2018 DIRA Review: Drivers of industry performance

A REPORT PREPARED FOR THE MINISTRY FOR PRIMARY INDUSTRIES

August 2018

2018 DIRA Review: Drivers of industry performance

Contents

2018 DIRA Review: Drivers of industry performance

Boxes

Figures

Tables

Executive summary

Frontier Economics is pleased to submit this report to the Ministry for Primary Industries (MPI), assessing the key divers of the performance of the New Zealand dairy sector since the introduction of the Dairy Industry Restructuring Act 2001 (DIRA).

Our first report, Report One, drew on reliable publicly available data, and information provided to us by MPI, to assess the historical performance of the dairy sector in New Zealand in a number of dimensions (economic, environmental, consumer and social) since 2001. This report, Report Two, builds on the evidence base presented in Report One to identify the factors most likely to have driven this performance.

In this Executive Summary we briefly outline the key performance outcomes, before identifying the drivers for each outcome in turn.

Economic benefit

The dairy sector has provided, and continues to provide, substantial **economic benefit** to New Zealand. The **value** of the dairy sector in New Zealand grew significantly, by an average of 5.1% per annum, from NZ$7.9 billion in 2001 to NZ$16.6 billion in 2016. In comparison, New Zealand's nominal gross domestic product (GDP) grew by 4.5% over the same period. New Zealand's dairy **exports** more than doubled from NZ$6.1 billion in 2004 to NZ$14.6 billion in 2017. Increased exports to China comprised approximately 40% of this export growth. **Employment** in dairy farming and processing has increased relatively consistently at around 3% per annum from 24,840 employed in 2001 to 38,551 employed in 2017.

Global demand for dairy products has, on balance, driven a large part of the economic benefits that have flowed from the dairy sector derive. Initially, this growth in global dairy demand was for lower value commodities (underpinned by milk volume growth). More laterally demand has grown for higher value products. Domestic policy settings and Fonterra's position as a large supplier internationally contributed to New Zealand being well placed to capitalise on this increased global demand for dairy products. The behavioural constraints imposed by **DIRA** on Fonterra have likely increased the sector's economic benefit by helping to ensure dairy farmers receive an efficient price for the milk they produce (thus enabling efficient expansion of milk supply), and also by enabling the entry of several independent processors.

Regional economic benefit

The dairy sector brings considerable benefit to New Zealand's **regional economy**, although the distribution of economic benefits varies by region. Data on the contribution of dairy farming and processing to New Zealand's GDP at a regional level over time are unavailable, but regional employment data show the largest increases in regional employment associated with dairy farming and processing between 2001 and 2017 occurred in Canterbury, Waikato, Southland and Otago.

On balance, it seems likely that the regional distribution of economic benefits associated with dairy farming and processing is a function of the **decisions made by farmers** to expand milk production over time, including by converting land from other forms of farming to dairy farming. This in turn was influenced by developments in **global dairy markets**, and the reflection of these trends in the farmgate milk price. The decision making of farmers influenced, to some extent, the decision making of processors locating nearby.

There are a number of other factors that have likely influenced farmer decision making and facilitated the expansion of dairy farming and processing at a regional level, including **developments in other commodity markets**, **developments in on-farm technology**, **global capital markets** and the open entry/exit provisions of **DIRA**. However, it is difficult to isolate the extent to which each of these factors has driven the New Zealand dairy sector's performance.

Export product mix

The **product mix** of exported dairy goods has not changed substantially over the period from 2004. Whole milk powder was consistently the largest dairy export product by value, representing 31% of all dairy exports in 2004 and 36% in 2017, contributing 40% of the growth in dairy exports between 2004 and 2017. Although we note that the share of export value derived from products classified as "other" – which includes higher value products – has increased from approximately 3% in 2004 to nearly 11% in 2017.

Whilst the mix of dairy products exported by New Zealand has not changed significantly over time, the **value of exports** has increased very materially across all product categories. For example, between 2004 and 2017 the export value of:

- Whole milk powder increased from NZ$1.9 billion to NZ$5.3 billion (an increase of NZ$3.4 billion, or 283%);
- Butter, AMF and cream products from NZ$1.1 billion to NZ$2.8 billion (an increase of NZ$1.7 billion, or 260%);
- Cheese, and casein and protein products, from approximately NZ$1.0 billion to approximately NZ$1.8 billion (an increase of approximately NZ$0.8 billion, or 180%);

- Skim milk and butter milk powder from NZ$0.9 billion to NZ$1.4 billion (an increase of NZ$0.5 billion, or 150%); and
- Other dairy products from NZ$0.2 billion to NZ$1.6 billion (an increase of NZ$1.4 billion, or 683%).

These statistics suggest that New Zealand has succeeded in increasing it supply of dairy commodities (such as whole milk powder) and high value products, although the greatest growth (in dollar terms) has been in relation to commodities.

The **investment** by New Zealand dairy processors required to substantially change the product mix has been modest by global standards. For example, Fonterra has invested approximately NZ$900 million in R&D over the past decade, or approximately 0.6% of its annual turnover, compared to the average of 1.1% of annual turnover invested in R&D by the largest food producers globally over the past 10 years.

There are a range of factors that have influenced the product mix, and relatedly, the extent and nature of investments by New Zealand processors. There has been, since 2001, significant growth in demand for dairy products from Asian countries in particular—notably China. Much of this growth in demand was for whole milk powder. This shift in **global demand for dairy products** represented a significant economic opportunity for New Zealand dairy processors, and the investments made by these companies since 2001 have in large part been oriented towards satisfying this growth in demand. New Zealand's success in meeting demand from Asia appears to have been enabled by well-timed free trade agreements with several Asian countries.

However, it is likely that Fonterra's ownership structure and, in particular, the preferences of its farmer shareholders, meant that Fonterra faced **capital constraints** that may have affected its ability to invest in moving more volumes into higher value products.

Processing market developments

There has been a modest increase in **competition in dairy processing** in New Zealand since 2001. Fonterra's share of milk collected at the farmgate in New Zealand has fallen from 96% in 2001 to 82% in 2017. However, the total volume of milk produced in New Zealand increased by approximately 60% over this time, meaning the volumes of milk collected by Fonterra also increased significantly. Independent processors accounted for approximately 41% of the growth in raw milk solids collected since 2001; Fonterra accounted for 59% of growth in raw milk solids collected. The extent of competition in dairy processing varies significantly at a regional level.

The significant global **growth in dairy demand** has been necessary, but not sufficient, for the extent of **entry observed in farmgate markets**. The evidence suggests that subpart 5 of the **DIRA** has been successful in lowering barriers to

entry, allowing efficient processors to compete with Fonterra in farmgate markets. Alternative **business models** and **access to capital** have also contributed to entry in the sector, as independent processors have been able to pursue different opportunities and strategies to Fonterra.

There has been **little entry into the factory gate market**. Fonterra retains a very large share of milk collections, and players in the farmgate market typically do not have scale or business models to supply the factory gate market. Raw milk regulations are competitively constraining Fonterra in this market, which is important in lowering barriers to the farmgate market and protecting New Zealand consumers from higher prices.

Environmental performance

There is evidence the rapid growth of the New Zealand dairy sector has resulted in environmental degradation. The **usage of land for dairy farming** has increased from approximately 1.4 million hectares in 2001 to 1.7 million hectares in 2017. Dairy farm **land use intensity** has increased markedly in certain regions, such as North Canterbury and South Canterbury, with the conversion of land historically used for sheep and beef farming.

Nitrogen leaching into New Zealand's waterways increased by from approximately 37 million kilograms in 2001 to nearly 50 million kilograms in 2012—an increase of approximately 3% per annum, in line with the growth in milk production. Unfortunately, no reliable public data exists on the extent of nitrogen leaching since 2012. **Methane emissions** from dairy cattle in New Zealand have grown relatively slowly since 2001, at approximately 1% per annum. However, emissions from the agricultural sector (of which dairy is by far the largest contributor) accounts for nearly 50% of New Zealand's total greenhouse gas emissions annually—the largest proportion in the OECD.

It is likely that the **decisions made by dairy farmers**, influenced by **developments in global dairy markets** then reflected in the farmgate milk price, are the most important driver of environmental performance in the New Zealand dairy sector. It is possible **developments in other commodity markets**, the **open entry/exit provisions of DIRA**, **access to capital** and **technological developments** may have facilitated land-use changes and the associated environmental degradation, as discussed above in the context of regional economic benefits.

The environmental damage attributed to the dairy sector appears to be at odds with **public expectations** about how the sector ought to interact with the community at large—namely, that the sector should not impose disproportionate harm to the environment. Public perceptions about the environmental performance of the sector may also reflect concerns about how the costs and benefits that flow from the activities of the sector are distributed throughout

society. For example, are relatively few individuals capturing most of the economic benefits, while the environmental costs are being borne by the community at large?

The fact that there is evidence of worsening environmental outcomes as the dairy sector has grown suggests that the existing **environmental regulatory framework** has not constrained fully the adverse environmental outcomes associated with dairy farming over the period since DIRA was introduced. It should be noted that several initiatives have been launched recently by central and local government, and by the dairy industry, to mitigate these poor environmental outcomes. However, it is too early to evaluate the efficacy of these initiatives.

Consumer outcomes

With the exception of butter, **changes in the domestic price of dairy products** have been roughly in line with movements in the consumer price index and overall retail grocery price trends since 2007, increasing at less than 1% per annum in real terms. There is some qualitative evidence that the **product range** available to domestic retail consumers has expanded since 2001. Retail milk prices in New Zealand are **relatively constant throughout the year**, despite the significant seasonality of milk production, and the attendant differences in the cost of milk production within the year.

The primary driver for the expansion in the range of dairy products available to domestic consumers in New Zealand has been changes in **domestic demand and preferences**. **Subpart 5 of the DIRA** is likely to have facilitated the entry of niche suppliers and the development of new products. There has been no large-scale entrant focused on supplying the domestic market, given the scale of the domestic market relative to export opportunities.

Technological developments, leading to productivity gains, may have resulted in smaller retail price increases for dairy products in New Zealand than would otherwise have been the case. However, evidence to substantiate this conclusion is not available. It is notable that domestic dairy prices have not reflected the substantial decline in **global dairy prices**[1] (between 15% and 28%, in nominal term, depending on the price index used) over the period 2007 to 2017.

Social performance

The social performance of the dairy sector in New Zealand reflects the public perception over economic performance, environmental performance and consumer outcomes. Specifically, there has been public concern that the **economic benefits** from the growth in the New Zealand dairy sector has come at the cost of **environmental harm** and **higher prices** to domestic consumers.

---

1 Excluding butter.

The most significant driver of the social performance of the dairy industry in New Zealand is likely to be **public expectations** in interpreting economic, environmental and consumer outcomes. In turn, the economic benefits of the sector appear to be driven by a combination of exogenous factors, such as the very significant growth in **global demand for dairy products**. This was likely facilitated by a number of factors, including the **constraints imposed by DIRA** on Fonterra, which facilitated the significant expansion of the sector. The negative environmental outcomes observed appear to have been driven by many of the same factors, including **farmers' decisions** to expand dairying activities. However, the **absence of sufficiently stringent environmental protections**, including Government and industry initiatives early on to mitigate environmental harm were likely significant in allowing those outcomes to occur. The social dimension to perceptions about poor consumer outcomes appear to be motivated by **concerns about affordability** of dairy products to ordinary consumers, rather than lack of variety and product choice.

1 Introduction

Frontier Economics is pleased to submit this report to the Ministry for Primary Industries (MPI), assessing the factors driving performance of the New Zealand dairy sector since the introduction of the Dairy Industry Restructuring Act 2001 (DIRA).

1.1 Background

In May 2018 the Minister of Agriculture announced a review of the DIRA and its impact on the dairy sector (the Review).[2] The key objectives of the Review are to consider:

- Whether the regulatory regime enshrined in DIRA is operating in the interests of New Zealand's consumers, farmers and society;
- Any unintended consequences arising from DIRA; and
- Whether DIRA remains fit-for-purpose.

The key stages of the Review involve:

- Stage 1: Determining facts and building evidence;
- Stage 2: Considering options for change through consultation and subsequent recommendations to the Government; and
- Stage 3: Implementing the Review's findings.

In this context, MPI has commissioned Frontier Economics to assist in the first stage of the Review. In particular, Frontier Economics has been asked to describe the performance of the dairy sector in New Zealand since the introduction of DIRA, and consider the extent to which this performance is attributable to DIRA or other factors (such as Fonterra's business strategy, other regulation in New Zealand or global drivers).

1.2 Role of this report

Frontier Economics has been asked to prepare two reports for MPI:

- Our first report, Report One, examined how the dairy sector in New Zealand has performed in a number of dimensions (economic, environmental, consumer, social impact) since 2001. It also examined how the dairy sector in other countries—Australia and New Zealand—and the New Zealand tourism

[2] Ministry for Primary Industries, *Terms of reference for the review of the Dairy Industry Restructuring Act 2001 and its impact on the dairy industry*, 9 May 2018.

sector, performed over the same period to provide reference points against which to assess the performance of the New Zealand dairy sector.

- This report, Report Two, builds on the evidence base presented in Report One to examine and, where possible, attribute the factors that have driven the observed performance of the New Zealand dairy sector.

The two reports should be read in conjunction with one another.

In preparing these two reports, we have drawn on reliable and publicly available, information from government and industry sources, and other information provided to us by MPI, that was able to be accessed within the relatively short timeframes for this project. We were assisted in data collection by MPI staff.

1.3 Structure of this report

The remainder of this report is organised as follows:

- Section 2 sets our **analytical framework** for this report.
- Section 3 summarises the **key findings from Report One**—namely the key outcomes that describe the performance of the New Zealand dairy sector since the introduction of DIRA.
- Section 4 identifies and briefly describes the **potential drivers** of the outcomes identified.
- Section 5 **analyses** the extent to which each of the key observed outcomes for the New Zealand dairy sector can be explained by the potential drivers.

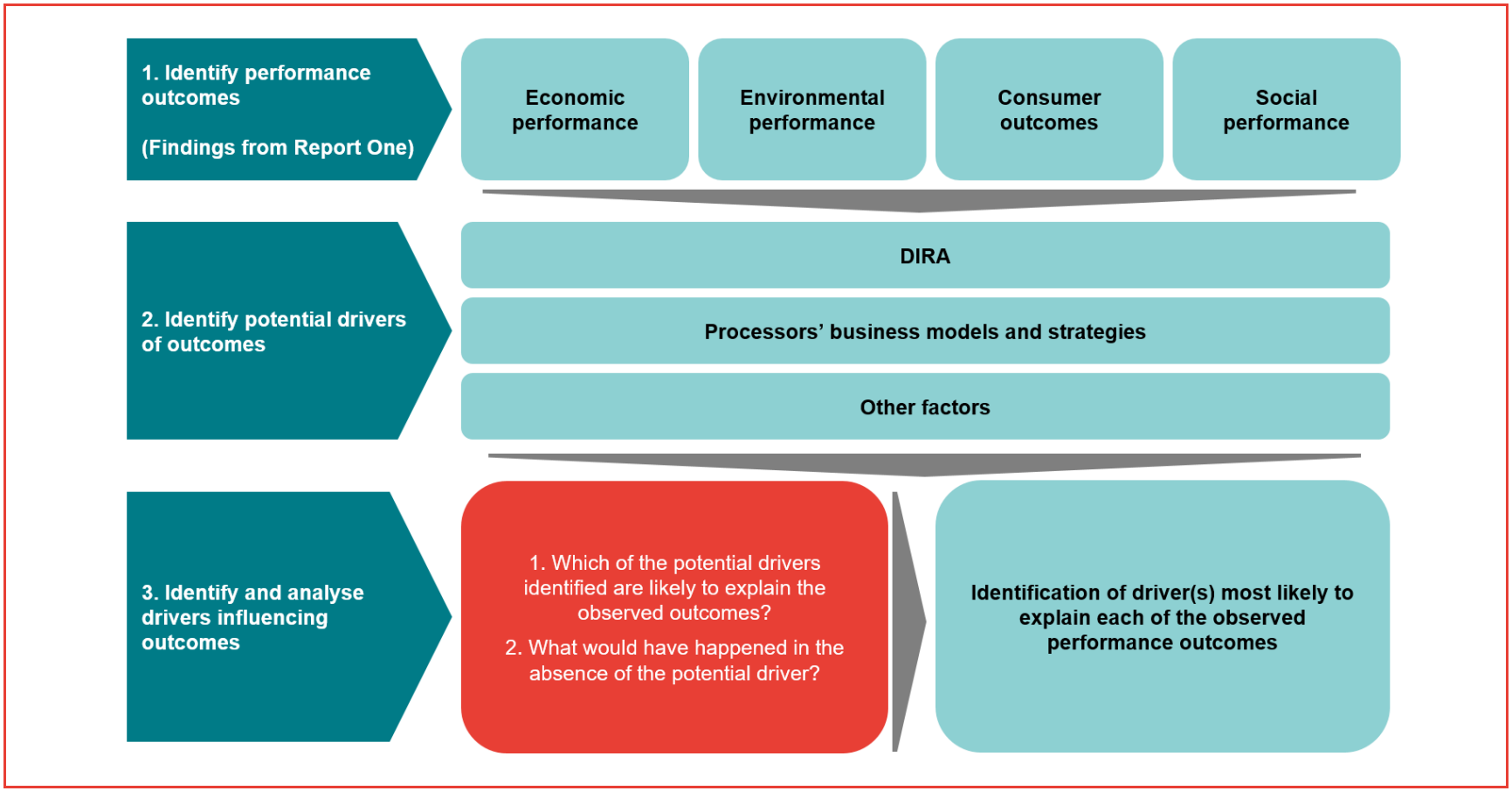
2 Analytical approach

A wide range of factors have influenced the performance of the New Zealand dairy sector over time. Identifying and isolating the influence of each of these factors on the performance of the sector is not straightforward. We have therefore developed an analytical framework to ensure our approach to identifying and attributing the influence of each driver is as systematic and comprehensive as possible. Figure 1 provides an overview of our analytical approach.

Our analysis proceeds using the following process:

- We first summarise the observed performance outcomes we are seeking to explain, drawing on the findings from Report One, in Section 3.
- We then describe potential drivers of the key outcomes in Section 4. We group the potential drivers according to three main categories:
  - DIRA, including for example Fonterra's obligation to accept raw milk from farmers.
  - Processors' business models and strategies, including for example corporate structures and pricing strategies.
  - Other factors, including for example trade policy and consumer preferences.
- Finally, for each of the observed performance outcomes in turn, we discuss the drivers most likely to have influenced those outcomes (see Section 5). We do this by:
  - Identifying the drivers that are unlikely to have influenced outcomes to identify the relevant drivers.
  - Discussing the influence of each driver in turn, considering what would have happened in the absence of the driver, and focussing on the most important drivers.
  - Where possible, commenting on the relative influence of various drivers, recognising that it might not be possible to disentangle the influence of various drivers and that the relative importance of the drivers may have changed over time.

Figure 1: Overview of approach adopted in this report



Source: Frontier Economics

3 Outcomes observed in the New Zealand dairy sector

This section summarises the main findings observed in the performance of the New Zealand dairy sector over the period 2001 to 2017, presented in Report One. It considers in turn the key outcomes associated with the economic performance (Section 3.1), environmental performance (Section 3.2), consumer outcomes (Section 3.3) and social performance (Section 3.4) related to the New Zealand dairy sector in turn. A more detailed discussion of each of these outcomes is presented in Report One. These key drivers of these outcomes are analysed in Section 5.

3.1 Economic performance

The New Zealand dairy sector has provided, and continues to provide, substantial **economic benefit** to New Zealand.

- The **value** of the dairy sector in New Zealand grew significantly, by an average of 5.1% per annum, from NZ$7.9 billion in 2001 to NZ$16.6 billion in 2016. In comparison New Zealand's nominal gross domestic product (GDP) grew by 4.5% annually over the same period.
- **Milk production** has grown relatively consistently at around 3% per annum on average over the study period, from 12.9 billion litres in 2001 to 20.7 billion litres in 2017.
- The growth in the value of the sector has been driven by growth in **exports**, rather than growth in the domestic market.
  - New Zealand's dairy exports have grown at an average rate of around 7% per year between 2004 and 2017, more than doubling from NZ$6.1 billion to NZ$14.6 billion. Exports to China comprised approximately 40% of this export growth.
  - Whole milk powder was consistently the largest dairy export product by value (representing 31% of all dairy exports in 2004 and 36% in 2017), and has contributed the most (40%) to growth in dairy exports between 2004 and 2017.
- The prominence of **commodities** in New Zealand's dairy export portfolio exposes the industry to volatile returns.
- **Employment** in dairy farming and processing has increased relatively consistently at around 3% per annum from 24,840 employed in 2001 to 38,551 employed in 2017.

The dairy sector brings considerable benefit to New Zealand's **regional economy**, although the distribution of economic benefits varies by region:

- Data on the contribution of dairy farming and processing to New Zealand's GDP at a regional level over time are not available, but regional employment data can be used as a proxy for economic activity.
- Between 2001 and 2017, the largest increases regional employment associated with dairy farming and processing occurred in Canterbury, Waikato, Southland and Otago.

The **product mix** of exported dairy goods has not changed substantially over the period from 2004.

- Whole milk powder was consistently the largest dairy export product by value, representing 31% of all dairy exports in 2004 and 36% in 2017, contributing 40% of the growth in dairy exports between 2004 and 2017.
- The share of export value attributable to butter, AMF and cream has remained relatively constant over the period from 2004 to 2017, increasing from 18% to 19%.
- The share of export value from cheese has fallen from 17% in 2004 to 13% in 2017.
- Casein and protein products contribution to export value has also decreased from 16% to 12%.
- Skim and butter milk powder as a proportion of export value have fallen from 15% in 2004 to 9% in 2017.
- The share of export value derived from other products has increased from 4% in 2004 to 11% in 2017.

Whilst the mix of products has not changed significantly, the **value of exports** in all these product categories has increased very substantially. For example, between 2004 and 2017, the export value of:

- Whole milk powder increased from NZ$1.9 billion to NZ$5.3 billion (an increase of 283%);
- Butter, AMF and cream products from NZ$1.1 billion to NZ$2.8 billion (an increase of 260%);
- Cheese, and casein and protein products, from approximately NZ$1.0 billion to approximately NZ$1.8 billion (an increase of approximately 180%);
- Skim milk and butter milk powder from NZ$0.9 billion to NZ$1.4 billion (an increase of 150%); and
- Other dairy products from NZ$0.2 billion to NZ$1.6 billion (an increase of 683%). The growth in this category could indicate an expansion in variety of

products and/or growth in premium products, although the data are not sufficiently disaggregated to discern this definitively.

Investment in R&D by New Zealand dairy processors has been modest by global standards:

- Fonterra has invested approximately $900 million in R&D over the past decade, or approximately 0.6% of its annual turnover. The largest food producers globally have, on average, invested approximately 1.1% of their annual turnover in R&D, over the past 10 years.
- Fonterra invests more annually on marketing, sales and distribution than it has invested over the past 10 years in R&D.
- The New Zealand Government has also invested in R&D in the dairy sector. For example, the Government has committed $170 million over seven years under the Transforming the Dairy Value Chain Primary Growth Partnership programme to boost innovation in and the productivity of the dairy sector. However, this remains a very small fraction of the total investments made by Fonterra ($15.27 billion) and independent processors ($2.65 billion) between 2001 and 2017.

There has been a modest increase in **competition in dairy processing** in New Zealand since 2001:

- Fonterra's share of milk collected at the farmgate in New Zealand has fallen from 96% in 2001 to 82% in 2017 (although, as noted above, the total volume of milk produced in New Zealand has increased by approximately 60% since 2001). The extent of competition in dairy processing varies significantly at a regional level.
- Independent processors accounted for approximately 41% of the growth in raw milk solids collected since 2001; Fonterra accounted for 59% of growth in raw milk solids collected.
- Since 2001, four independent processors (Open Country Dairy, Synlait, Oceania and Miraka) have entered the farmgate markets, and one processor (New Zealand Dairies) has entered and exited. Nutricia Danone and Yashili have also entered the processing sector, and Mataura Valley Milk has announced entry in 2018. All of these processors are significantly smaller than Fonterra (the next largest processor's 2016 turnover was just 5% of Fonterra's) and are primarily focussed on export markets.
- Numerous small-to-medium and niche processors have also entered the domestic dairy markets.

3.2 Environmental performance

The rapid growth of the New Zealand dairy sector has resulted in environmental degradation:

- The **land used for dairy farming** has increased from approximately 1.4 million hectares in 2001 to 1.7 million hectares in 2017.
- Dairy farm **land-use intensity** has increased markedly in certain regions, such as North Canterbury and South Canterbury, with the conversion of land historically used for sheep and beef farming (particularly in the South Island) and in some regions planation forestry (particularly in Waikato) and, to a much lesser extent, scrub.
- **Nitrogen leaching** into New Zealand's waterways increased by from approximately 37 million kilograms in 2001 to nearly 50 million kilograms in 2012—an increase of approximately 3% per annum, in line with the growth in milk production. No data on nitrogen leaching are available beyond 2012.
- **Methane emissions** from dairy cattle in New Zealand have grown relatively slowly since 2001, at approximately 1% per annum. However, emissions from the agricultural sector (of which dairy is by far the largest contributor) accounts for nearly 50% of New Zealand's total greenhouse gas emissions annually. This is significantly larger than any other sector in New Zealand, and is also the largest proportion in the OECD.

3.3 Consumer outcomes

Consumers are concerned that the prices of dairy products in New Zealand are relatively expensive. This has been the subject of two major public inquiries:

- Our analysis of consumer outcomes focused on the **domestic market**, although the vast majority (around 95%) of the New Zealand's dairy sector's output is exported.
- There is some qualitative evidence that the **product range** available to domestic retail consumers has expanded since 2001.
- With the exception of butter, **changes in the domestic price of dairy products** have been roughly line with movements in the consumer price index (CPI) and overall retail grocery price trends since 2007, increasing at less than 1% per annum in real terms.
- However, over the same period, global dairy prices have fallen in nominal terms by between 15% and 28% (depending on the dairy commodity index considered). It is unclear why the price of dairy products domestically have increased (in nominal terms) while global dairy commodity prices have declined over the same period.

- Retail milk prices in New Zealand **are relatively constant throughout the year**, despite the significant seasonality of milk production and the associated difference in the cost of production within the year.

3.4 Social performance

The social performance of the dairy sector in New Zealand reflects the public perception over economic performance, environmental performance and consumer outcomes. Specifically, there has been public concern that the economic benefits from the growth in the New Zealand dairy sector has come at the cost of:

- environmental harm and some loss of environmental amenity value; and
- economic detriment to domestic consumers through higher prices for staple dairy foods considered important to health and wellbeing of New Zealanders.

There may also be some concern that, whilst the economic benefits of the dairy sector have been felt most in particular regions where dairy farming activity has intensified since 2001, the spillover costs described above may be felt more widely by New Zealanders that have not benefited directly from this economic success.

4 Potential drivers of outcomes

This section introduces and describes each of the potential drivers we analyse in this report. Section 4.1 describes the factors relating to DIRA. Section 4.2 considers those factors related to the business models and strategies of processors. Section 4.3 considers other factors that could potentially have influenced the observed performance of the New Zealand dairy sector. This section does not seek to analyse the extent to which each of these potential drivers may have influenced outcomes. That task is undertaken in the remaining sections of this report.

4.1 DIRA factors

The DIRA was enacted in 2001 and brought with it a new structure for the New Zealand dairy sector. Prior to the Act, the sector was dominated by two incumbent cooperatives – Kiwi Dairies and the New Zealand Dairy Group. However, the two cooperatives were only able to compete domestically and in the farmgate milk market, as both had to sell their products to the New Zealand Dairy Board (NZBN), which had then marketed these products offshore through its single-desk export status afforded to it by law.

The 2001 DIRA facilitated the formation of Fonterra, after previous attempts to merge Kiwi Dairies and the New Zealand Dairy Group had been preliminarily blocked by the Commerce Commission on competition grounds. It also saw the NZDB dissolved, removing the single-desk exporter status and liberalising access to export markets (including, over time, quota markets). This provided opportunities for new processors to enter and compete with Fonterra in the farmgate market to serve global export markets.

Given Fonterra's dominant position (at the time of the merger, it collected 96% of all milk produced in New Zealand), subpart 5 of the DIRA was designed to regulate the activities of Fonterra to promote the efficient operation of dairy markets in New Zealand. The DIRA set out to achieve this by safeguarding two elements of the dairy markets: contestability for the supply of milk from farmers (provisions 1 to 4), and competition in the wholesale supply of domestic consumer milk products (provision 5). We discuss these in detail below.

4.1.1 Open entry and exit

Contestability in the context of the DIRA refers to the ability of dairy processors to source milk from farmers in the farmgate market. The remit of regulation in this context was to prevent Fonterra from foreclosing competition by hindering farmers' ability to switch between processors. It was intended that freedom of choice amongst farmers in who they supply their milk to, would allow for an efficient allocation in the form of milk being channelled into its most productive

usages, and enhance Fonterra's incentives to be efficient and therefore be able to compete with independent processors for farmers' milk.

Specifically, the DIRA requires that Fonterra has an open entry and exit scheme for shareholding farmers. This includes the following.

- Fonterra is obliged to accept applications to supply milk, if accompanied by the required share capital[3, 4]
- Fonterra is obligated to allow shareholding farmers the right to reduce or cease supply to the cooperative.[5]
- Fonterra may offer farmer suppliers long-term contracts, but only if at least 33% of milk solids produced within a 160km radius of any point in New Zealand are produced by independent processors, or under contracts with Fonterra that the supplier may terminate at the end of the current season, at no cost to the supplier.[6] This regulation was designed to limit the extent to which Fonterra can lock supplier shareholders into their supply chain through long-term contracts, exclusivity agreements, or other such mechanisms.
- Under the no-discrimination clause,[7] Fonterra must ensure that the terms of supply that apply to a new entrant are the same as those that apply to a shareholding farmer in the same circumstances, and that if there are differences in the terms, they must reflect only differences in circumstances.
- A shareholding farmer who withdraws fully from supplying to Fonterra is entitled to request that Fonterra sell a milk vat situated on their farm, either to the farmer or to another independent processor.[8]

Such an approach ensures that Fonterra cannot impede entrance of new independent processors into the market, by prohibiting the movement of farmers between suppliers. Obtaining farmer-suppliers is critical to the success of an independent processor in establishing itself in the primary dairy processing industry, and without the free entry and exit provisions Fonterra may be able to hinder the ability of new independent processors to attain the critical mass of capacity utilisation necessary for the business to be viable. Indeed, almost all independent processors have cited the importance of these provisions in relation

---

3 With the exception of new entrants unable or unwilling to supply more than 10,000kg of milk solids in a single season, or new entrants for whom the cost of transporting the milk exceeds the highest cost of transporting another shareholding farmer's milk (see sections 94 and 95 of the DIRA).

4 DIRA, section 73

5 DIRA, section 97

6 DIRA, section 107

7 DIRA, section 106

8 DIRA, section 109

to their decision to enter the market.[9] Moreover, farmers have emphasised the importance of the provisions in reducing the risk they face in switching processors – if an arrangement with a new independent processor does not work out, they can return to Fonterra.

4.1.2 Trading Among Farmers

The open entry and exit mechanism is facilitated by Fonterra's shareholding system. In accordance with its cooperative corporate model, the amount of milk an individual farmer can supply to Fonterra is pegged to the number of Fonterra shares that they own. Consistent with the open entry and exit policy, Fonterra was obliged to buy and sell shares from farmers according to how much milk they wished to supply. The DIRA required that the prices for buying and selling shares were the same, therefore inhibiting Fonterra's ability to restrict exit by not allowing farmers to redeem their full capital value.

As there was no open market for Fonterra's shares that would allow natural price discovery, shares were priced according to the externally administered (by Standard & Poor's) Fair Value share pricing mechanism.

This system was replaced in 2012, when the Trading Among Farmers (TAF) corporate restructure saw the implementation of the Fonterra Shareholders Market (FSM)—an internal marketplace for shareholding farmers—and the option for farmers to hold "dry" shares over and above their milk production amounts. Open entry and exit however, was not impacted by these changes, as farmers now buy and sell shares in a market rather than trading directly with Fonterra. So long as the Fonterra Shareholders Market is sufficiently liquid, farmers will not be constrained from releasing their capital if/when they exit Fonterra.

The DIRA contains a number of provisions that aim to ensure liquidity of the Fonterra's Shareholders Market.

4.1.3 Milk price setting

Subpart 5a of the DIRA was inserted to help "promote the setting of a base milk price that provides an incentive to new co-op to operate efficiently while providing for contestability in the market for the purchase of milk from farmers."[10]

9 Commerce Commission, Review of the state of competition in the New Zealand Dairy Industry (2016), section 4.43

10 DIRA, ss 150A

Subpart 5a details requirements for:

- the establishment of a **Milk Price Panel** – by Fonterra – that supervises the calculation of the price, and advises Fonterra on the application of the Milk Price manual;
- the **milk price manual** that sets out how the base milk price is calculated[11]; and
- the Commerce Commission's **milk price monitoring regime** that is intended to promote greater transparency and confidence in Fonterra's base milk price setting.

Further below, section 4.2.2 provides more details of the mechanics of Fonterra's milk price setting mechanism.

4.1.4 Right to supply independent processors – the 20% rule

Section 108 of the DIRA outlines the provision that Fonterra member farmers are allowed to sell up to 20% of their produce to dairy producers other than Fonterra. Supplier shareholders do not therefore have to sell all of their milk to Fonterra. The purpose behind this sub section is that farmers can supply a proportion of their milk to independent processors, rather than all of their milk, which may be seen as a lower risk way to switch at least some of their supply, thereby lowering barriers to entry into the farmgate market. Many of the larger independent processors do not make use of this provision however, due to the associated practical difficulties, such as the need for duplicate testing on the farm and duplicate vats.[12] Our understanding from MPI was that the 20% rule was included in the DIRA particularly to encourage the entry of independent processors that would compete to supply the domestic market, rather than assist the entry of export focussed processors.

4.1.5 Raw Milk Regulations

Given Fonterra collected about 96% of farmers milk in New Zealand at the time of its inception, there was a concern amongst policymakers that independent processors may be unable to secure sufficient raw milk to build enough scale to become viable and compete—particularly to supply domestic consumers. The

---

11 In exceptional circumstances Fonterra may deviate from the milk price manual. Fonterra has deviated from the milk price manual only once since the regime has been in place, in the 2013/14, in response to the disconnect between whole milk powder prices (which were at an all time high) and Fonterra's processing capacity (which contained facilities to process cheese and other products, constraining Fonterra's capacity to respond to global whole milk powder prices in the short term) (Fonterra, 'Reasons' Paper in support of Fonterra's base milk price for the 2013/14 season (July 2014), p43).

12 For example: Westland, Review of the state of competition in the New Zealand dairy industry: Consultation paper—process and approach (10 July 2015).

absence of a large-scale domestic competitor might have allowed Fonterra to leverage its market power and charge higher wholesale prices for its produce.

In order to protect against this possibility, the DIRA provided for the introduction of Raw Milk Regulations, which imposed a number of provisions on the behaviour of Fonterra with respect to domestic independent processors. Chief among these provisions, Fonterra was required to provide 250 million litres of unprocessed milk per year to a newly formed domestic competitor, at an agreed or a regulated price. This competitor was formed using a divestment of 50% of Fonterra's product manufacturing assets, and is today known as Goodman Fielder. The original supply agreement between Fonterra and Goodman Fielder has been renewed once and the existing agreement is set to expire in 2021. Goodman Fielder has already expressed its desire to extend the contract, citing the absence of a viable alternative supplier capable of meeting its requirements on acceptable terms. Supply from alternative suppliers such as Westland or Synlait are typically negligible, Goodman Fielder has argued, owing to the fact other such independent processors will only supply raw milk when collections are in excess of their own requirements.

Furthermore, Fonterra was obligated to provide up to 50 million litres of unprocessed milk per year at an agreed or regulated price to any other independent processor, such as cheese, chocolate and ice-cream producers. It was hoped that this provision would lower barriers to entry to the farmgate market, and help foster development and diversity of dairy product offerings in the broader New Zealand food sector, thereby benefiting domestic consumers. The DIRA mandated that 600 million litres was the maximum amount of regulated milk that Fonterra was obliged to supply in total. This total amount has been, and is, subject to regular review.

Fonterra is obliged to sell regulated raw milk at the default milk price to independent processors that supply more than 30 litres of their own[13] raw milk. However, independent processors that supply less than 30 million litres of their own raw milk have the option to purchase regulated raw milk from Fonterra at fixed quarterly prices, which are set according to the most recent forecast of the farmgate milk price. This provision was designed to protect smaller processors from some degree of the volatility associated with milk price fluctuations.

Finally, from June 2016, Fonterra is no longer obliged to supply price-regulated raw milk to independent processors who have had an own supply of raw milk in excess of 30 million litres for the previous three consecutive seasons.

---

13 An independent processor's (IP's) own supply is defined as "raw milk collected from dairy farmers by or on behalf of an IP".

4.2 Processing business model and strategy

This section sets out the potential drivers of the outcomes that relate to processors' business model and strategy. As Fonterra currently accounts for a very large share of the New Zealand dairy sector, its model and strategy are significant drivers of the sector overall. However, independent processors have accounted for approximately 41% of the growth since 2001 in milk solids collected, and therefore we explore their business models and strategies as potential drivers of the observed outcomes.

The remainder of this section discusses:

- the impact of the cooperative model and wider governance arrangements;
- the impact of Fonterra's milk prices settings;
- Fonterra's published strategy;
- independent processors business models and strategies;
- vertical integration;
- investment in R&D; and
- access to capital.

4.2.1 Impact of cooperative model and wider governance arrangements

Fonterra, Tatua and Westland are all supplier-owned dairy cooperatives. While numerous investor-owned processors have entered since 2001 (as detailed in section 2.3 of Report One), cooperatives remain the predominant model in New Zealand. We detailed in section 2.6.1 of Report One Fonterra's cooperative model and relevant wider governance arrangements. Here, we present a summary of the most important features of Fonterra's corporate structure, in its present form:

- Fonterra operates under a unique corporate structure that may be referred to as a hybrid cooperative model; it is owned by its farmer shareholders, and offers non-ownership economic rights over 6% to 8% of its share capital to external investors via the Fonterra Shareholders Fund (FSF).
- After the implementation of TAF in 2012, farmers trade supply-contingent "wet" shares and non-supply-contingent "dry" shares with each other on the FSM, rather than directly with Fonterra.
- Strict restrictions are in place on the size of the FSF, so as not to threaten farmer ownership over the cooperative. The FSF is viewed primarily as a vehicle for providing liquidity for the FSM, rather than for procuring external equity capital.

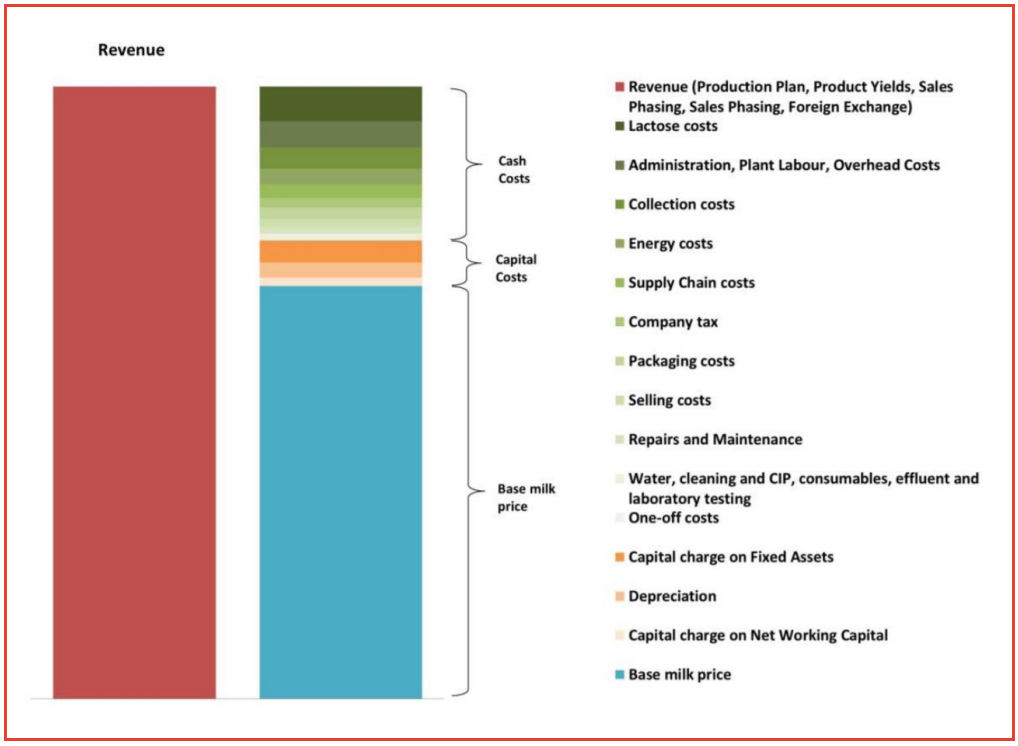
- The FSM and the FSF succeeded in alleviating the redemption risk that Fonterra's balance sheet was previously exposed to, under the traditional cooperative model. Prior to TAF, capital washed in and out of Fonterra's balance sheet according to the milk supply yielded each year.

4.2.2 Impact of milk price settings

Fonterra farmers receive two income streams from Fonterra: a milk price as suppliers of raw milk and a dividend on their shareholding in the company. Given its position as the largest dairy processor in New Zealand, Fonterra's farmgate milk price is used as a benchmark from which most independent processors set their price.[14]

Figure 2 summarises how Fonterra calculates a benchmark farmgate milk price (which is referred to in DIRA as the 'base milk price'). The purpose of this benchmark farmgate milk price is to enhance transparency by providing dairy farmers (including Fonterra's shareholders) and other processors a reference point for an efficient farmgate milk price.

Figure 2: Components of the base milk price



Source: Commerce Commission, Our approach to reviewing Fonterra's Milk Price Manual and base milk price calculation (August 2017), p16.

14 Fonterra, 2016, Farmgate Milk Price Manual: Part A – overview.

The benchmark milk price is calculated as:[15]

- the revenue Fonterra would earn in New Zealand dollars if the equivalent of all the raw milk supplied to Fonterra in New Zealand was converted into a portfolio of reference commodity products (RCPs), and sold on international dairy markets;[16] less
- the operating costs of collecting raw milk from farms, processing it into the RCP product mix and transporting this product to the point of export from New Zealand, plus the costs of selling the finished product, administration/overhead and tax expenses; less
- the capital costs, which provide for depreciation of fixed assets, return on and of capital investment, and working capital.

Any revenue that Fonterra earns above the notional revenue to the hypothetical efficient processor, and any cost savings Fonterra achieves above those of the assumed efficient processor, is part of the return to shareholders, and will therefore contribute to shareholders' dividends and retained earnings.

The exact methodology used by Fonterra to calculate the benchmark milk price is not prescribed in legislation. DIRA sets out some principles that must be followed when the benchmark milk price is set, and requires Fonterra to develop, maintain and publish a 'milk price manual' that sets out its methodology for calculating the benchmark milk price.

DIRA also requires Fonterra to appoint a Milk Price Panel to supervise the calculation of the benchmark milk price, advise Fonterra on the application of the milk price manual (including amendments to the manual); and to recommend to Fonterra the benchmark milk price. If Fonterra does not follow or implement the recommendations of the Milk Price Panel, it must publish the recommendations of the Milk Price Panel as well as Fonterra's reasons for not following the Milk Price Panel's recommendations.

The Commerce Commission is required by DIRA to review each season the milk price manual, and Fonterra's calculations of the benchmark milk price, and report on the extent to which both are consistent with the purpose of promoting:[17]

> …the setting of a base milk price that provides an incentive to new co-op to operate efficiently while providing for contestability in the market for the purchase of milk from farmers.

---

15 Commerce Commission, Our approach to reviewing Fonterra's Milk Price Manual and base milk price calculation (August 2017), p24.

16 The RCP portfolio is referred to in s 150C(2) of DIRA. It requires the milk price to include the commodities that are likely to be the most profitable over a period not exceeding five years and for the commodities to utilise all components of the milk.

17 DIRA, Subpart 5A, s 150A.

Constraints on Fonterra's process for setting the milk price

Fonterra has in the past set a 'final farmgate milk price' that differs from the benchmark milk price. For example, in the 2014 season Fonterra calculated a benchmark milk price of $8.93 per kgMS. However, due to a material reduction in earnings in that season (due to constraints faced by Fonterra in responding to an unusual and short-lived change in demand from China for whole milk powder), Fonterra's Board set a final farmgate milk price of $8.40 per kgMS (i.e., $0.53 per kgMS lower than the benchmark milk price).[18] This was the first time Fonterra had set a final milk price lower than the farmgate milk price.

Fonterra also has some control over the benchmark milk price because it:

- Has the ability to amend the milk price manual. Fonterra has made a number of changes to the milk price manual over time; and
- Has the ability to change the way it determines the inputs to the calculation of the milk price methodology set out in the milk price manual.[19]

Fonterra may make these changes without, or against, the recommendations of the Milk Price Panel but, as noted above, must publish its reasons for any such deviations.

Finally, we understand from MPI that Fonterra may, under DIRA, set different terms of supply (including the farmgate milk price) for groups of farmers facing different circumstances (although DIRA prohibits Fonterra from discriminating between farmers facing the same circumstances).

Whilst Fonterra evidently has some discretion over the farmgate milk price that it pays farmers for the production of milk, it does face a number of incentives and constraints to ensure its milk price its set at an appropriate level:

- **Regulatory oversight:** The Commerce Commission's milk price monitoring regime is intended to promote greater transparency in Fonterra's benchmark milk price setting. However, the Commission's role is restricted to monitoring, rather than an enforcement role. For example, the Commission cannot amend the milk price manual, or substitute its own calculations of the benchmark milk price for Fonterra's.
- **Milk Price Panel:** As noted above, the Milk Price Panel supervises the calculation of the benchmark price, advises Fonterra on the application of the milk price manual, and makes recommendations to Fonterra on the benchmark

---

18 Fonterra, Farmgate milk price statement 2014.

19 For example, in April 2018 the Commerce Commission raised concerns that the asset beta (an input to the calculation of capital costs in the milk price methodology) used by Fonterra had been set too low. This demonstrates that the specific inputs to the calculation of the benchmark milk price are subject to some discretion, rather than fully deterministic.

milk price. However, as described above, Fonterra may decide not to follow the recommendations of the Milk Price Panel.

- **Open entry and exit:** If Fonterra sets a price too high for milk, it will receive inefficiently high volumes of milk from farmers as the high price will provide farmers with the incentive to enter and/or expand. DIRA requires Fonterra to accept all entry. On the other hand, if Fonterra set a price too low, then farmers may exit Fonterra to supply independent processors and/or new independent processors may enter to compete against the low milk price.
- **Shareholder oversight:** When shareholding and supply was linked on a one-to-one basis, Fonterra farmers would have been indifferent on the split of returns between the farmgate milk price and the dividend (apart from the dividends potential impact on the share price). However, the introduction of the Fonterra Shareholders Market and Fonterra Shareholders' Fund means that ownership and supply is no longer necessarily linked. Therefore, shareholders will be concerned that the farmgate price is not set too high, as that would undermine their return on capital, potentially increasing Fonterra's future cost of capital.
- **Fonterra's cooperative model:** Fonterra's cooperative model has, arguably resulted in it paying a national price for milk as it does not wish to differentiate between shareholder farmers. This may therefore decrease Fonterra's incentive to overpay for milk at the farmgate in response to regional competition, as Fonterra would have to overpay on a national basis (or, move away from its preference of a national milk price). Due to the open entry provisions, this overpaying for milk would likely result in an increased supply of inefficient milk, and would also reduce shareholders returns.

Non-share-backed milk supply

While most of Fonterra's milk supply is share backed, it is increasingly contracting for non-share-backed supply. For example, the introduction of MyMilk, is a mechanism to drive non-share-backed milk supply, as explained in Box 1 below.

Box 1: MyMilk

In regions with strong competitive pressures for farmer suppliers, such as Canterbury, Southland and Otago, Fonterra has implemented some non-price programs in order to limit the incentive for farmers to switch to other processors. Amongst these programs is MyMilk, which allows farmers the option to supply Fonterra with milk for five years without acquiring shares. This program allows farmers to "share up" over time, and was designed to address the perception inside Fonterra that the group was struggling to attract new conversions in these competitive regions due to its requirement that suppliers invest in shares. It is aligned with Fonterra's broader growth strategy, which revolves around growing the volume of milk that it collects.

Source: Frontier Economics

4.2.3 Fonterra's published strategy

As Fonterra currently accounts for a very large share of the New Zealand dairy sector (82% of farmgate milk collected in 2017), its strategy may be a significant driver of the outcomes observed in the sector since 2001.

Fonterra's product mix and business strategy were described in Section 2.3.4 of Report One. Here, we present an executive summary of the features of Fonterra's strategy that may have acted as drivers of the outcomes treated here in Report Two:

- Fonterra operates two business segments – Ingredients and Consumer and Foodservice – which may be broadly categorised as low-margin and high-margin, respectively.
- Fonterra's express strategy revolves around maximising the sales volume and value-add in each of these two segments.
- Fonterra generate a great deal of its revenue via exports, and serves a highly diversified portfolio of international markets. It has a particularly large exposure to Asia and Latin America.
- Although the EBIT generated by Fonterra's core Ingredients business has generally trended upwards over the past eight years, the EBIT generated by the Consumer and Ingredients segment has been relatively stagnant, despite managements verbal commitment to moving Fonterra up the dairy value chain. The Ingredients business registered CAGRs of 2.62% and 16.9% in revenue and EBIT respectively, between 2010 and 2017, while the Consumer and Foodservice business registered CAGRs of 1% and 0.62%.

These figures suggest that growth and profitability at Fonterra remain driven by its lower-margin products.

4.2.4 Other processors' published strategy and business model

As noted in Section 3, independent processors have been a significant component of the sector growth since 2001.

We have considered independent processors' business models and strategies as potential drivers of the observed outcomes in the dairy sector, as well as significant entrants into the dairy sector since the formation of Fonterra. Here we present a summary of the detailed independent processors' strategies and business models that are set out in Section 2.3.5 of Report 1.

Although Fonterra does account for a significant share of the New Zealand dairy sector, individual processors have actually accounted for 41% of the growth since 2001 in milk solids collected, while Fonterra has accounted for 59%. Each of these independent processors have distinct approaches to their production strategies.

Some of them produce with a centralised focus on quality rather than volume, or increasing the product mix. Other independent processors, such as Nutricia Danone, have a strategy focussed more increasing volumes.

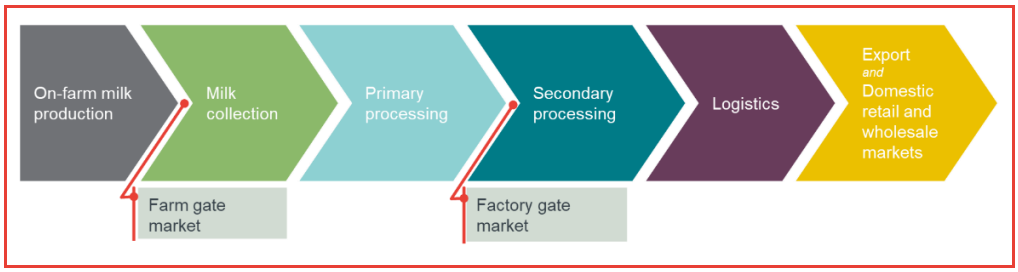
New entrants such as Miraka, Oceania, Open Country Dairy, and Synlait were mostly unprofitable when they began, and had to invest in large scale processing assets without a committed end supply or customers. These four companies are now successful exporters, despite the initial uncertainty they faced when they first entered. However, one independent processor, New Zealand Dairies Limited (which entered in 2006, and was subsequently acquired by Russian food company, NutriTek) went into receivership and was acquired by Fonterra in 2012.

Two of the major individual processors, Yashili and Oceania, are owned completely by Chinese milk companies and therefore have a greater access to capital and opportunities for market penetration outside New Zealand. The four companies that produce public financial reports are Open Country Dairy Limited, Synlait, Tatua, and Westland, and these four companies together account for 90% milk volume of the milk processed by Fonterra's competitors.[20] Over the years to 2017, Fonterra's market share has gradually fallen to 84%. Westland and Tatua's market share has remained much the same around 4%, while new processors have grown to a combined 12% share. With these trends, it is probable that IPs market share will continue to grow in the coming years keeping healthy competition in the works for Fonterra.

4.2.5 Vertical integration

Vertical integration in this context refers to the steps in the value chain that are undertaken by a dairy processor. The dairy value chain is summarised in Figure 3 below.

Figure 3: The dairy supply chain



Source: Frontier Economics

Fonterra, for example, is fully vertically integrated at the processing level as it undertakes milk collection, primary and secondary processing logistics, and exports and sales to domestic markets. Some other dairy processors specialise in certain

20 TDB Advisory, New Zealand Dairy Companies Review (2017).

parts of the supply chain, where they consider they have the largest competitive advantage. For example:

- Danone is a downstream processor of consumers goods that acquires its input milk in the factory gate market; and
- Oceania distributes internationally through its parent company's distribution channel.[21]

The extent of vertical integration is a potential driver in two ways.

- Vertical integration may increase barriers to entry in some functional markets by reducing the amount of supply available in that market.[22] This could occur, for example, if vertically integrated processors are unwilling to sell raw milk to other processors at the factory gate level, but rather focus on self-supplying their downstream operations. Therefore, vertical integration can in some instances reduce the level of competition in intermediate markets, leading to higher prices for those buying in these markets.
- Commercial drivers may require processors to become vertically integrated if they are unable to buy or sell in workably competitive functional-level markets. For example, if firms were unable to buy sufficient quantities and quality of milk in the factory gate market, at competitive prices, they may instead collect farmers' milk themselves. This is compared to a counterfactual where they could access that milk at the factory gate level, and thereby could specialise in the functional levels where they consider they have the most competitive advantage. By way of example, as discussed in Report One, in Ireland there are a number of downstream processors (e.g., Abbott, Wyeth and Danone) that are not vertically integrated, but rather purchase their milk input requirements in the factory gate market.[23] These companies do not collect milk directly from farmers, but rather contract with cooperatives to supply them with milk (or milk products) in wholesale markets. These processors specialise in particular products such as infant nutritional products.

4.2.6 Access to capital

Dairy processing is a capital intensive business. Capital is required not just for investment in collection and processing, but also sales and marketing, distribution and R&D. Therefore, dairy processors' access to capital to fund these activities is a potential driver of the observed outcomes.

---

21 Similarly, some Irish dairy cooperatives undertake collection and processing, and sell either at the factory gate market or sell final products via Ornua via its brands and export channels.

22 Vertical integration can also increase efficiencies by creating synergies, reducing contracting cost, and removing double marginalisation.

23 Frontier Economics, Report One, section 7.3.2.

Fonterra

Between 2003-2012, Fonterra benefitted from a growth in domestic milk production in New Zealand, which necessarily resulted in demand for its shares under the old cooperative model. The group experienced a net equity inflow of NZ$2.46 billion over this period. The lower growth in Fonterra's milk supply and the introduction of the FSM saw share capital inflows effectively cease after 2012, with share capital having risen from NZ$5.7 billion in 2012 to just NZ$5.8 billion in 2017.

However, the benefit of TAF and the dampening of share capital flows was the stabilisation of Fonterra's balance sheet. This served as a platform for the group to increase its borrowings following the introduction of TAF. The group's gross debt position increased from NZ$4.65 billion in 2012 to a peak of NZ$7.56 billion in 2015. Fonterra's gearing ratio as a result is now higher than most independent processors in New Zealand and comparable international firms such as Kerry Group and Glanbia.

Fonterra's capital expenditure increased markedly after TAF, likely due to the group's greater capital account stability and access to debt. Capital expenditure increased each year from NZ$680 million in 2012 to NZ$1,200 million in 2015; however, this has reduced again in 2016 and 2017. The majority of this expenditure has been allocated towards expanding existing operations, rather than the development of new innovative products. Kerry Group and Glanbia, by way of contrast, have spent comparably more on strategic acquisitions and R&D.

As suggested in section 2.6.1 of Report One, in light of Fonterra's limited access to equity capital and reluctance to take on more debt, it is possible that Fonterra now faces a capital constraint. If this is the case, it may restrict Fonterra's capacity to expand its capital expenditure and investment programs in the future.

Independent processors

As outlined in Report One, independent processors have a range of options and models for accessing capital (in addition to debt markets) including:

- Westland is a farmer-owned cooperatives that is financed through milk growth;
- Tatua is a farmer-owned cooperative that is financed through retained earnings;
- Synlait raised money in the equity markets via an IPO, and also has significant overseas shareholdings;
- Open Country Dairy is part of the Talley's Group, a large diversified agribusiness and food company based in New Zealand;
- Oceania and Yashili are both owned by large overseas parent companies that have funded their investment in New Zealand;

- Miraka is owned by a collection of Maori Trusts and has two strategic investor partners, Global Dairy Network and Vinamilk.
- Mataura Valley Milk is currently majority owned by China Animal Husbandry Group (a Chinese state-owned enterprise) with farmer-supplier shareholding.

4.3 Other factors

4.3.1 Trading relationships and policies

New Zealand has entered into a series of trade agreements over the period since DIRA was introduced. The key elements of these trade agreements are summarised in Table 1 below.

Table 1: New Zealand Free Trade Agreements

Country	Time of effect	Overview	Commentary
Australia	1983 (previously 1965 NAFTA)	All goods and services are free to trade, with no tariffs or quotas.	All tariffs and quotas were eliminated by 1990. Trade has been increasing steadily since signing.
Singapore	2001	Covers most goods and services. Milk powder and butter are two of New Zealand's major exports to Singapore.	Between 2004 and 2014 NZ's exports increased from NZ$362m to NZ$2.9b.
Thailand	2005	Tariffs and quotas are slowly being eliminated, with full effect by 2025. Also covers more relaxed rules about business travellers. Does not cover services.	A joint review found the agreement had "created significant trade and economic benefits for both countries"
Trans-Pacific Strategic Economic Partnership (P4)	2006	New Zealand, Singapore, Brunei and Chile entered into an agreement which saw all tariffs on exports between the countries phased out by 2017.	New Zealand already had zero tariffs on exports with Singapore from their own free trade agreement.
China	2008	The free trade agreement between New Zealand and China covers almost all goods traded between them, including dairy products.	Since signing in 2008 New Zealand exports to China have almost quadrupled
Hong Kong	2010	Most goods and services are free to trade, with no tariffs.	Milk powder is one of New Zealand's biggest exports to Hong Kong.
Malaysia	2010	99.5% New Zealand's exported goods to Malaysia are not subject to tariffs.	Investment increased by 56% four years after signing the agreement.
ASEAN-Australia (AANZFTA)	2010-2011	Cambodia, Laos, Myanmar and Vietnam have more gradual phasing out of tariffs.	Between 2010 and 2017, dairy export value to SEA increased by 3.0% per annum

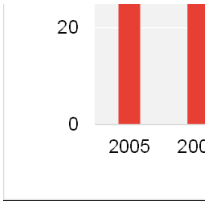
Country	Time of effect	Overview	Commentary
Taiwan	2013	New Zealand does not maintain diplomatic relations with Taiwan, the FTA provides for immediate elimination of tariffs on 95.2% of products imported to Taiwan from New Zealand	Dairy exports to Taiwan have only increased gradually post-FTA
Korea	2015	Tariffs will be removed on 98% of NZ's exports to Korea, happening in stages over the next 15 years.	Most dairy exports will have their tariffs eliminated between 2021 and 2029.

Source: NZ Ministry of Foreign Affairs and Trade, MPI provided data (v2 NZ's FTAs and DIRA.docx)

4.3.2 Developments in global dairy markets

Overall, global dairy consumption has been growing at a low and steady rate since 2005 onwards. As seen in Figure 4 below, global consumption of dairy products per capita has increased at a relatively low and steady rate of approximately 1% a year, from 102kg in 2005 to 111kg in 2016. Historical growth is primarily driven by the rapid growth of the middle-income consumers particularly in in emerging markets, leading to dietary preferences shifting towards a higher protein intake,[24] as well as rapid urbanisation, leading to increased access to dairy products.[25]

Figure 4: Global per capita consumption of dairy products



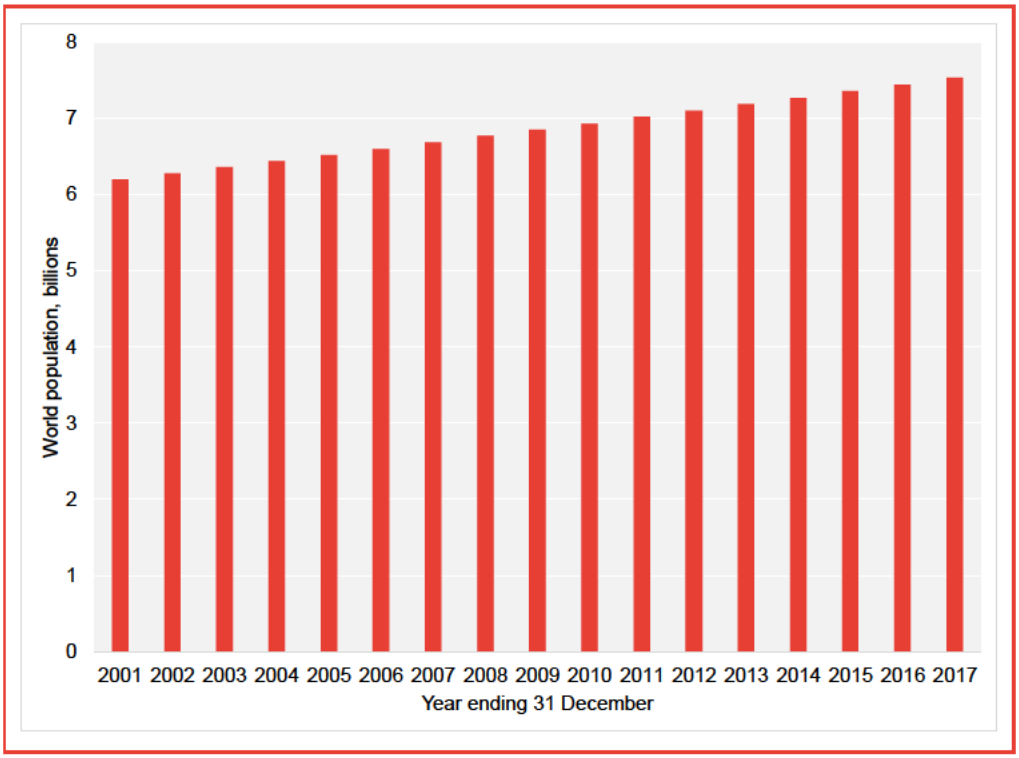
Source: International Dairy Federation

As shown in Figure 5, the global population has also grown at a steady rate of just over 1% per year, from 6.2 billion in 2001 to 7.5 billion in 2017, further contributing to growth in demand for dairy globally.

24 OECD OECD-FAO Agricultural Outlook 2018-2027, p 21, 28.

25 MarketLine. Global Dairy, p7. (June 2017)

Figure 5: Global population, billions



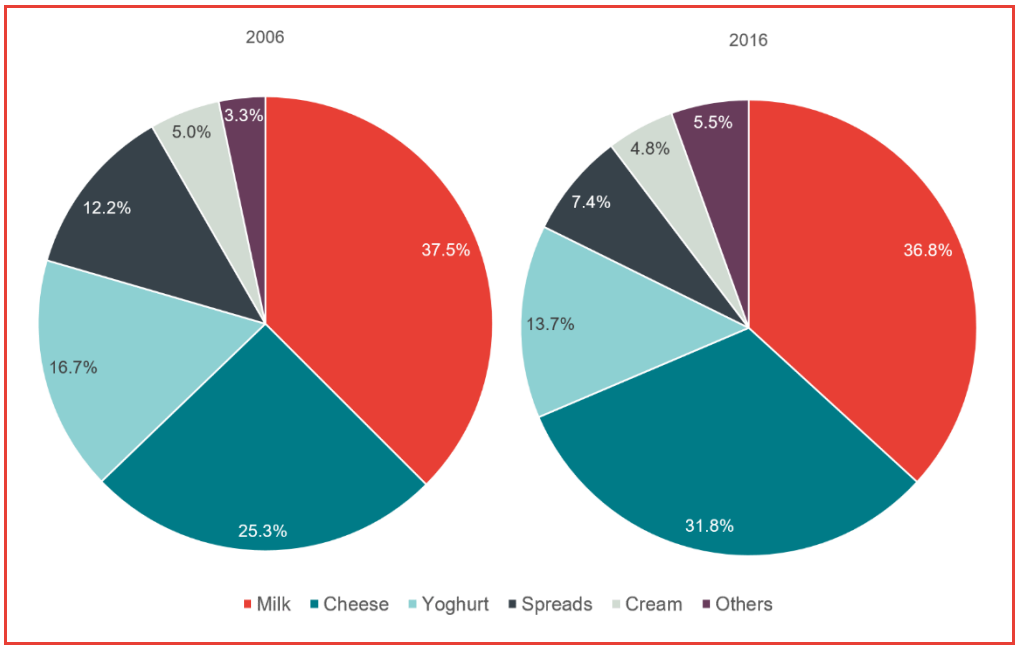
Source: World Bank

As such, global demand for dairy products has been growing at a steady pace of approximately 2% per annum, from 659 million tonnes in 2005 to 827 million tonnes in 2016—an increase of approximately 168 million tonnes.

The composition of global dairy consumption has remained relatively constant over the past decade, with some exceptions. In particular, there has been rapid growth in demand for cheese, primarily in emerging economies, where there has been increasing affluence and westernisation of local diets[26] By product, milk and cheese comprise approximately two-thirds of global dairy consumption value, as shown below in Figure 6. The relative composition of global dairy consumption value by product stayed relatively stable between 2006 and 2016. However, as a proportion of all dairy products' consumption, cheese consumption has increased by six percentage points over the past decade, at the expense of yoghurt and spreads (mostly butter) consumption.

26 Italian Food, Global consumption of cheese bound to continue growth (Mar 2017). Available at: https://www.italianfood.net/2017/03/01/global-consumption-of-cheese-bound-to-continue-growth/

Figure 6: Breakdown of global dairy consumption value by product in 2006 and 2016

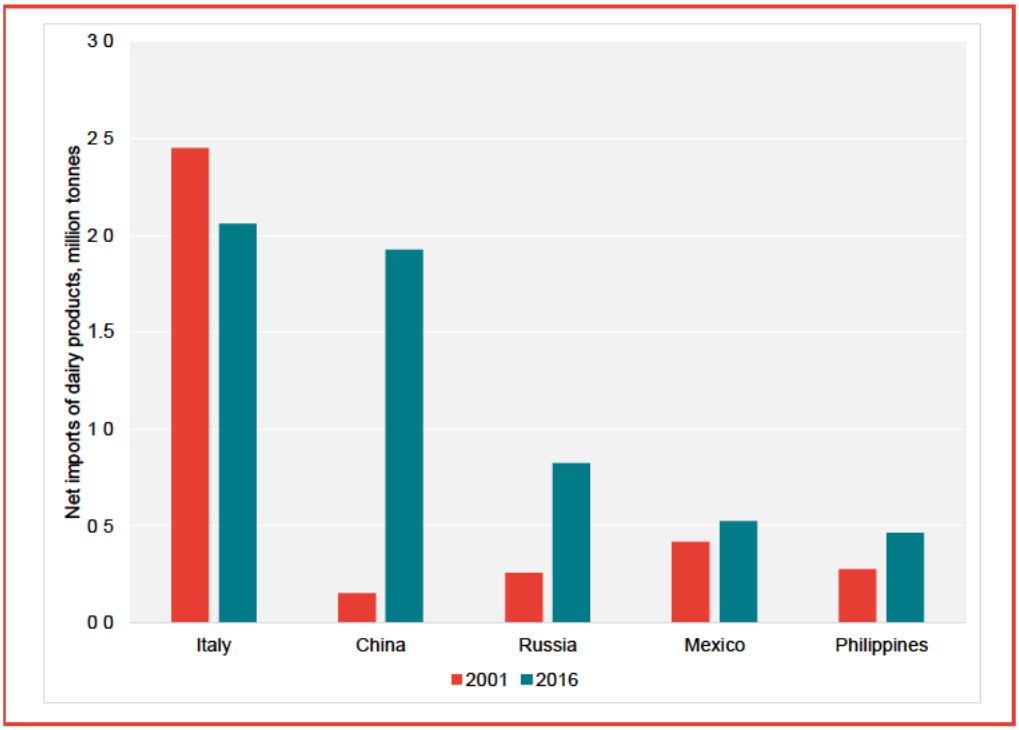


Source: MarketLine

The rapid growth in dairy demand within emerging economies is also borne out by data on net imports. In particular, as shown in Figure 7, import demand for dairy products has increased markedly between 2001 and 2016 for China and Russia, given relatively limited scope for increasing domestic supply to meet rapidly rising dairy demand in both countries. The product range has also diversified considerably in recent years, with Asian markets increasingly interested in alternatives to powdered milk, including UHT milk, and other dairy products including cheese.[27]

[27] Ministry of Businesses, Innovation and Employment, The Investors Guide to the New Zealand Dairy Industry 2017: Final Report (June 2017), p18.

Figure 7: Net import volumes for top five net importers of dairy products in 2016



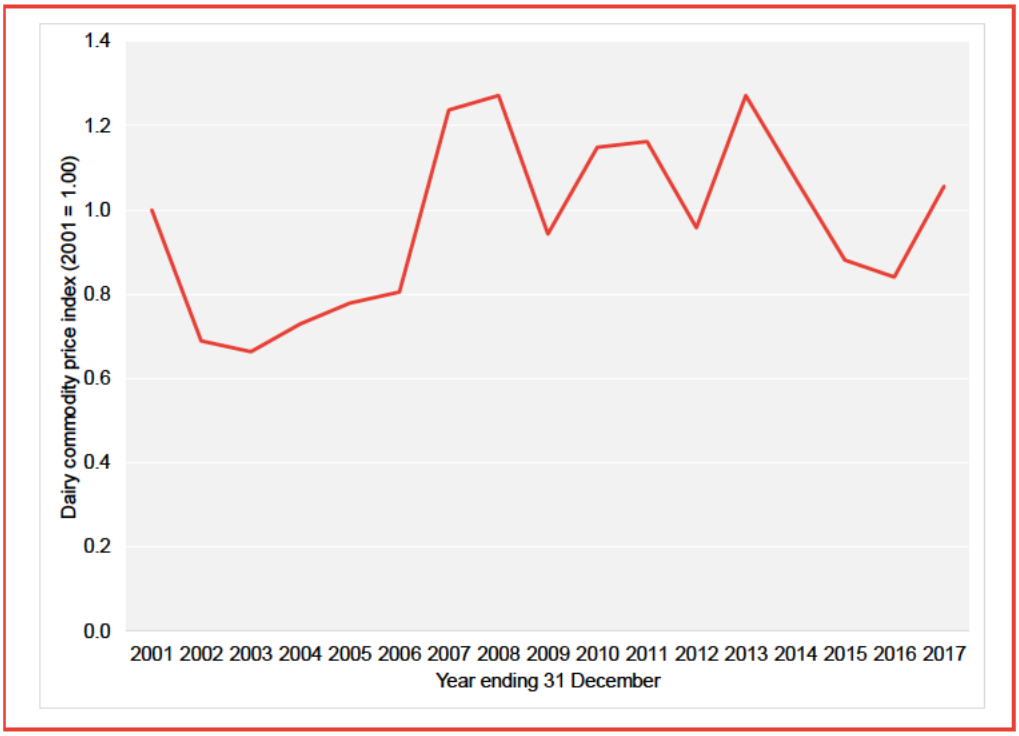
Source: UN Comtrade

Despite the steadily increasing demand for dairy products over the last decade the dairy commodity prices have been volatile, but generally increasing between 2003 and 2013 at a compound annual growth rate of approximately 7%, before decreasing again thereafter (see Figure 8). This volatility reflects the combination of a range of demand and supply side factors, with the recent decline in prices reflecting lower demand for dairy imports from China and other oil producing nations and increased milk production and exports by European Union farmers.[28] We also note that due to the global butter shortage (due to reduction in supply capacity) in recent years,[29] international butter prices have been rising significantly in the past five years, as shown in Figure 9 below.

28 Ministry of Primary Industries, Situation and Outlook for Primary Industries (2016), p31.

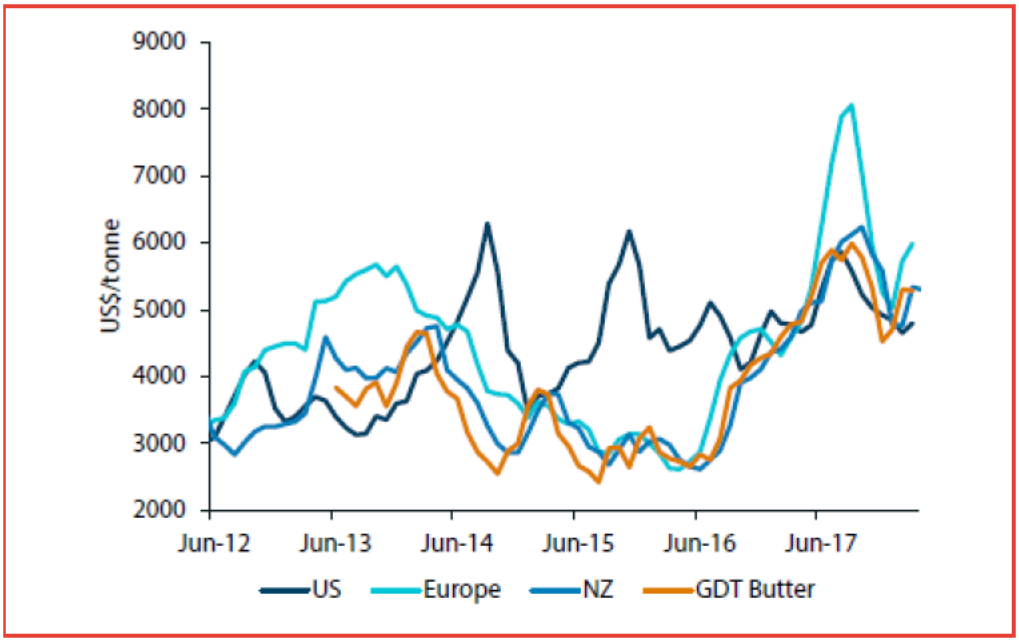
29 Financial Times, Butter prices churned as market goes from shortage to meltdown (Nov 2017). Available at: https://www.ft.com/content/0de763f4-bf0a-11e7-9836-b25f8adaa111

Figure 8: Dairy commodity prices from 2001 to 2017



Source: ANZ Commodity Price Index

Figure 9: International butter prices



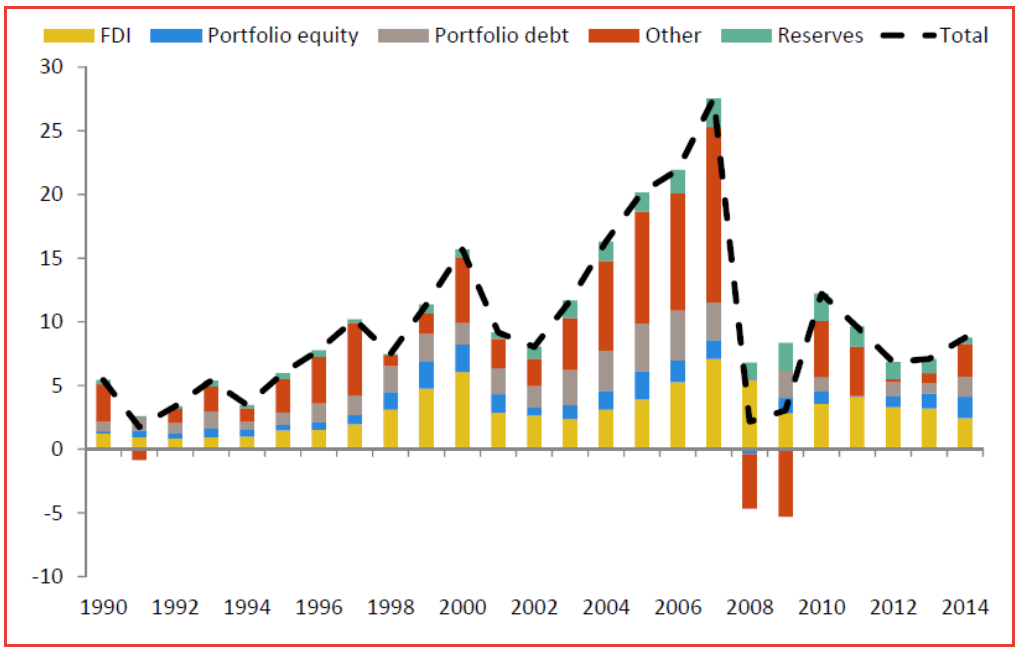
Source: ANZ AgriFocus, June 2018

4.3.3 Developments in global capital markets

Over the past 25 years, many major economies around the world have deregulated their financial systems, removed capital controls, and opened their economies to trade and capital flows. As a result, and in combination with development of technology that has facilitated financial capital trading and settlement, capital markets have become increasingly globalised and integrated over time.

Figure 10 shows that the value of cross border capital flows increased significantly from approximately 5% of global GDP in 2001 to over 25% of global GDP in 2008. The onset of the Global Financial Crisis (GFC) in 2008 saw international capital flows fall sharply to approximately 2.5% of global GDP as financial markets around the world were disrupted significantly. By 2014, global capital flows had recovered to approximately 8% of global GDP. Whilst this appears only a modest increase from the beginning of the period, between 2001 and 2014, global GDP grew from approximately US$33.4 trillion to US$79.1 trillion.[30] This implies that global capital flows grew from approximately US$1.7 trillion in 2001 to over US$6.3 trillion in 2014, a nearly four-fold increase.

Figure 10: Global capital inflows as percentage of global GDP



Source: McQuade, P. and M. Schmitz (2016), The great moderation in international capital flows: a global phenomenon?, European Central Bank working paper 1952, Figure 1.

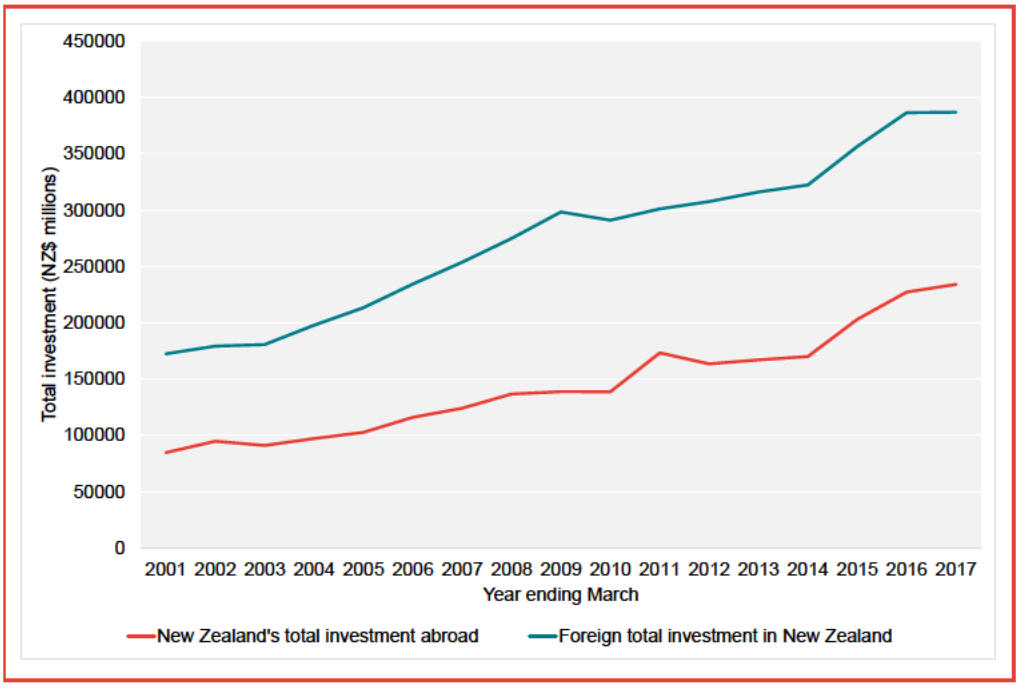
30 World Bank indicators:

https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2017&start=2001&view=chart

Since pursuing major economic reforms in the late 1980s and early 1990s, the New Zealand economy has become more open and integrated with global capital markets.[31] Following deregulation, New Zealand's GDP grew at more 4% per annum for several years, after previously staying steady at around 1% per annum.[32]

New Zealand's increased access to global capital markets is demonstrated by Figure 11. The total amount of capital invested into New Zealand has been rising steadily since 2001, at an average of 5.1% per annum, between 2001 and 2017, while New Zealand investment abroad has grown by approximately 6.6% per annum over the same period.

Figure 11: Total investment by and into New Zealand



Source: Stats NZ

Figure 11 also shows that the Global Financial Crisis (GFC) in 2008-09 resulted in a small, temporary reduction in capital inflows and outflows. Since the GFC, both foreign investment in New Zealand and New Zealand investment abroad has continued to rise. However, whilst the average rate of growth in capital outflows since the GFC (6.8% per annum) was roughly similar to the rate of growth in

31 These reforms included removal of interest rate and foreign exchange controls; floating of the exchange rate; establishing an independent central bank tasked with inflation targeting; removing price and rent controls throughout the economy; removing agricultural subsidies, export assistance and import licensing; widespread public sector reforms; and labour market deregulation. See Evans, L., A. Grimes, B. Wilkinson and D. Teece, Economic Reform in New Zealand 1984-95: The Pursuit of Efficiency (1996), Journal of Economic Literature 34(4), pp. 1856-1902.

32 Trading Economics, New Zealand GDP annual growth rate

capital inflows over the nine years before the GFC (6.4% per annum), the rate of increase in foreign capital investment in New Zealand has fallen substantially since the GFC. Over the nine years before the GFC, inward capital investment increased at an average rate of 7.1% per annum. Post-GFC, the rate of increase in foreign capital investment in New Zealand declined to 3.3% per annum.

Stats NZ does not publish any data on how foreign capital investment is distributed across sectors. However, in a recent study, KPMG estimated (based on analysis of decision summaries published by the Overseas Investment Office) that 5% of all foreign investment in New Zealand between 2013 and 2015 was in dairy and milk production.[33]

4.3.4 Domestic consumer demand and preferences

The New Zealand domestic dairy retail market is relatively small, and has historically seen low growth.[34] This, combined with the fact that New Zealand has a high milk consumption per capita compared to other countries,[35] has meant that the innovation and product development seen in the domestic retail market has largely mirrored global trends.[36] Coriolis (adviser to MPI, New Zealand Trade and Enterprise and the Ministry of Business, Innovation and Employment) has argued that there are four broad 'mega-trends' that are driven by changing global tastes and preferences, which influenced the New Zealand domestic dairy retail market:[37]

- The first is the rise of consumers' health and wellness, pushing processors to supply healthier alternatives to more traditional products. The aging population in many developed countries is the main driver behind this, encouraging high growth products that are perceived to be healthier like yoghurt and high grade spreads.
- The next mega-trend is the trend to be authentic and environmentally responsible, resulting in consumers becoming more mindful as to where their food comes from and how it is produced. This also happens to come at a time of multiple food scares around the world regarding contamination and unhealthy additives. This trend is likely driven by a wave of human rights movements which have spilled over to animal welfare.

---

33 KPMG, Foreign Direct Investment in New Zealand: Trends and Insights (Nov 2016), p. 12.

34 Ministry of Business, Innovation & Employment, Investor's guide to the New Zealand dairy industry (2017), p. 7

35 Statista, Per capita consumption of fluid milk worldwide in 2016

36 Ministry of Business, Innovation & Employment, Investor's guide to the New Zealand dairy industry (2017), p. 7

37 Ministry of Business, Innovation & Employment, Investor's guide to the New Zealand dairy industry (2017), p. 56

- The third mega-trend of wanting more indulgent products stems from a growing inequality in income, with income bands becoming more polarised. Dairy products in particular can be used to demonstrate social status, with the many different levels of product differentiation, ranging from value to more artisanal products.
- The last mega-trend is the rise of ease and convenience in packaged products, this encompasses products from yoghurts to protein and nutritional shakes. This has been driven by demand as consumers need to work longer hours to maintain relative income, who then value convenience over price. This trend has given rise to an increasing focus on value-added dairy products in the export market, particularly because convenience usually goes along with increased shelf life, boosting the export potential.

One notable domestic development has been the entry of independent processors that differentiate their offerings by producing niche, premium products.[38] Examples of these offerings include mature aged cheeses, high grade yoghurt and other dairy goods produced using artisanal processing methods to add value to their products and differentiate them from generic brands. Euromonitor suggests that this artisanal trend is expected to continue for cheese over the forecast period, with soft cheese producers engaging in new product development and increased distribution channels.[39]

4.3.5 Public expectations

The general New Zealand public may hold certain expectations about how the dairy sector ought to interact the community at large. These expectations may be multifaceted and may include:

- an expectation that the sector should not impose disproportionate harm to environment. This expectation may be motivated by:
  - a recognition by the public that New Zealand has a long-standing image internationally as a 'clean green' country, reinforced by successful international marketing campaigns such as '100% Pure New Zealand', and an understanding that other sectors important to the economy (e.g., tourism) rely on this reputation to compete globally;
  - national pride in the country's natural beauty;
  - the cultural value placed on land by Maori; and

38 Commerce Commission, Review of the state of the competition in the New Zealand Dairy Industry (2016), p. 110

39 Euromonitor, Dairy in New Zealand (2017), executive summary.

- the importance of the natural environment in providing recreational value to New Zealanders and visitors.

- an expectation that the dairy sector should support the wellbeing of New Zealanders by supplying high-quality, nutritional food;
- an expectation that this food—staples, in particular—should be affordable and accessible to ordinary consumers, given the abundance of dairy farming activity in New Zealand and the evident growth in the sector over time; and
- an expectation that the sector should deliver significant economic benefits to New Zealand, particularly given the historical success globally of agricultural products from New Zealand.

In practice, public perception likely involves an implicit trade-off as to the degree of costs the public is willing to bear in return for the accrued benefits. As the sector has grown, that trade-off may have altered if perceived societal costs have become more evident than the benefits. These perceptions may also reflect concerns about how the costs and benefits that flow from the activities of the sector are distributed throughout society. For example, are relatively few individuals capturing most of the benefits, while the costs are being borne by a much wider group?

4.3.6 Decisions of New Zealand farmers

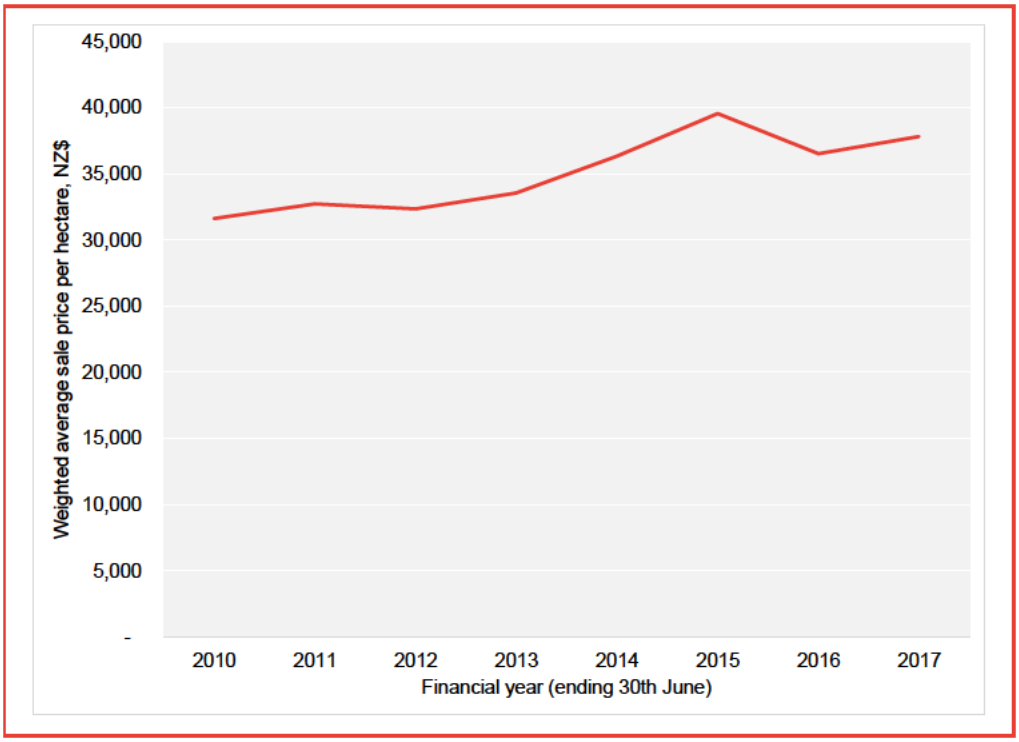
The decision-making of farmers in New Zealand could influence outcomes observed in the dairy sector in several ways:

- Farmers need to decide how best to use the various scarce resources—labour, capital and land—available to them to maximise the returns they earn from farming activities. For example, farmers that own land must decide whether they farm sheep for wool and meat production, dairy cattle for milk production, beef cattle for meat production, or use the land for horticulture or forestry. Farmers can and do switch between land uses.[40] Economic theory suggests that if farmers allocate their resources efficiently, they will select the combination of inputs to production—including land use—that maximises their expected returns. Therefore, if the expected future returns from dairy farming are likely to exceed the expected future returns from sheep farming, a purely rational economic choice would be convert sheep farms to dairy farms. Modern dairy farming is now a highly capital-intensive activity. In addition, farm land prices have increased materially over time, most likely as growth in the value of the dairy sector specifically has been capitalised into land prices (see Figure 12). Therefore, in order for dairy farming to be worthwhile, the expected streams of income from dairy farming would need to be sufficiently

[40] Section 3.2 of Report One sets out data on land conversions and intensification of farming in New Zealand since 2001.

high to cover not only day-to-day operating costs, but also the initial capital outlay of equipment and any land acquisition costs.

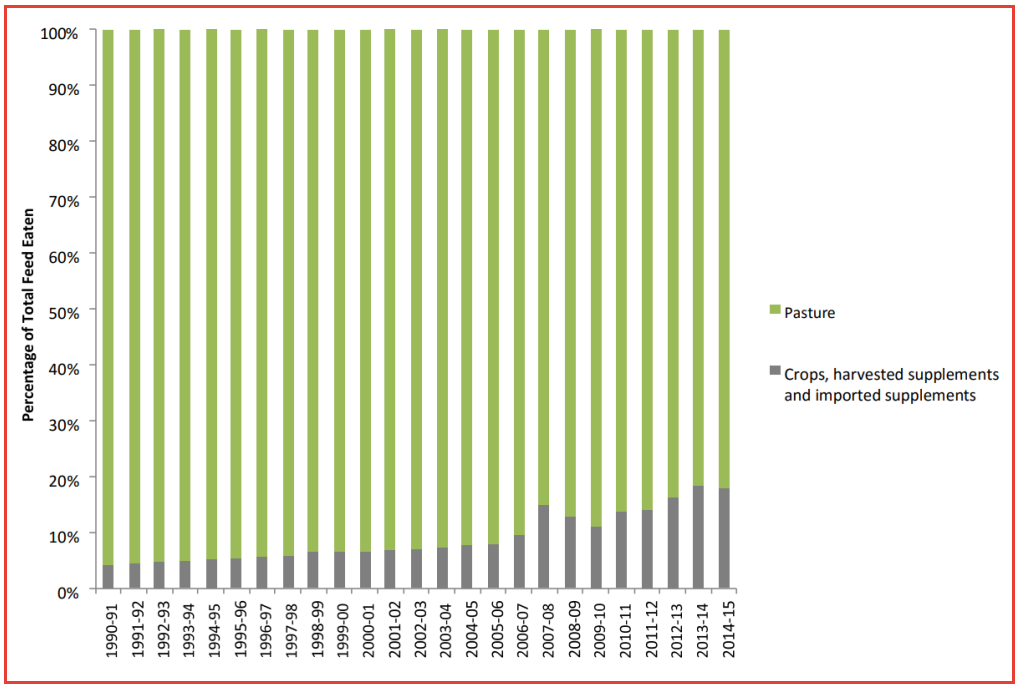
Figure 12: Weighted average sale price of dairy farm land per hectare, NZ$



Source: Dairy NZ New Zealand Dairy Statistics 2016-17, p50

- One main decision dairy farmers must make is whether to supplement the cows' pasture feed with extra crop and other supplements. Pasture grazing is a lower cost production method than supplementary feeding, which can be quite expensive depending on the price of crops and grain. In New Zealand, pasture growth occurs in warmer months, meaning that milk production is highly seasonal, peaking in October/November before falling to minimal levels in June/July. This seasonality provides a low-cost method for farmers to produce milk, however means that processors have a low capacity factor as most of the year they are not utilising the full facility. Lately, there has been a rise in the use of crops and supplements for feed, as seen in Figure 13, although it is still quite a small share of total feed used.

Figure 13: Split between pasture grazing and non-pasture milk production



Source: Feed Use in the NZ Dairy Industry, 2016, p. 19

- New Zealand dairy farmers have a large amount of debt, as noted by the Reserve Bank of New Zealand in a 2014 report that the number of indebted dairy farms has tripled over the past decade. Dairy farmers have NZ$40 billion of debt as at 2016, a 150% increase from the 2006 value.[41] As noted above, dairy farms require a large capital investment, and the assets are relatively illiquid, since they are tied up in the farm and its operations with milking equipment, which is highly specialised (so cannot be put to alternative uses) and is hard to divest quickly. The returns from dairy farming can also be highly dependent on exogenous factors such weather and global dairy market conditions (i.e., demand and supply). The possibility of seasons with low returns due to factors beyond farmers' control, and high levels of leverage, is likely to mean that dairy farmers have a strong preference for cash (i.e., to service their debt and meet other running and capital costs), in the form of the highest possible levels of dividends from the downstream processors they invest in. This preference could impact on the retained profits available to processors to reinvest in their activities.

41 Reserve Bank of New Zealand. Agriculture credit by loan type as at June ($m) - C26 (discontinued). Available at: https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Statistics/discontinued/C26-Annual-Agriculture-Agriculture-credit-by-loan-type-discontinued.xls

4.3.7 Technological development in the dairy sector

Technological developments in herd improvement and on-farm and processing technology have allowed suppliers to optimise milk production by substituting labour with more productive capital inputs.

Herd improvement

Breeding cows with the optimum genetic make-up to maximise production and thereby profitability has been a long-term focus for the New Zealand dairy industry and government. Experts consider this is the fundamental reason New Zealand's farmers are among the most efficient and competitive dairy producers in the world.[42]

For over a century, New Zealand farmers have been testing samples of milk from their dairy cattle and recording data to inform their herd management decisions. Farmers shared the resulting data, developing local, then regional and now industry-wide datasets to support ongoing herd improvement. Data collection standards have been regulated since 1936. Today's farmers are well equipped with animal evaluation tools to help them make breeding and sale/purchase decisions to improve the productivity and efficiency of their herds.

The genetic gain resulting from animal evaluation delivers significant economic benefits to the New Zealand dairy industry, estimated at around $300 million per annum.[43] DairyNZ has estimated that over a ten-year period genetic improvement would add in excess of $250,000 to the bottom line of an individual farmer with an average-sized dairy herd.[44]

As shown in Figure 14 below, the average kilograms of milk solids produced per cow each year has increased from 310kg per year in 2001 to 381kg per year in 2017, an increase of 23%. This level of production is consistent with the average of 372kg of milk solids produced per cow in Ireland in 2016.[45] In contrast, 503kg of milk solids was produced per cow in Victoria in 2017, due in part to the year-long production period facilitated by grain feeding.[46]

---

42 New Zealand Dairy Herd Improvement Database Review, Anderson Committee Report, Commissioned by DairyNZ (2009), p4

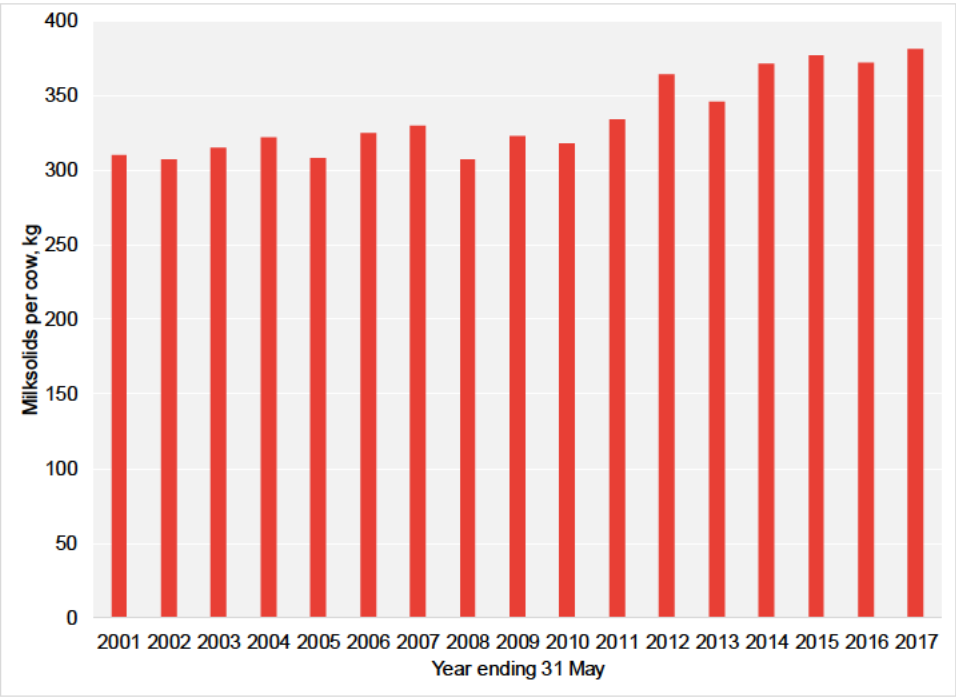
43 P Amer, Cost Benefit Implications of a New National Breeding Objective for the New Zealand Dairy Industry (2012).

44 Value of Genetic Improvement, DairyNZ Technical Series Issue 22 (July 2014).

45 Agriculture and Food Development Authority Ireland (Teagasc), Sectoral Road Map: Dairying. (2016). Available at: https://www.teagasc.ie/media/website/publications/2016/Road-map-2025-Dairy.pdf

46 Agriculture Victoria., Dairy Farm Monitor Project Victoria Annual Report 2016-17 (2017). Available at: http://agriculture.vic.gov.au/__data/assets/pdf_file/0003/368733/FINAL_WEB_Dairy-Farm-Annual-Report-16_17_4.4.pdf

Figure 14: Average kilogram of milk solids produced per cow from 2001 to 2017



Source: New Zealand Dairy Statistics 2016-17

The dairy industry's ability to achieve optimal rates of genetic gain in the future depends on an ongoing supply of and access to data to inform decision making. Today, data from around 70% of dairy herds is entered into the dairy industry good animal database (DIGAD), which contains information on over 35 million animals.

On-farm technology

On-farm technology has been driven by data intensive 'precision dairy' management approaches, which incorporate greater use of information technology, data collection and analysis, and automated responses. For example:

- **Tracking technology:**[47] Although GPS tracking has been widely used to monitor the behaviour of animals since the 1980s, refinement in precision accuracy and increased battery efficiency since 2008 has allowed GPS tracking and supporting software to become more accessible for farmers across New

47 Draganova, I. G, I. Yule, M. Stevenson (Undated), The use of sensing technologies to monitor and track the behaviour of cows on a commercial dairy farm, International Society of Precision Agriculture, Working paper 1270.

Zealand.[48] The use of GPS tracking, electronic identification tags and supporting software can allow farmers to examine the natural behavioural patterns of dairy cows and sync feeding and pasture regimes to these patterns. Understanding the behavioural patterns, via GSP on-farm technology, can allow farmers to assess the needs and conditions of individual animals, and subsequently optimise milk production to the times that are most profitable, efficient and sustainable.

- **Alternative feeding systems:** A 2016 case study demonstrated how alternative feeding systems, such as covered feed pads, allowed for more efficiently obtained milk, which led to greater productivity and dairy of a higher quality.[49] Feed pads are used to mitigate external risks, such as inclement weather, which can seriously damage pasture and disrupt production. In this case, employing covered feed pads resulted in a reduction in under-sowing areas from 80 hectares to 8 hectares. Feed utilisation was improved as feed was delivered directly to the cow and not wasted. In this case, average milk production per cow increased by 24% (from 396kgMS to 493kgMS) from 2011-12 to 2014-15.[50]
- **Automated detection of mastitis:** Mastitis is an inflammatory reaction to the cow's udder tissue, and may be caused by bacterial infections or physical trauma. The cost of mastitis across the New Zealand dairy industry has been estimated at $180 million per year.[51] A 2003 study conducted by McGill University found that mastitis accounts for up to 70% of total lost milk production.[52] DairyNZ reports that most milking technology companies offer Automated Mastitis Detection (AMD) systems, which are compatible with most herd management systems. The affordability and convenience of the system has resulted in approximately 5% of dairy farmers across New Zealand installing the AMD systems.[53] Accurate AMD systems will allow farmers to efficiently identify and treat cows with mastitis before the disease is transferred

48 Swain. D. L, Friend. M. A, Bishop-Hurley. G.J, Handcock. R.N, & Wark. T (2011) Trading livestock using global position systems – are we still lost? Animal Production Science Review (vol. 51), 167 – 175.

49 Ministry for Primary Industries Farm Systems Change – 2016 Dairy Farm Case Study: Waikato, Butterworth Enterprises (2016).

50 Ministry for Primary Industries (2016) Farm Systems Change – 2016 Dairy Farm Case Study: Waikato, Butterworth Enterprises (2016).

51 Dairy NZ, DairyNZ Protocols for Field Evaluation of In-Line Automated Mastitis Detection (AMD) Systems (2013).

52 McGill University Faculty of Agricultural & Environmental Sciences *Mastitis in dairy cows*, Dairy Cattle Production 342-450A, 12 (2003).

53 Dairy NZ, DairyNZ Protocols for Field Evaluation of In-Line Automated Mastitis Detection (AMD) Systems, (2013). Available at: https://www.dairynz.co.nz/media/785859/Protocol-document-310513.pdf.

to other cows. In turn, this will reduce mortality rates, which will increase milk quality and quantity. Further, the costs associated with managing mastitis, borne by the farmer, will be reduced as less cows will contract the disease.

Processing technology

There have been a range of developments in processing, including for example, the milk 'finger-printing' technology developed in 2015 by Fonterra. Milk finger-printing consists of running a 'high speed diagnostic test' on milk composition to identify which product the milk is best suited to be produced into. The testing takes into consideration how the composition of milk varies according to the farm and region from which it has come. Furthermore, it is a considerably more efficient method of identifying milk composition as it runs 'hundreds of tests…in seconds', relative to manual identification, could take 'days or weeks'. [54]

The efficiency of the testing allows for the optimisation of milk production, as it allows for the specialisation of milk product at substantially lower costs. The testing is reported to have reduced Fonterra's specific testing costs by 'more than 99%' and has significantly cut the 'time required to process results'.[55]

Although this technology has significantly boosted the productive capacity of Fonterra, small-scale dairy processing firms across New Zealand may not have access to such sophisticated technology, therefore limiting the impact to high-scale production firms.

Other technologies

Technological developments in transportation of milk from farm gate to processing plants is steadily evolving. The objective is to reduce the amount of handling in the chain so that rather than moving milk from cows to a refrigerated storage tank and then to transporters, the milk is pumped from the automated milking system directly into the transporter. However, this may require scale in order to be efficient, which may be an obstacle for small, fragmented farms. Small-scale alternatives include better logistics management via software technology in terms of timing of pickups, routes for delivery trucks, timing of delivery to processers and to retailers of finished products. Improved technology in the transportation process has allowed for increased efficiency in transporting milk from manufacturer to retailer.

---

54 Dairy NZ, DairyNZ Protocols for Field Evaluation of In-Line Automated Mastitis Detection (AMD) Systems, (2013), Available at: https://www.dairynz.co.nz/media/785859/Protocol-document-310513.pdf.

55 Dairy NZ, DairyNZ Protocols for Field Evaluation of In-Line Automated Mastitis Detection (AMD) Systems, (2013), Available at: https://www.dairynz.co.nz/media/785859/Protocol-document-310513.pdf.

Since 2001, dairy producers have shifted marketing strategies to appeal to four dominant consumer 'mega-trends', being health, responsible production, convenience, and luxury preferences.[56] Further productivity enhancements could potentially be realised through analysis of retailer data, to identify which products are popular and sell quickly, and those which move more slowly and likely to reach use by dates.

4.3.8 Other regulation

In addition to the sector specific regulatory framework established by DIRA, the dairy sector in New Zealand is subject to a range of regulations, typically encoded in statute, that apply to all sectors in the economy. Table 2 below provides examples of some of these regulations.

In addition, there has been some suggestion that the tax provisions relating to farming may have influenced the performance of the New Zealand dairy sector over the study period. In particular, commentators have argued that:

- There have been significant capital gains related to dairy farms.
- Farmers have accepted lower returns from farming activities in return for these capital gains.[57]
- In order to increase the returns from farming activities, it would be necessary to reduce the value of capital gains, for example by introducing a capital gains tax.

56 New Zealand Trade & Enterprise, 'The Investors Guide to the New Zealand Dairy Industry 2017', *Part of the New Zealand Food & Beverage Information Project* (June 2017).

57 Shadbolt, N. M. and J. W. M. Gardner (2003), Farm Investments: Alternative Ownership Structures that Address the Liquidity versus Profitability Conundrum, Working Paper, 14th International Farm Management Congress, Western Australia.

Table 2: Other New Zealand statutes of relevance to the dairy sector

Legislation	Overview	Recent changes	Relevance to the dairy industry
Resource Management Act 1991	This Act promotes the sustainable management of natural and physical resources. This means managing the use of resources in a way which enables people and communities to provide for their social, economic and cultural well-being while also meeting the needs of future generations.	Various changes were proposed in 2017, some of which focused on giving councils new functions to ensure development capacity could be reached, how to manage significant risks from natural hazards and the subdivision of land.	The Act specifies restrictions on water pollution, including for the discharge of dairy effluent. Almost half of prosecutions under the Act between July 2008 and September 2012 involved dairy effluent.
Skilled Migrant Category, Immigration Act 2009	This is a point-based system to ensure that migrants with certain skills and qualifications New Zealand wants can easily apply for residency. The Government also publishes a register of skills shortages. Individuals working in occupations listed on this register may be able to obtain work or residence visas more easily. Several occupations related to the dairy sector are presently listed on the register	Changes in 2015 include the way employment and experience are awarded points, along with age, experience and qualifications. These changes were made to promote higher-paid and higher-skilled migrants, including dairy farmers.	Dairy cattle farmers have been placed on the "immediate skill shortage list", which facilitate applications to a temporary work visa, but not to a residence application directly.
Overseas Investment Act 2005	The purpose of this Act is to ensure overseas persons who own or control sensitive New Zealand assets meet certain criteria and have conditions imposed upon them to regulate their ownership.	Changes in 2018 imposed stricter requirements for foreigners intending to buy land near a New Zealand heritage site.	Recent changes may have significantly influenced foreign investment in rural farmland for dairy farming.

Legislation	Overview	Recent changes	Relevance to the dairy industry
Health and Safety at Work Act 2015	The purpose of this Act is to provide a framework to secure the health and safety of workers by protecting them against harm by minimising risks, providing fair representation and encouraging unions to promote improvements in health and safety practices, among other things.	Changes to guidance documents have been made to ensure it is up to date and relevant.	The Act does not place specific requirements on dairy farmers, but places responsibility for health and safety on various stakeholders, including business partners, farmers and farm visitors
Taxation (Livestock Valuation, Assets Expenditure, and Remedial Matters) Act 2013	This Act outlines how livestock should be valued and taxed, along with assets expenditure and other remedial matters.	Changes to guidance documents were made to more clearly explain how to tax the value and timing of transfers of livestock.	Guidance is provided on the taxation of dairy cattle, affecting net profit margins.
Animal Welfare Act 1999	The Act sets out how people should take care of and act towards animals, including meeting an animal's physical, health and behavioural needs, and alleviating pain or distress. MPI and the Royal New Zealand Society for the Prevention of Cruelty to Animals (the RNZSPCA) jointly enforce the Act.	Changes were made in 2015 to include stronger animal welfare standards, broadening enforcement powers, and other measures to improve the clarity and transparency of the animal welfare system.	The Act places responsibility on dairy farmers to ensure the well-being of dairy cattle.
Commerce Act 1986	The purpose of this Act is to promote competition in markets for the long-term benefit of consumers within New Zealand.	Changes made in 2017 expanded the definition of cartel conduct to include restricting output and market allocation (rather than only price fixing), and made it easier to take action against international cartels	This Act provides consumer protection, in addition to DIRA, in the event of a lack of competition.

Source: Various Acts from New Zealand Legislation, New Zealand Immigration, media search

While it is clear that dairy land values have increased substantially over time, we have not seen any evidence that this has occurred at the expense of lower farming returns. Even if this were shown to be the case, the introduction of a capital gains tax would not, in our view, change farmer decision making, and therefore the performance of the dairy sector in New Zealand. This is because farmers currently face incentives to maximise farming returns because doing so maximises the capital value of the land.[58] Introducing a tax would not enhance incentives to increase returns further by altering farmers' behaviour. Rather, a capital gains tax would simply transfer a share of the future capital gains to Government consolidated revenue

58 Economic theory suggests that in frictionless markets, the value of land should equal the expected present value of returns from the land's most productive use.

5 Analysis of key drivers

As discussed in Section 2, this section considers in turn each observed outcome described in Section 3:

- First, identifying the key outcome we are seeking to explain, as set out in Section 3.
- Then, identifying the relevant drivers from the list of potential influences set out in Section 4 and discussing each of the relevant drivers in turn to assess whether the relevant drivers explains the observed outcome in question. We analyse the relevance of each driver by first considering the available evidence, and then asking what would likely have occurred in the absence of that driver. For example, we ask whether, in the absence of the sharp rise in global dairy prices, the volume of dairy farming activity in New Zealand would have increased as much as it has, and whether the associated environmental outcomes would have occurred?
- Finally, concluding as to the relative influence of various drivers. In doing so we may conclude that:
  - A single driver stands out as the most plausible explanation;
  - There may be competing explanations for the same observed outcome; or
  - A combination of drivers may explain the observed outcome, but it is not possible to determine the impact that each driver has had.

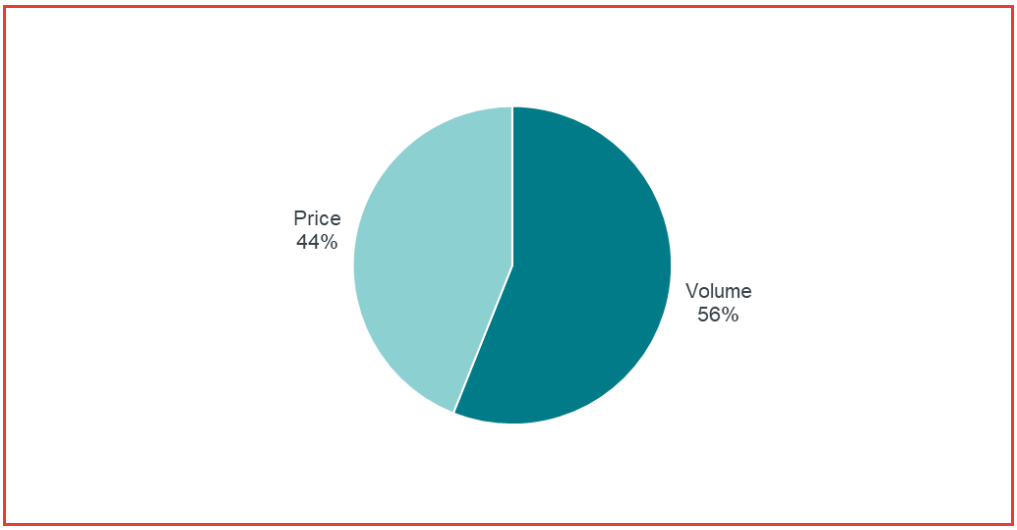
5.1 Economic benefit

In this Section we consider the drivers of the growth in economic benefit to New Zealand from the dairy sector since 2001, discussed in Section 3. The value of the dairy sector in New Zealand has grown significantly, by 5.1% per annum from NZ$7.9 billion in 2001 to NZ$16.6 billion in 2016, outstripping 4.5% average annual growth in New Zealand's GDP over the same period.

As shown in Figure 15, the growth in the sector over this period can be attributed 56% to increased production volumes and 44% to higher prices.[59]

[59] In 2001, the sector generated 61 cents in value for every litre of milk produced. If this 61 cents had remained constant over time, then given the increase in volumes to 2016, the sector would have grown by $4.9 billion, or 56% of the $8.7 billion in growth achieved. In 2016, the average value per litre of milk had grown to 79 cents, thereby contributing $3.8 billion of growth, or 44% of the total sector growth.

Figure 15: Origin growth in dairy sector value



Source: DairyNZ; Stats NZ

The growth in the value of the sector has been driven by growth in **exports**, rather than growth in the domestic market. New Zealand's dairy exports have grown consistently at around 7% per annum since 2004 to 2017, from NZ$6.1billion to NZ$14.6 billion.

5.1.1 Drivers

There are a range of drivers that could explain growth in economic benefit from New Zealand's dairy sector.

Global factors

Growth in **global dairy demand** has prompted an increase in both the value and volume of New Zealand's dairy exports over the period. A significant part of that growth was driven by growing demand for commodity products during the commodity boom from about 2006/07 to 2013/14. Much of that demand has been centred in Asia, in particular China. For example, China accounted for around one-third of the NZ$5 billion of milk powder exports in 2017. However, there has also been significant growth in other markets like the Middle East and North Africa. More recently, growth has been focused on some higher value products as global demand patterns change (see section 4.3.4). For example, the value of infant formula exports doubled between 2014 and 2016, to $800 million.[60]

The increased global demand, identified above, has been a key driver in increased milk prices to farmers. In particular, Fonterra's farmgate milk price is based on a bundle of commodities, so if commodity prices are high then so are the milk prices

60 ANZ, September 2017, Agrifocus

received by farmers (all else remaining equal). Significant increases in global milk prices, particularly between 2002 and 2008, may have fuelled expectations of continued growth in prices into the future, thereby incentivising farmers to enter and expand milk production over time. This in turn increased the contribution of the sector both due to higher prices and larger volumes. (We discuss in the regional benefits section below some of the other drivers in relation to farmers' decisions specifically.)

Trade policy and non-DIRA regulations

New Zealand has been well placed to serve this growing demand, in part to New Zealand's **trading relationships and policies**[61] and **other regulations** including:

- trade policy and signing of free trade agreements with countries that were experiencing significant growth in dairy demand;
- a highly regarded food safety regime that is more stringent than standards that apply in many of the countries that experienced significant growth in dairy demand—particularly in Asia. This likely provided New Zealand dairy products with a competitive advantage relative to domestically-produced products in those high growth markets; and
- immigration policy that included dairy workers on the skill shortage list.

It also appears that environmental regulations, and enforcement of those regulations in certain parts of New Zealand, has not constrained significantly the growth in dairy volumes. (This issue is discussed further in section 5.5.) These loose constraints would also have aided the New Zealand dairy sector in meeting rising global demand, albeit at the cost of some domestic environmental detriment.

DIRA

While global demand was a key driver of growth, the evidence[62] suggests growth was likely enabled by the certain elements of the **DIRA**. In particular, subpart 5 of the DIRA has likely helped ensure the following:

- **Farmers receive an efficient price for their milk:**[63] The open entry requirements of the DIRA have required Fonterra to accept new and expanding farmers' milk on the same terms as existing farmers. Consequently,

---

61 By comparison, European Union dairy exporting countries were constrained by milk quotas. See section 7 of Report One for further details.

62 For example, see Fonterra's submission (29 June 2018); Commerce Commission, , Review of the state of competition in the New Zealand dairy industry (2016).

63 That is, consistent with a price that would be determined in a competitive market. The DIRA provisions are used to derive a farmgate milk price in New Zealand in absence of a workably competitive market (see Commerce Commission, Our approach to reviewing Fonterra's Milk Price Manual and base milk price calculation (August 2017), p22).

the DIRA is likely to have ensured that farmers, including new entrants, have received an efficient price for their raw milk. Linked to the point below, where entry has occurred, farmers have also had a choice of where to provide milk, and in some cases have received milk payments substantially higher than that offered by Fonterra.

- **Independent processors can compete with Fonterra for farmers' milk:** A number of DIRA provisions including open entry, open exit, non-discrimination, the 33% rule, the 20% rule and the raw milk regulations, have ensured that efficient independent processors can compete with Fonterra for farmers' milk. This has helped facilitate significant entry into processing with independent processors having accounted for about 41% of the growth in farm gate milk volumes (milk solids collected) since 2001. Fonterra has still been able to grow significantly, accounting for the other 59% of growth – see Figure 16 below.
- **Independent processors can purchase milk in the factory gate market for an efficient price**: The Raw Milk Regulation have allowed independent processors to buy at the factory gate. This has not only lowered barriers to entry into the farmgate market, but has also allowed for specialist downstream processors (for example, Nutricia Danone) to enter or expand in New Zealand, contributing further to the sectors growth.[64]

It is unclear what the growth in economic benefit would have been absent subpart 5 of the DIRA — that is, if Fonterra's behaviours were not constrained by this legislation. New Zealand would have still benefitted from the growth in global dairy demand, and would have been well placed to capitalise on that demand growth. However, it is conceivable that Fonterra could have frustrated entry (e.g., by long term contracts, not supplying at factory at an efficient price, etc.), which may have limited the sector's ability to increase the supply of milk to meet volume demand from export markets, and may have deterred or delayed the entry of some independent processors that have contributed to the growth in the value of the sector. For example, many farmers who have switched to supply independent processors are likely to have done so because:

- the independent processor pays a higher milk price (which may in turn be a function of their focus on higher value products); and/or
- there are lower upfront capital contribution (e.g., not share-backed supply) and new entrant farmers are often capital constrained.

64 Absent these processors purchasing that milk, Fonterra would have likely sold the milk as commodity products as that is the marginal use of the milk.

Figure 16: Estimated volumes of milk solids collected for Fonterra and independent processors

Source: Fonterra, DairyNZ

It is worth noting that many of the independent processors (e.g., Open Country Dairy, Synlait, Oceania, Miraka, Yashili and Danone) are supported by foreign ownership that provides both a source of capital and often access to markets, as we discussed in Section 2.3 in Report One.

There are at present no reliable data on the number of farmers that have switched from Fonterra to supply independent processors (or the number of farmers that have returned to Fonterra), and the volumes of milk supplied by these farmers.[65] Data of this kind, and consultation with farmers that did switch, would help demonstrate the extent of benefit that the open entry and exit provisions of DIRA had in practice.

Without as extensive entry into the market, it is conceivable (though impossible to conclude definitively) that:

- prices for some farmers would likely have been lower, therefore lowering overall returns in the sector; and

65 We understand that MPI has sought this information from Fonterra, and Fonterra had provided an initial response to MPI's request at the time of writing of this report. However, certain aspects of the data submitted by Fonterra required further clarification before it could be relied on in our analysis.

- some capital-constrained farmers may not have entered or expanded, or may have entered or expanded at smaller scale, if their only option was to supply Fonterra on a share-backed basis. This would have resulted in lower milk production than has actually occurred in the sector since 2001.

Growth in the sector is also likely to have been impacted by **Fonterra's business model and strategy**, in particular any capital constraints faced by Fonterra. As owners of a large integrated dairy exporter, Fonterra's shareholders have been well placed to take advantage of the global growth in dairy demand. Fonterra has been able to expand its operations and its sales channels in response to growth in New Zealand milk production. Fonterra also likely enjoys economies of scale in collection, processing, logistics and sales – which contribute to maximising the milk price. These factors have all led to high returns, including to Fonterra shareholder farmers, when commodity prices are high. However, returns have also been volatile, both on-farm and at the processor level.

Fonterra's capital structure means that its equity base is intrinsically linked to its milk supply. While Fonterra has been successful at limiting its redemption risks, has accessed some additional equity via the Fonterra Shareholder Fund, and retains some earnings on a yearly basis, it is constrained in its ability to access capital given the cooperative model its shareholders have chosen.[66] As discussed in Fonterra's submission to MPI dated 29 June 2018, volume growth over the last decade has led to it focusing on increasing capacity, rather than investing in moving more quickly into higher value products. Arguably, if Fonterra had faced less binding capital constraints, it would have been able to invest in both strategies concurrently.

Fonterra strategy

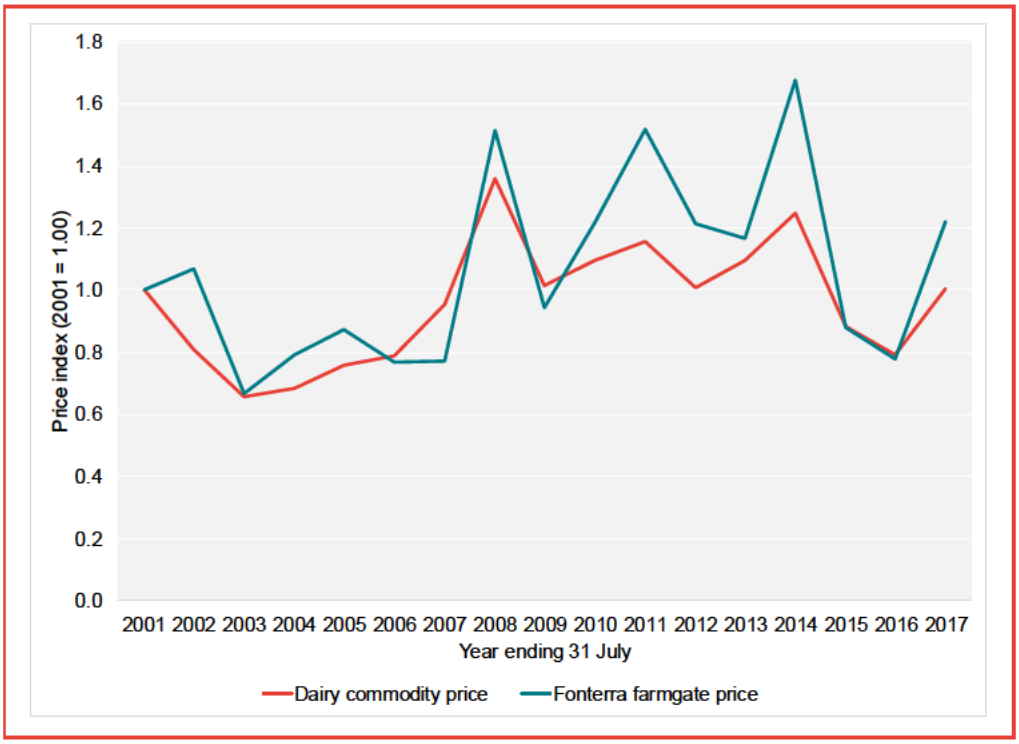
One key issue is the extent to which New Zealand's volume growth was a function of global market conditions, or dairy processor' (in particular, Fonterra's) strategy. To assess this further, we have considered the incentives Fonterra provides its shareholder farmers to increase milk supply. There are two main components to this – the return on milk supplied to Fonterra, and the required equity contribution for farmer shareholders (including the return on that equity) – both of which impact farmers' incentives and ability to grow their milk supply.

- **Return on milk supplied:** As discussed in Section 4.2.2 Fonterra is required to set a benchmark milk price for the raw milk it collects from farmers. This benchmark milk price is a function of global commodity prices (as well as the costs of a hypothetical efficient processor). Figure 17 below shows that as dairy commodity prices varied from 2001 to 2017, Fonterra's farmgate prices

66 In comparison, the Kerry and Glanbia cooperative model in Ireland includes significant access to private equity markets.

followed closely. This illustrates that farmgate prices (which accounts for the majority of returns that farmers receive from Fonterra) are influenced by external forces.

Figure 17: Relationship between dairy commodity prices and Fonterra farmgate prices



Source: Fonterra annual reports, ANZ Commodity Index

However, as noted in Section 4.2.2 Fonterra may influence the farmgate milk price it charges farmers:

- Fonterra may amend the milk price manual, including without or contrary to recommendations of the Milk Price Panel;
- Fonterra has discretion over the inputs to the methodology set out in the milk price manual;
- Fonterra may set a farmgate milk price that differs from the benchmark milk price calculated using the milk price manual. Indeed, it did so in 2013/14 in response to the disconnect between whole milk powder prices (which were at an all-time high) and Fonterra's processing capacity (which contained facilities to process cheese and other products, constraining Fonterra's capacity to respond to global whole milk powder prices in the

short term).[67] Our understanding is that such deviations from the benchmark milk price derived using the milk price manual has occurred only once and so is rare. Further, we note that in this single historical instance in which Fonterra deviated from the benchmark milk, it set the final farmgate price below the benchmark price. We would expect this to have lowered rather than increased milk production; and

- We understand from MPI that Fonterra may, under DIRA, set different terms of supply (including the farmgate milk price) for groups of farmers facing different circumstances (although DIRA prohibits Fonterra from discriminating between farmers facing the same circumstances). Conceivably, then, Fonterra may be able to set the farmgate milk price in a way that influences the milk production of certain groups of farmers.

To the extent that Fonterra can influence the farmgate milk price paid by farmers, Fonterra could potentially influence milk production by its suppliers, by varying the price. Further, since the farmgate milk price set by Fonterra is used as pricing benchmark for other processors, any influence that Fonterra has over the farmgate price may potentially also affect the production decisions of non-Fonterra farmers.

- **Required equity contribution:** As a cooperative, Fonterra's farmers are ordinarily required to contribute equity in order to supply milk. This equity is a combination of:
  - acquiring Fonterra cooperative shares; and
  - retained earnings (i.e., profit earned by Fonterra and retained as equity rather than paid out as dividends).

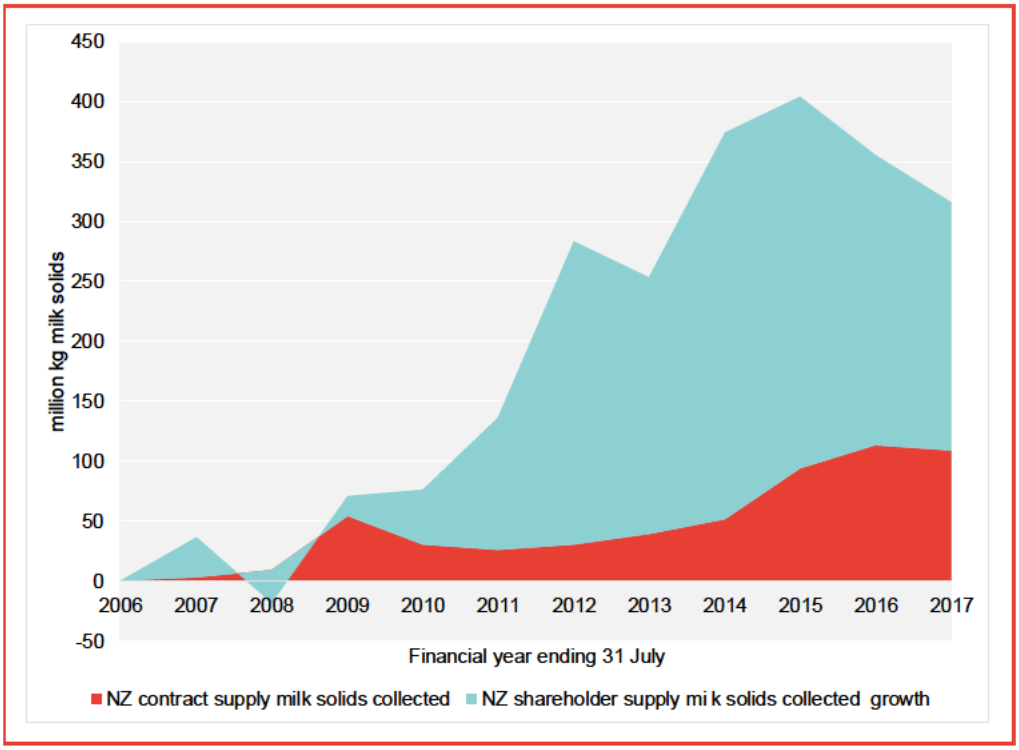
  Over time, shareholder farmers should recoup this these contributions through a combination of dividends or capital gain in their shares. However, if farmers are either capital constrained or risk averse, a requirement to contribute additional equity in line with milk supply may have a deleterious impact of Fonterra's milk growth. The evidence suggests that Fonterra has recognised this potential impact on its milk supply growth in New Zealand and has put in place measures to mitigate the impact.

  For example, Fonterra does not always require farmers to "share up" when entering the cooperative or expanding production. Fonterra's annual reports suggest that it started procuring contract supply in 2006/07. These contracts were typically called Growth Contracts. Suppliers were initially required to purchase 1,000 Fonterra shares followed by the purchase of sufficient shares to cover one third of their total milk supply at the start of the fifth, sixth and

[67] Fonterra, 'Reasons' Paper in support of Fonterra's base milk price for the 2013/14 season (1 July 2014), p43.

seventh milking seasons.[68] We understand that the structure of these Growth Contracts have evolved over time.[69] These contracts mean that capital constrained farmers could enter or grow their milk supply, without having to contribute substantial additional equity in shares or retained earnings. In 2017, contract supply accounted for about 7% of Fonterra's New Zealand milk supply.[70] However, when just considering the growth in milk volumes since 2006 – the year before these contracts were introduced – contract milk supply accounted for about 34% of Fonterra's growth in New Zealand milk supply (see Figure 18).

Figure 18: Fonterra's growth in New Zealand milk supply since 2006 by shareholder milk and contract milk supply



Source: Fonterra annual reports

Second, the evidence suggests that Fonterra's dividend payout ratio has been trending upward over time (see Figure 19), which suggests that its retained earnings (as a percentage of earnings) has been decreasing. Fonterra's dividend

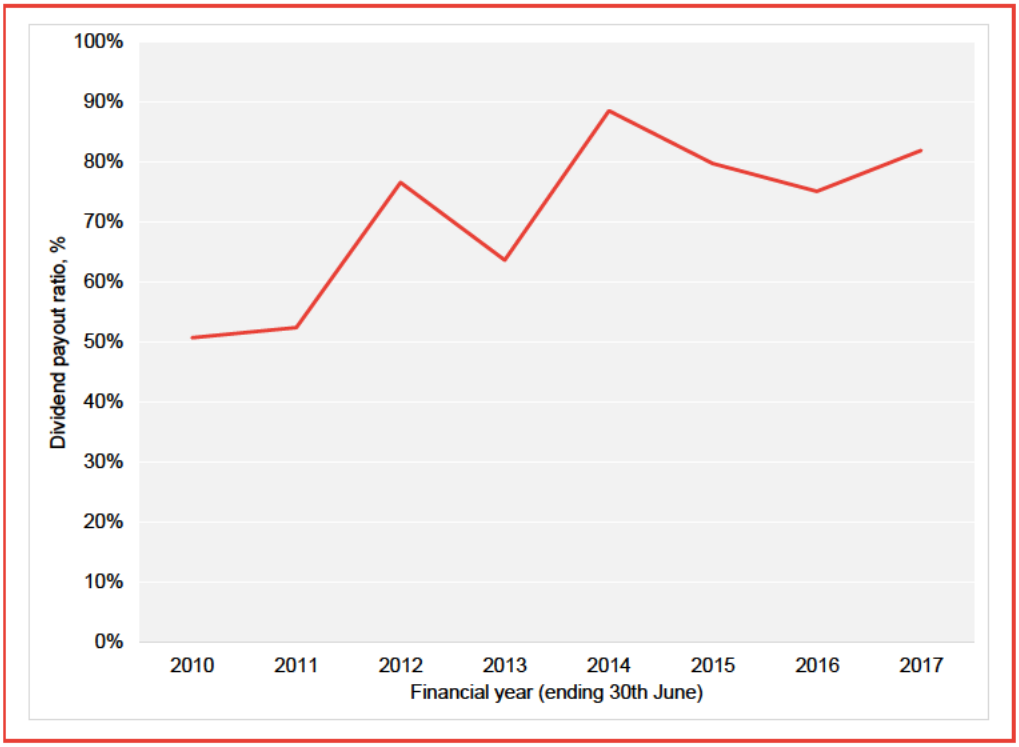
68 See, Commerce Commission, 2012, Determination: Fonterra Limited and New Zealand Dairies Limited (in receivership), NZCC 21

69 For example, in 2013 Fonterra introduced a modified growth contract that would allow farmers to purchase a minimum 10% of shares upfront for growth milk. Farmers would not have to purchase further shares until the fourth season. After that, they would be given more time to share up provided they made a specified minimum annual investment. *Fonterra, Media Release, 27 February 2013.*

70 Fonterra, 2017, Annual Report.

policy may have incentivised further milk production by lowering the required equity contribution in Fonterra, thereby reducing the short-term cost of supply. However, it is important to note that Fonterra's shareholders are likely to have driven that dividend policy due to their own capital constraints and investor risk profiles, as discussed in Section 4.3.6.

Figure 19: Fonterra dividend payout ratio from 2010 to 2017, percentage



Source: MPI provided data

Note: Dividend payout ratio = net profit after tax per kgMS / dividend per share

The evidence above suggests that the farmgate price has been a major driver of volumes as that is the largest component of farmers' returns. This is influenced heavily by global dairy prices, which are beyond Fonterra's control. However, as described above, Fonterra can exert some influence the farmgate milk price. Further, Fonterra appears to have been successful in encouraging volume growth by reducing the required equity contribution of farmers to supply the cooperative (through a combination of contract supply and high dividend payout ratios).

The extent to which Fonterra can, through its actions, influence the production of milk in New Zealand is likely to be an important consideration in the future design of DIRA. Therefore, we recommend that MPI consult further with Fonterra and other stakeholders on the extent to which Fonterra can and does influence the volume of milk produced.

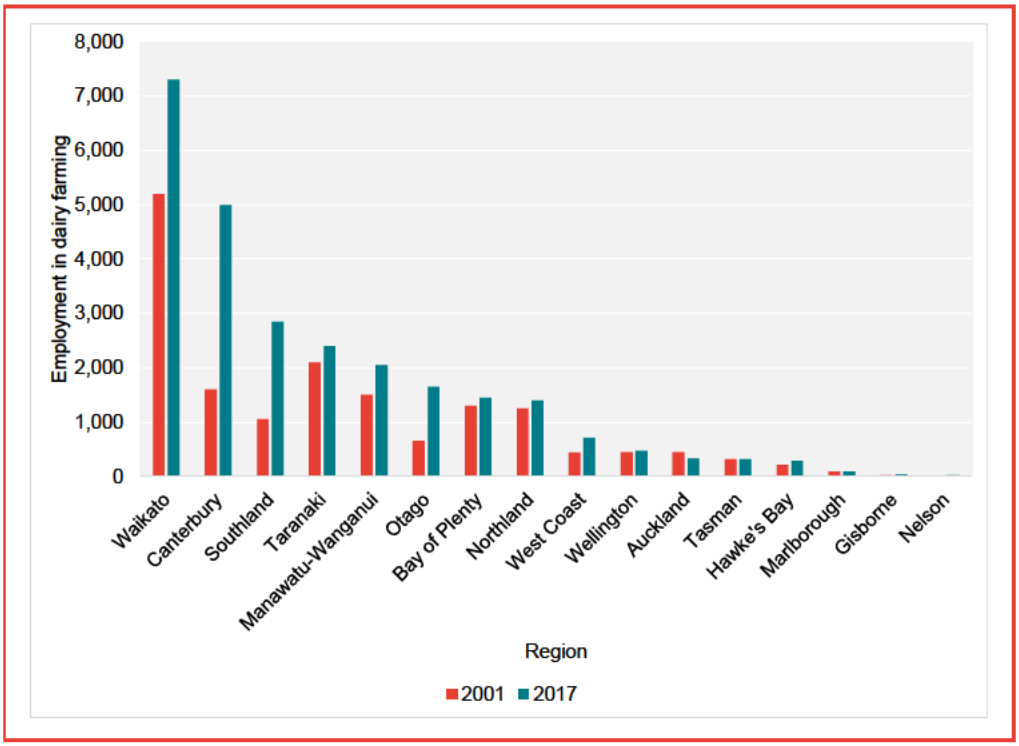
5.1.2 Conclusions

On balance, it seems likely that a large part of the economic benefits that have flowed from the dairy sector derives from growing global demand for dairy products—lower value commodities (underpinned by milk volume growth), initially, and higher value products more latterly. Domestic policy settings and Fonterra's position as a large supplier internationally has contributed to New Zealand being well placed to capitalise on this increased global demand for dairy products. The behavioural constraints imposed by DIRA on Fonterra have likely increased the sector's economic benefit by helping to ensure dairy farmers receive an efficient price for the milk they produce (thus enabling efficient expansion of milk supply), and also by enabling the entry of several independent processors. Fonterra's capital constraint may have impacted its ability to invest in moving more volumes into higher value products, which has also likely impacted on total economic contribution from the sector.

5.2 Regional economic benefit

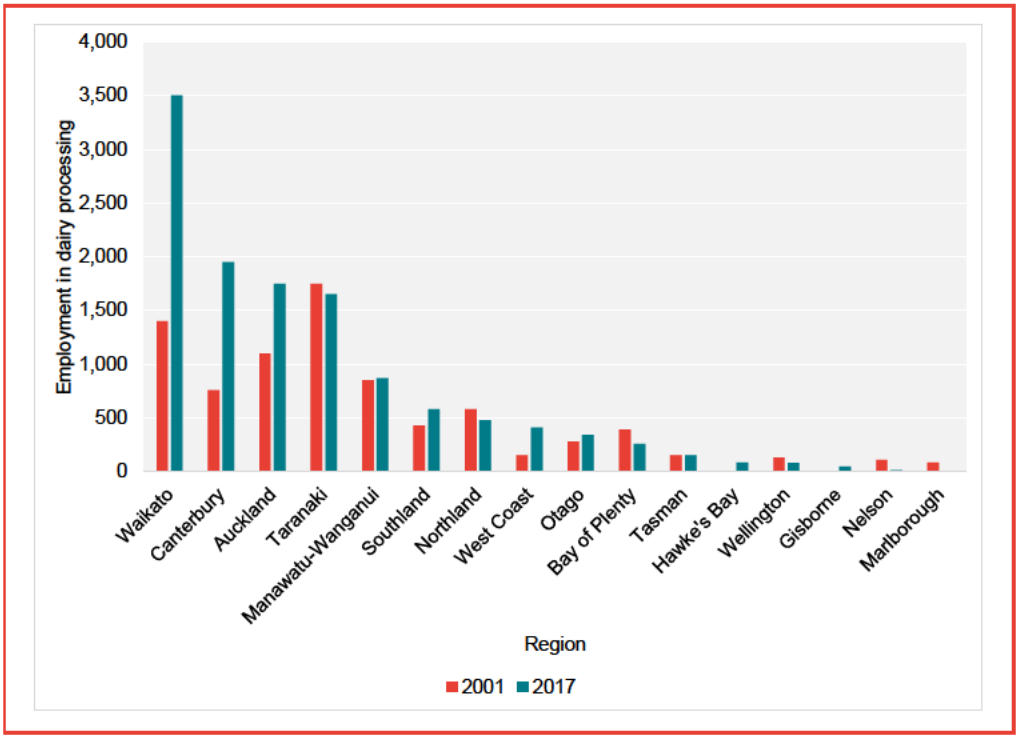
In this Section we consider the drivers of the distribution of economic benefits the New Zealand dairy sector has brought to many areas of New Zealand's regional economy, discussed in Section 3. There is very limited publicly available data on the contribution of dairy farming to regional GDP. However, employment provides an indicator of the extent of regional economic activity associated with dairy farming and processing. The available data (see Figure 20 and Figure 21) suggest there has been a significant increase between 2001 and 2017 in dairy farming and processing employment in Waikato, Canterbury, Southland, Otago and West Coast. This conclusion is corroborated by evidence that there has been a significant increase in dairy farming land use (Figure 22) and the number of cows used for dairy farming (Figure 23) in those particular regions.

Figure 20: Change in dairy farming employment by region from 2001 to 2017



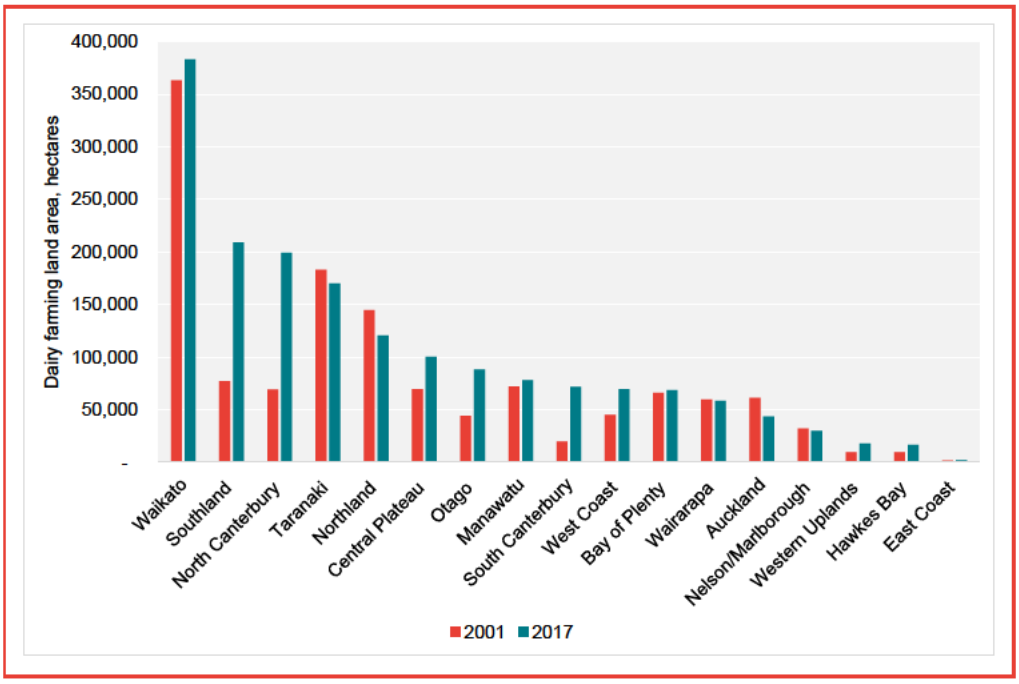
Source: MPI provided data

Figure 21: Change in dairy processing employment by region from 2001 to 2017



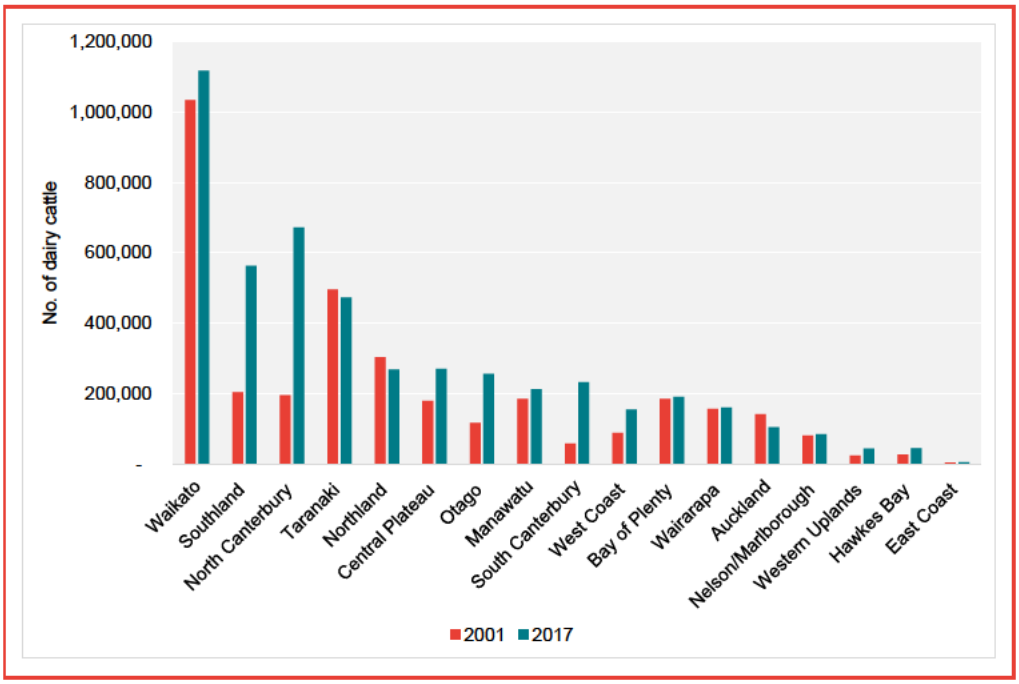
Source: MPI provided data

Figure 22: Change in usage of land in each region for dairy farming from 2001 to 2017, hectares



Source: MPI provided data (Table 3-3)

Figure 23: Change in total number of dairy farming cows in each region from 2001 to 2017



Source: MPI provided data (Table 3-3)

5.2.1 Drivers

There are a range of drivers, acting together, that could explain the distribution of economic benefits of the expansion of the New Zealand dairy sector to different regions.

The primary driver of the distribution of regional benefits are the **decisions of farmers** to expand milk production over time or to convert land from other forms of farming to dairy farming. The land conversion decisions of farmers are likely to reflect expectations of the greater profitability associated with dairy farming, compared to alternative land uses. This in turn depends on a range of factors including the relative cost of alternative land uses and the expected profitability.

The hectares of land used for dairy farming increased substantially in many regions, but most notably in Southland, Canterbury, Gisborne and Otago, where there were a large number of conversions from sheep farming and Waikato, where land was converted to dairy farming from plantations and forestry. In some regions, including Taranaki and West Coast, land was converted to dairy farming from scrub. As a result, the distribution of dairy farming has changed substantially over the study period, to cover a relatively larger area of regional New Zealand.

It is unlikely dairy farming and processing in New Zealand would have increased to the same extent without the significant growth in the global dairy market. To this end **developments in global dairy markets** are central in influencing the decision making of farmers and processors.

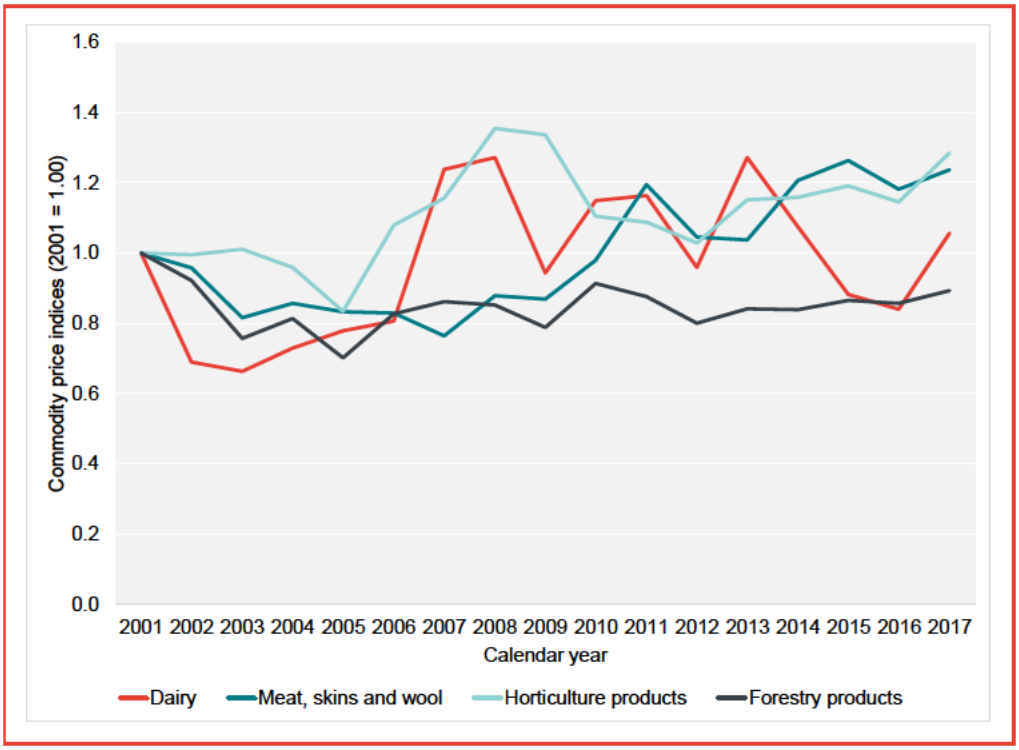
As discussed in Section 4, changes in global dairy markets drove an increase in both the value and volume of New Zealand's dairy exports. Report One presented a comparison of movements in land-based commodity prices over the period 2001 to 2017, which is shown in Figure 24 below. The Figure demonstrates that global dairy commodity prices increased substantially over the period 2002 to 2008, which may have motivated farmer decisions to increase participation in the sector.

Figure 25 shows that the farmgate milk price set by Fonterra—the price most visible/relevant to domestic farmers and therefore likely to influence their investment decisions—largely mirrored the movement in global dairy prices over time. The average milk price set be Fonterra between 2001 and 2007 was $4.25 per kgMS between 2001 and 2007. Over the next seven years (2008 to 2014) the average milk price was $6.62 per kgMS. In 2015 and 2016, Fonterra's milk price decreased again, but this recovered in 2017 and is forecast to be higher again in 2018 and 2019.

It is notable that dairy commodity prices and the farmgate milk price, and therefore returns, have been relatively volatile compared to other land-based commodity prices over the period. The 2017 dairy price index is only 6% higher than the 2001 value, indicating limited evidence of sustained price increases. As discussed in Section 5.1, the evidence suggests the expansion in New Zealand's dairy exports was driven primarily by a growth in volume, rather than value. This suggests there

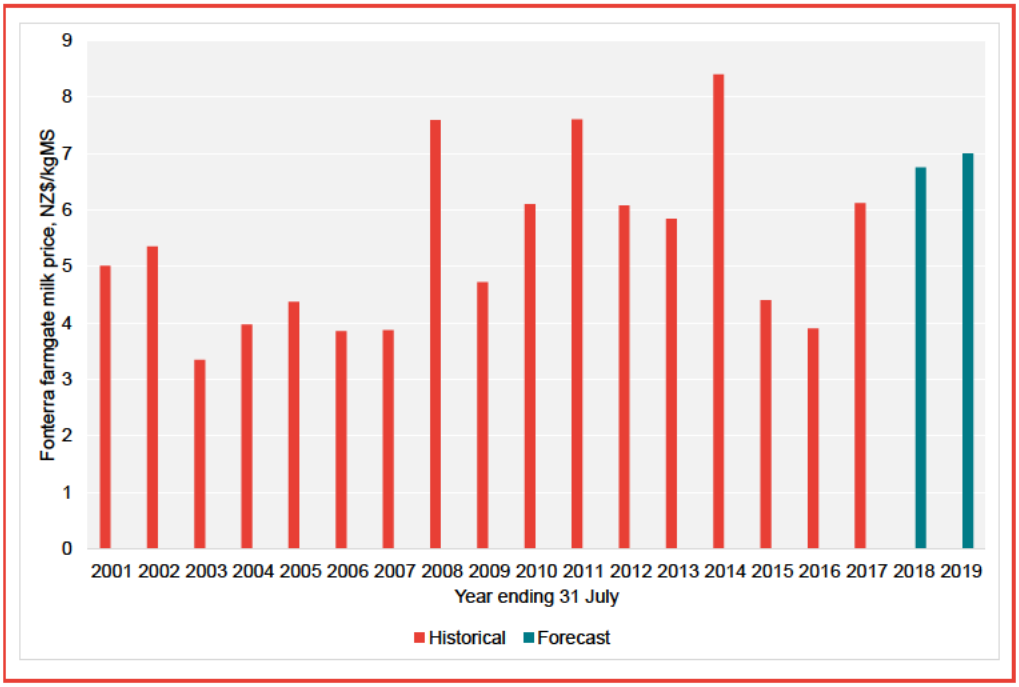
may have been other factors influencing farmer decision making in relation to the expansion of dairy farming, in addition to global dairy market developments.

Figure 24: Comparison of land-based commodity prices from 2001 to 2017



Source: ANZ Commodity Price Index

Figure 25: Fonterra farmgate milk price



Source: Fonterra annual reports

Other potential drivers that may have influenced farm decision making, beyond global dairy market trends, include:

- **Developments in other commodity markets**, which affect the expected relative payoffs from different types of farming. The relative movements in the prices of other land-based products may mean that the expected return from dairy farming was anticipated to be higher than alternative land-uses, motivating land-switching. For example, Figure 24 shows the relatively limited movement in forestry prices over the study period. Furthermore, if we compare prices for dairy, beef, lamb and wool historically (see Figure 26 below), we see that dairy price increases been larger and more sustained than those for beef, lamb and wool, which may have encouraged land-switching towards dairy farming.

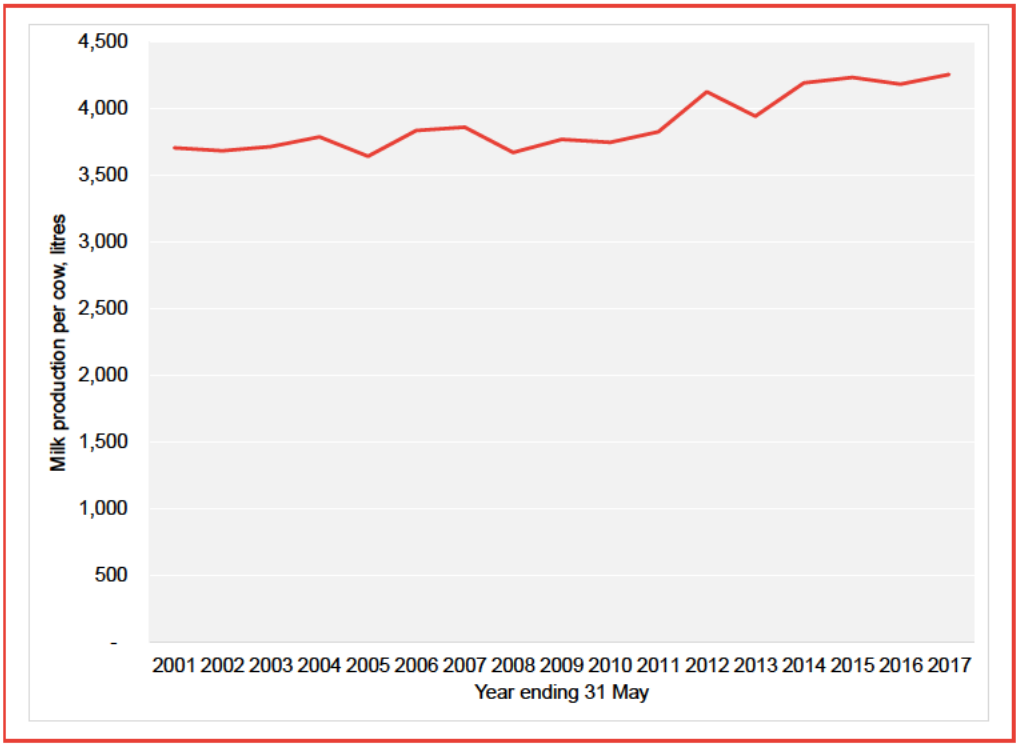
Figure 26: Average export price for dairy, beef, lamb and wool from 2004 to 2017

Source: Situation and Outlook for Primary Industries June 2018 web data release, available at: https://www.mpi.govt.nz/dmsdocument/27843-sopi-june-2018-web-data-release

- **Developments in on-farm technology**, which would be expected to increase the productivity of dairy farming, potentially making it more profitable relative to alternative forms of farming and other land uses. The lack of data on the penetration of technology improvements in various regions, and the timing and extent associated productivity improvements, makes it difficult to comment definitively on the extent of this influence. However, Figure 27 below shows that between 2001 and 2017, milk yield increased by nearly 15% from 3,708 litres per cow to 4,259 litres per cow. Similarly, as shown earlier in Figure 14, milk solids produced per cow per year have increased by 23%

between 2001 and 2017. Over the same period, the average herd size increased by 65% from 251 cows in 2001 to 414 cows in 2017 (see Figure 28). This could potentially be an indication of an increase in dairy farm productivity in New Zealand since 2001.[71]

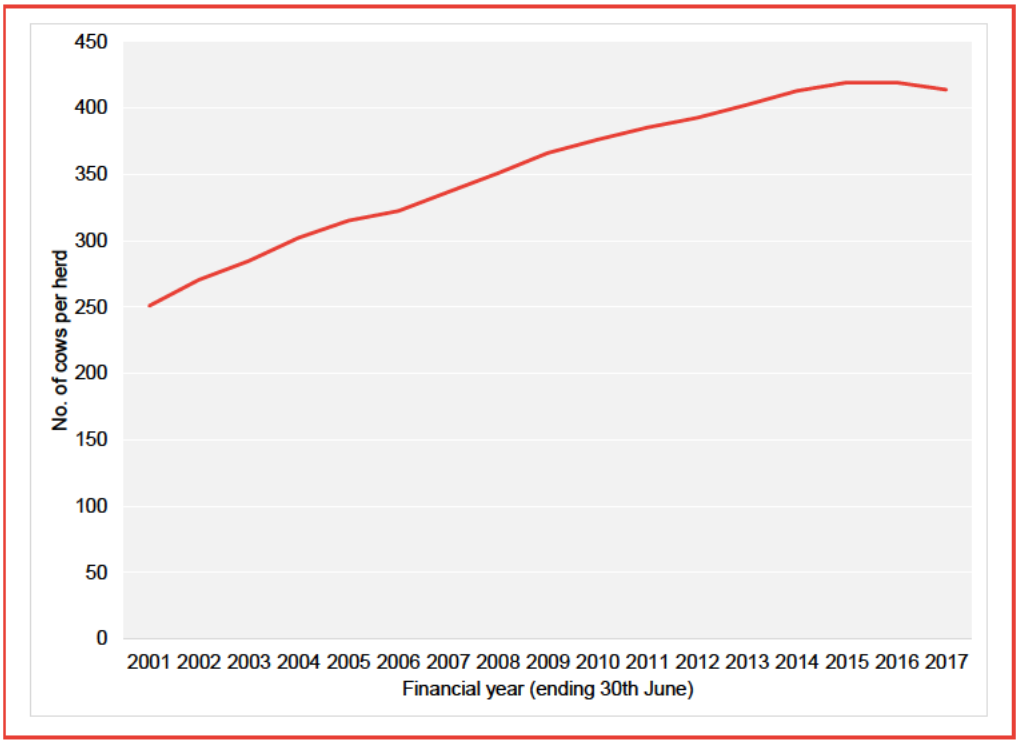
Figure 27: Milk production per cow from 2001 to 2017



Source: Dairy NZ Statistics 2016-17

71 It is important to note that it is not possible to be definitive, without further detailed analysis, that the improvement in yield represents a true improvement in farm productivity. This is because the increase in yield may have been due to adoption of more expensive methods of farming. For example, many New Zealand farmers began using imported palm kernel and other feed in 2008 following the significant increase in the milk price around that time, as the increase in milk price made more expensive feed more economical. This could explain some of the increase in milk yields, even if total factor productivity fell.

Figure 28: Average herd size for dairy farming



Source: MPI provided data (Table 3-3)

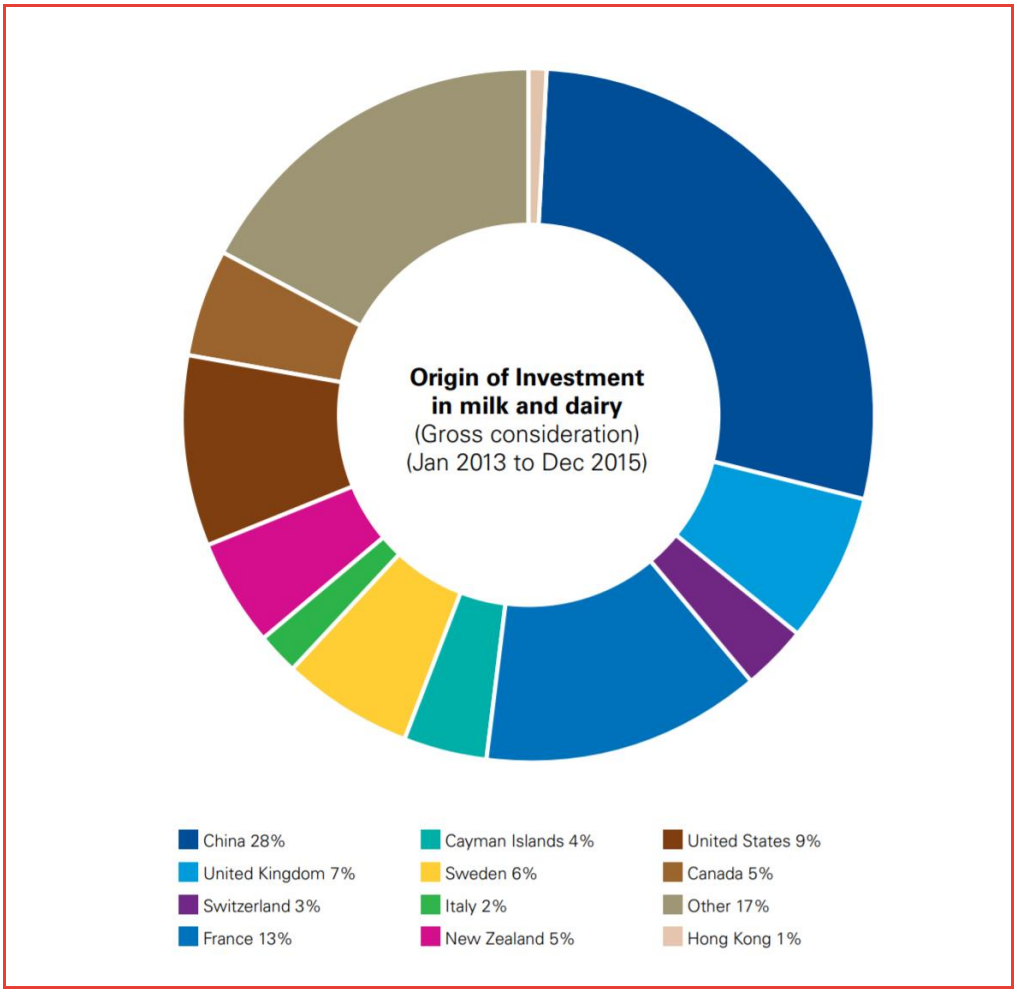
- **Access to global capital markets.** The conversions of land from alternative uses to dairy farming, and development of processing facilities, requires significant capital investment in land and infrastructure. If access to global capital markets was not forthcoming it is unlikely land-conversions and milk production could have expanded at the same rate. Ready access to global capital markets plays an important role in facilitating this investment, via lending and equity investment. Foreign investment in New Zealand is widespread across the economy, with agribusiness accounting for only 13% of foreign investment over the period January 2013 to December 2015.[72] The dairy sector (including milk processing) is the primary destination for foreign investment in the agriculture sector in New Zealand, accounting for around 38% of foreign direct investment over the period January 2013 to December 2015.[73] China accounts for the largest share of investment, although investment in the New Zealand dairy sector reflects flows from a wide range of countries, as shown in Figure 29. Canterbury, Otago and Southland regions accounted for nearly half of all freehold land acquired by foreign investors that

72 KPMG, Foreign Direct Investment in New Zealand: Trends and Insights (November 2016), p12.

73 KPMG, Foreign Direct Investment in New Zealand: Trends and Insights (November 2016), p26.

was subject to consents under the Overseas Investment Act 2005, consistent with the location of land conversions to dairy as we discussed above.[74]

Figure 29: Origin of investment in dairy farming and processing, January 2013 to December 2015



Source: KPMG, Foreign Direct Investment in New Zealand: Trends and Insights (Nov 2016), p27.

- The open entry/exit provisions of **DIRA** may also have affected farmer decision making. As discussed in section 5.1, these provisions prohibit Fonterra from discriminating against new entrant farmers, and requires that Fonterra must treat existing and new shareholding farmers on equivalent terms. This may have offered new some farmers a level of security that aided their decision to enter the dairy sector. In the absence of these provisions it is possible Fonterra could have refused to take the milk of new entrant farmers, or offered less favourable terms. The uncertainty over whether the largest processor in the country would accept their milk, or do so on unfavourable

74 KPMG, Foreign Direct Investment in New Zealand: Trends and Insights, (Nov 2016), p32.

terms, may potentially have deterred some farmers from entering the sector by converting land from alternative uses to dairy farming.

The **decisions and strategies of processors** also influence the distribution of economic benefit at a regional level. Processing facilities are typically located close to dairy farming regions, to minimise the costs associated with transporting raw milk. The regional distribution of processing facilities could therefore be expected to reflect the increased penetration of dairy farming in new regions. However, in practice the regional distribution of processing has not changed to the same extent as dairy farming over the study period, increasing most substantially in the West Coast, Gisborne and Hawkes Bay, while declining in Nelson and Marlborough.

5.2.2 Conclusions

On balance, it seems likely that the regional distribution of economic benefits associated with dairy farming and processing is a function of the decisions made by farmers. This in turn was influenced by developments in global dairy markets, and the reflection of these trends in the farmgate milk price. The decision making of farmers to increase the use of land for dairy farming influenced, to some extent, the decision making of processors locating nearby.

There are a number of other factors that have likely influenced farmer decision making and facilitated the expansion of dairy farming and processing at a regional level, including developments in other commodity markets, developments in on-farm technology, global capital markets and the open entry/exit provisions of DIRA. However, it is difficult to isolate the extent to which each of these factors have driven the New Zealand dairy sector's performance.

5.3 Export product mix

Section 3.1 reported that the growth in the value of the sector has been driven by growth in **exports**, rather than growth in the domestic market. Whole milk powder was consistently the largest dairy export product by value (representing 31% of all dairy exports in 2004 and 36% in 2017), and contributed the most (40%) to growth in dairy exports between 2004 and 2017. The growth in other products, like cheese and protein products, was substantial but smaller than the growth in whole milk powder, as we discuss in Section 2.2.3 of Report One. In recent years Fonterra has developed a substantial ingredients business, supplying inputs to large multinational food companies.

Section 3.1 noted investment in **R&D** by New Zealand dairy processors, and Fonterra in particular, has been modest by global standards over the study period. Fonterra's annual accounts show that it has invested $900 million in R&D over the past decade, and that it typically spends more on marketing, sales and distribution annually than it has on spent on R&D over the past 10 years. On average, Fonterra's investment in R&D over this period was approximately 0.6% of its net

sales. The median ratio of R&D to net sales of the largest food and beverage producers in the world, over the same period, was significantly higher – approximately 1.11%. These figures suggest that Fonterra's strategy to invest in the development of higher-value products has not yet been accompanied with the scale of financial investment.

5.3.1 Drivers

There are a range of potential explanations for the Fonterra's investment in R&D and marketing over the study period, which we discuss in turn below.

Developments in global dairy markets and New Zealand's ability to respond to changes in global demand

Developments in global dairy markets meant that there was a large and sustained increase in demand for commodity-type (as opposed to high value-added) dairy products such as milk powder (see section 4.3.2). New Zealand was able to satisfy this demand effectively for a number of reasons:

- Report One discussed New Zealand's relatively competitive dairy farming sector, ranking as one of the lowest cost producers in the world.
- New Zealand's geographic proximity to Asia compared to other relatively low cost producers in South America, meant that New Zealand was well positioned to serve the growth in demand from Asia.
- It is possible the established distribution system throughout Asia inherited by Fonterra from the New Zealand Dairy Board also facilitated market access and logistics.[75]
- In addition, New Zealand was able to quickly expand milk production and scale up exports to meet the growth in Asian demand, potentially aided by certain features in the **DIRA**, such as free entry and exit (see section 5.1.1).

Given these market opportunities overseas, it may have been perfectly rational and profit-maximising for a period of time since 2001 for Fonterra (and other New Zealand processors) to focus on serving commodity markets rather than investing heavily in R&D to move more of their volumes into higher value products.

Further, given the commoditised nature of the products that experienced significant growth in Asia—and the drivers of demand from those economies (i.e., reputation for food safety, nutritional value)—it seems natural that Fonterra would invest significantly more in generic marketing, sales and distribution than the R&D required to develop new products or the marketing required to support brands.

---

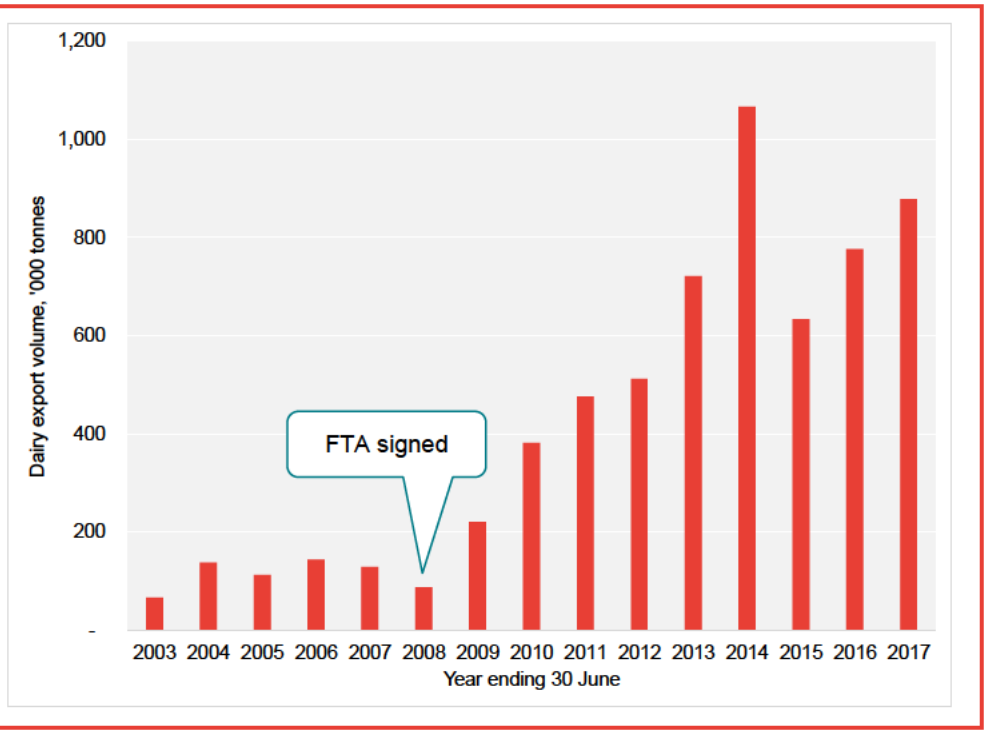
75 Nayga, R.M. & Mtonga, P., "A Structural Analysis of the New Zealand Dairy Industry", Journal of Food Distribution Research (February 1994), pp69-74.

Trading relationships and policy and competition in overseas markets

It may also be that New Zealand's **trading relationships and policy** reinforced Fonterra's incentives to compete in global commodity markets rather than higher-value product markets. Over the period since DIRA was introduced New Zealand has entered into a series of bilateral or multilateral trade agreements focused on Asia, where demand growth was focused on low value added products like milk powder, as discussed in Section 4.3.2. Figure 30 to Figure 32 plot export volumes over time to the three largest importers of New Zealand dairy products in Asia, and identify when New Zealand established free trade agreements with those countries.

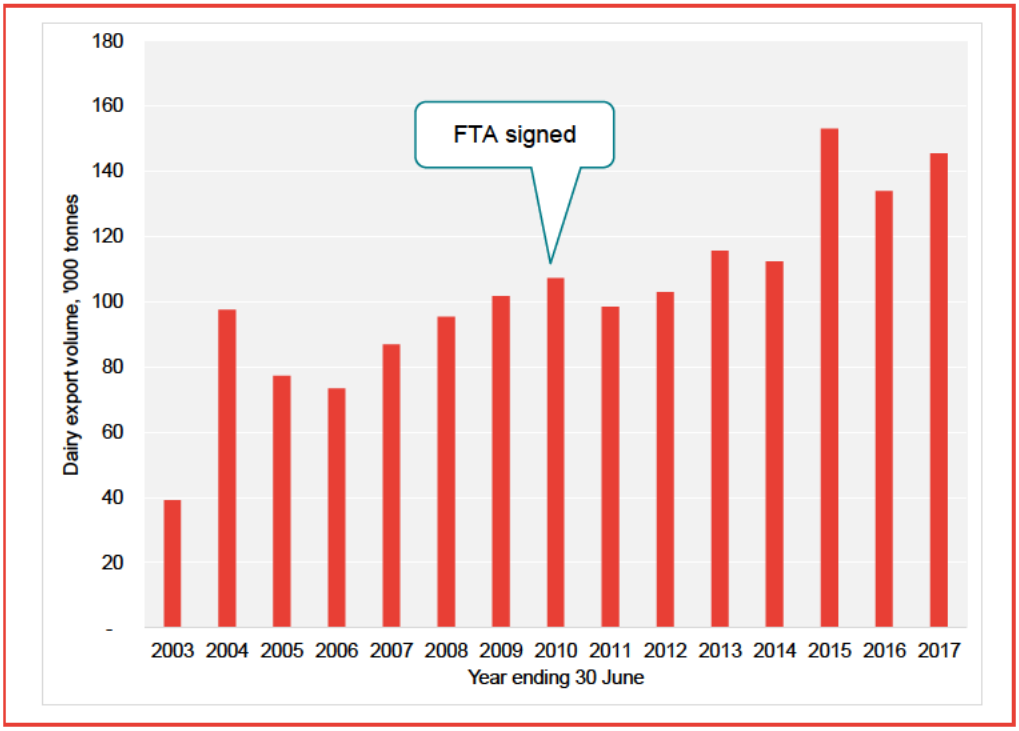
It is difficult to be definitive about the impact these agreements had on New Zealand export volumes. However, it is noteworthy in Figure 30 between 2008 (when New Zealand signed a free trade agreement with China) and 2017, export volumes to China increased by tenfold. Whilst less dramatic, the growth in export volumes to Malaysia and Thailand were also significant following the establishment of free trade agreements. Specifically, export volumes to Malaysia grew by approximately 1.4 times between 2010 and 2017, and export volumes to Thailand grew by approximately 1.7 times between 2005 and 2017.

Figure 30: Export volume of dairy products from New Zealand to China, '000 tonnes



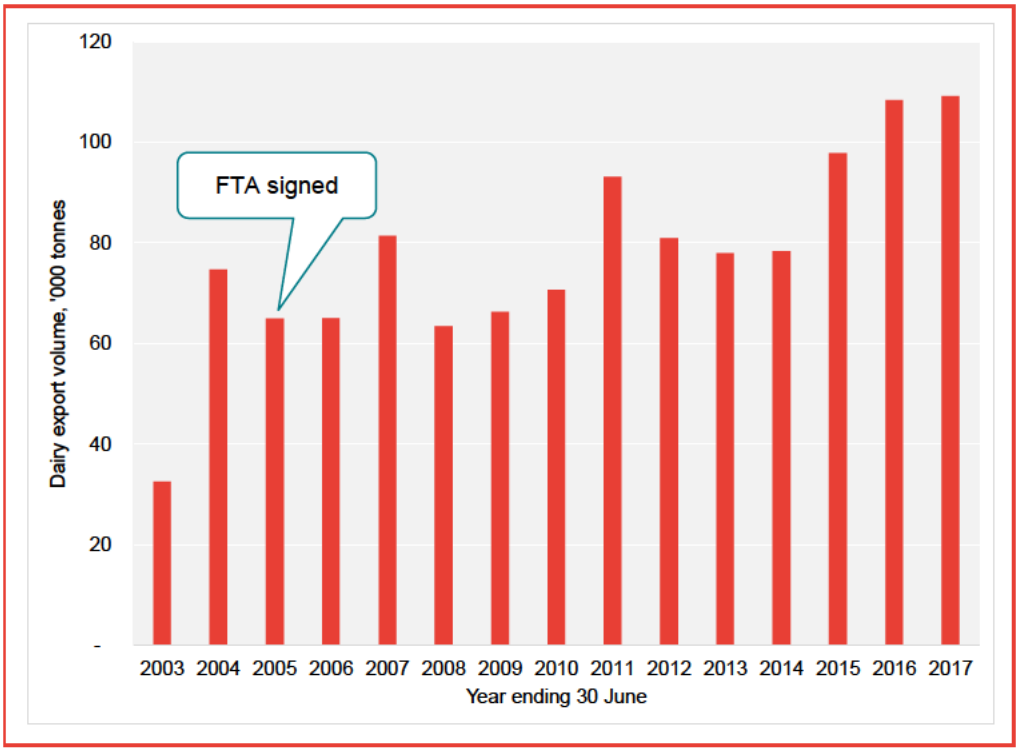
Source: Stats NZ Overseas Merchandise Trade data

Figure 31: Export volume of dairy products from New Zealand to Malaysia, '000 tonnes



Source: Stats NZ Overseas Merchandise Trade data

Figure 32: Export volume of dairy products from New Zealand to Thailand, '000 tonnes



Source: Stats NZ Overseas Merchandise Trade data

Although New Zealand is a relatively open economy, dairy imports face barriers in many markets, and most notably those that consume a high proportion of value added products like the European Union and the United States. The lack of trade agreements with United States and the European Union means it is likely New Zealand dairy exporters had less favourable access to those markets than producers located in those markets or producers exporting from nations that had successfully established free trade agreements with the European Union or the United States.

It is important to recognise market access relies not only on free trade agreements, but on the coverage of the agreements and the implementation of any associated policy changes, which are often phased to facilitate adjustment. For example, under Australia's free trade agreement with the United States, signed in 2004 and introduced in 2005, all Australian tariffs on imported agricultural goods were removed, while United States tariffs on dairy imports above the defined quota remain, with the volume of the quota gradually increasing over time.[76] There is limited evidence Australia's Asian free trade agreements substantially influenced trade. Agricultural exports from Australia to China increased rapidly in the years prior to the trade agreement being signed, as shown in Figure 33.[77]

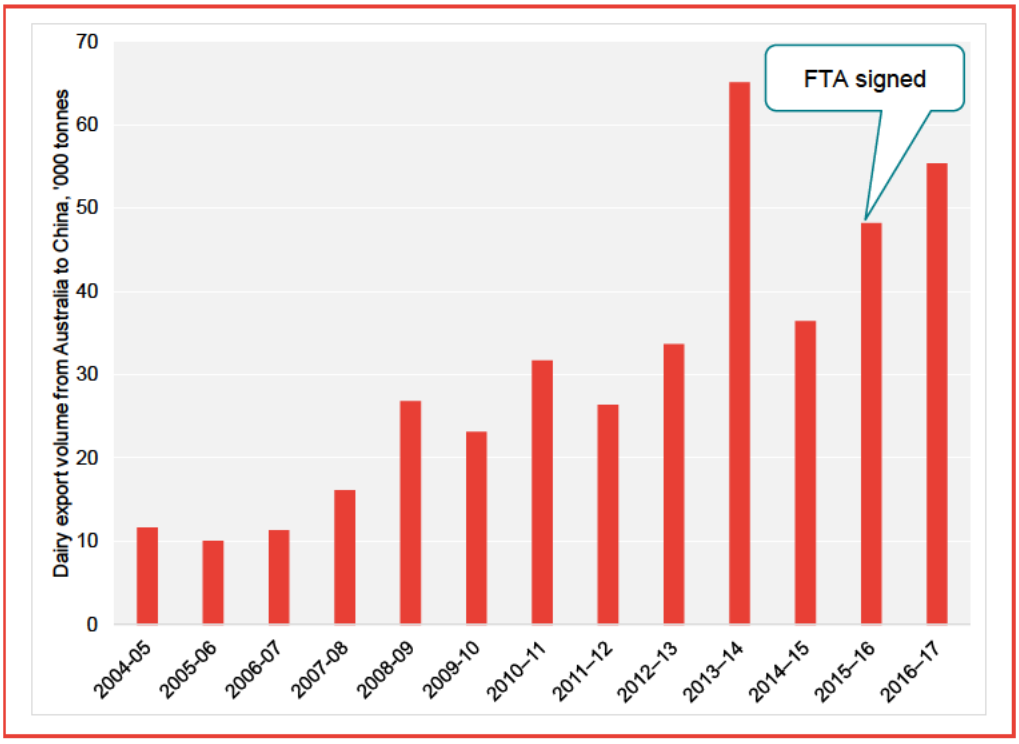
As noted in section 4.2.3, the proportion of Fonterra's revenue that derives from Europe and the United States has declined from at least 2010. This could potentially be due to market access and terms of trade. Another potential explanation is that Fonterra (and other New Zealand processors) may face quite high barriers to entry into these markets, notwithstanding the many competitive advantages New Zealand enjoys. For example, in both the European Union and in the United States there are a number of well-established dairy food producers making high value added products, and with a significant brand presence (examples of which are shown in Table 3). This means that exports of value added dairy products from New Zealand to these markets would face strong competition. Having said that, it is possible for new firms to enter and succeed in these markets. For example, as explained in section 7 of Report One, Glanbia (an Irish firm) has entered successfully into the United States and, currently, 72% of its revenues originate from the United States.

---

76 Australian Department of Foreign Affairs and Trade, Australia – United States Free Trade Agreement: Guide to the Agreement, 1st edition (Mar 2004).

77 ABC News, Winners and losers from first years of free trade agreements with China, Japan and Korea (29 Nov 2016).

Figure 33: Export volume of dairy products from Australia to China, '000 tonnes



Source: ABARE

Table 3: Top dairy companies in Europe and the USA

Company	Head office location	FY17 revenue, billion US$	Dairy products	Non-dairy products
Danone	France	27.9	Yoghurt, milk, creams, cheese, desserts	Plant-based alternatives to dairy products, bottled water, nutrition products
Arla	Denmark	11.7	Yoghurt, cheese, milk, butter and spreads	NA
Kraft Heinz	USA	26.2	Cheese	Meat, seafood, other beverages, refrigerated meals, condiments and sauces, snacks dressings, soups, infant nutrition, etc.
Dean Foods	USA	7.8	Milk, ice cream, fresh cream, and other dairy products	Other beverages (fruit juice, fruit flavoured drinks, iced tea, and bottled water)

Source: Marketline

In our view, it would be useful for MPI to consult with Fonterra to understand whether access to markets such as the European Union and the United States has influenced its strategy to focus predominantly on commodity products, and whether strong existing competition from established players in those potential export markets has encouraged it to focus on other markets where Fonterra has strong comparative advantages.

Taken together, developments in global dairy markets and New Zealand's trading relationships and policies suggest that export opportunities were at the lower end of the value added spectrum, and therefore did not necessitate a large investment in R&D. Rather, investments were focused on the capital investment required to maintain and support growth in production, as discussed in Section 4.2.6.

Access to capital

Fonterra's **access to capital** to invest is likely to be another important influence on the extent of R&D expenditure. As discussed in Section 2.6 of Report One and Section 4.2.6 Fonterra's capacity to fund capex is limited to some extent by its particular cooperative ownership structure. The funds available for Fonterra to support investment in R&D are therefore a function of:

- retained earnings, which have been relatively modest and declining in percentage terms over time (as implied by Figure 19). This may reflect the **preferences of Fonterra's farmer shareholders**, who have incentives to prefer dividends to manage farm cash flow and to service high levels of debt, rather than investment in R&D via Fonterra.
- expanding share-backed production (see Figure 18).[78] The new equity from this volume expansion provides for the collection, processing and sale of milk, but also potentially funds other investments and expansion.

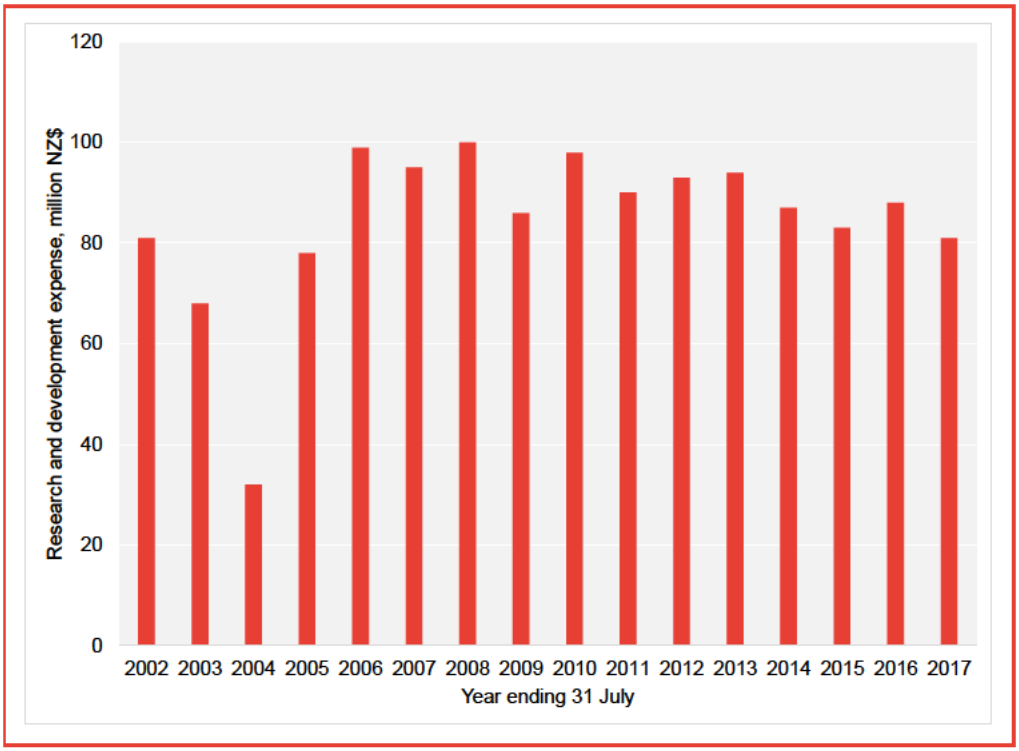
There is evidence, as discussed in Report One, that Fonterra's attempts to access additional capital, which could have been directed to fund additional investment have been unsuccessful, and capex has been limited to business sustaining capex for most of the study period. Fonterra also suggests that its required investment in capacity expansion may have crowded out its ability to invest in moving more volumes into high-value products. However, in recent years Fonterra's investments in New Zealand have focused on high-value product facilities, as discussed in Report One.

Report One noted that independent processors have successfully raised a reasonably significant quantity of external capital. Many independent processors have access to equity capital from foreign owners. Other cooperatives (such as Tatua and Westland) may face some similar issues to Fonterra in relation to capital

78 As noted in Section 5.1.1, Fonterra has also increased in recent years contract milk supply.

constraints, but the smaller number of owners in each of these cooperatives may mean that those owners face less diversity of circumstances, which may in turn make equity raising and coordination of strategy more straightforward.

Figure 34: Fonterra in R&D, 2002 to 2017



Source: Fonterra annual reports

5.3.2 Conclusions

There are a range of factors that have influenced the product mix, and relatedly, the extent and nature of investments by New Zealand processors. Since 2001 there has been significant growth in the demand for dairy products from Asian countries, most notably China, with much of this growth in demand for whole milk powder. This shift in global demand for dairy products represented a significant economic opportunity for New Zealand dairy processors, and the investments made by these companies since 2001 have in large part been oriented towards satisfying this growth in demand. New Zealand's success in meeting demand from Asia appears to have been enabled by well-timed free trade agreements with several Asian countries.

However, it is likely that Fonterra's ownership structure and, in particular, the preferences of its farmer shareholders, meant that its capacity to raise capital was limited compared to more traditionally structured corporations. This, in turn, meant that the requirement for investment to facilitate increased production to meet the growing international demand is likely to have reduced Fonterra's

capacity to invest to facilitate a move into high value products over the study period.

5.4 Processing market developments

Since the creation of Fonterra there have been several new entrants to the farmgate market (seeReport One). Over the last five years, Fonterra's competitors have grown their milk volumes by around 10% per annum, on average.[79] As a result of this entry, Fonterra's share of the farmgate milk collection in New Zealand has fallen from 96% in 2001 to 82% in 2017.

As discussed in Report One Fonterra's share of milk collection differs on a regional basis – with most entry in Waikato, Taranaki, Canterbury and Southland, whilst the West Coast is served by Westland. There has also been numerous small-to-medium and niche participants enter to the domestic market, primarily providing premium products and/or servicing regional markets.

There has been little significant entry into supplying factory gate markets.[80] Buyers in this market have instead relied on milk supplied by Fonterra under the Raw Milk Regulations Milk, although Danone has recently started purchasing factory gate milk from suppliers other than Fonterra, such as from Synlait.

5.4.1 Drivers

As with increased economic and regional benefits, a major driver of entry into the New Zealand processing sector has been **developments in global dairy markets**—specifically, growth in global dairy demand. As discussed above in section 5.3, there was substantial growth in commodity demand and prices in the first decade after the DIRA was introduced. Coinciding with this, some of the first entrants to the farmgate market after the DIRA focussed on commodity products (including Open Country Dairy, New Zealand Dairies, and Synlait (at least in its initial years). More recent investment in the sector has focused on serving growing demand in higher-value products, such as investment by Nutricia Danone and Yashili to produce infant milk formula for export markets.

Growth in global demand is likely to have been necessary but not sufficient for the extent of entry into the dairy processing sector that has occurred. For example, that growing demand could have alternatively been served by Fonterra, or competitors in other geographies. Therefore, there must have also been other drivers that have led to entry into the processing sector. That is, the conditions of entry into New Zealand's processing sector needed to be such that processors could enter and compete with Fonterra in farmgate markets and compete with other dairy exporters in global dairy markets.

---

79 TDB Advisory, New Zealand Dairy Companies Review (2017).

80 Commerce Commission, Review of the state of competition in the New Zealand dairy industry (2017).

As with the growth in economic benefits to New Zealand, increased competition in dairy processing has been facilitated by **developments in global capital markets** and New Zealand's **trading relationships and policies** and **other regulations** including:

- access to global capital markets;
- trade policy and signing of FTAs with countries that were experiencing significant growth in dairy demand; and
- a highly regarded food safety regime that is a likely competitive advantage in global export markets.

Likewise, subpart 5 of the **DIRA** appears to have been successful in lowering the barriers to entry to the farmgate market sufficiently that some entry has occurred. There are broadly two ways in which the DIRA could have encouraged or facilitated entry into the market.

- **Preventing Fonterra from creating barriers to entry for efficient independent processors to enter and compete with Fonterra at the farmgate**: The key regulatory provisions of the DIRA – such as open entry and exit, raw milk regulations, and non-discrimination clauses – have the preventing Fonterra raising barriers to entry to the farmgate market, thereby allowing efficient entrants to compete with Fonterra. Evidence presented by the Commerce Commission suggests that DIRA provisions have been successful in lowering barriers and allowing efficient entry into the farmgate market.[81] Absent DIRA provisions, Fonterra may have frustrated entrants' ability to compete, for example, by engaging in long-term supply contracts with farmers.[82]
- **Higher costs to Fonterra could allow some less efficient independent processors to compete with Fonterra at the farmgate:** If the DIRA provisions increase Fonterra's costs – for example the need to invest in surplus capacity, opportunity costs of regulated milk – then this may impede Fonterra's ability to compete in the farmgate market. If this cost burden on Fonterra is sufficiently high, this may allow some less efficient processors to compete for farmers' milk, therefore increasing entry in the farmgate market.[83] Fonterra has argued that open entry has resulted in significant costs to it as it has had to invest in new capacity that would ensure it is able to accept all potential new supply.

81 Commerce Commission, Review of the state of competition in the New Zealand dairy industry (2017).

82 Commerce Commission, Review of the state of competition in the New Zealand dairy industry (2017).

83 Fonterra, Response to Terms of reference for the review of the DIRA and its impact on the dairy industry (29 June 2018).

However, evidence presented by the Commerce Commission suggests that costs to Fonterra from the DIRA provisions are unlikely to have been material, to date.[84] Any requirement for surplus capacity is likely to be modest,[85] but this is small part of the combined $13 billion farmgate markets, and therefore unlikely to be determinative as to entrant's ability to compete with Fonterra.

Fonterra has also argued that its requirement to invest capacity to service the expanding milk supply has crowded out, or delayed its investments in high-value products.[86] Arguably, any crowding out of other investment is related more closely to Fonterra' access to capital (discussed further below) than the requirement to accept more milk. Increased milk supply also leads to increased equity investment, as new supply is typically share-backed and is the extent to which some of the supply is not share-backed has been driven by Fonterra. Depending on the share price, that increased milk supply would not only fund increased capacity, but would also contribute to other investments, such as in high-value products.

The Commission also noted that the price Fonterra receives for regulated raw milk is likely to reflect its opportunity cost of that milk over time, as the price is based off a bundle of commodities that Fonterra produces,[87] and that bundle is likely to be representative of Fonterra's marginal product.

Other potential drivers of processor entry since the DIRA is the existence of **alternative processor strategies and business models** may have left some opportunities and niches underserved, therefore providing opportunities for entrants. This is not a criticism of Fonterra's strategy, which may have been profit-maximising given its business model and the constraints and opportunities it faced. However, other firms have identified opportunities in the market that provide sufficient returns to allow them to compete with Fonterra in the farmgate market despite Fonterra's economies of scale. Some of these opportunities relate to different products – for example, the recent investment in infant milk formula – while other opportunities relate to the global supply chains that various independent processors are part of, either through parent companies or strategic partnerships, which perhaps allows access to markets or customers that Fonterra may not otherwise be able to serve. Those parent companies or strategic partnerships also provide independent processors with **access to capital** that Fonterra may not have (or, at least, Fonterra has to prioritise how to spend the

84 Commerce Commission, Review of the state of competition in the New Zealand dairy industry (2016).

85 Commerce Commission, Review of the state of competition in the New Zealand dairy industry (2016).

86 Fonterra, Response to Terms of reference for the review of the DIRA and its impact on the dairy industry (29 June 2018).

87 Commerce Commission, Review of the state of competition in the New Zealand dairy industry (2016).

capital it can access), which is also likely to have been a driver of entry into the sector.

In relation to the factory gate market, there has been very limited observed entry. This could be due in part to the **Raw Milk Regulations** acting as a substitute for competition in that market as downstream processors can access factory gate milk at a regulated price. We note the Commission's finding that without regulated milk prices would likely have been higher for entrants and for domestic consumers.[88]

However, it is not clear that a factory gate market would have emerged in the absence of DIRA. In its recent review of the dairy industry in Australia the Australian Competition and Consumer Commission found that while there was evidence of milk trades between processors the volumes were a small proportion of milk production volumes.[89] In Ireland three of the world's largest infant nutrition companies – Abbott, Wyeth and Danone – purchase milk (or milk products) from cooperatives, rather than directly from farmers to supply their secondary processing facilities in Ireland.[90]

Another potential factor limiting entry into the factory gate market is that new entrants currently lack **economies of sales** to compete with Fonterra in that market. Entry to the farmgate market has typically been predicated on serving specific export markets and specific products. These entrants typically have neither the business model to supply the factory gate market (as their opportunity cost is likely high) nor the scale to compete with Fonterra. More recently there has been entry into downstream processing in New Zealand. Many of these entrants have developed their own milk supply chains, although some are at least in part reliant on the factory gate market. We understand that Synlait has recently supplied this market (although it is unclear at what price), and that one motivation for Danone's switch away from being supplied by Fonterra was the 2013 botulism scare.[91] The issues associated with establishing a secure and reliable supply of milk to meet production requirements may have acted as a barrier to the entry of these independent processors in the absence of DIRA.

5.4.2 Conclusion

The significant **global growth in dairy demand** has been necessary but not sufficient for the extent of entry observed in farmgate markets. The evidence

88 Commerce Commission, Review of the state of competition in the New Zealand dairy industry (2016).

89 ACCC, Dairy Industry Inquiry, Final Report (2018), p88.

90 Enterprise Ireland website, Dairy and Ingredients. Available at: https://www.enterprise-ireland.com/en/Start-a-Business-in-Ireland/Food-Investment-from-Outside-Ireland/Key-Sectors/Dairy-and-Ingredients/, accessed 13 June 2018.

91 https://www.fonterra.com/nz/en/our-stories/media/fonterra-announces-outcome-of-danone-arbitration.html

suggests that subpart 5 of the **DIRA** has been successful in lowering barriers to entry, and allowing efficient processors to compete with Fonterra in farmgate markets.

Alternative **business models** and **access to capital** have also contributed to entry in the sector, as independent processors have been able to pursue alternative opportunities and strategies to Fonterra.

There has been **little entry into the factory gate market**. Fonterra retains a very large share of milk collections, and players in the farmgate market typically do not have scale or business models to supply the factory gate market. Raw milk regulations are competitively constraining Fonterra in this market, which is important in lowering barriers to the farmgate market; and protecting New Zealand consumers from higher prices.

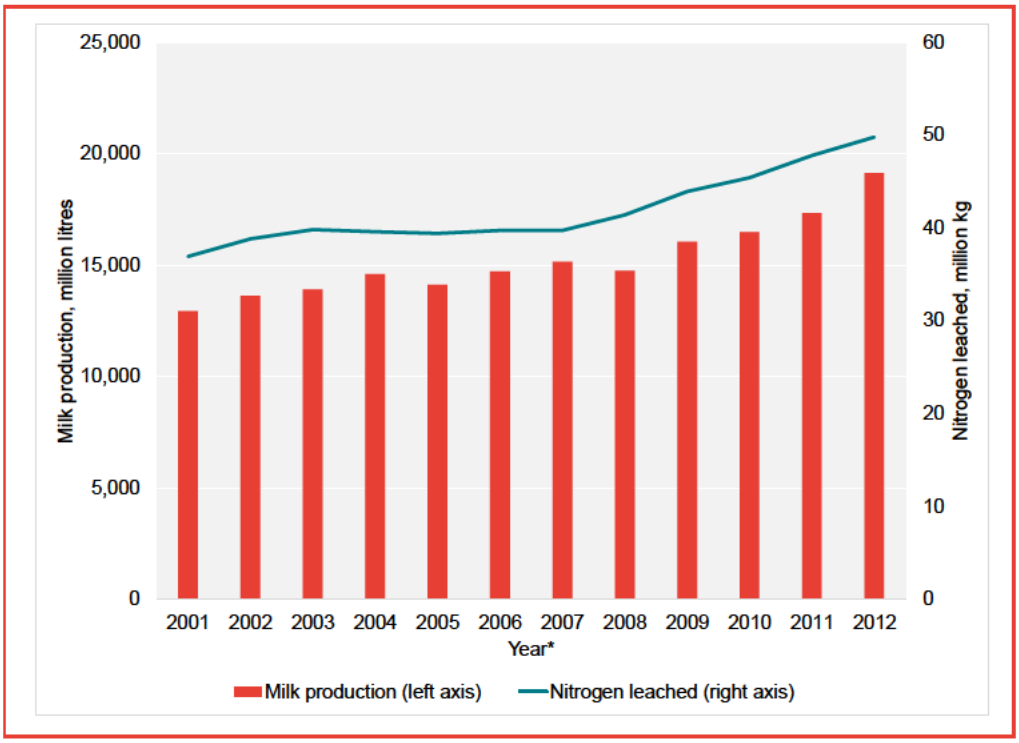
5.5 Environmental performance

In this Section we consider the drivers of the environmental outcomes, including waterway health and emissions levels. The available data on waterway health indicates it has deteriorated since 2001, particularly in areas like Canterbury where dairy farming has increased significantly. Methane emissions from dairy cattle in New Zealand have grown relatively slowly since 2001, at approximately 1% per annum.

5.5.1 Drivers

The **decisions made by farmers**, to expand dairy production is most likely to have driven environmental outcomes. Figure 35 shows milk production in New Zealand appears to be closely related to the nitrogen leaching into freshwater from dairy cattle in New Zealand, with both increasing at around 3% to 4% each year over the period from 2001 to 2012.

Figure 35: Relationship between milk production and nitrogen leaching due to dairy cattle



Source: Dairy NZ Statistics 2016-17, Ministry for the Environment database (later data for nitrogen leaching is unavailable)

Note: Milk production data is for years ending 31 May; nitrogen leaching data is for years ending 31 December

As we set out in Report One, there is evidence of significant increase in nitrate-nitrites in regions that have seen large volumes of land-use conversion to dairy farming, including Canterbury and Southland.

As discussed in Section 5.2, the decisions made by farmers are most likely to have been influenced by **developments in global dairy markets**. A number of other factors are likely to have influenced farmer decision making, although it is difficult to isolate on the influence of various factors, including:

- **Developments in other commodity markets**, which affect the expected relative payoffs from different types of farming.
- **Developments in technology** may have improved dairy farming productivity, making it relatively more profitable when compared to alternative land uses. **Technological developments** also seem likely to explain the relatively limited increase in emissions from the dairy sector despite the increase in the number of cows and milk production.
- **Global capital markets** may also have played a role in facilitating the increase in production by financing the investment required for land-use switching, as discussed in Section 5.2.

Public expectations are also likely to be important in interpreting the environmental degradation associated with the expansion of dairy farming in New Zealand. Section 5.2 noted that the economic benefits that have flowed from the New Zealand dairy sector has not been uniformly distributed between regions. Economic activity is concentrated in businesses and regions where dairy farming is most prominent. In contrast, although originating in particular regions, environmental degradation has the potential to result in more widespread consequences. For example, reduced amenity for domestic tourists and damage to the 100% Pure NZ brand supporting New Zealand's international tourism.[92]

The influence of subpart 5 of the **DIRA** on the environmental performance of the dairy sector in New Zealand requires some consideration. As discussed in 5.2, it is possible the DIRA open entry and exit provisions may have influenced the decision making of farmers, facilitating land-use switching which in turn was a driver for environmental degradation. In particular, the requirement for Fonterra to accept raw milk supplied by shareholding farmers, and the associated non-discrimination provisions for new or returning farmers, may offer some assurance to land owners which influences their assessment of the risk associated with their decision to switch land use.

Fonterra has suggested that the DIRA open entry and exit provisions, including the non-discrimination requirements, have prevented Fonterra from limiting environmental detriment by refusing to purchase milk from farmers with poor environmental performance. Fonterra's ability to refuse to collect milk may therefore be one of timing. As Fonterra points out in its initial submission to MPI's 2018 review of the DIRA, it is required to accept new applications for milk, but it cannot refuse to collect milk until the terms of its supplier handbook have been breached.

We note that the Government and Fonterra have introduced a series of initiatives intended to improve environmental performance in recent years, as set out in Report One, within the context of the existing DIRA regulatory framework. Fonterra also prescribes the environmental standards that its farmers must meet in its supplier handbook.

It is also likely that the form of **environmental regulation** over the study period had an important influence on the environmental outcomes in New Zealand's dairy sector.

In 2015 the New Zealand Productivity Commission was asked to examine New Zealand's urban planning system and to identify the most appropriate system for allocating land use to support the best social, economic and environmental outcomes. This also involved examining the Resource Management Act 1991, since many participants were "strongly critical, believing the Resource

92 "Poll reveals lake, river pollution key concern of Kiwis", The New Zealand Herald (7 Jan 2018).

Management Act had not worked out as intended, or needed a substantial overhaul."[93] This was largely thought to be due to both the central and local governments having jurisdiction over enforcing environmental policies, making it unclear where enforcement responsibilities should lie. Outcomes in the two large dairying regions of Canterbury and Waikato were thought to throw doubt on the efficacy of the planning system.

There have been a large number of initiatives led by central and local governments and the dairy industry, led by DairyNZ and including Fonterra, in recent years directed at reducing environmental degradation and improving waterway health, including for example imposing limits on the nutrient content of farm discharge into natural waterways and fencing off waterways.[94] While we would expect initiatives of this nature to improve environmental performance, the data are currently not available to enable us to evaluate the efficacy of these more recent developments in environmental regulation.

If environmental regulations (and/or enforcement of those regulations by local governments) were more stringent, for example imposing specific requirements in relation to run-off, it seems likely that it would have been possible to increase production while mitigating or managing some of the negative environmental consequences. However, more stringent environmental regulation could be expected to raise the costs associated with dairy farming, influencing the decision making of farmers, and potentially reducing the extent of land-use switching and the production increase supporting the significant export growth. It is also possible that there are specific characteristics of the dairy sector that merit a more tailored approach to environmental regulation, rather than relying on general legislation such as the Resource Management Act. A comprehensive evaluation of this issue is beyond the scope of this report. However, we note that if environmental protections and enforcement of those regulations do need to be strengthened, this should probably be done through legislation other than DIRA, given DIRA's very specific purpose.

5.5.2 Conclusions

It is likely that the **decisions made by dairy farmers**, are the most important driver of environmental performance in the New Zealand dairy sector. This decision making is in turn influenced by **developments in global dairy markets**, as reflected in the farmgate milk price. It is possible **developments in other commodity markets**, the **open entry and exit provisions of DIRA**, **access to capital** and **technological developments** may have facilitated land-use changes and the associated environmental degradation, as discussed in Section 5.2.

93 New Zealand Productivity Commission, Better Urban Planning (2015), p. iii

94 A number of these initiatives were summarised in sections 3.6, 3.7 and 3.8 of Report One.

The environmental damage attributed to the dairy sector appears to be at odds with **public expectations** about how the sector ought to interact with the community at large—namely, that the sector should not impose disproportionate harm to the environment. Public perceptions about the environmental performance of the sector may also reflect concerns about how the costs and benefits that flow from the activities of the sector are distributed throughout society. For example, are relatively few individuals capturing most of the economic benefits, while the environmental costs are being borne by the community at large?

The fact that there is evidence of worsening environmental outcomes as the dairy sector has grown suggests that the existing **environmental regulatory framework** has not constrained fully the adverse environmental outcomes associated with dairy farming over the period since DIRA was introduced. It should be noted that several initiatives have been launched recently by central and local government, and by the dairy industry, to mitigate these poor environmental outcomes. However, it is too early to evaluate the efficacy of these initiatives.

5.6 Consumer outcomes

In this Section we consider the drivers of outcomes for domestic consumers, including the trends in product choices, which have increased substantially, and retail prices, which have moved in line with the consumer price index (CPI) and overall retail grocery price trends since 2007, but continue to attract concern.

5.6.1 Drivers

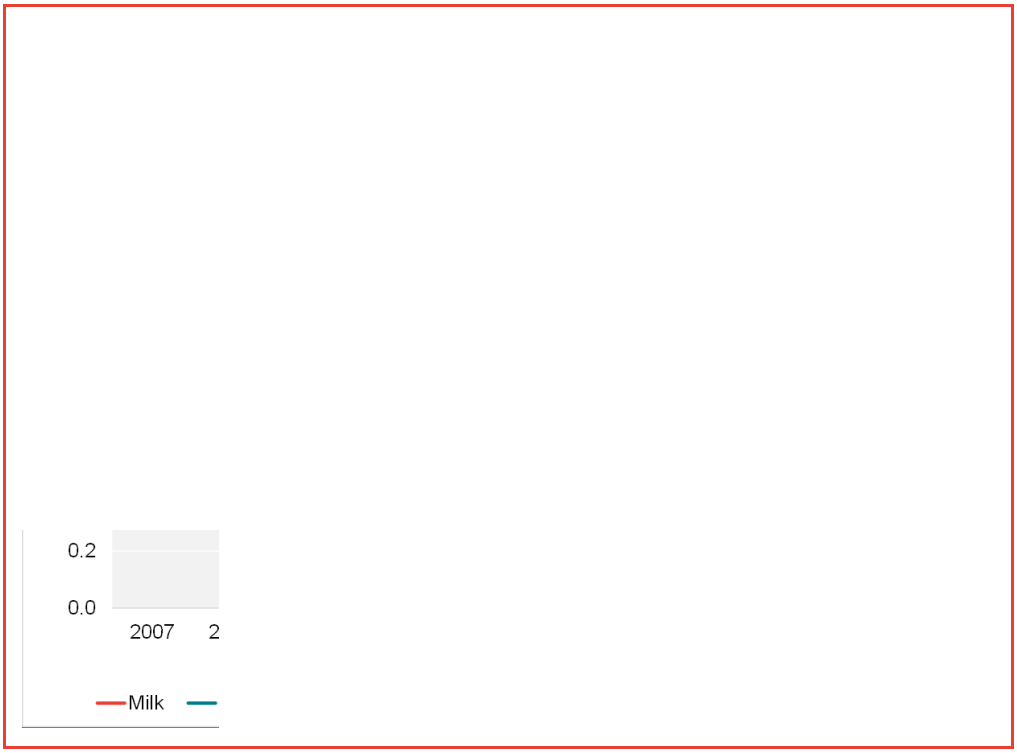
Changes in **domestic demand and preferences** are one of the key drivers of consumer outcomes. As discussed in section 4.3.4, consumer tastes and preferences have developed in response to a range of factors including international influences, health aspirations, new product development, and innovations in flavour and packaging. This has, in turn, resulted in a wider range of products available for domestic consumers in New Zealand, including a number of niche products such as speciality cheese and yoghurt, as discussed in section 4.2. To a large extent the domestic demand and preferences in New Zealand have mirrored the **developments in global dairy market** trends observed in other developed countries. Domestic consumer demand and preferences have also been important in the continuation of relatively constant milk prices throughout the year, despite the large differences in production costs throughout the year associated with seasonality.

It is possible that subpart 5 of the **DIRA** discussed in Section 4.1, including for example the 20% rule, exit and re-entry provisions and the obligation on Fonterra to make raw milk available to other processors, have facilitated product variety in the domestic market. These provisions lower barriers to entry for small scale processors supplying the domestic market. It is likely that in the absence of the

DIRA provisions there may have been higher barriers to entry, resulting in less product variety than has actually emerged, and less competition at the margin.

The available price data suggests that there is no evidence (from 2007onwards) to support public concern that the retail cost of dairy products in New Zealand has risen excessively. As we discuss in Report One, the retail prices of fresh milk, cheese, yoghurt and infant formula have remained relatively flat in real terms since 2007, and broadly in line with the real change in the average price of retail food.[95] Only the price of butter appears to have shown sustained increase, nearly doubling in real terms since 2007, following international trends. In this context, the Commerce Commission's 2011 milk price inquiry concluded that the major supermarket chains in New Zealand operate in competition, with a significant proportion of milk sales made through smaller stores.[96]

Figure 36: CPI-deflated real price index of dairy products, compared to the retail food price index in New Zealand from 2007 to 2017



Source: Stats NZ

The relatively limited increase in the price of real dairy products over time may reflect developments in **on-farm and processing technology**, which have

95 Data for earlier years are not available publicly in a consistent form. It is possible that data for earlier years would have shown a more material increase in retail dairy prices, even if that is not evident over the past decade.

96 Commerce Commission, Milk markets: Consideration of whether to initiate a Commerce Act part 4 Inquiry into milk prices (Aug 2011), pp5-6.

facilitated significant productivity improvements as discussed in Section 4.3.7. However, we were unable to find any conclusive evidence that would either support or disprove this hypothesis.

It is possible the retail prices of dairy products in New Zealand have reflected **developments in global dairy markets** and, in particular, international commodity price trends. However, over the period for which retail price data are available publicly (2007 to 2017) the global dairy commodity price decreased by 15%. It is unclear why domestic retail prices for dairy products have not experience similar reductions. This would be an issue that would be worthwhile for MPI to consult on.

There are several possible explanations for community concerns over the retail cost of dairy products in New Zealand, motivated by **public expectations**:

- There is an expectation that core retail dairy products, including milk and block cheese, should be relatively cheap. Many of the new products introduced to the domestic market in New Zealand are premium products and relatively expensive, but don't attract consumer concern.
- There is an expectation domestic retail prices should reduce to reflect movements in global dairy commodity prices, as discussed above. This does not appear to have occurred.
- It is possible there were large price increases in the retail prices of dairy products prior to 2007 (the earliest period the relevant data is published by Stats NZ). If so, concerns about 'high prices' may reflect an earlier step change in prices that have levelled off in real terms since 2007.
- New Zealand is recognised internationally as a relatively low-cost producer for dairy products, as we discuss in Report One. In addition, New Zealand is recognised internationally as a dairying nation. These factors may have given rise to consumer sentiment that New Zealand ought to enjoy relatively low retail prices for dairy products.
- There may possibly be an expectation that the outcomes observed in other markets, for example the A$1 per litre milk available at supermarkets in Australia (which, as we discuss in Report One, is a function of the strategies of major supermarkets), should be available to retail customers in New Zealand.[97]

In practice a combination of these factors may be motivating public concern, reflecting different preferences and information availability, although no robust evidence — such as comprehensive surveys investigating the factors motivating

[97] As we discuss in Report One, the prices of private label milk and block cheese in Australia reflects strategic and competitive decisions made by the major supermarket chains in Australia, rather than dairy sector specifics.

New Zealand consumers' concerns about retail pricing of dairy products — are available at the present time.

Finally, MPI has asked us to consider the extent to which an independent processor serving the domestic consumer market in a substantial way could successfully compete for a large volume farmers' milk. It is difficult to conclude definitively on this issue without undertaking further analysis, but we make a number of observations below.

The following developments since 2001 are informative as to the extent and nature competition in domestic consumer market since the introduction of DIRA:

- As discussed in Section 2.3 of Report One, several independent processors have entered since 2001. However, all of the processors that have entered with any significant scale are export focussed, rather than focussed on serving domestic consumer markets. This is not surprising, given the size of the domestic markets relative to the available export opportunities. Those processors focussed on supplying the domestic consumer market have been very small, localised and have tended to specialise in niche or differentiated/premium products. In other words, competition by new independent processors serving domestic consumer markets has emerged only at the margin.
- Synlait – which is predominantly export focused – has recently won the contract to supply house-branded milk to Foodstuffs South Island, historically held by Goodman Fielder.[98] [redacted]. We understand that Synlait has advised MPI that its entry into domestic consumer markets is a key part of its strategy to grow its export business (by being able to market its products as preferred by New Zealand consumers).
- Whilst independent processors have accounted for approximately 41% of the growth in raw milk solids collected since 2001, the vast majority of this growth relates to export-focussed independent processors.
- The Commerce Commission noted in its 2016 review of the sector that domestic markets remain highly concentrated, with Fonterra and Goodman Fielder being the main players. Goodman Fielder is currently reliant on milk supplied by Fonterra.

98 Foodstuffs NZ, Synlait partners with Foodstuffs South Island to supply fresh milk and cream, Media release, 21 December 2017, Available at: https://www.foodstuffs.co.nz/media-centre/news-media/synlait-partners-with-foodstuffs-south-island-to-supply-fresh-milk-and-cream/.

A recent TDB report commissioned by Goodman Fielder argues that the scale advantage enjoyed by Fonterra means that it is not feasible for any independent processor of scale, focussed on the domestic consumer markets, to successfully recruit large volumes of milk currently being supplied to Fonterra. Specifically, TDB argues that:[99]

- In order to compete effectively in the domestic consumer markets, it would be necessary to be able to supply processed dairy products year-round. This means it is necessary to collect winter milk as well as peak milk.
- Given Fonterra's scale, only a fraction of its farmers need to be willing to supply winter milk. However, given its size, all of Goodman Fielder's farmers would need to be willing to supply winter milk. This would be unrealistic, so Goodman Fielder would need to collect significantly greater volumes of milk than it actually needs in order to have sufficient winter milk to satisfy its requirements to serve domestic consumer markets.
- The need to collect greater volumes than required for its own purposes would mean Goodman Fielder incurs significant transport costs, making it less competitive than Fonterra, thereby making it harder to attract the milk supply it requires.

There are clearly economies of scale in the collection, transportation and processing of raw milk. However, there are natural limits on scale economies. The physical capacity of processing plants, and the cost associated with transporting milk, mean that Fonterra operates in many different local regions throughout New Zealand. Therefore, it would not be necessary for an independent processor to match Fonterra's scale at a national level in order to compete effectively for farmgate supply in smaller, local regions.

To compete effectively for farmgate supply with Fonterra, an independent processor would need to become sufficiently efficient. This means that the processor would likely need to:

- develop its own scale (at least locally within collection), possible in tandem with the synergies associated with producing for export markets (as in Sylait's example); and
- earn a premium for its milk (e.g., by producing niche, premium products).

As noted above, it is difficult to conclude definitively on this issue without further analysis. We recommend that MPI consults on the scope for entry/expansion into the farmgate market by independent processors to serve domestic consumer markets.

---

99 TDB, Review of the Regulatory Environment for Domestic Dairy Products, March 2018, Annex 5.

5.6.2 Conclusions

The primary driver for the expansion in the range of dairy products available to domestic consumers in New Zealand has been changes in **domestic demand and preferences**. **Subpart 5 of the DIRA** is likely to have facilitated the entry of niche suppliers and the development of new products. There has been no large-scale entrant focussed on supplying the domestic market, given the scale of that market relative to export opportunities.

Technological developments, leading to productivity gains, may have resulted in smaller retail price increases for dairy products in New Zealand than would otherwise have been the case. However, evidence to substantiate this conclusion is not available. It is notable that domestic dairy prices have not reflected the substantial decline in **global dairy prices**[100] (between 15% and 28%, in nominal term, depending on the price index used) over the period 2007 to 2017.

5.7 Social performance

The social performance of the dairy sector in New Zealand has attracted considerable scrutiny in recent years. In particular, as discussed in Section 3.4, there is concern the economic benefit associated with the growth of the dairy sector in New Zealand has come at the expense of environmental outcomes, loss of amenity value of the natural environment and poor outcomes for domestic consumers in the form of high prices.

5.7.1 Drivers

The significance of the dairy sector to New Zealand's national and regional economies means it features prominently in debates and attracts a relatively high degree of political and public scrutiny. Sections 5.5 and 5.6 above highlighted the importance of **public expectations** in interpreting environmental and consumer outcomes. For example, there appears to be concern that environmental degradation caused by a growth in dairy farming activity could have negative spill-overs to other parts of the economy (e.g., tourism) and New Zealand's image internationally as a clean-green country, as well as loss of liveability for New Zealand citizens. There also seems to be concern that the domestic retail prices of dairy products—traditionally seen as essential to promoting health and wellbeing, and important culturally to New Zealanders—may be becoming increasingly unaffordable to ordinary consumers.

There is also likely to be a distributional element motivating public concern about the sector. Specifically, whilst it has delivered significant economic benefits, those benefits have been captured largely by relatively few individuals (i.e., dairy farmers)

100 Excluding butter.

in particular regions, whereas the costs associated with the success of the sector may be borne by society at large.

As noted above, the scrutiny of the dairy sector in New Zealand depends in large part on the economic, consumer and environmental performance of the sector. The drivers of these outcomes are therefore also relevant for driving social performance. In particular:

- **Global dairy market developments** have influenced the decisions and strategies of both farmers and processors, as discussed earlier in this section.
- **Farmer and processor decisions**, relating to land-use and production choices that have influenced the regional distribution of wealth and contributed to environmental degradation.

And, to a lesser extent:

- **Global capital markets**, in facilitating the investment required to support farmer and processor decisions.
- **Technological developments**, resulting in an increase in productivity in the sector.

As explained in earlier sections of this report, subpart 5 of the **DIRA** is likely to have facilitated the expansion in dairy farming activity in New Zealand. To the extent that intensification of land use and growth in dairy farming are perceived as important causes of poorer environmental outcomes, DIRA may have played an indirect role in the social outcomes that may be motivating community concern. However, it is important to note that DIRA in and of itself is unlikely to have been the cause of declining environmental outcomes. For instance, it is possible that if environmental regulations and enforcement had been strengthened as the sector expanded and/or Government and the industry had pursued innovative ways to mitigate the environmental harm earlier (e.g., by incentivising farmers to limit runoff and leaching into rivers), the environmental damage that has occurred could have been mitigated to some extent. In otherwise, it does not necessarily follow that because DIRA played a role in facilitating the expansion of the sector, DIRA is also responsible for any associate spill-over costs. Conceivably, other measures pursued concurrently with DIRA may have avoided or limited those costs.

5.7.2 Conclusion

The most significant driver of the social performance of the dairy industry in New Zealand is likely to be **public expectations**. The social performance of the dairy sector depends in large part on the economic benefits delivered by the sector, and the costs to the environment and consumers.

The economic benefits of the sector appear to be driven by a combination of exogenous factors, such as the very significant growth in **global demand for dairy products** that New Zealand has succeeded in satisfying. This was likely facilitated

by a number of factors, including the **constraints imposed by DIRA** on Fonterra, which probably allowed significant expansion of the sector (at both the farming and processing parts of the supply chain) in a way that might not have occurred in the absence of DIRA.

The negative environmental outcomes observed appear to have been driven by many of the same factors, including **farmers' decisions** to expand dairying activities, including through significant switching from other land uses. However, the **absence of sufficiently stringent environmental protections** and enforcement of those regulations, as well as Government and industry initiatives early on to mitigate environmental harm, probably also played significant (and arguably more important) roles in allowing those outcomes to occur.

The social dimension to perceptions about poor consumer outcomes appear to be motivated more by **concerns about affordability** of dairy products to ordinary consumers, rather than lack of variety and product choice. Over the past ten years, the retail prices of dairy products (except butter) have not moved materially out of line with changes in CPI. However, over this period, global dairy prices appear to have fallen significantly, but domestic retail consumers have not benefited from these price reductions. The reasons for this are unclear. This may, in part, explain community concern over the price of retail dairy products in New Zealand.

FRONTIER ECONOMICS
BRISBANE | MELBOURNE | SINGAPORE | SYDNEY
Frontier Economics Pty Ltd 395 Collins Street Melbourne Victoria 3000
Tel: +61 (0)3 9620 4488 Fax: +61 (0)3 9620 4499 www.frontier-economics.com.au
ACN: 087 553 124 ABN: 13 087 553 124