

SECTOR BRIEFING

number **52**

DBS Asian Insights

DBS Group Research • November 2017

China Dairy

Downstream is Key



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How Much Dairy Is China Consuming?

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Dairy Supply Chain and Sustainability

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Executive Summary

Yogurt sales leading growth

According to Euromonitor, China's dairy sales, inclusive of alternative milk, could post a healthy 5.3% compound annual growth rate (CAGR) in 2016-2021F, driven by rising yogurt demand (15.6% CAGR). Ultra-high temperature (UHT) yogurt, in particular, should post the fastest CAGR of over 20%, as many Chinese consumers are lactose intolerant and avoid milk. This category does not need to be stored at low temperatures, allowing it to swiftly expand into more remote areas across China. Other products like cheese, butter and plant-based milk (e.g. walnut milk, coconut milk, soy milk, etc.) also see increasing customer demand. Some players are also looking for new opportunities to tap the high-end segment, e.g. organic products, goat milk, etc.

Mergers & acquisitions

As households' purchasing power continues to improve and Mainland Chinese travel more, consumers are trading up and demanding better quality and variety, including an increasing number of imported products. Diversification strategies on products, brands and distribution channels, as well as gradual premiumisation will be required to cater to changing consumer behaviour. As a classic example, Nestlé has evolved over time, from initially selling infant and dairy products to also offering ice-cream, beverages, nutritional products, pet foods, confectionery, etc., through M&As. It has also seen its share price surge over 14 times in the last 30 years, reaffirming the strong potential of well-executed acquisitions. As non-dairy companies continue to enter the dairy and plant-based segments – an example is soft-drink leader Coca-Cola, tapping the US premium milk category through a joint venture with Fairlife to produce milk with higher protein and no lactose, and spending US\$575m on Unilever's AdeS soy brand in Latin America – Chinese dairy groups should also speed up M&As to lift product quality and variety.

Upstream faces pressure

Since the 2008 melamine scandal, China's dairy supply chain has been heavily scrutinised and hampered by stringent government policies. While significant improvement has been made along the supply chain, we believe there is further room for enhancement especially in food safety and cost competitiveness. Specifically, upstream players' profitability is determined by raw milk prices, feed costs, productivity and overall efficiency. With a growing supply of low-price imported milk powder, it seems difficult to see an inflection point in China's upstream sector. Further support by the downstream brand operators in the form of guaranteed volume commitment, capital investment or financial support may be required to help sustain upstream profitability.

Downstream's catalysts

The downstream segment has seen strong top line and earnings growth, supported by rising dairy consumption per capita thanks to consumers trading up and population growth. In terms of product category, yogurt (UHT yogurt, probiotic beverages), cheese

and butter should continue to see double-digit CAGRs in the range of 10.2-15.6% for 2016 to 2021F (source: Euromonitor), which should offset softening sales in basic UHT milk and flavoured milk beverages. While around a 50% y-o-y rise in the prices of whole-milk powder (WMP) as well as increases in sugar and packaging costs could lay pressure on gross margins, a cut in advertising and promotional spending post-2016 Olympics should offset rising raw material costs.

Infant milk formula

The IMF segment has been affected by more stringent regulations and players need to meet registration requirements before 2018. Volume growth should resume this year on the back of the revised tax regime for purchases via cross-border e-commerce. Euromonitor also projects the IMF segment to grow at a 6% CAGR in 2016 to 2021F, along with relaxation of the One-Child Policy and rising demand for higher quality brands. The Development Plan for China Milk Industry (2016-2020) promotes market consolidation, targeting for over 80% of domestic IMF sales to come from the top 10 players in China by 2020. Better performance could be achievable by large players as the market firms up. ❌

How Much Dairy Is China Consuming?

On a per-capita basis, dairy consumption in China is estimated at 26.2kg in 2016 (OECD data), growing at a CAGR of 2% since 2010. Consumption remains low compared to both Western and neighbouring countries. It is expected that dairy consumption per capita in China will expand to 33.2kg by 2025F, which will be roughly equivalent to Taiwan's current consumption per capita.

Diagram 1. China – dairy consumption per capita

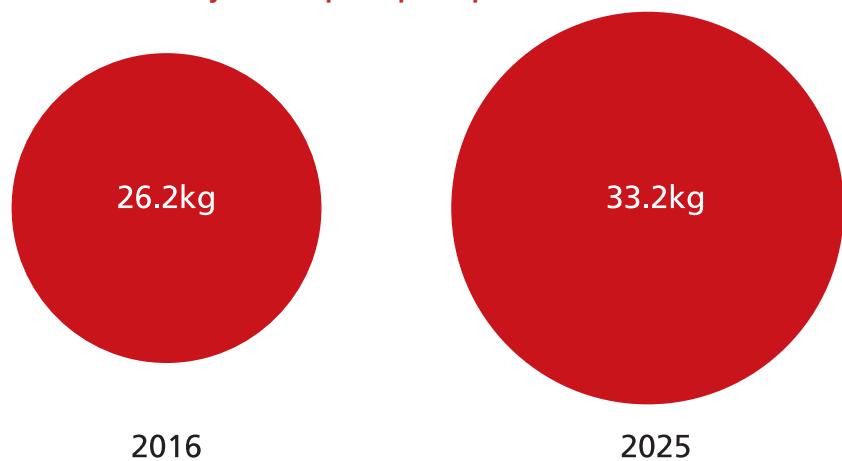
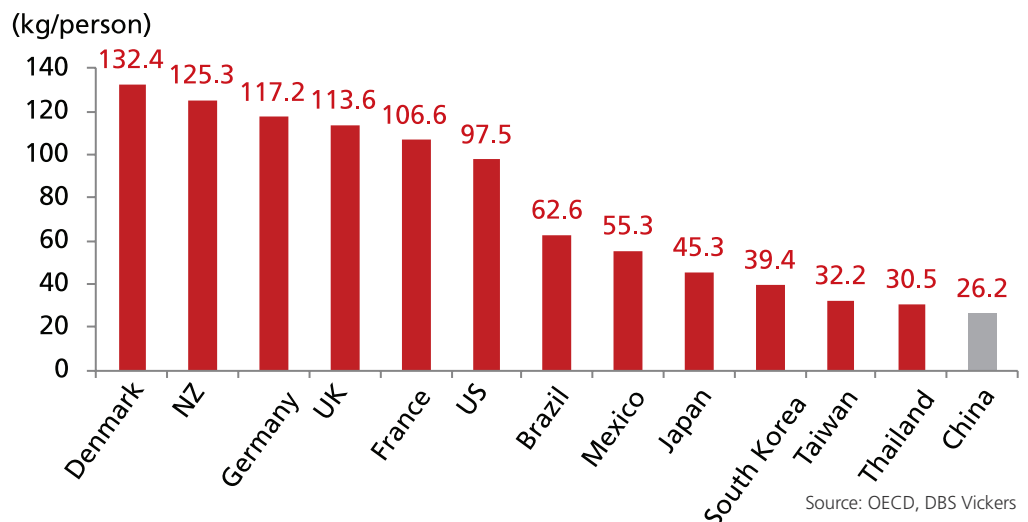


Diagram 2. Dairy consumption per capita by country (2016)

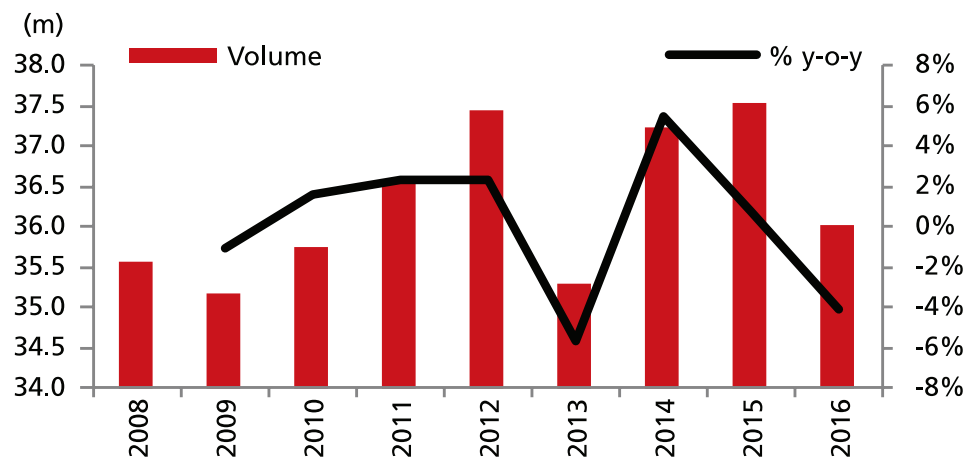
Source: OECD, DBS Vickers



Domestic Production Is Declining...

At present, China is the fourth-largest dairy producer globally after the US, the EU-28, and India. Nevertheless, raw milk production declined at a CAGR of 1.7% in 2014 to 2016 on the back of a surge in imports. In 2016, China's production declined 4.1% y-o-y to 36m tonnes. In terms of dairy-related products, production grew at a CAGR of 3% y-o-y to 38.7m tonnes.

Diagram 3. China - raw milk production



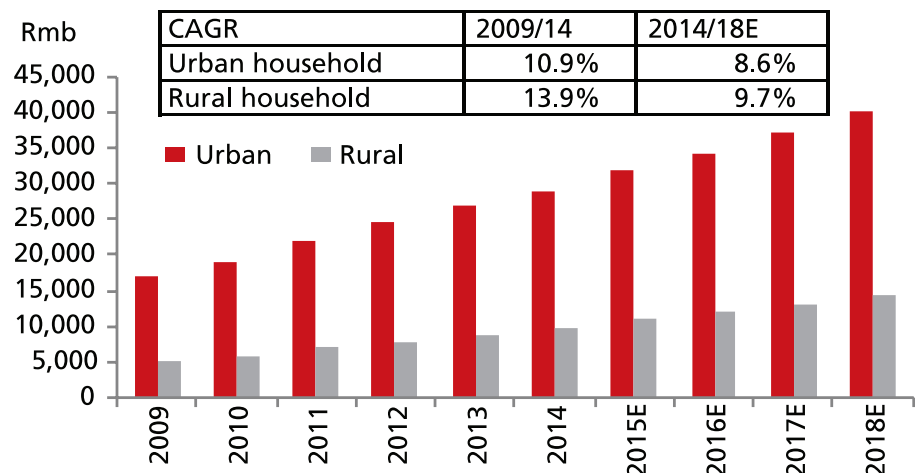
Source: NBS, DBS Vickers

...But Consumption Remains on the Growth Track

What is driving demand?

A growing population, rising disposable income, an expanding middle class and urbanisation are among the key reasons behind dairy demand in China. We expect the relaxation of the One-Child policy to also bode well for the dairy sector.

Diagram 4. Urban vs. rural household disposable income



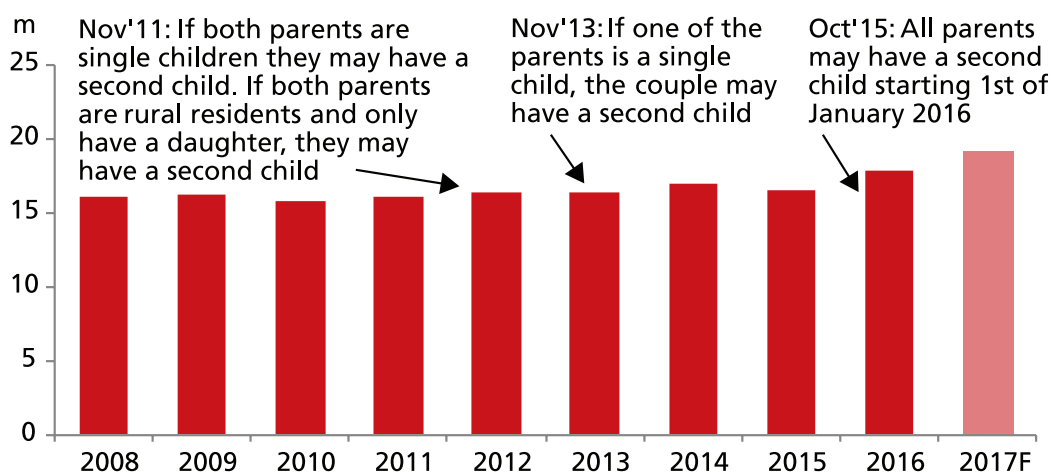
Source: Frost & Sullivan, DBS Vickers

Two-Child Policy

Since the relaxation of the One-Child Policy in October 2015, there were an additional 1.31m births in 2016 versus a year earlier. While the 17.86m babies born just missed the original target of 18m births for 2016, the impact on demand for infant milk formula should be positive.

Based on our estimates, we predict around a 7% net increase in birth rates for 2017F, supported by organic growth of 0.5% y-o-y and the relaxation of the One-Child Policy.

Diagram 5. Birth rates

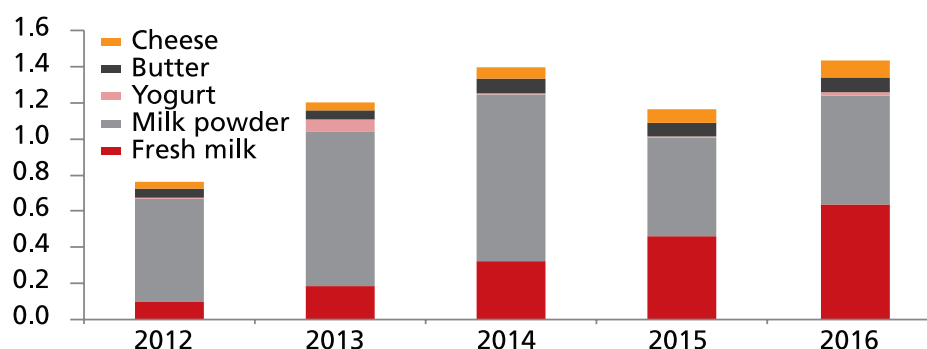


Source: NBS, DBS Vickers

Dairy Imports Also on the Rise

Dairy imports have been growing at a phenomenal rate in China. They come in various formats including liquid milk, fresh milk, milk powder, yogurt, butter and cheese. While milk powder accounted for the largest proportion of consumption last year, the fastest growing categories (by volume) were yogurt (103% y-o-y), liquid milk (39% y-o-y), cheese (29% y-o-y), and butter (15% y-o-y).

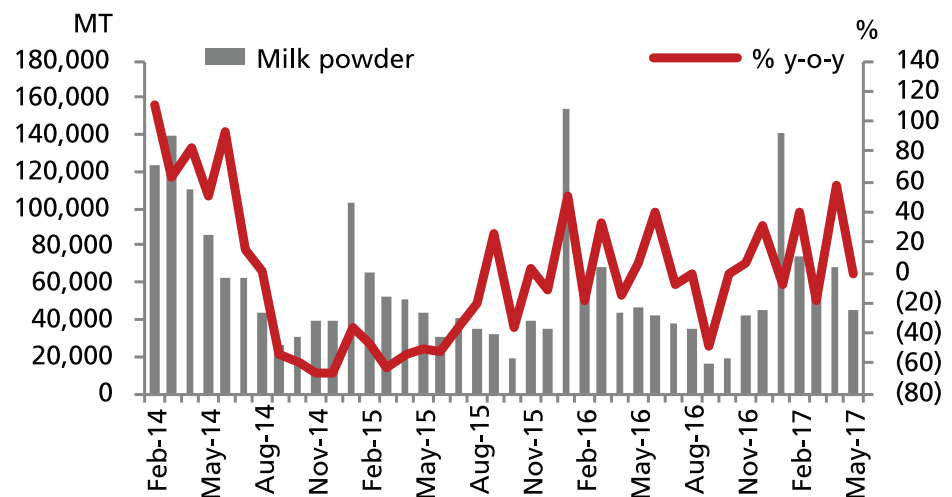
Diagram 6. Import volume – dairy products



Source: China Customs, DBS Vickers

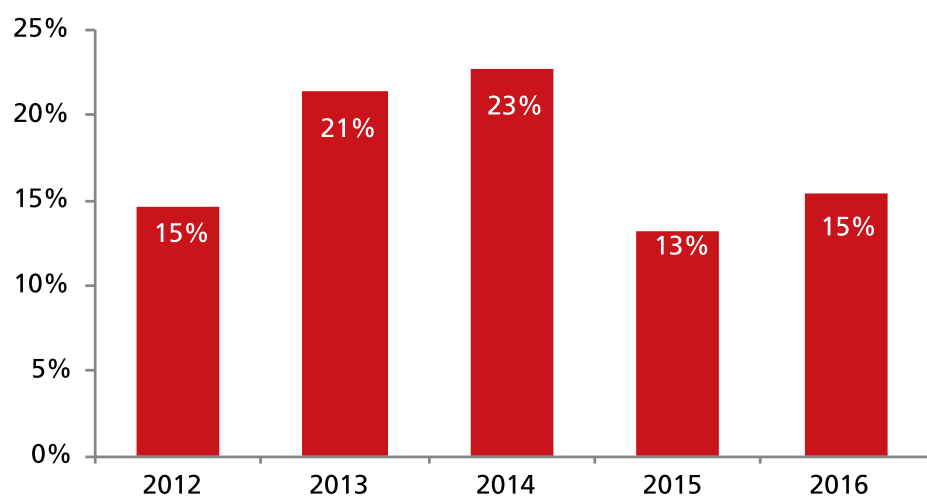
Based on our conversation with dairy processors, milk powder can be conveniently converted into UHT milk (reconstituted), milk beverages, yogurt, and ice cream. Based on USDA publications, whole milk powder (WMP) is typically used for infant formula (25% of total share), fluid milk (30%), milk beverage (20%) and bakery products (25%). In 2013 to 2014, due to the fear of a milk powder shortage, dairy imports as a percentage of domestic production surged to 21-23%, and thereafter normalised to 13-15% in 2015 to 2016. We expect dairy imports could see further room to stage proportionate expansion.

Diagram 7. Import volume – milk powder



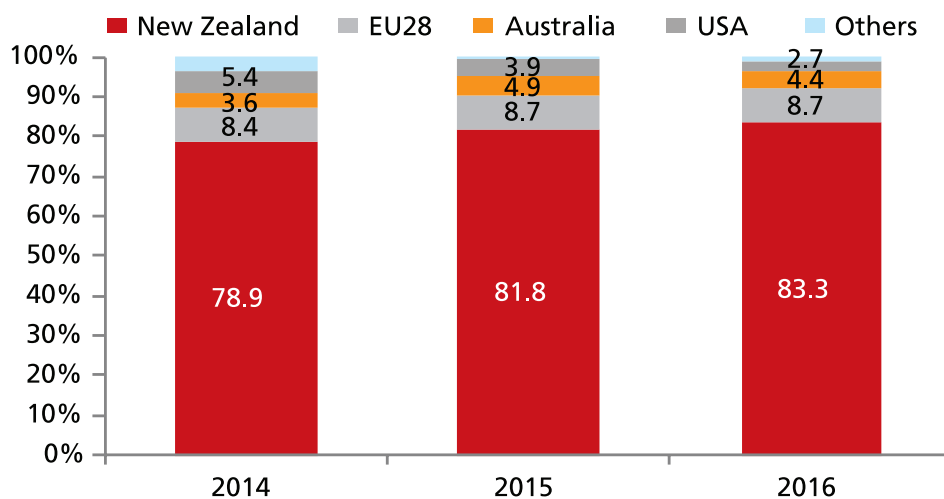
Source: China Customs, DBS Vickers

Diagram 8. Imported milk powder vs. China's dairy production volume



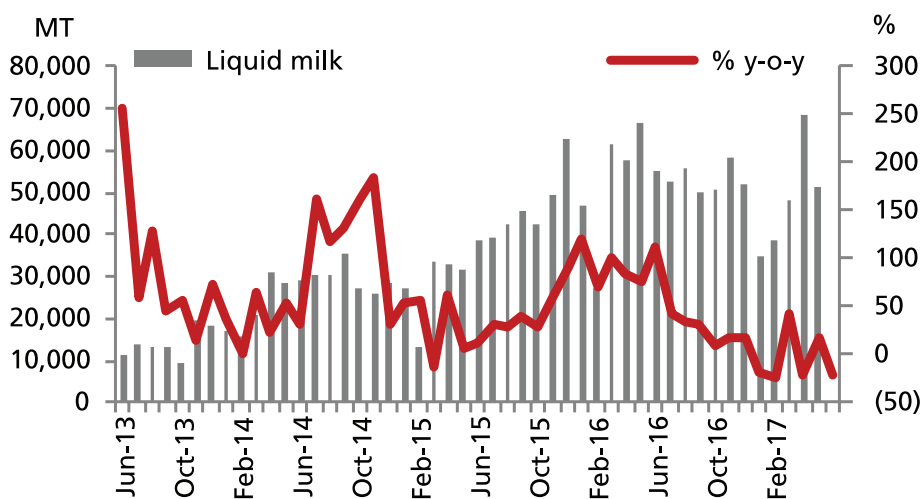
Source: China Customs, DBS Vickers

Diagram 9. Imported milk powder breakdown % (by origin)



Source: China Customs, DBS Vickers

Diagram 10. Import volume – liquid milk



Source: China Customs, DBS Vickers

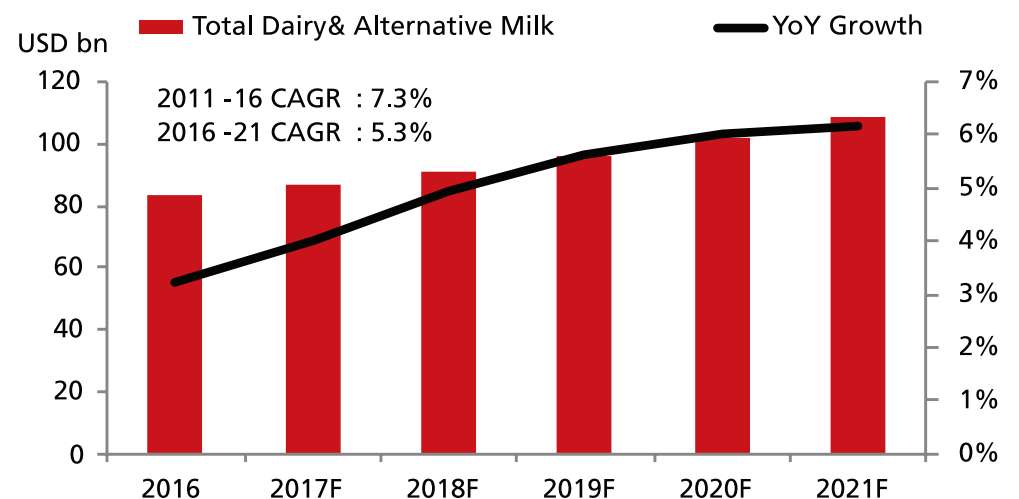
Trends and Opportunities

Factors Behind Rising Demand

Lactose intolerance China's dairy sales, inclusive of alternative milk, are projected to achieve a healthy 5.3% CAGR in 2016 to 2021F. Nevertheless, not all types of dairy products are as popular as the others.

The National Institutes of Health estimated that around 65% of all humans have lactose intolerance and are unable to digest milk products, the consumption of which could lead to gas, bloating, lower belly pain, vomiting and/or diarrhoea. The rates of lactose intolerance vary between different countries, from less than 10% in northern Europe to around 95% in certain parts of Asia (including China) and Africa (source: NIDDK).

Diagram 11. China's dairy market



Source: Euromonitor

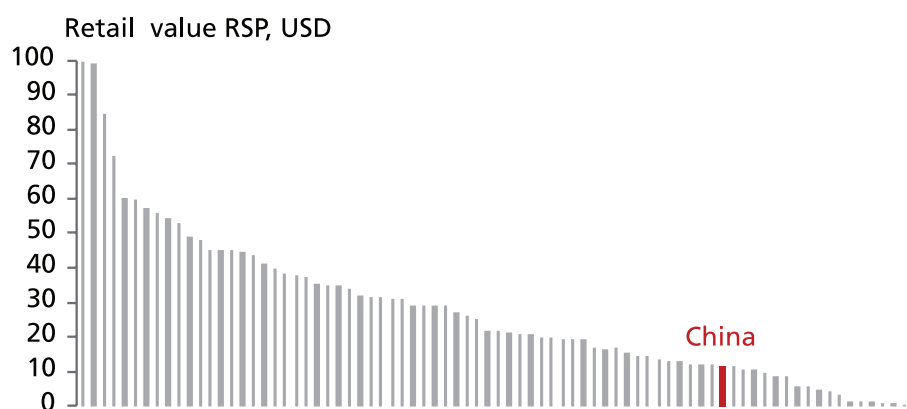
China's dairy sales, inclusive of alternative milk, are projected to achieve a healthy 5.3% CAGR from 2016 to 2021F

Meanwhile, there are a few types of dairy products that have minimal effects on consumers with lactose intolerance. They include aged cheese (e.g. cheddar, parmesan, etc.), butter, as well as yogurt (probiotic or full-fat yogurt). Others like plant-based milk such as walnut milk, coconut milk, soy milk, etc. could also be alternatives. Hence, there is increasing customer preference for these products in China.

Sound demand for yogurt

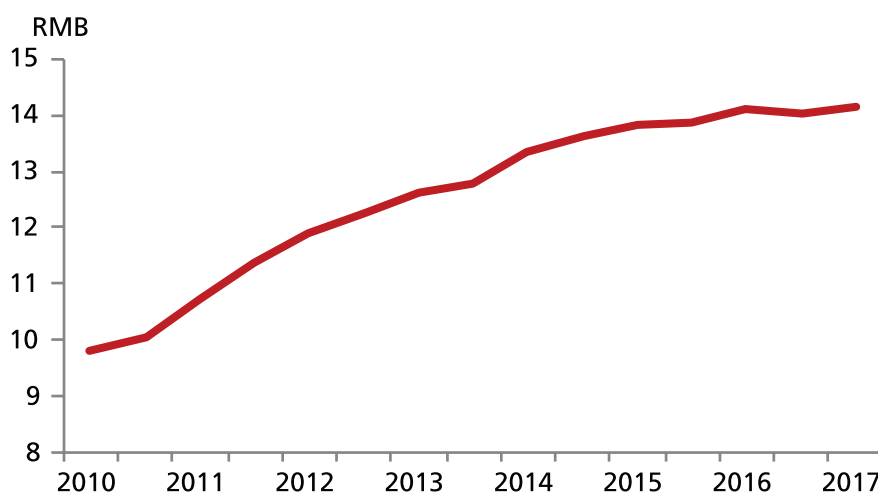
At present, the penetration rate of yogurt products in China in terms of per-capita consumption remains low. As demand increases further and household affordability also improves, the average selling price (ASP) of yogurt could also see room to increase ahead, as seen from a fairly steady ASP increase since 2010, equivalent to over a 5% CAGR.

Diagram 12. Yogurt consumption per capita (2016)



Source: Euromonitor

Diagram 13. Average selling price of yogurt in China (RMB/kg)



Source: Wind

Looking at the key growth segments across China dairy (and alternative milk), Euromonitor projects both cheese and yogurt will see the strongest demand, staging the fastest growth of 15.6% and 14.1% CAGR, respectively, in 2016 to 2021F. These are followed by a 10.2% CAGR for butter and margarine.

In terms of market share, yogurt products could see the most gain of 16 percentage points in 2011 to 2021F, to attain a 27.5% share of China's dairy market by 2021F. The expansion mainly comes at the expense of flavoured milk drinks that could see around a 14-percentage-point squeeze in market share, to 5.3% by 2021F.

Falling out of favour

As Chinese consumers become increasingly health-conscious, it is believed that the negative health perception of flavoured milk drinks (e.g. higher sugar levels) and their more mature product profile have caused consecutive annual sales to decline, down by 14.3% y-o-y in 2015 and 12.4% in 2016 for the segment. Flavoured milk drinks are expected to post further sales declines of 11.7% (CAGR) in 2016 to 2021F.

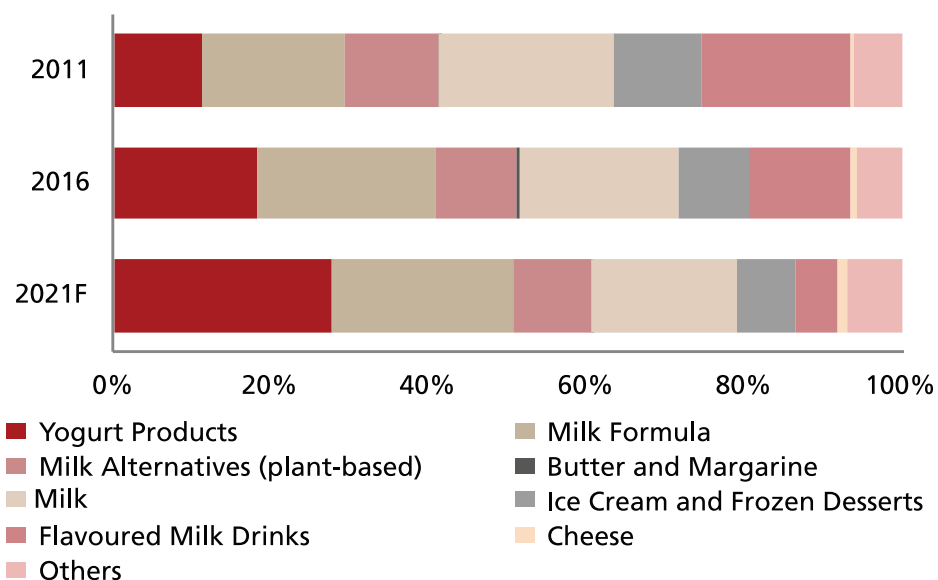
Diagram 14. Segmental CAGR in China

	CAGR (2011-2016)	CAGR (2016-21F)
Cheese	20.8%	15.6%
Yogurt Products	18.4%	14.1%
Butter and Margarine	9.3%	10.2%
Milk Formula	12.1%	6.0%
Milk Alternatives (plant-based)	4.6%	3.9%
Milk	5.6%	3.5%
Ice Cream and Frozen Desserts	2.1%	2.0%
Flavoured Milk Drinks	-0.9%	-11.7%
Total dairy & alternative milk	7.3%	5.3%

Source: Euromonitor

In terms of market share, yogurt products could see the most gain of 16 percentage points in 2011 to 2021F, to attain a 27.5% share of China's dairy market by 2021F

Diagram 15. China dairy - market share breakdown (2011-2021F)

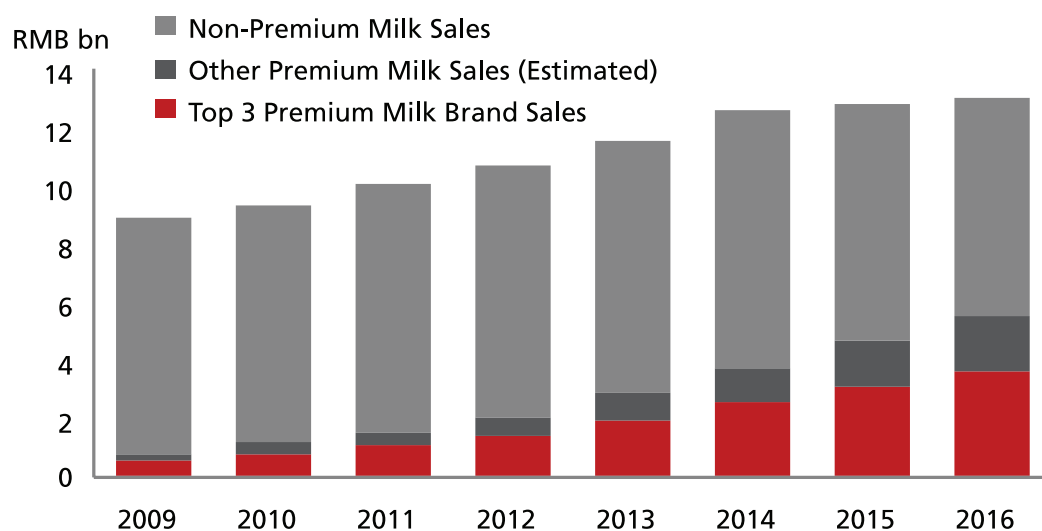


Source: Euromonitor

Trading up Another trend we see in China is the rising number of customers that are willing to pay slightly more in return for food and beverage products with better quality. This is particularly the case given lingering food safety concerns in the China market.

For example, the top three premium UHT milk products in China sustained double-digit CAGR in sales in 2010 to 2016, versus mid-single-digit sales CAGR for UHT milk.

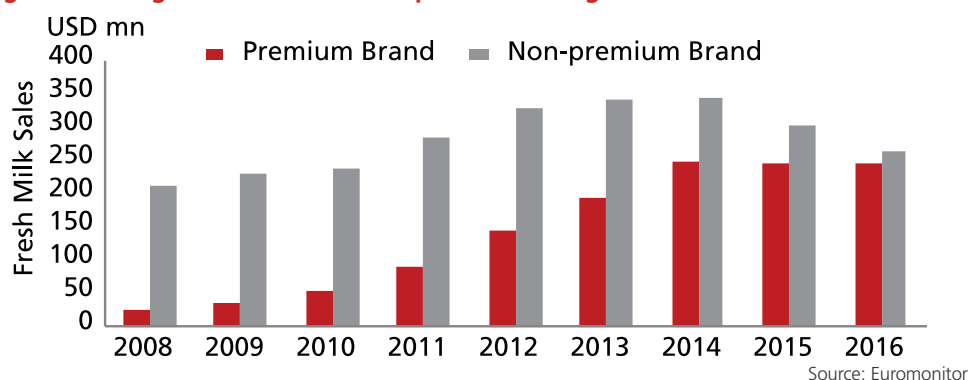
Diagram 16. UHT Milk - premiumisation trend in China



Source: Euromonitor

Another example could be fresh milk products, as there is also a rising demand for wholesome foodstuff in China, and fresh milk is closer to the natural form. Premium products in this category have also seen better demand.

Diagram 17. Bright: Premium brands posted faster growth



Fresh milk At present, Bright is the leading player in the fresh milk segment. Its own “Bright” brand and “U Best” brand took up market share of 7% and 5.9%, respectively, in 2016, adding up to a total 12.9% share.

Certain entry barriers exist though, which include the upstream support in terms of raw milk sources and quality, plus cold chain logistics infrastructure. All these could result in the top fresh milk players still mainly comprising of domestic operators. With the increase in consumer awareness on the nutritive value of fresh milk and gradually improving cold chain logistics, more of such products from domestic suppliers as well as imported fresh milk could be demanded in China.

Diagram 18. China: Top 10 brands in fresh milk

Top 10 Brand Name	Company Name	Market Share
Bright Dairy		12.9
Bright	Bright Food (Group) Co Ltd	7.0
U Best	Bright Food (Group) Co Ltd	5.9
Sanyuan	Beijing San Yuan Foods Co Ltd	10.3
Weigang	Nanjing Dairy (Group) Co Ltd	5.3
Jia Bao	Jiabao Group Co	4.2
Huangshi	Guangxi Royal Dairy Co Ltd	3.3
Chenguang	Shenzhen Guangming Group Co Ltd	1.8
Flower Lounge	Canton American Flower Lounge Livestock Co Ltd	1.8
Huaxi	Sichuan New Hope Agribusiness Co Ltd	1.3
Yinqiao	China Dairy Group Ltd	1.2
	Top 10	29.2

Source: Euromonitor

Diversification on Multiple Fronts

Product diversification

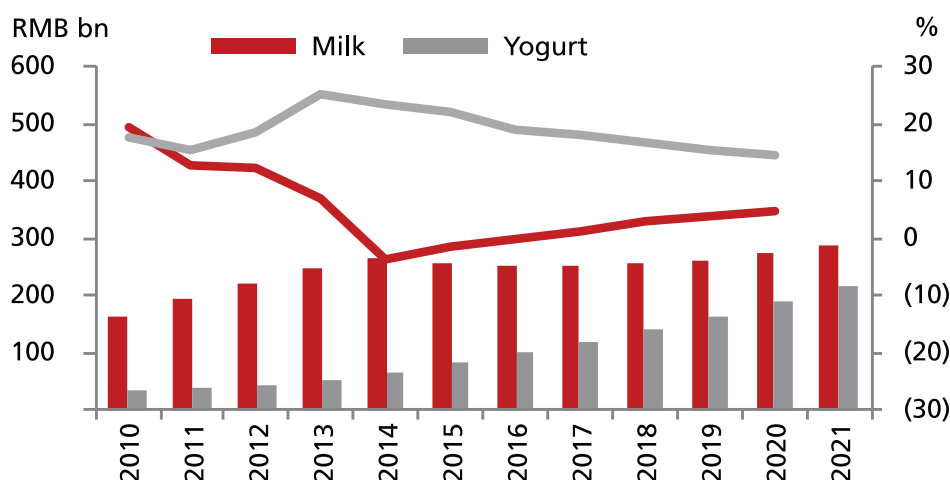
Following the milk scandal in 2008 plus the rising variety of product offerings over the years, it was not until the past one or two years that the liquid milk segment started to resume mild growth in China. With its matured product portfolio and ongoing lactose impacts, it is wise for dairy companies to focus more on faster growth categories, such as yogurt (14.1% CAGR in 2016 to 2021F).

Specifically, among all yogurt products, plain yogurt that largely consists of ambient (UHT) yogurt product currently has a lower base, potentially posting 21% CAGR in 2016 to 2021F and taking up a majority of the yogurt market in China (source: Euromonitor).

In China, there is a rising number of consumers eating yogurt products at breakfast, or starting to use them in salad dressings. UHT yogurt, in particular, does not need to be stored at lower temperatures so consumers can carry it around easily. It can also expand to be sold in more remote areas given that it does not require cold chain transportation or storage.

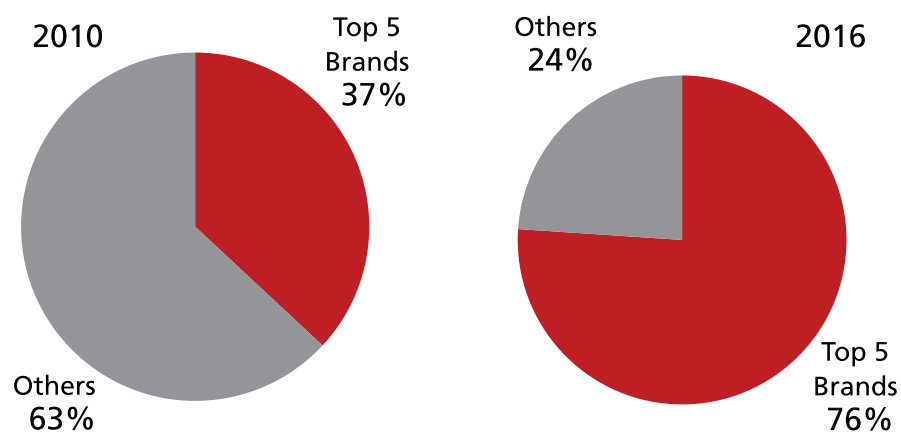
Over the past six years, the market share of the top five plain yogurt brands had also more than doubled from 37% in 2010 to 76% in 2016. (Source: Euromonitor) These top brands are all dominated by the largest domestic players of Yili, Mengniu, and Bright. In terms of last year's ranking, the number one player was Yili's "Ambrosial", with Mengniu's own brand in second place and Bright's "Momchilovtsi" in third place. The fourth-place brand was Yili's own brand, and fifth-place was Bright's "AB100 (Jian Neng)".

Diagram 19. More attractive growth of yogurt vs. liquid milk



Source: Euromonitor

Diagram 20. Market share of top five plain yogurt brands in China



Source: Euromonitor, companies

Diagram 21. Retail value RSP of top 20 plain yogurt brands in China (2016)

Top 20 Plain Yogurt Brand Name	Company Name	2016 Sales (RMB m)
Ambrosial	Inner Mongolia Yili Industrial Group Co Ltd	11,524.8
Mengniu	China Mengniu Dairy Co Ltd	9,373.6
Momchilovtsi	Bright Food (Group) Co Ltd	6,330.1
Yili	Inner Mongolia Yili Industrial Group Co Ltd	1,980.9
AB 100	Bright Food (Group) Co Ltd	692.2
Weigang	Nanjing Dairy (Group) Co Ltd	656.0
Jun Le Bao	China Mengniu Dairy Co Ltd	628.0
Jia Bao	Jiabao Group Co	613.7
Sanyuan	Beijing San Yuan Foods Co Ltd	592.7
Activia	Danone, Groupe	459.2
Wonder Sun	Wonder Sun Dairy Co Ltd	254.6
Bright	Bright Food (Group) Co Ltd	220.5
Tianyou	Sichuan New Hope Agribusiness Co Ltd	99.4
Rushi	Bright Food (Group) Co Ltd	63.4
Huaxi	Sichuan New Hope Agribusiness Co Ltd	45.5
Yinqiao	China Dairy Group Ltd	44.4
Flower Lounge	Canton American Flower Lounge Livestock Co Ltd	36.5
Yantang	Guangzhou Yantang Dairy Co Ltd	33.6
Classy Kiss	Green's Bioengineering (Shenzhen) Co Ltd	18.4
Fengxing	Guangzhou Fengxing Dairy Co Ltd	17.9

Source: Euromonitor

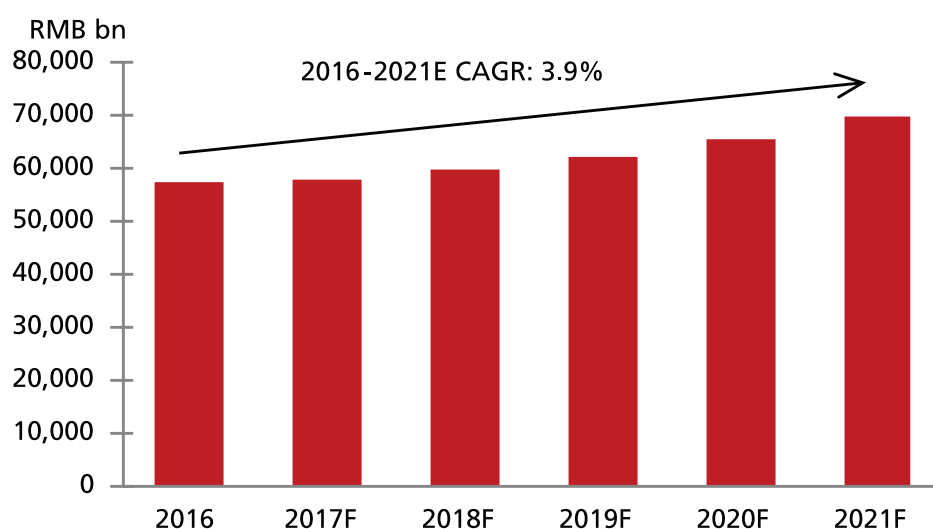
Brand diversification As we can see from the above table, major dairy operators are offering multiple yogurt brands to tap various consumer segments. Some also diversify their brands in other product segments to enhance market share and returns. For instance, Bright's "U Best" and "Zhi You" form its brand differentiation strategy to grow market share of premium fresh milk products. The same goes for New Hope's brands of "Huaxi" and "Shuangfeng". Synergies could include back-office support and the share of marketing and distribution resources for different brands under one umbrella.

Dairy alternatives In developed regions such as the US and Europe, per capita consumption of dairy milk fell by 13% and 4% respectively over 2011 to 2015, as consumers become more conscious about health and wellness, and amid increasing controversy about saturated fats in cow's milk being the primary cause of heart disease.

We have seen rising consumer interest in plant-based milk produced from soy, walnut, coconut, almond, peanut, rice, oat, etc. With soy milk being the traditional plant-based drink, during recent years there has also been a demand shift from cow's milk toward other types of alternative milk in China.

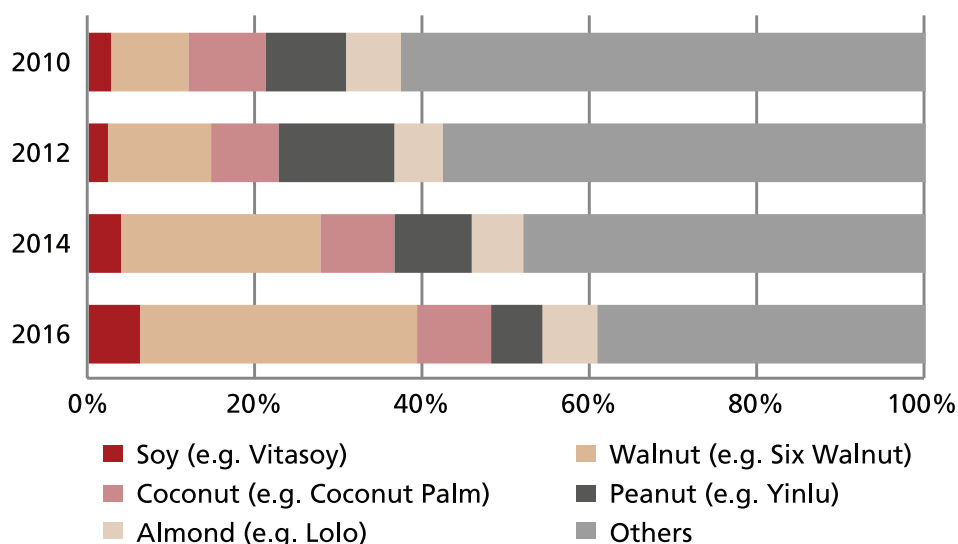
While Euromonitor's projected 2016 to 2021F CAGR of 4% in the plant-based category denotes mild growth, we find certain flavours, such as soy, have been growing strongly. For example, market leader Vitasoy has been reporting double-digit CAGR in the past three to four years with solid expansion, e.g. into Wuhan. Newcomers, such as Dali Foods and Want have also entered this category.

Diagram 22. Sales of plant-based milk in China



Source: Euromonitor

Diagram 23. Plant-based milk market in China



Source: Euromonitor

Diagram 24. Quick comparison: plant-based drinks vs. cow's milk

	Lactose-free	Low calories	High protein	Saturated fat	Vitamins	Other minerals	Health issue
Cow's milk			✓	high		calcium	
Almond milk	✓	✓		no	A		nut allergies
Soy milk	✓	✓	✓	little	A, B-12	potassium, isoflavones	soy allergies, gene-modified soy
Rice milk	✓			No			least allergenic among peers
Coconut milk	✓	✓		high			
Peanut milk	✓	✓		little	E, B-6	Magnesium	nut allergies
Walnut milk	✓			little			

Milk and milk alternatives: Nutrition comparison per 8 fluid ounces

Category (per 8 fluid ounces)	Calories	Carbo-hydrates (total)	Sugars	Fat (total)	Protein
Cow's milk (whole)	150	12 g	12 g	8 g	8 g
Cow's milk (1%)	110	12 g	12 g	2 g	8 g
Cow's milk (skim)	80	12 g	12 g	0 g	8 g
Almond milk (unsweetened)	40	1 g	0 g	3 g	2 g
Soy milk (unsweetened)	80	4 g	1 g	4 g	7 g
Rice milk (unsweetened)	120	22 g	10 g	2 g	0 g
Coconut milk beverage (unsweetened)	50	2 g	0 g	5 g	0 g

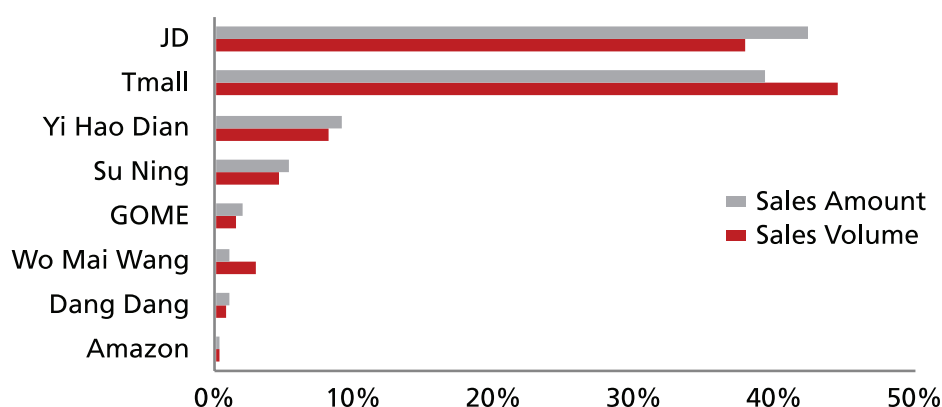
Source: Healthline, Livestrong

Channel/market diversification

Following the rising popularity of e-commerce in China, plus strong demand for overseas foods and beverages amid lingering concerns about food safety, we have seen a substantial increase in the online sales of dairy products. Such demand has been expedited via “daigou” services that are made available by online agents, as well as the rollout of free-trade zones and cross-border e-commerce channels in China. Hence, the proportion of online dairy sales surged from less than 1% in 2010 to 8% in 2016, particularly driven by strong demand of imported dairy items such as infant milk formula products.

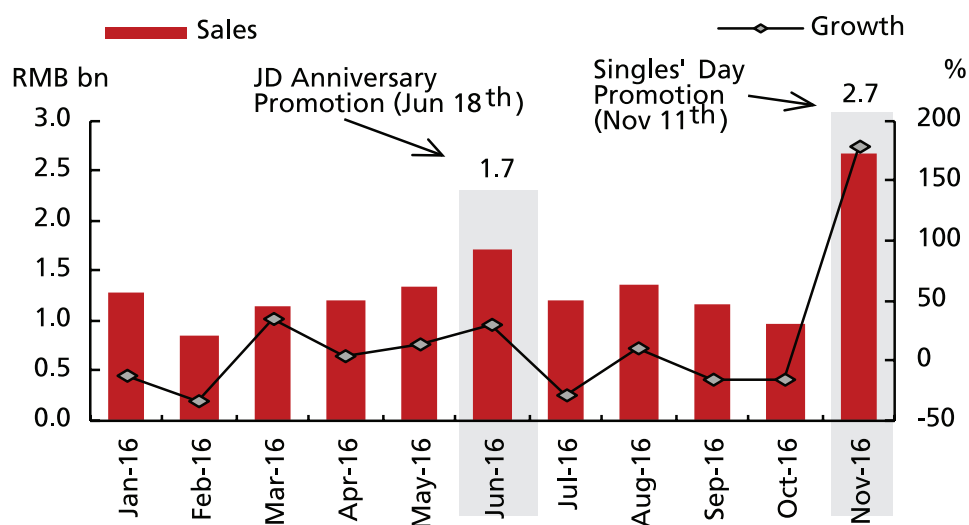
So far, e-commerce players, including JD.com and Alibaba’s T-mall channel, have dominated online demand of dairy products in China, altogether taking up about 80% of the total in both sales and volume terms. Such strong online demand has also been lifted by major promotional campaigns each year, especially during Single’s Day on 11 November.

Diagram 25. Online dairy sales: Market players in China (2016)



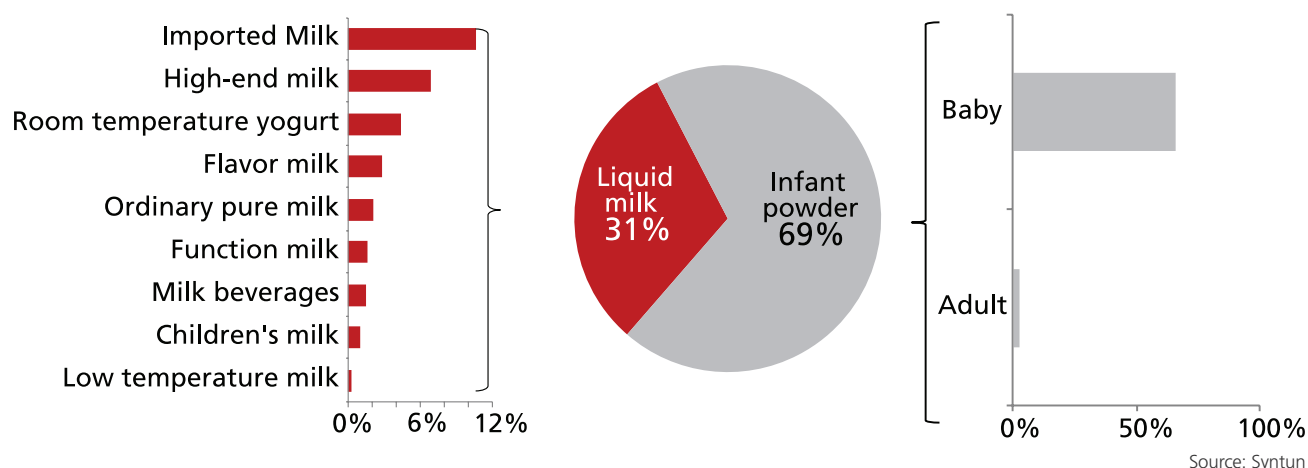
Source: Syntun

Diagram 26. Seasonality of online dairy sales



Source: Syntun

Diagram 27. More dairy categories demanded via e-commerce (sales breakdown by category)



M&As – The Large Get Larger

Globalisation

As overall trade networks and global transparency on products and prices continue to improve over time, it is inevitable that the top brands with the best merchandise will be most preferred by consumers. Large players with relatively more abundant resources to enhance research & development, marketing and promotion, as well as acquire some good operations both domestically and overseas, etc. should help them grow even bigger and capture a larger market share.

Meanwhile, some medium-term questions could include whether food safety concerns in China could be further minimised, so that the local perception of domestic products could improve and compete head-to-head with imported merchandise. This is particularly the case as Chinese consumers continue to look for better merchandise and are more willing to trade up. Such a development could be even more apparent for the dairy industry, especially in products for newborns and young children.

In recent years, Chinese dairy companies have continuously extended their sourcing to overseas markets. This has included the acquiring of or partnering with infant milk powder manufacturers in New Zealand, Europe, etc. to enhance overall customer confidence. The PRC Development Plan for Milk Industry 2016-2020 also highlights the government's target to further consolidate the dairy sector toward the best players, through a more stringent registration process and product quality control.

Through the Internet, social media, and direct exposure to overseas markets as the Chinese travel more, consumers are also increasingly aware of the trendier dairy products in overseas markets, arousing their desire for overseas products. As such, to safeguard sales, we believe Chinese dairy companies will increasingly seek more M&As or collaboration with compatible overseas brand players. For example, Sanyuan and Fosun are negotiating to purchase the St Hubert brand, a French margarine maker, in July 2017.

Sales of IMF products have stayed strong as Chinese consumers continue to like imported milk powders for their infants. Yet, their weighting in overall online dairy sales fell 11% y-o-y in 2016. This was mainly due to a doubling of online sales of imported liquid milk, and 50% growth in online sales of UHT yogurt last year. As e-commerce and overall logistics infrastructure develop across China, we expect the online channel to increase in importance for the overall dairy market.

Diagram 28. A summary of the provision of Development Plan for Milk Industry 2016-2020E

	2015	2020
Dairy production (m ton)	39	41
Self-sufficiency ratio (%)	1	>70%
Dairy and related products (m ton)	28	36
Sampling test rate success (%)	99	>99
Milk powder sampling success rate (%)	97	>99
100 heads and above scale farm (%)	48	>70
Mechanised dairy production (%)	95	>99
Milk yield per annum (ton/annum)	6	8
Quality Alfalfa production (m ton)	2	5
Waste use efficiency (%)	50	75
Infant formula companies with sales above RMB5bn	1	3-5
Top 10 domestic infant formula market share (%)	n.a.	80%

Source: Ministry of Agriculture, NDRC

Nestlé – a classic case

Nestlé, currently the world's largest food and beverage company, has completed many M&As over the years to reinforce its businesses and develop into a global group. First established in 1867 to sell infant formula products, the company merged with the condensed milk operator Anglo-Swiss Milk Company in 1905, and continued to extend into dairy, confectionery, coffee, ice cream, water, frozen foods, pet foods, etc. through multiple corporate transactions.

At present, Nestlé owns over 8,500 brands with a total of about 500 factories in over 80 countries. The company initially leverages M&As to diversify its business segments, and then rides on acquisitions to further expand geographically.

Just focusing on its more recent acquisitions since 2001, its share price largely increased following each major deal announcement, revealing investors' confidence in its execution and possible synergies from the acquisitions. More importantly, Nestlé designs its acquisition process with standard protocol and well-defined acquisition criteria. Aside

from a strong M&A team, the company also invites the respective operational team plus geographical units to assess outlook of a potential deal. Besides, no acquisition will be concluded should the operational management not be prepared to support the deal. Post-deal reviews will also be carried out.

Nestle's new CEO, Mark Schneider, recently revealed an interest in more acquisitions and speeding up growth. Although on a larger base already, such strategy should be a favourable move to strengthen performance and investors' returns ahead.

Some China dairy companies have also been increasingly looking for overseas brands and markets. For instance, Inner Mongolia Yili, currently the eighth largest dairy group worldwide, aims to get into top five in the near future and achieve over RMB100bn. The company already invested RMB3bn to establish the world's largest integrated dairy production centre in New Zealand in 2014, with current annual production of nearly 50,000 metric tonnes of infant formula. The second stage of expansion in New Zealand starting this year will also include UHT milk and whole powder milk production.

Diagram 29. Recent major acquisitions by Nestle (by segment)

	Date	Target companies	Deal size	Currency	Payment
Beverages-Non-alcoholic					
M&A	3/12/2001	Aqua Cool Pure Bottled Water ops	220	U.S.	Cash
M&A	3/2/2003	Powwow bottled water division	603	France	Cash
M&A	4/9/2007	Sources Minerales Henniez SA	61	Switzerland	Cash
M&A	16/10/2007	Sources Minerales Henniez SA	69	Switzerland	Cash
Nutrition & Medical					
M&A	26/5/2000	Summit Technology Inc/MA	839	U.S.	Cash
M&A	19/6/2006	Jenny Craig Inc	600	U.S.	Cash
M&A	14/12/2006	Medical nutrition business	2,500	Switzerland	Cash
M&A	11/2/2014	Galderma Pharma SA	4,272	Switzerland	Stock
M&A	28/5/2014	Aesthetic dermatology assets	1,400	U.S.	Cash
Ice Cream					
M&A	9/12/1996	Ault ice cream division	163	Canada	Cash
M&A	26/12/2001	Ice Cream Partners USA LLC	641	U.S.	Cash
M&A	17/6/2002	Dreyer's Grand Ice Cream Holdings Inc	2,595	U.S.	Cash
M&A	23/1/2003	Moevenpick ice cream business	N/A	Switzerland	Undisclosed
M&A	24/5/2004	Valiojaatelo ice cream business	N/A	Finland	Undisclosed
M&A	19/12/2005	Delta Ice Cream SA	288	Greece	Undisclosed

Diagram 29. Recent major acquisitions by Nestle (by segment) cont.

Baby Food

M&A	12/4/2007	Gerber Baby Foods	5,500	U.S.	Cash
M&A	23/4/2012	Pfizer Nutrition	11,850	U.S.	Cash

Ready Food

M&A	28/4/1988	Buitoni SA	1,100	France	Cash and Stock
M&A	6/8/2002	Chef America Inc	2,600	U.S.	Cash
M&A	5/1/2010	North American pizza business	3,700	U.S.	Cash
M&A	4/2/2016	Osem Investments Ltd	849	Israel	Cash

Candy

M&A	23/5/2006	Uncle Tobys Unit	673	Australia	Cash
M&A	11/7/2011	Hsu Fu Chi International Ltd	1,519	China	Cash

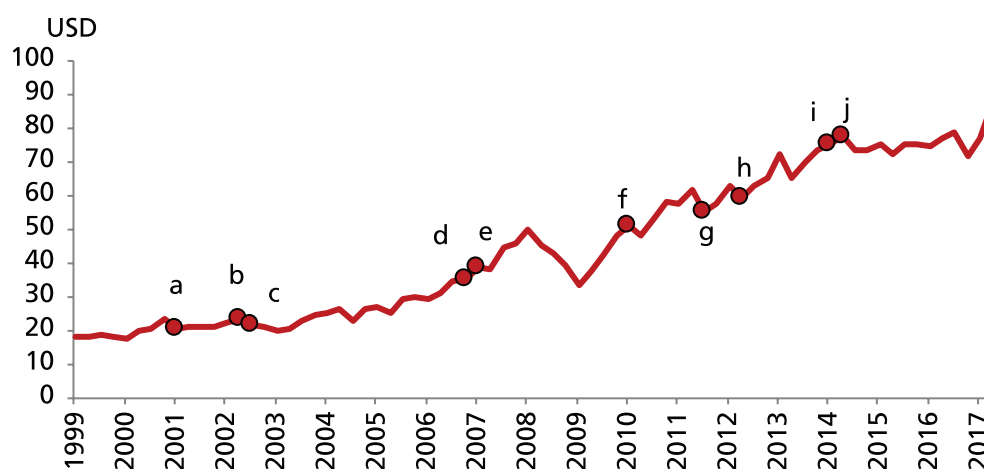
Dairy

M&A	17/8/1994	Avides, Miko & Castillo de Marcilla	N/A	Spain	Undisclosed
M&A	31/1/2002	Brand + Yogurt facility	205	U.K.	Cash
M&A	18/11/2005	Svenska Glasskiosken AB	N/A	Sweden	Undisclosed
M&A	18/4/2011	Yinlu Foods Group	N/A	China	Undisclosed

Pet Food

M&A	4/2/1998	Spillers Petfoods	1,185	U.S.	Cash
M&A	16/1/2001	Nestle Purina PetCare Co	11,856	U.S.	Cash
M&A	16/1/2001	Nestle Purina PetCare Co	11,856	U.S.	Cash

Diagram 30. Nestle's stock performance with respect to M&As



	Date of announcement	Acquired Company	Transaction Value (US\$m)	Payment Type	EV/EBITDA (x)
a	16 Jan 01	Nestle Purina PetCare Co	11,856	Cash	
b	17 Jun 02	Dreyer's Grand Ice Cream Holdings Inc	2,595	Cash	
c	06 Aug 02	Chef America Inc	2,600	Cash	
d	14 Dec 06	Medical nutrition business	2,500	Stock	
e	12 Apr 07	Gerber Baby Foods	5,500	Cash	
f	05 Jan 10	North American pizza business	3,700	Cash	
g	11 Jul 11	Hsu Fu Chi International Ltd	1,519	Cash	123.7
h	23 Apr 12	Pfizer Nutrition	11,850	Cash	
i	11 Feb 14	Galderma Pharma SA	4,272	Cash	17.9
j	28 May 14	Aesthetic dermatology assets	1,400	Cash	

Diagram 31. Nestle - Revenue/EBIT/EBITDA

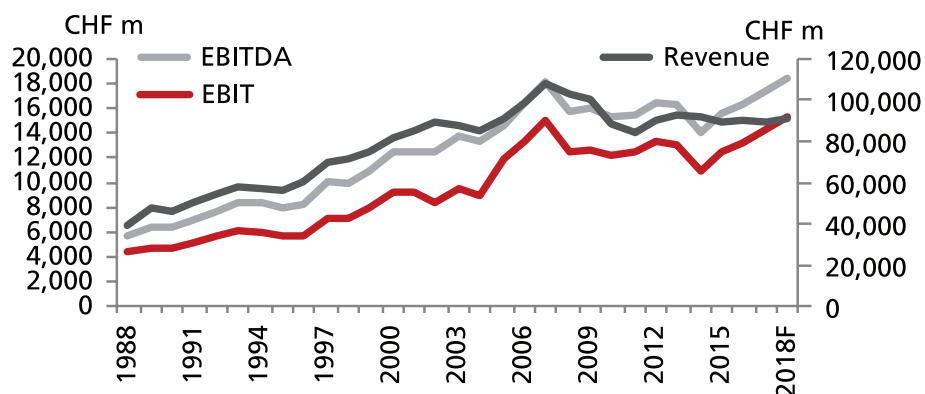
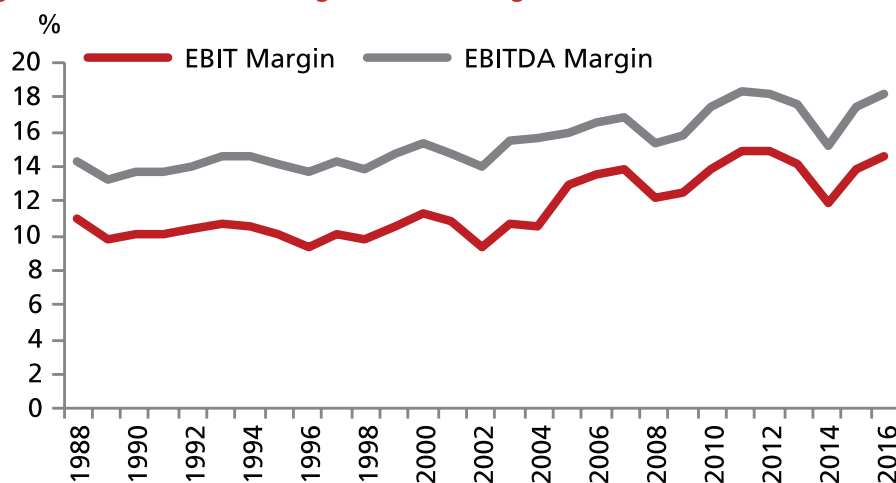


Diagram 32. Nestle - EBIT margin/EBITDA margin

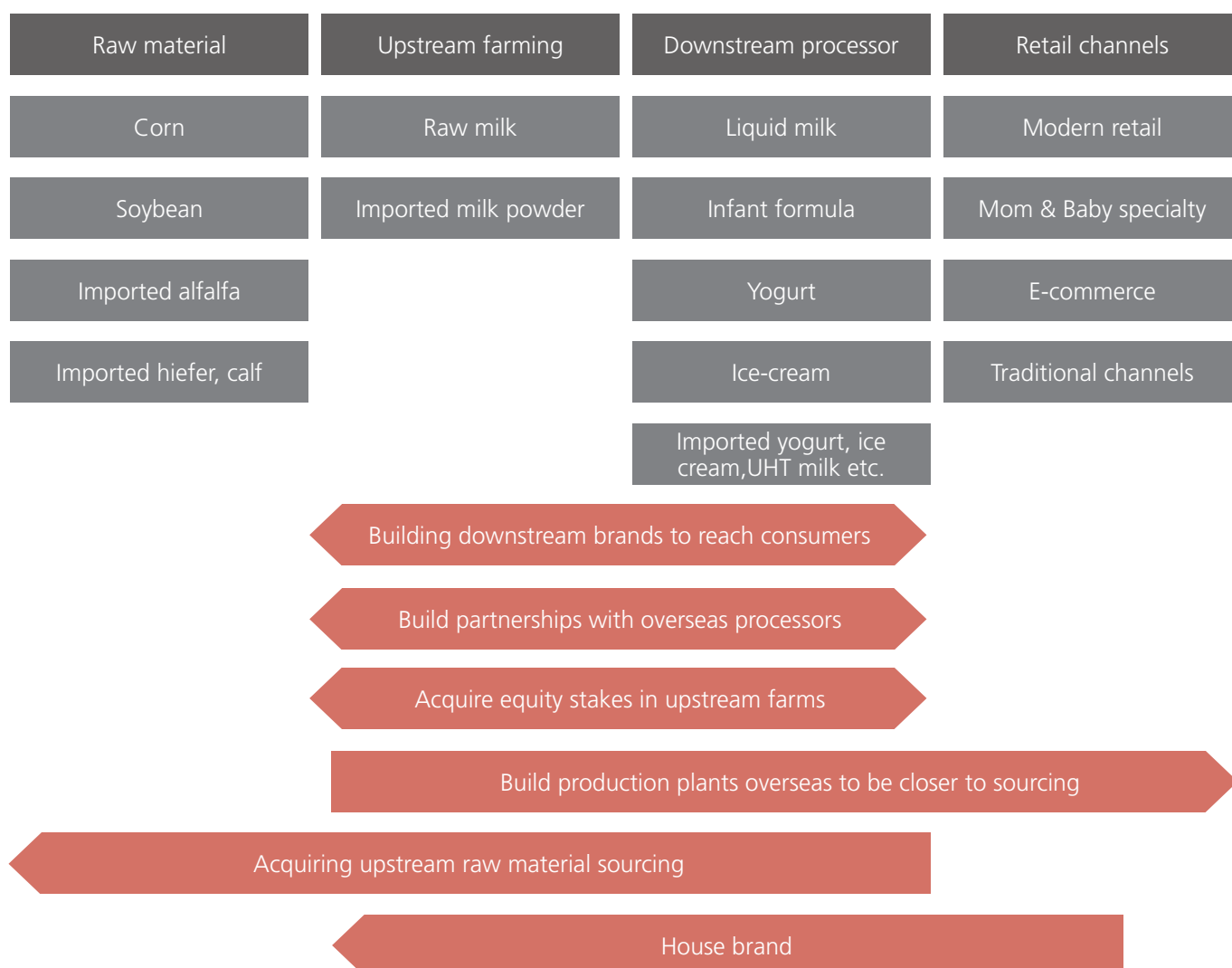


Sources: Bloomberg Finance L.P.

Dairy Supply Chain and Sustainability

In this section, we provide a detailed walkthrough of key segments across the dairy supply chain, including dairy farms, processors and infant formula manufacturers.

Diagram 33. Dairy industry's supply chain – more vertical integration ahead

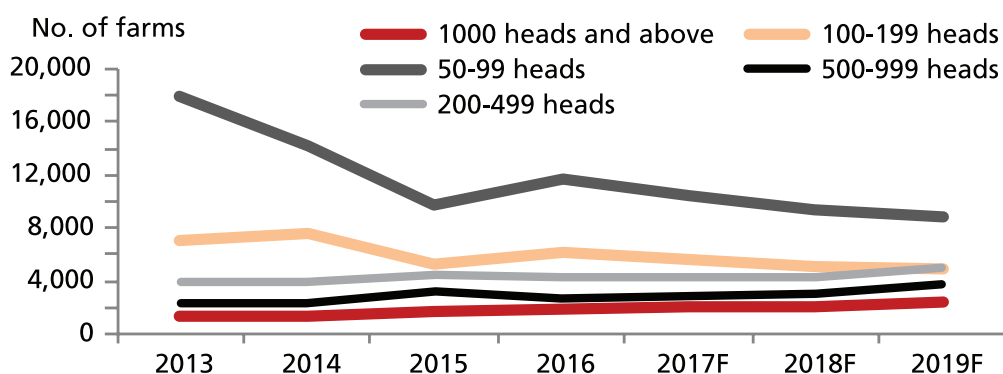


Source: Company data, DBS Vickers

Dairy Farms

The dairy-farming sector has witnessed significant changes along with the rise of large-scale commercial farming. Tighter government policies and the introduction of private financing etc. have all expedited the process. We estimate farm size contribution with less than 100 heads to drop from 57% in 2009 to 37% in 2019F, while those with over 1,000 heads will expand from 3% in 2009 to 10% by 2019F.

Diagram 34. Dairy farm size breakdown



Source: China Dairy Yearbook, DBS Vickers' estimates

China's dairy farming industry has remained very fragmented, with the largest dairy player, China Modern Dairy (CMD), taking up a mere 1.6% market share in 2016. Other upstream listed players include Shengmu, Bright Dairy, Japfa, Zhongdi Dairy, and YST Dairy, each of which commanded a market share of 0.4-0.9% in terms of herd size. Based on raw milk production volume, we estimate the top six players accounted for 7.8% of market share in 2016 (versus herd size of 4.4%).

Diagram 35. Total herd size

Company	2016	%
China Modern Dairy	229,200	1.6%
Shengmu	123,329	0.9%
Bright Dairy	90,000	0.6%
Japfa	80,000	0.6%
Zhongdi Dairy	55,263	0.4%
YST Dairy	54,749	0.4%
San Yuan *	50,000	0.4%
New Hope	50,000	0.4%
Fonterra	30,000	0.2%
Wenshi	20,000	0.1%
Subtotal	782,541	5.6%

*DBS estimates

Source: Company data, company websites, news sources, DBS Vickers

Diagram 36. Dairy production volume (tonne/annum)

Company	2016	%
China Modern Dairy	1,009,854	2.8%
Shengmu	598,379	1.7%
Bright Dairy *	350,000	1.0%
Japfa	372,500	1.0%
Zhongdi Dairy	224,094	0.6%
YST Dairy	258,675	0.7%
Subtotal	2,813,502	7.8%

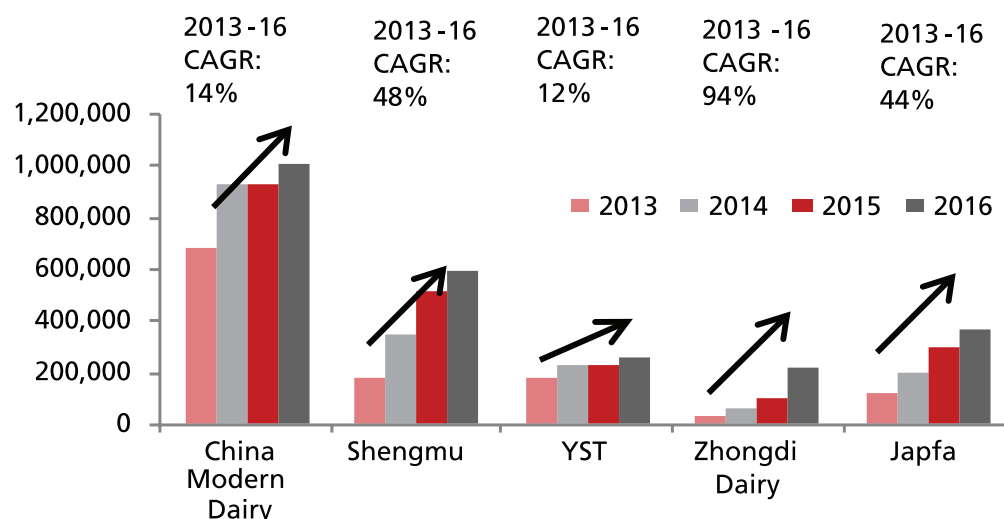
*DBS estimates

Source: Company data, news sources, DBS Vickers

Market consolidation continues

The top five (excluding Bright Dairy) listed companies' production volume grew at a CAGR of 27% in 2013 to 2016, suggesting fast market consolidation. With lower raw milk prices, production volume grew 19% y-o-y in 2016 (2015: 17% y-o-y). In 2017F, we expect sales volume to remain fairly stable and grow at a high single-digit rate given softer raw milk prices.

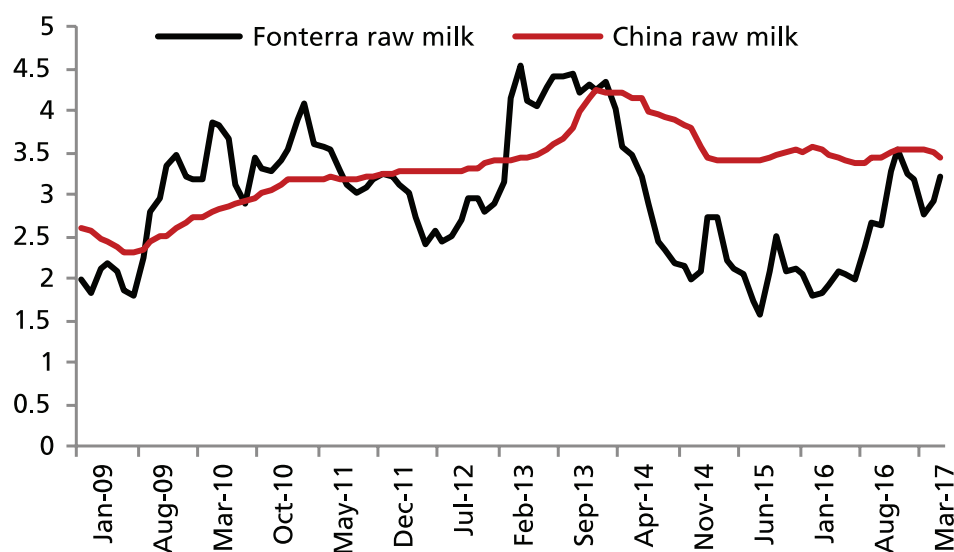
Diagram 37. Production volume



In the overseas market, Fonterra WMP prices surged from a low of US\$2,070 per tonne in August 2016 to US\$3,110 per tonne in July 2017 (up 45% y-o-y), still far from the historical peak of approximately US\$5,000 per tonne in 4Q13. Yet, despite the surge in overseas prices, there was no rally for Chinese domestic prices, as overseas milk powder still trades at a discount to domestic prices. Since January 2017, we estimate the discount of imported milk powder price to domestic price has narrowed from 32% to 17%.

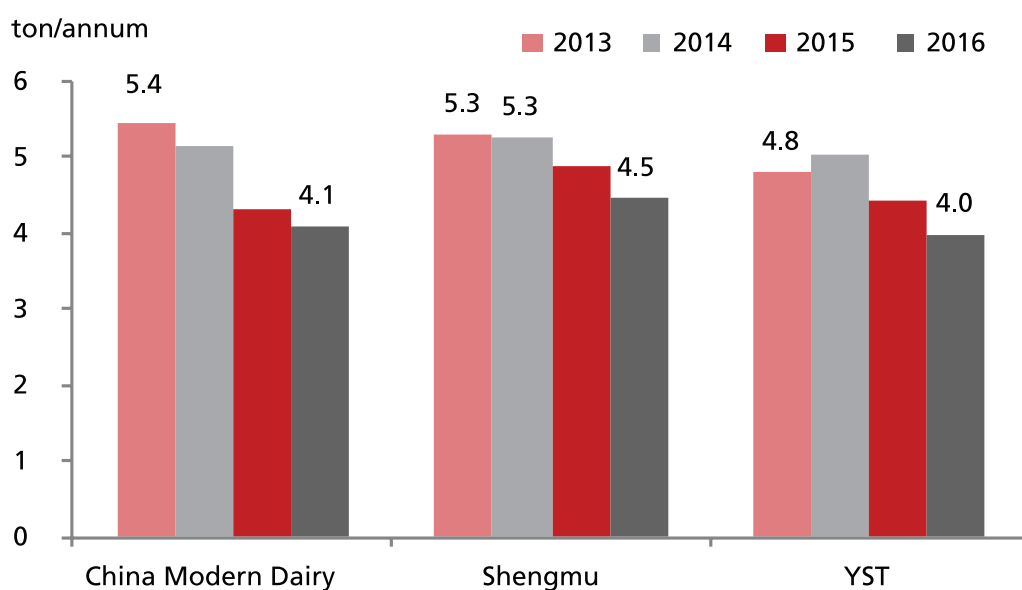
The attractiveness of import pricing continues to place pressure on all the large-scale players in 2017. In 1H17, the raw milk price has dropped 11% y-o-y to RMB3.67 per kg. This trend is expected to continue into 2H17 due to rising milk import. That being said, imported milk powder volume growth began to slow to 5% y-o-y in 5M17 (vs. 1H15/16 at 16% y-o-y).

Diagram 38. Raw milk price vs. Fonterra WMP prices (converted to raw milk pricing)



Source: Bloomberg Finance L.P., Holstein Farmer, DBS Vickers

Diagram 39. Average selling prices – Raw milk prices

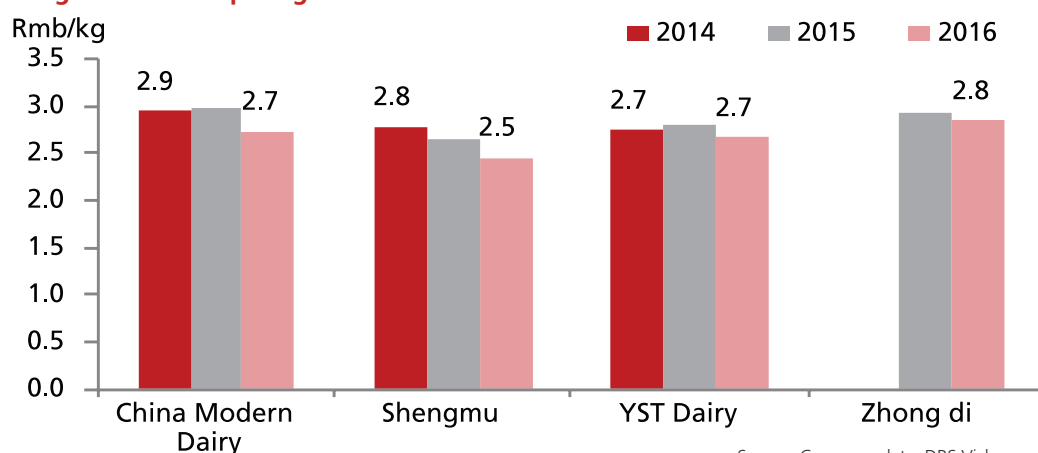


Source: Company data, DBS Vickers

Scale Matters

Cost efficiency Production cost per kg has been reducing on improving scale and lower raw material costs. However, the decline is not enough to offset raw milk price volatility. In 2016, for instance, production cost per kg ranged between approximately RMB2.5-2.8 per kg, which translates into RMB0.97-1.75 a kg of gross profit.

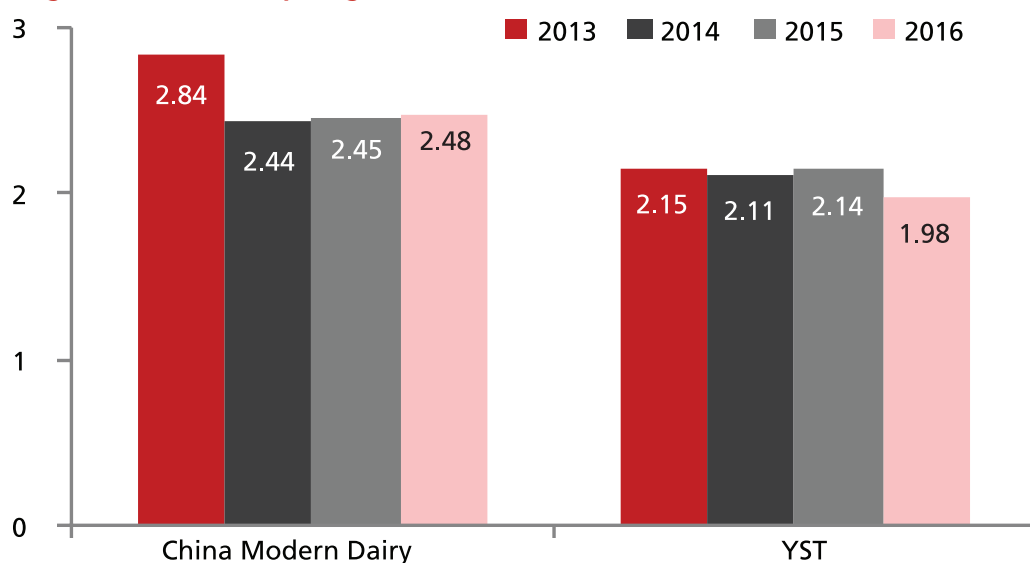
Diagram 40. Cost per kg*



Source: Company data, DBS Vickers
*before biological fair value adjustment of dairy farming business

Costs of feed – comprising corn, soybean, alfalfa, and wheat – have been reducing over the years. CMD and YST Dairy's feed cost per tonne declined at a CAGR of 4.4% and 2.7%, respectively, from FY14 to 2016. Corn and soybean reported mixed price changes of -16% and +10% YTD y-o-y. Hence, we expect overall cost per kg improvement to be limited in FY17F.

Diagram 41. Feed cost per kg

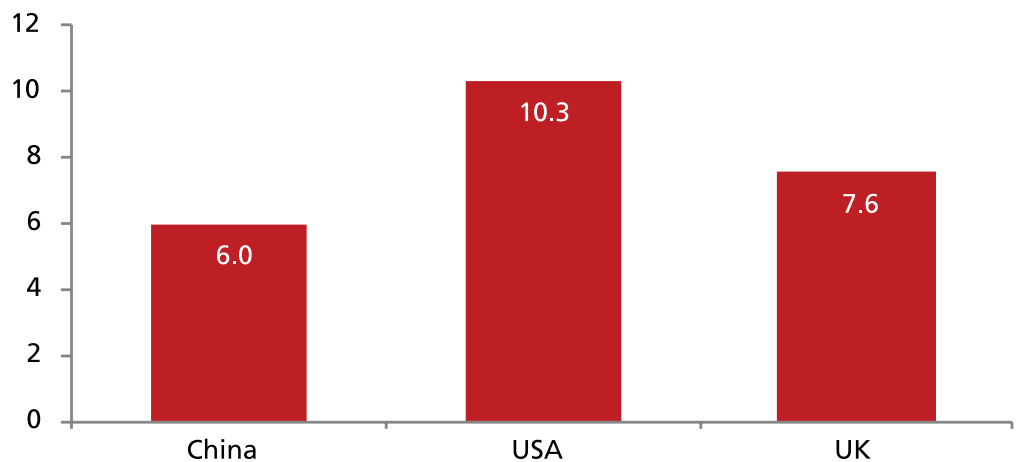


Source: Company data, DBS Vickers

Sector potential versus major markets

China's average milk yield of 6 tonnes per annum still lags behind that of developed countries' such as the US and the UK. Based on 2016 data, average milk yield in China represented a 42% discount to that in US, and a 21% discount to the UK's, suggesting room for improvement.

Diagram 42. Yield per annum – global

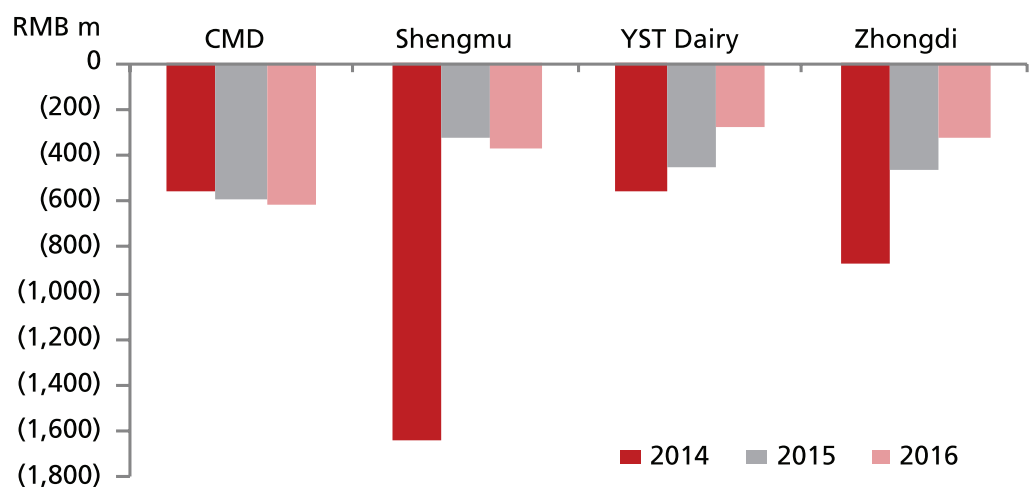


Source: China Dairy Yearbook, USDA, AHDB, DBS Vickers

Negative cashflow generation

While major dairy farmers (excluding biological assets) are still generating profits, their free cashflow has remained in negative territory. Hence, all four companies – CMD, Shengmu, YST Dairy and Zhongdi Dairy – reported deteriorating financial positions over 2014 to 2016, with increasingly higher net gearing ranging from 30-80% in 2016 (versus 20-67% in 2015); except for YST Dairy which sustained a net cash position.

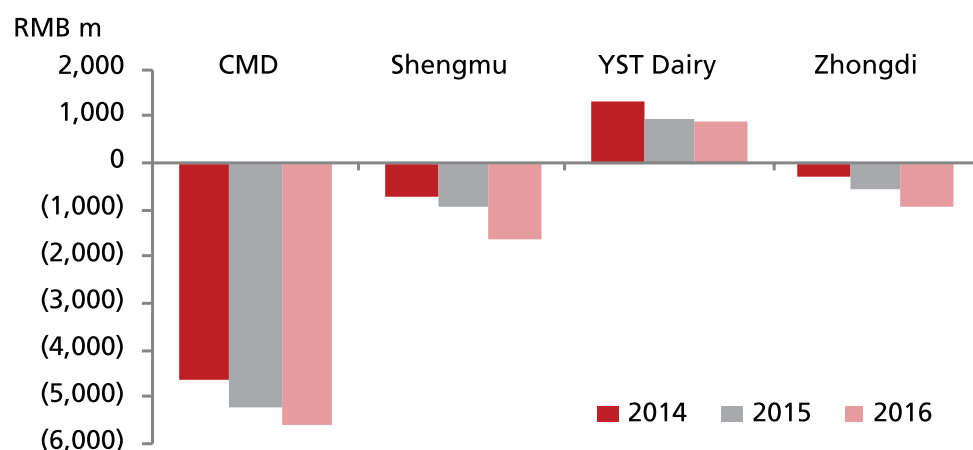
Diagram 43. Negative free cashflow *



Source: Company data, news sources, DBS Vickers

*Includes addition of biological assets and purchase of heifer and calves

Diagram 44. Deteriorating financial liquidity – Net cash (debt) position



Source: Company data, news sources, DBS Vickers

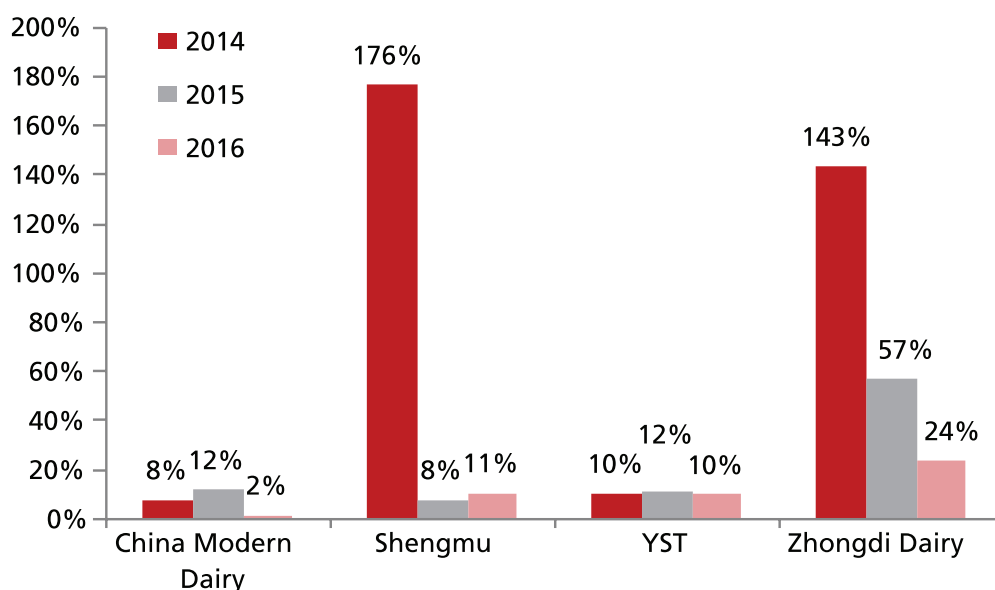
Efforts to Improve Profitability

In an effort to raise profitability, upstream companies have (i) culled cows to reduce cost and control herd size, (ii) received government support, (iii) converted raw milk into milk powder to extend the shelf life, and (iv) expanded downstream gradually.

Culling of cows

In view of weaker raw milk prices, dairy players have slowed their herd size growth through the culling of cows and reducing the number of imported calves.

Diagram 45. Total herd size growth (% y-o-y)



Source: Company data, DBS Vickers

- Government subsidies** Dairy farmers could receive small sums of subsidies for building additional farms (e.g. environmental compliance, equipment purchases, etc.), in addition to agricultural tax at 0%.
- Exploring downstream** Dairy farmers, such as CMD and Shengmu, had been selling fresh milk under their private labels to try and absorb any surplus of their raw milk supply. However, due to the fairly high entry barrier (e.g. high advertising and promotional spending, lack of bargaining power with distributors), upstream farmers found it difficult to manage excess inventory by simply going downstream on their own.

Starting in May 2017, CMD has allowed Mengniu to operate its downstream business. In return, CMD will receive a 3% gross profit margin. While this could cap the returns from its downstream business, we believe such an agreement could at least guarantee a stable pay-out for CMD although essentially keeping it as an original equipment manufacturer play.

Options For Sustainability

Upstream players could strive to seek technical or financial support from downstream operators. A change in business model that could ensure a fairer pay-out to dairy farmers could also work. Anyhow, if large-scale farms are facing declining profits and unsustainable cashflow, it is likely that small farms are under even higher pressure. Should more small farms exit the industry at a rapid rate, this could create a sharp shortage of raw milk and could potentially affect the stability of the supply chain.

- The price equation** Overseas dairy farmers, for instance, typically collect a market price of their produce (less manufacturing, packaging and marketing costs) plus retentions for future capital costs through their cooperative. Without processors taking up some responsibility for the upstream expansion, it is difficult to cover the high fixture costs.
- Speeding up the trend** Upstream players could forge partnerships with supermarkets and online players to accelerate the fresh dairy trend. Encouraging the consumption of fresh milk may improve raw milk demand. For example, Bright has a stable business delivering fresh milk to consumers in Shanghai on a daily basis. This could be replicated in other 1st tier cities to start off with.
- Partnerships** Based on our conversation with major dairy farm operators, most of them have already been supplying to the top downstream players (Mengniu, Yili, and Bright). Seeking more new partners could also be a good opportunity. For example, foreign players who seek to enter China could consider collaboration with local milk producers to develop fresh products.

Case study: Arla

Arla is a European dairy cooperative owned by 12,000 dairy farmers. All farm owners agree to equally share the earnings from their produce, which helps them to agree to a common goal for profitability and sustainability along the supply chain. Its core markets

now span across Europe, including Sweden, Denmark, Finland, the UK, Germany, and the Netherlands.

Market consolidation

Arla was the largest upstream player in Denmark, with a strong market share; it enabled steadier margins, and opportunity to grow beyond its core market. We reckon China's dairy farming industry could also adopt a dairy cooperative model amongst smaller farms, on top of rapid market consolidation and large-scale farming to improve bargaining power, and reduce capital cost outlay.

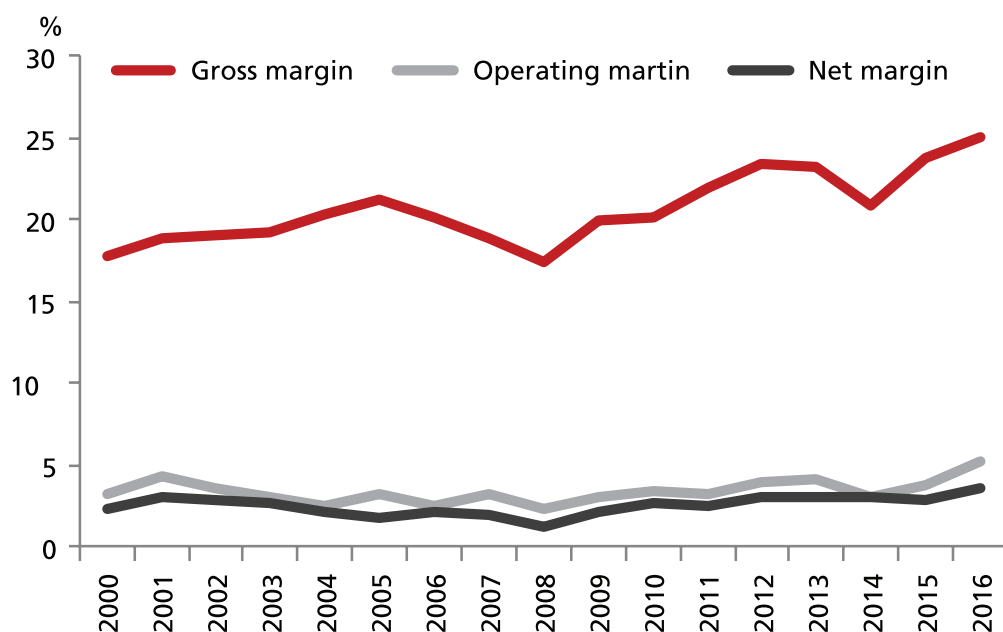
Why cooperatives could work

A cooperative also guarantees a floor price to farmers regardless of dairy price volatility. This weakens dairy farmers' option to negotiate, but it also offers a buffer when prices decline significantly. This also allows better planning by farmers in terms of capacity expansion to match market demand. Players also offer more favourable credit terms to alleviate the farmers' burden, similar to Yili's model.

Downstream is key

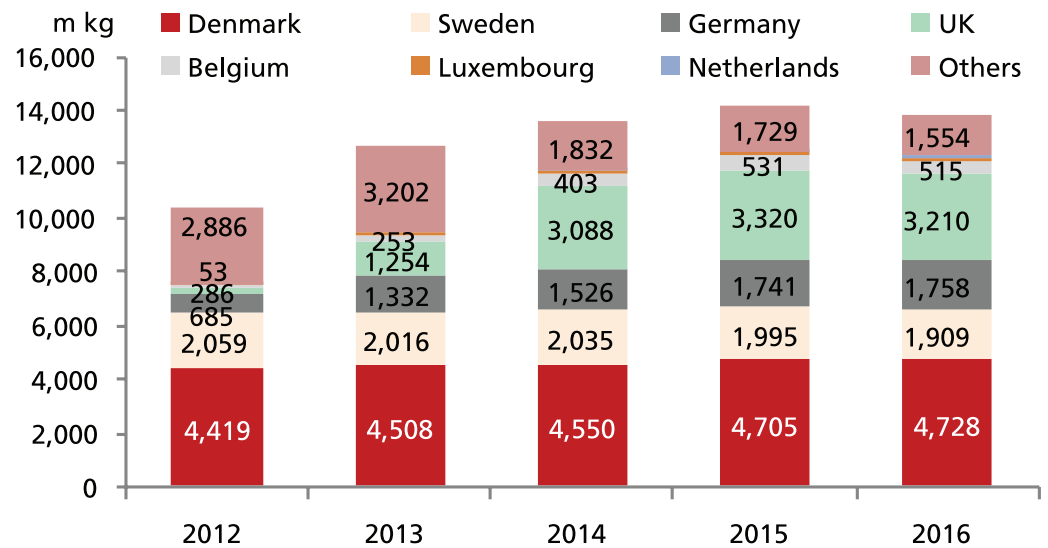
In 2016, Arla processed 13.9b kg of raw milk, which is 13 times the volume of the largest player in China (CMD). With a strong foothold in the upstream, Arla also invested in downstream operations to ensure margin stability. Despite a downturn in dairy prices in 2014 to 2016, Arla's margin improved y-o-y.

Diagram 46. Arla – Margin remained largely stable despite dairy price volatility



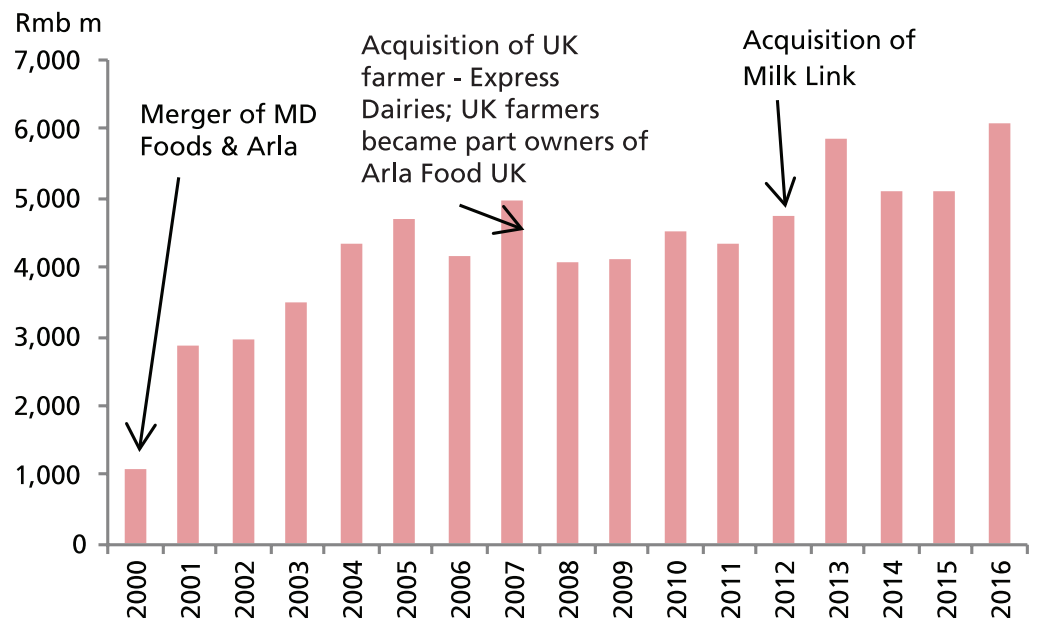
Source: Bloomberg Finance L.P, DBS Vickers

Diagram 47. Arla - Processed milk (m kg)



Source: Bloomberg Finance L.P, DBS Vickers

Diagram 48. Arla - EBITDA rerating through M&As 48. Arla - Processed milk (m kg)



Source: Bloomberg Finance L.P, DBS Vickers

Diagram 49. Arla's milestones

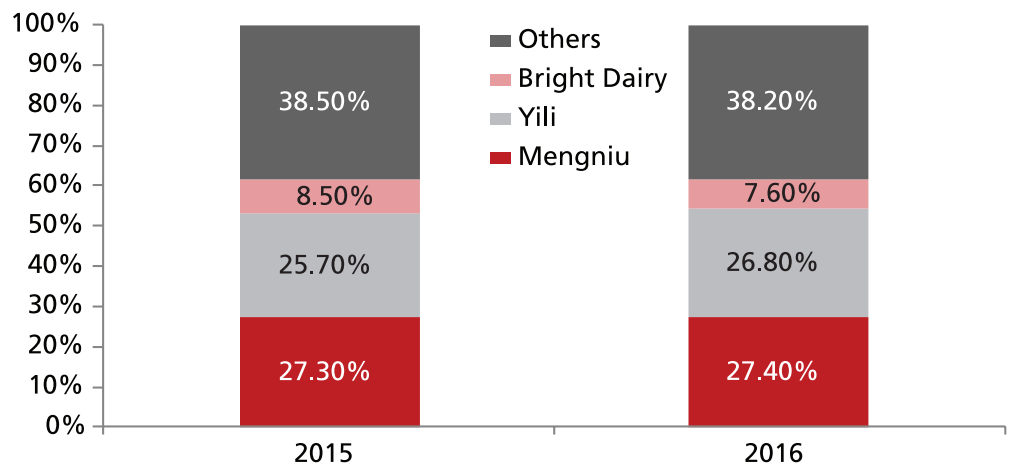
Date	Description
2000	Arla Foods amba is formed
2001	Arla Foods closes 17 dairies and reduces 1k employees
2002	Arla Food merges with Hellevad Omegns Andelsmejeri
2004	Arla Foods' subsidiary acquires National Cheese Company (Canadian cheese importer)
2005	Arla Foods and Mengniu Dairy begins a partnership in the production of powdered milk
2006	Arla acquires White Clover Dairy (US), and Tholstrup Cheese. Thereafter, Arla acquires 30% of Ingman Foods Oy Ab (Finnish dairy company)
2007	Arla merges with Express Dairies (UK).
2008	Arla Food acquires remaining 50% of Cocio Chokolademaek A/S. UK farmers became part owners of Arla Food UK
2009	Hirtshals Co-op joins Arla
2011	Arla Foods acquires Fresh Nijkerk from FrieslandCampina, and merges with Hansa Milch (Germany)
2012	Arla Foods merges with Milk Link (UK), and Milch-Union Hocheifelin (Germany).
2016	Arla Foods agrees to a partnership with Dairy Farmers of America to build a new dairy plant for cheddar cheese and premium product opportunities.

Source: Company data, DBS Vickers

Downstream Processors

Chinese processors have experienced the fastest market consolidation, with the top three players – Yili, Mengniu and Bright Dairy – accounting for over 60% of market share by 2016.

Diagram 50. Market share – Liquid milk

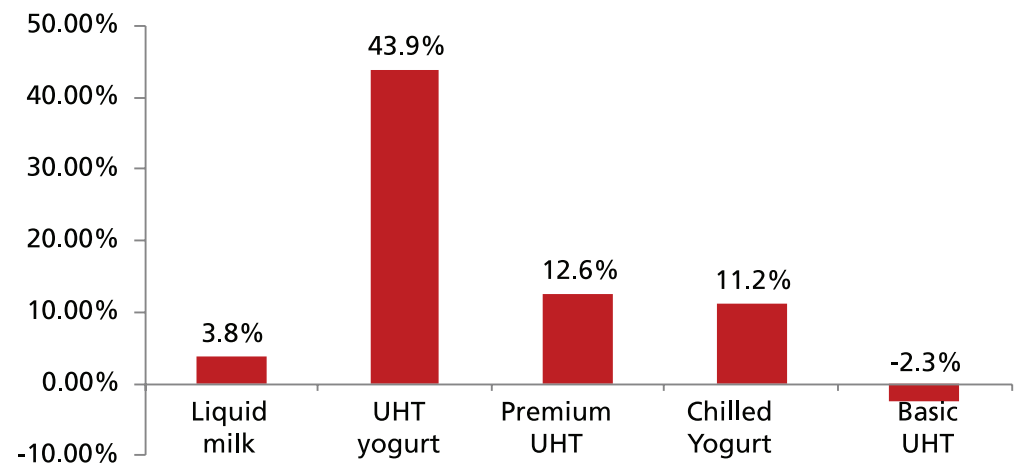


Source: AC Nielsen, DBS Vickers

Categories seeing rising demand

In 2016, UHT yogurt grew 43.9% y-o-y, outperforming premium UHT milk (12.6% y-o-y), and chilled yogurt (11.2% y-o-y). On the flip side, basic UHT milk saw a mild decline of 2.3% y-o-y as the product becomes too commoditised. We believe UHT yogurt and chilled yogurt will remain the key drivers, while basic UHT milk will remain under pressure from growing imports. In addition, we expect plant-based alternatives and the fresh consumption trend will see sound growth from a low base. Hence, players that place stronger focus on these fast-growing product categories could see more sustainable business performance.

Diagram 51. Industry growth – by product category (2016)



Source: AC Nielsen, DBS Vickers

Premium pricing is a plus

Based on our sampling, we found that premium UHT brands were priced at around a 14% premium to fresh milk on a per-litre basis. On the other hand, UHT yogurt was priced at around an 87% premium against domestic UHT milk. This helps explain why processors have been targeting yogurt categories.

Diagram 52. Domestic versus overseas SKUs

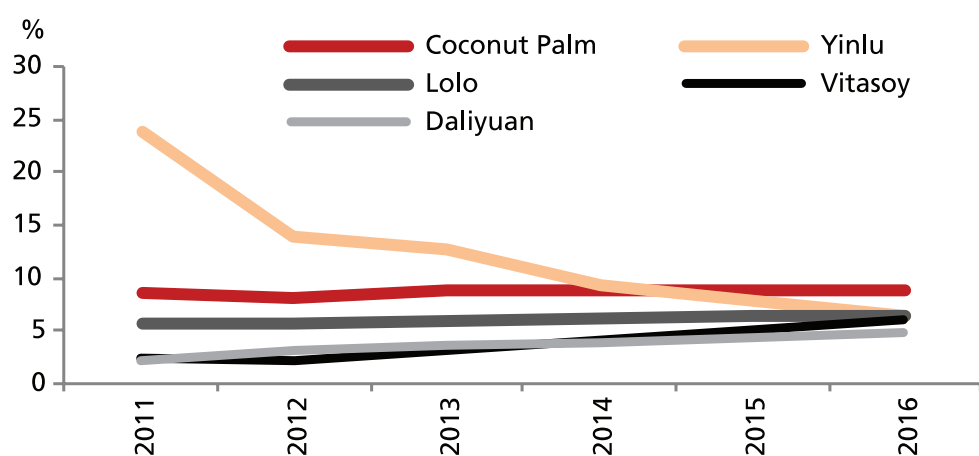
Product	Type	Deliver to	Origin	Rmb/L		
Arla Farmer Milk	Fresh milk	UK	Asda	4.8		Overseas pasteurised milk ASP: Rmb8.8/L
Arla Big Milk	Fresh milk	UK	Tesco	7.7		
Arla Organic Farm Milk	Fresh milk	UK	Tesco	7.7		
Tesco UHT Whole Milk	UHT Milk	UK	Tesco	7.9		
Yeo Valley Organic Fresh Semi- Skimmed	Fresh milk	UK	Tesco	10.1		
Arla Semi-Skimmed (Lactofree)	UHT Milk	UK	Tesco	11.4		China UHT milk: Rmb10/L
A2 Whole Milk	Fresh milk	UK	Asda	12.2		
Oldenburger Pure Milk	UHT Milk	China	JD.com	8.3		
Yili Satine	UHT Milk	China	JD.com	8.8		
Yili Pure Milk	UHT Milk	China	JD.com	10.8		
Anchor Pure Milk (imported)	UHT Milk	China	JD.com	13.2		China UHT yogurt ASP: Rmb19.3/L
Mengniu Milk Deluxe	UHT Milk	China	JD.com	8.7		
Yili Amboshilvis	UHT yogurt	China	JD.com	22.8		
Bright Dairy Momchiltovsi	UHT yogurt	China	JD.com	15.7		
San Yuan Iceland UHT yogurt	UHT yogurt	China	JD.com	15.6		
Bright Dairy Momchiltovsi (2 Fruit 3 Vegetable)	UHT yogurt	China	JD.com	23.0		Overseas yogurt ASP: Rmb33.2/L
Mengniu Chun Zhen	UHT yogurt	China	JD.com	19.4		
Yeo Valley Organic Yogurt	Fresh yogurt	UK	Tesco	24.2		
Alpro	Fresh yogurt	UK	Tesco	26.4		
Weetabix On the GO Breakfast Drink	Breakfast Drink	UK	Tesco	48.9		

Source: JD.com, supermarket.co.uk, DBS Vickers

Plant-based alternatives

Aside from yogurt, one of the fastest-growing trends is plant-based alternative products such as almond, soy, rice, and cereal milk. Many players have already begun to step into this category, particularly in plant-based drinks. According to Euromonitor, the top five players altogether already accounted for 32.4% market share (based on retail sales value) in 2016.

Diagram 53. Plant-based alternatives market share (%)

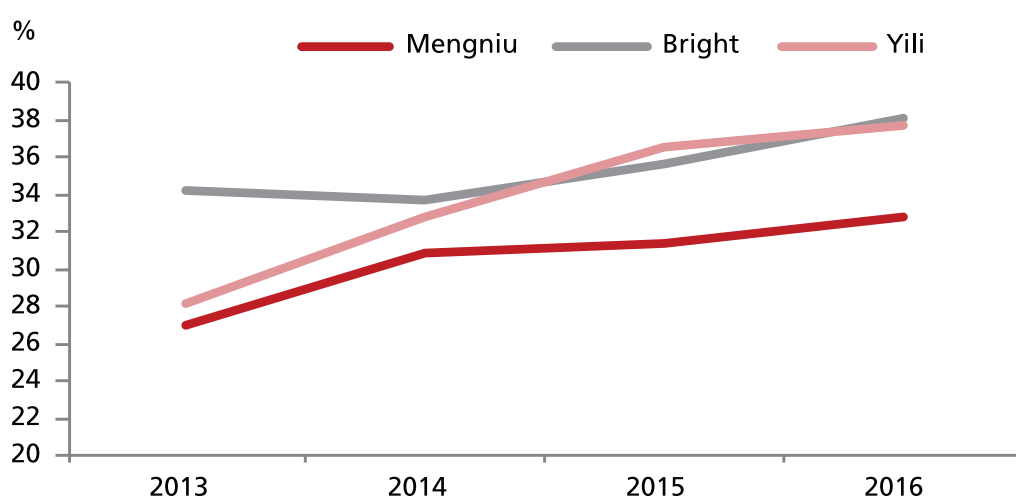


Source: Euromonitor, DBS Vickers

Gross margin in 2017

With a surge in raw material prices such as for imported milk powder, packaging and sugar, it is expected that the gross margin will contract. In 1Q17, Bright and Yili reported gross margin contraction of 5.6 percentage points and 3.6 percentage points to 34.6% and 37.9%, respectively.

Diagram 54. Gross margin trend (%)



Source: Company data, DBS Vickers

Diagram 55. Imported milk powder ASP vs. Fonterra whole-milk powder prices

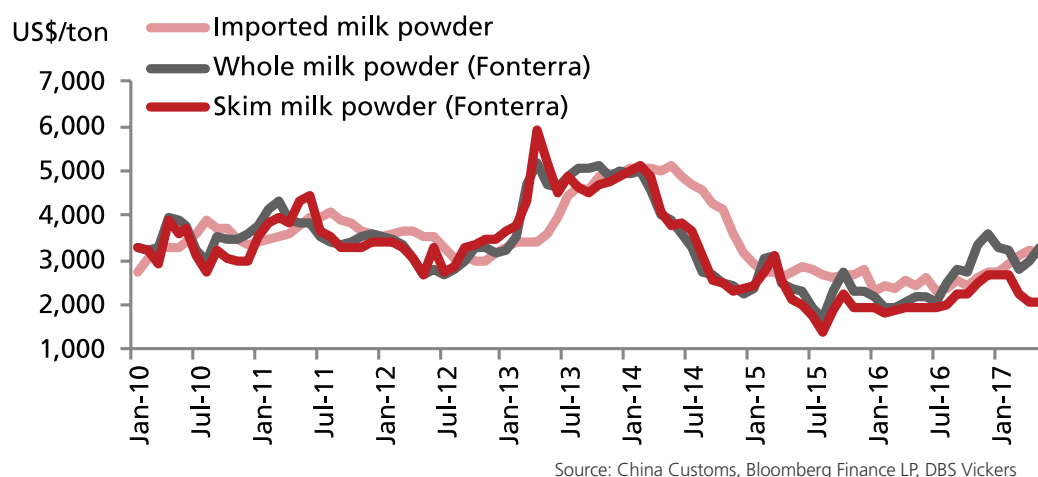


Diagram 56. Milk production (major exporters) – On a mild increase

m tons	2016	2017
Argentina	10.2	10.4
Australia	9.4	9.1
EU-28	151	151.3
New Zealand	21.2	21.9
United States	96.4	98.1
Total	288.2	290.8

Source: USDA, DBS Vickers

More sustainable?

Downstream processors have been remarkably more profitable due to several reasons. First, with strong bargaining power, processors are able to put price pressure on upstream players. Second, due to the large price disparity between domestic and overseas sourcing, processors have increasingly opted to use imported sources that offer better prices. Separately, while China's dairy demand is expected to grow steadily, we believe major downstream operators with strong balance sheets could be in a better position to look beyond China via M&As to further strengthen their domestic portfolio as well as exploring overseas growth opportunities.

Diagram 57. Dairy M&As

Date	Company	Target	Stake	Location	Metric	Market value	Valuation	Complete?
Jul-10	Bright Dairy	Synlait Dairy (Private)	51.0%	Overseas	NZD m	58		Y
Dec-10	Mengniu	Junlebao (Private)	51.0%	Domestic	RMB m	470		Y
May-13	Mengniu	China Modern Dairy (1117.HK)	26.9%	Domestic	HK\$m	3,175	16.9x FY13 P/E or 1.6x P/B	Y
Jun-13	Mengniu	Yashili (1230.HK)	76.6%	Domestic	HK\$m	9,540	23.7x FY13 PE or 3.35x PB	Y
Nov-13	Mengniu	YST Dairy (1431.HK)	~4%	Domestic	HK\$m	470	25.6x FY13 PE	Y
Jan-14	Mengniu & Whitewave (51/49)	Yashili Zhengzhou Plant	100.0%	Domestic	RMB m	377		Y
Feb-14	Danone, COFCO	Mengniu (2319.HK)	6.2%	Domestic	HK\$m	5,153	39.5x FY13 PE, or 5.0x P/B	Y
Mar-14	Fosun International	Sanyuan Food (600429:CH)	20.5%	Domestic	RMB m	2,000	187.7x FY14 PE, or 3.7x PB	
May-14	Bright Food	Tnuva (Private)	56.1%	Overseas	US\$m	2,500	43.2x FY14 PE	Y
Jul-14	Mengniu	Shengmu Dairy (1432.HK)	~4%	Domestic	HK\$m	112	17x FY14 PE or 2.9x PB	Y
Oct-14	Danone	Yashili (1230.HK)	25.0%	Domestic	HK\$m	4,390	44x FY14 PE	Y
Feb-15	Bright Food	Tnuva (Private)	20.7%	Overseas	US\$m	1,290	60.5x FY14 PE	Y
Mar-15	Fonterra	Beingmate (002570:CH)	18.8%	Domestic	RMB m	775	80.3x FY14 PE	Y
Jun-15	Yili	New Jufeng Packaging 新巨丰 (Private)	20.0%	Domestic	RMB m	96		Y
Aug-15	Xinjiang Western Animal	Yili Shihei Company (Milk powder, Liquid milk)	100.0%	Domestic	RMB m	90		Y
Oct-15	Yashili	Mengniu Arla (51/49)	100.0%	Domestic	RMB m	1,050	13.3x FY14 PE	
Jan-16	Ornua	Ambrosia Dairy (Private)	100.0%	Domestic				Y
Mar-16	Herman Shao-ming Hu, Kenny Zhang	Van Diemen's Land (Private)	100.0%	Overseas	AUS m	220		Y
Sep-16	Danone	Whitewave Foods	100.0%	Overseas	US\$m	12,500	23.4x EV/ LTM Adjusted EBITDA (2016)	Y
Oct-16	Yili	Shengmu Dairy (1432.HK)	37.0%	Domestic	HK\$m	5,290	17.5x FY16 PE or 1.9x P/NAV	N
Jan-17	Mengniu	China Modern Dairy (1117.HK)	33.3%	Domestic	HK\$m	4,671		Y
May-17	Yili	Stonyfield (Danone)	100.0%	Overseas	US\$m	850		N
Jun-17	Synlait Dairy	New Zealand Dairy Company	100.0%	Domestic	NZD m	57		Y
Jul-17	Bright Dairy	Shanghai Holstein (RRJ Capital)	45.0%	Domestic	US\$m	315		Pending
Jul-17	Lactalis	Stonyfield (Danone)	100.0%	Overseas	US\$m	875		Y

Source: Company compilation, DBS Vickers

Diagram 58. Sustainability checklist

	Mengniu 2319.HK	Yili 600887:CH	Bright Dairy 600597:CH
Farm profitability and support	<ol style="list-style-type: none"> 61.4% stake in China Modern Dairy Strategic milk supply agreement with large-scale farmers 	<ol style="list-style-type: none"> Small investment in Shengmu & Huishan Dairy at Pre-IPO stages Offer financial support to farmers Strategic milk supply agreement with large-scale farmers 	<ol style="list-style-type: none"> Initially started a JV with RRJ Capital to build own farms. In July'17, Bright repurchased the 45% stake from PE fund. Strategic milk supply agreement with large-scale farmers
Overseas sourcing	<ol style="list-style-type: none"> Yashili - Began production in infant formula plant set up in NZ. Acquired majority stake in Burra Foods (AUS) for dairy processing. 	<ol style="list-style-type: none"> Partnership agreement with Dairy Farmers of America to build milk powder plant Acquired Oceania Dairy (NZ) to build dairy processing plants 	<ol style="list-style-type: none"> Acquired majority stake in Synlait Dairy (NZ) Signed supply agreement with Pactum Dairy (Freedom Food) for UHT milk products
Product growth trend			
Yogurt	3	2	2
Premium UHT milk	2	3	1
Pastuerised milk	1	2	3
Plant based	A 51/49 JV with Whitewave Foods, established in 2015.	Walnut flavoured	
Cheese	Arla & Mengniu invests in China-Denmark Milk Technology Lab to target cheese.	<ol style="list-style-type: none"> Signed R&D agreement to research on cheese with Wisdom Valley Agrees to sell Milk Link's Cheese under Yili's Pureday brand 	Began to export cheese products from Israeli Tnuva
Increasing competitiveness: Overseas collaboration & M&As	<ol style="list-style-type: none"> Yashili - Acquisition of Mengniu's Oumei, Danone's Dumex, and Arla's Merla Danone and Arla as shareholders - A 20 (Danone)/80 venture to develop Bio (Activia) - Danone's largest yogurt brand. 	<ol style="list-style-type: none"> Agrees to jointly develop brand with Sterilgarda Alimenti S.p.A under Perfectland Place bid on Danone's Stonyfield (US-based yogurt) for US\$850m, but failed 	1. Bright Food (Parent) acquired Tnuva (Israel), the largest dairy cooperative in Israel with strong expertise in cheese and butter.
Net gearing (x)	18.8% (FY17F)	Net cash (FY16)	15% (FY17F)
Food security & R&D	Collaboration with Danone on R&D and supply chain operation in infant formula and pastuerised milk businesses	1. Set up an overseas R&D Center in the Netherlands	1
Net profit	2	3	1
Total	2	3	1

Source: Company data, DBS Vickers

Diagram 59. Upstream sustainability list

FY16		China Modern Dairy 1117.HK	Shengmu Dairy 1432.HK	YST Dairy 1431.HK	Zhongdi 1492.HK
Productivity metric	Metric				
Herd size	k heads	230	123	54.7	55.3
Herd size growth	% y-o-y	1.6% y-o-y	10.7% y-o-y	9.9% y-o-y	23.7% y-o-y
Sales volume	m tonnes	1m	0.6m	0.3m	0.2m
Sales volume growth	% y-o-y	9% y-o-y	16% y-o-y	11% y-o-y	123% y-o-y
ASP	Rmb/kg	4.08(conso.)	4.45	3.98	3.82
Feed cost	Rmb/kg	2.48	n.m	1.98	1.88
Total cost	Rmb/kg	2.74	2.21	2.67	2.44
Milk yield	Tonne/annum	9.4	n.m	10	10.7
Financial metric					
Sales % y-o-y	%	1%	12%	0%	99%
2016	Rmb m	4,862	3,467	1,029	962
2015	Rmb m	4,826	3,101	1,033	483
Upstream sales	%	2%	-6%	0%	100%
2016	Rmb m	3,384	1,360	1,029	856
2015	Rmb m	3,324	1,445	1,033	428
Gross margin (conso.)	%	33.0%	48.3%	33.0%	33.7%
Gross margin (upstream)					
2016	%	30.7%	47.4%	33.0%	36.2%
2015	%	31.7%	46.1%	36.8%	42.6%
SG&A expenses % of sales	%	22%	12%	9%	11%
Net debt (cash)	Rmb m	5,955	1,503	Net cash	Net cash
Current ratio	x	0.5	1.6	1.9	0.5
ROE (%)	%	-10.0%	13.8%	-2.0%	5.7%
ROA (%)	%	-4.2%	6.8%	-1.8%	3.1%

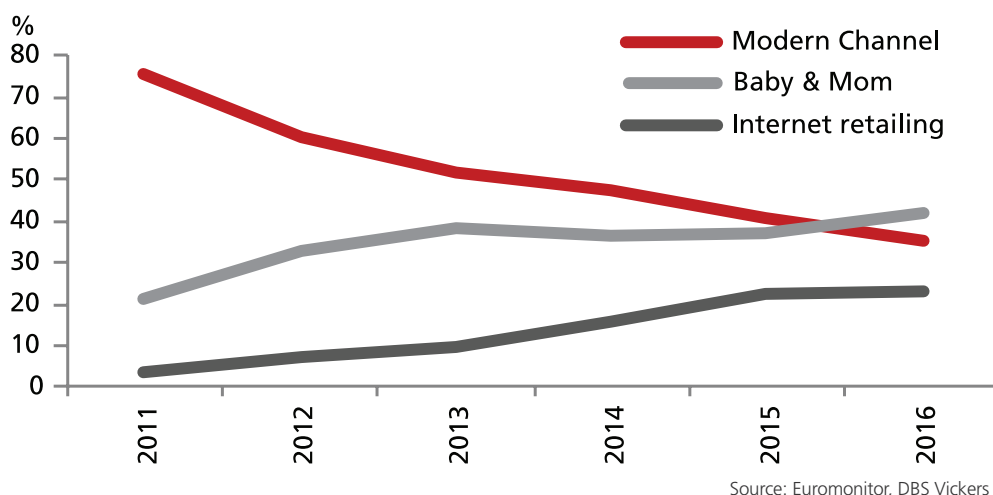
Source: Company data, DBS Vickers

Infant Formula

A sustainable model

In the past few years, infant formula was plagued by shifts in China's consumption channels and regulatory changes. This year marks an important year for China Food & Drug Administration (CFDA) registration, to be implemented starting January 2018, as the government targets streamlining of the infant formula import markets that have seen accelerated growth via e-commerce. We believe this sector could likely be among the more sustainable segments given regulatory actions to secure the supply chain.

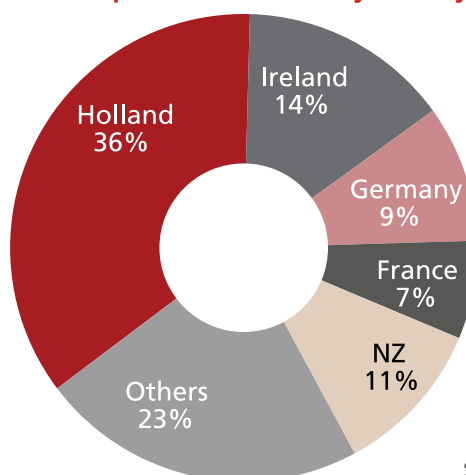
Diagram 60. Infant formula – Distribution of baby food by format (% value) – 2011-2016



Cross-border e-commerce

With a rapid change in distribution channels in recent years, the government aims to better regulate brands that enter the Chinese market through cross-border e-commerce. Hence, the purpose of the latest CFDA registration is to narrow the play field between offline and cross-border channels in addition to refining the number of brand offerings.

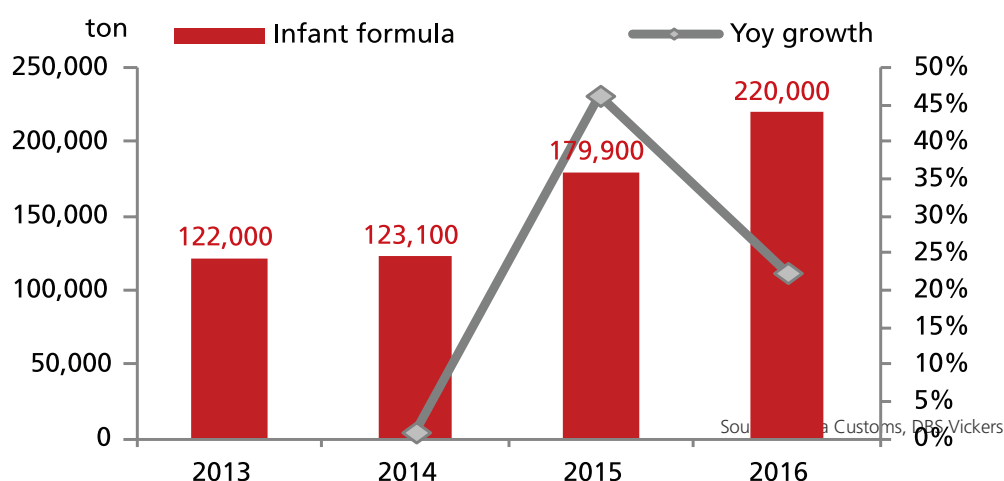
Diagram 61. Infant formula imports into China – by country of origin (2016)



Other channels Despite prior regulations required by the Certificate & Accreditation Administration (CNCA) for offline channels, brands are able to bypass this through basic registration via bonded warehouses in China, or even by “daigou” arrangements being the grey channel that do not need any registration at all.

Euromonitor estimates that consumers in China took in roughly 760,000 tonnes of infant formula products in 2016. About 220,000 tonnes, or 29% were estimated to come from imports. We expect that much of the transactions through grey channel have not been captured in the official data; hence the percentage of import sourcing should be even higher.

Diagram 62. Infant formula import volume



In October 2016, a new set of guidelines was issued for domestic and foreign infant formula manufacturers. Infant formula brands exported to China must register with CFDA by 1 January 2018, before marketing in China. Infant formula registration will involve product testing, technical evaluation, on-site inspection of manufacturing plants, sample inspection, development capacity, and the approval and issuance of certificates. In principle, each company may only apply for, at most, nine formula products with three series. This includes stage 1 (0-6 months), stage 2 (6-12 months) and young children’s formula (12-36 months) in each plant. Based on our latest understanding, some firms started to submit their applications in early January to February, and are expected to receive a response by August 2017 at the earliest.

Reducing inventory Given the current regulatory changes, distributors have been cautious in holding onto inventories before the visibility of registration approvals become clearer. This is also reflected by the weaker sales recorded across infant formula players.

What to expect next?

Local manufacturers are reducing production capacity in China, and shifting to overseas plants as Chinese consumers still prefer infant formula products that are 100% made in developed markets abroad, such as Europe, New Zealand, etc. For example, H&H's Changsha infant formula plant, or Yashili's manufacturing plant, will start to produce other nutritional products and adult milk powder instead. Looking ahead, infant formula players will likely begin to restore inventory levels once better transparency of registration approvals is seen in the coming months. This, coupled with more marketing and promotion, should drive a recovery in the top line.

Actions taken by brands

There are currently 68 overseas plants registered with CNCA (see Appendix). Due to the time consuming nature of the registration process, selected infant formula brands have taken the initiative to purchase equity stakes in manufacturing bases already registered with CNCA. That being said, a CNCA license is not a guaranteed safe pass, as Camperdown International had its license suspended recently.

Diagram 63. Taking a stake in registered infant formula manufacturing plants

Date	Company	Target	Paid	Stake
Sep-10	Bright Dairy (Pure Canterbury)	Synlait Dairy	NZ\$82m	51%
Jun-12	H&H Int'l	Arla Foods (Arcinco)	HK\$108m	50% of Arla's cap expansion in 2015
Jul-13	H&H Int'l	Isigny Sainte Mere	EUR 20m	20%
Mar-14	Royal Friesland Campina	Synlait Dairy	NZ\$14.8m	2.5%
Nov-14	Aspen	New Zealand New Milk	US\$15m	50%
Nov-15	Yashili	Yashili New Zealand	NZ\$220m	100%
Mar-17	A2	Synlait Dairy	NZ\$47.8m	8%
May-17	Ausnutria	Australian Milk Powder	Rmb170m	100%
Jun-17	Synlait Dairy	New Zealand Dairy Company	NZ\$56.5m	100%
Jun-17	Bellamy's	Camperdown Int'l	AUS\$28.5m	90%
Jul-17	Mason Financials (Aiyingdao-retailer)	Blend & Pack	AUS\$80m	80%
Jul-17	Watton Health Australia	Blend & Pack	AUS\$5m	5.0%

Source: Company data, DBS Vickers

Diagram 64. Infant formula regulations

Regulations	Description
CNCA	CNCA require infant formula produced overseas to comply with Chinese labelling requirements, such as translated label, nutrient information, etc. New advertising laws must be complied with.
New China Advertising Law	China label products must comply with the new Advertising Law. This bans formula makers from making claims to replace mother's milk, in addition to misleading content such as "express" and implying the function of disease prevention or treatment, health function, improving intelligence, "zero-added", "no added," "do not contain " in products, exaggerated wording, etc.
China Cross Border E-commerce tax change	New taxation on both E-commerce Bonded mode and Cross Border mode (1) imports
Administrative Rule for Recipe Registration of Baby Formula Powder (CFDA)	CFDA Formula registration; domestic/imported product to be compliant with WTO submission on 3 product lines (9 formulas). All recipes must be registered under CFDA.

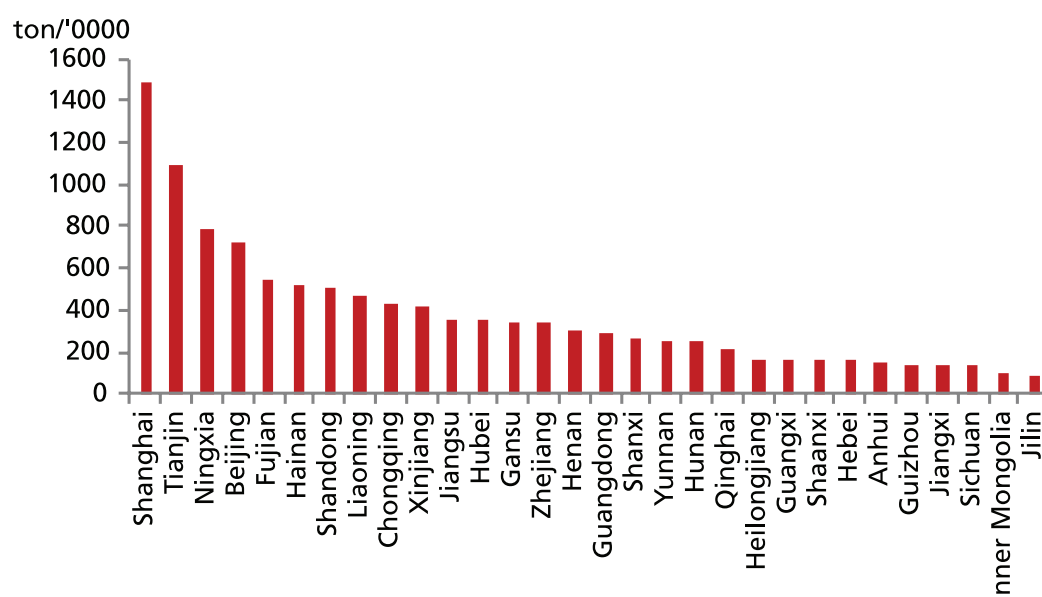
Source: AISIQ, MoA, news sources

Cold Chain To Support the Growth of Fresh Dairy

Strong demand for cold chain logistics

According to China Cold Chain Logistics Association and HNA Cold Chain Logistics, cold chain logistics is expected to grow at a CAGR of 15% in 2016 to 2030E. With rising infrastructure support, we expect fresh dairy will be a key growing trend.

Diagram 65: Cold storage per '0000 (by province) (2016)



Source: China Cold Chain Logistics Association

Cold chain concentrated in certain areas

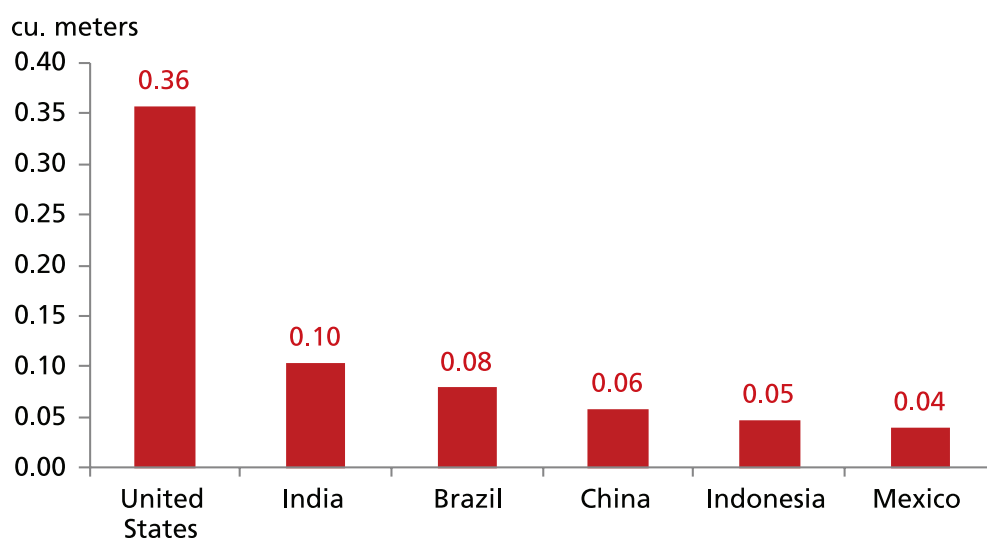
Based on China Cold Chain Logistics Association, we find cold chain logistics and trucking services are well penetrated in 1st-tier cities, particularly in the eastern region. This coincides with the dominance of local dairy players, for example San Yuan in Beijing or Bright Dairy in Shanghai. In 2016, cold storage in Shanghai had a per-capita space of 1,400 tonnes, equivalent to four times the national average.

The rest of the region

According to the China Warehousing Industry Bluebook 2016, cold chain warehouse capacity grew by 12% in 2016 to 42m tonnes, with cold chain warehouse space per capita reaching 78 litres (versus 53 litres in 2011). The penetration, however, remains far below the global level. The US, for example, has a per-capita space of 357 litres, more than 6 times that of China. A report by ITA in 2016 also revealed that China's cold storage penetration has been lower than some developing countries such as India and Brazil.

Aside from that, China is also deficient of refrigerated trucks, which only accounted for 1/11 of the U.S.'s total number, as reported by China Cold Chain Logistics Association.

Diagram 66: China cold-chain logistics capacity (2016)



Source: ITA, US Department of Commerce, DBS Vickers

Large players are emerging

Among the 2016 top 10 cold chain logistics companies in China, there is a rising new comer - Shanghai Exfresh Logistics. Established in 2005, Shanghai Exfresh Logistics is a wholly owned subsidiary of Yiguo Group (易果生鲜), one of the leading fresh produce e-commerce platforms in China. Yiguo has received financing led by several reputable names, such as Alibaba, KKR, and Suning Group.

Diagram 67: Top ten logistics providers in China (2016)

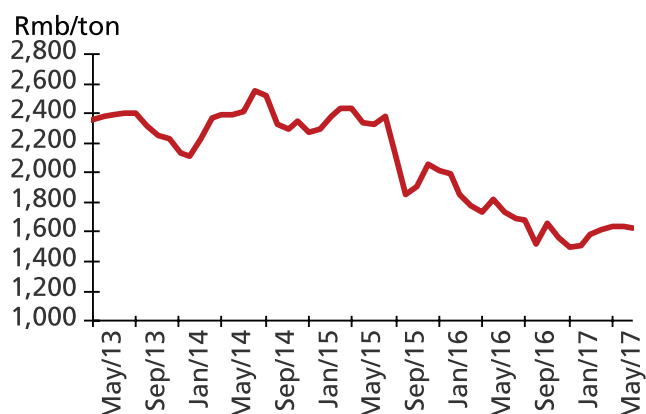
Rank / (net change)	Company	Owner (s)	Core Business
1	Rokin Logistics	CJ Korea Express	Refrigerated ground transport
2 (+1)	Xianyi Supply Chain	Xianyi Holdings	Integrated cold chain logistics solution
3 (+3)	SF Express	Mingde Holding (Wang Wei)	Express mail and parcel
4 (-2)	Shuanghui Logistics	Shuanghui Group	Refrigerated ground transport
5 (-1)	Speed Fresh Logistics	Bright Dairy & Food	Refrigerated ground transport & warehouse
6 (New)	Shanghai Exfresh Logistics Technology	Yiguo Group	Refrigerated ground transport & warehouse
7 (+4)	HNA Cold Chain Logistics	HNA Group	Integrated cold chain logistics solution
8 (-1)	Havi	N/A	Specialty food cold chain logistics
9	DCH Logistics	N/A	Specialty food cold chain logistics
10	China Merchants Americold	China Merchant Port, Americold	Refrigerated ground transport & warehouse

Source: China Cold Chain Logistics Association

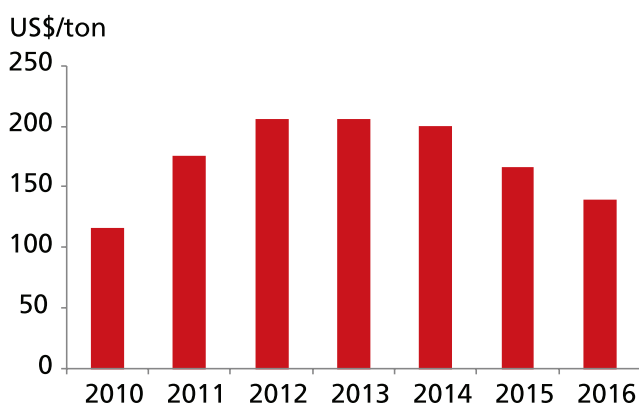
Going forward, we expect E-commerce giants, such as JD and Yiguo, will continue to penetrate into the cold chain logistic industry to secure delivery from production, warehousing to last-mile delivery. ❌

Appendix

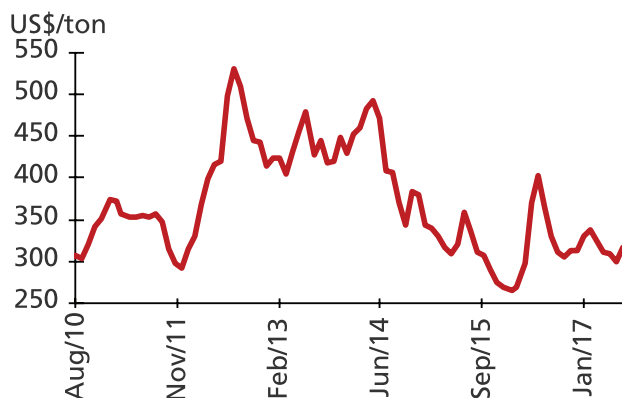
Prices - Corn



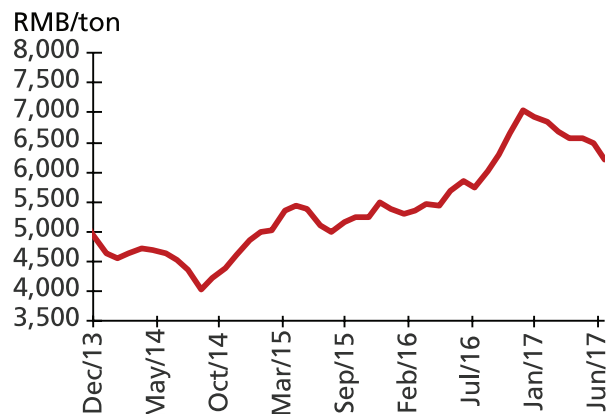
Prices - Alfalfa



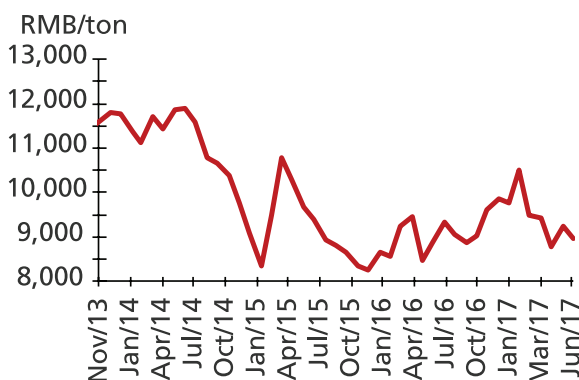
Prices - Soybean meal



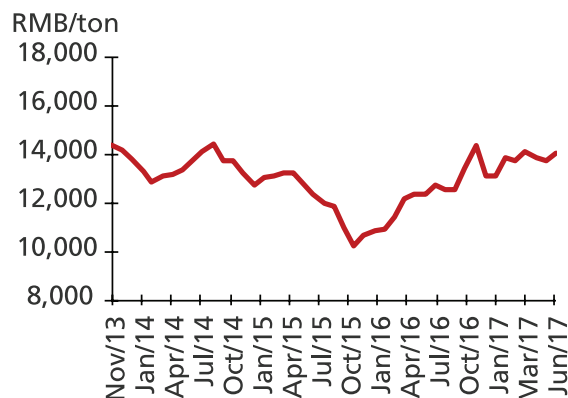
Prices - Sugar



Packaging prices - PET

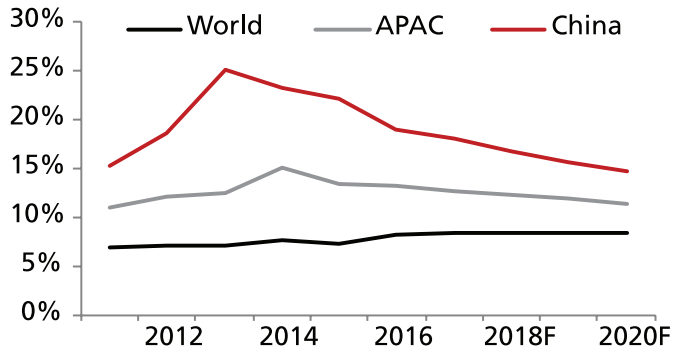


Packaging prices - PET

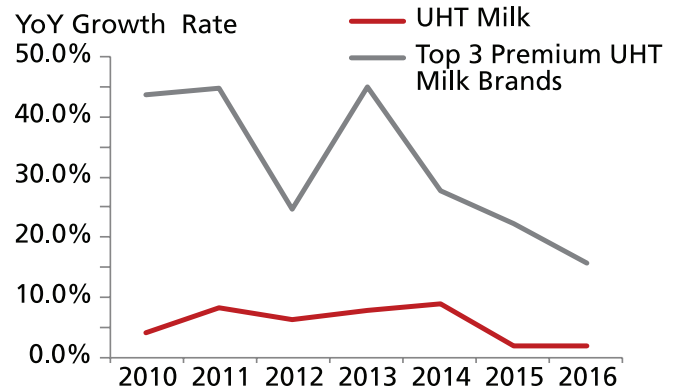


Source: Bloomberg Finance L.P., USDA, DBS Vickers

China's yogurt growth vs. overseas

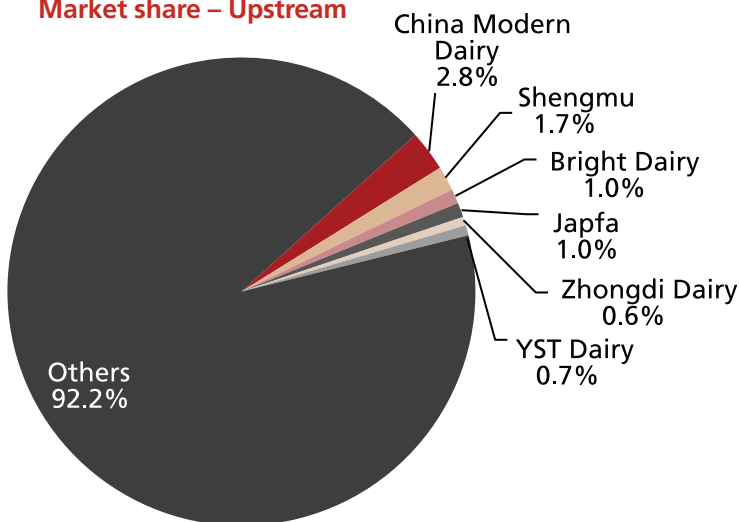


Growth trend of UHT milk

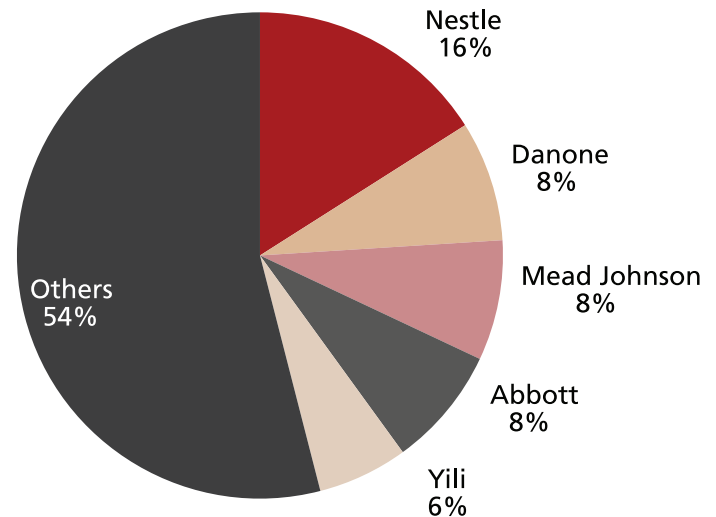


Source: Euromonitor, DBS Vickers

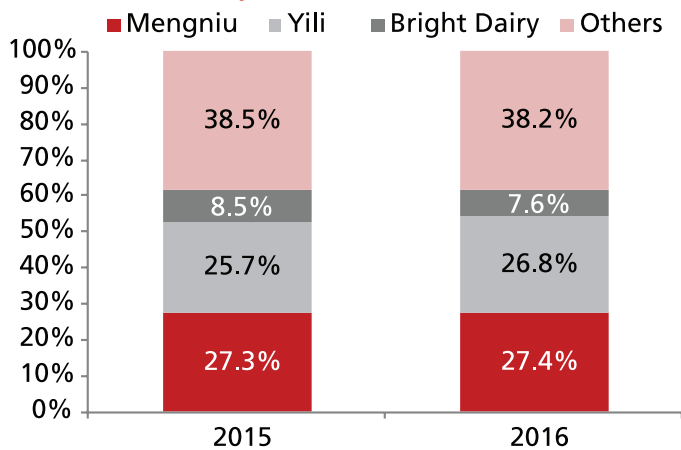
Market share – Upstream



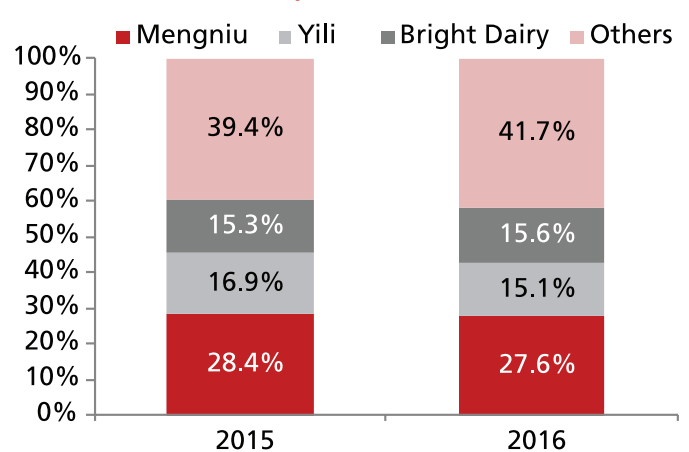
Market share – Infant formula



Market share – Liquid milk (%)

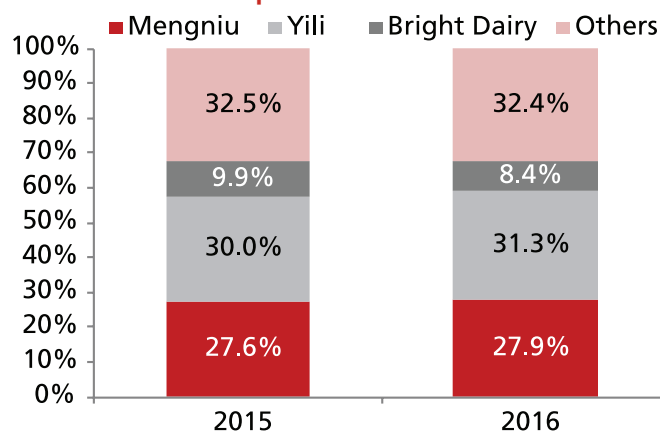


Market share – Chilled products



Source: AC Nielsen, Euromonitor, DBS Vickers

Market share –UHT products



Source: AC Nielsen, Euromonitor, DBS Vickers

Infant formula – overseas manufacturing plants registered with CNCA

No.	Country	Manufacture name	No.	Country	Manufacture name
1	Singapore	Wyeth Nutritionals	35	France	COOPERATIVE ISIGNYSAINTE MERE
2	Singapore	Abbott Manufacturing	36	France	"CELIA-LAITERIE DE CRAON"
3	Korea	Pyeongtaek factory, Maeil Dairies Co.,Ltd	37	France	LACTINOV ABBEVILLE
4	Korea	LOTTE FOODS CO	38	France	NUTRIBIO
5	Korea	Namyang Dairy Products	39	France	LAITERIE DE MONTAIGU SAS SABOURIN
6	Korea	Samyang Packaging Corporation Kwanghaewon Plant	40	France	UNION LAITIERE VENISE VERTE
7	Korea	Ildong Foodis Chuncheon Plant	41	France	EVEN SANTE INDUSTRIE
8	New Zealand	Nutricia Limited	42	France	SYNUTRA France International SAS
9	New Zealand	NIG Nutritionals	43	Germany	Töpfer GmbH
10	New Zealand	Canpac International	44	Germany	Nestlé Deutschland AG
11	New Zealand	Synlait Milk	45	Germany	Milupa GmbH
12	New Zealand	Blue River Dairy LP	46	Germany	Milchwirtschaftliche Industrie Gesellschaft Herford GmbH & Co. KG
13	New Zealand	Sutton Group	47	Germany	CREMILK GmbH
14	New Zealand	Dairy Goat Co-operative	48	Ireland	Kerry Ingredients (Ireland)
15	New Zealand	New Zealand New Milk	49	Ireland	Abbott Ireland

Infant formula – overseas manufacturing plants registered with CNCA cont.

16	New Zealand	Yashili New Zealand Dairy	50	Ireland	Wyeth Nutritionals Ireland
17	New Zealand	GMP Dairy Limited	51	Ireland	Nutricia Infant Nutrition
18	New Zealand	Alpha Laboratories (NZ)	52	Italy	GRANAROLO S.P.A
19	New Zealand	Health Pak	53	Holland	MEAD JOHNSON B.V
20	New Zealand	New Zealand Pure Dairy	54	Holland	NESTLE NEDERLAND
21	Australia	Camperdown Powder (export license suspended)	55	Holland	FrieslandCampina Domo
22	Australia	VIPLUS DAIRY	56	Holland	ABBOTT LABORATORIES
23	Australia	SPHERE HEALTHCARE	57	Holland	Lypack Leeuwarden B.V.
24	Australia	FARMLAND DAIRY PTY	58	Holland	Nutricia Cuijk B.V.
25	Australia	asis	59	Holland	Industriële Diensten Heino
26	Australia	TATURA MILK INDUSTRIES	60	Poland	GEO-POLAND SP.
27	Australia	MURRAY GOULBURN	61	Switzerland	HOCHDORF Swiss Nutrition Ltd.
28	Australia	BLEND AND PACK	62	Switzerland	HOCHDORF Swiss Nutrition Ltd.
29	Austria	Agrana Stärke GmbH	63	Switzerland	Nestlé Suisse S.A.
30	Austria	Pöll Beteiligungs GmbH & CO.KG-Gittis Naturprodukte	64	Spain	INDUSTRIAS LACTEAS ASTURIANAS,S.A.
31	Belgium	Belgomilk CVBA	65	Spain	ALTER FARMACIA, S.A.
32	Denmark	Arla Foods amba Arinco	66	Spain	ABBOTT LABORATORIES S.A.
33	Denmark	"Arla Foods amba Esbjerg Mejeri Dairy"	67	Spain	HERO ESPAÑA, S.A.
34	United Kingdom	Kendal Nutricare Ltd	68	Belarus	"Volkovysk Open Joint Stock Company «Bellakt »"

Source: CNCA, DBS Vickers

The upstream sector

	2013	2014	2015	2016
Consolidated sales (RMB m)				
China Modern Dairy	3,289	5,027	4,826	4,862
Shengmu	1,144	2,132	3,101	3,467
YST Dairy	881	1,163	1,033	1,029
Upstream sales (RMB m)				
China Modern Dairy	2,968	4,194	3,324	3,384
Shengmu	841	1,393	1,445	1,360
YST Dairy	881	1,163	1,033	1,029
Upstream as % of total				
China Modern Dairy	90	83	69	70
Shengmu	74	65	47	39
YST Dairy	100	100	100	100
Downstream sales (RMB m)				
China Modern Dairy	321	833	1,502	1,479
Shengmu	303	739	1,656	2,106
YST Dairy	0	0	0	0
Gross margin (%) - consolidated				
China Modern Dairy	38.2	37.1	34.4	33.0
Shengmu	42.9	50.2	47.7	48.3
YST Dairy	42.6	45.7	36.8	33.0
Herd size				
China Modern Dairy	186,838	201,507	225,542	229,200
Shengmu	37,343	103,252	111,395	123,329
YST Dairy	40,396	44,623	49,795	54,749
Sales volume (tonne/annum)				
China Modern Dairy	679,722	931,334	924,092	1,009,854
Shengmu	183,702	344,696	514,668	598,379
YST Dairy	183,702	230,121	233,275	258,675
Raw milk ASP (conso)				
China Modern Dairy	5.44	5.15	4.33	4.08
Shengmu	5.29	5.25	4.90	4.45
YST Dairy	4.79	5.05	4.43	3.98
Milk yield (tonne/annum)				
China Modern Dairy	8.4	8.9	9.1	9.4
YST Dairy	9.8	10.8	10.7	10.7
Selling & admin expenses (% of sales)				
China Modern Dairy	6%	6%	9%	22%
Shengmu	9%	11%	12%	12%
YST Dairy	7%	6%	10%	9%

Downstream operators

	2013	2014	2015	2016
Consolidated sales (RMB m)				
Mengniu	43,357	50,049	49,027	53,779
Bright	16,290	20,650	19,373	20,207
Yili	47,779	54,436	59,515	60,609
Gross profit (Rmb m)				
Mengniu	11,697	15,434	15,375	17,635
Bright	5,576	6,972	6,899	7,697
Yili	13,462	17,851	21,733	22,885
Gross margin (%)				
Mengniu	27.0	30.8	31.4	32.8
Bright	34.2	33.8	35.6	38.1
Yili	28.2	32.8	36.5	37.8
S&D expenses (Rmb m)				
Mengniu	(8,168)	(10,564)	(10,985)	(13,435)
Bright	(4,410)	(5,471)	(5,392)	(5,619)
Yili	(8,546)	(10,075)	(13,258)	(14,114)
Admin expense (Rmb m)				
Mengniu	(1,606)	(1,941)	(1,871)	(2,471)
Bright	(484)	(585)	(683)	(772)
Yili	(2,392)	(3,163)	(3,456)	(3,457)
SG&A (%)				
Mengniu	22.5	25.0	26.2	29.6
Bright	30.0	29.3	31.4	31.6
Yili	22.9	24.3	28.1	29.0
Operating margin (%)				
Mengniu	4.27	5.32	5.40	(0.78)
Bright	4.17	3.75	4.17	6.26
Yili	5.50	8.35	8.60	9.15
Net profit (Rmb m)				
Mengniu	1,631	2,351	2,367	(751)
Bright	406	570	418	563
Yili	3,187	4,144	4,632	5,662
Net gearing (x)				
Mengniu	26%	24%	14%	12%
Bright	Net cash	Net cash	Net cash	Net cash
Yili	Net cash	12%	Net cash	Net cash

Downstream operators cont.

CAPEX

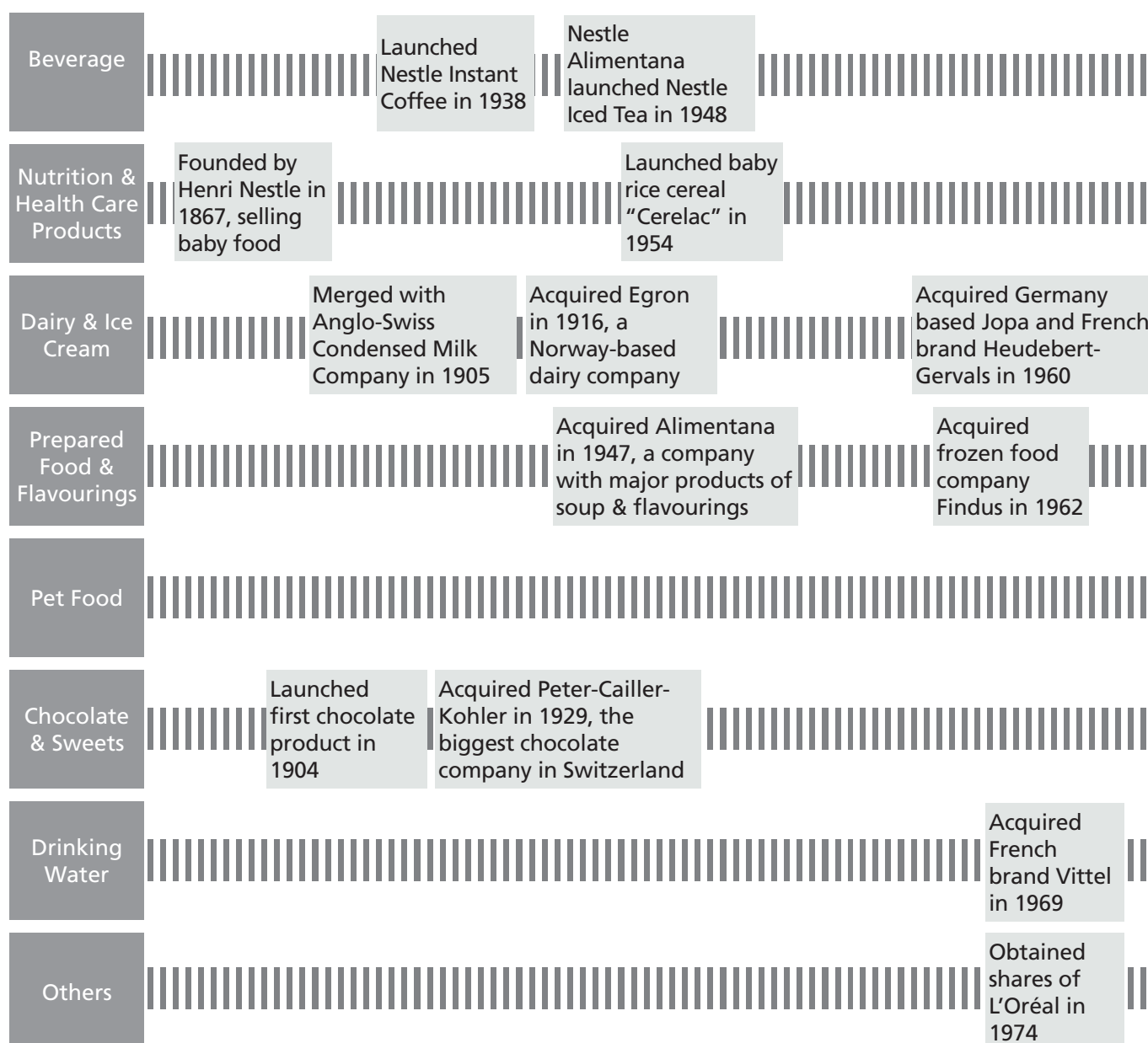
Mengniu	(2,867)	(2,931)	(3,043)	(3,268)
Bright	(3,241)	(3,946)	(3,652)	(3,419)
Yili	(1,195)	(1,797)	(2,166)	(1,290)

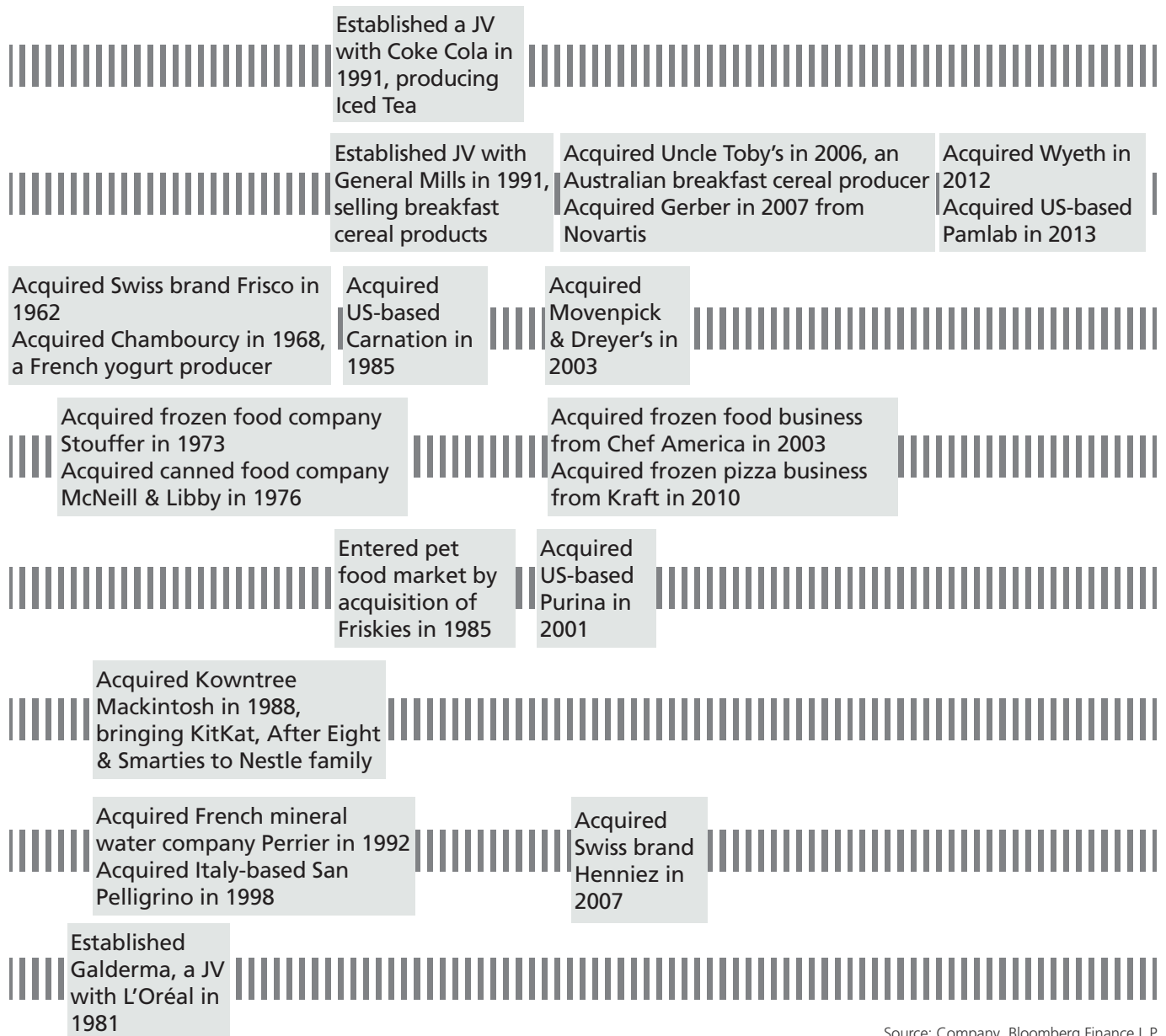
OCF

Mengniu	3,284	3,080	1,909	4,513
Bright	5,475	2,436	9,536	9,536
Yili	1,305	338	1,866	2,609

Source: Company data, DBS Vickers

Nestle: company historic development and M&As





Source: Company, Bloomberg Finance L.P.

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