	PREGNANT MOTHERS
Common name	Infant formula	Infant formula Follow on formula Follow up formula		Children’s nutrition Toddler formula “Growing up milk”		
Regulatory environment	<ul style="list-style-type: none"> - Highly regulated - Advertising banned (by law or voluntarily) - Manufacturers focus on selling through doctors & nurses 	<ul style="list-style-type: none"> - Less regulated as it is not the only source of food (baby is eating solids) - Advertising allowed - Traditional FMCG sales & marketing - “take advantage of brand loyalty developed in Stages 1 and 2 to retain consumers as they grow older” 				<ul style="list-style-type: none"> - Regulated as dairy - Advertising allowed
Defined target age range	Birth to 6mo.	6mo. to 1 year	1 to 3 years	3 to 6 years	6 years +	Pregnant & lactating women
EXAMPLE range:	 					

HOW IS THE MARKET STRUCTURED?

Infant formula is one of the most consolidated food products globally; the top five firms account for 56% of the world market; however there are an emerging group of Chinese firms challenging the world order

Baby food/infant nutrition global market share by firm
(US\$m; 2013)

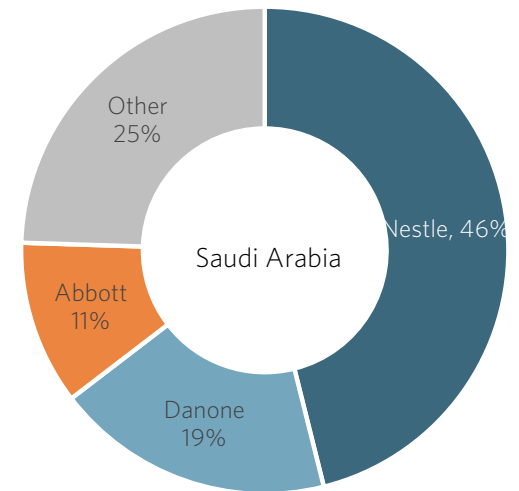
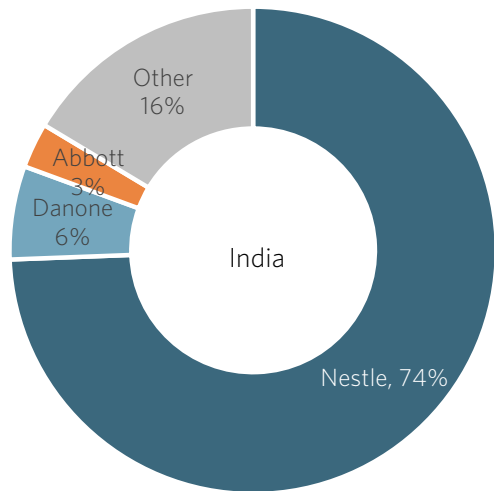
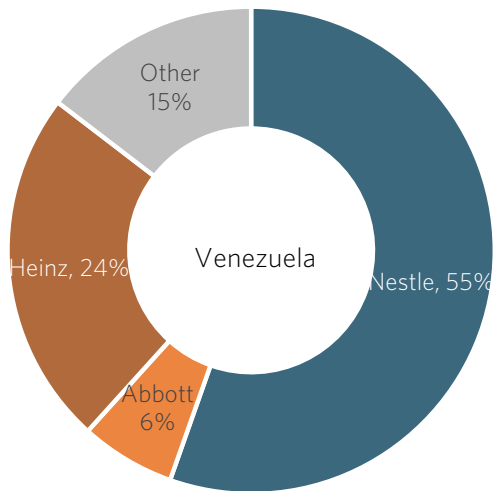
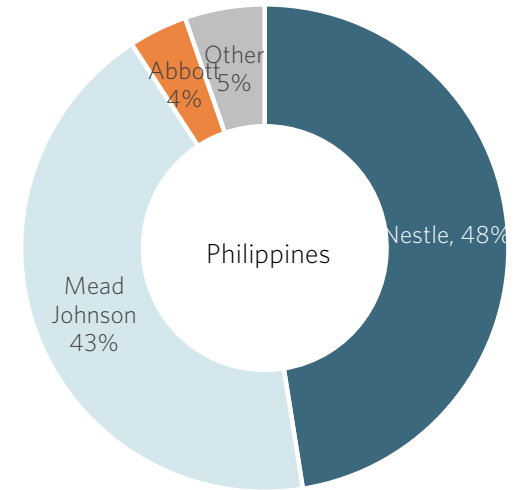
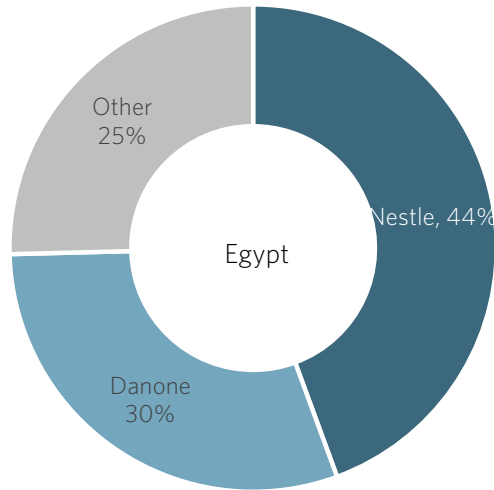
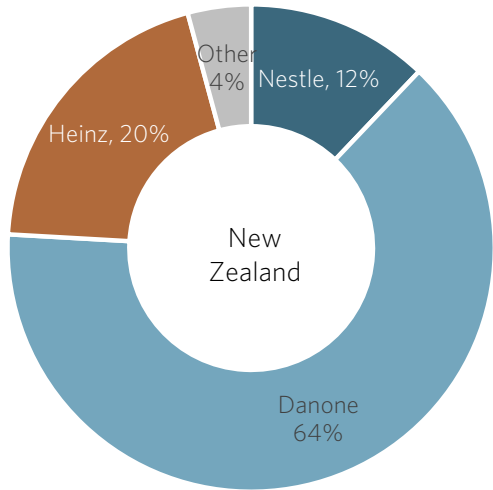


Source: Euromonitor; Coriolis analysis

IS THERE A TYPICAL MARKET STRUCTURE?

Markets are typically structured as three or four key firms and a small other

Baby food/infant formula market share by select market
% of sales; 2013



WHAT ABOUT CHINA?

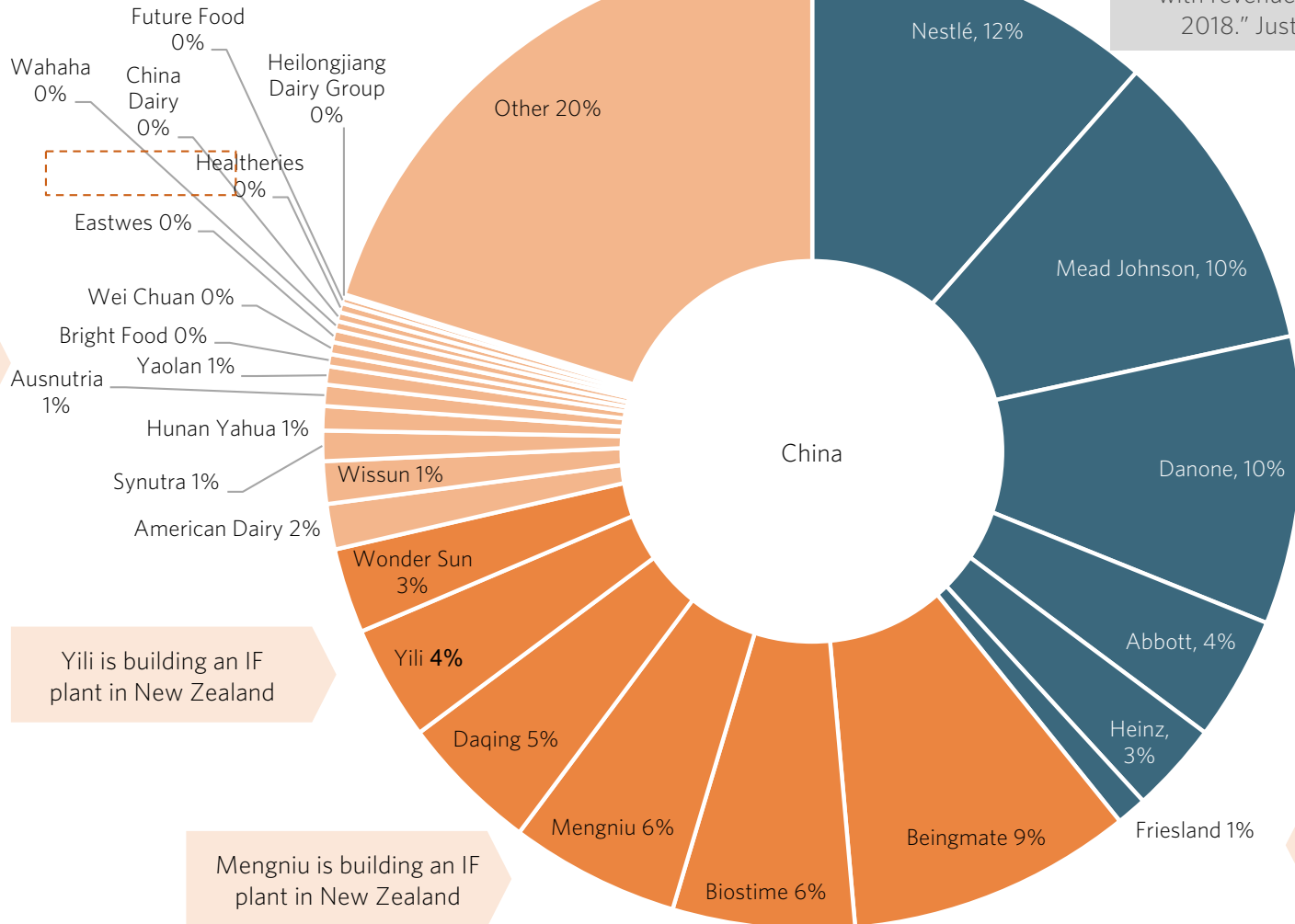
China is the main exception and the infant formula market there is still highly fragmented; much of the current action and excitement in the New Zealand infant formula industry can be seen as a result of this situation

Baby food/infant nutrition market share by firm in China
(US\$m; 2013)

“According to local reports, the Ministry of Industry and Information Technology (MIIT) has indicated that it hopes to reduce the number of manufacturers to 3-5 firms with revenues exceeding CNY50bn by 2018.” Just-Food, August 16, 2013

Only NZ firm registers in the data; Healtheries has more share than Fonterra

Bright is a shareholder in Synlait



Plant in NZ

Abbott said all the milk for its Chinese IF plant comes from NZ

Friesland is a shareholder in Synlait

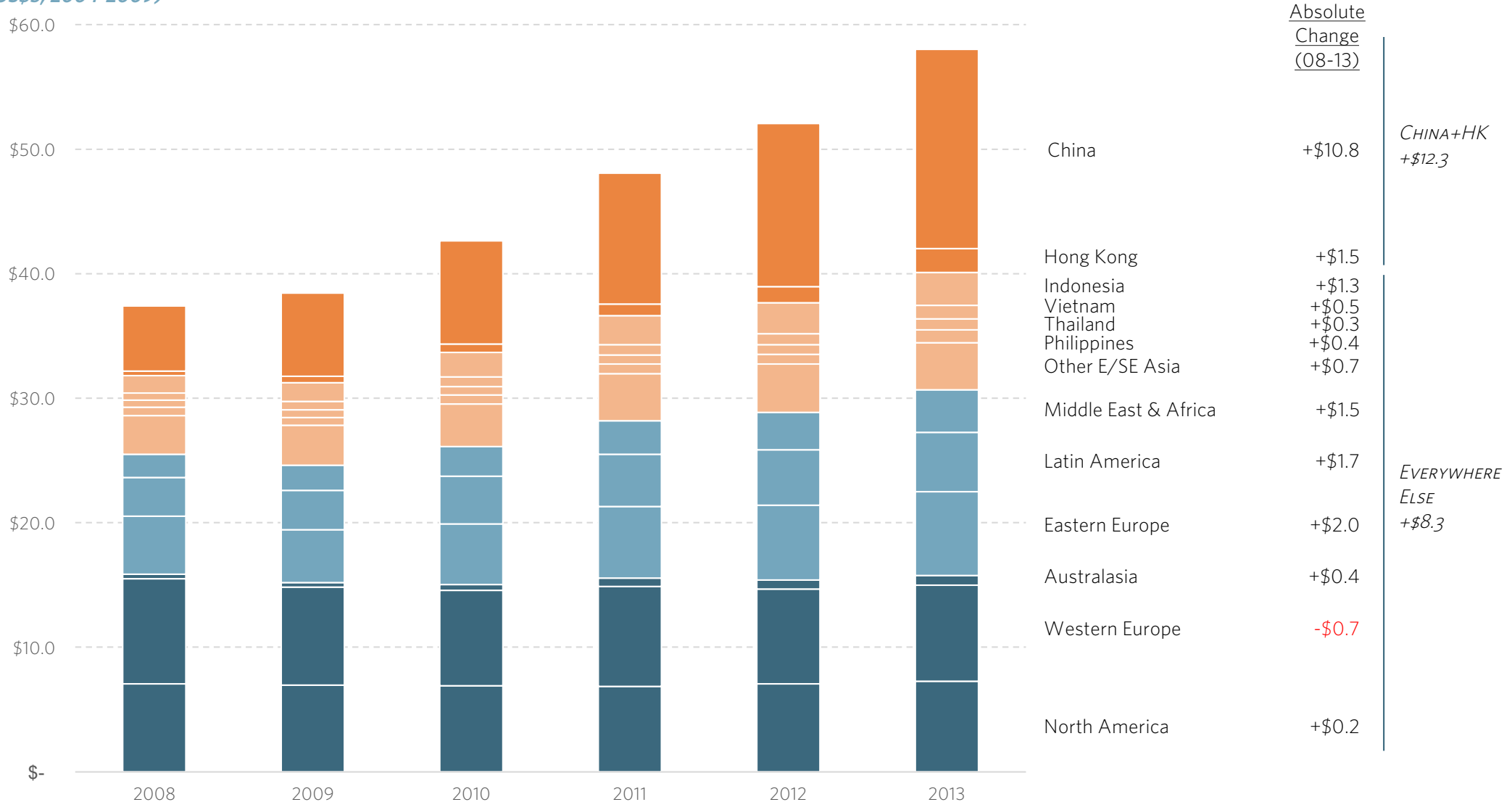
Yili is building an IF plant in New Zealand

Mengniu is building an IF plant in New Zealand

WHERE IS GROWTH COMING FROM?

Industry growth is almost non-existent (after inflation) in the developed world; China is driving world growth, growing +50% more than the rest of the world combined; however strong growth across the developing world

Growth in baby food/infant nutrition sales by global region
(US\$b; 2004-2009)



There has been significant investment - in the order of \$900m to \$1b - in the New Zealand infant formula industry over the past decade

Identified investments in Infant Formula production plant and capacity in New Zealand

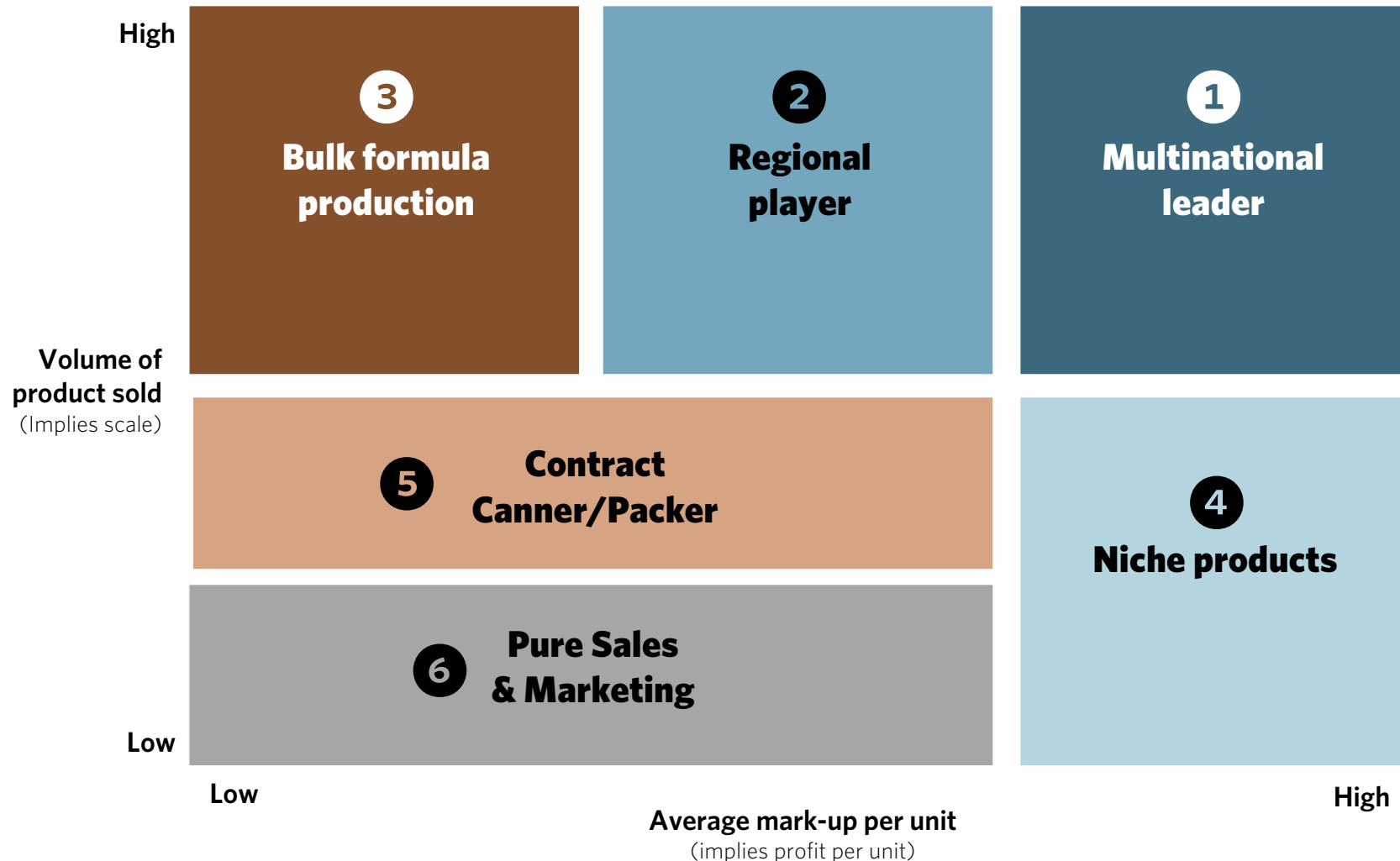
1980-2013+

DATE	FIRM	PLANT LOCATION	INVESTMENT	ACTION
2003	Dairy Goat Co-op	Hamilton	\$16m	- Spray drying plant built at Gallagher Drive, Hamilton site
2006	Dairy Goat Co-op	Hamilton	N/A	- Dry Blending plant built at Gallagher Drive site
2007	Fonterra	Waitoa Canpac Kauri Darnum (AU)	\$72m	- Investing \$71.8 million in +33% increase nutritional milk-powder production, which is mainly devoted to baby and toddler formulas (from 90,000 to 120,000 tonnes) - Fonterra "seeing "double-digit growth" in nutritional powders in Asia due to strong birth rates, and was signing global supply agreements with up to five major international marketers"
2011	Westland	Hokitika	N/A	- Infant formula (base formula), follow-on formula and growing-up milk
2011	New Image Group	Paerata, South Auckland	N/A	- Spray dryer designed for the powder production of specialised colostrum and milk materials for use in nutritional formulations; New Image operates four sites across Auckland encompassing the entire production chain
2011	Synlait (Bright/Mitsui)	Dunsandel, Canterbury	\$100m	- Infant formula plant
2012+	Gardians (Sutton Group + Paterson Corp.)	Balclutha, Otago	N/A	- Infant formula plant
2013	Westland	Rolleston, Canterbury	N/A	- Various nutritional milk based products (e.g. infant formula, growing up milk powders etc.)
2013	Dairy Goat Co-op	Hamilton	\$67m	- Second powder dryer; four times the capacity of existing plant
2014+	Mengniu/Yashili	Pokeno, Waikato	\$212m	- Infant formula plant
2014+	Inner Mongolia Yili	Glenavy, South Canterbury	\$214m	- Infant formula plant at acquired Oceania Dairy site (47,000t at full capacity)

SEGMENTATION

We propose the following six potential strategic positions for firms in the infant formula industry

EXAMPLE: Simplified model of six possible strategic positions for firms in the infant formula industry
Model; 2013



A firm's strategic position is a function of the factors available to leverage; all positions are obviously not available to all firms

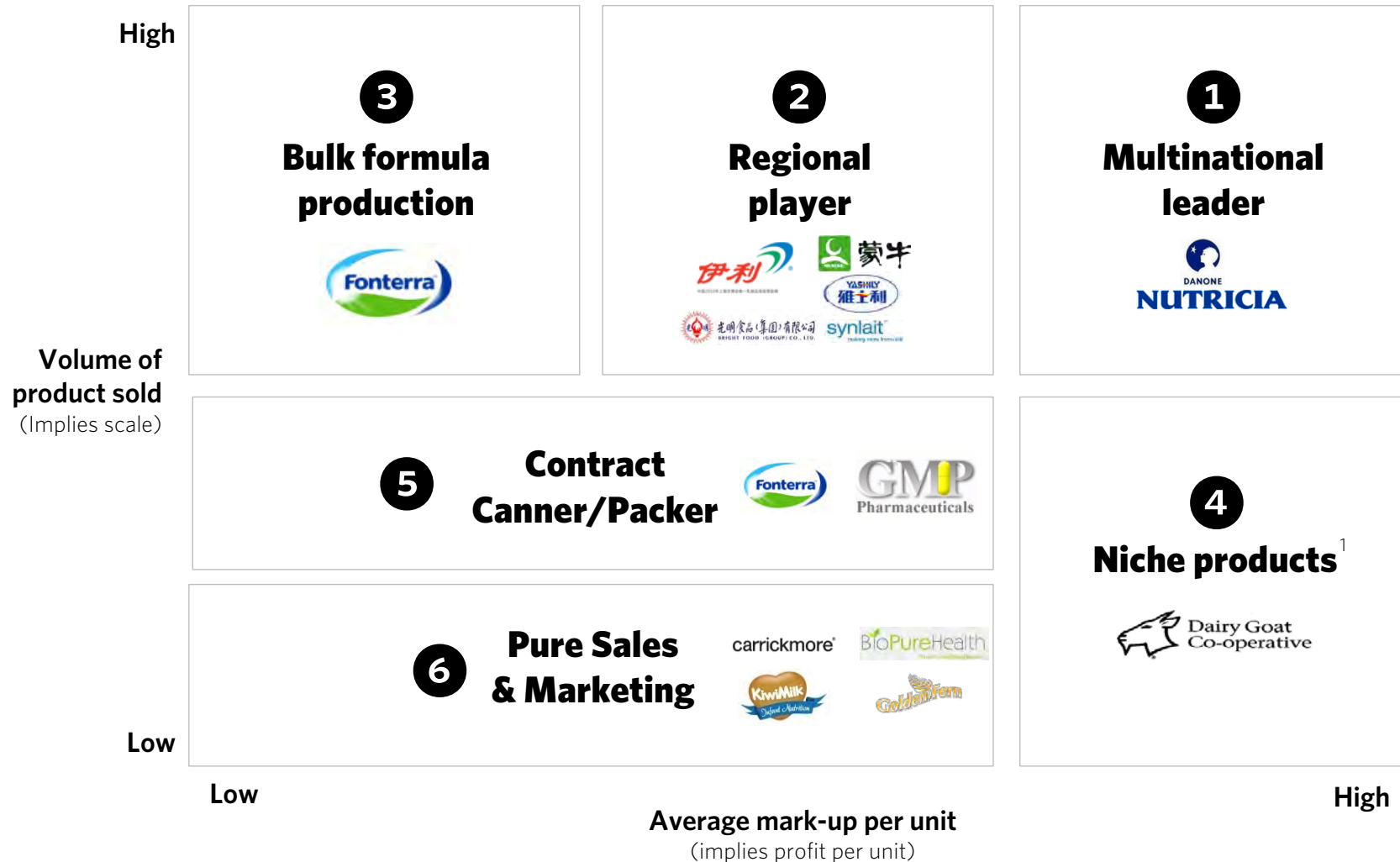
	1. Multinational Leader	2. Regional Player	3. Bulk Formula	4. Niche	5. Contract Canner/Packer	6. Pure Sales & Marketing
Did you invent infant formula?	●	○	○	○	○	○
Have you been doing R&D leading to NPD for 100 years?	●	○	○	○	○	○
Are you a global leader in the category?	●	◐	○	●	○	○
Do you own global brands?	●	◐	○	○	○	○
Do you spend a lot of money marketing to consumers globally?	●	◐	○	○	○	○
Do you have a large salesforce regularly visiting all channels?	●	◐	○	○	○	○
Do you have lots of money? Can you get more?	●	●	○	○	○	○
Are you really good at spray drying? Do you have scale?	●	◐	●	◐	○	○
Are you located close to low cost milk?	●/○	○	●	●	●	●
Is the countryside around your factory picturesque?	○	○	●	●	●	●
Do you have enthusiasm and entrepreneurial vigour?	○	○	○	◐	◐	●

Leverage

- High
- ◐ Medium
- Low

Firms in all identified strategic positions can be identified in New Zealand

EXAMPLE: Simplified model of six possible strategic positions for actors in the infant formula industry
Model; 2013



1. Other examples of a niche position, though not in NZ, is organic (e.g. Bellamy's Organic baby food in Tasmania); Source: Coriolis

1. MULTINATIONAL LEADERS

Two of the global top six infant formula manufacturers now own infant formula factories in New Zealand, two others have product contract packed in the country; Mead, Abbott, Morinaga and Meiji all buy from NZ

Top 11 global baby food/infant formula multinationals and their identified activities in New Zealand (if any)

As of August 2013

1

Multinational leader

Firm	Global revenue Global Employees	Ownership	Do they source raw dairy ingredients from New Zealand?	New Zealand infant formula activities
Nestle	CHF92.2b 339,000	Publicly listed Switzerland	- Yes, lots	- Contract packed by Fonterra
Danone	€19.3b 101,000	Publicly listed France	- Yes, lots	- Factory in New Zealand
Mead Johnson	US\$3.9b 5,600	Publicly listed USA	- Yes, lots	- No factory; likely buys base powder
Abbott	US\$38.9b 70,000	Publicly listed USA	- Yes, lots	- No factory; likely buys base powder - Potential to build a plant in NZ ???
Heinz	US\$11.6b 32,200	Private equity USA	- Yes, lots	- Contract packed by Fonterra
Freisland Campina	€10.3b 22,000	Co-operative Netherlands	- Not much	- Acquired 7.5% share in Synlait Aug 2013
Hipp	€1.1b 1,200	Private Germany	- Primarily baby food not IF	-
Hero	CHF1.5b 4,000+	Private Switzerland	- Not much	-
Hain	US\$1.7b 3,670	Publicly listed USA	- Primarily organic IF in the US; no NZ market access	-
Morinaga	¥594.2b 5,710	Publicly listed Japan	- Yes	- No factory; likely buys base powder - Potential to build a plant in NZ ???
Meiji	¥1,109.2b 15,338	Publicly listed Japan	- Yes	- No factory; likely buys base powder - Potential to build a plant in NZ ???

1. MULTINATIONAL LEADERS

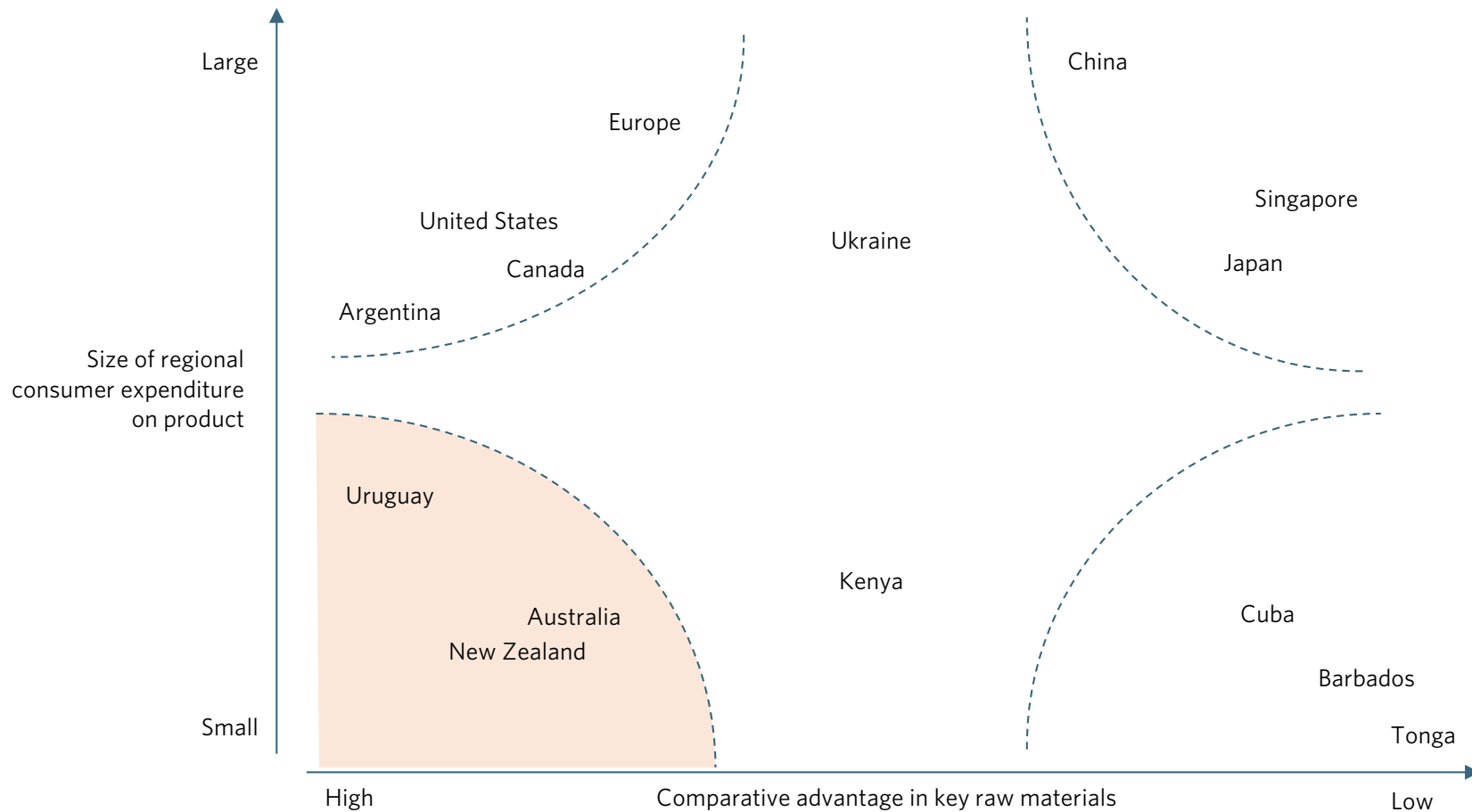
New Zealand has a high comparative advantage in dairy but is embedded in a relatively small regional market

Relative comparative advantage vs. size of regional market in dairy products

Model; 2013

1

Multinational leader



The bottom 119 milk producing countries in the world together produce as much milk as New Zealand

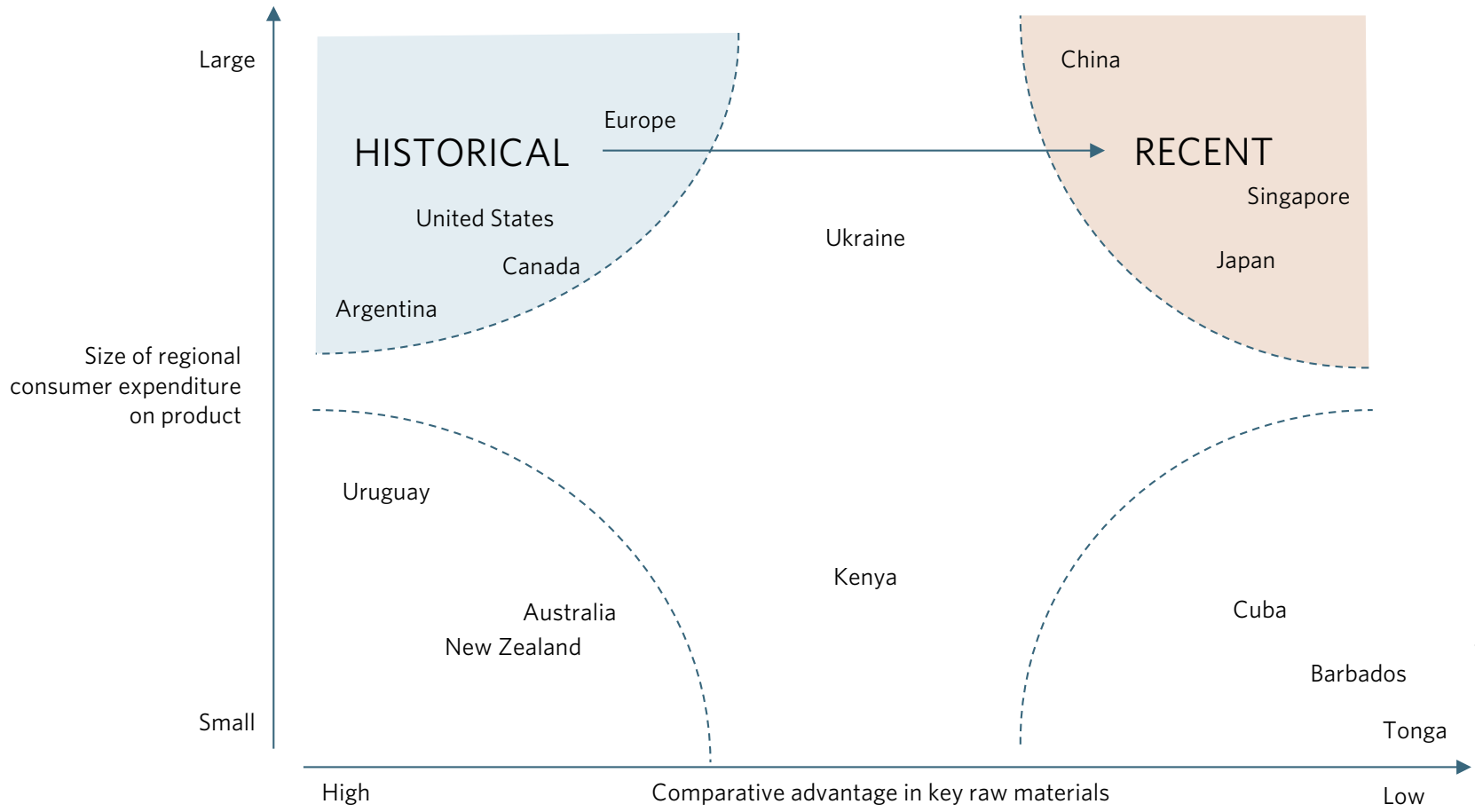
1. MULTINATIONAL LEADERS

Historically multinational manufacturers built plants in regions of large “home” markets with comparative advantage in dairy; more recently they have built plants in large markets with low comparative advantage

Relative comparative advantage vs. size of regional market in dairy products

Model; 2013

1 **Multinational leader**



The bottom 119 milk producing countries in the world produce as much milk as New Zealand



1. MULTINATIONAL LEADERS

The behaviour of both Mead Johnson and Abbott demonstrate this model

EXAMPLE: Location of infant formula/baby nutrition plants of Mead Johnson and Abbott Nutrition
As of August 2013

1

Multinational leader

	1910's	1920's-1940's	1950's	1960's	1970's	1980's	1990's	2000's	2010's
 Mead Johnson <small>Nutraceuticals</small>	Evansville, IN United States	Zeeland, MI United States	Mexico City, Mexico	Manilla, Philippines	-	Nijmegen, Netherlands	Guangzhou, China Chonburi, Thailand	-	Singapore SE Asia
Reason for location	- Near raw materials - Near consumers	- Near raw materials - Near consumers	- Near consumers	- Near consumers - Competitive manufacturing	-	- Near raw materials - Near consumers	- Near consumers	-	- Near consumers
 Abbott		Columbus, OH United States	Sturgis, MI United States	Zwolle, Netherlands Brockville, Canada	Cootehill, Ireland Granada, Spain ¹	CasaGrande, AZ United States	-	Singapore Guangzhou, China	Jiaxing, China Argentina ¹
Reason for location		- Near raw materials - Near consumers	- Near raw materials - Near consumers	- Near raw materials - Near consumers	- Near raw materials - Inside EU	- Near raw materials - Near consumers	-	- Near consumers	- Near consumers

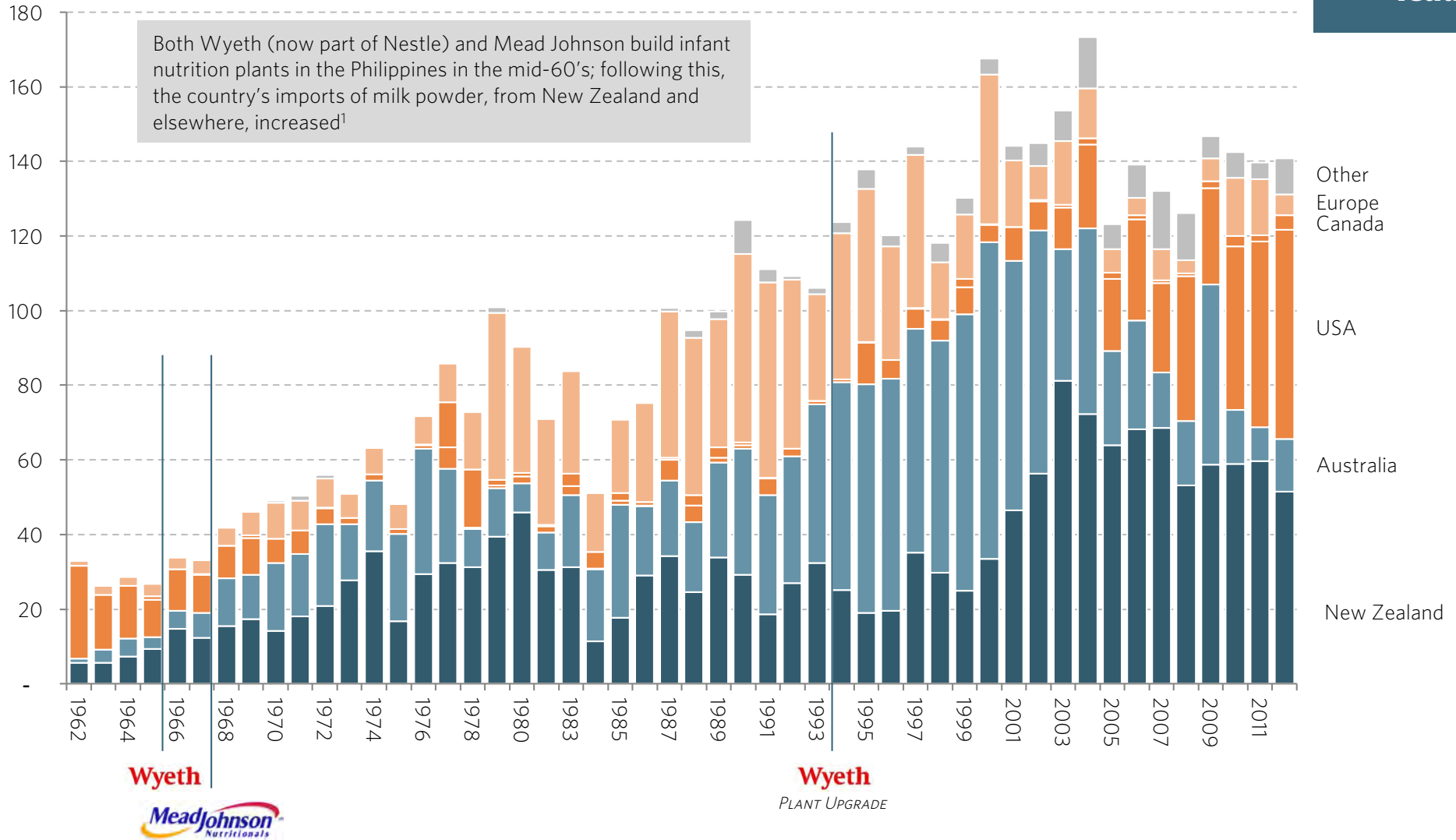
1. MULTINATIONAL LEADERS

When multinational leaders build infant formula plants in markets accessible to New Zealand dairy product, New Zealand firms' sales to those market then grow

EXAMPLE: Import volume of milk powder into the Philippines by source country
Kg; millions; 1962-2012

1 **Multinational leader**

Both Wyeth (now part of Nestle) and Mead Johnson build infant nutrition plants in the Philippines in the mid-60's; following this, the country's imports of milk powder, from New Zealand and elsewhere, increased¹



1. Obviously for a range of uses not just infant formula; Source: UN Comtrade database (custom job); Coriolis analysis and classification

2. REGIONAL DAIRY




Three of the top four largest dairy companies in China have or are building infant formula production plants in New Zealand; however the main Chinese pure-play IF manufacturers appear to be investing in Europe

Details of Chinese dairy firms activities in New Zealand

As of August 2013

2

Regional dairy

Firm	Position in Chinese dairy market	Global revenue Global Employees	Ownership	New Zealand (and other) investments	Websites
	#1 milk producer in China by sales and volume	CHY 43.5b US\$7.0b 57,800	Publicly listed	- Granted approval to build Infant Formula plant in New Zealand	http://www.yili.com/
	#2 milk producer in China by sales and volume	CHY 36.16b US\$5.9b 30,000	COFCO 19% + others (COFCO revenue US\$28.2b)	- Recently acquired infant formula maker Yashili for HK\$12.5b (NZ\$2b) - Yashili planning to open infant formula plant in New Zealand (in Pokeno) - JV with Arla (Denmark/Sweden) for yoghurt venture - JV with Danone (France) and COFCO for yoghurt venture	http://www.mengniuir.com http://www.yashili.hk
	#4 milk producer in China by sales and volume	Group US\$7b (11) Bright Dairy CNY14.16b NZ\$2.4b 3,680	State owned parent Subsidiary Publicly listed	- Owns 39% of NZ's Synlait Dairy - Sources raw materials from NZ's Synlait for China - Bought Weetabix (UK) - Bought Manassen Foods (Australia) - Reported in talks to acquire largest dairy in Israel (Tnuva) for US\$1.3b	http://www.brightfood.com http://www.brightdairy.com

Investing elsewhere

BeingMate	#1 Chinese owned Infant Formula brand			- Investing €20m into production venture with Kerry in Ireland
Biostime	#2 Chinese owned Infant Formula brand			- Investing €20m into production venture with Isigny Sainte Mere in France
Synutra	#9 Chinese owned infant formula brand			- Investing €100m into production venture with Sodiaal in France







3&4. BULK FORMULA/NICHE PRODUCTION

Six New Zealand firms now produce and wholesale bulk base infant formula powder

Identified firms in New Zealand producing bulk/base infant formula
2013

3

**Bulk formula
production**

	Year Founded	Year began producing base IF powder	Do they...			Current predominant strategic position
			Wholesale bulk base formula?	Can & contract pack for others?	Sell branded infant formula?	
	2001	Predecessor 1980's	Yes	Yes (only large)	Launching	Bulk formula Developing brand
	1989	2003	Yes (goat)	Yes (goat)	Yes (goat)	Niche products
	2000	2011	Yes	No (?)	Yes	Bulk formula Developing brand
	1937	2012	Yes	No	No	Bulk formula
	2011	2012	Yes	Yes (Sutton)	Yes	Bulk formula Developing brand
	1984	2011	Yes	Yes	Yes	Bulk formula Developing brand

4

5. CONTRACT CANNING/PACKING

New Zealand has a wide range of infant formula dry blenders and canners, most of whom contract pack for others

Identified firms dry blending and canning Infant Formula in New Zealand
1980-2013+

5

**Contract
Canner/Packer**

FIRM	PLANT LOCATION	EMPLOYEES	ACTION	WEBSITE
Fonterra/Canpac	Hamilton	251-500	Manufactures and prints can packaging for a wide range of dairy-based consumer products and food packaging. Contract packaging services and can printing	http://www.fonterra.com
Sutton Group/Gardians	Airport Oaks, Auckland	101-250	- Wet, dry and canning	http://www.suttongroup.co.nz/
GMP Pharmaceuticals	East Tamaki, Auckland	150	- Dry blending and canning	http://www.gmp.com.au/
Alpha Laboratories	Mt. Wellington, Auckland	150	- Dry blending and canning	http://www.alphalabs.co.nz/
Danone/Nutricia	Mt. Wellington, Auckland	51-100	- Dry blending and canning	http://www.nutricia.co.nz/
Health Pak	Penrose, Auckland	51-100	- Pack small sachets	http://www.healthpak.co.nz
Dairy Goat Co-op	Hamilton	51-100	- Wet, dry, canning	http://www.dgc.co.nz/
Unitech Industries	Henderson, Auckland	80	- Dry blending and canning	http://www.unitech.co.nz/
New Image	Avondale, Auckland	21-50	- Dry blending and canning	http://www.newimageasia.com/
Doxcon Pharmaceuticals	Henderson, Auckland	21-50	- Dry blending and canning	http://www.doxcon.co.nz/
New Zealand Nutritionals	Christchurch	21-50	- Dry blending and canning	http://nznutritionals.co.nz/
New Zealand New Milk	Auckland Airport, Auckland	N/A	- Dry blending and canning	http://nznewmilk.co.nz/
New Zealand Food Packing	Rosedale, Auckland	N/A	- Dry blending and canning	http://www.nzfoodpacking.com/

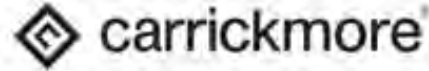
6. PURE SALES & MARKETING

New Zealand has 100+ brands of infant formula being sold by “pure play” sales & marketing firms

EXAMPLES: Select pure-play sales & marketing organisations infant formula brands from New Zealand
Presence; as of August 2013

6

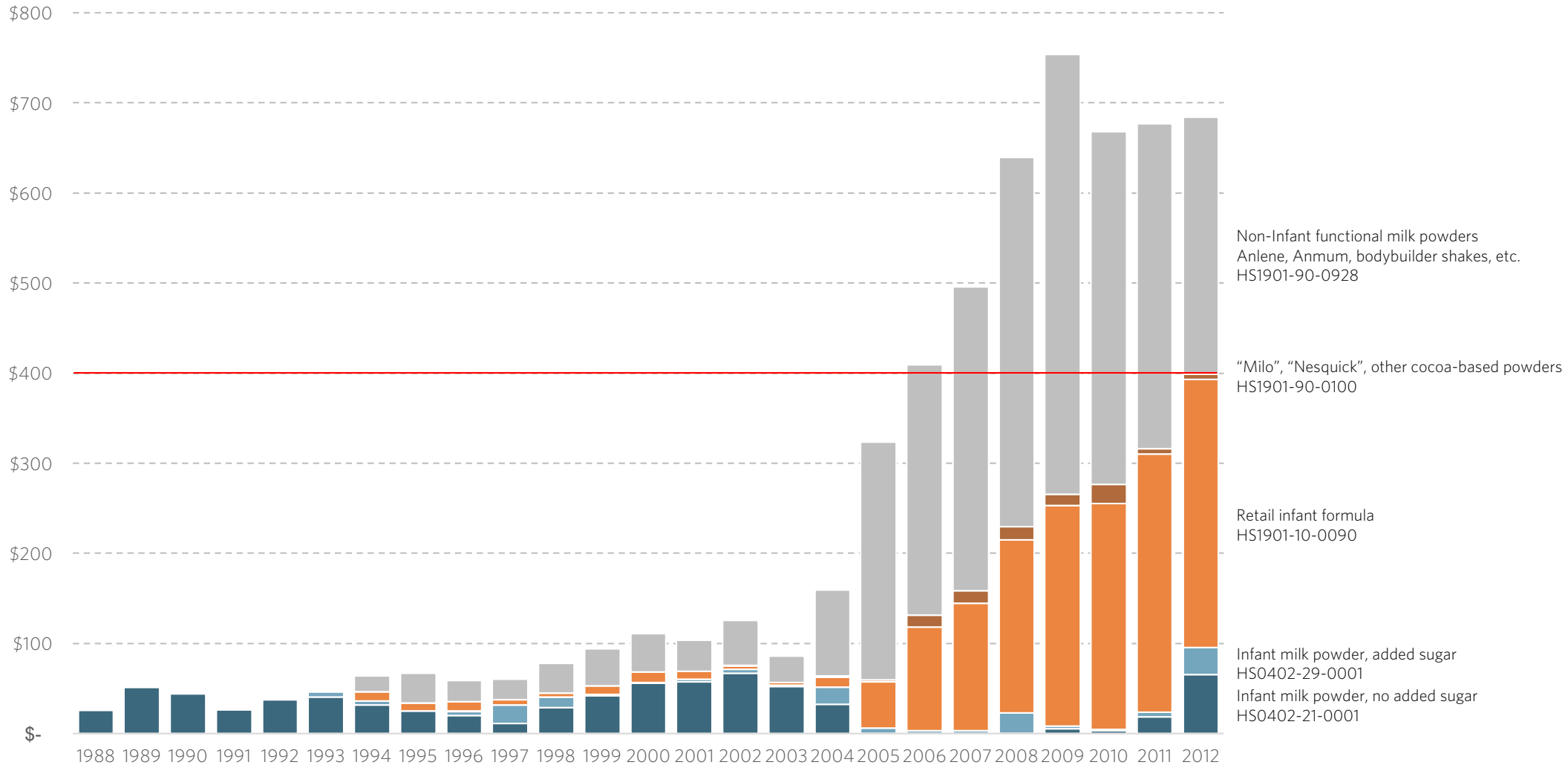
Pure Sales & Marketing



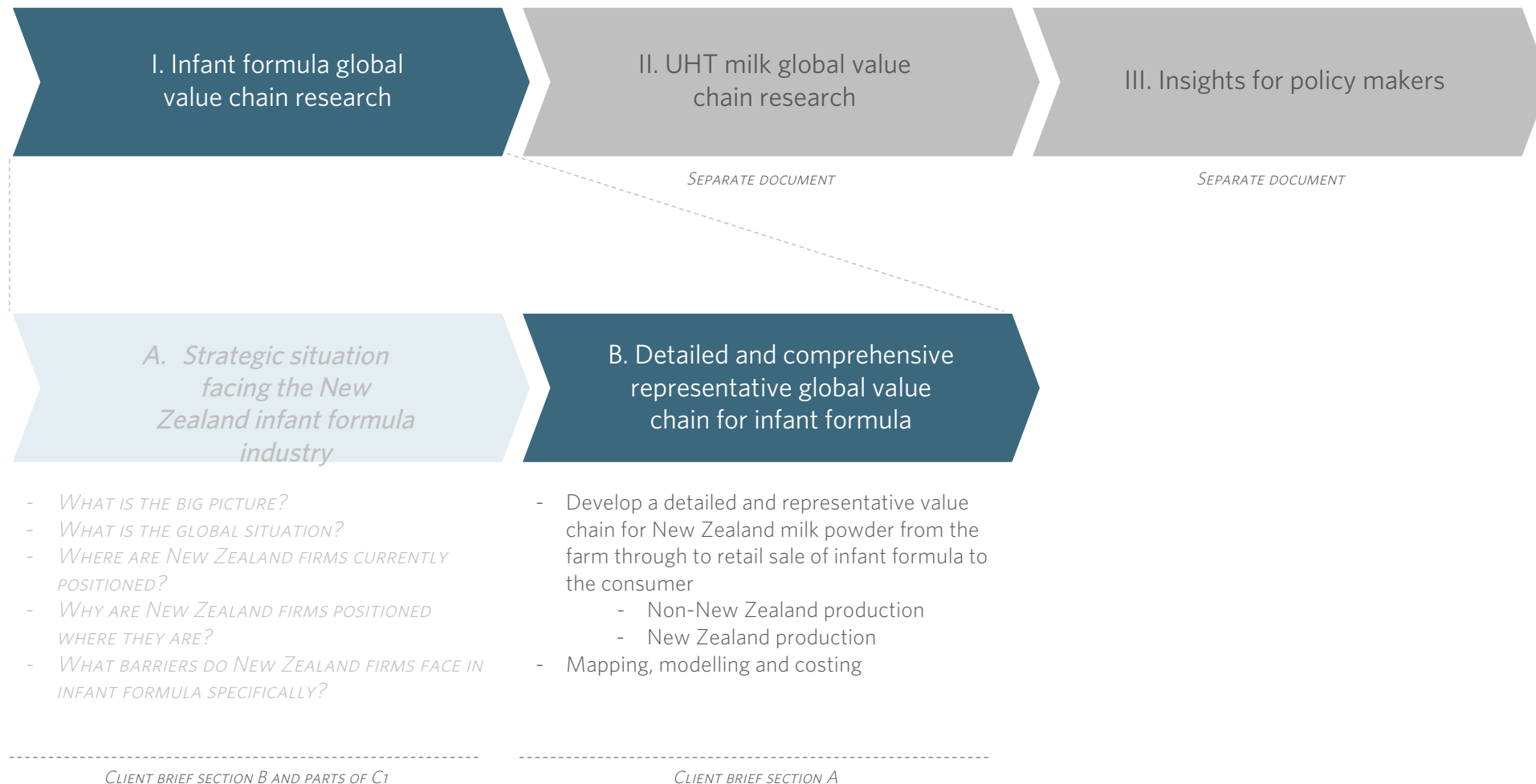
New Zealand infant formula exports continue to grow, reaching ~NZ\$400m in 2012

New Zealand infant formula and related valued-added milk-based powder exports by value

NZ\$m; declared value FOB; 1988-2012



The second section of this report looks at a representative global value chain for infant formula



The value chain for infant formula is complex and every participant earns their returns

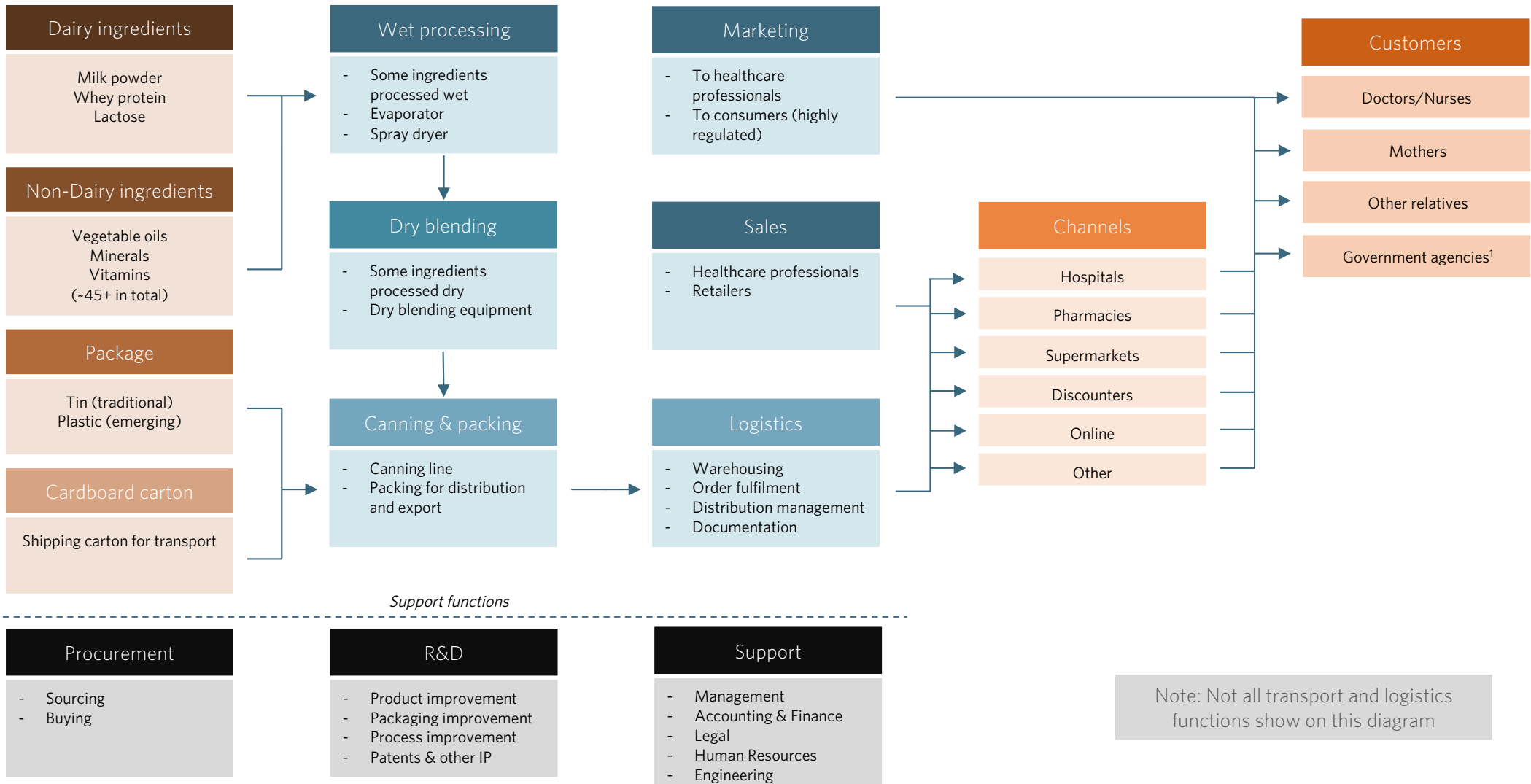
A range of key findings and conclusions come out of this analysis of the global infant formula value chain:

1. The value chain for infant formula starts with the consumer not the primary producer of any ingredient or raw material. 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.
2. Most food & beverage categories are not like wine. In most categories, including infant formula, 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 multinationals that have been in business for 100+ years .¹
3. All actors in the value chain have clearly defined roles and responsibilities. There is a common industry structure and value chain globally - with the same actors and roles occurring everywhere - signalling strong forces creating this structure.
4. Economies of scale are real. The firms in the value chain beyond New Zealand are large scale entities typically with a market capitalisation larger than Fonterra.
5. 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.
6. More defensible positions - with strong barriers to entry - are more profitable and less defensible positions with lower barriers to entry are less profitable.
7. Deep and defensible industry profit pools - typically located around activities at scale - are protected by huge balance sheets.
8. Pro rata on a per can basis, the total infant formula value chain requires \$44 worth of total assets to sell an product worth \$44. This suggests that selling a lot more infant formula (e.g. to a new emerging market like India), will require a lot more assets in the total chain.
9. Shareholder's return are generally proportional to assets, particularly across an economic cycle.
10. 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.
11. The high defensibility and asset intensive nature of many positions further along the value chain acts as the single largest barrier to New Zealand firms changing position.

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 infant formula can be represented by the following simplified model

Simplified value chain for infant formula manufacturer
Model; 2013



1. For example two-thirds of all infant formula in the United States is purchased by the United States Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants and Children (WIC)

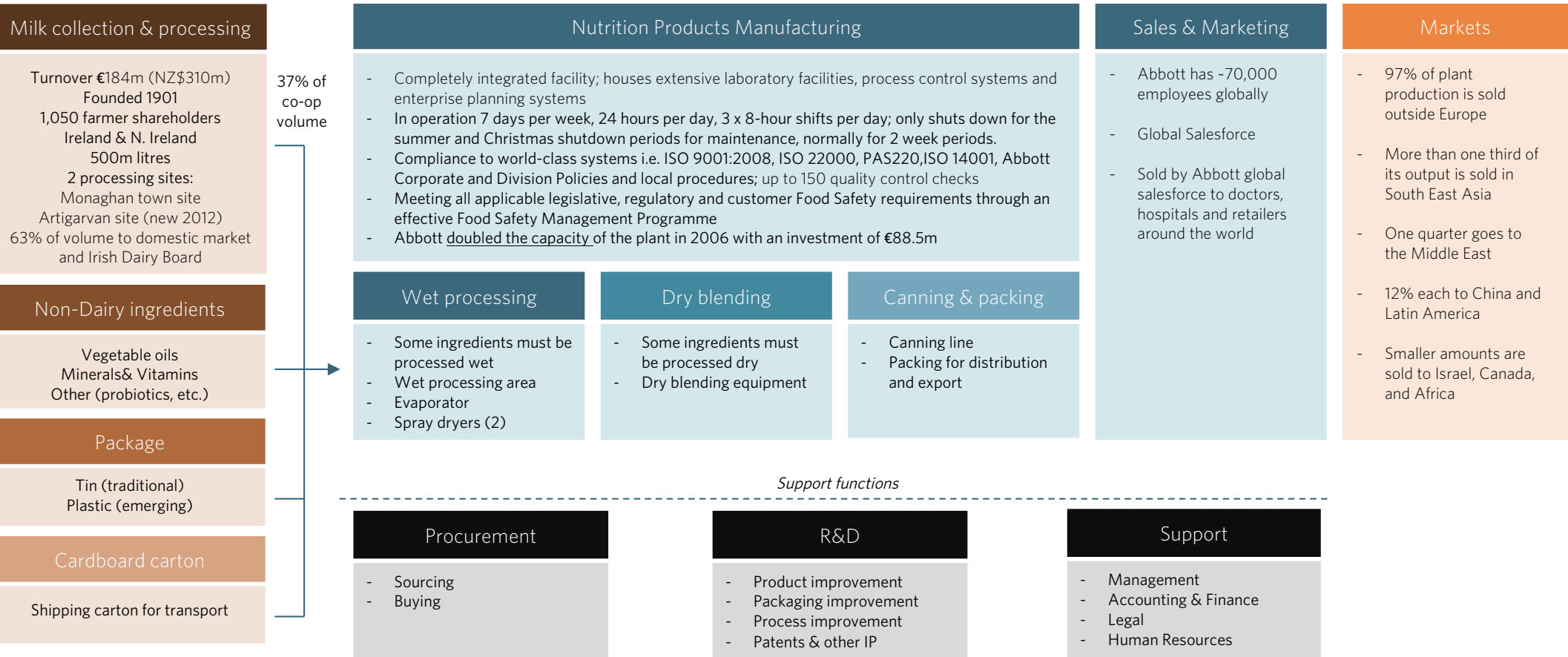
INFANT FORMULA - THREE STAGES

Abbott's Nutritional plant in Cootehill Ireland gives a real world example of a tight, concise infant formula value chain in action

EXAMPLE: Real world value chain for Abbott Nutrition plant in Cootehill, Ireland
2012 or as available



Abbott Ireland
 Plant in Cootehill Ireland
 Opened 1975
 250-300 employees






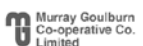























Source: Coriolis from a range of published accounts and sources

INFANT FORMULA - DIFFERENT MODELS

In New Zealand there are a range of models in place for splitting up this value chain

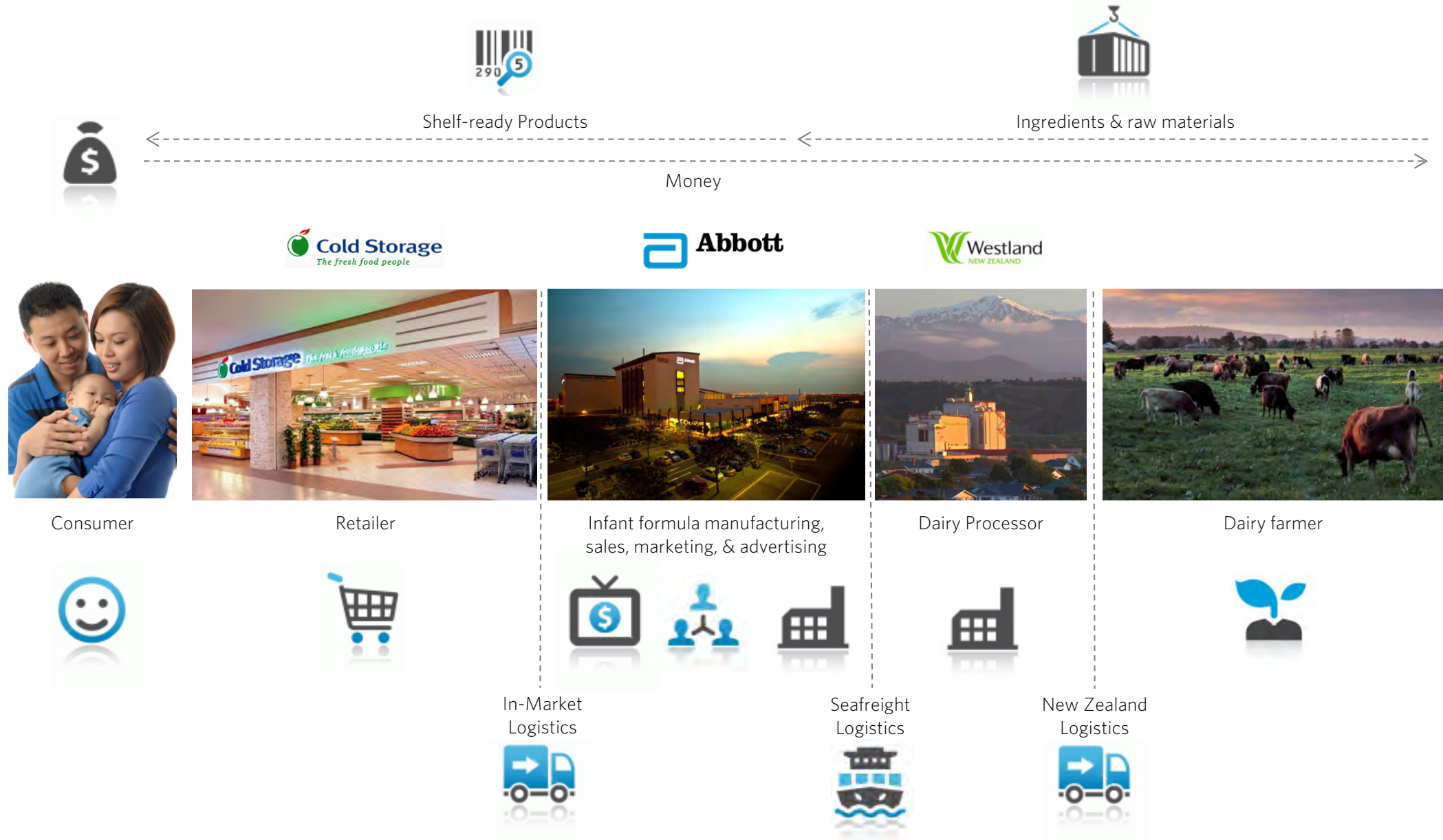
EXAMPLE: Simplified production process and supply chain

2012 or as available

	Milk collection & processing	Wet processing	Dry blending	Canning & packing	Sales & Marketing
EXAMPLE Abbott in Ireland					
EXAMPLE Abbott in Singapore	   				
Base powder to NZ multinational factory					
Contract packed for global firm					
Local canner to smaller marketer	   		  		<i>... and a few others...</i> <i>... and 100+ others</i>
Local canner & marketer	   			 	
Integrated		 or 			

INFANT FORMULA VALUE CHAIN - MODEL

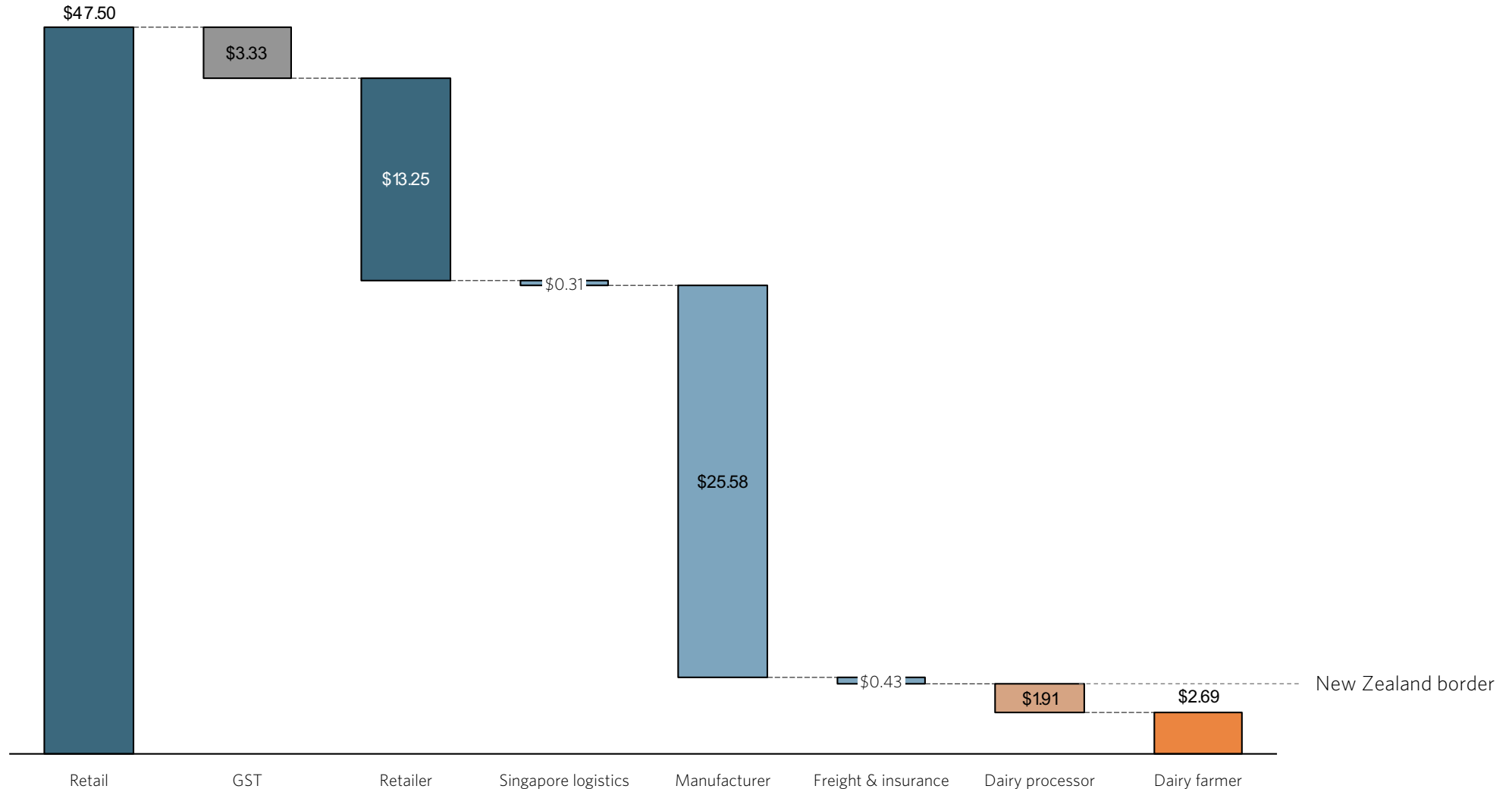
This analysis of the infant formula value chain uses a simplified value chain from the consumer in Asia through to the dairy farmer in New Zealand; at key stages as far as possible we use real firm's financials as models



INFANT FORMULA VALUE CHAIN - MARKUP BY STAGE

Preliminary analysis of the infant formula 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 can of infant formula through to farm gate value to dairy farmer in New Zealand
NZ\$; actual; 2012

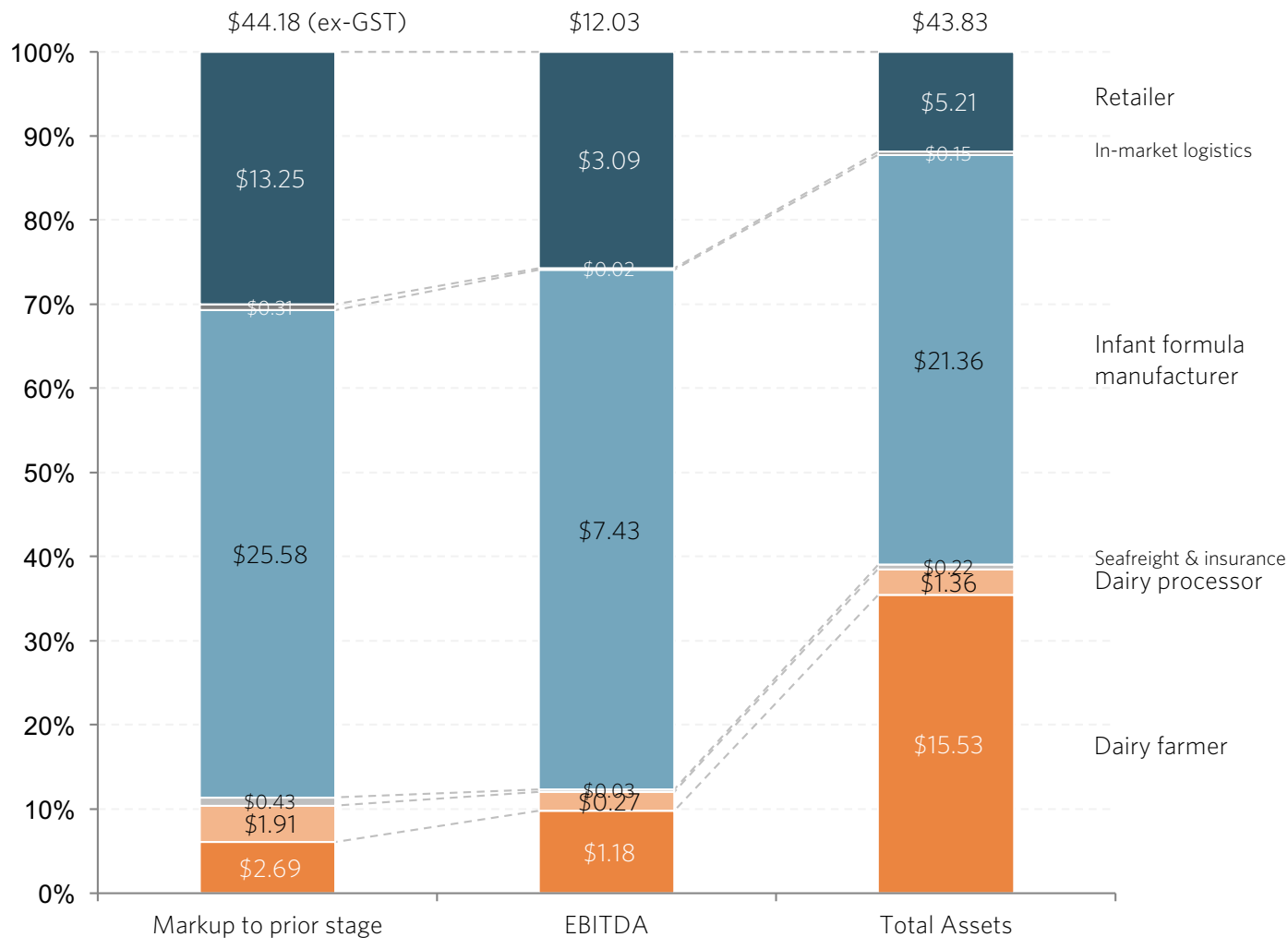


INFANT FORMULA VALUE CHAIN - MARKUP VS. EBITDA VS. ASSETS REQUIRED

Looking beyond markup by stage, into profitability (EBITDA) and nominal assets required to achieve the profit highlights relative returns along the chain; the low return of dairy farmers on their farm value stands out

MODEL: Value chain of a nominal "can of infant formula": markup to stage prior, EBITDA and assets required

NZ\$; actual; 2012



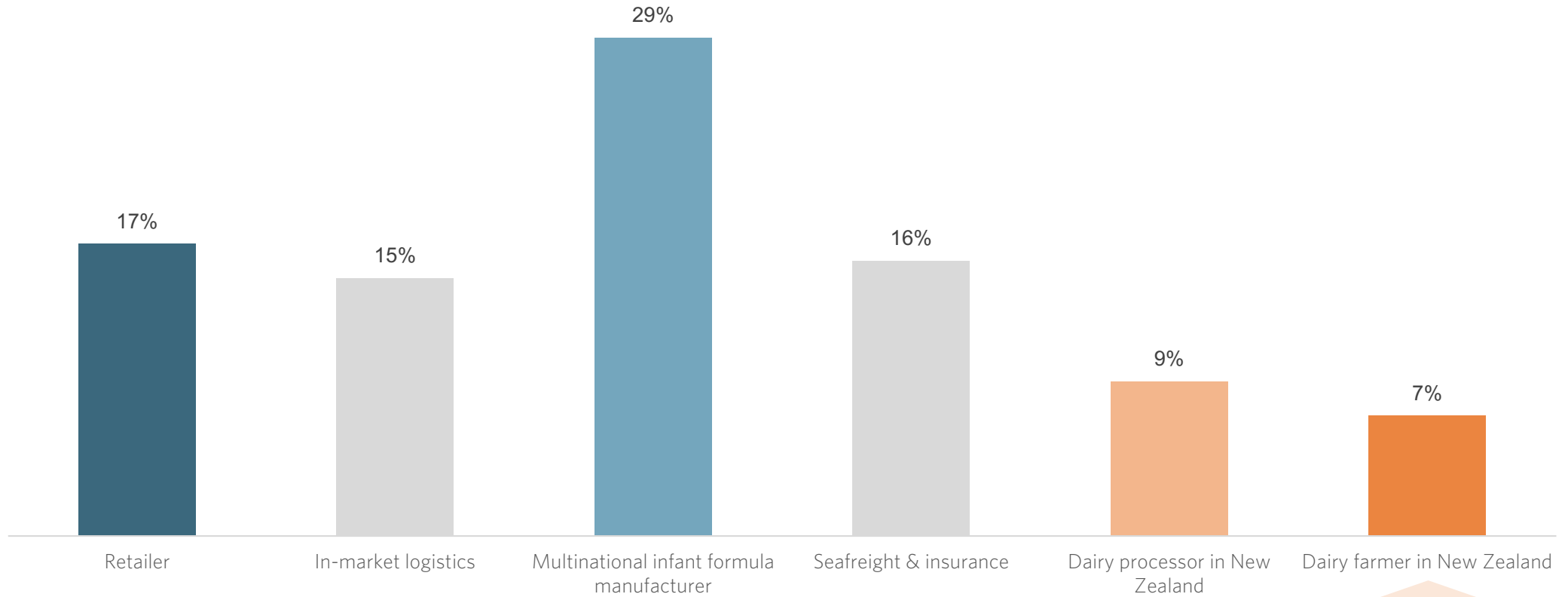
PRO RATA PER NOMINAL CAN

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 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 change over the last decade would double this number.

Our model value chain for infant formula starts with the consumer; in this case “the Wong family”, a typical Singaporean consumer of infant formula



Christopher, Fann & Ong Wong

A “typical Singaporean family”

They are a dual income household with two working parents and one child. He works as an engineer and she works as an administrator in a mid-sized firm

They make the average Singaporean household income, which is about \$86,000 after tax.

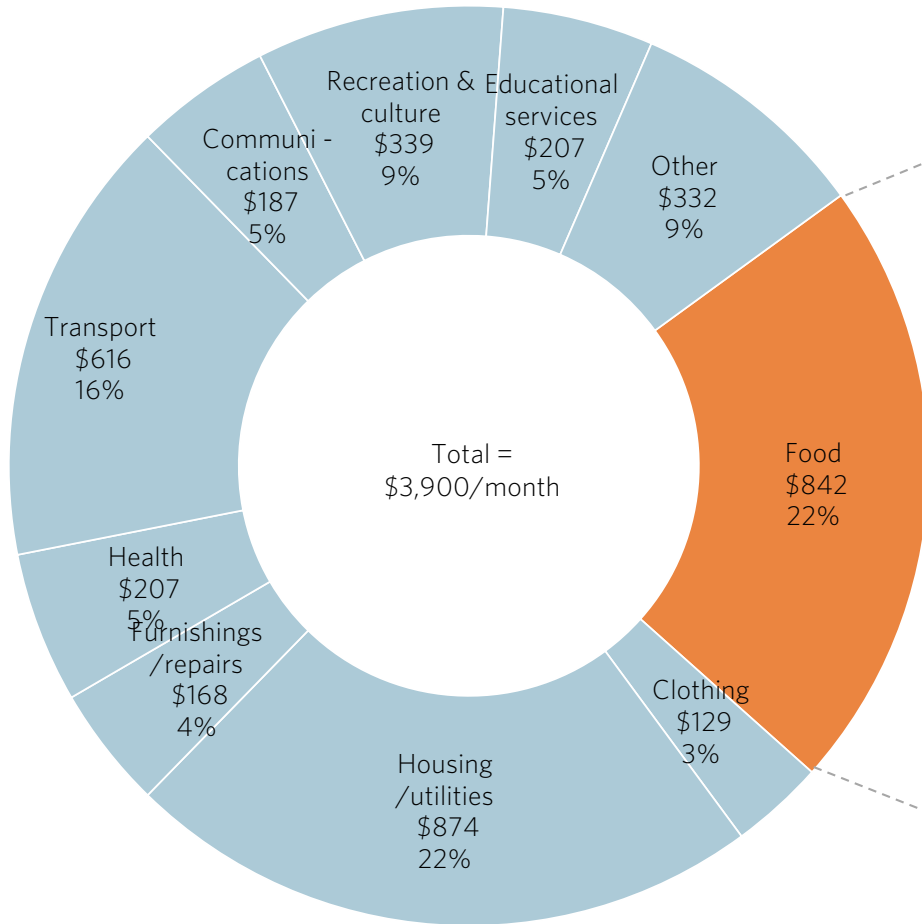
They rent an 3 room flat from the Singaporean Government’s Housing and Development Board (HDB) as do 85% of Singaporeans.

Ong (the consumer) was born six months ago and is in day care, as Fann (the customer) can’t afford not to work. As a result Ong is fed infant formula.

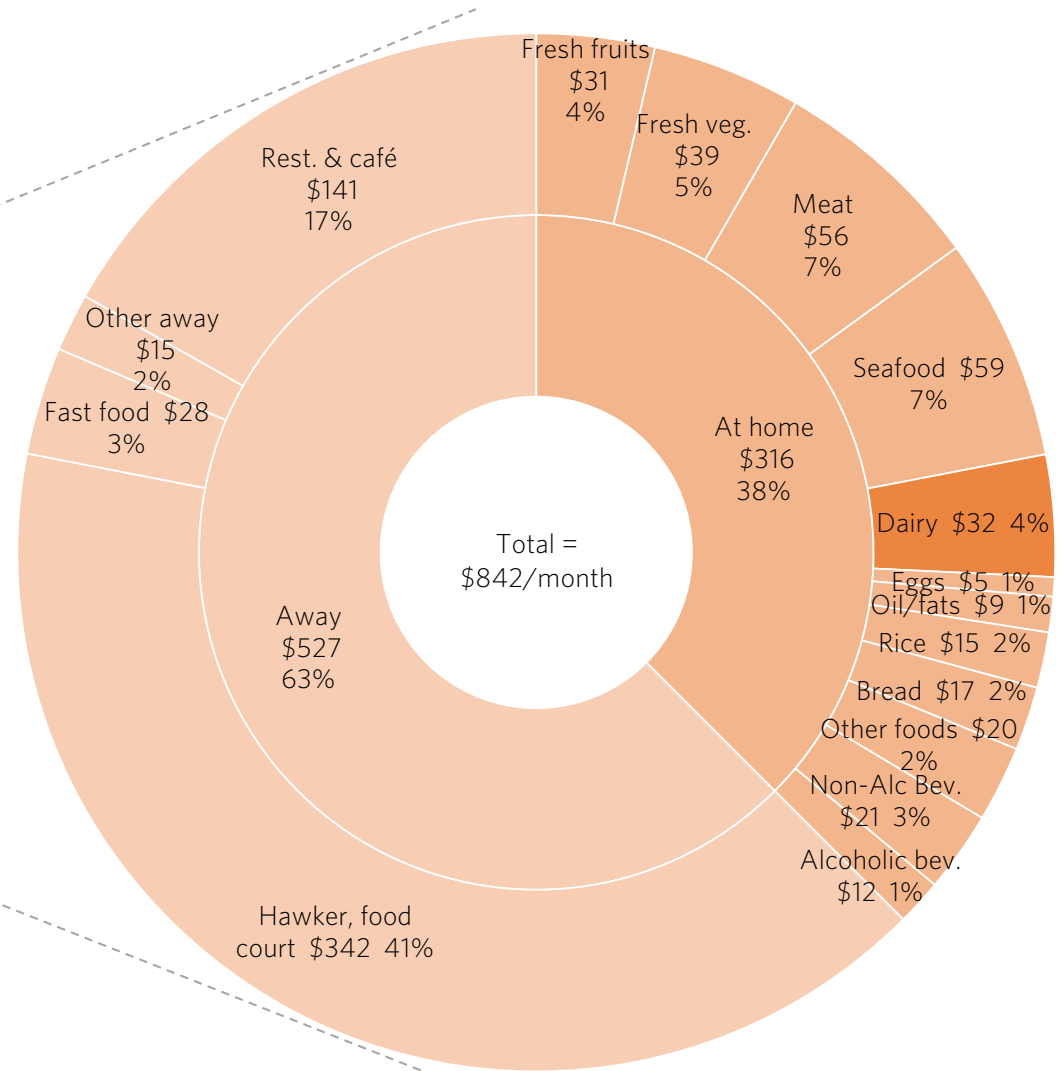
AVERAGE HOUSEHOLD EXPENDITURE

The average Singaporean household spends about S\$3,900 per month, 22% goes on food; almost two-thirds of food expenditure is on eating out away from home; dairy products account for 4% of food spend

Average Singaporean household expenditure per month
S\$; % of S\$; 2012 est



Average Singaporean household expenditure per month on food & bev.
S\$; % of S\$; 2012 est



Ong consumes a can of formula per week meaning the family spends about S\$176 per month on infant formula; this had led to less spending elsewhere in the family budget



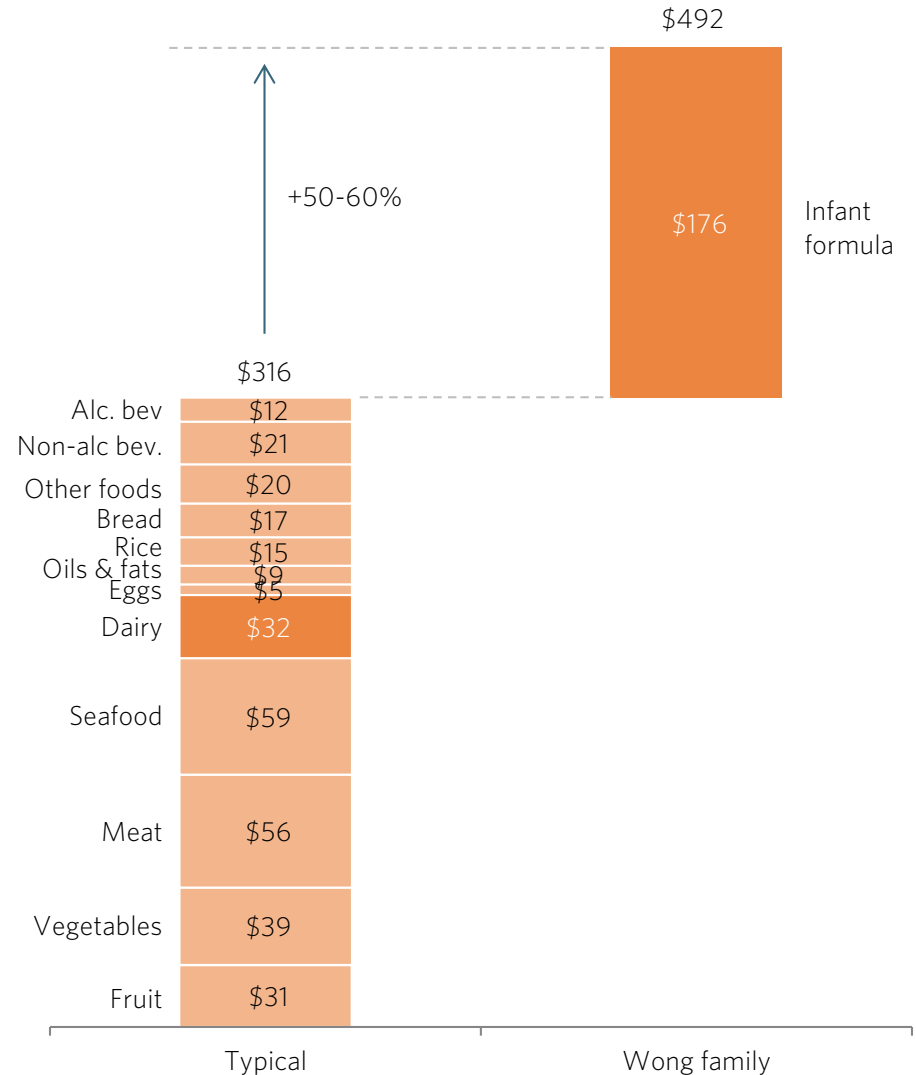
Ong Wong
(The consumer)

Consumes

1x900g can/week
4x900g can/month

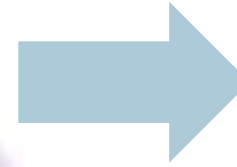
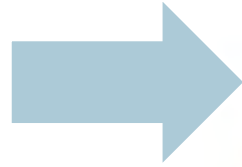
At S\$46/can=
S\$176/month

Model: incremental food at home spending
S\$; % of S%; 2012 est



DOCTOR'S INFLUENCE ON BRAND DECISION

Fann buys Abbott's Similac brand for Ong as this was recommended to her by her doctor, whom she consulted with when she decided to stop breastfeeding; Ong's doctor is visited regularly by salespeople from the major infant formula suppliers in Singapore



"Our sales force **EDUCATES** health care professionals about **THE BENEFITS OF OUR INFANT FORMULA** products in each of the countries where we market our infant formula products. **PRIMARY MARKETING EFFORTS** for infant formula products are directed toward **SECURING THE RECOMMENDATION** of the Enfa family of brands by **PHYSICIANS OR OTHER HEALTH CARE PROFESSIONALS**.

We focus our product detailing efforts on **NEONATAL INTENSIVE CARE UNITS, PHYSICIANS**

and other **HEALTH CARE PROFESSIONALS, HOSPITAL GROUP PURCHASING ORGANIZATIONS** and other **INTEGRATED BUYING ORGANIZATIONS**. Our sales force receives training on our products and customer service skills.

We support health care professionals by **ORGANIZING CONTINUING MEDICAL EDUCATION PROGRAMS, SYMPOSIA AND OTHER EDUCATIONAL INTERFACES.**" p6, *MEAD JOHNSON 10K, 2012*

SALESFORCE FOCUS

The major global multinationals put a large part of their selling effort into health practitioners rather than retailers (as in normally the case in FMCG/CPG¹); they are doing this as it works to sell product

EXAMPLE: Mead Johnson global salesforce by focus target market for selling
of employees; 2010



"Prior to 1988, infant formula was marketed strictly as a pharmaceutical product. Given historical product loyalty, formula makers offered their products free to pediatricians and hospitals in the hopes that the first formula a mother used would be the one she continued to purchase." Funding Universe

Total = 1,900 salespeople worldwide

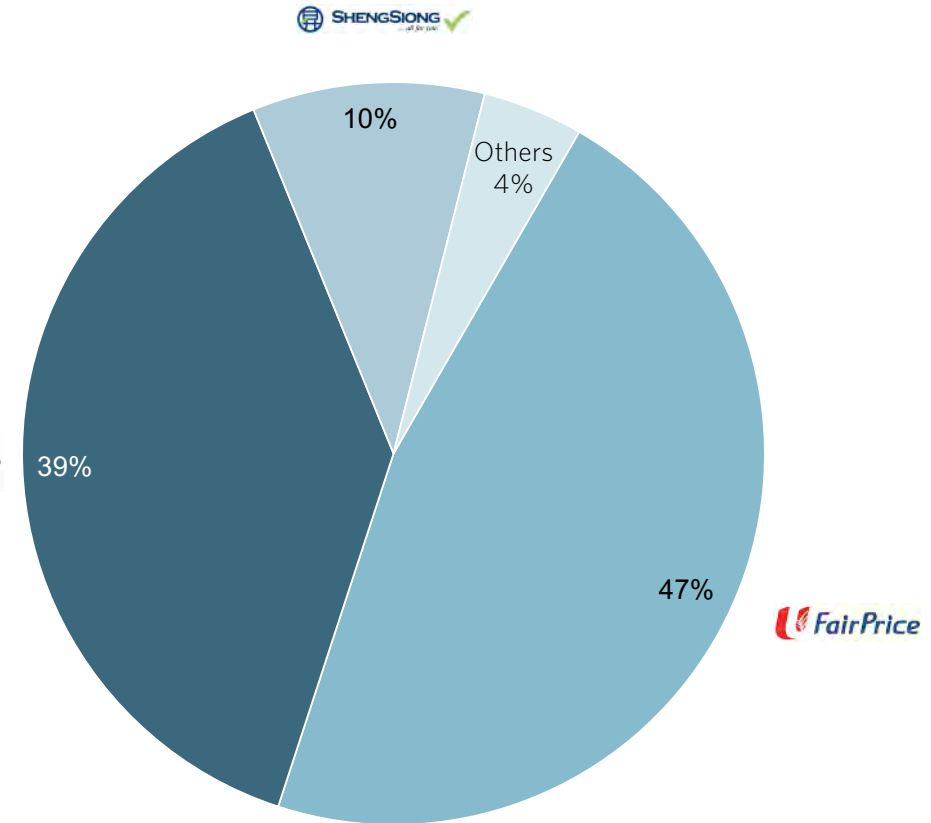
1. FMCG = Fast Moving Consumer Goods; CPG = Consumer Packaged Goods; (aka. Things with a bar code you put in a shopping cart); Source: Mead Johnson prospectus; Coriolis analysis

VALUE CHAIN: THE RETAILER - WHERE THEY SHOP

Like most people, the Wong family shop at the closest supermarket to their home – in their case a Cold Storage near the MRT station; Cold Storage is the #2 chain in Singapore










Supermarket market share by chain in Singapore
% of supermarket/hypermarket sales; 2012

The Wong family's local supermarket



Singapore, like most markets its size, has a highly consolidated retail environment; Cold Storage is owned by Dairy Farm and the company owns and operates a range of stores around Singapore

Major retail food store operators in Singapore (2010)

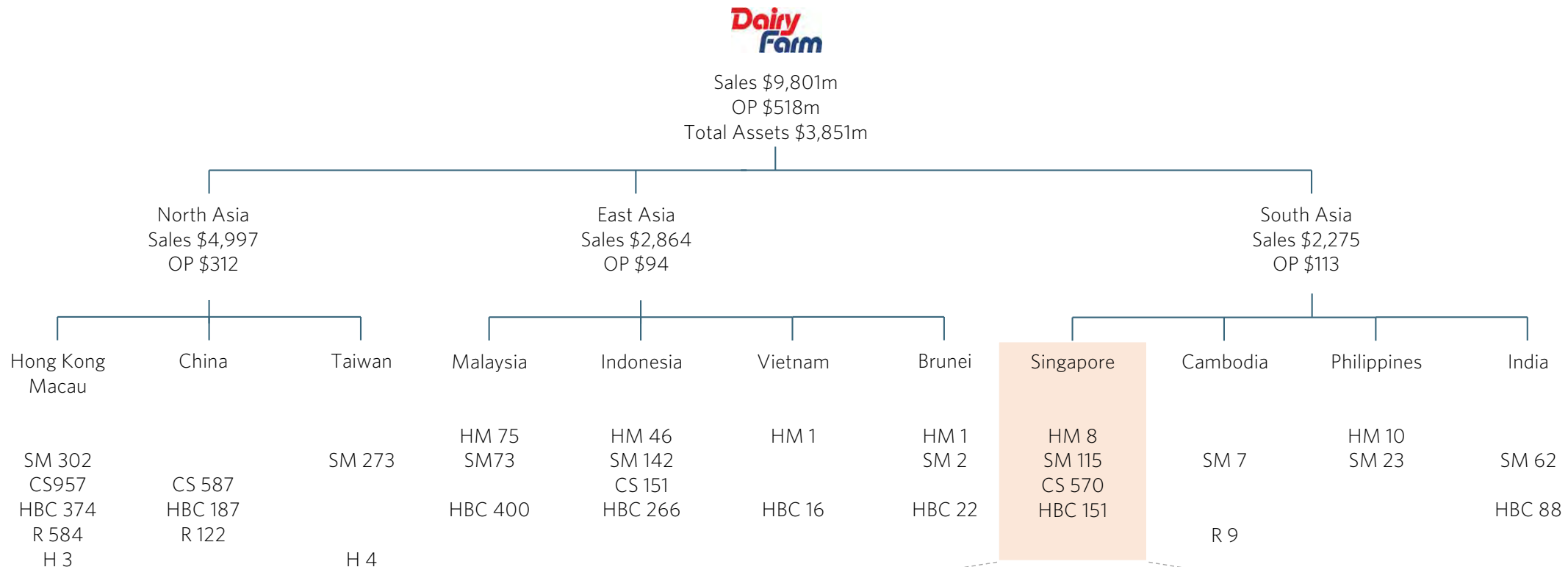
	Year founded	# of stores	Ownership	Group sales	Store formats	Firm/Concept summary	Website
 	1973	106 (s/h)	Co-operative	S\$2.1b (2011)	FairPrice (95) [SM] FairPrice Finest (7) [SM] FairPrice Xtra (4) [HM] FairPrice Xpress (18+) [CS] Cheers (120+) [CS] Foodfare [Foodservice]	Owned by National Trades Union Congress (NTUC) itself owned by 60 unions (550,000 members)	www.fairprice.com.sg www.cheersstore.com/
 	1903	111 (s/h)	Dairy Farm (HK)	-S\$1.7b (estimate)	Cold Storage (39) [SM] Market Place (6) [SM] Shop N Save (59) [SM] Giant (7) [HM] 7-Eleven (549) [CS] Guardian (135) [Ph]	Singapore operations of Dairy Farm (listed; Hong Kong); former owner of Woolworths NZ	www.coldstorage.com.sg www.gianthypermarket.com.sg www.7-eleven.com.sg http://www.guardian.com.sg
	1985	23	Private (Lim Hock Chee)	S\$0.5b (2009)	Sheng Siong (23) [SM/HM] Food Courts (5)	Local chain started by former wet market pork seller	www.shengsiong.com.sg
	1984	19	Private	N/A	Prime (19) [SM]	Mid-sized supermarkets	www.primesupermarket.com
	1972 (SG)	4	Listed (SGX); 60% Japan parent	S\$0.3b ² (2010)	Isetan (4) [DS] Scotts (1) [SM] ¹	Japanese department store chain; 1 has supermarket	www.isetan.com.sg
	1973	1	Private (Mustaq Ahmad)	N/A	Mustafa 1 [DS/HM]	Indian entrepreneur expands from clothers store to department store w/food	www.mustafa.com.sg
		1	Japan	N/A	Meidi-Ya 1 [SM]	Fresh food imported directly from Japan (!); other products local & imported	www.meidi-ya.com.sg www.meidi-ya-store.com

1. Inside Isetan Orchard store; 2. Includes non-food sales; Supermarket (SM), Hypermarket (HM), Convenience store (CS), Department store (DS), Pharmacy (P) Source: various company websites; various company annual reports; published articles and websites; Coriolis analysis and estimates

WHO OWNS THEIR SUPERMARKET?

Dairy Farm International is a multinational retail group based in Hong Kong with stores across the East/South East Asia region; Dairy Farm operates a range of store formats beyond supermarkets

Operational structure of Dairy Farm International in Asia
 US\$m; As of FY2012



- HM Hypermarkets
- SM Supermarket
- CS Convenience Stores
- HBC Health & Beauty Stores
- R Restaurants
- H Home furnishings (e.g.Ikea)

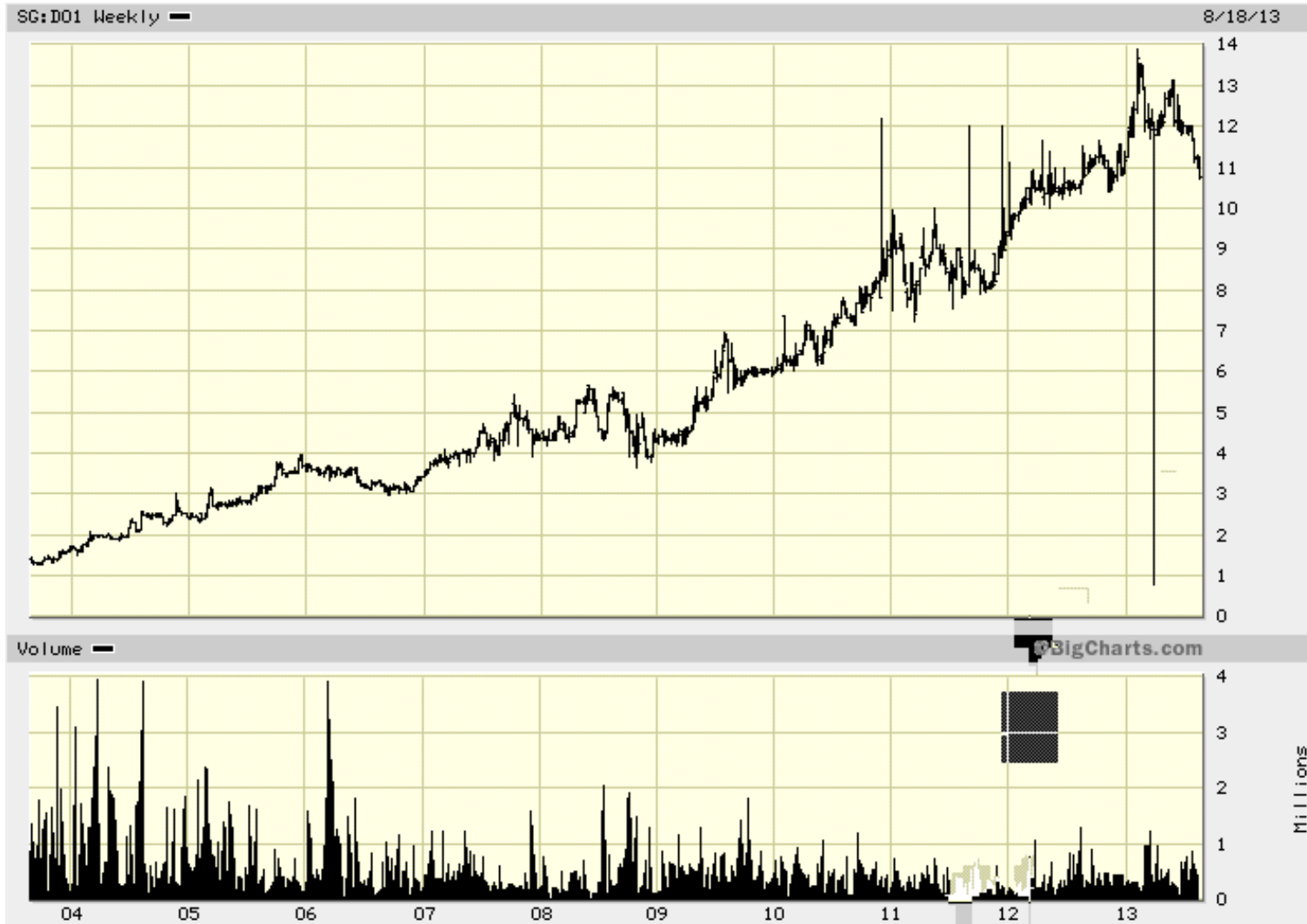


DAIRY FARM SHARE PRICE

Dairy Farm International's share price has shown reasonable growth over the past decade and the company has a current market capitalisation of US\$14.9b (or 172% of Fonterra's current market cap)

Dairy Farm International share price

US\$; SG: D01; 10 years
























← Current market capitalisation US\$14.9b

INFANT FORMULA RANGE

Cold Storage stocks 14 different Stage 2 formula items from six different global multinationals; Fann begins the value chain by spending S\$47.45 on Similac

Range of Stage 2 infant formula stocked by Cold Storage Singapore
August 2013

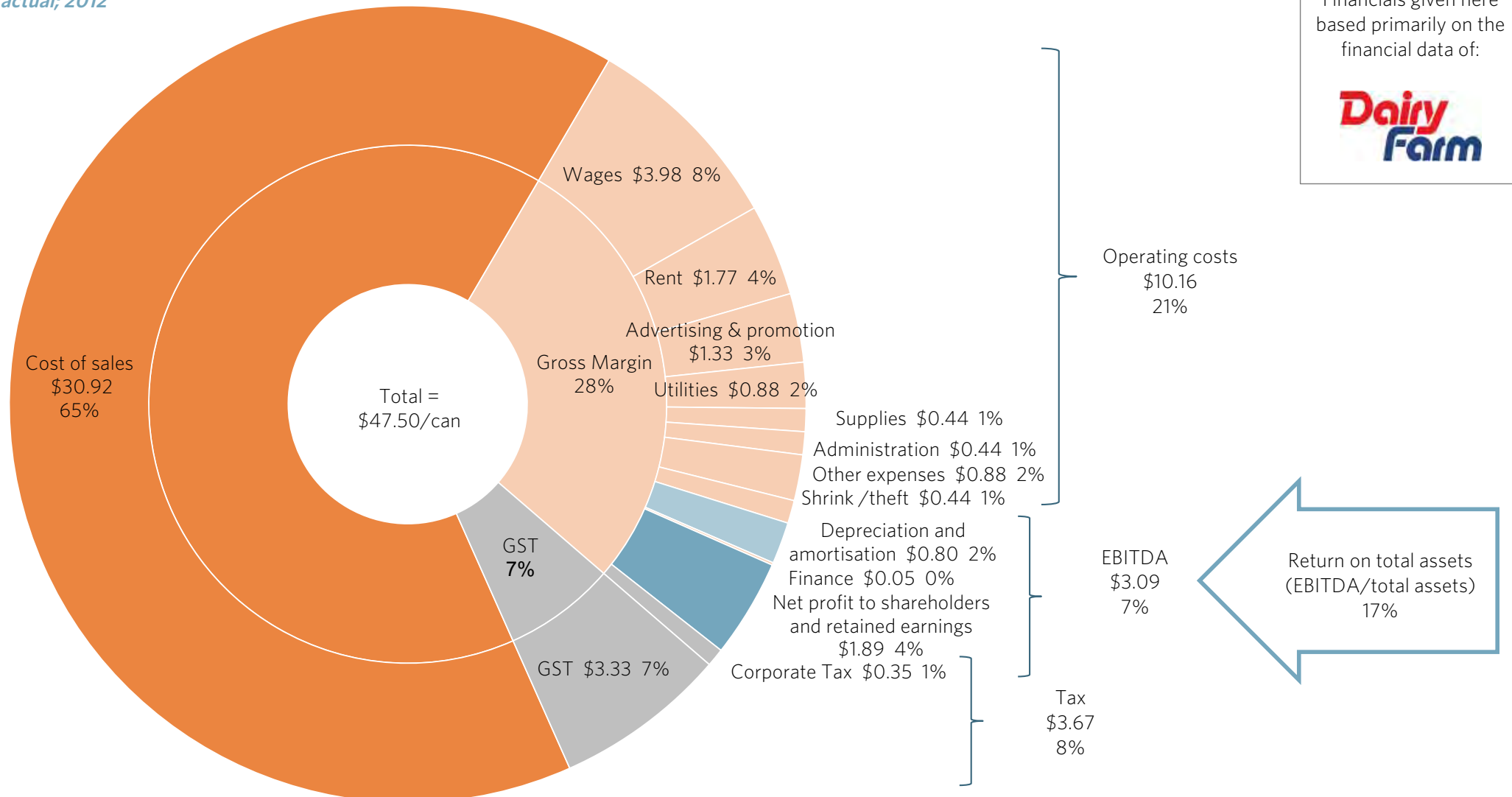
800-900g				1.6-1.8kg	800-900g			1.6-1.8kg			
 DANONE				 \$40.50	 \$40.50	 \$43.90	 \$73.90	 \$42.75	 \$41.45	 \$37.55	
			 \$46.25	 \$48.75	 \$92.25			 \$43.05	 \$82.05		
 Abbott			 \$56.10	 \$47.45	 \$89.95				 \$17.25		

MODEL SUPERMARKET COST STRUCTURE

Two thirds (65%) of the selling price goes to the supplier, one fifth (21%) goes to pay for the staff, rent, utilities and other costs; a 4% EBIT goes to shareholders and 8% goes to government

RETAILER MODEL: Estimated model of net selling price through to shareholders return of a can of infant formula sold through a Singapore supermarket

S\$; actual; 2012



MODEL COST STRUCTURE - SUPERMARKET - SOURCES & KEY ASSUMPTIONS

The model cost structure used for the retail component of a 900g can of infant formula 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"> - Dairy Farm Annual Report 2012 (Dairy Farm is #2 supermarket retailer in Singapore) - Dairy Farm website and advertising - Other Singapore 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 retail price of S\$47.50 per can leading to a S\$40.92 average annual wholesale price paid by the retailer and a retail gross margin of 28% plus 7% GST - GST of 7% applies to retail shelf price of infant formula in Singapore; ignoring GST 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 (900g infant formula can) 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 and comes out of their SG&A

The can of Similac that Fann purchased from Cold Storage supermarket was manufactured in Abbot Nutrition’s plant in Singapore, built in 2007 at a cost of US\$280m (equivalent to the total assets of Westland)

Abbott Nutrition plant in Singapore (Opened 2008)

“[Abbott’s Singapore plant] is the largest investment ever made by the company in nutritional products, as well as its first major investment in Asia and the biggest investment made by a single company in a nutritional plant in Singapore. The facility employs over 300 people.

The facility produces 45 million kilograms of powder nutritional products, including infant formula, follow-on formula and growing-up milk. It serves one million infants and children in Asia annually. The products from Abbott are shipped to China, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Taiwan, Vietnam and the Middle East...

Abbott says its decision to set up facilities in Singapore was prompted by the availability of skilled workforce, food safety and quality standards, and infrastructure such as ports. In addition, the AMS nutritional facility enables faster shipment of products to Asian countries...

The facility is completely integrated and houses extensive laboratory facilities, process control systems and enterprise planning systems. The manufacturing process at the facility involves wet processing, evaporation, spray drying, blending and packaging.

Wet processing involves mechanically removing the outer skin of the raw material. The raw material is then dried up. The spray drying process is used to produce dry powder with the help of hot gas.

[The plant] produces nutritional products for

infants and children. It manufactures Similac, Gain, Gain Plus, Grow, Grow School and PediaSure Complete. Similac is a nutritional product intended for infants aged up to six months, while Gain is for babies aged six months and older.

Gain Plus targets children aged one year and above. It is intended to help in visual as well as physical development, support the growth of brain and increase immunity. It also provides probiotics to maintain a healthy digestive system.

Grow is nutritional milk, which helps in the physical and cognitive growth of children aged three years and above. Grow School is also a milk product for children aged six and above. PediaSure is a complete nutritional product, which helps growing children aged one to ten.

The plant is located in the Tuas Biomedical Park II (TBP). TBP II is a 188ha facility located at Tuas View, 20 minutes from Jurong Port, Singapore. Situated in the west end of Singapore, TBP is a biomedical manufacturing centre that houses facilities of important world players in the biomedical field. The centre includes all the necessary amenities and infrastructure such as roads, power lines and telecommunication lines.” Food Processing Technology website, accessed Aug 2013




Key operations:	Wet processing Evaporation Spray drying Blending Packaging	Investment:	US\$280m (S\$450m)
Produced:	Infant formula Other nutritional powders	Location:	Tuas Biomedical Park 2, Singapore
Brands:	Similac Advance®, Gain®, PediaSure® and Grow®.	Floor area:	52,222 square metres
Key raw materials:	skim milk powder (100% imported) lactose oils cans cardboard packaging	Year opened:	2008
		Employment:	300+ people

ABBOTT NUTRITION - LOCATION OF PLANTS

The Singapore plant is one of 14 Abbott Nutrition manufacturing plants around the world

Location of Abbott Nutritionals plants (2012)



 New plant last five years

Abbott Nutrition's 14 manufacturing plants range in size; not all manufacturing plants produce all products

Details of Abbott Nutritional plants around the world

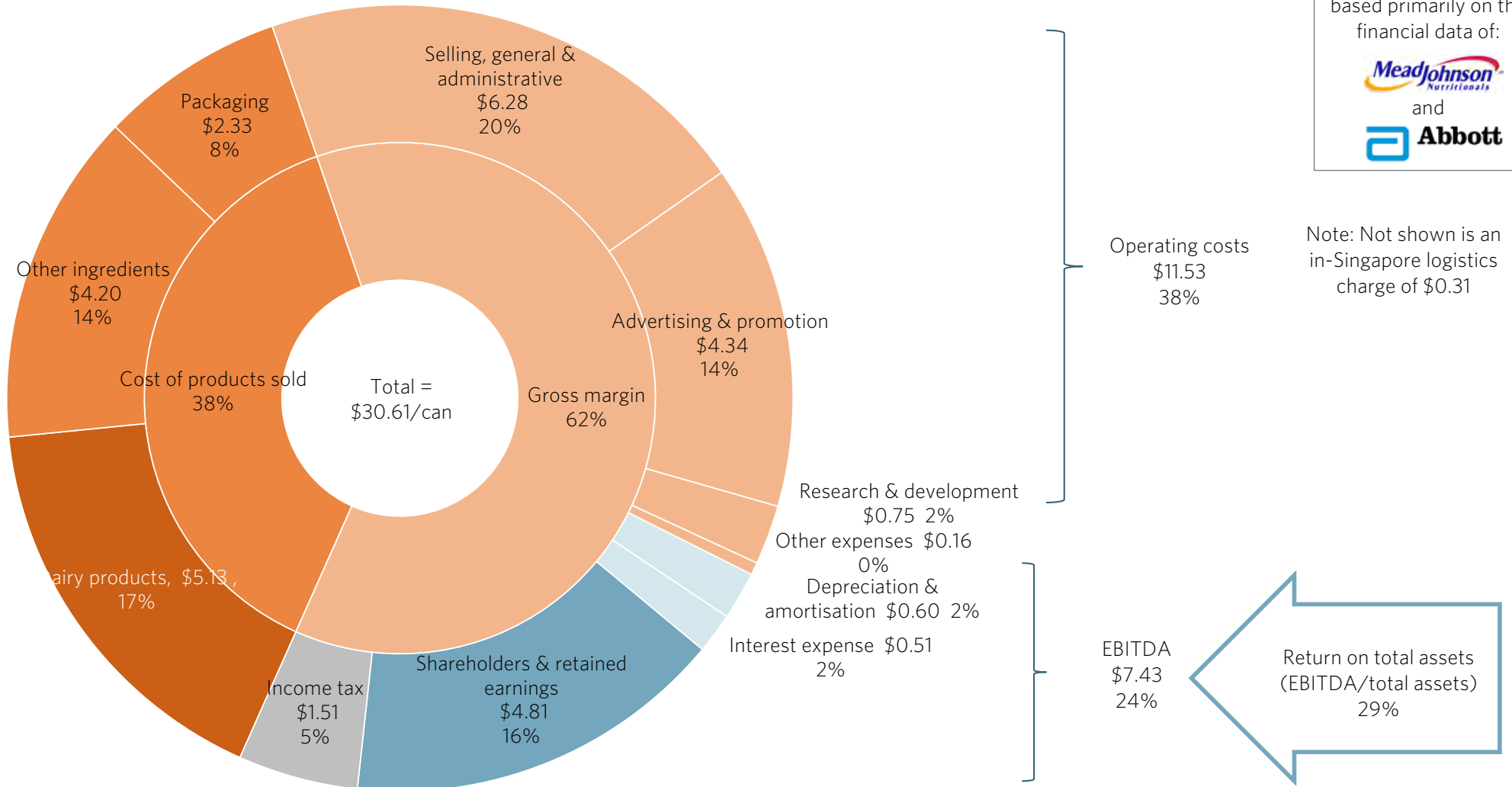
(2012 or as available)

REGION	NUTRITIONALS PLANT LOCATION	PRODUCT	# OF EMPLOYEES AT THIS LOCATION	YEAR OPENED	OTHER AVAILABLE DETAILS
North America	Altavista, Virginia	Nutritional drinks	700	N/A	
	Brockville, Canada	Infant formula	160	N/A	Strike in 2009; exports to 30 countries; being closed 2013/14
	Casa Grande, Arizona	Infant formula Nutritional drinks	425	1985	Added capacity in 2003
	Columbus, Ohio	Nutritional drinks	TBD	N/A	Location of Nutrition division HQ
	Fairfield, California	Various nutrition	200	N/A	
	Sturgis, Michigan	Various nutrition	~700	N/A	"Insect part" driven product recall in 2010; lost US\$100m
	Tipp City, Ohio	Nutritional drinks	240 when open	2014	Produce nutritional drinks for US market
Europe	Cootehill, Ireland	Infant formula	120	1975	Established 1975; Abbott's largest single IF factory
	Sligo, Ireland	Enteral (tube) feeding	TBD	1974	Established 1974
	Granada, Spain	Infant formula	TBD	[1994]	Part of 1994 acquisition of Lacto Puleva's nutrition division
	Zwolle, Netherlands	Infant formula	TBD	N/A	30+ different food products produced
Asia	Singapore	Infant formula	200+	2007	Singapore has no cows
	Guangzhou, China	Infant formula	TBD	2009	Appears to use 100% NZ milk powder
	Jiaxing, China	Infant formula	300 when open	2014	New plant to serve Northern China market

MODEL COST STRUCTURE - MANUFACTURER

About a third (38%) of the ex-factory price of a can of infant formula goes to pay for the product, a third (38%) to operating costs and a seventh (16%) to shareholders and retained earnings

MANUFACTURER MODEL: Estimated model of wholesale price (ex. local logistics) through to shareholders return of a can of infant formula sold \$*S*; actual; 2012



Financials given here based primarily on the financial data of:



and



Note: Not shown is an in-Singapore logistics charge of \$0.31

MODEL COST STRUCTURE - MANUFACTURER - SOURCES & KEY ASSUMPTIONS

The model cost structure used for the manufacturing component of a 900g can of infant formula 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"> - Mead Johnson Annual Report 2012 (Mead Johnson is the global #3 infant formula manufacturer and the only large listed pure-play multinational infant formula manufacturer (therefore its financials give the purest view of the cost structure of the industry) - Abbott 10k and Annual report 2012 (used to cross check Mead Johnson where possible) - Nestle, Danone, Mead Johnson, & Abbott websites and promotional materials - Material from other infant formula manufacturers websites and advertising; various published articles - Industry interviews; guidance from reviewers
Key assumptions	<ul style="list-style-type: none"> - The overall P&L cost structure and profitability of an infant formula manufacturer can be used to represent pro rata the cost structure of a specific item (900g can) from sales value through to shareholder return - For a large multinational producer at scale, the cost of raw materials is ~45% dairy; 37% all other ingredients and 21% packaging - 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 all manufacturers in Singapore source dairy ingredients from a range of countries (i.e. reality is more complex) - Assuming net effect of payment terms
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 Singapore 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 Singapore is assumed to be the difference between NZ FOB (\$/kg) and Singapore CIF (\$/kg)

Infant formula contains a range of ingredients designed to mimic human breast milk as closely as possible; three key ingredients are dairy based (nonfat milk powder, whey protein and lactose)

Key ingredients in infant formula

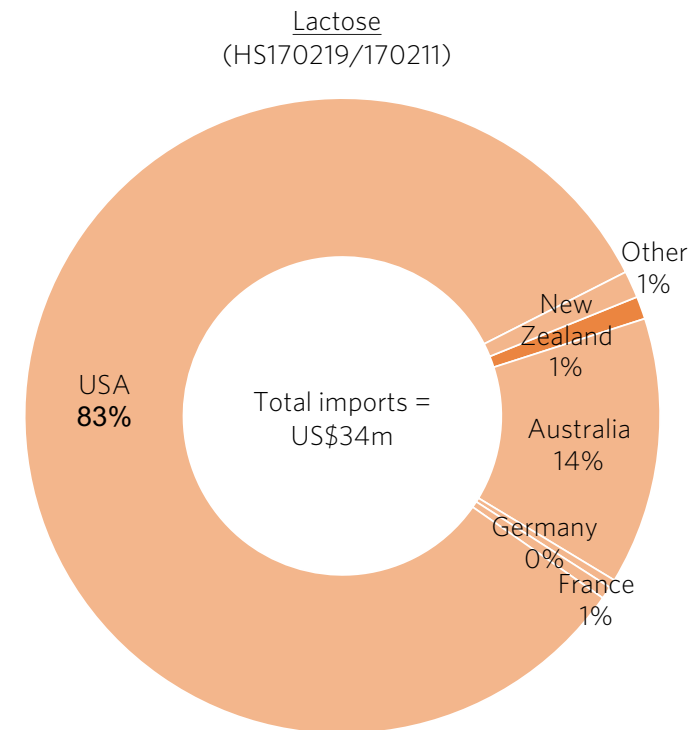
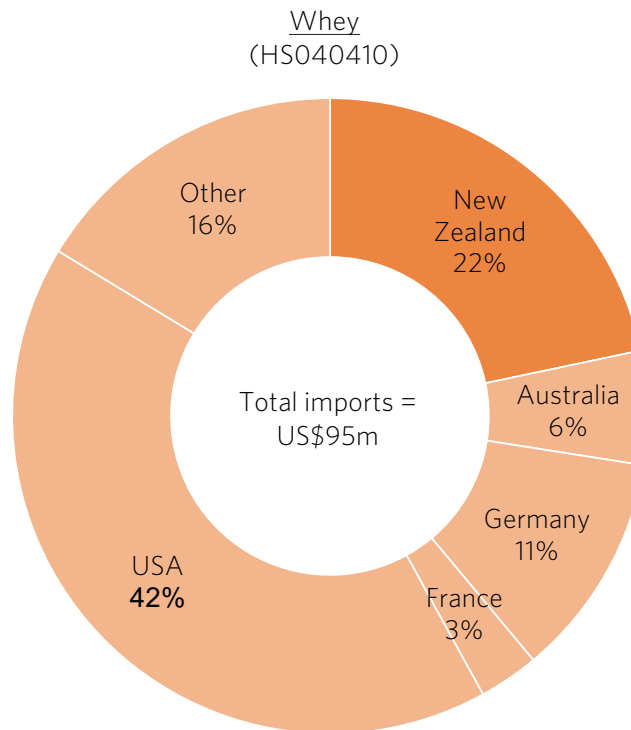
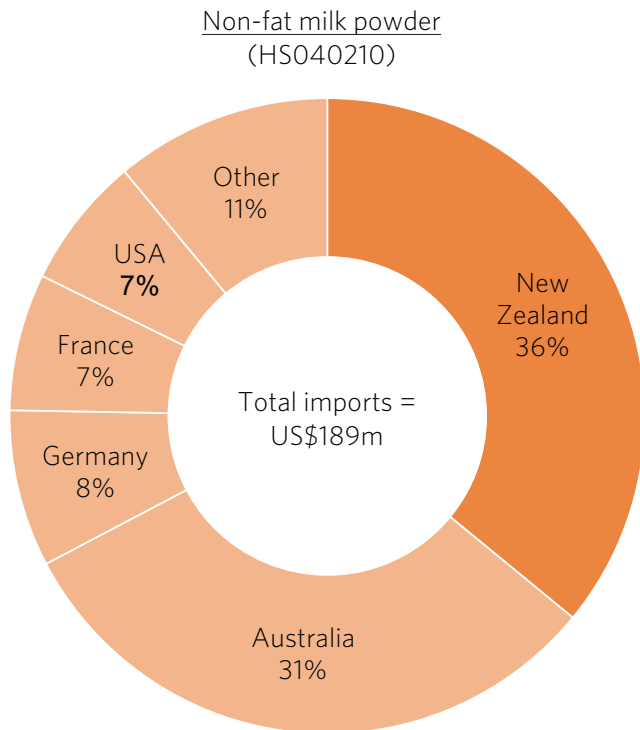
2013

INGREDIENT CATEGORY	DETAILS	KEY INGREDIENTS DAIRY	NON-DAIRY
Protein	From cow's milk that is processed to have a profile similar to human milk	Nonfat milk powder Whey protein	-
Fats	a blend of vegetable fats (including DHA/ARA) to replace bovine milk fat in order to better resemble the composition of human milk	-	High Oleic Safflower Oil Soy Oil Coconut Oil
Carbohydrate	generally lactose from cow's milk	Lactose	-
Vitamins, minerals & other	"micronutrient" pre-mix that is blended into the product to meet the specific needs of the infant at a given age	-	Galactooligosaccharides (though made from lactose), C. Cohnii Oil, M. Alpina Oil, Beta-Carotene, Lutein, Lycopene, Ascorbic Acid, Soy Lecithin, Monoglycerides, Potassium Citrate, Calcium Carbonate, Potassium Chloride, Carageenan, Ferrous Sulfate, Magnesium Chloride, Choline Chloride, Choline Bitartrate, Taurine, m-Inositol, Calcium Phosphate, Zinc Sulfate, Potassium Phosphate, d-Alpha-Tocopheryl Acetate, Niacinamide, Calcium Pantothenate, L-Carnitine, Vitamin A Palmitate, Cupric Sulfate, Thiamine Chloride Hydrochloride, Riboflavin, Pyridoxine Hydrochloride, Folic Acid, Manganese Sulfate, Phylloquinone, Biotin, Sodium Selenate, Vitamin D3, Cyanocobalamin, Salt, Potassium Hydroxide, and Nucleotides (Adenosine 5'-Monophosphate, Cytidine 5'-Monophosphate, Disodium Guanosine 5'-Monophosphate, Disodium Uridine 5'-Monophosphate), others

SOURCE OF DAIRY INGREDIENTS

Singapore sources these three key dairy ingredients from a range of developed countries; New Zealand is a major supplier, but certainly not the only supplier

Total Singapore import value of three key dairy ingredients in infant formula by source country
US\$m; 2012



[For the purposes of this value chain we are assuming that...] the dairy products used in Fann's can of infant formula 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)

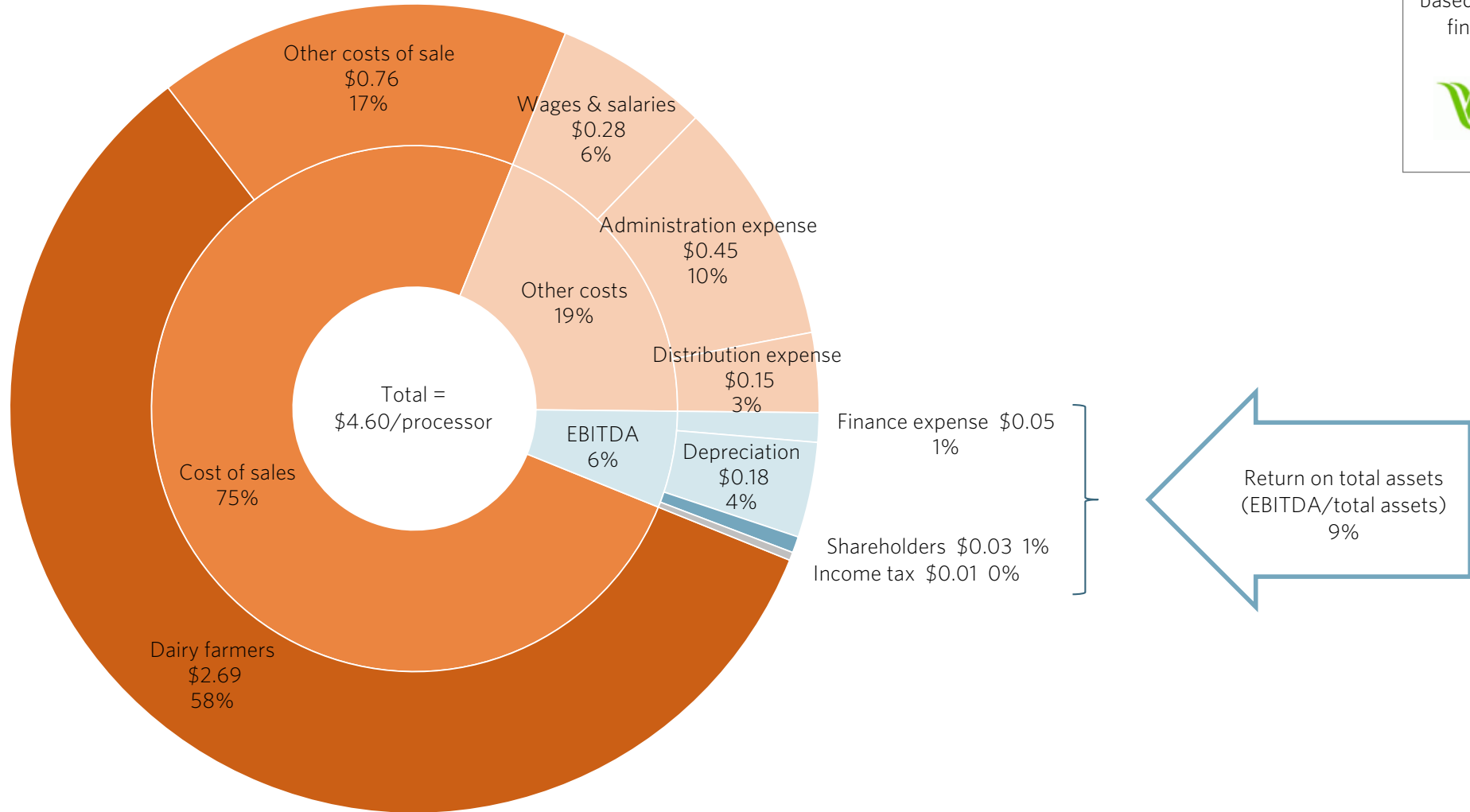
MODEL COST STRUCTURE - DAIRY PROCESSOR

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

DAIRY PROCESSOR MODEL: Estimated model of return to dairy farmer through to shareholders return on the dairy component of a can of infant formula sold

NZ\$; actual; 2012

Financials given here based primarily on the financial data of:



MODEL COST STRUCTURE - DAIRY PROCESSOR - SOURCES & KEY ASSUMPTIONS

The model cost structure used for the dairy processor component of a 900g can of infant formula 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 (IF ingredients) from sales value through to shareholder return - 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 Abbott/Singapore 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 Singapore 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)

VALUE CHAIN: 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

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 return to dairy farmer through to shareholders return on the dairy component of a can of infant formula sold NZ\$; actual; 2012

Financials given here based primarily on the financial data from:

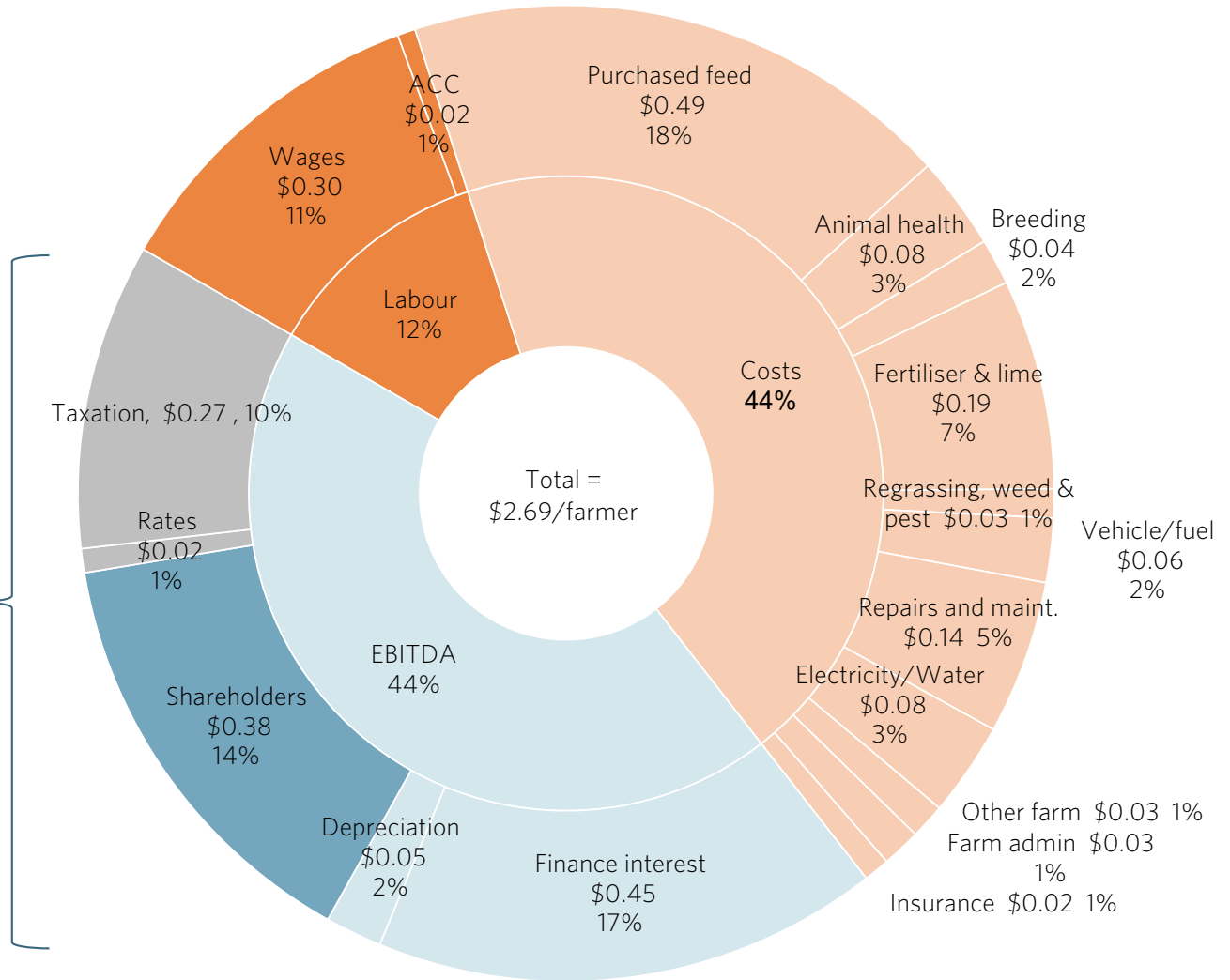
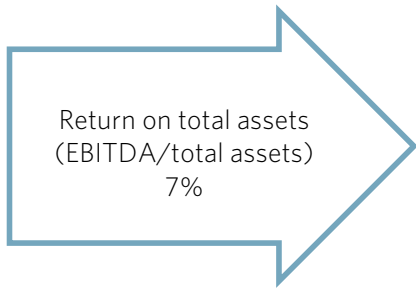


CANTERBURY DAIRY
Key results from the Ministry for Primary Industries 2012 Dairy Marketing Programme

KEY FINANCIALS

The 2012/13 season was a challenging one for Canterbury Dairy Farmers. Dairy production was down 10% on the previous year, and the price of milk was down 10% on the previous year. Canterbury Dairy Farmers received a total of \$1.2 billion for their milk production in 2012/13, which is a decrease of 10% on the previous year. Canterbury Dairy Farmers received a total of \$1.2 billion for their milk production in 2012/13, which is a decrease of 10% on the previous year.

Item	2012/13	2011/12
Total milk production (kg)	1,200,000,000	1,320,000,000
Total milk price (¢/kg)	100	110
Total milk revenue (\$)	1,200,000,000	1,452,000,000
Total cost of production (¢/kg)	100	110
Total cost of production (\$)	1,200,000,000	1,452,000,000
EBITDA (\$)	528,000,000	616,560,000
EBITDA margin (%)	44%	42%
Shareholders (\$)	380,000,000	450,000,000
Shareholders margin (%)	32%	31%
Government (\$)	148,000,000	166,560,000
Government margin (%)	12%	11%
Banks (\$)	92,000,000	99,500,000
Banks margin (%)	8%	8%



MODEL COST STRUCTURE - DAIRY FARMER - SOURCES & KEY ASSUMPTIONS

The model cost structure used for the dairy farmer component of a 900g can of infant formula was built using the following sources and assumptions

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

2012/13

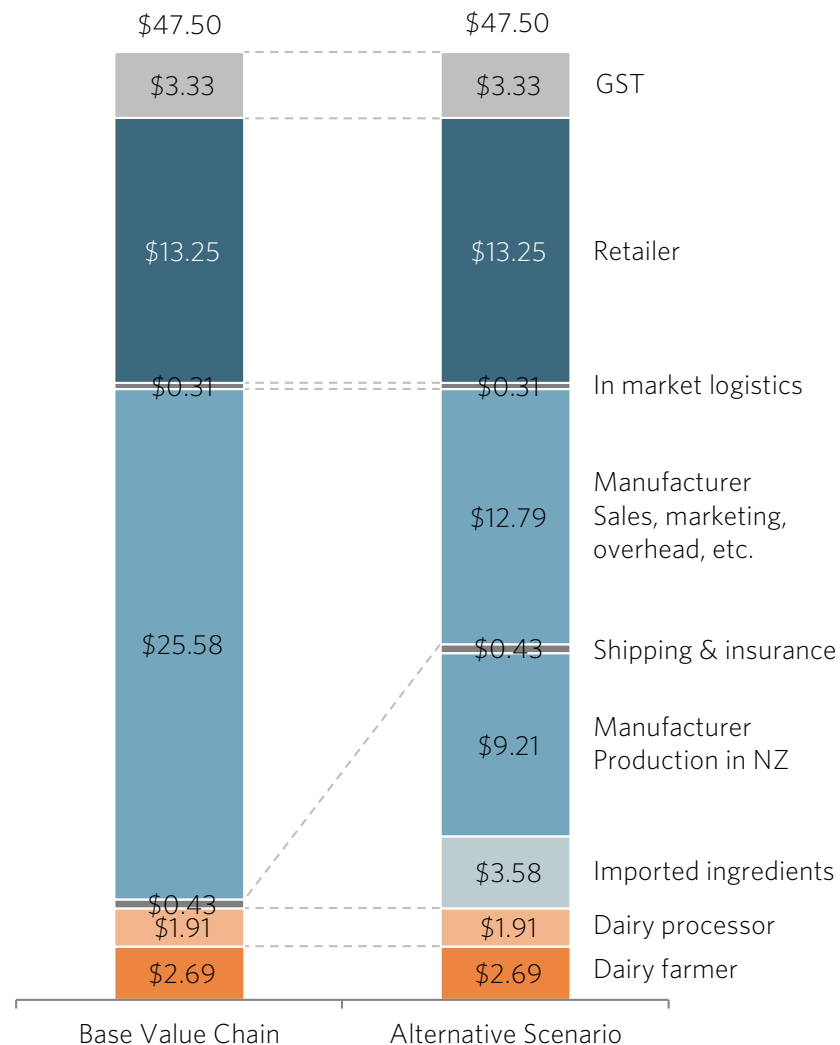
ISSUE	DETAILS
Key data source(s) used	<ul style="list-style-type: none">- New Zealand Ministry for Primary Industries (MPI) Farm Monitoring 2012 Canterbury dairy report- Checked against other New Zealand dairy regions and national- Industry interviews; guidance from reviewers
Key assumptions	<ul style="list-style-type: 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 (900g can of infant formula) from sales value through to shareholder return
Not modelled	<ul style="list-style-type: none">- Relative profitability of components of raw milk, both those that go into infant formula and those sold elsewhere- Complex item level costs
Transport from stage prior	<ul style="list-style-type: none">- None

VALUE CHAIN - ALTERNATIVE SCENARIO - MULTINATIONAL PRODUCTION IN NZ

If the multinational moved production of the infant formula to New Zealand (the alternative scenario), we project the new value chain as follows; the key change is more value added in New Zealand

Value chain of a can of infant formula through to farm gate value in New Zealand: base and alternative scenario

NZ\$; actual; 2012



ALTERNATIVE SCENARIO: MULTINATIONAL MOVES PRODUCTION TO NEW ZEALAND	
Concept	- Global multinational moves some of its global production of infant formula to New Zealand by building a plant in the country
What changes?	- Location of production
What stays the same?	- Same manufacturer - Same retail price
Outcomes for New Zealand	- Investment in a new infant formula factory (US\$250-300m) - Imports of non-dairy IF ingredients increase - Exports of infant formula increase
Arguments for	- Reduce double shipping - Potential to label "product of New Zealand"
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	- Treating freight as a wash (higher volume from NZ offset by no double shipping from Singapore onward to other markets) - Roughly 50% of manufacturer costs stays in NZ (materials plus half of SGA); not factored for increased imports - All ingredients other than dairy are imported

EVERY MOTHER
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Daily Mail

Grand Yearling Competition
 Daily Circulation Five Times as Large as That of Any Other London Morning Journal

WEDNESDAY, MAY 17, 1922. LONDON. SATURDAY. P.M. 1922. 105 BARTHOLOMEW.

"The Food that Builds Bonnie Babies."

GLAXO

Here are its six prominent points.

1. Glaxo contains no starch nor any fermentable substances.
2. Glaxo is easily and quickly digested by the youngest baby.
3. Glaxo is prepared with hot water—it requires no milk.
4. Glaxo contains 25 per cent. of fat.
5. Glaxo will keep indefinitely.
6. Glaxo is inexpensive and economical.



Baby's First Year.

The first twelve months of your baby's life are of vital importance, because they build the foundation of your child's future health. Health depends, principally, upon proper food. Presently all the life that a baby suffers from are caused by indigestion feeding. Feed your child properly and he will sleep soundly—thrive rapidly—reach early and be protected from the many troublesome ailments of infancy, and still will be saved the hardship and expense and anxieties which too often attend the first few months of a baby's life.

GLAXO is easily digested.

GLAXO contains no starch, sugar, beer, salt, lye, nor any fermentable substances. Instead of these you get the purest cream and a baby's delicate digestive organs. Lactation is the most indispensable of all food constituents. It is difficult to digest, because it is a heavy, bulky mass in the baby's stomach. The amount of lactation that a baby can assimilate is limited. The excess is excreted in the form of indigestion, which is the cause of the troubles that afflict the young infant. Your baby's stomach is unable to digest the milk. GLAXO, however, contains a substance which is easily digested. It is a natural product of the cow's milk, and is the only substance that can be added to the mother's milk, thus allowing the mother to breast-feed her baby, and at the same time to give him the best of both worlds.

GLAXO is recommended by prominent physicians.

GLAXO is recommended by prominent physicians because it is the only food that is easily digested by the youngest baby. It is the only food that contains no starch, sugar, beer, salt, lye, nor any fermentable substances. It is the only food that is prepared with hot water—it requires no milk. It is the only food that contains 25 per cent. of fat. It is the only food that will keep indefinitely. It is the only food that is inexpensive and economical.

GLAXO is a complete food.

The complete nutrition of a baby is essential for his health. GLAXO is a complete food because it contains all the elements necessary for the growth and development of a baby. It is the only food that contains no starch, sugar, beer, salt, lye, nor any fermentable substances. It is the only food that is prepared with hot water—it requires no milk. It is the only food that contains 25 per cent. of fat. It is the only food that will keep indefinitely. It is the only food that is inexpensive and economical.

GLAXO contains 25% of fat.

Most babies make an excellent use of the GLAXO contains 25% of fat. It is the only food that contains no starch, sugar, beer, salt, lye, nor any fermentable substances. It is the only food that is prepared with hot water—it requires no milk. It is the only food that contains 25 per cent. of fat. It is the only food that will keep indefinitely. It is the only food that is inexpensive and economical.

GLAXO is sold by all Chemists and Grocers at 1/3 and 2/3 per tin.



A LIBERAL SAMPLE.

A liberal sample tin of GLAXO—enough to do baby good—sent with our booklet entitled "BABY'S HEALTH, AND HOW TO ENSURE IT," will be sent you free on receipt of three penny stamps. Write today to

The GLAXO CO., 55, Gracechurch St., London, E.C.

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