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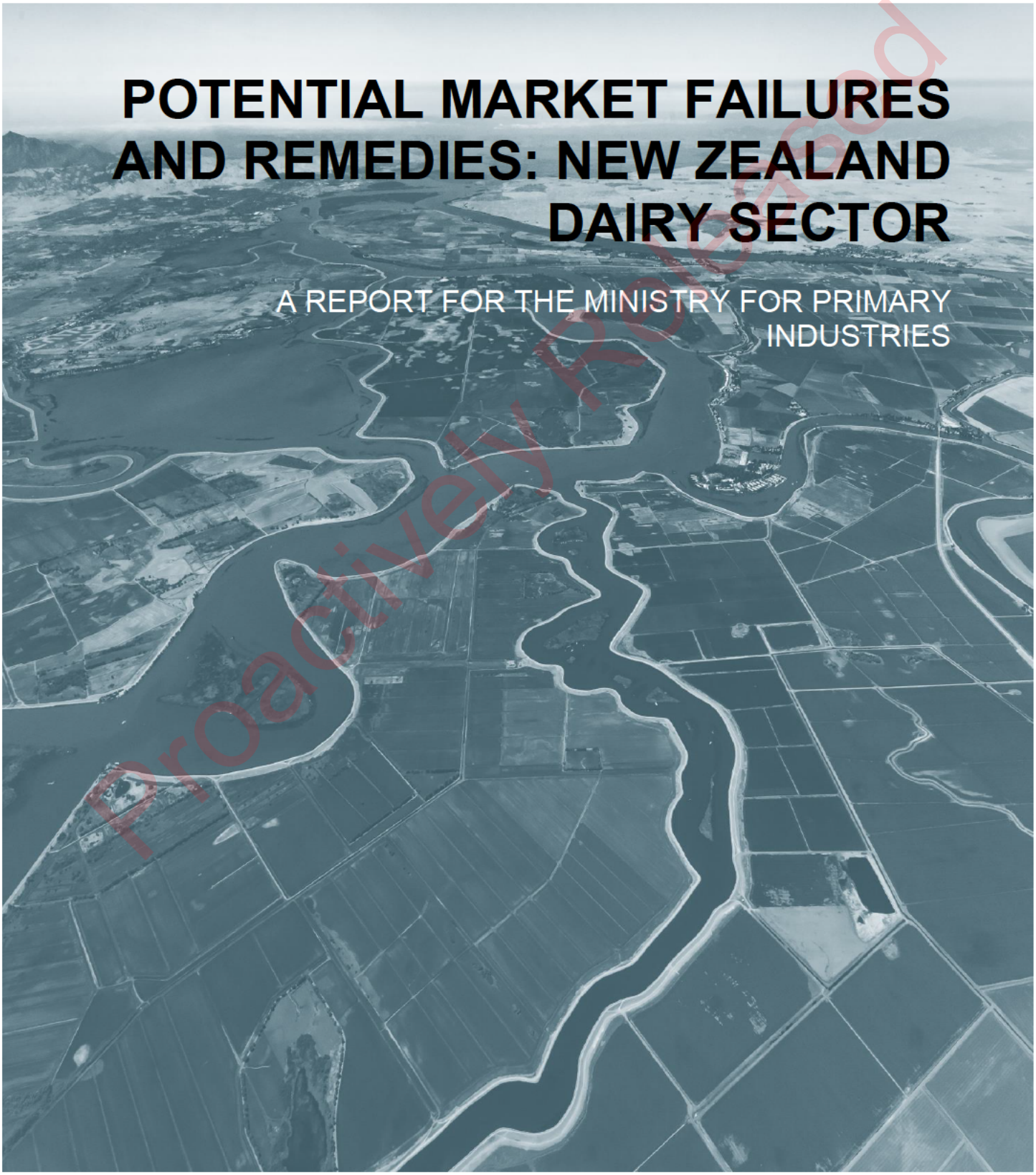
POTENTIAL MARKET FAILURES AND REMEDIES: NEW ZEALAND DAIRY SECTOR

A REPORT FOR THE MINISTRY FOR PRIMARY INDUSTRIES



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Background

The Ministry for Primary Industries (MPI) is undertaking a comprehensive review of the Dairy Industry Restructuring Act 2001 (DIRA) and its impact on the dairy sector in New Zealand. To inform this review MPI asked Frontier Economics to:

- Identify any likely competition-related market failures or sources of inefficiency that could potentially arise in each element of the New Zealand off-farm dairy sector supply chain in the absence of the DIRA regulatory regime, and the type of societal detriment that may arise from such market failures.
- Assess potential remedies to the identified market failures, having regard to the regulatory options available.

New Zealand dairy sector

The key activities involved in the **dairy sector supply chain** are: milk production; milk collection; processing (primary and secondary); and marketing of processed dairy products either to domestic customers or overseas customers.

Fonterra is **vertically integrated** into all of these activities from the farmgate downwards, and is by far the largest processor involved in the sector. Fonterra has significant **market power** in the purchasing of raw milk from farmers, as well as market power downstream in selling to domestic retailers of processed dairy products. It is unlikely that Fonterra has significant market power when selling overseas. However, if Fonterra does have market power in export markets, or behaves as though it does, that could affect its incentives to engage in conduct that could result economic harm to New Zealand. Given that Fonterra does have market power in at least some of the markets it operates in, it is appropriate to consider whether the absence of DIRA would provide Fonterra the ability and incentive to exercise market power, thereby causing economic detriment to New Zealand.

Many other processors operating in New Zealand are, like Fonterra, vertically integrated to varying degrees. As a result, there is some duplication of activities across processors, namely in milk collection and processing. This raises the question whether any such duplication is inefficient and, if so, whether overall economic welfare to New Zealand could be enhanced by eliminating at least some of this duplication.

Fonterra's **motivations and objectives** are important to understanding how it is likely to behave if unconstrained by DIRA. Fonterra is a farmer-owned cooperative. Consistent with the economic literature on cooperatives, Fonterra's overall objective is not to maximise its own profits (a standard assumption in economics when analysing the conduct of investor-owned firms) but, rather, to maximise the wealth of its farmer-shareholders. It is clear that Fonterra's farmer-shareholders value control over the strategy and operations of the business. This is consistent with the economic theory of cooperatives, and is evident from past instances in which Fonterra's owners have exercised control to change the company's direction, as well as the various mechanisms that have been introduced to minimise the risk that Fonterra's management might not act in the interests of its owners. It is possible Fonterra may be motivated to achieve objectives other than wealth maximisation, such as maximisation of the size of the cooperative or its market share. If Fonterra is motivated by objectives other than wealth maximisation of farmer-shareholders, that would have important implications for its incentives to engage in strategic behaviour that may cause economic detriment to New Zealand.

Potential market failures and regulatory remedies

The potential competition concerns at each stage of the off-farm dairy supply chain in New Zealand in the absence of DIRA depend on Fonterra's objectives and the extent to which it has market power in export markets. We identify each of the potential competition concerns in the absence of DIRA and consider a series of regulatory remedies to address those potential market failures.

Incumbency advantage

Fonterra enjoys an incumbency advantage over potential new entrants, due to the sunk costs and economies of scale in processing (particularly in relation to non-specialty products), which may make it difficult for independent processors to enter and compete both upstream in the market for farmgate milk and in downstream processing. In our view, Fonterra's significant incumbency advantage is likely to be the largest impediment to the off-farm dairy sector becoming more contestable and efficient. However, there is no straightforward way of addressing this concern.

One option would be to introduce an **access regime** for Fonterra's processing capacity. This would lower the barriers to efficient entry or expansion by enabling independent processors to access existing capacity, improving the contestability and efficiency of the off-farm dairy sector in New Zealand. The main drawback of this approach is that there is a significant risk that the access price could inadvertently be set inefficiently high or inefficiently low, deterring efficient entry by processors or encouraging inefficient entry by processors. An access regime would introduce significant complexity, increase regulatory uncertainty and the risk of mispricing access services.

Requiring Fonterra to **divest plant** would be an effective means of overcoming the incumbency advantage in those regions where Fonterra operates multiple processing plants. However, this would be a very costly, complex and intrusive form of intervention, which could perversely deter Fonterra from making efficient investments in future.

Fonterra may have incentives to lock farmers in or out

If Fonterra is motivated by objectives other than the maximisation of the wealth of its owners and/or if Fonterra has market power in selling in export markets, then Fonterra may (in the absence of DIRA) have an incentive to use its incumbency advantage to lock farmers in or out.

Sections 27 and 36 of the **Commerce Act** may prevent Fonterra from taking strategic steps to lock farmers in or out, as a means of limiting the ability of rival processors to compete. However, a more direct and transparent means of addressing such conduct would be to retain the existing **open entry and exit provisions and non-discrimination rule** within DIRA. To date, these provisions do not appear to have resulted in much actual switching between processors by farmers. However, these provisions undoubtedly reduce switching barriers. It may be that the threat of farmer switching has provided some competitive constraint on Fonterra.

Fonterra has argued that open entry and exit imposes significant costs and inefficiencies on the sector by encouraging over-capacity, incentivising investments in low-value processing and raising Fonterra's stranding risk. [redacted]

Although the evidence does not suggest widespread inefficiency, Fonterra's concern that open entry and exit may compel it to make inefficient investments in new capacity, particularly to accommodate new conversions, is reasonable. One way of addressing this problem would be to provide an exemption to Fonterra to refuse milk generated from new conversions, if substantial new (and uneconomical) investments would need to be made in order to accommodate that additional milk supply.

Any action by Fonterra to refuse milk from returning farmers, or to apply discriminatory price or non-price terms to such farmers, is very likely to be a strategy to deter farmers from switching to other processors. Such conduct is therefore likely to have an anticompetitive effect and should therefore be prevented by regulation.

Fonterra may set an inefficiently high raw milk price

In the absence of DIRA, Fonterra may set an inefficiently high price for raw milk which may foreclose entry or expansion by independent processors.

General **competition law** may be effective in preventing blatant predatory pricing by Fonterra. However, the Commerce Act may not prevent all instances in which Fonterra prices in a manner that makes entry or expansion by rival processors difficult.

An alternative option would be to require an **independent regulator** (rather than Fonterra, as currently occurs) to set the farmgate milk price by estimating **hypothetical efficient costs**. This would reduce Fonterra's ability to engage in predatory conduct since it would no longer be the price-setter. However, Fonterra could still attempt to predate by paying dividends that are persistently higher than the opportunity cost of funds. Any rivals seeking to compete with Fonterra would likely be foreclosed if they are unable to match this margin. The main drawback of this option is the scope for regulatory error (misestimation of notional efficient costs) when setting the farmgate milk price. This could result in allocative, productive and dynamic inefficiencies.

A third option would be to set the farmgate milk price using **Fonterra's actual costs**. If Fonterra's processing costs are higher than the notional costs of an efficient processor, then this approach would result in a reduction in the farmgate milk price. In theory, this would encourage entry by any processor that is at least as efficient as Fonterra. The ensuing competition would incentivise Fonterra to become more efficient over time, and the farmgate milk price would rise to the point Fonterra's costs match those of the efficient processor. There would be less scope for regulatory error under this option (compared with the option of a regulator being tasked with setting efficient farmgate milk prices). However, in order to implement this approach, it would be necessary to have a sound understanding of Fonterra's actual costs. This could be supported by a formal information disclosure regime.

Farmer-shareholders may have insufficient information to monitor Fonterra's performance

One potential source of discipline on any firm is owners motivated to ensure that the firm maximises shareholder returns by becoming as efficient as possible. Insufficient or incomplete information can be one factor that limits the ability of investors in large cooperatives to provide effective oversight of this kind.

An **information disclosure regime** that provides targeted and independent information on Fonterra's performance to its owners may help reduce this information access problem. This could make it easier for Fonterra's shareholders to focus the business on maximising efficiency.

However, individual farmer-shareholders may not be sufficiently motivated to act on better information, even if it were available. Even if some owners were motivated to act, Fonterra's scale, cooperative structure and governance arrangements may make it difficult for individual farmers to influence the company's overall direction.

The most useful information disclosure regime is likely to be one that benchmarks Fonterra's performance against other dairy processors. However, the information collection costs associated with such a regime are likely to be high. Further, the informativeness of any such benchmarking analysis will

depend on the consistency of the information used in the analysis. Achieving consistency would be a complex and potentially costly exercise.

It is critical that any information disclosure regime be designed carefully to avoid releasing commercially sensitive information that could place Fonterra at a competitive disadvantage. This might be achieved by ensuring that information on Fonterra's performance is disclosed only to Fonterra's shareholders rather than the wider public. This would be an important point of difference from the information disclosure regime that applies to businesses regulated under Part 4 of the Commerce Act.

1 INTRODUCTION

1.1 Background and context

The Ministry for Primary Industries (MPI) is undertaking a comprehensive review of the Dairy Industry Restructuring Act 2001 (DIRA) and its impact on the dairy sector in New Zealand.[1] To inform this review MPI has asked Frontier Economics to consider the likely consequences that may emerge if certain provisions of the DIRA were removed given the current structure of the industry, and given those likely consequences, identify the regulatory options most likely to promote efficient outcomes for the industry and to enhance overall societal welfare for New Zealand.

1.2 Our task

Frontier Economics has been asked by MPI to:

- Identify the likely competition-related market failures or sources of inefficiency that could potentially arise in each element of the New Zealand off-farm dairy industry supply chain in the absence of DIRA regulatory regime. This involves considering the characteristics of each market in the supply chain in the absence of DIRA to consider the nature and extent of any potential market failures and identify the type of societal detriment that may arise from such market failures.
- Undertake conceptual and quantitative analysis to estimate the magnitude of the market failures in each segment of the dairy industry supply chain in the absence of DIRA, where market failures have been identified and relevant information is available.
- Assess potential remedies to the identified market failures having regard to the regulatory options available (including but not limited to existing DIRA provisions) and identify the regulatory tools it is likely to be beneficial to implement given the magnitude of the potential market failures.

1.3 Structure of this report

This report is structured as follows:

- Section 2 sets out the analytical framework we have adopted in preparing this report;
- Section 3 discusses the dairy industry in New Zealand, setting out the relevant supply chain components and the relevant characteristics of the industry;
- Section 4 considers the potential market failures in the farmgate market;
- Section 5 considers the potential market failures in collection market;
- Section 6 considers the potential market failures in the processing market;
- Section 7 discusses the case for regulation in the event of market failures; and
- Section 8 describes and assesses the regulatory remedies available to address the identified market failures.

Appendix A summarises the relevant economic literature on cooperatives.

[1] For more information see: https://www.mpi.govt.nz/law-and-policy/legal-overviews/primary-production/dairy-industry-restructuring-act/dairy-industry-restructuring-act-2001-review/

2 ANALYTICAL FRAMEWORK

This Section sets out the analytical framework that informs our analysis. We begin by defining the concept of market failure in Section 2.1, before discussing market power in Section 2.2. We then set out the key pro-competition provisions of DIRA in Section 2.2. We outline the approach we adopted in preparing this report in Section 2.4.

Summary and conclusions

- Competition is likely to be the most effective way of promoting efficiency in markets. Regulation may be warranted where the characteristics of the market mean competition (or contestability) is unlikely to be efficient or effective.
- Market failure occurs when markets produce inefficient allocations of scarce resources. In this report we focus on market failures caused by departures from competition – where competition is either not efficient (e.g., natural monopoly) or where competition is not sufficiently effective to promote efficient outcomes (e.g., where one or more market participants have significant market power and may have the incentive to exercise that market power to reduce competition).
- In this paper we consider the likely nature and extent of market power in each element of the supply chain in the absence of DIRA, before considering the ability and incentive of Fonterra to exercise market power in each market.

2.1 Market failure

A key proposition in the field of economics is that a world organised by a full set of competitive markets in equilibrium will produce an efficient allocation of resources that maximises welfare to society.[2] An efficient allocation is one which maximises value, where value is defined as the surplus of the willingness to pay by final consumers over the costs entailed in the production of goods.

An efficient allocation of resources involves efficiency of various kinds. Economists typically think about economic efficiency across three dimensions:

- Allocative efficiency – refers to how well a market allocates resources to their highest-valued uses.
- Productive efficiency – refers to the maximisation of outputs for given inputs or, alternatively, the production of given outputs for the minimum inputs.
- Dynamic efficiency – refers to how well investment in new capital stock reflects efficient resource allocation over time.

Market failure is said to occur when markets produce allocations that are not efficient.[3] If a market does not achieve allocative or productive efficiency this can in turn result in a loss of welfare to society, described as a 'deadweight loss'. For example, in the context of the New Zealand off-farm dairy sector

[2] This proposition is known as the First Fundamental Theorem of Welfare Economics.

[3] See John O Ledyard, "Market Failure", pp 326-329 of John Eatwell, Murray Milgate, and Peter Newman, *The New Palgrave, A Dictionary of Economics*, (1987), Vol 3.

if the cost of production does not reflect the least (avoidable) resource cost this will result in a loss of productive efficiency in the form of a deadweight loss, with implications for upstream and downstream markets. Dynamic efficiency is particularly important, since efficient investment is critical to the achievement of allocative and productive efficiency in the medium to longer term. In this report we are concerned with outcomes that could potentially arise in the New Zealand off-farm dairy sector supply chain in the absence of DIRA that result in allocative, productive or dynamic efficiency being suboptimal.

Markets can fail to produce an efficient allocation of resources for a range of reasons. This report will focus on market failures caused by departures from competition – where competition is either not efficient (natural monopoly) or where competition is not sufficiently effective to promote efficient outcomes (for example, where there is market power). We discuss the concept of market power in more detail in the next section.

Importantly, we consider the scope for market failure to emerge before discussing the nature and extent of social detriment likely to arise from the market failure. This means our analysis identifies both significant market failures (for example, where there may be natural monopolies) and potentially smaller market failures (for example, where there is scope for competition, but this may result in some inefficient duplication occurring).

The presence of a potential market failure does not necessarily mean there is a case for regulatory intervention. Competition is likely to be the most effective way of promoting efficiency in markets. Regulation may be warranted where the characteristics of the market mean competition is unlikely to be efficient or effective. The task of a regulator or policymaker is to maximise welfare to the extent possible, having regard to the potential costs and benefits of regulatory intervention, including any effects on dynamic efficiency which may influence the nature and extent of competition in the longer term. As we discuss in more detail in Section 7, a net social benefit test is often applied to determine whether regulatory intervention is warranted, which involves comparing the potential magnitude of the benefit to consumers against the costs of regulation.[4] Maximising welfare may therefore involve tolerating some inefficiencies in practice, if the cost of regulating these inefficiencies is likely to outweigh the benefit of regulatory intervention. We discuss the case for regulation and the types of regulatory interventions available in more detail in Section 7.

Another important consideration in our analysis is the distinction between the presence of market power and the incentive and ability to exercise that market power. The presence of market power is a necessary, but not sufficient, condition for the exercise of that market power. In our analysis we first consider the extent to which Fonterra is likely to have market power in the markets that comprise the dairy sector supply chain, before considering the incentives and ability of Fonterra to engage in strategies consistent with the exercise of that market power in the absence of DIRA.

2.2 Market power

Market power is essentially the power of a firm to "administer" its production and selling policies (for example its prices, its service, its capacity, its techniques) somewhat independently of market pressures.[5] A business only has market power if it can act without significant competitive restraint from

[4] See John O Ledyard, "Regulation and Deregulation", pp 128-133 of John Eatwell, Murray Milgate, and Peter Newman, *The New Palgrave, A Dictionary of Economics*, 1987, Vol 4.

[5] Brunt, M., '"Market Definition" Issues in Australian and New Zealand Trade Practices Litigation', *Australian Business Law Review*, 1990, Vol. 18, No. 2, pp. 86-128, at p. 93.

its competitors and customers. Accordingly, competition is frequently defined by reference to an absence of market power: "market power and competition are but the inverse of each other."[6]

In the absence of direct measures, assessments of market power are usually based on the analysis of a number of indicators. The analysis of market shares is usually the starting point, however high market shares do not necessarily mean businesses have the ability to exercise market power. Other indicators that are generally used are:

- the height of barriers to entry to the market;
- the degree of countervailing power in the market;
- the extent to which substitutes are available;
- the dynamic characteristics of the market, including growth, innovation and product differentiation; and
- the nature and extent of vertical integration in the market.

The economics literature makes a distinction between a firm's degree of market power and its incentive to utilise this market power. In many cases, this distinction can be expressed as the difference between the ability of a firm to exercise market power and its incentive to exercise market power. For example, businesses with market power may have an incentive to use this market power to enhance their market power in other markets in the supply chain.

In this paper we consider the likely nature and extent of market power in each element of the supply chain in the absence of DIRA, before considering the ability and incentive of Fonterra to exercise market power in each market.

2.3 Key elements of DIRA

Since this project requires us to consider what market failures may arise in the absence of DIRA, we summarise below the key regulatory provisions within DIRA.

Subpart 5 of DIRA was designed to regulate the activities of Fonterra to promote the efficient operation of dairy markets in New Zealand. DIRA sets out to achieve this by facilitating contestability for the supply of milk from farmers and providing access to a wholesale supply of raw milk. The key elements of DIRA include:

- **Open entry and exit.** DIRA requires that Fonterra has an open entry and exit scheme for shareholding farmers, to ensure that farmers are not locked into supplying Fonterra, and to enable independent processors to compete with Fonterra for farmers. The open entry and exit provisions include the following.
  - Fonterra is obliged to accept applications to supply milk, if accompanied by the required share capital.[7, 8]

[6] Brunt, M., '"Market Definition" Issues in Australian and New Zealand Trade Practices Litigation', *Australian Business Law Review*, 1990, Vol. 18, No. 2, pp. 86-128, at p. 95.

[7] 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 DIRA).

[8] DIRA, Section 73

- Fonterra is obligated to allow shareholding farmers the right to reduce or cease supply to the cooperative, including the withdrawal of share capital.[9]
- 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.[10] 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,[11] 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. The purpose of the no-discrimination rule is prevent Fonterra from 'gaming' open entry requirements.
- 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.[12]

- **Milk price setting.** Subpart 5A of 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."[13] 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;[14]
  - the **milk price manual** that sets out how the base milk price is calculated;[15]
  - the Commerce Commission's **milk price monitoring regime** that is intended to promote greater transparency and confidence in Fonterra's base milk price setting;[16] and
  - the base milk price to provide for contestability by taking into account notional costs, revenues and other assumptions that are **practically feasible** for an efficient processor.[17]
- **The 20% rule.** Section 108 of DIRA allows Fonterra member farmers to sell up to 20% of their produce to dairy producers other than Fonterra. The purpose behind this 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.

[9] DIRA, Sections 97-101

[10] DIRA, Section 107

[11] DIRA, Section 106

[12] DIRA, Section 109

[13] DIRA, Section 150A

[14] DIRA, Section 150D

[15] DIRA, Section 150F. In exceptional circumstances Fonterra may deviate from the milk price manual.

[16] DIRA Section 150H

[17] DIRA, Section 150A. The practically feasible requirement also appears in Section 150B "all milk collected by new co-op is processed into commodities at yields that are practically feasible." The Commerce Commission has interpreted practical feasibility as including commercial feas bility, stating "it must be poss ble for an efficient processors operating in New Zealand to replicate or achieve the component being assessed" (Commerce Commission, *Our approach to reviewing Fonterra's Milk Price Manual and base milk price calculation*, 15 August 2017, p5).

- **Raw Milk Regulations.** These regulations allowed independent processors to access a limited quantity of raw milk from Fonterra at a regulated price, to allow those processors to build up sufficient scale in processing to compete effectively with Fonterra.
  - 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;
  - Fonterra is not obliged to sell regulated raw milk at the farmgate milk price to independent processors who have been sourcing more than 30 million litres of their own[18] raw milk from farmers for three consecutive seasons. However, independent processors that source 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.

2.4 Approach

Having regard to the discussion above we have adopted the following approach in this report:

- First, we consider the characteristics of the off-farm dairy sector in New Zealand. This discussion informs our assumptions about the likely incentives and constraints on industry players, and in particular Fonterra, in the absence of DIRA. This discussion is presented in Section 3.
- Next, we describe the activities, structure and conduct for each of the supply chain segments in turn, before identifying the potential concerns that may result in market failure. The concerns we analyse are motivated by a review of the extensive relevant literature on the possible competition problems that could arise in each element of the supply chain in this industry. We then consider each concern in turn:
  - Describing the conceptual basis for the concern;
  - Examining the extent to which the issue is likely to arise in the absence of DIRA, having regard to the incentives and for market participants to engage in particular behaviours and their ability to engage in those behaviours, and taking into account the characteristics of the off-farm dairy sector in New Zealand; and
  - Commenting on the likely incidence and potential magnitude of any identified market failures, where possible.

  We present this analysis in Sections 4 to 6.
- Finally, we consider the case for regulation, describing the range of regulatory tools available and the circumstances in which they are most appropriate, and evaluating the application of a range of instruments to the potential market failures identified at various steps along the supply chain. This discussion is presented in Section 7.

2.5 Conclusion

Competition is likely to be the most effective way of promoting efficiency in markets. Regulation may be warranted where the characteristics of the market mean competition is unlikely to deliver efficient outcomes.

Market failure occurs when markets produce inefficient allocations of scarce resources. Economists typically think about economic efficiency across three dimensions: allocative efficiency (how well a market allocates resources to their highest-valued uses), productive efficiency (the production of given

[18] An independent processor's (IP's) own supply is defined as "raw milk collected from dairy farmers by or on behalf of an IP". This provision was introduced in June 2016.

outputs using the minimum inputs) and dynamic efficiency (how well investment in new capital stock reflects efficient resource allocation over time). Dynamic efficiency is particularly important, since efficient investment is critical to the achievement of allocative and productive efficiency in the medium to longer term.

Market power is the power of a firm to determine its production and selling policies somewhat independently of market pressures. A business only has market power if it can act without significant competitive restraint from its competitors and customers. High market shares do not necessarily mean businesses have the ability to exercise market power. Other indicators generally used include the height of barriers to entry to the market, the degree of countervailing power in the market, the extent to which substitutes are available, the dynamic characteristics of the market and the nature and extent of vertical integration in the market.

In this report we focus on market failures caused by departures from competition – where competition is either not efficient (e.g., natural monopoly) or where competition is not sufficiently effective to promote efficient outcomes (e.g., where one or more market participants have significant market power and may have the incentive to exercise that market power to reduce competition). We do this by considering the likely nature and extent of market power in each element of the supply chain in the absence of DIRA, before considering the ability and incentive of Fonterra to exercise market power in each market.

3 THE NEW ZEALAND DAIRY SECTOR

This Section considers the characteristics of the dairy sector in New Zealand and explains how those features are relevant to the analysis that follows in the remainder of this report. It begins by discussing the New Zealand dairy sector supply chain in Section 3.1, before discussing the overall industry structure in Section 3.2. It then describes the key characteristics of the off-farm dairy sector in New Zealand, and the implications for our analysis later in this report:

- The ownership model of processors in New Zealand (Section 3.3)
- The extent of vertical integration within the industry (Section 3.4)
- The structure of the farmgate market (Section 3.5)
- The structure of the collection market (Section 3.6)
- The structure of the market for selling to domestic retailers (Section 3.7)
- The structure of the export market (Section 3.8).

We summarise our conclusions in Section 3.9.

Summary and conclusions

- We consider the potential for competition-related market failures that may arise in the market for the purchase of raw milk from farmers (the farmgate market), the market for the provision of raw milk collection services (the collection market) and the market for the selling of processed dairy products to secondary processors, domestic customers and international customers (the processing markets).
- Fonterra is vertically integrated into all of these markets and is by far the largest processor in the sector. Fonterra has significant market power in the farmgate market, and in selling to domestic retailers of processed dairy products. It is unlikely that Fonterra has significant market power in export markets, but it is possible that its behaviour reflects its belief that it does. This raises the question whether Fonterra might, in the absence of DIRA, have the ability and incentive to exercise its market power in upstream or downstream markets, thereby causing economic detriment to New Zealand.
- Many other processors operating in New Zealand are also vertically integrated to varying degrees. As a result, there is some duplication of activities across processors, particularly in milk collection and processing. This raises the question whether any such duplication is inefficient and, if so, overall economic welfare to New Zealand could be enhanced by eliminating at least some of this duplication.
- Fonterra is a farmer-owned cooperative. Consistent with the economic literature on cooperatives, cooperative member shareholders are motivated to maximise their total payout, which includes on-farm returns (i.e., the payment for milk) and off-farm returns (i.e., the payment for capital contribution). This contrasts with the standard assumption that investor owned firms are incentivised to maximise their own profits. It is possible Fonterra may be motivated by other objectives, such as the maximisation of market share or company size.
- Fonterra's farmer-shareholders value control over the strategy and operations of the business. This is consistent with the economic theory of cooperatives, and is evident from past instances in which Fonterra's owners have exercised control to change the company's

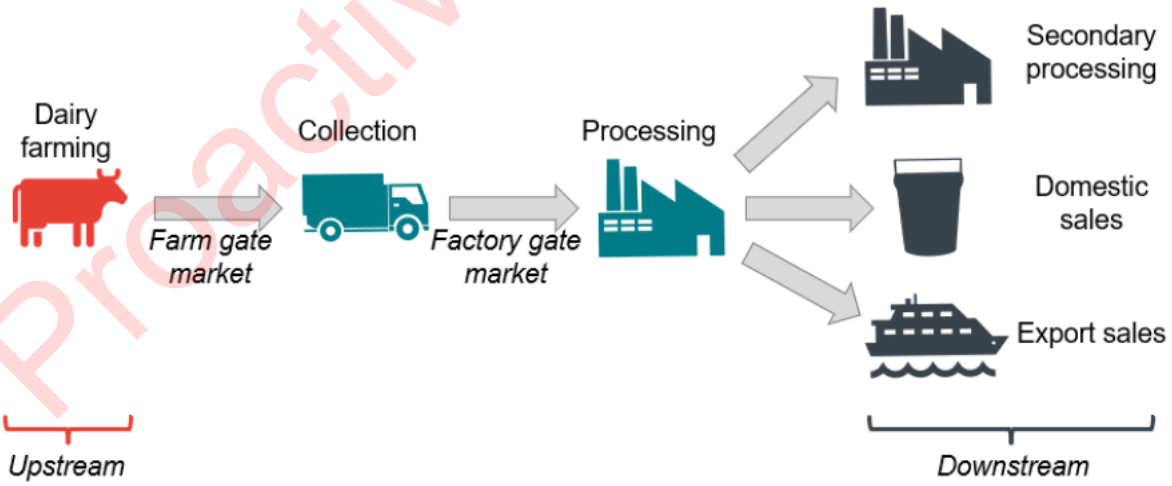
direction, as well as the various mechanisms that have been introduced to minimise the risk that Fonterra's management might not act in the interests of its owners.

3.1 Dairy sector supply chain

The dairy sector supply chain (summarised in **Figure 1**) is organised into four main activities:

- **Milk production.** Raw milk is produced by dairy farmers. Farmers sell this milk to dairy processors in what is known as the farmgate market.
- **Milk collection.** Raw milk is collected and transported from the farm gate to the factory gate for processing.
- **Processing.** Once delivered to the factory gate, raw milk is then processed into a range of dairy products, including finished, consumer products (such as fresh milk, cream, butter and cheeses) and ingredients for use in the manufacture of other food and nutritional products (such as milk powders, whey and casein). Processing activities may be divided further into:
  - Primary processing, which may involve pasteurisation of raw milk and the manufacture of certain products (such as cheeses) for further processing; and
  - Secondary processing, which may involve processing pasteurised milk to make consumer products, or further processing of primary processed goods (e.g., grating and packaging primary processed cheeses).
- **Marketing of processed dairy products.** Finished dairy products are then marketed and distributed by dairy processors, either by exporting the goods to customers overseas, or by wholesaling to retailers (e.g., supermarkets, service stations, convenience stores) domestically.

Figure 1: Dairy sector supply chain



Source: Frontier Economics

As explained in Section 1.2, MPI has asked us to consider likely market failures at each element of the supply chain described above. This request directs our attention to potential market failures in each of

these particular activities. This is consistent with the standard approach of defining markets, in the context of competition law applied in New Zealand and elsewhere, with respect to particular activities.[19]

However, a market should not only specify a range of activities; it should also specify whether it is concerned with the buying of inputs for that activity or the selling of the outputs of that activity.[20] Therefore, in this report, as we consider each of the activities in the dairy sector supply chain, we direct our attention to both the relevant productive activity and to the ways in which the markets that are needed to support those activities may fail for a lack of competition. In particular, we focus on the potential for competition-related market failures that may arise in:

- The market for the purchase of raw milk from farmers (the farmgate market);
- The market for the provision of raw milk collection services (the collection market);
- The market for the selling of primary-processed dairy products to secondary processors (the primary processing market);
- The market for the selling of fully-processed dairy products to domestic customers such as retailers (the domestic market) and
- markets for the selling of fully-processed dairy products to overseas customers (the export markets).

For simplicity, we analyse the last three of these markets together (in Section 6) since they are all connected to the processing (and subsequent selling) of dairy products.

As we explain in the remainder of this report, any detriment arising from competition-related failures in the farmgate, collection and processing markets will ultimately be felt by consumers of dairy products in the downstream markets and/or farmers in the upstream farm gate market.

3.2 Overall industry structure of the off-farm dairy sector

As indicated by **Table 1**, Fonterra is by far the largest processor in the New Zealand dairy sector, both in terms of annual turnover and milk volumes processed. Apart from Fonterra, there are several mid-sized independent processors, nearly all of whom entered the New Zealand dairy sector following the introduction of DIRA in 2001. The four independent processing companies that produce public financial reports (Open Country Dairy Limited, Synlait, Tatua, and Westland) together account for 90% milk volume of the milk processed by Fonterra's competitors (around 18% of total milk volumes processed).[21]

Table 1: Overview of major dairy processors in New Zealand

PROCESSOR	FY16 TURNOVER, NZ$ MILLION	2017 PROCESSED MILK VOLUME, BILLION LITRES	MAJOR PRODUCTS	YEAR FORMED
[redacted]				

[19] See, for example: *Singapore Airlines Ltd v Taprobane Tours WA Pty Ltd* (1992) ATPR 41-159 (FCA) at 40,169-40,170; *Commerce Commission v Air New Zealand Ltd* (2011) 9 NZBLC 103,318 at 113; *Power New Zealand Ltd v Mercury Energy Ltd* [1996] 1 NZLR 686; 5 NZBLC 103.996 at 705; and *Port Nelson Ltd v Commerce Commission* [1996] 3 NZLR 686; 5 NZBLC 104,142 at 560.

[20] Maureen Brunt, 'Market Definition' issues in Australian and New Zealand Trade Practices Litigation", "pp 185-237 of Maureen Brunt, *Economic Essays on Australian and New Zealand Competition Law*, Kluwer Law International (2003) at 205.

[21] TDB Advisory, *New Zealand Dairy Companies Review*, 2017 and Frontier Economics estimates assuming Fonterra collects approximately 80% of all mi k supplied by farmers in New Zealand (from MPI's discussion document).

PROCESSOR	FY16 TURNOVER, NZ$ MILLION	2017 PROCESSED MILK VOLUME, BILLION LITRES	MAJOR PRODUCTS	YEAR FORMED
[redacted]				

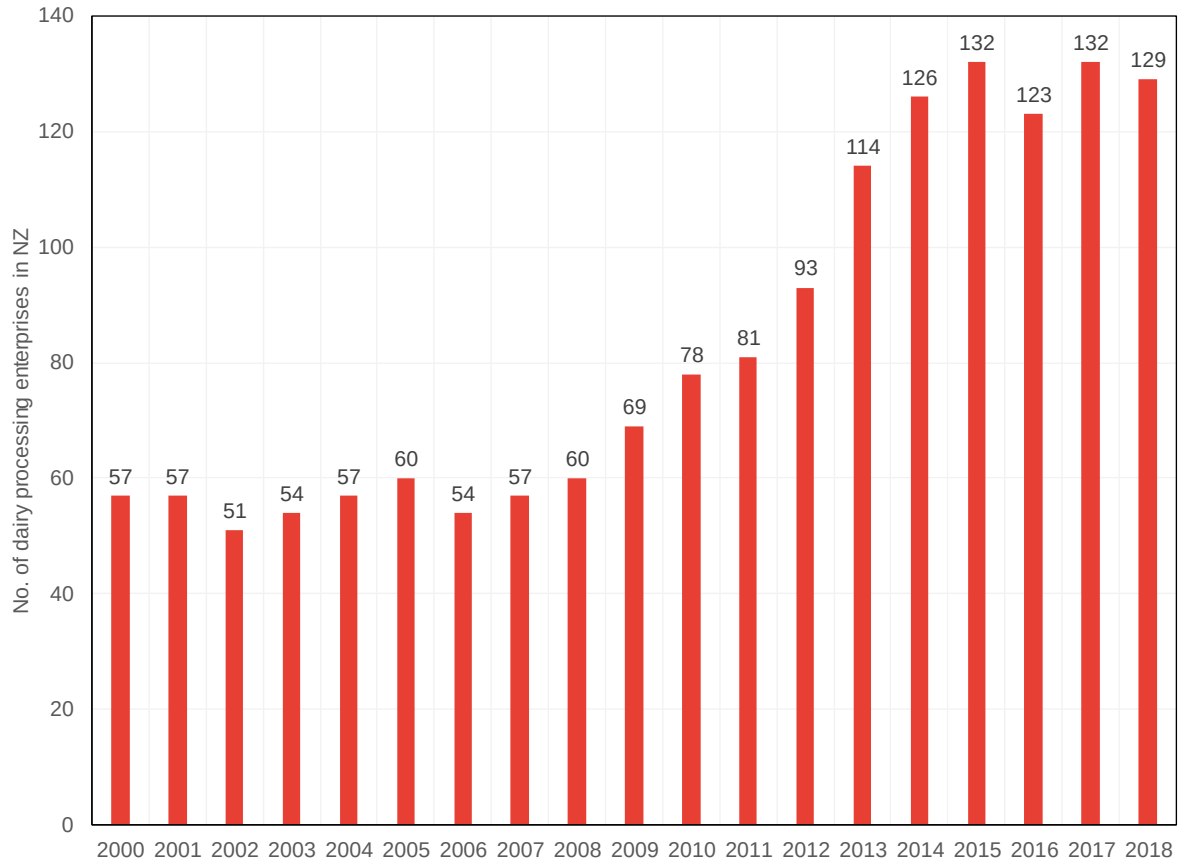
Source: The Investor's Guide to the New Zealand Dairy Industry 2017, MPI provided data, TDB Advisory New Zealand Dairy Companies Review (April 2018), media search

Note: [redacted] revenue shown is only for New Zealand, but covers dairy and non-dairy products

With the exception of Goodman Fielder, all of the largest dairy processors in New Zealand (including all those that have entered since the introduction of DIRA in 2001) are currently focussed on serving export markets, rather than the domestic consumer market. Fonterra states that about 95% of the milk collected from its farmers is exported (in the form of processed dairy products).[22] This means that the vast majority of Fonterra's revenues derive from selling in export markets dairy products that are processed in New Zealand.

While the sector is predominantly comprised of these large processors, there are in fact more than 100 dairy processing enterprises in New Zealand, as shown in **Figure 2**. However, many of these processors are small-to-medium and niche processors serving domestic demand, primarily providing premium products and/or servicing local consumers.[23]

Figure 2: Number of dairy processing enterprises 2000-2018



Source: Frontier Economics analysis using Stats NZ data

Note: Dairy processing enterprises are defined as C113-100 Milk and cream processing and C113-300 Other dairy processing

Given that the pro-competitive provisions of DIRA are intended to regulate Fonterra, Fonterra's possible conduct in the absence of DIRA is a natural focus for the analysis in this report. Fonterra's scale, its significant market share in upstream markets for purchasing raw milk from farmers and certain downstream markets, and the fact that it is vertically integrated into all aspects of the dairy sector supply

[22] Fonterra, *2018 Annual Report*, p 12.

[23] For a summary of these small, niche processors, see: Frontier Economics, *2018 DIRA Review: Analysis of industry performance*, August 2018, Table 3.

chain, mean that many of the potential market failures that could arise in the absence of DIRA relate to factors that apply most relevantly to Fonterra. These factors are discussed further in the sections below. Fonterra's cooperative structure is also relevant when considering potential incentives and constraints on its behaviour, as we discuss in the next section.

3.3 Ownership models

3.3.1 Ownership models of processors in New Zealand

As **Table 2** below shows, there are a range of ownership models amongst the larger dairy processors operating in New Zealand. For example, Fonterra, Westland and Tatua are supplier-owned cooperatives. By contrast, Goodman Fielder, Open Country Dairy, Synlait, Oceania, Miraka, Yashili and Nutricia Danone are all investor-owned corporations.[24]

Table 2: Ownership models of a sample of large dairy processors operating in New Zealand

PROCESSOR	OWNERSHIP MODEL
Fonterra	Supplier-owned cooperative Shareholder farmers are required to own shares in proportion to the milk they provide for processing. Fonterra Shareholders' Fund allows the issuance of 'units' backed by economic rights attached to a pool of Fonterra shares to raise a limited quantity of external capital.
Goodman Fielder	Corporation owned by Wilmar International and First Pacific
Open Country Dairy	Corporation owned by Talley's Group and Olam International
Westland	Supplier-owned cooperative
Synlait	Corporation owned by a2 Milk Co and Mitsui & Co
Tatua	Supplier-owned cooperative
Oceania	Corporation owned by Inner Mongolia Yili Industrial Group Co
Miraka	Corporation owned by group of iwi trusts and Vinamilk
Yashili	Corporation owned by Yashili International Holdings
Nutricia Danone	Corporation owned by Danone Group

Source: Company websites and press articles

3.3.2 Cooperatives are not necessarily motivated by profit maximisation

A standard assumption in economics is that firms seek to maximise profits. Therefore, when analysing the way firms may behave under different market structures (i.e., when faced with more or less competition), the conventional approach is to consider what the firm's profit-maximising strategy would be. If profit-maximisation is the firm's primary objective, and a particular strategy would not be profit-

[24] All of these investor-owned processors have attracted some foreign investment.

maximising, then conventional competition analysis would conclude that conduct consistent with that strategy is unlikely be pursued as the firm would face a real economic cost, in the form of lower profits, in doing so. However, if profit maximisation is not the firm's objective this may change the firm's incentives to engage in a particular strategy. It is therefore important to understand Fonterra's motivations, and the motivations of farmer-shareholders, to inform our analysis of Fonterra's likely behaviour in the absence of DIRA later in this paper.

By way of example, standard competition theory states that a firm with significant market power would only seek to engage in exclusionary conduct (such as overpaying for an input good – such as raw milk) if future recoupment is possible. This is because exclusionary conduct can be costly as it involves the exclusionary firm incurring higher costs in order to increase its rivals' costs. Their expectation must therefore be that reduced competition will lead to higher profits (for example, by allowing the firm to raise prices in downstream markets). However, exclusionary conduct would not be profit-maximising if prices cannot be increased in downstream markets (for example, due to significant competition in global markets). If profit maximisation is the firm's overriding objective, then such a firm would have little incentive to engage in exclusionary conduct. However, if the firm's managers or owners sought to exclude rivals at all costs due to other motivations (e.g., a desire to maximise sales, market share or the size of the firm), then exclusionary conduct might occur even if it is unclear whether the firm is able to recoup those costs by increasing costs in downstream markets.

Whilst it may be reasonable to assume that the primary motivation of investor-owned firms is profit maximisation, the same may not be true for all cooperatives. As discussed in Appendix A, the economic literature on cooperatives suggests that supplier-owned cooperatives may be motivated by considerations apart from pure profit maximisation of the cooperative itself. In particular, member shareholders are typically motivated by maximising their total surplus or payout, which includes consideration of both on-farm returns (i.e., the payment for milk) and off-farm returns (i.e., the payment for capital contributions). For example, this may manifest itself through owner-suppliers of cooperatives seeking the following:

- **Mitigating the economic harm that may arise from the monopsony purchasing power of a single buyer.** Suppliers (such as dairy farmers) can prevent a monopsonist from exploiting its market power against their interests by taking an ownership stake in the buyer and directing its management to maximise not just the returns to the buyer, but the total returns to suppliers *and* buyers. This is usually facilitated by owner-suppliers requiring the buyer to maximise the price at which their output is purchased, subject to covering the cooperative's costs — that is, by maximising the combined payout of the cooperative to its owners.
- **Maintaining a market by ensuring that there will be a reliable purchaser for output produced by suppliers.** If the buyer were completely separated from suppliers, then it may (for profit-maximising reasons) purchase a lower quantity of output, or may exit the market altogether, during unfavourable market conditions. However, supplier control of the buyer may limit or prevent the buyer's incentive or ability to do this.
- **Directing the investment strategy of the purchaser.** For instance, to ensure that the buyer makes conservative rather than risky investment decisions that may jeopardise the long-term returns of the suppliers if those investments fail. Cooperative shareholders may prefer a more conservative investment strategy if the returns from the cooperative are correlated positively with on-farm returns.
- **Pooling upstream risk.** For example, the returns from farming can be highly dependent on weather and climatic conditions, which can vary significantly between regions. Investing in a cooperative that is geographically diversified in terms of its owner-suppliers can allow individual farmers to reduce their exposure to climate risk—particularly if the cooperative pays uniform prices across suppliers. More generally, farmers may use a cooperative structure to mitigate, through pricing, exposure to risk that they may be unable to manage on their own.

- **Diversifying downstream risk.** Another major risk that farmers may face is that demand in downstream markets may dwindle over time. Farmers may be able to diversify this risk by investing in a cooperative that uses capital contributed by farmers to develop new products and markets. However, diversification into new markets typically requires investment. If farmers are risk averse and direct the cooperative to adopt a conservative investment strategy, it may be difficult for the cooperative to make the investments necessary to diversify downstream risk faced by its shareholders.

As explained above, an important objective for many cooperatives is to maximise shareholders' total benefits, which includes maximising payouts to their owners, as a means of maximising their total wealth. However, due to the information constraints they face, it can often be difficult for owners to judge objectively whether their cooperative is in fact maximising the payout. Often, the only way owners can make this judgment is by comparing the payout they receive against the payout provided by other similar firms.

However, in some sectors (particularly those involving the processing of agricultural production), there are very few other cooperatives against which owners can benchmark performance. In such circumstances, the managers of a cooperative may develop other indicators to signal to owners that the firm is maximising payout, even if those indicators are not necessarily consistent with payout maximisation. Examples of these indicators include:

- total revenue and revenue growth;
- volume growth; and
- market share or market position.

These metrics could be used to signal to owners that the cooperative is operating successfully. For instance, if a cooperative was losing market share, this could be interpreted by farmer-shareholders that it is no longer maximising shareholders' surplus compared to alternatives in the market. Hence, a cooperative's managers may work towards maximising the market share of the firm, even if that does not necessarily result in a higher payout to its owners in the longer run, because market share is a measure of relative performance against rivals that may be more readily interpreted by shareholders.

This has important implications for the analysis in this report. It may be that while a cooperative seeking to maximise the total payout to its farmer-shareholders does not have incentives to behave strategically, a cooperative seeking to achieve objectives other than wealth maximisation, for example maximising volumes, does face incentives to engage in strategic behaviour. We therefore consider the implications of relaxing the wealth maximisation assumption, where relevant, in our analysis.

3.3.3 Cooperatives may suffer agency costs that hinder profit-maximisation

In addition, the dispersed ownership of very large cooperatives could make them particularly vulnerable to principal-agent problems, whereby the management of the firms do not necessarily act in the best interests of the owners. The large costs associated with individual cooperative owners monitoring the performance of managers could result in management:

- Failing to pursue cost minimisation or the most efficient investment decisions; or
- Seeking to maximise the size of the firm ('empire building') even if doing so would be inefficient and not in the cooperative owners' long term wealth maximisation interests.

Such actions, arising from a misalignment of the interests of managers and owners, could result in the cooperative structure failing to maximise profits. This problem is not unique to cooperatives. Large investor-owned firms with dispersed shareholdings can experience similar principal-agent problems.

One mechanism that can provide discipline on the behaviour of managers in investor-owned corporations is the threat of external takeovers. Poor managerial performance can encourage new, active investors seeking opportunities for efficiency improvements that can raise the value of the firm to take over the firm and replace existing management with a new, more effective management team. Cooperatives, including Fonterra, typically have constitutions that insulate them from takeovers. In principle, the lack of takeover threat makes cooperatives more susceptible to principal-agent problems than investor-owned corporations.

Cooperatives have developed various mechanisms to increase owners' ability to monitor and control the behaviour of management:

- **Board representation**: One such mechanism is direct representation of owners on cooperative Boards. For example, Fonterra's Board has up to 11 members, seven of whom are elected from its shareholder base (with the remaining members appointed by the Board and approved by Fonterra shareholders at the Annual Meeting).
- **Shareholder Council**: In addition, Fonterra has a Shareholders' Council comprising 25 elected farmer-shareholders. The Shareholders' Council's roles include monitoring and reporting to the remaining shareholder base its views on the direction, performance and operations of the company.[25] The Shareholders' Council also consults frequently with farmers and meets regularly with Fonterra's Board to represent farmers' views—particularly in relation to the development of new policies, company strategy, or when Fonterra is considering a major change that may affect farmers.
- **Tradable equity**: One reason shareholders in cooperatives may have difficulty monitoring performance is because cooperative shares are usually not tradeable. Therefore, there is not the discipline that a tradeable share – with associated monitoring, analysis and movements in share prices would entail. The typical absence of a liquid market for equity means that individual investors in cooperatives with large, dispersed shareholders do not have access to a key signal of firm performance that is available to investors in publicly-listed firms. However, in Fonterra's case, the Trading Amongst Farmers (TAF) scheme provides a liquid market for tradeable equity, and some external oversight. This means that Fonterra's owners may be better able to monitor its performance than investors in most other cooperatives.

While Fonterra has adopted a range of mechanisms to address the principal-agent problem, it is possible that these mechanisms are not effective in removing the problem in practice. These arrangements provide opportunities for farmer-shareholders to influence, either directly or indirectly, the management and investment decisions of the cooperative. This in turn may impact on the commercial strategy of the cooperative. As we discuss in Appendix A, cooperatives may adopt commercial strategies that are more risk averse and less capital intensive than investor owned firms, reflecting the risk preferences of the cooperative owners and capital constraints.

3.3.4 What are Fonterra's objectives?

Fonterra's Constitution makes clear that its purpose reflects many of the considerations outlined above. For example, the Constitution states that:[26]

[25] See, for example: Fonterra Shareholders' Council, *Independent assessment of Fonterra's financial performance since inception*, November 2018.

[26] *Constitution of Fonterra Cooperative Group Limited*, Part A, clause 1.2.

> *The purpose of the Company [Fonterra] in carrying out its business is to maximise the wealth of its Shareholders by:*
>
> *(a) the sale of their Milk;*
>
> *(b) providing a purchaser of that Milk; and*
>
> *(c) enhancing the value of the Company as a cooperative.*

That is, Fonterra exists not simply to maximise its profits in isolation, but to maximise the wealth of its owners as suppliers of milk to Fonterra, and by acting as a reliable purchaser of milk produced by its farmers.

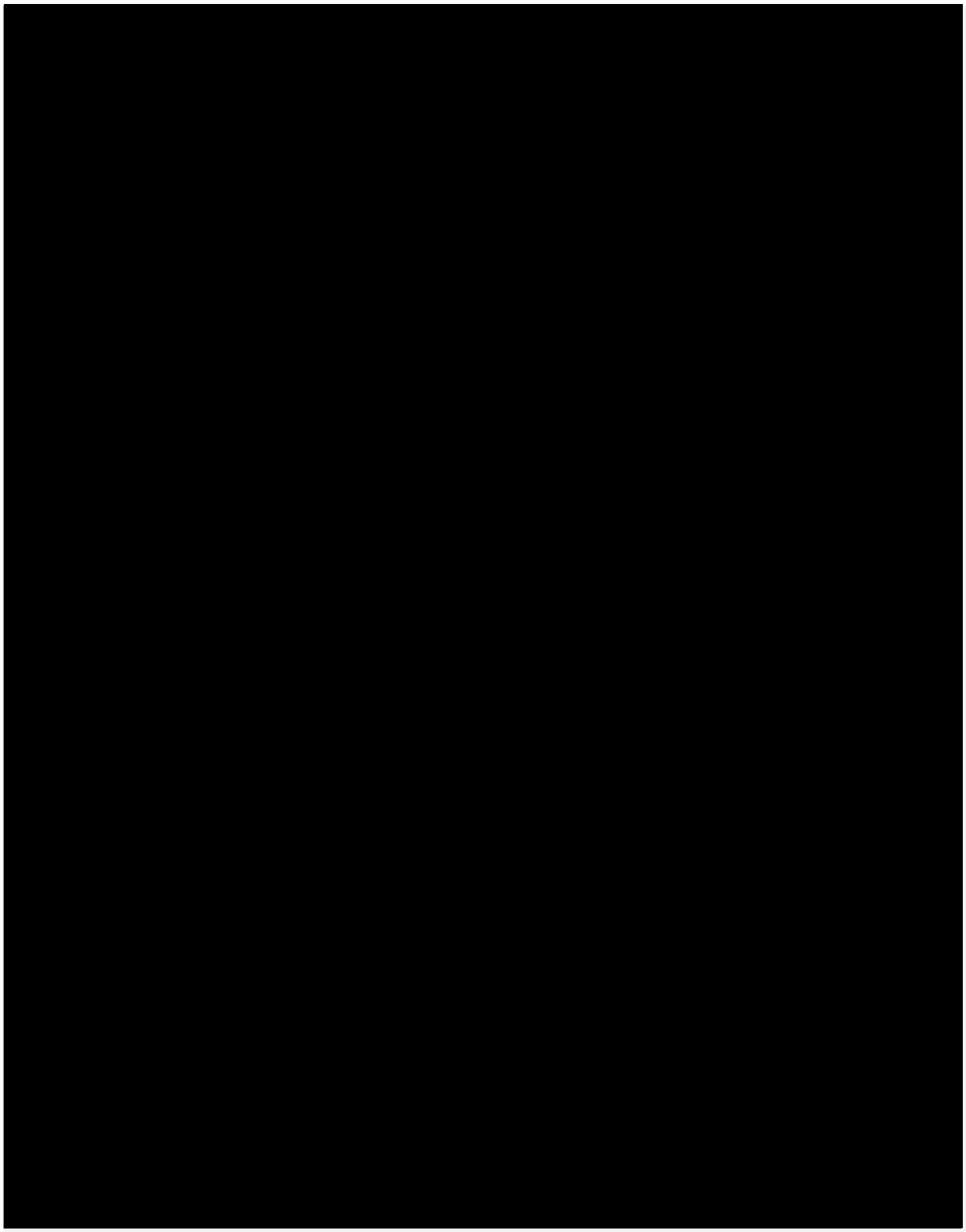
Furthermore, Fonterra's Constitution sets out certain principles that should guide Fonterra's setting of the raw milk price, one of which is that the milk price should "be the maximum amount that the Company, reflecting its status as a properly managed and efficiently run sustainable cooperative."[27] This principle is consistent with Fonterra maximising the surplus available to its owner-suppliers, rather than its own profits, since a firm with Fonterra's buying power would ordinarily face incentives to set a lower price.

That Fonterra's pursuit of profit-maximising behaviour is sometimes tempered by other considerations related to its cooperative structure is illustrated by the failed capital restructuring proposal by Fonterra's Board in 2007 (see Box 1:). A key motivation for that proposed restructuring was to allow Fonterra to raise external capital to pursue growth opportunities in export markets—an apparent strategy to maximise profits. However, the proposal was rejected by Fonterra's shareholders on the grounds that the inflow of significant external equity from non-farmer investors would dilute the ownership and control that Fonterra's farmer-shareholders could exercise over the firm. Fonterra's Board ultimately pursued an alternative capital restructuring programme, the TAF and Fonterra Shareholders' Fund (FSF) schemes, that maintained 100% ownership and control of the cooperative by farmers.

Farmer shareholders' rejection of the original capital restructuring plan suggests that they valued control over the business more than potential additional returns for the cooperative that might be facilitated by significant external capital raising. This is consistent with the motivations of owner-suppliers discussed in Section 3.3.2, including seeking to direct the investment strategy of the cooperative, and could be motivated by the desire to maximise returns across both farming and processing, while managing contingent risks.

Fonterra's motivation is an important determinant of its incentive to exercise market power in various segments of the New Zealand off-farm dairy supply chain. Our working assumption is that Fonterra aims to maximise the surplus available to its owner-suppliers, consistent with the objective set out in its Constitution and the objective of cooperatives in the economic literature. However, we also consider the incentive for Fonterra to exercise market power if it is motivated to pursue other objectives. This could occur, for example, as a result of the constraints farmer-shareholders place on the investment policy of the cooperative, or from managers seeking to signal their success to farmer-shareholders by seeking to maximise more tangible outcomes like company size or market share.

[27] *Constitution of Fonterra Cooperative Group Limited*, Part A, Annexure 1.



[Confidential][30]

3.4 Vertical integration

All of the export-focussed processors in New Zealand have tended to vertically integrate into all aspects of the dairy sector supply chain from the farmgate downwards.

Fonterra, for example, is a vertically integrated processor undertaking milk collection, primary and secondary processing, logistics, and the marketing and distribution of processed dairy products to the domestic and export markets. Fonterra does not invest in ownership of farms in New Zealand.[31] Instead dairy farmers invest in ownership of Fonterra.

Other large independent processors have also adopted vertically integrated business models.

There are some exceptions. The following is a selection of examples of processors that have chosen not to vertically integrate in certain activities:

- Goodman Fielder purchases raw milk under contract from Fonterra.
- Danone is a downstream processor of consumers goods that purchases raw milk from Synlait.
- Synlait contracts with a haulage operator to collect milk from farmers.
- [redacted]
- Small processors, such as Kaimai Cheese and the Grate Kiwi Cheese Company, contract with Open Country Dairy to undertake primary processing on their behalf, under a toll manufacturing arrangement.

Competition theory suggests that vertically integrated firms with significant market power in either upstream or downstream markets may have the ability and incentive to leverage that market power to increase and exercise market power upstream or downstream, to the detriment of society. For example, a dominant firm may seek to foreclose rivals in downstream markets by limiting access to an essential input to production, or by applying a margin squeeze that makes it more costly for a rival to compete downstream.

As we discuss in the following sections, Fonterra enjoys significant market power in markets for acquiring raw milk in New Zealand, and also enjoys some market power in the domestic market for supplying retailers with processed dairy products. This raises the question whether Fonterra might, in the absence of DIRA, seek to use its market power in one or more of these markets to behave anticompetitively in other, vertically-connected markets. This question is investigated in Section 4.

In addition, the fact that many major processors have chosen to vertically integrate means that some duplication of activities across processors has occurred. This raises the question as to whether any such duplication is economically efficient, and whether removal of such duplication might improve the overall efficiency of the sector. This question is investigated in sections 5 and 6.

[28] This exposure was known as 'redemption risk.'

[29] Fonterra 2007 Annual Review, pp. 7-9.

[30] Fonterra, Blueprint for Trading Among Farmers, version 2.3, 5 October 2011.

[31] Fonterra has diversified into farm ownership in other countries.

3.5 Structure of the farmgate market

The farmgate market involves the purchase of raw milk from farmers at the farmgate. This milk is then collected and taken to processing facilities where it is turned into dairy products and marketed and distributed to other processors, local and international markets.

Fonterra collects the vast majority of raw milk produced in New Zealand. For example, MPI notes in its November 2018 DIRA discussion document that Fonterra collected approximately 80.5% of all milk supplied by farmers in New Zealand in 2018.[32,33] Fonterra's analysis, as presented in **Table 3**, shows that its share of milk collection remains very large [redacted] in most regions in New Zealand. **Table 3** shows Fonterra's market share ranged from [redacted] in Marlborough to [redacted] in Westland. Of the independent processors, Open Country Dairy has the broadest coverage.[34] The regions with the greatest number of processors were Canterbury, Auckland, Waikato and Bay of Plenty.[35]

Table 3: Fonterra's share of milk collection by regional council region [Confidential]

[redacted]

[32] MPI, Review of the Dairy Industry Restructuring Act 2001 and its impact on the dairy industry: Discussion document, November 2018, p. 19.

[33] Fonterra's national market share of collection has declined from 96% in 2001, when DIRA was introduced.

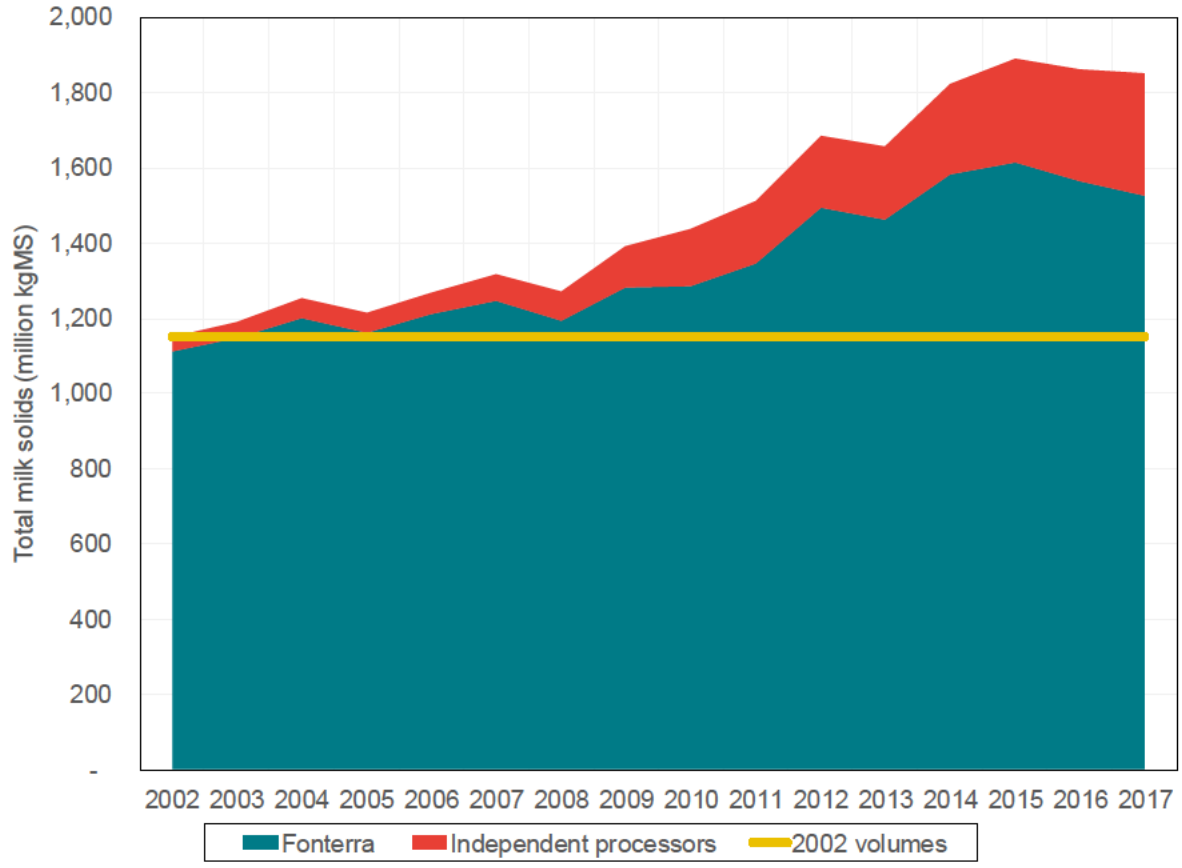
[34] Frontier Economics, *2018 DIRA Review: Analysis of Industry Performance*, Final Report (2018), p22.

[35] Frontier Economics, *2018 DIRA Review: Analysis of Industry Performance*, Final Report (2018), p22.

Source: Fonterra's February 2019 submission to MPI, p. 23

Fonterra's share of milk collected at the farm gate in New Zealand has fallen from 96% in 2001.[36] As shown in **Figure 3**, independent processors have played a significant role in expansion of the sector since 2001, accounting for approximately 41% of the increase in raw milk solids collected at the farm gate since 2001, with Fonterra accounting for 59% of growth in raw milk solids collected.

Figure 3: Estimated volumes of milk solids collected by Fonterra and independent processors



Source: Fonterra, DairyNZ

A key element of the DIRA regulatory regime are the open exit and entry provisions, as discussed in Section 2.2. **Figure 4** presents the volume of milk supplied by owner-farmers that have exited and re-entered Fonterra compared to Fonterra's total milk supply in each year from 2011/12 to 2017/18. A very small proportion of Fonterra's total milk supply has been subject to exit (on average, [redacted] per annum over the period 2011/12 to 2017/18) and re-entry ([redacted] per annum on average over the period 2011/12 to 2017/18). Since the total volume of milk purchased by independent processors has increased significantly more than the volumes associated with farmers leaving Fonterra, it appears that farmers utilising land conversions from other uses, rather than Fonterra farmer-shareholders, have been the main source of growth in farmgate milk supply to independent processors. However, this historical trend could reflect the volume of milk available from land conversions. It is not clear this pattern will continue in the future as land conversions slow.

[36] Frontier Economics, *2018 DIRA Review: Analysis of Industry Performance*, Final Report, 2018, p21.

Figure 4: Fonterra exits, re-entries and total milk supply 2011/12-2017/18 [Confidential]

The purchase of raw milk from farmers at the farm gate involves a transaction between the farmer and the processor, and the payment of a farmgate milk price (also known as a raw milk price). The raw milk price comprises the largest cost component in the dairy supply chain. According to Fonterra's 2017/18 milk price model the raw milk price at the farm gate comprised 77% of the total cost of producing reference dairy products for export in New Zealand.[37]

Processors that purchase milk at the farmgate market typically do so by entering into a contract with farmers for the purchase of that milk. While there is limited information available about the terms of the contracts we have been advised by MPI that under the current arrangements most of the contracts Fonterra enters into with farmers for the purchase of milk at the farmgate are for a single year or season. The open entry and exit provisions of DIRA provide that Fonterra may offer farmer suppliers long-term contracts, but only if at least 33% of milk solids produced within a 160km radius are supplied to independents, or is supplied to Fonterra under a contract that can be terminated at the end of the current season.

[redacted]

[37] Frontier Economics calculations based on Fonterra, *Public Version of the 2017/18 Milk Price Model Spreadsheet*, Available at: https://www.fonterra.com/nz/en/investors/farmgate-mi k-prices/milk-price-methodology.html , Accessed 12 February 2019.

[redacted]

Figure 5: Shareholder farms contracted with Fonterra under multi-year contract 2018/19 [Confidential]

Source: Fonterra

In many regions, farmers have the option of supplying their milk to Fonterra or to one or more competitors to Fonterra. Fonterra's market share means its farmgate milk price is used as a benchmark from which most independent processors set their price.[38] These competitors typically offer farmers a premium over the Fonterra raw milk price (as shown in **Figure 6**), although the extent of the premium may reduce once the competitor becomes established.[39,40] Independent processors also tend to enter into multi-year contracts with farmers for the purchase of milk at the gate, rather than contracts for a single season. MPI has advised us that some processors have open-ended contracts with a termination notice period of around 18 months. There are limited data available on the terms and conditions of independent processor contracts and the motivation underlying these terms and conditions. However,

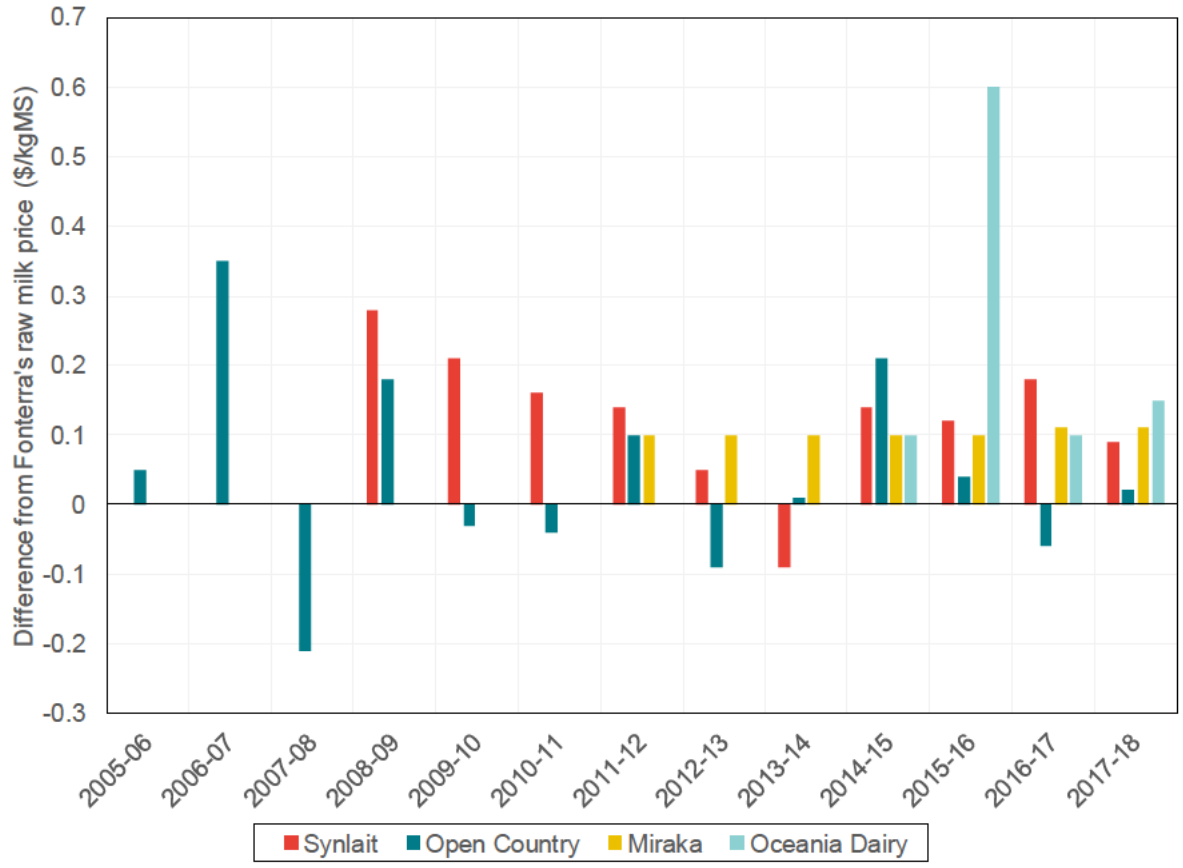
[38] Fonterra, 2016, *Farmgate Milk Price Manual*, August 2017, p5.

[39] TDB Advisory, *New Zealand Dairy Companies Review*, April 2018, p 19.

[40] Conceptually, rather than competing with the raw milk price independent processors compete with the total payout (that is, the raw milk price and dividends) plus the change in share price and less the opportunity cost of equity. This means it is poss ble independent processors could compete with Fonterra even with a lower raw mi k price, depending on dividend and share price growth vs opportunity cost of capital.

we understand that independent processors have advised MPI they prefer multi-year contracts because it ensures the security of their milk supply for several seasons.

Figure 6: Difference between Fonterra milk price and milk price offered by independent processors



Source: Data from https://www.interest.co.nz/rural-data/dairy-industry-payout-history.

Note: Other cooperatives such as Tatua and Westland are excluded from this comparison since it was unclear whether the data available represented the milk price alone or the total unbundled payout (i.e., milk price plus dividends)

Under the current arrangements Fonterra pays farmers in New Zealand a raw milk price determined with reference to Fonterra's Milk Price Manual.[41] The methodology set out in the Milk Price Manual involves calculating the raw milk price paid by Fonterra to farmers as:[42]

- The revenue Fonterra would earn in New Zealand dollars if the equivalent of all the raw milk forecast to be supplied to Fonterra in New Zealand for the next season was converted into a portfolio of reference commodity products (RCPs), and sold on international dairy markets;[43] less

[41] Fonterra, *Farmgate Milk Price Manual*, 1 August 2017. Available at: https://www.fonterra.com/content/dam/fonterra-public-website/phase-2/new-zealand/pdfs-docs-infographics/pdfs-and-documents/milk-prices/pdf-f18-milk-price-manual-final-1-august-2017.pdf

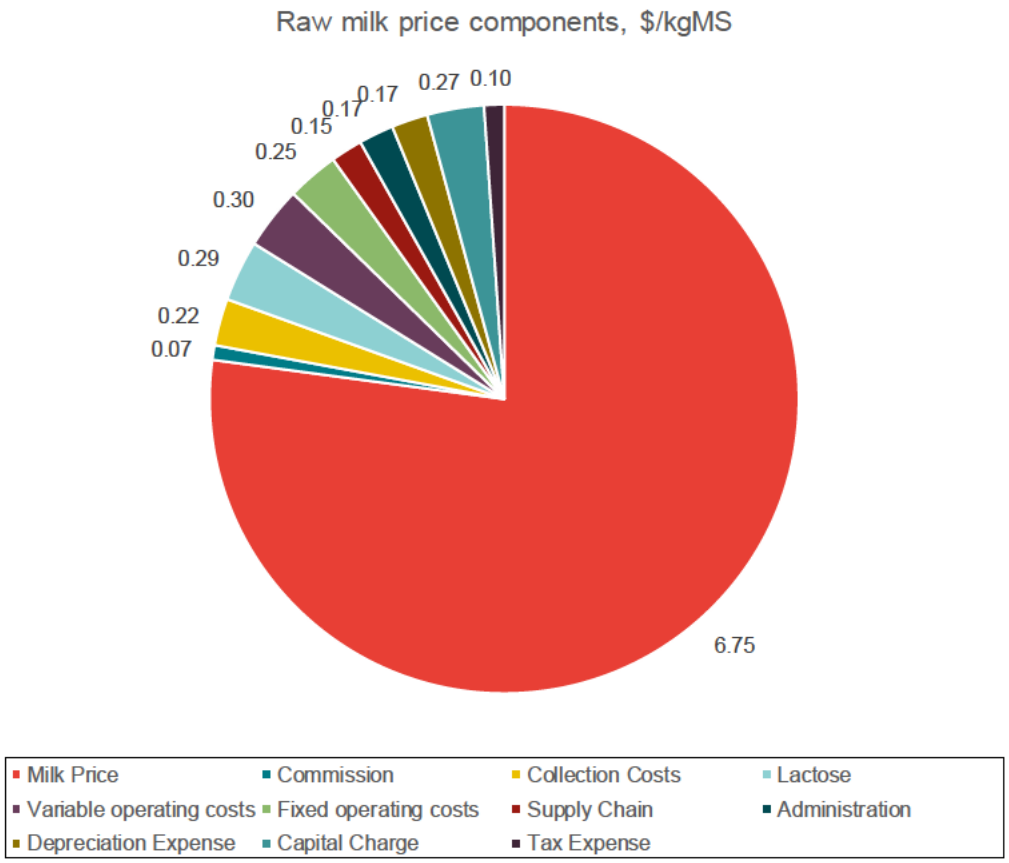
[42] Commerce Commission, *Our approach to reviewing Fonterra's Milk Price Manual and base milk price calculation*, August 2017, p24.

[43] 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.

- 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.

This calculation involves a mix of Fonterra's actual costs (for unit costs, collection costs, supply chain costs and overhead costs, adjusted to reflect the narrower scope of the milk price business) and the costs of a hypothetical efficient producer (for the operating and capital costs of processing plant). 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. Likewise, if Fonterra's revenue is below, or its costs above, that of the hypothetical competitor's, this will reduce shareholders' dividends and retained earnings. **Figure 7** shows the breakdown of the processed milk price components published by Fonterra for the 2018/19 season. While Fonterra supplier-farmers are on average paid the uniform raw milk price, the price received by individual farmers may vary to reflect price adjustments based on quality, composition and timing.

Figure 7: Raw milk price components (2018/19)



Source: Frontier Economics calculations based on Fonterra data. Public Version of the 2017/18 Milk Price Model Spreadsheet, Available at: https://www.fonterra.com/nz/en/investors/farmgate-milk-prices/milk-price-methodology.html , Accessed 12 February 2019

3.6 Structure of the collection market

Raw milk is collected at the farm gate and transported to processing facilities. Raw milk is stored on-farm in refrigerated vats, before being collected tested (for quality and safety) and transported by refrigerated tanker to processing plants. The perishable nature of milk means collection usually takes place every 24 to 48 hours and is processed shortly afterwards.

We understand from MPI that processors in New Zealand typically own tanker fleets they use to undertake collection. Section 3.5 presented information about the collection of raw milk in New Zealand, noting Fonterra collects the majority of milk, with the share of milk collected by independent processors varying considerably between regions.

Raw milk purchased by independent processors under the DIRA raw milk regulations is delivered to the factory gate, with Fonterra undertaking collection on behalf of independent processors for this milk. In the 2018/19 season Fonterra is contracted to supply 250 million litres of raw milk under the raw milk regulations, or 1.5% of Fonterra's total expected collection of 17.2 billion litres, with the majority of this milk supplied to Goodman Fielder to supply the domestic market.[44]

On average, collection costs are a relatively small component in the total cost of producing dairy products. Evidence of this comes from Fonterra's collection costs in calculating the benchmark raw milk price paid to farmers. These collection costs are based on Fonterra's actual costs averaged across all volumes. In the calculation of the 2018/19 raw milk price, collection costs accounted for $0.22/kgMS or 2.6% of the expected revenue from producing reference dairy products for export from New Zealand.

Although Fonterra's deduction for collection is based on the average costs of collection from all farmers, the cost of collection varies between farmers. This reflects variations in the distance of farms from the processing facility, the proximity to other farms, the volume produced at each farm and the frequency of collection. Collection costs may also vary reflecting differences in efficiency between firms, such as the costs associated with the administration and operation of milk tankers.

3.7 Structure of the market for selling to domestic retailers

There is limited information available publicly on the structure of the downstream market for selling processed dairy products to retailers in New Zealand. The most reliable data we are aware of are data collected by the Commerce Commission when it conducted its 2016 review of competition in the New Zealand dairy industry, which we reproduce below in **Table 4**.

[44] Fonterra, *Fonterra's forecasts for season ending 31 May 2019*, December 2018, Available at: https://www.fonterra.com/content/dam/fonterra-public-website/phase-2/new-zealand/pdfs-docs-infographics/pdfs-and-documents/financial-results/fy18/Public-Notice-for-Season-Ending-30-May-2019.pdf

Table 4: Market share in main domestic product categories, August 2015 [Confidential]

Source: Commerce Commission, Review of the state of competition in the New Zealand Dairy Industry, 1 March 2016,

The Commerce Commission's data indicate that Fonterra and Goodman Fielder are the two largest processors serving the domestic market for processed dairy products, [redacted] Fonterra is the only processor to supply the full range of products. The Commerce Commission concluded that:[45]

> *Fonterra remains the most significant player in domestic downstream markets, particularly for fresh milk and cream (typically supplied indirectly through private label toll manufacturing).*

However, the Commerce Commission found evidence that small independent processors (apart from Goodman Fielder) had made "significant in-roads in certain product categories" and that:[46]

> *There appears to have been some consequent price pressure on Fonterra (although this may be limited since most of the smaller IPs products are premium products), as well as a quality pressure.*

In addition to supplying branded dairy products, Fonterra and Goodman Fielder also supply the majority of private label products, which account for most fresh milk and cream sales. The Commerce Commission noted that at the time it undertook the review, all private label products were supplied by either Fonterra or Goodman Fielder.[47] However, in 2017 Synlait won a contract to become the exclusive supplier of private label fresh milk and cream to Foodstuffs South Island from 2019, a contract historically

[45] Commerce Commission, *Review of the state of competition in the New Zealand Dairy Industry*, 1 March 2016, para. 5.150.

[46] Commerce Commission, *Review of the state of competition in the New Zealand Dairy Industry*, 1 March 2016, para. 5.150.

[47] Commerce Commission, *Review of the state of competition in the New Zealand Dairy Industry*, 1 March 2016, para. 5.138.

held by Goodman Fielder.[48] Goodman Fielder is currently reliant on milk supplied by Fonterra, and processes fresh milk for Fonterra at its South Island processing facility.

3.8 Structure of the market for New Zealand processors selling to export markets

In 2017 (the latest year for which complete data are available), New Zealand was the largest exporter of dairy products globally (followed by Germany, the Netherlands, France and the United States). Fonterra's sales accounted for the vast majority of this export value. In practice the global dairy market is not a single market, but a series of markets involving a range of products traded across various regions.

As **Figure 8** shows, even in 2014 (the year in which the value of New Zealand's dairy exports peaked) New Zealand's share of global dairy export sales by value was 13.5%.[49] An important implication is that whilst Fonterra sells a very large quantity of dairy products globally, its sales represent only a relatively small share of global trade in dairy products.

Figure 8: Value and global share of total dairy exports from New Zealand 2001-2017

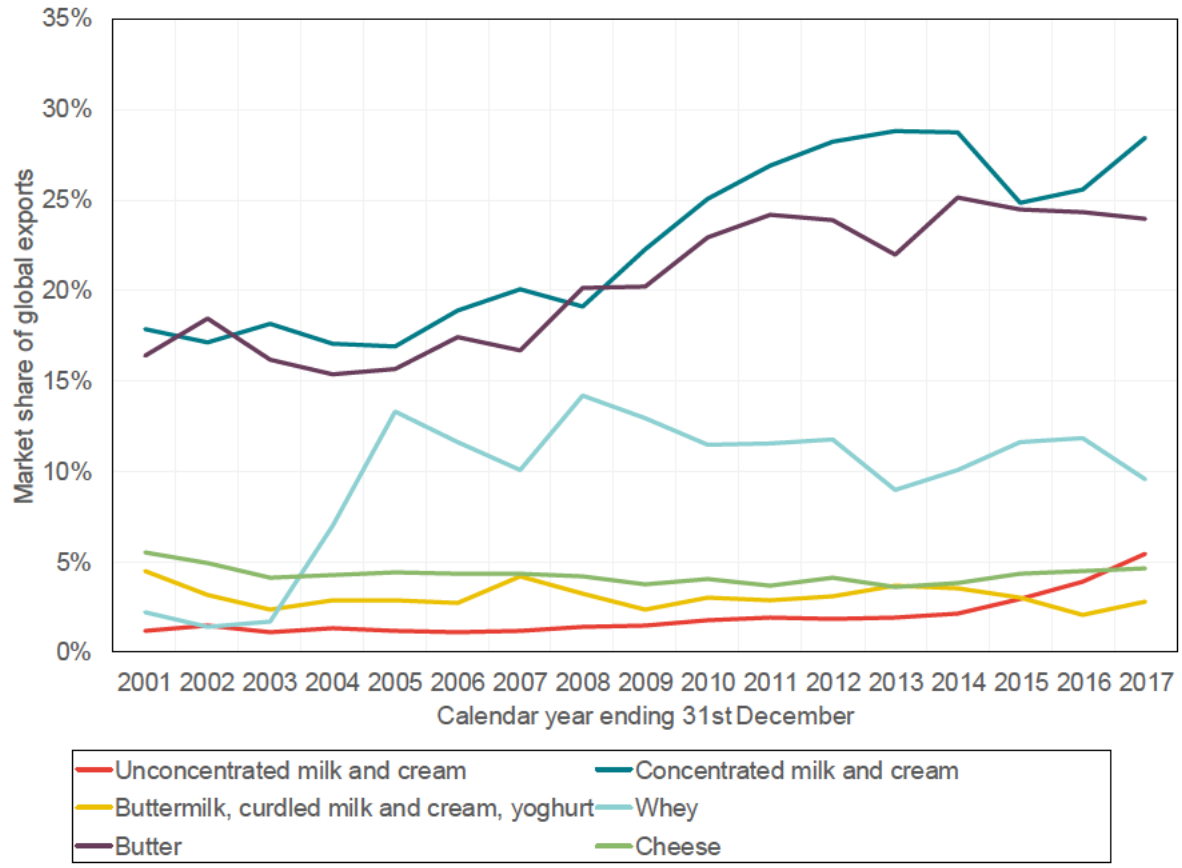
Source: UN Comtrade data, Frontier Economics analysis

[48] 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/.

[49] New Zealand's share of global dairy export sales by volume is around 30%. For the purposes of this analysis, considering the ability and incentive of Fonterra to exercise market power, global dairy export sales by value is the most relevant measure.

The global dairy market consists of a wide range of products, ranging from basic commodities to specialised, high-value products. **Figure 9** shows New Zealand's global share of dairy export sales by product. The Figure shows New Zealand's market share is as high as 28% for concentrated milk and cream products and 24% for butter). This is consistent with Fonterra's earnings profile, with the majority of Fonterra's revenue deriving from basic commodity products. This is important since it is likely to be relatively easier to find substitutes in supply for basic commodity products compared to more specialised products. This means it is likely to be difficult for Fonterra to sustainably raise prices in basic commodity products, despite its significant market share.

Figure 9: Global share of dairy exports by value from New Zealand by product 2001-2017



Source: UN Comtrade data, Frontier Economics analysis

Figure 10 demonstrates that, at its peak, the volume of milk produced in New Zealand represented no more than 4.0% of total global milk production. As Compass Lexecon notes, the fact that New Zealand accounts for a very small share of global milk production suggests that processors in other countries could divert some domestic dairy production from their domestic markets to supplying global export markets if prices rose internationally, for example as a result of the exercise of market power.[50] An increase in global dairy prices would create an incentive for processors in other countries to sell dairy products internationally rather than domestically. There are a range of frictions, including for example import tariffs and production quotas that act as constraints on the production and trade of dairy products globally. However, these frictions may ease with the trend towards greater liberalisation of international

[50] Compass Lexecon, *The effectiveness of DIRA in fostering competition and economic efficiency in New Zealand dairy markets*, 20 July 2011, p. 53.

trade (e.g., the growth in free trade agreements around the world, and lifting of European Union production quotas).

Figure 10: Volume and global share of milk produced in New Zealand

Source: UN Food and Agriculture Organization data; Frontier Economics analysis

The analysis above suggests to us that Fonterra is, on the whole, likely to be a price-taker rather than a price-setter in export markets for processed dairy products. The Commerce Commission reached a similar conclusion in its 2016 review of competition in the New Zealand dairy industry, in which it stated that "Fonterra is largely a price-taker in export markets."[51]

Fonterra's dependence on sales overseas, and the likelihood that it does not enjoy significant market power when selling overseas, limits the incentives for Fonterra to engage in certain strategic conduct that may weaken competition or encourage inefficiencies. This issue is discussed further in Sections 4 to 6.

Whether Fonterra is a price taker in international markets has important implications for the conclusions of the analysis discussed later in this report. It is possible that Fonterra may have market power in particular export markets (e.g., in particular countries or regions of the world). However, for the reasons set out above, we would not expect this market power to persist indefinitely as there has been a strong tendency for international trade to become more open and frictionless over time. As explained in the remainder of this report, Fonterra's incentives to pursue certain strategies in the New Zealand dairy

[51] Commerce Commission, *Review of the state of competition in the New Zealand Dairy Industry*, 1 March 2016, para. 5.19.3.1.

sector would be affected by the extent of market power it has (or perceives that it has) in overseas export markets. Therefore, in the remainder of this report we also consider the economic consequences for the New Zealand dairy sector if Fonterra does have market power in export markets or behaves as though it might.

3.9 Conclusion

The key activities involved in the dairy sector supply chain are: milk production; milk collection; processing (primary and secondary); and marketing of processed dairy products either to domestic customers or overseas customers.

Fonterra is vertically integrated into all of these activities from the farmgate downwards, and is by far the largest processor involved in the sector. In addition, Fonterra has significant market power in the purchasing of raw milk from farmers, as well as market power downstream in selling to domestic retailers of processed dairy products. It is unlikely that Fonterra has significant market power when selling overseas but, even if it does not, it is possible Fonterra may act as though it does (for instance, if it believes it has market power). This raises the question whether Fonterra might, in the absence of DIRA, have the ability and incentive to exercise its market power in upstream or downstream markets, thereby causing economic detriment to New Zealand. We assess this question in the remainder of this report.

Many other processors operating in New Zealand are also vertically integrated to varying degrees. As a result, there is some duplication of activities across processors, namely in milk collection and processing. This raises the question whether any such duplication is inefficient and, if so, whether overall economic welfare to New Zealand could be enhanced by eliminating at least some of this duplication. We also assess this question in the remainder of this report.

Fonterra is a farmer-owned cooperative. Consistent with the economic literature on cooperatives, Fonterra's overall objective is not to maximise its own profits (a standard assumption in economics when analysing the conduct of investor-owned firms) but, rather, to maximise the wealth of its supplier-shareholders. It is possible that Fonterra is motivated to achieve objectives other than wealth maximisation, for example maximisation of the size of the cooperative or market share. We consider the implications for economic efficiency if Fonterra were to pursue such objectives. Fonterra's motivations and objectives are important to understanding how it is likely to behave if unconstrained by DIRA.

It is clear that Fonterra's owners value control over the strategy and operations of the business. This is consistent with the economic theory of cooperatives, and is evident from past instances in which Fonterra's owners have exercised control to change the company's direction, as well as the various mechanisms that have been introduced to minimise the risk that Fonterra's management might not act in the interests of its owners.

4 POTENTIAL MARKET FAILURES IN THE FARMGATE MARKET

This Section discusses the farmgate market for raw milk. We first outline the potential issues given the structure of the farmgate market (Section 4.1). We then consider in turn a number of areas where potential performance in the absence of DIRA may be consistent with market failures, describing the issue, considering the incentives facing Fonterra in the absence of DIRA and the nature and extent of any resulting market impact (Sections 4.2 to 4.6). We present our conclusions in Section 4.7.

Summary and conclusions

- Fonterra may not face strong incentives to be productively efficient in the absence of DIRA and, as a result, may set the farm gate milk price inefficiently low. Competition among processors for farmgate milk would be the most effective way to ensure that Fonterra is productively efficient.
- Providing Fonterra seeks to maximise the wealth of its farmer-shareholders, it would be unlikely to reject efficient applications from new or returning farmers. However, Fonterra may have incentives to reject efficient applications from new or returning farmers if it is seeking to achieve other objectives or if it has market power (or acts as though it has market power) in export markets.
- Fonterra claims that its cooperative structure and principles would constrain it from discriminating among existing farmer-shareholders in the absence of the non-discrimination rule in DIRA. These cooperative principles are unlikely to be sustainable if Fonterra faces increased competition for farmgate milk. However, it is unlikely that discrimination among existing shareholder farmers or discrimination between existing and potential new farmer-shareholders to reflect differences in cost would reduce the efficiency of the New Zealand dairy industry. Fonterra may seek to use price discrimination as a punishment strategy to deter farmers from leaving if it is motivated by objectives other than wealth maximisation.
- In the absence of DIRA, Fonterra may seek to enter into long-term exclusive contracts with farmer-shareholder when such contracts enhance efficiency. Providing these contracts were motivated by a desire to maximise the wealth of its shareholder farmers, long-term exclusive contracts would have little or no effect on markets for dairy products either in New Zealand or abroad. However, it is possible that, in the future without DIRA, Fonterra may seek to hinder competition through long-term contracts, for example in order to increase the size of the Fonterra organisation or maintain its market share.
- Providing Fonterra were seeking to maximise the wealth of its shareholder farmers, it would be unlikely to engage in exclusionary conduct against its processor competitors by setting an inefficiently-high raw milk price. Fonterra may seek to engage in such conduct if it pursued an objective of maximising the size of the cooperative rather than maximising the wealth of its shareholder farmers. It is possible the removal of the "practically feasible" constraint imposed by DIRA may have the effect of foreclosing rivals, if Fonterra's actual costs are less than the notional costs of an efficient processor.

4.1 Potential concerns

As discussed in Section 2.2 there are a range of factors that should be examined to determine if a business has market power. Section 3.5 discussed the structure of the farmgate market in New Zealand. It noted that Fonterra has a large market share, and effectively sets the price for farmgate milk in New Zealand. These factors could indicate Fonterra has a dominant position as a monopsony purchaser in the farmgate market.

If Fonterra has market power in the acquisition of raw milk, this may lead to several concerns about its ability and incentives to influence competition in the farmgate and downstream markets in the absence of DIRA:

- **Productive efficiency:** Competition generally drives firms to become productively efficient and to make efficient investment decisions over time. Competition also enhances welfare to society by encouraging firms to produce efficient quantities of output and to set prices equal to the competitive level. Weak competition from other processors would result in less pressure on Fonterra to innovate and to drive its costs down. This may produce lower economic welfare to New Zealand than would occur if Fonterra were to face effective competition from other processors. We consider the possibility that a lack of competition in the farmgate market may result in productive (or operating) inefficiency, resulting in the farmgate price being set inefficiently low in Section 4.2.
- **Monopsony power:** The standard competition concern in relation to monopsony purchasers is that the monopsonist will face incentives to restrict the quantity of inputs purchased (in this case, raw milk from farmers used as the major input to dairy processing) and lower the price paid for inputs below the competitive level. This, in turn, would result in a transfer of economic welfare from the suppliers of the input to the monopsonist, and a loss of overall welfare to society. However, as we explained in Section 3.3, Fonterra's cooperative ownership structure is likely to constrain its incentives and ability to exercise monopsony power in this way. We consider the ability and incentives of Fonterra to restrict the quantity of inputs purchased by inefficiently refusing supply from existing or returning farmers in Section 4.3.
- **Price discrimination:** The no-discrimination rule within DIRA limit the capacity of Fonterra to pay farmers seeking entry into Fonterra different prices for milk than farmers in the same circumstances already supplying Fonterra with milk. We consider the incentives facing Fonterra to engage in price discrimination, the relevant constraints and the likely outcomes in Section 4.4.
- **Exclusionary conduct:** Fonterra could seek to render rivals less competitive by making access to raw milk (an essential input to production) difficult. If independent processors have difficulty acquiring the raw milk they require, this would in turn inhibit their ability to compete effectively with Fonterra in downstream processing. In turn, this may allow Fonterra to raise downstream prices (where it faces downward sloping demand) or increase its total sales. We consider two potential concerns here:
  - It is possible Fonterra may seek to engage in exclusive dealing arrangements or lock farmers in via long-term contracts, with the intent of limiting the supply of raw milk to rivals, thereby limiting actual or potential competition in the processing market. We consider this possibility in Section 4.5.
  - We next consider the possibility that Fonterra may have the ability and incentive to predate by setting the farm gate milk price inefficiently high, raising the costs of existing and potential competitors in the processing market. Fonterra might also set the milk price inefficiently high (e.g., by misestimating the notional costs of the efficient processor) without the intent of harming competition. This would have the same effect as predation—the foreclosure of rivals. We discuss this issue in Section 4.6.

Finally, we conclude this Section by summarising our conclusions about the ability and incentives for Fonterra to engage in particular behaviours in the farmgate market in the absence of DIRA, and the likely market failures that may result.

4.2 Concern 1: Fonterra's operating inefficiency may result in sub-optimal levels of milk production by the New Zealand dairy sector

4.2.1 The issue

The regulatory safeguards in DIRA were designed to ensure that Fonterra operated efficiently even in the absence of competition. The Annex to the Terms of Reference for the Review of DIRA states:[52]

> *While the ex-ante provisions of the open entry and exit regime were intended to send strong incentives to Fonterra to operate efficiently, the monitoring of Fonterra's milk price setting processes and the provisions relating to the trading of Fonterra's shares were put in place to provide for an ex-post scrutiny and assurance that the incentives are working as intended.*

As discussed in Section 3.5, Fonterra sets its farmgate raw milk price by reference to a benchmark price that estimates the revenue of a notionally efficient processor, of Fonterra's size and scale, would receive from a basket of commodity outputs and deducting a mixture of Fonterra's actual costs and the notional costs of an efficient processor.

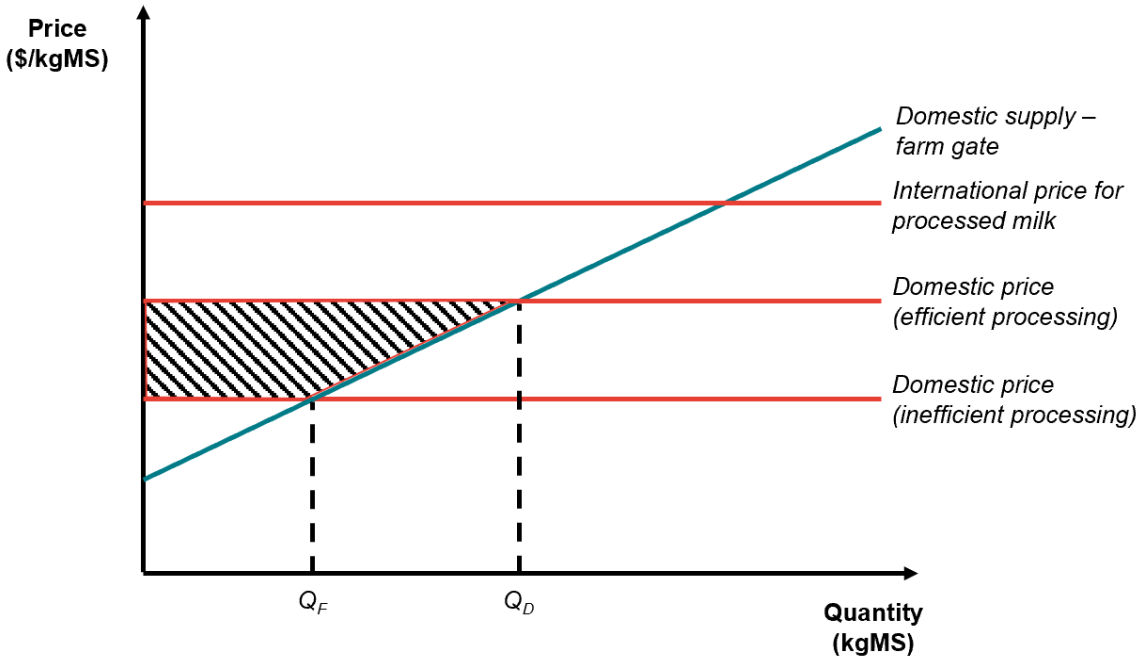
One potential concern is that because Fonterra determines the farmgate milk price and faces only weak competition in processing, in the absence of DIRA Fonterra may not face strong incentives to be productively efficient, and as a result set the farm gate milk price inefficiently low.[53]

The concern is represented in **Figure 11** below. Suppose that the price New Zealand farmers receive for their milk is the international price minus the actual cost of Fonterra's processing marketing and distribution rather than the costs of a hypothetical efficient producer. If Fonterra were efficient in producing at minimum cost, the domestic farm gate milk price would be the international price for processed milk minus the cost of efficient processing. The resulting quantity of processed milk would be Q_D. However, if processing were inefficient, farmers would be confronted with a lower price for their unprocessed milk and would produce only Q_F. This would result in less output available for export to generate income for New Zealanders. The shaded area on the diagram is the cost to New Zealand of this inefficient reduction in output. In effect, productive inefficiency within Fonterra caused by its power in determining the farmgate milk price may result in allocative inefficiency within the economy as a whole.

[52] Ministry for Primary Industries, *Terms of Reference for the Review of the Dairy Industry Restructuring Act*, 9 May 2018, p 7.

[53] Another concern is that, in the absence of DIRA's requirement for the benchmark price to be "practically feasible" Fonterra would set it inefficiently high, deterring potential competition. We discuss this poss bility in Section 4.6.

Figure 11: Effect on milk production of productive inefficiency within Fonterra



Source: Frontier Economics

4.2.2 The incentives facing Fonterra in the absence of DIRA

Competition in the purchase of raw milk would help solve this potential inefficiency. A more-efficient processor would be able to offer farmers a higher price for their milk. If there were vigorous competition among processors, the price of milk at the farm gate would rise until it was equal to the international price minus an allowance for the cost of efficient processing.

In order to test this, we analysed data from the past 15 seasons to assess if competition may have resulted in increased payouts to farmers. Using regression analysis, we estimated that, controlling for the commodity milk price index,[54] a 10% increase in the share of milk collected by independent processors during the previous season was associated with a 72c per kgMS increase in the total payout (farmgate price plus dividend) received by Fonterra farmers.[55] Conceptually, it is possible that the effect on the total payout we detected is not due the effect of competition but, rather, due to Fonterra gradually shifting to the production of higher value products, the effect of which would presumably be reflected in larger dividends and larger payout, all things remaining equal. Therefore, we tested what impact competition from independent processors has had on the farmgate milk price paid by Fonterra (as opposed to its total payout). We performed this test because the farmgate milk price is set assuming a hypothetical efficient processor that is a supplier of a basket of commodity-type products rather than high value-added products. We therefore control for the possibility that the effect we identify is due to a gradual move over time to producing more value-added products. We found that a 10% increase in the share of milk collected by independent processors during the previous season was associated with a

[54] Average of the ANZ Dairy Products NZ dollar price indices over the season.

[55] This effect was significant at the 10% level, applying robust standard errors, with a p-value of 0.063.

76c per kgMS increase in the farmgate milk price.[56] This provides some support for the notion that the competitive tension applied to Fonterra by independent processors creates a strong incentive to achieve cost efficiencies and maximise value, thereby increasing payouts and the milk price and retaining farmers.[57,58]

The concern that in the absence of competition a monopsony buyer (such as Fonterra) might be inefficient in its methods of production is similar to the concern in the competition policy literature that a monopoly seller might be inefficient in its methods of production.[59] One view would be that Fonterra's cooperative structure (that is, the fact that its suppliers are also its owners) might help mitigate the monopsony harm caused to farmers from Fonterra's operating inefficiency, even in the absence of competition. Operating inefficiently would not be consistent with Fonterra's objectives nor in the interests of Fonterra's farmer shareholders. As we discussed in Section 3.3, Fonterra's objective is to maximise the return to its farmer shareholders. Operating as efficiently as possible is important to achieving this objective.

However, as we discussed in Section 3.3, if Fonterra's shareholding is highly dispersed, individual farmer-shareholders may have little influence over Fonterra's efficiency.[60] In such circumstances the cooperative structure may not provide discipline against internal productive inefficiency. In addition, the cooperative structure of Fonterra also insulates it from the threat of takeovers — another mechanism that can provide discipline on a firm (and its managers) to remain as efficient as possible. However, Fonterra has put in place a number of mechanisms to enhance the oversight of the company by its shareholders, including the formation of a Shareholders' Council and direct representation of the owners on Fonterra's Board. The TAF scheme has also produced a traded share price, which can signal to owners the company's performance.

4.2.3 Impact on markets

The concern that Fonterra may be productively inefficient is contingent upon its market power as a buyer of farmgate milk. The competition facing Fonterra for farmgate milk has been increasing since 2001 – although this competition is much stronger in certain regions than in others. Fonterra's ownership structure and objectives also provides incentives for Fonterra to be efficient.

However, if Fonterra did not operate efficiently in the absence of DIRA's milk price setting provisions, this would reduce dairy production in New Zealand, to the detriment of farmers and the New Zealand economy more generally. Any lack of operating efficiency by Fonterra may affect the incentives for other processors to invest in the dairy sector in New Zealand, depending on the extent to which this inefficiency is reflected in the farmgate milk price, as we discuss in Section 4.6.

[56] This effect was also significant at the 10% level, applying robust standard errors, with a p-value of 0.081.

[57] It is important to view these results as indicative only as our analysis relied on only a small sample of observations.

[58] We note that Fonterra changed its milk price methodology in the 2008/09 season, when it adopted the approach of using the notional costs of an efficient processor (rather than its actual costs) to calculate the farmgate milk price. This change of approach could explain some of the estimated increase in the total payout or mi k price. However, we were unable to test statistically what impact, if any, this change of approach may have had, given the relatively small number of observations (years) available in the dataset.

[59] See Massimo Motta, *Competition Policy, Theory and Practice*, Cambridge University Press (2004) pp 47-48.

[60] This is the principal/agent problem where the owners of a firm may not be able to ensure that the managers of the firm always promote the interest of the owners.

4.3 Concern 2: Is Fonterra likely to refuse efficient milk supply from new or returning farmers?

4.3.1 The issue

Under s 73 of DIRA, Fonterra is obliged to accept milk from a new or returning farmer-shareholder. The Annex to the Terms of Reference for the Review of DIRA, explains the original purpose of these provisions:[61]

> *The open entry and exit requirements were intended to ensure that Fonterra cannot create barriers to other dairy processors entering the industry by "locking" farmers in or out of Fonterra. This in turn aims to ensure that farmers' milk is able to flow to its highest value use, continuously testing and optimising the size, composition, strategy and structure of the dairy industry. The regime was designed to put these commercial decisions squarely in the hands of dairy farmers, keeping the role of government to reducing barriers that may be created by a dominant industry player in an attempt to distort this flow.*

In its submission to MPI dated 29 June 2018, Fonterra states that, in the absence of open entry, Fonterra would be in a better position to align its capital investment with customer demand (because the supply-side driver would be reduced). Fonterra would be likely to use the discretion afforded by removing open entry in the following ways:

1. it may choose to decline applications by new entrants where it would not be efficient to build new capacity or where transport costs were too high;
2. it may choose to decline applications by new entrants for environmental reasons;[62]
3. it may choose to decline applications because it has good reasons to consider the farmer would not meet Fonterra's terms of supply (including animal welfare, hygiene and health and safety requirements); and
4. it may accept new supply but only on altered commercial terms (this last use of the freedom is discussed further below).[63]

4.3.2 The incentives facing Fonterra in the absence of DIRA

As we observed in Section 3.3 above, Fonterra's objective as stated in its Constitution is to maximise the wealth of its farmer shareholders. This objective does not seem to bear on whether or not it accepts applications from potential new shareholders.

As observed in Section 3.8, Fonterra is likely to be a price-taker in international markets. In seeking to maximise the wealth of its members, it will set its farmgate milk price at the international price minus the mixture of its actual and notionally efficient processors' costs of its processing, marketing and distribution activities. As illustrated in **Figure 12** below, at this farmgate milk price, farmers (both members and

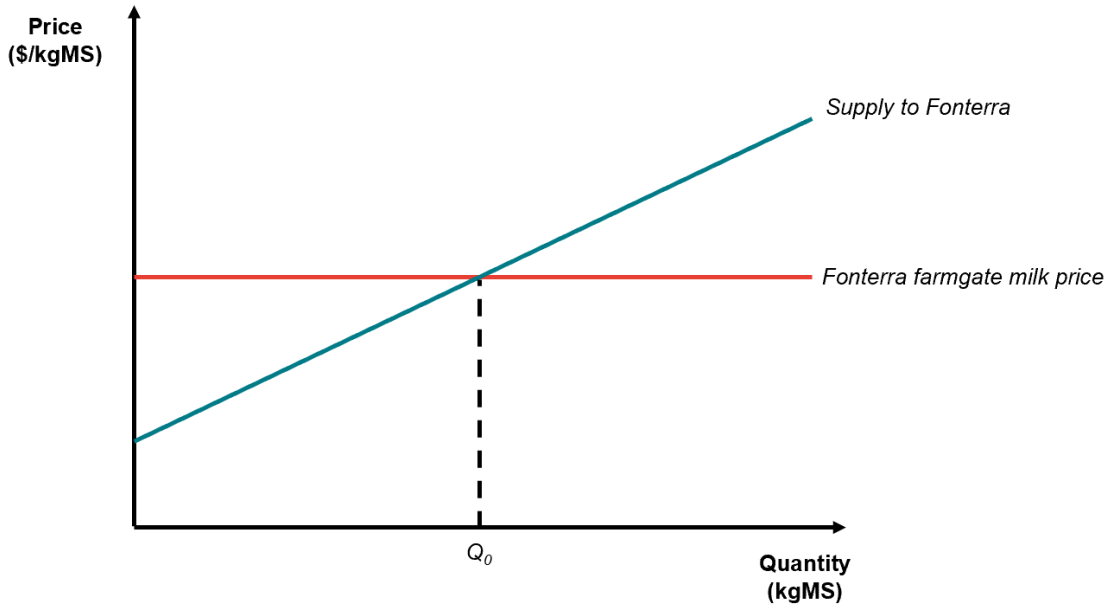
[61] Ministry for Primary Industries, *Terms of Reference for the Review of the Dairy Industry Restructuring Act*, 9 May 2018, p 6.

[62] DIRA does not prevent Fonterra from altering payment structures to reflect environmental performance, as it notes in its submission.

[63] Fonterra Submission 29 June 2018, para 2.42.

potential new members) will wish to supply the quantity Q_0. Fonterra would have little incentive not to accept this quantity of farmgate milk in order to achieve its objective of maximising the wealth of farmer-shareholders.[64]

Figure 12: Farmgate milk market



Source: Frontier Economics

Figure 12 assumes that:

- the cost Fonterra subtracts prior to fixing its farmgate milk price is its average cost of processing, marketing and distribution – averaged over all shareholders and all products;
- all shareholder farmers receive the same farmgate milk price; and
- Fonterra is indifferent between new and existing farmer-shareholders.

However, Fonterra's submission suggests that its decisions to accept new shareholders are more complicated than this. In particular, it is sometimes faced with an application for new shareholders which would require it to invest in substantial new capacity. In that case, the incremental costs incurred by Fonterra in processing, marketing and distributing the incremental product may be substantially greater than the average. However, the benchmark farmgate milk price is based on the assumption that the notionally efficient processor is (on average) covering its processing cost, including fixed costs. In that case, Fonterra (in the absence of DIRA) may prefer not to accept the farmgate milk because the revenue received from the sale of the product on international markets may not cover the costs of producing these incremental volumes. Fonterra also raises the possibility that, although accepting the farmer as a shareholder may not require substantial new investment, Fonterra may have good reasons to consider the farmer would not meet Fonterra's terms of supply. In both these cases, it is likely that accepting the

[64] This is somewhat of a simplification; Fonterra may have a downward sloping demand curve. Farms may differ in their distance from processing plants, herd size and ease of access to mi k storage tanks. Accordingly, Fonterra may be willing to pay a higher price to farms reflecting the lower collection costs. It should be noted this is not currently reflected in the payments received by farmers.

farm as a shareholder would be inefficient and a refusal by Fonterra to accept the potential supplier would enhance (rather than reduce) the efficiency of New Zealand's dairy sector.

Fonterra's submission is that the open entry provisions in DIRA force it to accept shareholders even when acceptance results in inefficiencies of this kind. We accept that this may be the case, but we have no way of assessing the magnitude of any such costs to New Zealand of these possible inefficiencies.

We note that s 86 of DIRA currently allows Fonterra to issue a capacity constraint notice for no more than one season for regions where it expects that the volumes of milk cannot be reasonably managed. Such a capacity constraint would mean that Fonterra is not obliged to accept new milk – from either new suppliers or existing suppliers. However, it is unclear whether delaying the acceptance of milk for one year would address the issue of higher incremental costs from accepting the new milk, because even after an additional season the new volumes of milk may still not be sufficient to allow efficient capacity expansion.

The discussion above assumes Fonterra is indifferent between new and existing farmer-shareholders. However, it is possible that Fonterra may prefer existing farmer-shareholders over new shareholders. This may be the case if, for example, Fonterra preferred a secure milk supply from existing farmer suppliers over a potentially uncertain milk supply from new farmer suppliers.

Finally, if Fonterra is not a price-taker in export markets it may have an incentive to refuse to accept milk from new or returning farmers in order to constrain its exports to international markets and thereby raise prices in those markets.

4.3.3 Impact on markets

If the DIRA open entry requirements were removed, and Fonterra refuses to accept some farmgate milk it would otherwise be required to accept, New Zealand's exports of milk products may be reduced. This may increase rather than reduce economic efficiency if the exports that would be lost would be those which cost New Zealand more to produce than they generated in export revenue. There would be no effect on domestic markets because the revenues and costs of servicing those markets would not be affected.

The above reasoning assumes that Fonterra is seeking to maximise the wealth of its shareholder farmers. However, if Fonterra pursues the policy of maximising the size of the Fonterra organisation or its market share (e.g., as a signal of performance to its shareholders), Fonterra may be tempted to deter competitors from entering the processing industry. In that case, it may be tempted to deter farmers from leaving Fonterra by threatening them that, if they left, they would not be allowed to return or be subject to another form of punishment such as a price penalty. As we discuss in more detail in the next section, there is evidence Fonterra has behaved in this way in the past, by imposing a price penalty on returning farmers who left Fonterra to supply New Zealand Dairies Limited.[65] Such conduct would likely have the effect of limiting competition in the New Zealand off-farm dairy sector. This is important, since as we discuss in Section 2.1, competition is likely to be the most effective mechanism for promoting productive, allocative and dynamic efficiency in markets. Conduct that limits competition is therefore likely to result in a loss of efficiency to the detriment of New Zealand dairy farmers and a detriment to the New Zealand economy as a whole.

[65] See Macintyre and Williamson Partnership et al v Fonterra Co-operative Group Limited, CIV-2014-404-877 [2015] NZHC 3012, 1 December 2015.

4.4 Concern 3: Is Fonterra likely to pay some farmers a higher price than others?

4.4.1 The issue

Section 106 of DIRA provides that Fonterra must ensure that the terms and conditions it offers new entrants are the same as those that apply to a shareholding farmer in the same circumstances.

Fonterra's 29 June 2018 submission argues that this rule would lose its justification if open entry were removed. Fonterra states that, in some circumstances it might be efficient for Fonterra to accept supply, but only if it could do so on altered terms that reflected the value of the additional supply to Fonterra.[66]

4.4.2 The incentives facing Fonterra in the absence of DIRA

In our opinion, removal of this provision would enable Fonterra to cope with the problem discussed in the preceding Section—of regions whose service would impose high incremental costs on Fonterra. Fonterra could say to the prospective shareholders of the area: we shall process your milk providing you compensate us (by accepting a lower milk price) for the higher costs we need to bear to undertake that processing. This would promote economic efficiency.

Fonterra argues that, in the absence of the non-discrimination rule, it would be constrained from discriminating among existing farmer-shareholders by:[67]

1. its contracts with its existing farmer-shareholders;
2. its cooperative structure; and
3. its cooperative principles.

It is not clear these cooperative principles would be able to withstand increased competition that Fonterra may face for the purchase of farmgate milk. It will be in the interests of independent processors to offer large farmers prices slightly above the Fonterra farmgate milk price in order to entice them away from Fonterra. Fonterra may find that, if it does not respond to such competitive pressure by offering certain farmers higher prices for farmgate milk, it will be unable to compete with independent processors. However, there are many regions in New Zealand where Fonterra faces very little or no competition from independent processors. In these cases, Fonterra is likely to face less competitive pressure to offer certain farmers higher prices for farmgate milk.

The ACCC investigated variations in prices received by farmers in Australia. It found that processors do not pay all farmers the same price and that the vast majority of farmers received between 90% and 110% of the weighted average price of their processor. Some difference in prices could be explained by the objective characteristics of the milk that was supplied, but other differences reflected the volume of milk supplied by the farmer.[68]

Section 106 of DIRA does not prevent Fonterra from discriminating among its existing shareholder farmers in these ways; it only demands that new entrants be offered the same as the terms that apply to a shareholding farmer in the same circumstances. Therefore, arguably even with the non-discrimination clause in place, Fonterra could already implement differential pricing in regions where it faces high incremental costs for new milk. However, the same differential pricing would need to apply

[66] Fonterra Submission, para 2.49.

[67] Fonterra Submission, para 2.50.

[68] ACCC, *Dairy Industry Inquiry*, Final Report, April 2018, pp 59-60.

to new and existing (and expanding) farmers. It is unclear whether the cooperative principles discussed above, and enforced via current shareholders, would permit such differential pricing for existing shareholders.

The preceding discussion assumes Fonterra is acting to maximise the wealth of its shareholders and may therefore price discriminate where it is efficient to do so. However, it is possible Fonterra may seek to use price discrimination as a punishment strategy to deter farmers from leaving. It may be incentivised to do this if it is seeking to achieve other objectives or if it has market power in export markets. There is evidence that Fonterra has adopted this strategy in the past, when it attempted to impose a price penalty that was not related to costs returning farmers who had left Fonterra to supply New Zealand Dairies Limited. In the High Court judgement Muir J observed:

> *The five cent per kilogram milk price discount was a small and relatively arbitrary figure designed to be and perceived to be a "penalty" for suppliers who had previously left the co-operative and couldn't therefore be expected to simply "waltz back in". The financial benefit to Fonterra was identified as being in the order of $3 million but this was not a material factor in the decision to impose the penalty.*[69]

This past behaviour suggests there is at least the possibility that Fonterra may, in the absence of DIRA, seek to punish farmer-shareholders if they attempt to switch to other processors. However, the legal precedent set by this court case may deter similar conduct in the future.

4.4.3 Impact on markets

As observed above, Fonterra claims that its cooperative structure and principles would constrain it from discriminating among existing farmer-shareholders in the absence of the non-discrimination rule. These cooperative principles are unlikely to be sustainable if Fonterra faces increased competition for farmgate milk. However, it is unlikely that discrimination among existing farmers or discrimination between existing farmers and potential shareholder farmers would reduce the efficiency of the New Zealand dairy industry. In seeking to maximise the wealth of its existing shareholder farmers, Fonterra would have no incentive to exclude farmers whom it would be efficient to include unless threatening to exclude farmers increased farmers' switching costs in a way that imposed little costs on Fonterra, and thereby helped maintain Fonterra's volumes and economies of scale.

However, if Fonterra were seeking to achieve other objectives (such as maximisation of the size of the cooperative or its market share) it may threaten to use discriminatory pricing to deter farmer-shareholders from switching to other processors. This type of behaviour is likely to frustrate competition in the New Zealand off-farm dairy industry, resulting in a detriment to New Zealand dairy farmers and the New Zealand economy as a whole. Competition not only promotes efficient pricing and production, but also provides signals for efficient investment. Foregone efficient investment could have a significant detrimental effect on dynamic efficiency and overall economic welfare to New Zealand.

[69] See Macintyre and Williamson Partnership et al v Fonterra Co-operative Group Limited, CIV-2014-404-877 [2015] NZHC 3012, 1 December 2015, para 113c.

4.5 Concern 4: Is Fonterra likely to lock farmers in using exclusive dealing arrangements or long-term contracts?

4.5.1 The issue

Part of the open exit requirements of DIRA is s 107. This restricts the ability of Fonterra to offer shareholder farmers long-term contracts. The purpose of that provision was to limit the extent to which Fonterra could lock shareholder farmers into their supply chain through long-term contracts, exclusivity agreements, or other such mechanisms. This would deter entry and expansion by processors in competition to Fonterra. This raises the question whether Fonterra would have an incentive to engage in anti-competitive conduct of this kind in the absence of DIRA.

4.5.2 The incentives facing Fonterra in the absence of DIRA

If Fonterra is seeking to maximise the wealth of its shareholder farmers, it may offer shareholder farmers long-term exclusive contracts for two possible reasons:

- they might be a means of enhancing efficiency – that is, creating value which Fonterra may be able to return to its shareholder farmers; and
- they might be a means of enhancing Fonterra's market power which would be another means of increasing the wealth of its shareholder farmers.

In this report, we are not concerned with long-term exclusive contracts that might be driven by economic efficiency. We are concerned only with long-term exclusive contracts that might be a means of increasing Fonterra's market power.

The farmers which entered into long-term exclusive contracts with Fonterra would be bearing a cost – because they would be forgoing the right to switch to an alternative processor if a better offer were made in the future. For this reason, Fonterra would need to offer farmers an incentive to entice them to accept a long-term exclusive contract. Fonterra's 29 June 2018 submission seems to anticipate the possibility of offering its shareholder farmers incentives to enter into long-term exclusive contracts. It states that, in the absence of the non-discrimination rule, Fonterra considers that it would have discretion to pay for supply at a price that reflected the incremental value of farmgate milk to Fonterra:[70]

> *This would allow Fonterra to manage supply and volume uncertainty by requiring a longer period of supply commitment, or to pay for supply or impose charges (e.g. based on transport costs) in a way that reflected the true value of that additional supply.*

As we observed above, Fonterra may be prepared to offer shareholder farmers a higher price in exchange for a long-term exclusive contract either because the long-term contract enhances efficiency or because it increases Fonterra's market power. However, it is hard to see how a long-term exclusive contract could enhance Fonterra's market power if it is a price-taker in export markets. Fonterra's seeming lack of market power in its export markets would suggest that the prospect that Fonterra could increase its market power by limiting the number of domestic processors is remote.

[70] Fonterra submission, para 2.50 (b).

As we noted above, there are many regions of New Zealand where Fonterra faces little or no competition from independent processors at the farmgate. In cases where farmers do not have an alternative processor they may be more inclined to write a long-term contract without an incentive from Fonterra. However, it is difficult to see the advantage of entering into a contract from the farmer's perspective – since their shareholder status provides security of supply, and Fonterra will always accept supply if they can profitably sell this output in the international market. Although, as noted in Section 3, currently around [redacted] of Fonterra farmers have long-term contracts.

Appendix A notes that one issue that often faces cooperatives is the free-rider problem. That is, the open cooperative structure enables certain farmers to operate at relatively low standards, supported by other cooperative members. Entering into contracts would be one method for Fonterra to impose minimum standards on its farmer shareholders. However, in the absence of DIRA it would be possible to impose those standards without entering into contracts. For example, Fonterra's terms of supply set out the standards it expects suppliers to follow.

This reasoning assumes that Fonterra is seeking to maximise the wealth of its shareholder farmers. As we observed in Section 3.2 above, it is possible that in the future Fonterra may be motivated by a wish to maximise its size. This would then provide a reason as to why it may be prepared to bear the cost of long-term exclusive contracts – even if contracts of this kind contributed nothing to the value generated by Fonterra, and are therefore inconsistent with its objectives of maximising the wealth of its farmer-shareholders.

The ACCC has recently considered whether exclusive, long-term supply contracts between farmers and processors of milk may be anti-competitive. Most supply contracts in Australia required farmers to supply all of their raw milk in an unspecified volume to a processor, who in return committed to collecting the entire milk production of the farm. The ACCC found that, in most instances, the purpose of exclusive supply clauses was to guarantee milk volumes, milk quality assurance, efficient milk collection and sampling of milk.[71]

The discussion in this Section has so far assumed that Fonterra is a price-taker in exports markets, and therefore has little incentive to limit competition from domestic processors. Suppose there is not a single, fully-integrated global dairy market, but many segmented export markets. Suppose further that processors from certain countries concentrate on particular export markets to take advantage of their particular comparative advantages. This could occur if geographical proximity, reputation or trade agreements between nations make it easier for processors from some countries to compete in certain export markets but not in others. This is not unrealistic. For example, Fonterra and other New Zealand processors are significant suppliers of processed dairy products to Asian countries but less so to Europe or North America.

In these circumstances, if independent processors based in New Zealand grow at the expense of Fonterra, and if Fonterra has market power in the export markets it serves, then Fonterra may have incentives to enter into long-term exclusive contracts to prevent the expansion of independent processors in New Zealand to preserve its position in export markets. Likewise, Fonterra may have incentives to enter into exclusive contracts with farmers in an attempt to lever its market power in the farmgate market into downstream markets, including into the export markets in which it operates. If Fonterra has an incentive to engage in strategic behaviour of this type it could use punishment strategies, like that used in the past and discussed in Section 4.4, as a mechanism to lock farmers in.

Note, that Fonterra need not actually have significant market power in export markets in order to attempt such strategies. It may pursue such conduct if it believes it has market power overseas. Of course, if

[71] ACCC, *Dairy Industry Inquiry*, Final Report, April 2018, p 82.

Fonterra does not have market power, such conduct would not be profitable and is likely to eventually be discontinued. It is also worth noting that the market frictions that may allow Fonterra to have market power in particular export markets are unlikely to persist over the long-run if the trend towards freer and more frictionless global trade continues.

4.5.3 Impact on markets

In the absence of DIRA, Fonterra may well seek to enter into long-term exclusive contracts with shareholder farmers when such contracts enhanced efficiency, such as enabling Fonterra to invest more efficiently in capacity. In that case, the long-term exclusive contracts would have little or no effect on markets for dairy products either in New Zealand or abroad. The benefits of increased efficiency would accrue to Fonterra's shareholder farmers in the form of higher payout.

It is possible that, in the future without DIRA, Fonterra may seek to hinder competition through long-term contracts, for example in order to increase the size of the Fonterra organisation or maintain its market share. In that case, Fonterra would be deterring entry which could potentially harm the efficiency of New Zealand's dairy processing industry. This would be to the detriment of New Zealand dairy farmers and a detriment to the New Zealand economy as a whole. The importance of competition to driving efficiency in the New Zealand off-farm dairy sector, including signals for efficient investment, means strategic behaviour of this type could result in significant detriment.

One mechanism to encourage farmers to enter into long-term contracts may be to offer them a higher price. We consider Fonterra's incentives and ability to do this in the next section.

4.6 Concern 5: Is Fonterra likely to set the farmgate milk price inefficiently high?

4.6.1 The issue

Section 3.5 above explained the way in which Fonterra sets its farmgate milk price. Under DIRA, Fonterra is free to set its own milk price. However, amendments to DIRA in 2012:

- embedded Fonterra's milk price governance arrangements in legislation;
- required Fonterra to publicly disclose information relating to its farmgate milk price setting; and
- introduced a regime monitoring the calculation of the benchmark milk price.

It is not clear what method Fonterra may use to determine the farmgate milk price in the absence of DIRA. However, DIRA does not prescribe the methodology to be used by Fonterra to calculate the farmgate milk price. Rather, DIRA establishes the 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.[72] Under the current arrangements Fonterra can amend the Milk Price Manual and change the way it determines the inputs used to calculate the milk price.

The methodology set out in the Milk Price Manual is consistent with the objective of maximising the payment to shareholders for the raw milk price, as required by Fonterra's Constitution. Fonterra's cooperative structure and associated governance arrangements, including the Shareholders' Council provide additional oversight to promote the setting of a milk price consistent with Fonterra's objectives.

[72] DIRA also establishes the governance and oversight arrangements associated with the calculation of the benchmark milk price including the requirement for Fonterra to appoint a Mi k Price Panel and the requirement for the Commerce Commission to review the milk price manual and Fonterra's calculations each season.

The approach adopted by Fonterra is broadly consistent with approach used to set farmgate milk prices in Australia, where processors forecast expected revenues and adjust these to take into account processing and other costs, amongst other factors like the extent of competition and the split between farmgate price and dividends for processors with cooperative structures.[73] For these reasons, it is reasonable to assume Fonterra is likely to adopt a methodology consistent with the approach set out in the Milk Price Manual in the absence of DIRA.

The report by Castalia draws a parallel between the way Fonterra determines its costs in the Milk Price Manual and methods for regulating prices of natural monopolies.[74] The Castalia report argues that, because the Milk Price Manual allows Fonterra to recover only the costs of a hypothetical efficient competitor, rather than Fonterra's actual processing costs, the resulting farm gate milk price is likely to be inefficiently high. It argues that the competition and efficiency consequences of this pricing are that:

- It sets an unrealistically high hurdle for new entrants into the milk processing market, and may therefore prevent entry by efficient competitors;
- It may deter investment from competitors that would contribute to a more dynamic agricultural sector, particularly niche processors;
- It encourages uneconomic bypass of existing milk collection serves in effort to capture any resource rents; and
- It serves as a barrier for Fonterra's farmers to exit the cooperative.[75]

This argument relies on the assumption in the Castalia report that the costs of the hypothetically efficient producer used in implementing this procedure are less than the opportunity costs forgone by Fonterra.[76]

The Commerce Commission has raised (and rejected) the possibility that, in the absence of DIRA, Fonterra may use a high milk price as a predatory weapon. It asked whether Fonterra may, if faced with competitive pressure, be incentivised to pay farmers a higher than efficient milk price in the short to medium term to discourage entry to, and encourage exit from, the processing market. In effect, the concern discussed in this Section is whether Fonterra might use its market power with respect to farmgate milk to predate against competing processors.[77]

4.6.2 The incentives facing Fonterra in the absence of DIRA

The effect of Fonterra of increasing the farmgate milk price

Before we explore the incentives facing Fonterra, it is important to explore the effects on Fonterra of paying farmers a milk price above the efficient level. Under clause 3 of the Fonterra Constitution, a shareholder farmer supplying Fonterra is obliged to hold at least one share for each kilogram of milk solids supplied. Shareholder farmers are allowed as a maximum to hold up to two shares for each kilogram of milk solids supplied. The Fonterra 2018 Annual Report indicates that it collected 1,505 million kilograms of milk solids and there were 1,612 million shares on issue.

[73] ACCC, *Dairy Industry Inquiry*, Final Report, 2018, p. 39.

[74] Castalia, *The "Hypothetical Efficient Competitor" and farm-gate Milk Prices*, 2012, pp. 19-23.

[75] Castalia, *The "Hypothetical Efficient Competitor" and farm-gate Milk Prices*, 2012, pp. 22-23.

[76] Castalia, *The "Hypothetical Efficient Competitor" and farm-gate Milk Prices*, 2012, p. 25: "The ECPR price of raw mi k would be lower than the price produced by the Mi k Price Manual – in essence, it would subtract more costs (actual rather than hypothetical) from the same revenues;"

[77] See Commerce Commission, *Review of the state of competition in the New Zealand Dairy Industry, Final Report*, 1 March 2016, p 85.

Although the number of shares on issue was slightly higher than the number of kilograms of milk solids collected in the last financial year, we make the simplifying assumption that each shareholder farmer holds a number of shares roughly equal to the number of kilograms of milk solids supplied. The tying of shareholdings to milk supply means that the ownership of a share in Fonterra provides benefits of two principal kinds:

- it provides the owner with a right to sell Fonterra one kilogram of milk solids at the farmgate milk price; and
- it provides the owner with dividends accruing to that share.

If shareholder farmers are indifferent as to the source of their dollars, they will be indifferent between an extra dollar in the form of the milk price and an extra dollar in the form of dividends. We illustrate the relationship between the farmgate milk price, Fonterra dividends and the Fonterra share price in **Table 5** below.

Table 5: Cash payout composition

	MILK PRICE	DIVIDEND	SHARE PRICE
With normal milk price	$9.00	$1.00	$10.00
With high milk price	$9.50	$0.50	$10.00

Source: Frontier Economics

Fonterra's market announcements are consistent with the proposition that farmers are concerned about the sum of the milk price and dividend. As shown in **Table 6** below, Fonterra's forecasts of milk prices, released during the season, may contain dividend forecasts and earnings per share forecasts, with Fonterra explicitly referring to the cash payout as the milk price plus dividend.

Table 6: Fonterra milk price forecasts 2017/18 season ($/kgMS)

	FARMGATE MILK PRICE	FORECAST CASH PAYOUT (MILK PRICE PLUS DIVIDEND)	FORECAST PAYOUT (MILK PRICE PLUS EARNINGS)
Final Update 13 September 2018	$6.69	$6.79	
Forecast Update 10 August 2018	$6.70	$6.80	$6.95-7.00

Source: Fonterra [https://www.fonterra.com/nz/en/investors/farmgate-milk-prices.html]

Suppose that, if it were pricing normally, Fonterra would set the farmgate milk price at $9.00 and this would result in a dividend of $1.00 and a share price of $10.00. The share price would be ten times the dividend.

Now consider what would happen if Fonterra had paid a farmgate milk price higher than normal. Its revenues and processing costs would have been the same, but it would have been paying its shareholder farmers more for farmgate milk. The result would have been that the dividend would have

fallen by the amount of the increase in money paid to farmers for their farmgate milk.[78] The dividend would have been $0.50. However, **Table 5** suggests that the share price would have been unchanged at $10.00.

The reason for the unchanged share price is that ownership of the shares gives access both to selling milk at the farmgate milk price and to the dividend. If the sum of these do not change, the benefits of owning the share will not change and the share price ought not change.

We sought to test the proposition that the price of Fonterra shares will respond equally to changes in forecast milk price and forecast dividend. We analysed the milk price announcements of Fonterra and the final results for the 2013, 2014 and 2015 seasons.[79] For each announcement we obtained three variables:

- The change in the share price between one week prior to and one week after the announcement. These data were sourced from Thomson-Reuters;
- The change in forecast/actual milk price since the most recent update for the season; and
- The change in forecast/actual dividend since the most recent update for the season.

While each announcement provided a forecast/actual milk price, not all provided information on the forecast dividend. Consequently, our analysis was restricted to 18 observations. We used a linear regression to examine the impact of changes in dividend forecasts and milk price forecasts on changes in share price. We found that an increase in the forecast dividend is associated with an increase in the share price.[80] Changes in the milk price forecast are however not associated with any change in the share price.[81] However, the results are driven by two observations, 24 May 2018 and 11 December 2013; without these observations the change in forecast has no statistically significant impact on the change in share price. Our efforts at empirical testing were limited by the availability of data.

In the absence of clear empirical evidence either way, we persisted with our assumption that, as a rough approximation, the Fonterra share price is impacted equally by a one dollar increase in the milk price and a one dollar increase in dividends. This assumption seems reasonable as a matter of economics.

If shareholder farmers valued a dollar in milk revenue above a dollar of dividends, Fonterra would have an incentive to offer high farmgate milk prices and low dividends whether it was engaging in predation or not. This conduct would lead Fonterra to have an unusually high price-earnings ratio – because it would be in the interests of its shareholder farmers to pay high milk prices and low dividends, and this action would have little effect on its share price.

We examined the price/earnings (PE) ratio of Fonterra shares over the period 24 September 2015 through 20 March 2015 using data sourced from Thomson Reuters.[82] We compared Fonterra's PE ratio with the PE ratios of the comparator firms used by the Commerce Commission in 2018 to derive an estimate of the appropriate asset beta for a hypothetical dairy processor.[83] We expected that, if

[78] Using Fonterra provided data for the 2002-03 through to 2017-18 seasons, we investigated the relationship between the mi k price and dividend paid in each season. A negative relationship was observed, with an R-squared of 29% and a t-stat of -2.4 (indicating statistical significance at the 5% level).

[79] Data sourced from: https://www.fonterra.com/nz/en/investors/farmgate-mi k-prices.html

[80] Coefficient of 3.51 and a t-statistic of 4.7, significant at the 1% level.

[81] Coefficient of 0.03 and a t-statistic of 0.2, insignificant at any reasonable level of significance

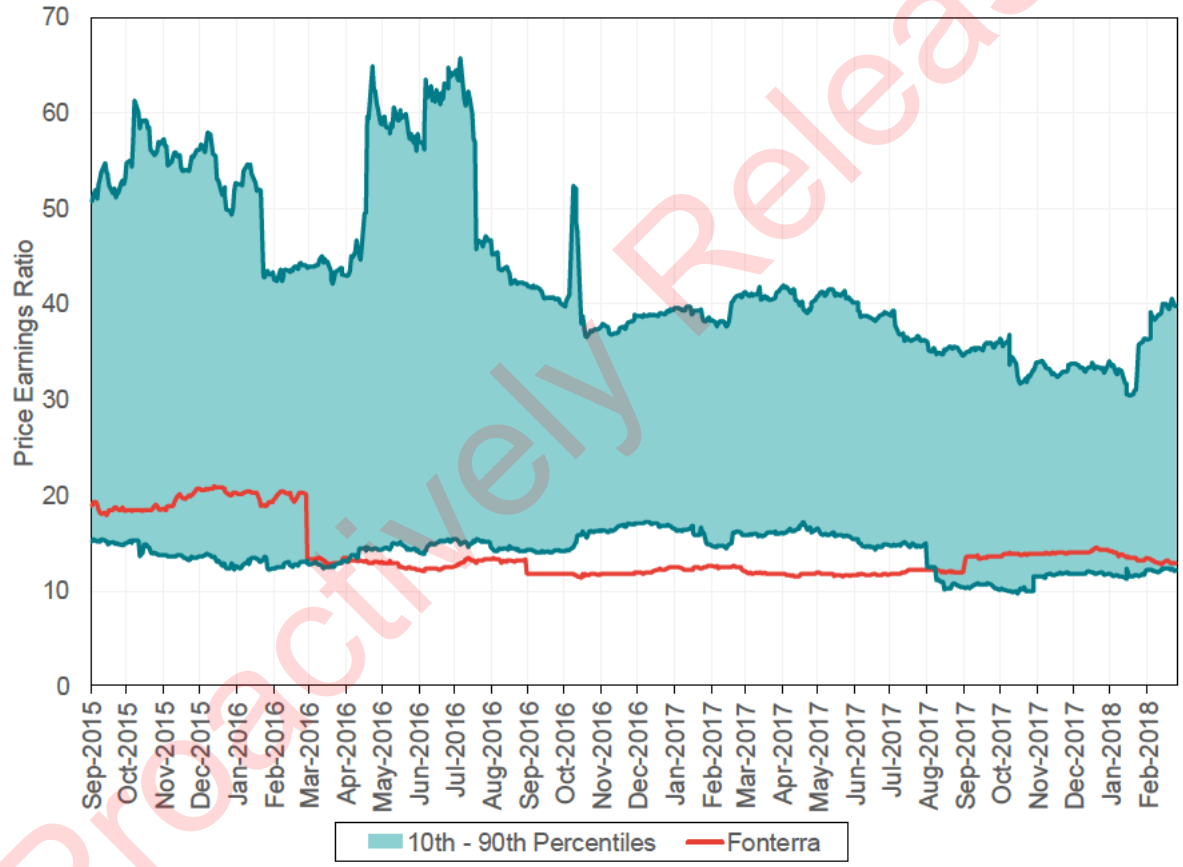
[82] This period is chosen as the only period for which the PE ratio for Fonterra Cooperative Group is available from Thomson Reuters. Murray Gou burn Co-op and Mead Johnson Nutrition were omitted as PE information was not publicly available.

[83] The original analysis for the Commerce Commission was undertaken by CEPA. See CEPA, Dairy Notional Processors' asset beta, 28 March 2018.

Fonterra's shareholder farmers valued dollars in the form of milk prices above dollars in the form of dividends, Fonterra would cater for these preferences by increasing returns in the form of the milk price at the expense of dividends. Because Fonterra's share price is only weakly correlated with its dividends, this would cause Fonterra's PE ratio to be unusually high.

However, when we compared Fonterra's PE ratio to the 10th and 90th percentile of the long-list (37 companies in total) of comparators considered by the Commerce Commission, we found that the PE ratio for Fonterra is below the typical PE ratio of the comparator companies (see **Figure 13**).[84] This seems to be inconsistent with the hypothesis that Fonterra is paying an inflated milk price at the expense of dividends. The finding remains largely the same if we compare Fonterra to the "Dairy companies" subsample examined by the Commerce Commission, as shown in **Figure 14**.[85]

Figure 13: PE for Fonterra compared to Commerce Commission's comparators

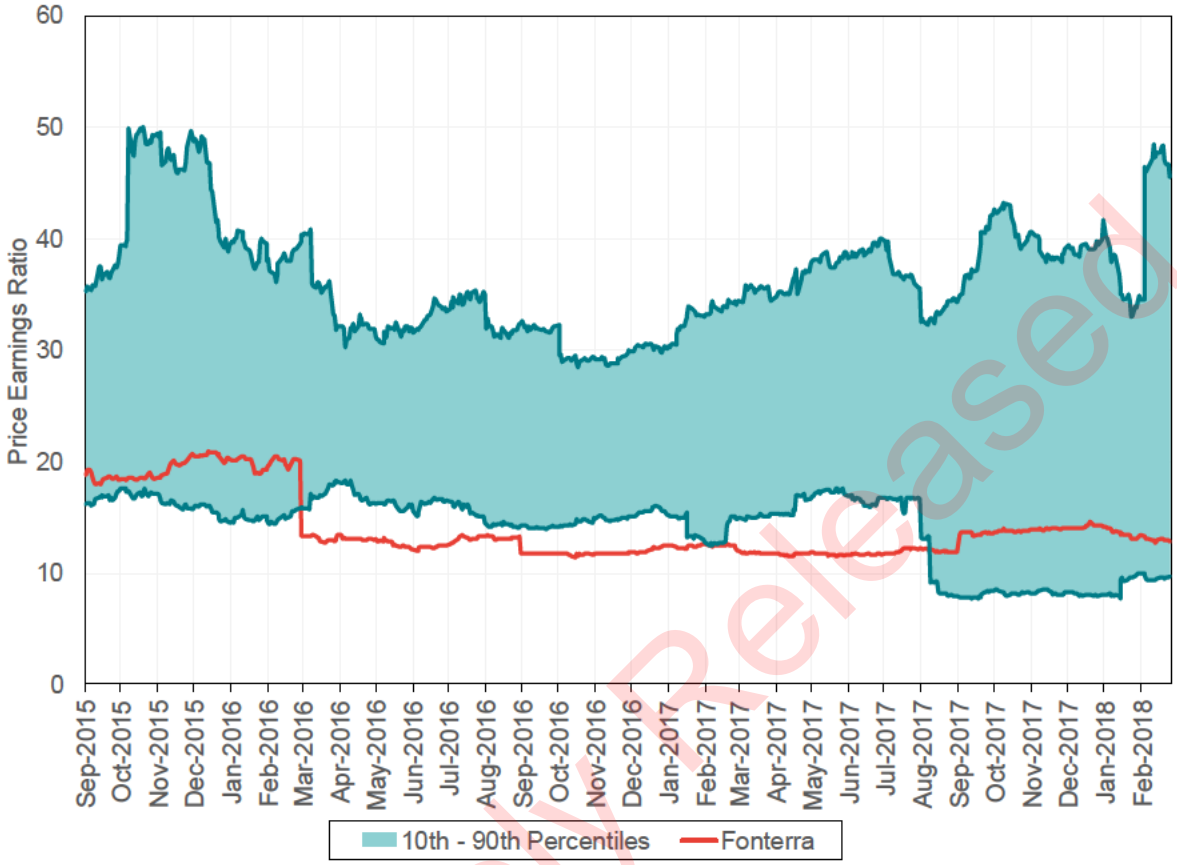


Source: Frontier Economics analysis of Thomson Reuters data

[84] Not all comparators had PE ratios available for all days during the sample period.

[85] With the exclusion, as before, of Mead Johnson Nutrition and Murray Goulburn Co-op.

Figure 14: PE for Fonterra compared to dairy comparators

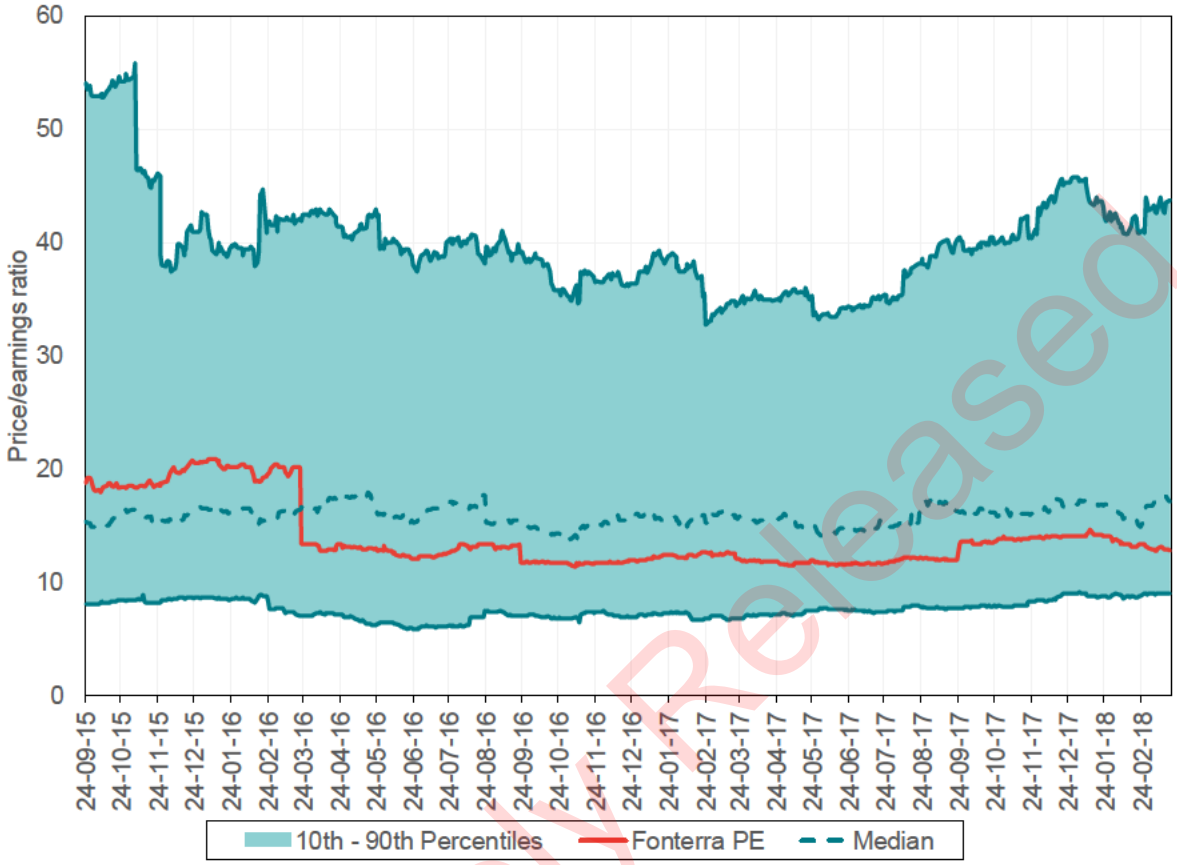


Source: Frontier Economics analysis of Thomson Reuters data

We also compared Fonterra's PE ratio to the PE ratios of the current constituents of the NZX50 index.[86] The result is depicted in **Figure 15** below. Again, we find no evidence that the PE ratio of Fonterra is above a typical value. In fact, the PE ratio was typically below the median of the NZX50 constituents.

[86] Constituents as at 14 February 2019.

Figure 15: Fonterra PE compared to current NZX50 constituents



Source: Frontier Economics analysis

The preceding plots show a step decrease in Fonterra's PE ratio around March 2016. This step decrease coincides with the increase in Fonterra's earnings per share recorded in the Thomson Reuters database. According to that database, Fonterra's average earnings per share in FY15 was 29c, whereas in FY16 and FY17 it was 51c and 46c. This increase in dividends seems to have had little effect on the share price. That is, the step down in the series of Fonterra's PE ratio in March 2016 is consistent with proposition that Fonterra's share price depends equally on milk price and dividends.

For the reasons above, we consider that Fonterra's shareholder farmers are concerned about both milk revenue and their dividends. As a rough approximation, we shall assume that Fonterra's shareholder farmers are indifferent between a dollar in form of milk revenue and a dollar in the form of dividends. This would suggest that Fonterra has little or no incentive to increase the milk price at the expense of dividends.

The incentive of Fonterra to engage in predation by setting a high farmgate milk price

The indifference of Fonterra's farmer-shareholders between a dollar in milk revenue and a dollar in dividends has implications for the way in which Fonterra would have to operate if it were to engage in predation by raising the farmgate milk price. If it were to increase its milk price and decrease its dividend by the same amount, its competitive position would be unchanged. This would not be sufficient to entice farmers to supply Fonterra rather than to supply a competitor processor. It would not be sufficient because (using our previous example), a Fonterra farmer-shareholder would receive $9.50 for its milk but would also be required to invest in Fonterra shares with very low earnings for the amount of money

invested. A competitor processor could meet this offer by offering a farmgate milk price of $9.00 and allowing its farmer suppliers to invest their funds in avenues that yield a normal rate of return.

When analysing predation, it is best to think of Fonterra's farmgate milk price as its farmgate milk price plus any difference between the earnings on Fonterra shares and the earnings on other investments that might be available (the opportunity cost of investing in Fonterra shares). Providing the earnings on Fonterra shares reflect the opportunity cost of investing in Fonterra shares, this qualification is not necessary. However, if one considers the possibility of Fonterra increasing its farmgate milk price at the expense of earnings, the qualification is required.

In order to engage in predation by offering a high milk price, Fonterra would need to increase its milk price without decreasing its dividend. In effect, it would need to bear a cost from engaging in predation and it would need to finance this cost by running down reserves or increasing its level of debt. If Fonterra were motivated solely to maximise the wealth of its owners, it would only be prepared to incur the cost of this predatory action if there were a prospect of recoupment. The normal way in which recoupment occurs is by increasing the market power of the predator. However, because Fonterra is likely to be a price taker in the international markets in which it sells the vast majority of its output, that would not be possible.

One way in which predation might be worthwhile would be if the objective of Fonterra were to increase the size of the Fonterra organisation. In that case, Fonterra might have an incentive to engage in predation by incurring the cost of setting a high farmgate milk price for a short period to force rivals to exit and to allow Fonterra to grow its market share. This may deter entry which could harm the efficiency of New Zealand's dairy processing industry. This would be to the detriment of New Zealand dairy farmers and a detriment to the New Zealand economy as a whole. Predation may be a profitable strategy if Fonterra has market power in export markets, and is able to recoup the costs of increasing the raw milk price by influencing outcomes in downstream markets. Fonterra may be tempted to pursue a predatory strategy if it believes it has market power in export markets—even if in fact it does not. However, the losses that would flow from acting on this mistaken belief would likely to cause Fonterra to eventually abandon such conduct.

An additional consideration is whether Fonterra's raw milk pricing strategy in the absence of DIRA may have the effect, although not the intent, of predation. The "practically feasible" requirement under Subpart 5A of DIRA (and the Commerce Commission's role in reviewing Fonterra's application of the Milk Price Manual) provides a form of 'sanity check' on the realism of the estimates of notional costs of an efficient processor. In the absence of DIRA, these constraints would be removed. This could result in underestimation of the notional costs of an efficient processor, which would result in the farmgate milk price being set inefficiently high. This may foreclose the ability of even efficient processors from competing against Fonterra.

4.6.3 Impact on markets

Providing Fonterra seeks to maximise the wealth of its shareholder farmers, it is unlikely to deliberately set the farmgate milk price inefficiently high to keep out rivals. However, predatory conduct via the farmgate milk price may be a means by which Fonterra could pursue an objective of maximising its size. Predation using this strategy may be profitable for Fonterra if it has market power in downstream markets. In the absence of DIRA, Fonterra could also set the farmgate milk price inefficiently high by underestimating the notional costs of an efficient processor. This may deter entry by efficient processors, which could harm the efficiency of New Zealand's dairy processing industry to the detriment of New Zealand dairy farmers and the New Zealand economy as a whole.

As discussed in the previous Sections, competition is important for creating incentives for allocative and productive efficiency, providing signals for efficient investment in the medium to longer term. Inefficient investment could have significant implications for the dairy industry in New Zealand. For example, deterring entry may weaken the incentives for Fonterra to innovate and move up the value chain.

Predatory conduct of this kind is precisely the form of conduct that s 36 of the Commerce Act is designed to address. In order to establish a contravention of s 36, the Commerce Commission would need to establish that:

1. Fonterra had a position of substantial power in the farmgate milk market;
2. Fonterra's conduct in decreasing its net assets by paying too high a price for milk is not conduct one would find in a more competitive market; and
3. Fonterra's conduct had the purpose of restricting entry in the farmgate milk market or the processing market.

Many commentators have pointed to the difficulties the Commerce Commission has encountered in winning the proceedings it has issued under s 36. However, if Fonterra did engage in conduct of this kind, it is at least possible that s 36 could be used to put an end to it.

4.7 Conclusion

In the absence of DIRA Fonterra may not face strong incentives to be productively efficient, and as a result set the farm gate milk price inefficiently low. Competition among processors for farmgate milk is likely to be the best way to ensure that Fonterra is productively efficient and to ensure that Fonterra offers New Zealand farmers an appropriate farmgate price for their milk.

Providing Fonterra seeks to maximise the wealth of its shareholder farmers, it would be unlikely to reject efficient applications from new or returning farmers. However, Fonterra may have incentives to reject efficient applications from new or returning farmers if it is seeking to achieve other objectives (such as maximising volume) or if it has market power (or behaves as though it has market power) in export markets.

Fonterra claims that its cooperative structure and principles would constrain it from discriminating among existing farmer-shareholders in the absence of the non-discrimination rule. These cooperative principles are unlikely to be sustainable if Fonterra faces increased competition for farmgate milk. However, it is unlikely that discrimination among existing farmers or discrimination between existing farmers and potential shareholder farmers to reflect differences in cost would reduce the efficiency of the New Zealand dairy industry. However, it is possible Fonterra may seek to use the threat of discriminatory pricing to deter existing shareholder farmers from switching to supply other processors. It may be incentivised to do this if it is pursuing other objectives or if it has market power in export markets.

In the absence of DIRA, Fonterra may well seek to enter into long-term exclusive contracts with shareholder farmers when such contracts enhance efficiency. Providing these contracts were motivated by a desire to maximise the wealth of its farmer-shareholders, long-term exclusive contracts would have little or no effect on markets for dairy products either in New Zealand or abroad. The benefits of increased efficiency would accrue to Fonterra's farmer-shareholders in the form of higher farmgate milk prices. However, if Fonterra is motivated to achieve other objectives or has market power in export markets, it may face incentives to deter entry and limit competition by seeking to enter into long-term contracts, or by using punishment strategies to deter existing farmer-shareholders from leaving.

Providing Fonterra were seeking to maximise the wealth of its farmer-shareholders, it would be unlikely to engage in exclusionary conduct against its processor competitors by setting an inefficiently-high milk price – because the cost to Fonterra of such conduct could not be recouped by any enhancement in its

market power. Fonterra may seek to engage in such predatory conduct if it pursued an objective of maximising the size of the Fonterra organisation rather than maximising the wealth of its shareholder farmers. It is possible the removal of the “practically feasible” constraint imposed by DIRA may result in Fonterra setting an inefficiently high farmgate milk price by underestimating the notional costs of an efficient processor. This may foreclose competition from efficient processors.

5 POTENTIAL MARKET FAILURES IN THE COLLECTION MARKET

This Section discusses the market for the collection of raw milk from farmers and delivery to processors. We begin by identifying the potential competitive concerns that may arise in the absence of competition (Section 5.1), before examining these in turn (Sections 5.2 and 5.3). Finally, we present our conclusions (Section 5.4).

Summary and conclusions

- There are likely to be some costs from duplication of collection activities. However, the available empirical evidence does not suggest the costs of duplication are large, or likely to exceed other kinds of efficiencies that might be achieved from duplication.
- Duplication can be managed contractually, but there is little evidence of such activities in New Zealand. There is unlikely to be an anticompetitive motive for the non-existence of contracts that would avoid duplication entirely, such as milk swaps.
- There would appear to be no economic rationale for processors to not enter into efficiency-enhancing arrangements because failing to take advantage of efficiency savings through contracting would represent an economic cost that would seem to be difficult to recoup.

5.1 Potential concerns

Section 3.6 discussed the structure of the collection market in New Zealand, noting that Fonterra collects by far the largest share of raw milk produced in the country. Where the share of milk collected by independent processors is higher, this implies more duplication of collection activities.

There appear to be few economies of scope between collection of milk and either dairy farming or processing of dairy products. That is, there is little obvious evidence that it should cost significantly less to do these activities jointly rather than separately. However, in New Zealand the collection activities are almost always undertaken together with processing. In other jurisdictions, a variety of milk collection models are used, as we discuss in more detail below.

It is unclear whether the relationship between collection and processing in New Zealand is comparatively high compared to the approaches adopted in the international market. Some uncertainty therefore remains about whether:

- new entrants into the processing market would be able to purchase transport services from existing vertically-integrated processors if they did not wish to undertake collection activities; or
- new entrants into the transport market would be able to supply such services without supplying processing services.

The potential market failure issues that relate to the collection market fall into one of two categories:

- The first is possible inefficiency related to duplication of facilities, and whether that could result in a suboptimal allocation of resources (i.e., too much devoted to collection activities). For example,

processors could opt to collect raw milk from farmers when there are already existing collection activities in that area. In the past, some commentators have argued that if collection services are monopolised, market entrants will have incentives to duplicate monopoly facilities to capture resource rents, while the owner of the collection monopoly may also have incentives to force new entrants into duplication.[87]

- The second concern is that Fonterra might use its incumbency advantages in collection and milk supply to raise barriers to entry. For example, Fonterra might refuse to enter into agreements to supply collection services to a processor where that processor has contracts with farmers for raw milk supply. The intention could be to weaken or hinder the competing processor, as this would force the processor to engage in or procure collection activities.

5.2 Concern 1: Might there be inefficient duplication of milk collection activities?

The pertinent question is whether any duplication of costs involved in the collection of milk is inefficient duplication. It is first worth emphasising that even in competitive industries rivals will duplicate the costs of production. However, the benefits of competition will typically outweigh any inefficiencies arising from this duplication.[88] There are numerous examples of this in the real world. For instance, most competing retailers invest in their own stores rather than share retail space with one another. Similarly, pharmaceutical companies engaged in a race to develop new drugs may duplicate some R&D activities rather than collaborate with one another to avoid such duplication. In both these examples, the firms involved find that there are advantages to operating independently (even if that results in duplication of costs) because doing so allows innovation, development of intellectual property, quality control and branding. Each of these things provide the firms involved with a competitive edge that end consumers ultimately benefit from.

The concern about inefficient duplication is most relevant where natural monopoly characteristics would create productive inefficiency.[89] Natural monopoly arises when the fixed costs of production are so large that average costs across the industry are minimised if a single supplier produces all the output in the market.

It seems unlikely that duplication or overlap in milk collection is likely to cause material inefficiency in the operation of milk collection markets – including the factory gate market in which entities supply milk to processors. We first discuss economies of scale or density in collection, before discussing three reasons why material inefficiency is unlikely.

5.2.1 Economies of scale or density in collection

The nature of the collection task suggests that there are likely to be benefits from reducing overlap of collection activities within an area, due to economies of scale and/or density.[90] The costs per unit of a single collector will likely be lower than two collectors, as a single collection will minimise the number of trips and vehicles needed to collect a given quantity of milk. Duplication of collection activities might mean, therefore, that collection costs are not minimised within a given area.

[87] Castalia, *The "hypothetical efficient competitor" and farm-gate milk prices*, 2012.

[88] If this were not the case, there would be strong efficiency incentives for rivals to merge.

[89] On the first of these issues, see William W Sharkey, *The Theory of Natural Monopoly*, Cambridge University Press, 1982, ch 9.

[90] Economies of scale typically refers to an advantage from size. For example, larger tankers could be a source of scale advantage. Economies of density refer to advantages from proximity. For example, economies of density will exist where farms are located more closely together, facilitating shorter collections runs.

Economies of scale or density are more likely to arise in situations where farms are widely dispersed and where farms are not located near processing facilities (noting that the location of processing facilities would likely have been chosen to minimise transport costs).

While economies undoubtedly exist in certain circumstances, there are reasons to doubt that the economies of scale (or density) from monopoly collection are large, would be fully achievable in practice, or could not be achieved in other ways:

- The evidence suggesting that economies are not likely to be large follows from the relatively small proportion of collection costs in total output prices. Even 50% higher collection costs would only increase costs by 11c/kgMS, a small fraction of the expected revenue.
- Collection efficiencies may be less important than processing efficiencies. There is likely to be a trade-off between processor scale economies and collection scale or density economies. A processor with a collection area that covers 100 farms will have longer collection runs and higher per unit transport costs than one that covers the 50 closest farms, but the plant will have reduced access to plant economies of scale. To the extent plant economies of scale are larger, there will always be some collection "inefficiency".
- Competing processors that acquire milk in the same geographic areas might be expected to contract between them to avoid significant inefficiencies in collection – for example, through the use of swaps or payments.

Empirical evidence

There are few empirical studies about economies of scale or density in raw milk collection. In part, this is because it is difficult to control for all relevant factors that would otherwise explain patterns of collection (other than economies of scale or density).

If data on the cost of collection across New Zealand were available it would be possible to model the relationship between collection costs in each region and the variables influencing the cost of collection, including for example the proximity to the processing facility, the density of farms in the area, the volume of milk produced at each location and the frequency of collection.

Simulation studies of collection costs can be undertaken and calibrated with real cost data. An example comes from the study of Dooley, Parker and Blair, which examined duplicated milk storage and collection for high value milk (such as "A2" milk).[91] The study found that increased transport costs associated with the collection of two milk types were not likely to be high. The difference in costs for differentiated milk relative to the status quo ranged from 4.5 to 22.0% for the different scenarios. This provided some support for the notion that transport costs are unlikely to prevent on-farm milk segregation. The conclusions regarding transport costs could arguably be extended to overlapping collection from different farms (rather than multiple visits to the same farm).

The Australian Productivity Commission, reviewing the cost structure of the dairy industry in Australia, noted that outsourcing transportation, cooperatively operating a fleet across a number of firms or milk swaps may increase the efficiency and lower the costs of milk transportation.[92] The Productivity Commission reported evidence that collection costs in New Zealand were 53-64% lower than the 2.5-3c/L reported for Australia.[93] However, it cautioned that these collection scale effects needed to be

[91] Dooley, A. E., Parker, W. J., Blair, H. T. (2005), Modelling of transport costs and logistics for on-farm mi k segregation in New Zealand dairying, *Computers and Electronics in Agriculture* 48, pp. 75-91.

[92] Productivity Commission, *Relative Costs of Doing Business in Australia: Dairy Product Manufacturing,* Research Report, September 2014, p18.

[93] Productivity Commission, *Relative Costs of Doing Business in Australia: Dairy Product Manufacturing,* Research Report, September 2014, pp81-82.

considered in conjunction with processing, since collection costs may influence decisions about minimum efficient plant size.[94] The Productivity Commission also noted some processors had indicated reservations about sharing milk collection on the basis it may compromise milk quality and safety and weaken farmer relationships.[95]

Collection in other markets

Box 2: summarises the mechanisms used to collect milk in Australia, Ireland, Denmark and the Netherlands. It is notable that collection in Australia and Ireland is less vertically integrated with processing than in New Zealand. In contrast, collection in the Netherlands and Denmark is highly vertically integrated.

In its recent dairy inquiry ACCC found that collection costs were sufficient to limit competition between processors for the supply of raw milk in Australia. The ACCC found that the cost of transporting milk is likely to limit the incentive for a processor to compete for farmers in a region where it does not have processing capacity.[96] Farmgate prices between regions, for example between Victoria (where milk supply exceeds local demand) and Queensland (where milk is produced primarily to meet local demand), varied to reflect the cost of transport between these locations.[97] Collection costs may therefore also be important in determining constraints on farmgate pricing in regions where there is limited competition in processing.

5.2.2 Contracting to avoid duplication

The first reason is that processors have a range of methods available to them to avoid inefficiency through duplication. For example, processors could enter into contractual arrangements to take advantage of efficiencies through coordinating their collection.[98] These contractual arrangements would distribute the gains from coordination among the parties to the arrangements.[99]

Milk swaps are one example of contractual arrangements that have emerged overseas as a means of improving the efficiency of collection activities. Milk swaps are exchanges of similar volumes of raw milk between two processors. Processor A buys milk from Farmer a and Processor B buys milk from Farmer b. Processor A then swaps its milk with Processor B. In effect, Processor A is trading its collection activity with Processor B.

Milk swaps are common in Australia. The ACCC reported its understanding that the majority of swaps in Australia were geographic swaps, which remove the need to transport milk between regions and therefore reduce transport costs.[100] These swaps may persist for many years and may account for up to 17% of the milk acquired by a processor. The ACCC found that swaps can result in milk collection efficiencies through the saving of transport cost, and appear to have enabled processors to compete for

[94] Productivity Commission, *Relative Costs of Doing Business in Australia: Dairy Product Manufacturing,* Research Report, September 2014, p. 7.

[95] Productivity Commission, *Relative Costs of Doing Business in Australia: Dairy Product Manufacturing,* Research Report, September 2014, p. 37.

[96] ACCC, *Dairy Industry Inquiry*, Final Report, 2018, p. 68.

[97] ACCC, *Dairy Industry Inquiry*, Final Report, 2018, p. 8.

[98] Even if the savings are small, the Coase theorem suggests that, providing transactions costs are not too large, efficient outcomes will result through contracting.

[99] R H Coase, "The Problem of Social Cost", *Journal of Law and Economics*, Vol 3, 1960, pp. 1-44.

[100] ACCC, *Dairy Industry Inquiry*, Final Report, 2018, p84.

raw milk in regions where they otherwise could not because they lack processing facilities in those regions.[101]

Box 2: Collection in international dairy industries[102]

Australia

- Processors usually appoint haulage companies to transport raw milk from farms to processing plants, rather than engaging in collection activities themselves. Haulage companies commonly use the same tanker when collecting milk from farms close to one another but supplying different processors.
- Most processors in Australia source 90% of their milk supplies within 250km of their processing facilities. There is evidence of processors entering into milk swaps as a mechanism to manage collection costs, among other factors including seasonal imbalances and production efficiencies.

Ireland

- Milk in Ireland is primarily collected via cooperatives – which either process the milk themselves or sell on to other downstream processors for further processing.
- Many Irish dairy processors have contracts with private hauliers to benefit from economies of scale without horizontal integration. This is particularly the case with smaller cooperatives. For the larger cooperatives, the tankers are typically owned and maintained by the processor, while the driver and the engine are contracted.
- Some processors also collect milk from smaller cooperatives and then process this milk along with milk collected from their own suppliers. However, this a small proportion of the total market.
- Kerry Group and Glanbia PLC – the two largest Irish dairy processors – use their subsidiary cooperatives to organise milk collection. Kerry Co-operative and Glanbia Co-operative are subsidiaries to their PLC counterparts. In each case, the cooperatives handle the collection while the PLCs are responsible for the processing and marketing of the good.

Denmark

- Danish dairy processing and collection is dominated by Arla Foods. Arla is a very large multinational cooperative supplying over 90% of the Danish dairy processing industry. Arla Foods owns, runs and operates all its collection.
- Arla undertakes all collections from its farmers regularly in Denmark, Sweden, Germany and the UK. As a result of its multinational nature, it exports and imports milk to its processors in Sweden and Germany when its processors require increased supply.

Netherlands

- The Dutch milk processing system is organised primarily by FrieslandCampina. FrieslandCampina historically used contractors to provide for their milk transport.
- The merger between Friesland and Campina in 2009 resulted in the amalgamation of Friesland and Campina's collection activities.

[101] ACCC, *Dairy Industry Inquiry*, Final Report, 2018, p86.

[102] ACCC, *Dairy Industry Inquiry*, Final Report, 2018; Case No COMP/M.5046 – Friesland Foods / Campina *REGULATION (EC) No 139/2004 MERGER PROCEDURE* Article 8 (2) Date: 17/12/2008; de la Mano, M., D'Souza, P., Langus, G., Lissens, M., Lorincz, S., Mauger, J. C., ... & Specker, A., 2009, Friesland Foods/Campina: a merger between two Dutch dairy cooperatives

In New Zealand, it appears that there would be the potential for milk swaps to occur if that could reduce costs. Information from Fonterra (see **Figure 16**) appears to indicate that there is considerable overlap between the collection zones for independent processors and farms that supply Fonterra.

Figure 16: Fonterra estimates of collection areas for independent processors and Fonterra farms [Confidential]

Source: Fonterra, submission to MPI, February 2019

Note: Collection areas are Fonterra estimates of an IP collection zone. Westland West Coast collection area is west of the Southern Alps only

approved with a set of comprehensive remedies, *Competition policy newsletter*, (1), 84-90; Csaba Jansik (ed.), *Competitiveness of Northern European Dairy Chains*, MTT, 2014; Briscoe, R., & Ward, M., 2006, Is small both beautiful and competitive? A case study of Irish dairy cooperatives, *Journal of Rural Cooperation*, 34(886-2016-64553), 119; Heery, D., O'Donoghue, C., & Fathartaigh, M. Ó., 2016, Pursuing Added Value in the Irish Agri-Food Sector: An Application of the Global Value Chain Methodology, *Proceedings in Food System Dynamics*, 161-179; Murphy, J., 2008, The Structure of the Irish Dairy Industry: A Constraint to Profitable Dairy Expansion?, *A report for Nuttfield Ireland Farming Scholarships*, Nenagh.

5.2.3 Collection costs are relatively small

The second reason why inefficiencies are unlikely to be material is that while duplication might lead to higher costs for some firms, these costs are not material in the context of the total supply chain, as shown in **Figure 7**. That Figure, which analyses the breakdown of the total cost stack underpinning Fonterra's 2018/19 farmgate milk price calculation suggests that collection costs represented just 2.2% of the total costs incurred by a hypothetical efficient processor. While these costs may be material to the profit earned by processors, collection costs account for a very small proportion of total costs.

The paper by Dooley, Parker and Blair referred to above suggests that the collection of milk may exhibit some economies of scale/density but these are likely to be small. Advantages or efficiencies in other segments, such as farming or processing, could easily offset or outweigh any collection cost disadvantage.

5.2.4 Collection creates benefits as well as costs

The third reason is that duplication might be justified for reasons that relate to control over the supply chain. While duplication might lead to higher costs overall, this might not be a source of net inefficiency. Economic efficiency is determined not just by cost, but by the economic value that is created from the output. For example, the increase in its costs might be worth incurring if the processor can differentiate the quality of its products from those of rivals and thereby extract a premium from customers downstream. In this context, even though we have suggested that there was little evidence of strong economies of scope between collection and processing, there is some market evidence to suggest that processors value being able to account for the quality of products at every stage of production and distribution, and this has been important to attracting foreign investment.[103]

5.3 Concern 2: Might Fonterra refuse to enter into contractual arrangements that avoids inefficient duplication?

Notwithstanding the general conclusion that collection markets are unlikely to be a source of material inefficiency, Fonterra's market power in processing and raw milk acquisition in certain geographic areas may raise some concerns. For example, supposing that there were circumstances where the costs of duplication were (relatively) high, and a processor wished to have milk delivered by Fonterra or enter into a contractual arrangement to swap supply of milk. As we explained above, such arrangements can increase efficiency, although this is not necessarily so if the costs to Fonterra exceeds the overall benefits of such contracting. The market failure concern would be that Fonterra would refuse to enter into such arrangements because these would undermine Fonterra's ability to exercise its market power, rather than because such arrangements would diminish efficiency. In other words, in the absence of DIRA, we may ask: is Fonterra likely to refuse to enter into efficiency-enhancing trades in the collection market in order to enhance its market power in the processing market?

In the last 20 years, economists have explored the circumstances in which a firm with substantial power in one market may refuse to enter into efficiency-enhancing contracts in a second market in order to enhance its market power in the first market. Although there are conditions under which such behaviour may occur,[104] these conditions seem unlikely to apply to Fonterra.

[103] MPI, *Review of the Dairy Industry Restructuring Act 2001 and its impact on the dairy industry*, Discussion document, November 2018, p61.

[104] See Massimo Motta (2004), *Competition Policy, Theory and Practice*, Cambridge University Press, pp. 372-377.

In the first place, as with all these cases, the refusal to enter into efficiency-enhancing trades will impose a cost on Fonterra. Fonterra would be unable to capture the share in the efficiency dividend that would be available to be shared between the parties to the contractual arrangement. However, in certain cases, the firm with substantial power in the first market may find this cost worth bearing because of the increase in profits it can capture in the second market. This second condition seems not to apply to Fonterra for two reasons.

In the first, place, the overwhelming majority of Fonterra's business is in export markets in which Fonterra likely has little or no market power. It is very unlikely that Fonterra's refusal to enter into an efficiency-enhancing collection arrangement would so increase its market power in selling milk products that the cost would be justified. It is more likely that Fonterra would find it profitable to enter into efficiency-enhancing collection arrangements in the form of milk swaps, trades at the factory gate or other contractual arrangements if there were genuine inefficiencies that it would benefit from eliminating. Secondly, many of the current competitors to Fonterra in the business of collection are already vertically integrated into processing. Fonterra's refusal to enter into cooperative collection arrangements is unlikely to dissuade any of these firms from expanding their processing activities.

Fonterra may have an incentive to refuse to enter into contractual arrangements that avoid inefficient duplication if it is seeking to achieve objectives other than wealth maximisation (for example, maximisation of the size of the cooperative or its market share) or if it has market power (or acts as if it has market power) in export markets.

5.4 Conclusion

There are likely to be some costs from duplication of milk collection activities by processors in New Zealand. However, the available empirical evidence does not suggest the costs of duplication are large, or likely to exceed other kinds of efficiencies that might be achieved from duplication.

Duplication can be managed contractually, but there is little evidence of such activities in New Zealand. There is unlikely to be an anticompetitive motive for the non-existence of contracts that would avoid duplication entirely, such as milk swaps.

There would appear to be no economic rationale for processors to not enter into efficiency-enhancing arrangements because failing to take advantage of efficiency savings through contracting would represent an economic cost that would seem to be very difficult to recoup.

However, if Fonterra is seeking to achieve objectives other than wealth maximisation (for example, volume maximisation) or if it has market power in export markets it may have an incentive to refuse to enter into contractual arrangements that avoid inefficient duplication. This is likely to result in a loss of efficiency in the dairy sector in New Zealand, to the detriment of dairy farmers (by raising costs to competing processors, which is likely to be reflected in the milk price) and the New Zealand economy.

6 POTENTIAL MARKET FAILURES IN THE MARKETS SELLING PROCESSED DAIRY PRODUCTS

This Section discusses the markets for selling processed dairy products. We begin by outlining a number of concerns about the potential for market failures resulting from a lack of competition in the absence of DIRA (Section 6.1). We then consider each concern in more detail, in each case outlining the issue, considering the incentives facing Fonterra in the absence of DIRA and discussing the nature and extent of any resulting market impact (Sections 6.2 to 6.5). Finally, we present our conclusions (Section 6.6).

Summary and conclusions

- There are significant barriers to entry to processing markets in New Zealand. These barriers take the principal form of capacity sufficient to process existing volumes of farmgate milk, coupled with the sunk costs of investing in processing assets.
- It is unlikely that Fonterra would refuse to supply a secondary processor if that supply would enhance economic efficiency. The most likely circumstance in which Fonterra would refuse efficient supply would be if it were seeking to maximise its size rather than maximising the wealth of its shareholder farmers.
- Fonterra has some market power in selling to domestic buyers. However, it will be in the interests of large supermarket buyers to structure their tenders to maximise competitive pressure on Fonterra.
- Fonterra likely has little or no market power in international markets.

6.1 Potential concerns

As discussed in Section 3 processed dairy products can be sold as semi-processed products to other processors for secondary processing or as fully processed products in either the domestic or export markets. Each year 95% of the milk produced in New Zealand is exported.[105]

While Fonterra is a relatively small player in the global dairy market, the supply of dairy products to the domestic market is dominated by Fonterra. It is therefore likely that Fonterra has significant market power in the domestic market. However, smaller independent processors seem to exert some competitive pressure on Fonterra at the margin, and there is some evidence that larger, export-focussed processors could potentially serve the domestic market even if they currently do not do so. The threat of this entry from such processors may offer some competitive constraint on Fonterra. The extent to

[105] Dairy Companies Association of New Zealand, *About the NZ Dairy Industry*, Available at: https://www.dcanz.com/about-the-nz-dairy-industry/ , Accessed 13 February 2019.

which the threat of competition acts as a competitive constraint depends on the extent of barriers to entry in processing.

In this Section we consider the following concerns:

- **Barriers to entry:** We first consider the extent to which there are barriers to entry in processing, which may limit the extent of competitive constraint faced by Fonterra. We discuss this concern in Section 6.2.
- **Refusal to provide semi-processed products:** Fonterra's market share in processing means it may have incentives to refuse to provide primary processing services to processors who wish to specialise in secondary processing. We consider this concern in Section 6.3.
- **Exercise of market power in domestic market:** Fonterra's dominance in the domestic market means it may have incentives to exercise market power in selling to the domestic market. We discuss this concern in Section 6.4.
- **Exercise of market power in export market:** For completeness, we also consider the scope for Fonterra to exercise market power in export markets, which account for 95% of the milk produced in New Zealand each year.[106] This issue is considered in Section 6.5.

We summarise our conclusions in Section 6.6.

6.2 Concern 1: Are there barriers to entry in processing that might limit competition?

6.2.1 The issue

Although different authors have proposed various definitions of barriers to entry, a common definition is that it is the profit that is earnt from incumbency.[107] This profit can take the form of dollars in the hands of shareholders or inefficiency in operations.

Barriers to entry are necessary if market power is to be sustained. Temporary positions of market power arise in many markets because of changes in demand or cost conditions. These changes increase or decrease the profitability of incumbents. If barriers to entry are low, entry and exit will ensure that any increases or decreases in market power will be short-lived. Markets cannot be expected to function without any frictions. However, substantial barriers to entry create frictions in markets that can last a long while. They cause a blunting of competitive pressure, which would otherwise be a guarantee of efficient conduct.

6.2.2 The incentives facing processors in the absence of DIRA

Barriers to entry can take different forms – depending on the form of the market. In markets producing commodity products – such as New Zealand dairy products destined for export markets – a standard form of barrier to entry is a combination of economies of scale over scales that are large compared with the size of the market coupled with the sunk costs incurred upon entry. The argument is that entry will need to be on a large scale to compete with the incumbent. However, entry on a large scale will increase the capacity of the market and depress prices. The low prices will not cause the incumbent to exit the market—providing it is covering its operating costs—because it has already incurred the sunk costs

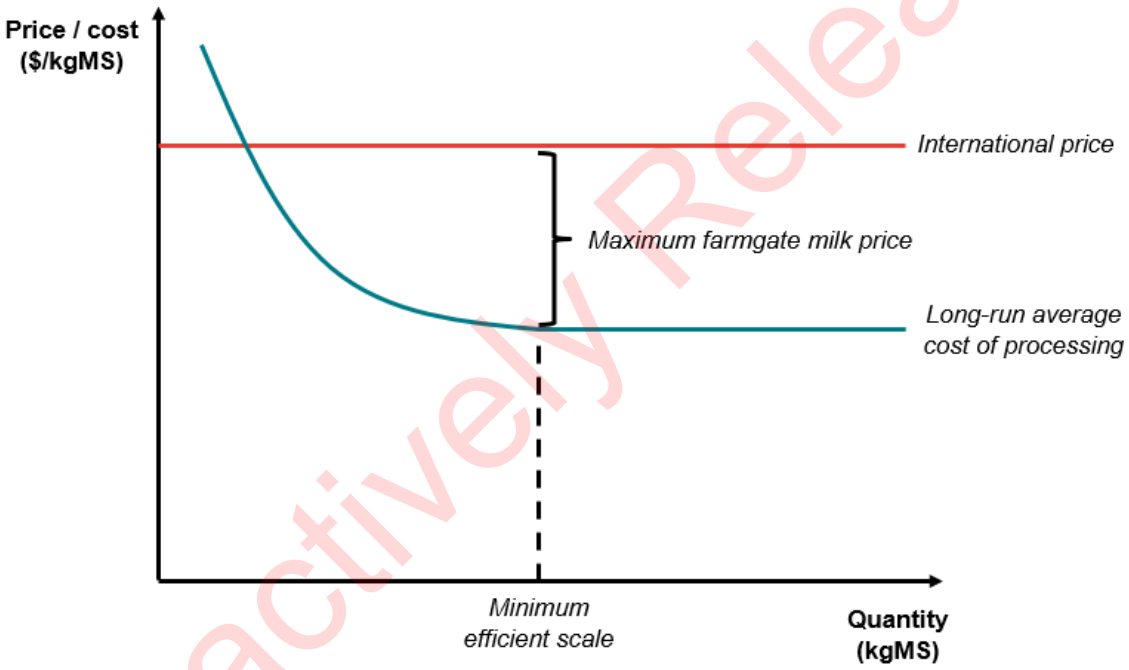
[106] Dairy Companies Association of New Zealand, *About the NZ Dairy Industry*, Available at: https://www.dcanz.com/about-the-nz-dairy-industry/ , Accessed 13 February 2019.

[107] This is the definition suggested by Richard J Gilbert, "Mobility Barriers and the Value of Incumbency" ch 8 of *Handbook of Industrial Organization*, volume 1, ed Richard Schmalensee and Robert D Willig, North-Holland (1989) p 478.

required in order to produce. This means that the incumbent may be able to sustain monopoly profits without attracting entry because the potential entrant will realise that the low prices caused by entry will mean that entry is not viable.

This reasoning is represented in **Figure 17** below. The costs depicted in the long-run average cost curve are the average total costs of processing (not including the cost of farmgate milk but including the cost of shareholders' funds). These are the costs a new entrant would incur if it produced at different throughputs of milk without building capacity significantly in excess of that used at the peak of annual production. Minimum efficient scale (MES) shows the minimum scale of operations at which the new entrant would be able to take advantage of all significant economies of scale. The difference between the international price and long-run average costs is the maximum price the new processor could afford to pay farmers at the farm gate and still remain viable.

Figure 17: Barriers to entry caused by combination of large MES and sunk costs



Source: Frontier Economics

A processor considering entry will attempt to estimate whether it would make a profit upon entry. If it is to compete on international commodity markets, it will need to be able to keep costs as low as possible. This will mean that it will need to acquire a volume of farmgate milk needed to operate at MES. However, if there is already sufficient capacity to process all available farmgate milk in the region, entry at MES will lead to excess capacity in the industry. The potential entrant will know that it will have to offer a higher farmgate milk price than Fonterra in order to obtain the farmgate milk it needs. In order to retain its farmers, Fonterra may respond by raising its farmgate milk price.[108] Fonterra will not close its processing plant in the region, providing it is covering its operating costs.[109] The potential entrant may realise that this would mean that its entry would not be viable. That is, the economies of scale coupled

[108] As we observed in section 4.4, Fonterra's commitment to pay all existing farmers a uniform farmgate milk price is unlikely to withstand vigorous competition.

[109] Assuming all capital costs are sunk.

with sunk costs will operate as a deterrent to a potential entrant – even if that potential entrant may be capable of operating more efficiently than the incumbent. The larger is MES compared with the size of the market, the higher this barrier to entry is likely to be.

There is little published data on plant-specific economies of scale in milk processing. Because processors are producing an internationally-traded commodity, competition is principally on the basis of costs. Naturally, processors treat information concerning their costs as highly sensitive.[110] However, the drivers of the costs of processing milk are complex. When considering economies of scale in dairy processing, one must distinguish plant-specific economies of scale from economies of scale that might accrue from multi-plant operations, such as economies of scale in distribution and marketing.

Plant-specific economies of scale differ depending on the mix of products produced. New Zealand's large processing plants producing commodities for export are large compared with those in Australia.[111] **Figure 18** shows the capacity of Fonterra's larger plants. **Table 7** shows the capacity of the plants owned by independent processors.

Figure 18: Fonterra's processing capacity [Confidential]

Source: Fonterra

[110] U Geary, L Shalloo and N Lopez, "Development of a dairy processing sector model for the Irish dairy industry" in *Proceedings of the British Society of Animal Science and Agricultural Research Forum* p 335 (2010), Belfast. Estimates of economies of scale are provided in Michael Keane, Öptimal Dairy Industry Structure – Empirical Study of Irish Cheese Manufacture" "pp 128-139 of Selma Tozanli and Jartua Gilpin (eds) *A Case Study of Structural Change: The EU Dairy Industry* (1997); Trevor Donnellan, Thia Hennesy, Mark Fennelon and Donal O'Callaghan, The potential for scale economies in milk powder processing", International Journal of Dairy Technology", Vol 67 (2014), pp 129-134; and J Hauser, What it takes to compete in the global dairy industry, Xcheque, http://www.xcheque.com/blogs/item/6549-what-it-takes-to-compete-in-the-global-dairy-industry (2013).

[111] See Australia, Productivity Commission, *Relative Costs of Doing Business in Australia: Diary Product Manufacturing*, Research Report, (2014) pp 102-103.

Table 7: Independent processors capacity [Confidential]

Source: Information provided by Open Country Dairy, Westland, Oceania and Miraka. Synlait, Tatua and Mataura also provided information, but we were not able to include it because it was inconsistent with the other information provided.

When the DIRA was in its infancy, Lew Evans and Neil Quigley distinguished plant-specific economies of scale from multi-plant economies of scale. They wrote: "Economies of scale might favour Global Dairy, although it is likely that these would lie in the area of marketing and distribution rather than processing per se."[112] The entry of new processors since 2001, many of whom process commodities for export, indicates that New Zealand processors can be viable without access to multi-plant economies of scale. **Figure 19** shows the pattern of independent entry since 2001.

Figure 19: Independent processing capacity 2001/02-2019/20 [Confidential]

Source: Fonterra, submission to MPI, February 2019

[112] Evans, L. and Quigley, N., Watershed for New Zealand Dairy Industry, NZISCR Monograph Series, Number 1, July 2001, p 28.

The barriers to entry created by the combination of economies of scale and sunk costs may be heightened if there is excess capacity in the market. Fonterra claims that open entry has the clear potential to incentivise significant excess capacity in the industry, creating a risk of a downward spiral of low-margin competition.[113]

Figure 20 indicates that [redacted] Milk output varies considerably from year to year. Although Fonterra has increased capacity over the last seven years, milk production in the last four years has not reached the levels of the preceding two years.

Figure 20: Utilisation for Fonterra processing plants on average 2012/13-2018/19 [Confidential]

Source: Fonterra, Updated Fonterra Response to MPI Information Request.xls

Figure 20 shows peak utilisation and capacity averaged over New Zealand as a whole. A somewhat different picture emerges if one examines peak utilisation for particular regions. [Confidential [redacted]

In our opinion, the combination of economies of scale coupled with sunk costs creates substantial barriers to entry to processing. There is no evidence that DIRA has raised the height of these barriers to entry through incentivising the creating of excess capacity.

[113] Fonterra Submission of 29 June 2018, para 33.

Figure 21: Utilisation for Fonterra processing plants producing for export 2018/19 [Confidential]

Source: Fonterra, Updated Fonterra Response to MPI Information Request.xls

6.2.3 Impact on markets

The substantial barriers to entry to processing mean that new entry into processing is unlikely to occur on a large scale unless the volume of raw milk increases. The volume of raw milk may increase in the future, but that is likely to require that the prices of milk products in international markets increase.

As observed in Section 3.5 above, Fonterra's share of milk collected at the farm gate in New Zealand has fallen from 96% in 2001. However, this has occurred at a time of significant expansion of the milk industry Because the total volume of milk purchased by independent processors has increased significantly more than the volumes associated with farmers leaving Fonterra, it appears that farmers utilising land conversions from other uses, rather than Fonterra farmer-shareholders, have been the main source of growth in farmgate milk supply to independent processors. Independent processors have captured approximately 41% of the increase in raw milk solids collected at the farm gate since 2001, with Fonterra accounting for 59% of growth in raw milk solids collected.

Lack of entry to an industry, by itself, does not create inefficiency. Incumbents can operate efficiently even without any significant threat of competition. The danger created by a lack of significant competition is that the incumbent is not forced to operate efficiently. In the future, this could lead to the problems raised in Section 4 of this report and, in particular, the problem of internal operating inefficiency. Barriers to entry to processing may mean that, in the future, Fonterra may incur higher operating costs than would be efficient and, because of barriers to entry of the kind outlined above, that would not attract

entry from new processors; farmgate prices would be below efficient levels; and the industry would be smaller than would be efficient.

Barriers to entry may also have implications for dynamic efficiency in the New Zealand dairy sector. Dairy processing may involve the production of a range of products, from commodity products to more high value, specialised outputs. The type of entry that takes place may place different competitive constraints on Fonterra as the incumbent. For example, independent processors that have successfully moved up the value chain by producing high value-added products may be able to generate higher margins on their sales. This may allow them to attract farmers away from Fonterra (to facilitate growth) by paying a premium for milk. This would put competitive pressure on Fonterra to become more efficient and/or to also move up the value chain to retain farmers. Even the credible threat of entry by processors producing high value-added goods could motivate Fonterra to invest and innovate to avoid losing market share in the farmgate market. The barriers to entry in processing and the resulting lack of competitive pressure for Fonterra may therefore result in a significant loss of dynamic efficiency in the New Zealand in the longer term.

6.3 Concern 2: Might Fonterra refuse to provide primary processing services to competitors who wish to specialise in secondary processing?

6.3.1 The Issue

Most of the bulk milk and colostrum produced by processors is destined for further processing before it is sold by the processor. However, some is sold to other processors for secondary processing.

Fonterra may refuse to sell to competitors bulk milk that has been subject to primary processing simply because the bulk milk could be put to more-valuable uses by Fonterra than by an alternative processor. This would not be a source of inefficiency or market failure. The important question for our enquiry is whether Fonterra would have an incentive to refuse supply of primary-processed milk even though that supply would enhance economic efficiency by allowing rivals to compete.

6.3.2 The incentives facing Fonterra in the absence of DIRA

As in our discussion in Section 5 concerning the possibility of Fonterra's refusal to enter into efficiency-enhancing arrangements to collect milk, a refusal to supply bulk primary-processed milk should acknowledge that any refusal to enter an efficiency-enhancing arrangement would entail a cost to Fonterra. However, Fonterra may find it worth incurring that cost if there is a prospect of recoupment through being able to enhance its market power.

In our opinion, it seems unlikely that a refusal to supply primary-processed milk would enhance the market power of Fonterra in international markets to any material extent. Furthermore, the companies likely to seek access to a supply of primary-processed milk from Fonterra in the absence of DIRA are likely to be small, specialised processors (without significant production facilities of their own) which produce products that are differentiated from those of Fonterra. Because these processors are unlikely to challenge Fonterra's position in domestic markets, any refusal to supply by Fonterra would be unlikely to yield a pay-off to Fonterra in the domestic market sufficient to compensate it for the loss it would incur through refusing to enter into efficiency-enhancing agreements.

6.3.3 Impact on markets

Some independent processors may not wish to incur the sunk costs associated with investing in large capital plant and may instead either wish to focus on secondary processing activities (e.g., specialising in particular products) or may wish to enter into arrangements with other, established processors to undertake some processing on their behalf (e.g., through a toll manufacturing agreement). If Fonterra, as the incumbent most likely to be capable of providing these services to such processors refuses to do so, then those incumbents may be forced to invest inefficiently in their own processing capacity, thereby reducing their ability to compete effectively. Alternatively, independent processors may be deterred from entering the market, limiting the competitive constraint faced by Fonterra. However, for the reasons given above, we consider that Fonterra would be unlikely to refuse to provide these services if it were efficient for them to do so. The principal reason why Fonterra may refuse to provide efficient services would be if management were concerned to maximise the size of Fonterra rather than to maximise the wealth of Fonterra's shareholder farmers. If this were the case this would likely result in a loss of efficiency to the detriment of dairy farmers in New Zealand and to the New Zealand economy as a whole.

6.4 Concern 3: Might Fonterra exercise market power in selling to the domestic market?

6.4.1 The issue

Until relatively recently, it might have been considered that Progressive Woolworths New Zealand and Foodstuffs had few suppliers other than Fonterra and Goodman Fielder for the supply of fresh milk and cream. This may have given Fonterra market power in selling fresh milk products to the domestic market. This was in marked contrast to the position in Australia.

The ACCC Dairy Industry Inquiry Final Report states that there is vigorous competition for wholesale supply to retailers in Australia:[114]

> *Private label contracts often change hands following tender processes in most regions, which shows that rival firms have the ability to out-compete the incumbent processor. Although price is an important consideration for the major supermarkets, evidence obtained during the inquiry indicates that product quality and efficiency in production and distribution are also important considerations when the retailers are evaluating tenders.*
>
> *Presently, contracts for the supply of private label fresh white drinking are relatively long term, such as five to 10 years. Between 2013 and 2015, several contracts shifted between processors in several states.*

If monopoly power in selling processed products to retailers led to retail prices being higher than would otherwise be the case, there would be an efficiency problem because New Zealanders would be consuming less milk (in the form of various milk products) than would be welfare-maximising.

[114] ACCC, *Dairy Industry Inquiry*, Final Report, April 2018, p 92.

6.4.2 The incentives facing Fonterra in the absence of DIRA

In the last few years, Fonterra and Goodman Fielder have faced increased competition in supplying the domestic market. In December 2017 Synlait was awarded an exclusive contract to supply Foodstuffs South Island with private label fresh milk and cream from early 2019.[115] The tougher the competition offered by independents for these large contracts, the less market power Fonterra will be able to exert in domestic markets.

6.4.3 Impact on markets

It is hard to assess the likely future bidding process for the supply of fresh milk and cream to domestic retailers. However, the size of these contracts may be critical in encouraging processors to bid for the contracts. Synlait's winning the contract to supply Foodstuffs South Island enabled Synlait to invest in an advanced liquid dairy packaging facility. It would be in the interests of Woolworths and Foodstuffs to call for tenders well in advance of first supply to encourage independent processors to bid for these long-term exclusive supply contracts. This would maximise competition for these contracts. However, managing contracts from multiple suppliers may impose additional costs on supermarkets. A lack of competition in the supply of dairy products to the domestic market may result in higher than efficient prices for domestic dairy products, resulting in a loss of welfare for New Zealand consumers and the New Zealand economy as a whole.

6.5 Concern 4: Might Fonterra exercise market power in selling to export markets?

6.5.1 The issue

An exception to the classic economic arguments in favour of free international trade is the so-called optimum tariff theory. The theory of the optimum tariff is often likened to the theory of monopoly pricing. Just as it can be in the interest of a firm with monopoly selling power to restrict output in order to increase prices, so it can be in the interests of a country with substantial market power to restrict its production and supply to world markets in order to increase prices.

The Terms of Reference for this Review indicate that the regulatory safeguards in DIRA were introduced to enable competition.[116]

[115] "Synlait partners with Foodstuffs South Island to supply fresh mi k and cream, Foodstuffs South Island, 20 December 2017, https://www.foodstuffs.co.nz/media-centre/news-media/synlait-partners-with-foodstuffs-south-island-to-supply-fresh-mi k-and-cream/

[116] Ministry for Primary Industries, *Terms of Reference for the Review of the Dairy Industry Restructuring Act*, 9 May 2018, p 6.

To mitigate the risks highlighted by the Commerce Commission [in opposing the merger of New Zealand's two largest dairy processing cooperatives], the Government introduced a set of regulatory safequards aimed at promoting the efficient operation of New Zealand dairy markets by ensuring:

contestability for the supply of milk from dairy farmers, and

competition in the wholesale supply of domestic consumer milk products.

As we observed in Section 3.5, in the period since 2001 independent processor have succeeded in winning market share away from Fonterra. To the extent that Fonterra has market power in international markets, this may have reduced the market power of Fonterra and, thereby, reduced the welfare of New Zealanders—because the optimal tariff argument shows that a country with market power in international markets can benefit by protecting and exercising that power. As indicated in Section 3.8, Fonterra is unlikely to have significant market power in export markets. It is however possible that Fonterra does have market power in international markets, or may behave as though it has market power in international markets.

6.5.2 Impact on markets

Fonterra and New Zealand's other exporters of processed dairy products likely have little or no market power in international markets. For these reasons, we consider that the Government's objective in introducing the regulation of conduct in DIRA (to enable competition in the processing of dairy products in New Zealand) was appropriate.

6.6 Conclusion

The processing market supplies three principal groups of buyers: secondary processors, domestic markets and international markets. There are significant barriers to entry to processing markets in New Zealand. These barriers take the principal form of capacity sufficient to process existing volumes of farmgate milk, coupled with the sunk costs of investing in processing assets.

It is unlikely that Fonterra would refuse to supply a secondary processor if that supply would enhance economic efficiency. The most likely circumstance in which Fonterra would refuse efficient supply would be if it were seeking to maximise its size rather than maximising the wealth of its shareholder farmers.

Fonterra has some market power in selling to domestic buyers. However, it will be in the interests of large supermarket buyers to structure their tenders to maximise competitive pressure on Fonterra.

Fonterra likely has little or no market power in international markets. For this reason, the Government was right in seeking policies for the industry to encourage competition in the processing industry.

7 MARKET FAILURE AND REGULATION

This Section provides an overview of the rationale for economic regulation and the tools available for regulatory intervention. It begins by discussing the case for economic regulation in Section 7.1, before considering the distinction between *ex-ante* and *ex-post* regulation in Section 7.2. We then discuss in Section 7.3 the circumstances in which industry specific, *ex-ante* regulation may be appropriate. In Section 7.4 we survey the types of *ex-ante* regulatory remedies available. We present our conclusions in Section 7.5.

Summary and conclusions

- Market failure is a necessary but not sufficient condition for regulation. The task of a regulator or policymaker is to maximise total societal welfare to the extent possible, having regard to the potential benefits *and* costs of regulatory intervention.
- *Ex-ante* sector specific regulation is usually adopted where general industry laws are considered to be insufficient to control the exercise of market power and/or encourage the further development of competition, particularly where there are significant incumbency advantages that are unlikely to be overcome without direct intervention.
- Structural remedies, such as divestments of assets, provide a permanent solution to identified problems and do not require ongoing monitoring of behaviour. However, such remedies are very intrusive and complex to implement well.
- Behavioural remedies may prohibit a firm from engaging in certain forms of harmful conduct, such as entering into exclusive contracts, or require the firm to act in certain way, such as provide access to key inputs at set terms.
- Performance remedies, such as price or profit controls, tend to be reserved for the markets where there are poor prospects for competition, or where competition would be inefficient.

7.1 The case for economic regulation

As discussed in Section 2, competition is usually the most effective way of promoting efficiency in markets. However, regulation may be warranted where the characteristics of the market mean competition is unlikely to be efficient (e.g., in a natural monopoly industry) or where competition is not sufficiently effective to promote efficient outcomes (e.g., where one or more market participants have significant market power and may have the incentive to exercise that market power to reduce competition). That is, regulation may be warranted where there is clear evidence of a competition related market failure.

The case for economic regulation relies on more than market failure. Market failure is a necessary but not sufficient condition for regulation. This is because intervening to correct market failures is generally not costless. The task of a regulator or policymaker is to maximise total societal welfare to the extent possible, having regard to the potential benefits *and* costs of regulatory intervention.

The New Zealand Government applies a net social benefit test to determine whether economic regulatory intervention is warranted.[117] This involves comparing the potential magnitude of the benefit

[117] See, for example, Commerce Act, Section 52G.

to society of improved economic efficiency (e.g., through lower prices or improved quality) as a result of regulation, against the costs of regulation, including:

- the costs of establishing and administering the regulatory regime (which are typically small in the overall scheme, and borne by relatively few members of society, such as the industry being regulated); and
- any dynamic efficiency losses (e.g., unintended distortions to efficient investment decisions by firms, which can potentially be very large).

7.2 *Ex-ante* and *ex-post* regulation

A basic distinction between different kinds of regulation is between *ex-ante* sector specific regulation and *ex-post* general industry regulation.

New Zealand already has *ex-post* regulation in the form of competition laws in the *Commerce Act 1986* (Commerce Act). The purpose of the Commerce Act is to promote competition in markets for the long-term benefit of consumers within New Zealand. The Commerce Act addresses certain kinds of anti-competitive behaviour, such as:

- taking advantage of market power (s 36);[118]
- contracts, arrangements, or understandings that substantially lessening competition (s 27); and
- mergers that substantially lessen competition (s 47).

The Commerce Act does not directly address concerns related to the use of market power which do not adversely affect competition – such as the charging of monopoly prices.

The benefit of general competition regulation such as the Commerce Act is that it is applied consistently across the economy. This creates precedents as to when conduct is likely to be harmful to competition and avoids *ad hoc* approaches to regulation. However, individual sectors may face particular market failure problems that general competition law is not well-suited to address. In these circumstances, *ex-ante* regulation may be appropriate.

7.3 Why *ex-ante*, industry-specific regulation?

Ex-ante sector specific regulation is usually adopted where the general industry laws are considered to be insufficient to:

- control the exercise of market power; or
- encourage the further development of competition, particularly where there are significant incumbency advantages (e.g., from natural monopoly features, or past monopolisation of the industry) that are unlikely to be overcome without direct intervention.

There are many examples of industry-specific regulation which seek to control monopoly or to promote competition. Two examples that are useful to draw out the scope of approaches include:

- the provisions in Part 4 of the Commerce Act; and
- the “three criteria” test for *ex-ante* regulation used in telecommunications regulation in Europe.

[118] A review of the s 36 provisions of the Commerce Act is currently underway, as we discuss below in Section 8.3.

7.3.1 Part 4 of the Commerce Act

Part 4 of the Commerce Act establishes that the Commerce Commission can only recommend the regulation of goods and services if the Commerce Commission is satisfied of three things:[119]

- the goods or services are supplied in a market where there is both little or no competition and little or no likelihood of a substantial increase in competition; and
- there is scope for the exercise of substantial market power in relation to the goods or services, taking into account the effectiveness of existing regulation or arrangements (including ownership arrangements); and
- the benefits of regulating the goods or services in meeting the purpose of this Part materially exceed the costs of regulation.

These tests apply a high threshold for the introduction of regulation, particularly the emphasis on "little or no competition" and a requirement that benefits "materially" exceed costs. However, this is arguably appropriate for the establishment of new regulations in a market. This is because the rules or regulations that govern an industry influence the decisions of those who participate in that industry—particularly the investment decisions of firms. Just as it is impossible to design perfect contracts capable of dealing with every possible future contingency, it is impossible to design regulatory arrangements that completely avoid the risk of unintended consequences (e.g., the skewing of incentives to make choices that lower rather than increase economic efficiency).

Any recommendations by the Commerce Commission to introduce regulation must pass a "net benefit" test. In applying the net benefit test, the Commerce Commission is required to:

- assess qualitatively all material long-term efficiency and distributional considerations;
- quantify:
  - the material effects on allocative, productive, and dynamic efficiency;
  - the material distributional and welfare consequences on suppliers and consumers; and
- assess the direct and indirect costs and risks of regulation, including administrative and compliance costs, transaction costs, and spill-over effects.[120]

7.3.2 Three criteria test in telecommunications

An alternative but broadly similar approach is used in the regulation of European communications markets. This example is helpful because the framework is sufficiently flexible to be used in markets which vary from (a) sustainably non-competitive to (b) markets that are potentially in transition from non-competitive to competitive.[121]

The "three criteria test" is used by national regulators in Europe as part of a systematic and harmonised approach to regulation. Application of the three criteria determines whether *ex-ante* regulation should be used for a communications market. Each of the following three criteria must be met:

- there are high and non-transitory barriers to entry (whether of structural, legal or regulatory nature);

[119] Commerce Act, Section 52G.

[120] Section 52I.

[121] The number of markets that are suscept ble to ex ante regulation have been reduced by the European Commission from 18 to 4 over time.

- the structure of the market does not tend towards effective competition within the relevant time horizon; and
- the application of competition law alone would not adequately address the potential market failure(s) identified.

The kinds of evidence used by national regulatory authorities to support the application of these criteria are summarised in **Table 8**.

Table 8: Relevant indicators in the application of the three criteria test

HIGH AND NON-TRANSITORY BARRIERS TO ENTRY	DYNAMIC ASPECTS – NO TENDENCY TO EFFECTIVE COMPETITION	INSUFFICIENCY OF COMPETITION LAW

• Level of sunk costs
• Asymmetries between firms
  ○ Scale and scope economies
  ○ Control of an infrastructure not easily duplicated
• Switching costs and product diversification
	• Evolution of market shares
	• Price trends and pricing behaviour
	• Control of infrastructure that may not easily be duplicated
	• Product/services diversification
	• Barriers to expansion
	• Potential emergence of further competition
		• Degree of generalisation of non-competitive behaviour
		• Degree of difficulty likely to arise in addressing non-competitive behaviour
		• Whether non-competitive behaviour brings about irreparable damage in related or connected markets
		• Whether there is need of intervention to ensure the development of competition in the long run

Source: Frontier Economics based on European Regulators Group (2008): "Guidance on the Application of the Three Criteria Test", June 2008.

The application of these tests can ultimately support the use of remedies which either control market power directly or facilitate the emergence of more competition. Further requirements on the imposition of remedies requires that they be proportional to the problem identified, and subject to a formal regulatory impact assessment (a cost benefit analysis).

7.4 Regulatory remedies

If a case for some form of *ex-ante* regulation is established, the challenge is then to determine a proportionate remedy. Ideally, this should be the least burdensome, effective remedy possible and so maximise the public benefit.

7.4.1 Public benefit

Assessing the public benefit associated with implementing a regulatory remedy requires an understanding of the benefits and costs of the proposed intervention, and the likelihood of these costs and benefits arising. As discussed above, Section 52I of the Commerce Act provides guidance about

the types of costs and benefits that should be taken into account when determining the net benefit of a regulatory intervention.

The benefits of economic regulation arise from addressing market failures that reduce economic efficiency. For example, a regulatory intervention aimed at preventing monopoly pricing could benefit consumers by reducing prices or raising quality in downstream markets. Alternatively, a regulatory intervention targeted at preventing monopsony behaviour in upstream markets, will benefit producers. In most cases the benefit of regulatory intervention will be the avoided cost of (i.e., the economic inefficiency associated with) the identified harm. The magnitude of any expected benefits of regulation depends on the likelihood of economic harm arising in the absence of intervention.

When considering the effect of regulatory intervention it is important to consider the longer-term effects associated with improvements in dynamic efficiency. This is particularly important in markets where:

- there is scope for the development of competition in the longer term;
- the regulatory intervention has the potential to encourage or impede new entry; and
- regulation may affect the investment decisions of firms — because it is investment that delivers the products and services that are consumed and that generate economic welfare.

The costs of regulatory intervention include both the direct costs of administering and complying with the regulation, the risk of costly regulatory errors in the absence of complete information, and any dynamic efficiency losses arising from that intervention. Dynamic efficiency losses may arise from industry or consumer response to deliberate regulatory interventions (e.g., unintended distortions to efficient investment decisions by firms, which might be very large).

In practice it is difficult to estimate the magnitude of net benefits and the associated cost. Assessing the public benefit associated with a proposed regulatory intervention therefore requires some judgement about the nature of costs and benefits to include in the assessment and the likelihood of various outcomes occurring.

7.4.2 Types of remedies: structural, behavioural or performance

Competition analysis uses market structure, conduct and performance to assess the extent of competition in a market. In a similar fashion, we can use this framework to assess suitable remedies. **Table 9** provides an overview of the strengths and weaknesses of different forms of regulatory remedies.

In general, remedies which directly affect the market structure are preferred over conduct or behavioural remedies to improve market performance. Structural remedies, such as divestments of assets, tend to be the most effective remedies that provide a permanent “fix” to identified problems and do not require ongoing monitoring of behaviour. This is a primary reason given by competition regulators when favouring structural remedies over conduct or “behavioural” remedies.[122] Structural remedies could be introduced vertically (that is, to separate entities responsible for various segments of the supply chain) or horizontally (that is, to create separate entities competing within a particular segment of the supply chain).

[122] In New Zealand, under section 69A of the Commerce Act, the Commission may accept undertakings in giving a merger clearance. Undertakings must be provided in written form by the applicant or on behalf of the applicant. The Commission can only accept undertakings to divest of assets or shares. Under the Commerce Act the Commission is only able to consider structural undertakings. The Commission is unable to accept behavioural undertakings. See also MBIE’s report on the Commerce Amendment Bill, 16 August 2018, which identifies possible changes to the Commerce Act including provisions relating to structural and behavioural undertakings in merger clearances: https://www.parliament.nz/resource/en-NZ/52SCTI_ADV_77799_583/ea190fb309b52a407d7c19a6e08d3e71ede1fd16

Behavioural remedies, in contrast, may prohibit a firm from engaging in certain conduct, such as entering into exclusive contracts, or may require the firm to act in certain way, such as providing access to key inputs at set terms or disclosing specific information to customers. Such remedies can be effective, but also risk market distortion, as it is difficult to design remedies that can effectively replicate competitive disciplines over time. They may also be vulnerable to circumvention, and they can have high implementation and monitoring costs.

Remedies to address market performance directly, such as price or profit controls, tend to be reserved for the markets where there are poor prospects for competition, or where competition would be inefficient (e.g., in circumstances of natural monopoly).

It is possible to combine various elements to form a regulatory regime. For example, an access regime is a combination of an obligation to supply on non-discriminatory terms (i.e., addressing conduct) and a price control (i.e., performance).

In each case it is better to apply remedies at the source of the competition concern. For example, regulating retail prices is likely to be ineffective if the issue is at the wholesale level. In general terms, structural remedies are the likely to be the most costly and intrusive to implement, while conduct remedies are likely to be the least costly and intrusive.

7.5 Conclusions

Market failure is a necessary but not sufficient condition for regulation. The task of a regulator or policy maker is to maximise total societal welfare to the extent possible, having regard to the potential benefits *and* costs of regulatory intervention. The costs of regulatory intervention include the cost of establishing and administering the regulatory regime and unintended consequences, including dynamic efficiency losses.

The benefit general competition *ex-post* regulation like the Commerce Act is that it is applied consistently across the economy. However, where individual sectors face particular market failure problems that general competition law is not well-suited to address *ex-ante* regulation may be appropriate.

Ex-ante sector specific regulation is usually adopted where the general industry laws are considered to be insufficient to control the exercise of market power and/or encourage the further development of competition, particularly where there are significant incumbency advantages that are unlikely to be overcome without direct intervention.

If a case for some form of *ex-ante* regulation is established, the challenge is then to determine a proportionate remedy. Ideally, this should be the least burdensome, effective remedy possible and so maximise the public benefit.

Structural remedies, such as divestments of assets, provide a permanent solution to identified problems and do not require ongoing monitoring of behaviour. However, such remedies are very intrusive and complex to implement well. Behavioural remedies may prohibit a firm from engaging in certain behaviour, such as entering into exclusive contracts, or require the firm to act in certain way, such as provide access to key inputs at set terms. Performance remedies, such as price or profit controls, tend to be reserved for the markets where there are poor prospects for competition, or where competition would be inefficient.

Table 9: Overview of types of remedies

REMEDY Type	Examples	WHEN APPROPRIATE	PROS	CONS
Structural remedies	• Divestment of assets • Forms of business separation	• Market structure uncompetitive but reasonable prospects for efficient competition if separation were implemented • Persistent concerns about anti-competitive conduct	• Provides a permanent solution, with low or no ongoing requirements to monitor market	• Costly for affected entities • May be no legal power, or trigger compensation provisions • Separation may harm efficiency (scope, scale)
Conduct remedies	• Non-discrimination rules • Accounting or functional separation • Other special conduct rules • Information disclosure and monitoring • Pricing principles • Obligation to supply	• To address specific concerns about conduct that is presumptively likely to be anti-competitive • To lower barriers to entry • To increase ability to monitor and prevent anti-competitive behaviour	• Specific, targeted measures that can enhance prospects for competition	• Costly to set/enforce • Risk of regulatory error
Performance remedies	• Price, revenue or profit controls	• When competition not feasible or economically efficient	• Prevents exploitation of market power • Can promote competition in related markets	• Costly to set/enforce • Risk of regulatory error, poor incentives

Source: Frontier Economics

8 POTENTIAL REGULATORY REMEDIES

This Section discusses the regulatory remedies that could be used to address the main potential competition-related market failures we have identified in the New Zealand off-farm dairy supply chain. We begin by summarising the potential market failures identified in earlier Sections of this report (Section 8.1). We then consider the regulatory remedies that could be applied to address each of the identified market failures in turn (Sections 8.2 to 8.5). Finally, we present our conclusions (Section 8.6).

Summary and conclusions

- The key competition concerns in the absence of DIRA we have identified in this report are the following:
  - Fonterra enjoys an incumbency advantage over potential new entrants, particularly when processing involves large scale economies. This may make it difficult for independent processors to enter and compete against Fonterra.
  - If Fonterra is motivated by objectives other than wealth maximisation and/or if Fonterra has market power in selling in export markets it may (in the absence of DIRA) have an incentive to use its incumbency advantage to:
    - Lock farmers in or out; and/or
    - Set the farmgate milk price inefficiently high, which may foreclose entry or expansion by other processors.
  - Farmer-shareholders may have insufficient information to monitor Fonterra's performance and to ensure it is operating as efficiently as possible.
- Where large scale economies exist, Fonterra's incumbency advantage is likely to be the largest impediment to fully contestable markets in the New Zealand dairy sector. There are no straightforward ways to address this concern. Two possible options include the following:
  - An access regime for Fonterra's processing capacity would lower the barriers to efficient entry or expansion by independent processors, improving the contestability and efficiency of the off-farm dairy sector in New Zealand. However, an access regime would introduce complexity, increasing regulatory uncertainty and the significant risk of mispricing access services.
  - Requiring Fonterra to divest plant would be an effective means of overcoming the incumbency advantage in those regions where Fonterra operates multiple processing plants. However, this would be a very costly, complex and intrusive form of intervention, which could perversely deter Fonterra from making efficient investments in future.
- Fonterra's incentives to lock farmers in or out could be addressed in several ways:
  - Sections 27 and 36 of the Commerce Act may prevent Fonterra from taking strategic steps to lock farmers in or out, as a means of limiting the ability of rival processors to compete.
  - However, a more direct and transparent means of addressing such conduct would be to retain the existing open entry and exit provisions (and non-discrimination rule) within DIRA. These provisions reduce switching barriers and may therefore provide some competitive constraint on Fonterra.

- The risk of Fonterra setting an inefficiently high price for raw milk could be addressed in a number of ways:
  - The Commerce Act may be effective in preventing blatant predatory pricing by Fonterra, but may not prevent all instances in which Fonterra sets the raw milk price inefficiently high.
  - An independent regulator (rather than Fonterra) could set the farmgate milk price by estimating hypothetical efficient costs. This would reduce but not completely eliminate Fonterra's ability to engage in predatory conduct. There may be significant scope for regulatory error when setting the farmgate milk price, due to misestimation of hypothetical efficient costs.
  - The scope for regulatory error could be reduced by setting the farmgate milk price using Fonterra's actual costs. This approach is likely to encourage competition, which would incentivise Fonterra to become more efficient. It would be necessary to have a sound understanding of Fonterra's actual costs in order to implement this regulatory option.
- An information disclosure regime that provides targeted and independent information on Fonterra's performance to its owners may help to ensure farmer-shareholders have the information required to assess Fonterra's performance. However, individual farmer-shareholders may not be sufficiently motivated to act on better information, even if it were available. Even if some owners were motivated to act, Fonterra's scale, cooperative structure and governance arrangements may make it difficult for individual farmers to influence the company's overall direction.

8.1 Potential market failures

In Sections 4 to 6 of this report, we identified the potential competition related market failures that could arise in the absence of DIRA in the farmgate market, the collection market and the processing market. The key competition concerns we have identified are that:

- Fonterra enjoys an incumbency advantage over potential new entrants or existing processors seeking to expand capacity, due to the sunk costs and economies of scale in processing, which may make it difficult for independent processors to enter and compete both upstream in the market for farmgate milk and in downstream processing.
- If Fonterra is motivated by objectives other than wealth maximisation and/or if Fonterra has market power in selling in export markets, then Fonterra may (in the absence of DIRA) have an incentive to use its incumbency advantage to:
  - Lock farmers in or out; and/or
  - Set the farmgate milk price inefficiently high, which may foreclose entry or expansion by other processors.
- Additionally, farmer-shareholders may have insufficient information to monitor Fonterra's performance and to ensure it is operating as efficiently as possible.

In the following Sections we discuss each of these issues in turn, summarising each concern before considering the extent to which the existing provisions of the Commerce Act or industry specific *ex-ante* regulation could be introduced to address these concerns in the absence of DIRA. We do this by first describing the regulatory remedies, before applying an evaluation framework to systematically identify and compare the costs and benefits associate with each regulatory option. We adopt an evaluation framework based on the following criteria:

- Effectiveness – How effectively does the option address the underlying market failure?

- Efficiency – How does this option influence productive, allocative and dynamic efficiency?
- Potential costs – How onerous and costly is it likely to be to implement this option? Are there any risks that should be accounted for when deciding whether this option should be implemented?

8.2 Incumbency advantage

8.2.1 The concern

As explained in Section 6.2, Fonterra's incumbency advantage stems from two sources:

- It has already incurred the sunk costs associated with investing in very substantial processing capacity in nearly all regions in New Zealand; and
- There are material economies of scale in processing raw milk, particularly when producing non-specialty products.

Incumbency advantages mean that for an independent processor to enter or expand in regions in which Fonterra already operates, they must do so at significant scale. In order for such entry or expansion to be viable, the independent processor will need to recruit sufficient milk volumes to operate at MES. If Fonterra has already invested in sufficient capacity to process all (or nearly all) available farmgate milk in the region, entry at MES would create excess capacity. Under these circumstances, a potential entrant (or existing processor seeking to expand) would need to offer a higher farmgate milk price than Fonterra in order to recruit the milk it requires. Since Fonterra has already incurred the sunk costs in processing capacity, it can see off this competition by raising the farmgate milk price above a level that covers its fully-allocated costs but up to a level that covers its operating costs. Potential rivals that anticipate such a response from Fonterra may be deterred altogether from entering or expanding capacity.[123] The ability to deter competition in this way may allow Fonterra to become less efficient than it would be, were it to operate in a fully contestable market with low barriers to entry or expansion. This efficiency loss may extend beyond productive efficiency to the efficiency of investment. In particular, it may be that limited competition in the processing sector results in Fonterra adopting an investment strategy that differs from the approach it may have adopted if it faced more competitive pressure. The benefits of preserving its incumbency advantage over other processors could also incentivise Fonterra to over-invest in processing capacity, as a means of raising barriers to entry or expansion.

8.2.2 Possible regulatory remedies

The most obvious way to overcome Fonterra's incumbency advantage would be to facilitate the entry or expansion of rival processors without requiring them to incur the large sunk costs associated with investing in substantial new processing capacity. Two possible means of doing this would be:

- Option 1: Introduction of a regulated access regime for Fonterra's processing capacity; and
- Option 2: Divestment of some existing Fonterra capacity to independent processors.

We describe each of these options in turn below.

[123] A question remains as to whether a threat by Fonterra to raise farmgate milk prices would be credible if entry actually occurs. The entrant will also incur sunk costs and so its best strategy may not be to exit if its operating costs are competitive with those of Fonterra. In such circumstances, Fonterra may choose to accommodate entry rather than to try to drive the entrant out. This is particularly so if Fonterra cannot readily price discriminate between farmers that might be attracted by the entering processor and those that would not.

Option 1: Introduction of a regulated access regime for processing capacity

Whilst dairy processing is not a natural monopoly activity, the particular circumstances in New Zealand (i.e., the sunk costs in large processing capacity controlled by Fonterra in most regions, and the material economies of scale associated with processing) share some features with the natural monopoly problem that is often addressed through access regimes. An access regime is a regulatory remedy that is often used to provide access to infrastructure it would be inefficient to duplicate.

Under such a regime, Fonterra would be required to lease access to its processing capacity to any independent processor that seeks such access.[124] This would be akin to the *ex-ante* regulatory access regimes that apply to natural monopoly infrastructure such as telecommunications or rail networks, where the removal of an upstream 'bottleneck' facilitates desirable downstream competition. However, in this instance the objective would be to facilitate greater *upstream* competition between processors in the market for acquisition of farmgate milk, by relieving a bottleneck in downstream processing. Such an approach would complement (rather than substitute) measures such as open entry and exit and non-discrimination rules designed to lower the barriers to farmers switching between processors. The objective of introducing upstream competition would be to drive Fonterra to become as productively efficient as possible, to ensure that the farmgate milk price is set at the allocatively-efficient level, encouraging efficient investment in the New Zealand dairy industry.

There are a range of options for determining the price and non-price terms on which access would be granted to Fonterra's processing capacity. For example, the access price could be set independently by a regulatory body (such as the Commerce Commission). Alternatively, the access price could be established through a negotiate-arbitrate process, whereby independent processors seek to negotiate terms of access directly with Fonterra. If agreement cannot be reached through commercial negotiation, the terms of access would be arbitrated by an independent regulator. That is, the regulator would act as a 'backstop' in case bilateral negotiations fail. At a minimum, there would need to be a requirement on Fonterra to grant access to independent processors on non-discriminatory terms. For example, Fonterra would not be permitted to prioritise its own processing requirements ahead of access seekers. An additional requirement could involve Fonterra needing to invest in additional capacity if required to serve access seekers, but being permitted to recover the efficient costs of any such incremental investment from access seekers.

Option 2: Divestment of existing capacity to independent processors

The second option would be to require Fonterra to divest some of its processing capacity to independent processors seeking to enter or expand within a region. Whilst independent processors would still incur the capital costs of acquiring new capacity from Fonterra (through the divestment price), there would be no creation of excess capacity as a result of the entry or expansion. Consequently, independent processors would not need to pay a premium to farmers to acquire the farmgate milk required to operate at MES.

8.2.3 Assessment of regulatory remedies

We assess below the merits of each of the options above by examining their effectiveness, effect on economic efficiency and potential costs/risks.

[124] In practice, this would mean Fonterra providing processing services to other processors who seek access (e.g., through a tolling arrangement).

Option 1: Introduction of a regulated access regime for processing capacity

Effectiveness

If Fonterra has sufficient existing capacity in a given region to process available farmgate milk,[125] then the efficient access price for capacity would be no higher than efficient marginal cost (i.e., the operating cost associated with processing one more unit of farmgate milk). If some additional capacity is required in order to meet the requirements of an access-seeking processor (e.g., if milk supply expands in the region due to land conversions to dairy farming, or because global dairy prices increase), then the access price should be no greater than the efficient incremental cost of providing that additional capacity. In any event, under an access arrangement, an independent processor would not need to incur the full cost associated with entering at MES. This means entry would not induce excess capacity in the market and drive up the farmgate milk price above a level that independent processors can viably pay. Hence, an access regime for processing capacity would be an effective means of overcoming Fonterra's incumbency advantage.

Efficiency

Independent processors would only seek access under such a regime if the access price would allow them pay at least a slightly higher farmgate price than Fonterra. Unless an access-seeking processor were able to offer farmers a slightly more attractive price than Fonterra's, there would be no economic incentive for farmers supplying Fonterra to switch and, therefore, no incentive for new processors to enter. Assuming the access price for processing capacity is set appropriately at the efficient level, then independent processors would be able to offer Fonterra's farmers a more favourable price than Fonterra if Fonterra's processing costs are inefficiently high. This would result in Fonterra losing market share in the farmgate market, and result in a reduction in its total sales. As long as the access price is set to reflect efficient processing costs (rather than Fonterra's actual processing costs), Fonterra would face strong incentives to maximise efficiency so as to minimise access being sought by other firms that may result in Fonterra facing greater competition for the acquisition of farmgate milk. This would drive the farmgate milk price towards an efficient level.

Potential costs

The introduction of an access regime for processing capacity would entail some upfront set-up costs and ongoing costs (i.e., the costs associated with an independent regulator administering the regime, and the cost of Fonterra and other stakeholders complying with the requirements of the regime).

The most significant costs are likely to be the costs of any regulatory errors:

- If the access price is set too low, that could encourage inefficient entry by independent processors and result in entrants bidding up the farmgate milk price to an inefficiently high level. That could encourage over-production of raw milk in New Zealand. The setting of an excessively low access price may deter efficient investment by Fonterra. Specifically, if Fonterra is unable to recover the efficient costs associated with granting access to other processors, the resulting losses would ultimately flow through as lower returns to its farmer-shareholders. This would result in a lower share value and lower equity capital available to fund new investments. A diminished ability to undertake welfare-enhancing investments would represent a form of dynamic inefficiency.
- If the access price is set too high, efficient entry by independent processors may be deterred. This would result in the benefits of greater contestability in the farmgate market being foregone.

[125] This is not an unreasonable assumption because (except under very limited circumstances) DIRA requires Fonterra to accept all raw milk produced by farmers. Further, **Figure 20** shows that, in aggregate, Fonterra's peak capacity exceeds slightly peak milk production at the present time.

The risk of setting the access price too low or too high is complicated by the need to set a number of access prices, rather than just one "price". That is, a variety of different prices would need to be set for processing services depending on access seekers' needs such as volumes, products, location, timing, etc. The number of access prices that would need to be set would increase regulatory uncertainty and the risk of mispricing some of the access services.

Finally, an access regime for Fonterra's processing capacity could expose Fonterra to asset stranding risk. If global dairy prices were to increase significantly, independent processors may seek additional access to Fonterra's plant that requires Fonterra to undertake investments to expand capacity. However, in the event of a subsequent market downturn, processors that previously sought access to Fonterra's capacity may exit, leaving some or all incremental investments stranded. The cost associated with that stranding would be borne by Fonterra, as the asset owner. This type of stranding risk is well-recognised in other industries with access regimes. Various approaches could be used to manage such risks—for example, the use of take-or-pay contracts for capacity, or *ex-ante* or *ex-post* compensation to the asset owner for expected or actual stranding events.

Option 2: Divestment of existing capacity to independent processors

Effectiveness

Under this option, Fonterra would be required to offer certain of its existing processing plants for sale to new or existing independent processors. An independent processor would still need to commit significant capital to acquire Fonterra's assets. However, by replacing Fonterra, the independent processor would not be adding excess capacity to the region, thereby avoiding a price war with Fonterra that would render its entry or expansion unviable.

However, such an approach would be an effective means of overcoming the incumbency advantage problem only under certain circumstances:

- In those regions where Fonterra has only a single processing plant, divestment would simply transfer the incumbency advantage from Fonterra to a different processor, replacing one monopsonist (or near-monopsonist) with another. This would do nothing to improve competitive outcomes.
- In regions where Fonterra has multiple plants, there may be some benefit in requiring Fonterra to divest some of those plants to alternative processors.[126] This may create competition for the acquisition of farmgate milk, particularly if the plant or plants that are divested have some spare capacity, which the new entrant would be motivated to utilise by winning farmgate milk supply away from Fonterra.

As discussed below, there would be a number of practical challenges and potential costs associated with imposing a divestment remedy on Fonterra, which have the potential to undermine the effectiveness of this remedy.

Efficiency

In principle, the introduction of new competition in a farmgate market where Fonterra previously faced little competition would incentivise Fonterra to become more productively efficient. This would drive the farmgate milk price towards an allocatively efficient level.

Imposing divestment on Fonterra could have an adverse impact on dynamic efficiency by distorting investment signals. Fonterra might be deterred from making efficient investments in new processing capacity if it perceives that divestment remedies may be imposed on it again in future. This may be particularly true if the requirement to divest forces Fonterra to sell assets at a price below market value

[126] In principle, Fonterra could seek to deter other processors from taking up the divestment offer by raising the farmgate milk price in that region. However, this would impose losses on Fonterra that it may not be able to recoup. Moreover, this would probably be a clear contravention of s 36 of the Commerce Act.

(i.e., a 'fire sale' problem). This might lead to a loss of dynamic efficiency, including through weaker incentives to invest in assets producing high value-added products.

Potential costs

Divestment remedies are typically very complex to implement successfully, particularly in circumstances where the assets being sold have been integrated within a business or portfolio for a significant period of time. This type of intervention is generally very costly for the party required to divest the assets—for example:

- The cost of significant disruption to normal business activities and strategy, including the diversion of management attention;
- The administrative costs associated with implementing forced separation;
- The risk that the assets are sold below market value because the business is required to divest, thus placing it at a bargaining disadvantage;
- The loss of synergies from reduction in scale (e.g., common costs would be required to be spread over a smaller organisation); and
- The potential dynamic efficiency losses arising from more cautious future investment for fear of more forced divestments.

For these reasons, divestment remedies are often used as a last resort, when the benefits of such a material intervention are large and clear.

There would also be practical challenges in implementing divestments. For example, in circumstances where there is a choice between different plants for divestment, which plant should be divested? The choice would become more complicated if the assets are specialised in producing different products. For example, suppose in one region Fonterra has one plant specialised in producing milk powder and another specialised in producing cheese. Which of these two plants should be selected for divestment? In addition, Fonterra would likely (and understandably) seek to contest the plants that are chosen for divestment with the aim of retaining the most valuable assets. This could add significant delay and complexity to the process. Finally, as owner and operator of the portfolio of processing assets Fonterra has a significant informational advantage over policymakers and regulators seeking to impose a divestment strategy. This is advantage could, in practice, be used to frustrate and delay the successful implementation of a divestment remedy.

8.2.4 Conclusion

In our view, Fonterra's significant incumbency advantage is likely to be the largest impediment to the off-farm dairy sector becoming more contestable and efficient. However, there is no straightforward way to address this problem.

One option would be to introduce an access regime for Fonterra's processing capacity. The ability for independent processors to access existing capacity without incurring the costs associated with entering at MES would lower the barriers to efficient entry or expansion. This would, in principle, improve the contestability and efficiency of the dairy sector.

The main drawback of this approach is that there is a significant risk that the access price could be set too high or too low. An access price set too high may deter efficient entry by processors. An access price set too low could encourage inefficient entry by processors, bidding up of the farmgate milk price to an inefficient level, leading to over-production of milk and under-investment by Fonterra. An access regime would also introduce greater complexity—particularly if a range of access prices are required for

different access services. This complexity increases regulatory uncertainty and the risk of mispricing access services.

Requiring Fonterra to divest plant would be an effective means of overcoming the incumbency advantage in those regions where Fonterra operates multiple processing plants. However, this would be a very costly, complex and intrusive form of intervention, which could perversely deter Fonterra from making efficient investments in future.

8.3 Fonterra may have incentives to lock farmers in or out

8.3.1 The concern

As explained earlier in this report, if Fonterra has objectives other than the maximisation of shareholder wealth, it may in the absence of DIRA, face incentives to:

- Refuse farmgate milk supply from returning farmers (or use other means, such as discriminatory price or non-price terms) as a punishment tool, to deter farmers from switching to other processors in the first instance (Section 4.3);[127] or
- Lock existing farmers in using exclusive dealing arrangements or long-term contracts, as a means of frustrating entry or expansion by other processors (Section 4.5).[128]

If Fonterra were to engage in such conduct, the likely effect would be to limit the availability of farmgate milk to independent processors seeking to enter or expand into areas served by Fonterra. This would reduce competitive pressure on Fonterra, potentially allowing Fonterra to become less productively efficient than it otherwise would be. This would result in a lower-than-efficient farmgate milk price being paid to farmers, and smaller-than-optimal dairy sector in New Zealand (with the attendant loss of economic welfare to the country). This lack of competitive pressure may also result in sub-optimal investment in the dairy sector in New Zealand, to the detriment of the economy as a whole.

8.3.2 Possible regulatory remedies

Two possible ways of addressing such conduct might be the following:

- Option 1: Rely on general competition law, such as the Commerce Act, to prevent such conduct; or
- Option 2: Retain the open entry and exit provisions and non-discrimination rule in DIRA.

We describe each of these options below.

Option 1: Rely on the Commerce Act to prevent Fonterra from locking farmers in or out

Section 36(2) of the Commerce Act provides that:

[127] Fonterra might also seek to refuse farmgate milk from new farmers if the collection and processing of that new milk would be unprofitable. The rationale for such refusals would be to improve efficiency, rather than to reduce competition. Therefore, in our view, refusal of new milk on those grounds would not be a concern that would warrant regulatory intervention.

[128] As we noted in section 4.5, Fonterra may seek to enter into long-term contracts with farmers to enhance efficiency. There is no reason, from a competition perspective, to be concerned about such conduct.

> *A person that has a substantial degree of power in a market must not take advantage of that power for the purpose of—*
>
> *(a) restricting the entry of a person into that or any other market; or*
>
> *(b) preventing or deterring a person from engaging in competitive conduct in that or any other market; or*
>
> *(c) eliminating a person from that or any other market.*

This section of the Commerce Act is intended to prevent firms with a substantial degree of market power exercising that market power unilaterally to lessen competition in a market. An attempt by Fonterra to lock returning farmers out, or to lock existing farmer-shareholders in, would likely constitute a breach of s 36 for the following reasons:

- In our view, Fonterra clearly "has a substantial degree of power" in regional farmgate markets owing to its very large share in nearly all such markets in New Zealand, and the high barriers to entry to those markets created by its incumbency advantage.
- Fonterra would be taking advantage of its market power if it were to: deter farmers from switching to alternative processors (by threatening to refuse re-entry if farmers wish to return in the future); or prevent or hinder farmers from switching (through contractual arrangements). This is because Fonterra would be unlikely to be able to credibly threaten departing farmers with future lock-out or force farmers to enter into exclusive dealing arrangements if it did not have substantial market power, since farmers would have alternative buyers for their milk.[129]
- Such conduct may amount to preventing or deterring farmers from engaging in competitive conduct in the farmgate market by hindering their ability to switch, or threaten to switch, between processors.

We note that the Ministry of Business, Innovation and Employment (MBIE) is currently reviewing s 36 and has proposed the following alternative wording:[130]

> *A person that has a substantial degree of power in a market must not engage in conduct that has the purpose, or has or is likely to have the effect, of substantially lessening competition in a market.*

Hence, s 36 may be amended in due course. MBIE's intention is to strengthen and clarify the operation of s 36 so that it may be a more effective means of addressing (and deterring) the exercise of unilateral market power.

From an economic perspective, conduct by Fonterra to lock farmers in or out would be likely to substantially lessen competition in the farmgate market by diminishing the ability of farmers to switch

[129] One of the problems historically in bringing successful prosecutions under s 36 is establishing that a firm has taken advantage of its substantial market power. See MBIE, Review of Section 36 of the Commerce Act and other matters – Discussion paper, January 2019, paragraph 6.

[130] MBIE, Review of Section 36 of the Commerce Act and other matters – Discussion paper, January 2019, paragraph 10.

and for independent processors to compete for farmgate milk. However, ultimately, whether such conduct would breach s 36 is a matter of legal interpretation that is yet to be tested.

Further, s 27 of the Commerce Act provides that:

> *(1) No person shall enter into a contract or arrangement, or arrive at an understanding, containing a provision that has the purpose, or has or is likely to have the effect, of substantially lessening competition in a market.*
>
> *(2) No person shall give effect to a provision of a contract, arrangement, or understanding that has the purpose, or has or is likely to have the effect, of substantially lessening competition in a market.*

Exclusive dealing arrangements between Fonterra and farmers may have the effect of substantially lessening competition in the farmgate market. If that is the case, such arrangements would be proscribed and unenforceable under s 27.

Option 2: Retain the open entry and exit provisions and non-discrimination rule in DIRA

An alternative option would be to retain the existing open entry and exit provisions under DIRA. Specifically:

- Section 73 of DIRA obliges Fonterra to accept milk from new or returning ("new entrant") farmers; and
- Section 107 restricts Fonterra's ability to lock shareholder farmers into supplying Fonterra exclusively through long-term contracts, exclusivity agreements or other such mechanisms.

8.3.3 Assessment of regulatory remedies

Option 1: Rely on the Commerce Act to prevent Fonterra from locking farmers in or out

Effectiveness

As noted above, it is unclear whether s 36 would in fact be successful in preventing Fonterra from locking farmers in or out—although a strong economic argument could be made that s 36 ought to constrain such conduct. Ultimately, the effectiveness of s 36 in preventing strategic conduct of this type will depend on the legal interpretation of s 36. We also note that s 36 is presently under review by the Government. If amended, existing legal precedent in New Zealand may provide limited assistance in interpreting the legislation.[131]

As noted above, s 27 may also prevent exclusive dealing arrangements. Once again, the effectiveness of the relevant part of the legislation to constrain such behaviour will be a matter of legal interpretation.

Efficiency

The Commerce Act is already in place. Therefore, reliance on the Commerce Act to prevent Fonterra from locking farmers in or out would not produce more efficient outcomes than the status quo, unless:

[131] We note that MBIE has proposed the wording used in Australian competition law to replace the existing wording s 36. If that occurs, Australian legal precedent may be useful in interpreting s 36 until sufficient new legal precedent develops in New Zealand.

- the existing provisions in DIRA (i.e., the open entry and exit provisions) to prevent such behaviour were creating inefficiencies; and
- those provisions were removed.

It is possible that exclusive reliance on the Commerce Act could result in less efficient outcomes if ss 27 and 36 are ineffective in preventing strategic conduct by Fonterra to lock farmers in or out, and if Fonterra were to engage in such conduct to weaken competition from other processors.

Potential costs

There would be no new or incremental costs in establishing or implementing this regulatory option since the Commerce Act already exists.

Option 2: Retain the open entry and exit provisions and non-discrimination rule in DIRA

Effectiveness

The most direct way of addressing the risk of Fonterra seeking to lock farmers in or out for anticompetitive reasons would be to retain the open entry and exit provisions in DIRA. This would retain the much clearer proscriptions on behaviour in dealings between Fonterra and dairy farmers compared with the more generic safeguards offered by the Commerce Act.

Our analysis in Section 3.5 showed there has been very little actual switching of farmers away from Fonterra, or back to Fonterra from other processors historically (see **Figure 4**). A very small proportion of Fonterra's total milk supply has been subject to exit (on average, [Confidential]] per annum over the period 2011/12 to 2017/18) and re-entry ([Confidential per annum on average over the period 2011/12 to 2017/18). This does not necessarily mean that DIRA's open entry and exit provisions have been ineffective. The *threat* of farmer switching under DIRA may have encouraged Fonterra to become more efficient than it might have been in the absence of open entry and exit. However, it is difficult to know this with certainty.

One view is that more active competition for farmers, and actual switching, may occur in the future as the scope for land conversions to dairying diminishes and independent processors are forced to seek out new sources of farmgate milk supply to sustain growth. This may be true, in which case keeping the barriers to farmer switching low, through regulations that maintain open entry and exit, may be desirable. However, it is telling that the main source of growth in farmgate milk supply to independent processors appears to have been farmers converting land from other uses, rather than farmers switching away from Fonterra.[132] The reluctance or inability of independent processors to compete head-on with Fonterra for farmers in the past may reflect the incumbency advantage enjoyed by Fonterra. Unless that incumbency advantage can be addressed, farmer switching may continue to remain low, even if open entry and exit is retained.

In our view, there is a very strong case for preventing Fonterra from rejecting milk supply from returning farmers, or from applying discriminatory price or non-price terms, to returning farmers. As discussed in Section 4, it is difficult to view such behaviour as anything other punitive conduct aimed at deterring farmers from switching. Such behaviour is likely to have an anticompetitive effect. However, for the reasons explained below, there may be good reasons to relax open entry provisions in relation to completely new supply—particularly supply arising from land conversion activity. Fonterra's refusal to accept new supply could in certain circumstances improve economic efficiency.

Efficiency

[132] See Section 3.5.

Retention of the open entry and exit provisions, along with the non-discrimination rule, would prevent Fonterra from erecting barriers to farmers switching. As discussed above, actual farmer switching, or the threat of switching, may exert pressure on Fonterra to remain productively efficient, and help drive the farmgate milk price towards the allocatively efficient level. This, in turn, is likely to promote dynamic efficiency in the dairy sector in New Zealand, benefiting the New Zealand economy as a whole (including participants in the dairy sector).

Potential costs

Fonterra has argued that the open entry and exit provisions of DIRA create potential inefficiencies and costs within the sector because:[133]

- The requirement to accept all raw milk offered to it by farmers forces Fonterra to invest in sufficient processing capacity to be able to accept all potential new supply. This requires Fonterra to build ahead of the market, which results in inefficient spare capacity. The need to maintain under-utilised capacity lowers returns to farmers. These foregone funds could be directed towards more efficient investment.
- Periods of high milk volume growth (e.g., due to an increase in global commodity prices, favourable weather conditions, on-farm productivity improvements or the exit of a competitor) means that its investments in plant need to be weighted towards low-value commodity products. This crowds out investment in high-value processing.
- If raw milk supply conditions change unfavourably, this could result in significant stranding of investments in processing assets.

As discussed in Section 6.2, there is little evidence that the open entry and exit provisions in DIRA have compelled Fonterra to invest in significant excess capacity. [Confidentia [redacted]] In our view, [redacted] the inefficiencies and costs associated with excess capacity that Fonterra claims arises from open entry and exits are overstated.

It is true that Fonterra's utilisation of annual capacity is significantly lower than utilisation of peak capacity. For example, Fonterra's 2018/19 annual plant utilisation rate weighted by annual plant capacity was approximately [Confidentia [redacted]] However, that problem seems more related to the peakiness of New Zealand's milk supply (which is a function of climate and farming practices) than open entry and exit.

One apparent reason for Fonterra's opposition to open entry and exit is that it may be required to invest in processing capacity in regions where it would otherwise be uneconomical to build new plant. In its February 2019 submission to MPI, Fonterra argues that open entry and exit encourages "inefficient new capacity and inefficient new conversions."[134] Fonterra also proposes that an exception to open entry and exit (and the non-discrimination rule) could be introduced in relation to new conversions.[135]

[133] Fonterra submission to MPI, February 2019.

[134] Fonterra submission to MPI, February 2019, paragraph 9.1.

[135] Fonterra describes this proposal as its third preference. Its first preference is to remove open entry and exit altogether. Its second preference is to remove open entry and exit and the non-discrimination rule in any region where Fonterra's market share drops below 75%, and nationwide removal open entry and exit for new conversions and applications that Fonterra considers is unl kely to comply with its terms of supply.

DIRA presently allows Fonterra to defer acceptance of milk supply from new, existing or returning farmers for up to 18 months if it has insufficient existing capacity to process the additional milk volumes.[136] However, there is no provision in DIRA currently for Fonterra to refuse milk altogether, even if it would be uneconomical to do so. A binding requirement on Fonterra to invest even if it is unprofitable to do so (or if it could put the capital to be invested to better use) would be inefficient. Therefore, an exemption to open entry and exit (and the non-discrimination rule) that allowed Fonterra to refuse milk associated with new conversions, if significant new investment by Fonterra were required in order to accommodate that additional milk, may be appropriate. Restricting this exemption to new conversions only would limit the risk of Fonterra using the threat of refusal to deter existing farmers from defecting to competing processors.

It is conceivable that providing Fonterra with an exemption to refuse farmgate milk in certain circumstances could raise the barriers faced by independent processors in acquiring raw milk from new conversions. For example, Fonterra could make one-time "take it or leave it" offers to new conversions to join the cooperative. This could deter farmers from opting to supply independent processors in that region because there would be no option to supply Fonterra in future (e.g., if they become dissatisfied with the original processor they chose to supply). This might have a similar deterrence effect to punishing farmers that seek to switch to alternative processors. As new conversions appear tos have historically been the main source of growth for independent processors, this could be a material concern if Fonterra were to engage in such conduct. Hence, any exemption for Fonterra to refuse milk from new conversions should only apply if Fonterra would need to make significant new investments to accommodate that supply. This would limit the risk of Fonterra seeking to use this exemption to foreclose rivals in regions in which it is already operating.

8.3.4 Conclusion

Sections 27 and 36 of the Commerce Act may prevent Fonterra from taking strategic steps to lock farmers in or out, as a means of limiting the ability of rival processors to compete.

However, a more direct and transparent means of addressing such conduct would be to retain the existing open entry and exit provisions (and non-discrimination rule) within DIRA. To date, these provisions do not appear to have resulted in much actual switching between processors by farmers. However, these provisions undoubtedly reduce switching barriers. It may be that the threat of farmer switching has provided some competitive constraint on Fonterra.

Fonterra has argued that open entry and exit imposes significant costs and inefficiencies on the sector by encouraging over-capacity, incentivising investments in low-value processing and raising Fonterra's stranding risk. [redacted]

Although the evidence does not suggest widespread inefficiency, Fonterra's concern that open entry and exit may compel it to make inefficient investments in new capacity, particularly to accommodate new conversions, is reasonable. One way of addressing this problem would be to provide an exemption to Fonterra to refuse milk generated from new conversions, if substantial new (and uneconomical) investments would need to be made in order to accommodate that additional milk supply.

Any action by Fonterra to refuse milk from returning farmers, or to apply discriminatory price or non-price terms to such farmers, is very likely to be a strategy to deter farmers from switching to other processors. Such conduct is therefore likely to have an anticompetitive effect and should therefore be prevented by regulation.

[136] See ss 86 to 93 of DIRA.

8.4 Fonterra may set an inefficiently high farmgate milk price

8.4.1 The concern

As explained in Section 4.6, it is unclear what method Fonterra may use to determine the farmgate milk price in the absence of DIRA. DIRA does not prescribe the exact milk price methodology that Fonterra must use but, rather, requires Fonterra to develop and publish a Milk Price Manual that sets out its pricing methodology. We consider that a reasonable assumption is that that Fonterra would adopt a methodology consistent with the approach set out in the Milk Price Manual, in the absence of DIRA.

A concern that arises is that, in the absence of DIRA, Fonterra may set the farmgate milk price inefficiently high. Rival processors seeking to compete with Fonterra would need to at least match Fonterra's farmgate milk price. Hence, setting the milk price inefficiently high could make it more difficult for rival processors to compete and could ultimately foreclose effective competition.

One way Fonterra could set the farmgate milk price inefficiently high using the existing Milk Price Manual would be to understate the costs of a hypothetical efficient processor. Under DIRA, the Commerce Commission is required to review the Milk Price Manual each season and report on the extent to which it promotes "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." In the past, the Commerce Commission has expressed concerns that some of the costs assumed by Fonterra when implementing the Milk Price Manual were not "practically feasible" for an efficient processor.[137] The implication of the Commerce Commission's finding is that Fonterra may have understated some of the costs of an efficient processor and, therefore, set the farmgate milk price too high. This scrutiny by an independent regulator would be lost if DIRA were removed.

Section 4.6 explained that Fonterra would likely have no economic incentive to engage in predatory pricing conduct to foreclose competitors if its sole objective is to maximise shareholder wealth. However, Fonterra may be tempted to engage in pricing to foreclose rivals if:

- It has other objectives (such as to maximise firm size or market share), even at the cost of maximising shareholder wealth; and
- Its shareholders cannot anticipate the long-term costs they might bear if rival processors are foreclosed—particularly if they are rewarded in the short-term with relatively high farmgate prices.[138]

8.4.2 Possible regulatory remedies

There are three possible solutions to this problem:

- Option 1: Rely on general competition law to prevent predatory conduct;
- Option 2: Require an independent regulator to set the farmgate milk price using hypothetical efficient costs; or
- Option 3: Require the farmgate milk price to be set using Fonterra's actual costs.

We describe each of these options below.

[137] Commerce Commission, Review of Fonterra's 2017/18 base milk price calculation: Dairy Industry Restructuring Act 2001, 14 September 2018.

[138] These costs might include immediate losses to Fonterra from predation that cannot be recouped over the long-run, or weaker efficiency incentives on Fonterra in the long-run if it is exposed to less pressure from rival processors in the long-run to compete for farmers.

Option 1: Rely on general competition law to prevent predatory conduct

The first option would be to rely on s 36 of the Commerce Act to deter Fonterra from engaging in predatory conduct. As described in Section 8.3, s 36 of the Commerce Act aims to prevent firms with a substantial degree of market power exercising that market power unilaterally to lessen competition in a market. This includes by means of predatory pricing.

Option 2: Require an independent regulator to set the farmgate milk price using hypothetical efficient costs

Another option would be to require an independent regulator, such as the Commerce Commission to set the farmgate milk price using hypothetical efficient costs. In practice, this may result in the regulator applying an approach similar to that set out in the existing Milk Price Manual. Under this approach the responsibility for estimating the notional efficient costs used to determine the farmgate milk price would sit with the independent regulator rather than Fonterra. This would not eliminate completely Fonterra's ability to engage in predatory pricing since Fonterra would still have discretion over the level of dividends paid. Fonterra could price in a predatory way by paying persistently a level of dividends that exceeds the opportunity cost of funds. Other processors would be able to compete with Fonterra for farmers only if they match the farmgate milk price plus any margin over and above the opportunity cost of funds paid by Fonterra in the form of dividends. Competition from rival processors could be foreclosed if they are unable to match that margin.

The regulator would be required to set the farmgate milk price to provide an incentive to Fonterra to operate efficiently, while providing for contestability in the market for the purchase of milk from farmers. The regulator may be able to review the Milk Price Manual from time to time to ensure that it is fit for purpose, through an open consultation process.[139] This would allow Fonterra and other stakeholders to make submissions on whether and how the methodology for setting the farmgate milk price should be amended.

Option 3: Require the farmgate milk price to be set using Fonterra's actual costs

A third option would be for the farmgate milk price to be set using Fonterra's actual costs rather than the notional costs of an efficient processor. In principle, Option 3 could be implemented either by:

- Requiring Fonterra to apply a Milk Price Formula (the components of which would be based on the components of the farmgate price set out in the existing Milk Price Manual) that uses Fonterra's actual costs. Fonterra's implementation of the Milk Price Formula could then be reviewed each season by an independent regulator, such as the Commerce Commission; or
- Requiring an independent regulator, such as the Commerce Commission, to apply the Milk Price Formula using Fonterra's actual costs.

Fundamental to this regulatory option is a sound understanding of Fonterra's actual costs. Fonterra clearly has the best information on its own costs. Therefore, in order to understand whether Fonterra has calculated the farmgate milk price correctly, or in order for an independent regulator to do so, it would be necessary to collect information on Fonterra's actual costs. This could be done through a formal information disclosure regime, akin to the regime that currently applies to regulated energy networks and airports in New Zealand under Part 4 of the Commerce Act (which is discussed in greater detail in Section 8.5 below).

[139] This could, for instance, follow a process similar to the process the Commerce Commission follows when reviewing its Input Methodologies for regulating energy networks and airports in New Zealand.

8.4.3 Assessment of regulatory remedies

Option 1: Rely on general competition law to prevent predatory conduct

Effectiveness

As explained in Section 4.6.3, predatory pricing is a good example of conduct that s 36 of the Commerce Act is designed to address. Hence, notwithstanding the difficulties the Commerce Commission has faced in winning s 36 cases in Court, if Fonterra did engage in clear predatory pricing, it is at least possible that s 36 may be used to put an end to it.

However, it is also possible — even likely — that only the most egregious such conduct may be caught by s 36. There may still be circumstances in which Fonterra could use the Milk Price Manual to set a price that, at least in principle, deters entry without triggering s 36 proceedings. For instance, as explained above, there have been instances where the Commerce Commission (in its capacity as reviewer of the Milk Price Manual under DIRA) has expressed doubts that the notional costs used by Fonterra were "practically feasible" for an efficient processor. The result was a farmgate milk price set by Fonterra above the level that the Commerce Commission considered would be commensurate with the farmgate milk price that an efficient processor could feasibly pay. The Commerce Commission certainly did not imply that Fonterra had priced in a predatory fashion. Nor did the Commerce Commission initiate s 36 proceedings against Fonterra. However, the price set by Fonterra may have had the effect of deterring efficient entry by competitors.

Hence, whilst s 36 of the Commerce Act may address overt predatory conduct, it may not prevent Fonterra pricing in a manner that makes entry or expansion by rival processors difficult.

Efficiency

For the reasons explained above, reliance on s 36 may prevent blatantly anticompetitive pricing by Fonterra but, may nevertheless result in farmgate milk prices that do not promote efficient competition and, therefore, do not maximise economic efficiency.

Potential costs

Reliance on s 36 would be the least cost option as this provision of the Commerce Act already exists, albeit that it is presently under review by MBIE and may be revised in future.

Option 2: Require an independent regulator to set the farmgate milk price using hypothetical efficient costs

Effectiveness

Option 2 would limit (but not eliminate completely) Fonterra's ability to strategically setting the farmgate price at a predatory level because responsibility for setting the farmgate price would be transferred from Fonterra to an independent regulator. However, it is still possible that this option may deter some efficient entry if the regulator inadvertently underestimates efficient costs in a way that overstates the efficient farmgate milk price.[140] Economic regulators in many jurisdictions and sectors often set regulated prices or revenues for monopolists by estimating notional efficient costs. This is an extremely difficult and often-contentious task. The significant disagreements that often ensue from such regulatory proceedings reflect the uncertainties involved in estimating notional efficient costs accurately, and the potential consequences of regulatory error. Whilst an independent regulator would have no incentive to deliberately set an inefficiently high farmgate milk price, that could occur simply because the regulator

[140] Of course, the regulator could also overestimate efficient costs, but this would encourage rather than deter entry.

has limited information, and because the task of estimating notional efficient costs is inherently challenging.

Efficiency

Option 2 would reduce the risk of economic inefficiencies arising from Fonterra engaging in overt predatory pricing. However, for the reasons explained below (in the assessment of Option 3), Option 2 could result in a farmgate milk price that deters some efficient entry. The absence of this competition (or threat of competition) may allow Fonterra some competitive 'slack' that manifests as operating inefficiency, and could result in Fonterra pursuing inefficient investments over the longer term. In our view, the most effective way to address this concern would be to expose Fonterra to as much competition as possible. Option 3 is more likely to achieve that, because it would allow any processor that is more efficient than Fonterra to enter and compete.

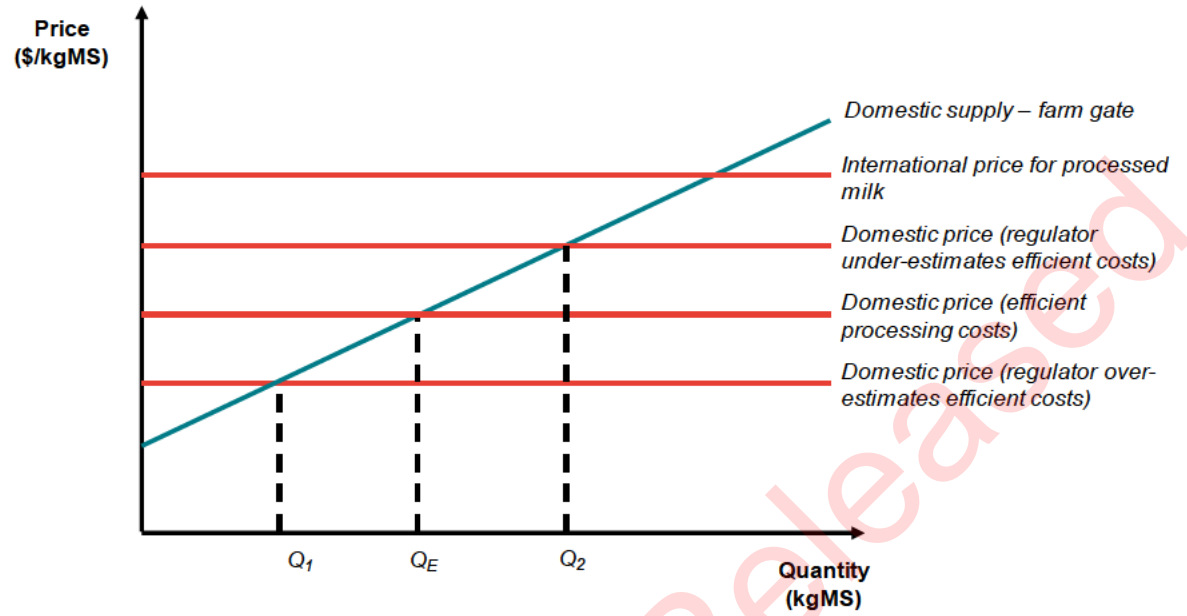
Potential costs

Option 2 would entail some costs associated with administering the regulatory regime. These would include the costs associated with the regulator (most likely the Commerce Commission) assuming new responsibilities (i.e., setting the farmgate price annually, and reviewing periodically the methodology for setting the farmgate milk price), and the costs of stakeholders (principally Fonterra) participating in the regulatory process.

However, the most substantial costs associated with Option 2 might be the costs associated with the regulator setting the farmgate milk price too high or too low. As **Figure 22** shows:

- If the regulator sets an inefficiently low farmgate milk price (by overestimating efficient costs), farmers would receive less economic surplus than they would if the efficient milk price had been set. This would incentivise under-production of milk by farmers ($Q_1 < Q_E$), and the New Zealand dairy sector would have less output than it would otherwise to sell into domestic or export markets. Fonterra (and other comparable processors in New Zealand paying the regulated farmgate milk price) would have more than sufficient margin between the domestic farmgate milk price and the international price for processed dairy products to cover their efficient processing costs. This could weaken incentives for Fonterra and other processors to operate efficiently and make efficient investment decisions. The too-low farmgate milk price could, over the longer-term, incentivise inefficient processors to enter the sector and/or cause some farmers to inefficiently exit the sector.
- If the regulator sets an inefficiently high farmgate milk price (by underestimating efficient costs), farmers would receive more economic surplus than if the price had been set at the efficient level. This would incentivise over-production of milk ($Q_2 > Q_E$). Apart from creating economic inefficiency, this could also create negative environmental externalities associated with over-farming. Since Fonterra and other processors would be over-paying for farmgate milk, they would have insufficient margin to cover their efficient costs. This would result in lower returns than would be expected if the farmgate milk price were set at the efficient level. This, in turn, would mean fewer funds available for investment and innovation. Over the longer-term, lower than required returns could drive some efficient processors to exit the sector (or deter some efficient processors from entering), and the too-high farmgate milk price could induce inefficient entry or expansion (including by suboptimal land conversions) by farmers.

Figure 22: Effect of a regulator misestimating efficient processing costs when setting the farmgate milk price



Source: Frontier Economics

Option 3: Require the farmgate milk price to be set using Fonterra's actual costs

Effectiveness

Option 3 would reduce the risk of Fonterra engaging in predatory pricing since farmgate prices would always be set in line with Fonterra's actual costs. However, as explained above, Fonterra could still implement a predatory pricing strategy by paying dividends above the opportunity cost of funds, thereby forcing any rivals to match those payments in order to attract or retain farmers. As explained below, Option 3 would also encourage entry by alternative processors, provided they are as efficient as Fonterra.[141]

Efficiency

If Fonterra's processing costs are higher than the notional costs of an efficient processor, then this approach would result in a lower farmgate milk price than would be set under Option 2—as shown in **Figure 23** below. If Fonterra's actual processing costs match those of the notional efficient processor, then in principle Option 3 would produce the same farmgate milk price as Option 2.

Under Option 2, independent processors could enter (or credibly threaten to enter) only if their actual costs were at least as low as that of the notional efficient processor. Therefore, Fonterra may be insulated from some potential competition, even if it were less efficient than the notional efficient processor.

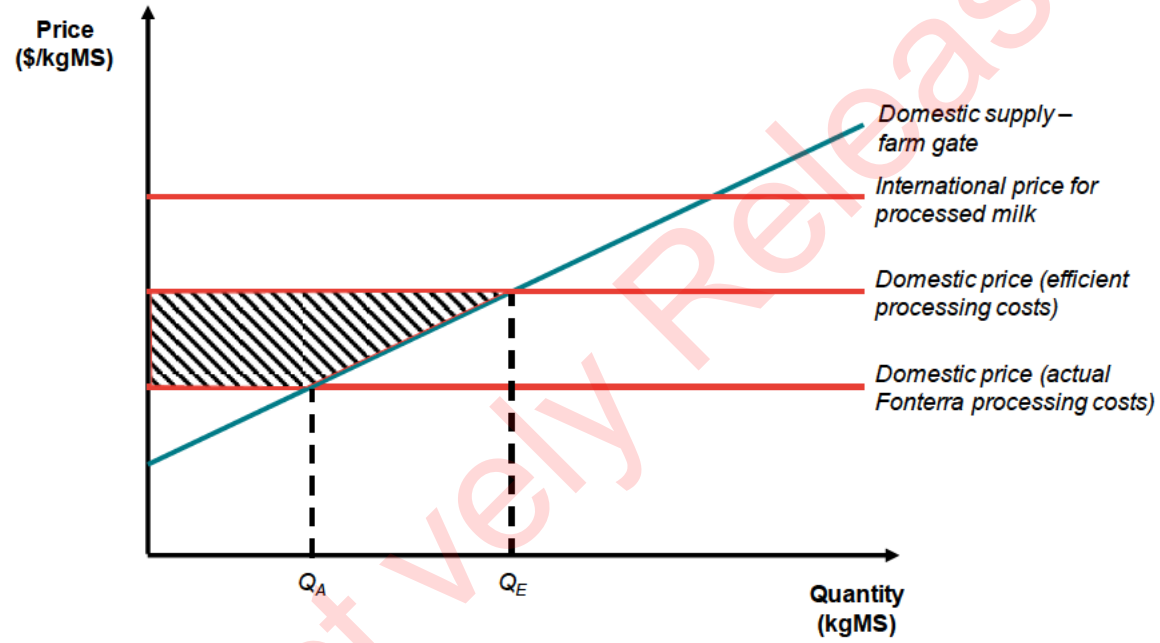
However, under Option 3 independent processors need only be more efficient than Fonterra in order to enter (or credibly threaten to enter) and operate viably. If Fonterra is currently less efficient than the notional efficient processor, then the farmgate milk price that farmers receive would, in the short-run,

[141] Note that efficient entry may not occur if Fonterra's incumbency advantage is large and persistent. Hence, reducing Fonterra's incumbency advantage (as discussed in section 8.2) would increase the likelihood of efficient entry occurring under Option 3.

fall under Option 3.[142] This would incentivise any independent processors that are more efficient than Fonterra to enter, or threaten to enter, and offer Fonterra's farmers a slightly higher price for farmgate milk. If this were to happen, or if Fonterra were to fear significant defection to more efficient processors, Fonterra would be incentivised to become more efficient. As Fonterra's actual processing costs fall, the farmgate milk price under Option 3 would rise to the point it equals the price that could be paid by the notional efficient processor.

If initially Fonterra is as efficient as the notional efficient processor, then implementation of Option 3 would not cause the farmgate milk price to fall. Hence, no new entry would be incentivised.

Figure 23: Difference between prices under Options 2 and 3 assuming Fonterra's actual costs are higher than the notional costs of an efficient processor



Source: Frontier Economics

Actual or threatened entry is also likely to encourage Fonterra to invest efficiently in dairy processing, including for example investing more in innovation and high value add products, as discussed in Section 6.2.

Potential costs

There are likely to be some additional regulatory costs associated with Option 3, particularly if an independent regulator is required to set the farmgate milk price, and if an information disclosure regime is required to support the implementation of this option. The risk of regulatory errors would be lower with this option compared to Option 2, provided that the regulator has access to reliable information on Fonterra's actual costs. Hence, there would need to be strong, binding obligations on Fonterra to provide accurate information sought by the regulator. An information disclosure regime, like that discussed in more detail in Section 8.5, could be used to support the regulator's information requirements.

[142] This would represent a transfer of wealth from farmers to processors (including independent processors), at least in the short-run—as denoted by the shaded region in **Figure 23**.

8.4.4 Conclusion

General competition law may be effective in preventing blatant predatory pricing by Fonterra. However, the Commerce Act may not prevent all instances in which Fonterra prices in a manner that makes entry or expansion by rival processors difficult.

An alternative option would be to require an independent regulator (rather than Fonterra) to set the farmgate milk price by estimating hypothetical efficient costs. This would reduce Fonterra's ability to engage in predatory conduct since it would no longer be the price-setter. However, Fonterra could still attempt to predate by paying dividends that are persistently higher than the opportunity cost of funds. Any rivals seeking to compete with Fonterra would likely be foreclosed if they are unable to match this margin. The main drawback of this option is the scope for regulatory error (misestimation of notional efficient costs) when setting the farmgate milk price. This could result in allocative, productive and dynamic inefficiencies.

A third option would be to set the farmgate milk price using Fonterra's actual costs. If Fonterra's processing costs are higher than the notional costs of an efficient processor, then this approach would result in a reduction in the farmgate milk price. In theory, this would encourage entry by any processor that is at least as efficient as Fonterra. The ensuing competition would incentivise Fonterra to become more efficient over time, and the farmgate milk price would rise to the point Fonterra's costs match those of the efficient processor. There would be reduced scope for regulatory error under this option. However, in order to implement this approach, it would be necessary to have a sound understanding of Fonterra's actual costs. This could be supported by a formal information disclosure regime.

8.5 Farmer-shareholders may have insufficient information to monitor Fonterra's performance

8.5.1 The concern

In our view, the most effective way to maximise the efficiency of the New Zealand dairy sector (and, therefore, economic welfare to New Zealand) is to maximise the contestability of the sector. This entails minimising as many of the impediments to potential competition emerging as possible. However, as explained in Section 3.3, investors can provide an important disciplining force to drive processors to become more efficient. For example, owners could exert pressure on management to take more efficient operational and investment decisions, and farmer-shareholders in cooperatives could threaten to switch supply elsewhere if the firm continues to underperform (perhaps by sponsoring new entry).

One challenge that farmer-shareholders in large cooperatives such as Fonterra face is access to sufficient, independent information on the performance of the firm to judge whether and how efficiency may be improved. An asymmetry of information, particularly between farmer-shareholders and the management of large cooperatives (with dispersed ownership) on the scope for cost savings, can hinder the ability of owners to monitor performance and exert effective influence. This, in turn, can allow principal-agent problems to develop, whereby management acts not to maximise shareholder wealth (through greater efficiency) but, rather, to pursue other objectives that are misaligned with the interests of shareholders.

As explained in Section 3.3, cooperatives have developed various ways of addressing this problem. For example, Fonterra's Shareholders' Council has a performance monitoring role in which it tracks Fonterra's performance using a number of agreed metrics. The Shareholders' Council has at least on one occasion commissioned and published independent analysis on Fonterra's performance for the

benefit of farmer-shareholders.[143] This report focussed on financial performance and financial indicators, rather than indicators of productive efficiency. There does not appear to be a formal process or responsibility for the Shareholders' Council to report regularly on Fonterra's efficiency and performance.

In principle, giving Fonterra's farmer-shareholders greater access to independent information on Fonterra's efficiency may better equip them to ensure the business is operating as efficiently as possible.

8.5.2 Possible regulatory remedies

One possible way of doing this would be to subject Fonterra to an information disclosure regulatory regime. Such a regime is currently administered in New Zealand in relation to energy networks and airports regulated under Part 4 of the Commerce Act. Broadly speaking, an information disclosure regime involves:

- Targeted collection of information from a regulated business that would otherwise remain private;
- An independent expert regulatory body analysing and interpreting the data, and preparing meaningful statistics on efficiency and performance; and
- The regulator publishing those statistics and accompanying commentary periodically for interested stakeholders to use.

For instance, in relation to regulated energy networks and airports in New Zealand, the Commerce Commission:

- Collects annually through published data templates audited information on companies':
  - Revenues;
  - Expenditure in standardised cost categories;
  - Asset values;
  - Asset registers (including volume of assets, asset age);
  - Demand; and
  - Measures of service quality/reliability.
- Analyses these data by processing them into simple metrics that can allow comparison of performance across firms and over time; and
- Publishes its findings annually in a 'summary and analysis' report that allows all stakeholders (including customers and company owners) to assess the performance of the companies, as well as an interactive performance accessibility tool for electricity distribution businesses.[144]

The main objective of the information disclosure regime is to enhance transparency and comparability of the performance of the businesses, and to ensure that interested parties have sufficient information to assess whether the purpose of the regulatory arrangements (as set out in Part 4 of the Commerce Act) is being met.[145]

[143] Northington Partners, Independent assessment of Fonterra's financial performance since inception – A report commissioned by Fonterra Shareholders' Council, November 2018.

[144] See: https://public.tableau.com/profile/commerce.commission.regulation#!/vizhome/Performanceaccessibilitytool-NewZealandelectricitydistributors/Highlevelratios

[145] See, for example: Commerce Commission, Information Disclosure (Airport Services) – Reasons Paper, 22 December 2010

The Australian Energy Regulator (AER) is required by the National Electricity Rules (NER) to go further than the Commerce Commission and publish annual benchmarking reports that compare and track over time the relative efficiency of regulated electricity distribution and transmission businesses in the National Electricity Market. An explicit objective of the annual benchmarking reports is to provide consumers with better information on the efficiency and performance of regulated electricity networks. For example, the Australian Energy Market Commission (which is the rule-making body in Australia responsible for developing the NER) stated the following when it amended the NER to require the AER to prepare annual benchmarking reports:[146]

> *Whilst benchmarking is a critical tool for the regulator, it can also be of assistance to consumers, providing them with relative information about network performance on NSPs [Network Service Providers]. Benchmarking information would be useful to consumers when participating in the regulatory determination process and merits reviews, and also in their informal interactions with NSPs.*

The AER collects a comprehensive dataset designed specifically to allow benchmarking of the businesses, performs complex benchmarking analyses, and publishes in its annual benchmarking report a set of performance indicators (including efficiency scores generated using different benchmarking techniques) for each business. As the reports are published annually, the efficiency performance of the businesses can be tracked over time. The idea is that exposing the performance of the businesses to public scrutiny would encourage company shareholders to exert pressure on management to lift performance over time.

Information disclosure can also provide a regulator with useful data to inform the setting of regulated prices, as discussed in Section 8.4.

An information disclosure regime could be introduced for Fonterra to provide its farmer-shareholders greater information and to assist with regulatory setting of the farmgate milk price (if that option is pursued). Examples of information that could be collected from Fonterra each season include:[147]

- Revenues by product type and in total;
- Expenditure by cost category, product type and in total;
- Plant capacity and utilisation rates (annual and peak);
- Volume of milk collected;
- Farmer churn (e.g., volume of farmgate milk related to new entries, exits, returning farmers and conversions); and
- Expenditure on innovation and R&D.

The information published by the regulator could be very simple indicators of the kind that the Commerce Commission presents in its summary and analysis reports, or more formal benchmarking of dairy processors in New Zealand and overseas. The latter would require information to be collected from sources other than Fonterra, so would be a considerably more complex exercise.

[146] AEMC, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012 & National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012 – Rule Determination, 29 November 2012, p. viii.

[147] This is not necessarily an exhaustive list of information that might be useful to collect.

8.5.3 Assessment of regulatory remedies

Effectiveness

An information disclosure regime may help reduce the information asymmetry between Fonterra and its farmer-shareholders, thereby facilitating more effective monitoring of Fonterra's performance and efficiency by its owners. Whilst an information disclosure regime may help address the information problem that farmer-shareholders face, the dispersed ownership and control within the cooperative structure and its governance arrangements could limit the ability of individual farmer-shareholders to act on that information and exert significant influence to improve Fonterra's efficiency.

A related problem may be that individual farmer-shareholders may not have sufficient profit motive to act on insights gleaned from information disclosure. Each farmer may only be a little bit better off from pushing Fonterra to drive out inefficiency, even if all farmers as a whole might be a lot better off. This is the classic free rider problem. In investor-owned firms, it is often large institutional shareholders that tend to provide effective challenge and discipline on company management and Boards. Fonterra has no such owners.

An information disclosure regime that involves an independent regulator benchmarking Fonterra's performance and efficiency against comparable firms is likely to be more useful to farmer-shareholders than a regime that simply tracks Fonterra's performance over time. This is because external benchmarks provide reference points against which Fonterra's performance may be compared. However, developing such benchmarks is likely to be a complex and costly process. If poor or inconsistent data are available on other processors (e.g., processors overseas), then the benchmarking exercise may be uninformative whilst imposing the regulatory burden of administering and complying with the regime.

Efficiency

As discussed above, the purpose of improving owners' access to information on Fonterra's performance would be to increase the internal pressure that Fonterra faces to become as productively efficient as possible. An improvement in productive efficiency would move the farmgate milk price closer to the allocatively efficient level at which economic welfare to New Zealand is maximised. Greater access to information could also allow Fonterra's owners to monitor and direct efficient investment more effectively, thereby promoting dynamic efficiency.

Potential costs

There would be initial set-up costs associated with developing an information disclosure regime for Fonterra. The fact that an information disclosure regime already exists for energy networks and airports in New Zealand is unlikely to lower these upfront costs materially. Past experience in establishing the Part 4 regime may offer some lessons for the creation of an information disclosure regime for Fonterra. However, the dairy sector is very different to the energy and airport sectors. Hence, it is unlikely that only minor modifications to the Part 4 regime would produce a fit-for-purpose regime that could be applied to Fonterra.

There would also be ongoing costs faced by the regulator tasked with administering the regime, and by Fonterra in complying with the requirements of the regime. If the information disclosure regime required the regulator to benchmark Fonterra's performance against other processors, and this necessitated collection of information from other New Zealand processors, then all processors contributing information would face compliance costs. Such a regime would also entail more complex analysis, so could be expected to be costlier for a regulator to administer.

A possible risk associated with an information disclosure regime is the potential for the release of commercially sensitive information that might place Fonterra at a competitive disadvantage. The kinds

of information that farmer-shareholders would find useful (examples of which are provided above) are likely to be commercially sensitive. Monopoly businesses, such as the electricity networks and declared airports regulated under Part 4 of the Commerce Act, by their nature face no material competition. Hence, publication of commercial information on those businesses would not put them at a competitive disadvantage. By contrast, Fonterra does face competition from other processors in New Zealand and overseas. Any information disclosure regime that applies to Fonterra should not, through the release of commercially sensitive information, undermine its ability to compete.

One way to minimise this risk would be to ensure a targeted release of information so that only Fonterra's farmer-shareholders receive the outputs of the information disclosure regime. This may be achieved by:

- Requiring Fonterra farmer-shareholders to register with the regulator administering the information disclosure regime before they can receive the summary and analysis reports. The registration process could be used to verify whether the recipient of the information is in fact a Fonterra farmer-shareholder. There are some drawbacks with this approach. For example, it would require farmers to register proactively to receive information, and the process of identity verification could be challenging and costly; or
- Requiring Fonterra to disseminate the summary and analysis reports to all its farmer-shareholders. That is, the regulator would collect and analyse the data, and prepare the summary and analysis report. Fonterra would be responsible for distributing the reports to its farmer-shareholders. Fonterra would not have any role in preparing or influencing the analysis, and the raw data collected by the regulator would not be disseminated.

There may be a high risk of confidential information being released inadvertently, even if best efforts are made to ensure that only Fonterra's farmer-shareholders are the immediate recipients of that information, since Fonterra currently has a very large number (approximately 10,000) of farmer-shareholders. Moreover, it is not clear that dissemination of information in this way would necessarily be effective in motivating improved performance in Fonterra, given the scope for the free rider problem described above.

8.5.4 Conclusion

One source of discipline on a firm is owners motivated to ensure that the firm maximises shareholder returns by becoming as efficient as possible. Insufficient or incomplete information can be one factor that limits the ability of investors in large cooperatives to provide effective oversight of this kind.

An information disclosure regime that provides targeted and independent information on Fonterra's performance to its owners may help reduce this information access problem. This could make it easier for Fonterra's shareholders to focus the business on maximising efficiency.

However, individual farmer-shareholders may not be sufficiently motivated to act on better information, even if it were available. Even if some owners were motivated to act, Fonterra's scale, cooperative structure and governance arrangements may make it difficult for individual farmers to influence the company's overall direction.

The most useful information disclosure regime is likely to be one that benchmarks Fonterra's performance against other dairy processors. However, the information collection costs associated with such a regime are likely to be high. Further, the informativeness of any such benchmarking analysis will depend on the consistency of the information used in the analysis. Achieving consistency would be a complex and potentially costly exercise.

It is critical that any information disclosure regime be designed carefully to avoid releasing commercially sensitive information that could place Fonterra at a competitive disadvantage. This might be achieved by ensuring that information on Fonterra's performance is disclosed only to Fonterra's shareholders

rather than the wider public. This would be an important point of difference from the information disclosure regime that applies to businesses regulated under Part 4 of the Commerce Act.

8.6 Conclusion

The key competition concerns in the absence of DIRA we have identified in this report are the following:

- Fonterra enjoys an incumbency advantage over potential new entrants, which may make it difficult for independent processors to enter and compete.
- If Fonterra is motivated by objectives other than wealth maximisation and/or if Fonterra has market power in selling in export markets it may (in the absence of DIRA) have an incentive to use its incumbency advantage to:
  - Lock farmers in or out; and/or
  - Set the farmgate milk price inefficiently high, which may foreclose entry or expansion by other processors.
- Farmer-shareholders may have insufficient information to monitor Fonterra's performance and to ensure it is operating as efficiently as possible.

Fonterra's incumbency advantage is likely to be the largest impediment to fully contestable markets in the New Zealand dairy sector. There are no straightforward ways to address this concern. One possible remedy would be an access regime for Fonterra's processing capacity. This would lower the barriers to efficient entry or expansion by independent processors, improving the contestability and efficiency of the off-farm dairy sector in New Zealand. However, an access regime would introduce complexity, regulatory uncertainty and the significant risk of mispricing access services.

Another possible remedy for the incumbency advantage problem would be to require Fonterra to divest plant in those regions where Fonterra operates multiple processing plants. This would be an effective means of overcoming Fonterra's incumbency advantage. However, this would be a very costly, complex and intrusive form of intervention, which could perversely deter Fonterra from making efficient investments in future.

Fonterra's incentives to lock farmers in or out could be addressed in several ways. For example, ss 27 and 36 of the Commerce Act may prevent Fonterra from taking strategic steps to lock farmers in or out, as a means of limiting the ability of rival processors to compete.

However, a more direct and transparent means of addressing such conduct would be to retain the existing open entry and exit provisions (and non-discrimination rule) within DIRA. These provisions reduce switching barriers and may therefore provide some competitive constraint on Fonterra. Any action by Fonterra to refuse milk from returning farmers, or to apply discriminatory price or non-price terms to such farmers, is very likely to be a strategy to deter farmers from switching to other processors. Such conduct is therefore likely to have an anticompetitive effect and should therefore be prevented by regulation.

The risk of Fonterra setting an inefficiently high price for raw milk could be addressed in a number of ways. The Commerce Act may be effective in preventing blatant predatory pricing by Fonterra, but may not prevent all instances in which Fonterra sets the raw milk price inefficiently high.

An independent regulator (rather than Fonterra) could set the farmgate milk price by estimating hypothetical efficient costs. This would reduce but not completely eliminate Fonterra's ability to engage in predatory conduct, since Fonterra could still choose the level of dividends (and therefore the total payout) to its farmer-shareholders. There may be significant scope for regulatory error when setting the farmgate milk price, due to misestimation of hypothetical efficient costs.

The scope for regulatory error could be reduced by setting the farmgate milk price using Fonterra's actual costs. This approach is likely to encourage competition, which would incentivise Fonterra to become more efficient. It would be necessary to have a sound understanding of Fonterra's actual costs in order to implement this regulatory option.

An information disclosure regime that provides targeted and independent information on Fonterra's performance to its owners may help to ensure farmer-shareholders have the information required to assess Fonterra's performance. However, individual farmer-shareholders may not be sufficiently motivated to act on better information, even if it were available. Even if some owners were motivated to act, Fonterra's scale, cooperative structure and governance arrangements may make it difficult for individual farmers to influence the company's overall direction.

A THE ECONOMICS OF COOPERATIVES

This Appendix provides a summary of the literature on the key economic features of cooperatives—and, in particular, agricultural cooperatives—that are relevant to our analysis in this report. In particular, we investigate the following questions:

- What is a cooperative?
- Why do cooperatives form?
- Are there any potential costs associated with cooperative ownership models?
- Do cooperatives have different motivations or incentives compared to investor owned firms?
- What is the empirical evidence of different firm performance outcomes from cooperative models?

This review is not intended to be an exhaustive survey of the literature on the economics of cooperatives. Rather, the review is focused on the issues and factors most relevant to this paper.

What is a cooperative?

There are varied definitions of a cooperative in the economic literature. Evans and Meade (2005) define cooperatives as follows.[148]

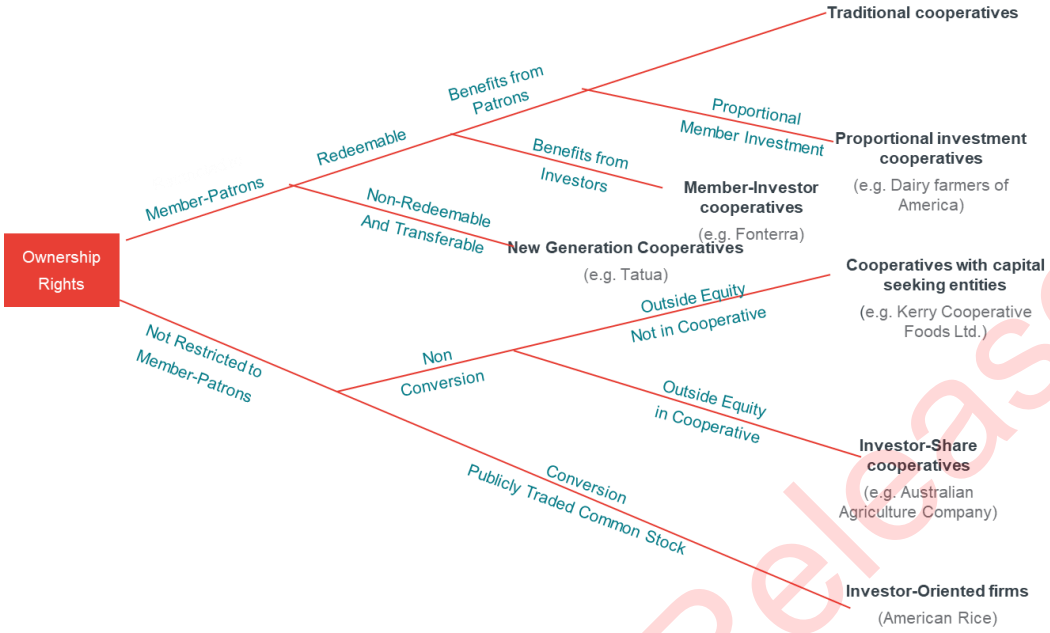
> *A cooperative is an organisation in which those who transact with (i.e. "patronise") the organisation also own and formally control the organisation, and derive significant benefits from those transactions over and above any financial returns they derive from their investment in the organisation.*

Key to this definition is the principle of ownership by those who transact with the cooperative. There are, however, many types of cooperative models. Some cooperative models have ownership and control linked strictly with patronage or the level of transactions with the cooperative. Other models of cooperative have a weaker relationship between ownership and supply. **Figure 24** below summarises the different cooperative models that have been studied in the literature.[149]

[148] Evans, L., & Meade, R. (2005). The Role and Significance of Cooperatives in New Zealand Agriculture, A Comparative Institutional Analysis.

[149] Chaddad, F. R., & Cook, M. L. (2004). Understanding new cooperative models: an ownership–control rights typology. Applied Economic Perspectives and Policy, 26(3), 348-360.

Figure 24: Alternative cooperative models by ownership rights



Source: Chaddad and Cook (2004)

Why do farmers form cooperatives?

The economic literature suggests that there are numerous reasons why cooperatives form. The reasons for supplier cooperative formation can be categorised as follows:

- addressing buyer power;
- maintaining a market where one may not exist;
- cost minimisation;
- ability to direct investment strategy;
- risk pooling; and
- diversification.

We discuss these reasons in turn below.

Buyer power

One of the fundamental historical reasons for forming a supplier cooperative was to protect members from the buyer power of a monopsonist purchaser. Evans and Meade (2005) argue that agricultural processing markets are often highly concentrated due to large economies of scale, with few or perhaps only one feasible processor for farm outputs that are costly to transport.[150] This results in farm output markets in which potentially a large number of farmers, each with quite limited bargaining power, seeking to sell their produce to a single (or small number) of purchasers with significant buyer power. In markets

[150] Evans, L., & Meade, R. (2005). The Role and Significance of Cooperatives in New Zealand Agriculture, A Comparative Institutional Analysis.

where the farm output is perishable – such as milk – farmers may be even more at risk of opportunistic buyer power because they cannot store their output and seek out alternative purchasers or withhold supply from the processor until they can secure a better deal.[151]

Farmers in many agricultural markets have sought to vertically-integrate with downstream processors, through cooperative structures, to protect themselves against the exercise of monopsony power. Cooperative formation in an agricultural context is typically an attempt by suppliers to weaken the incentives of monopsonists to push down price and quantity, which would result in a transfer of surplus away from farmers to downstream buyers and an incidental deadweight loss to society.[152]

Maintaining a market

Supplier cooperatives are also a mechanism for maintaining a market where it may not otherwise exist. That is, the formation of a cooperative structure can represent a risk mitigation strategy to maintain a market even in times when producer returns would otherwise cause non-cooperative downstream buyers to withdraw from the market or scale back demand materially.[153] The certainty that there will be a buyer for their output will in turn allow suppliers (such as farmers) to invest in their supply business (e.g., on farm) for long-term returns.

Cost minimisation

Cooperative formation may also be a strategy to maximise the returns from farming activities (by ensuring as high an output price as possible), by minimising downstream production costs. The lower are downstream costs, the great the surplus available to be shared between farmers and processors. One means of encouraging downstream efficiencies is for farmers to take ownership of the processor and to apply pressure to its management to become as efficient as possible. (As discussed below, the effectiveness of this strategy depends on how well cooperative owners are able to monitor, and exercise control, over management.)

Another way to encourage efficiencies is for farmers to vertically-integrate with processors. Supplier cooperatives is a model of partial producer vertical integration.[154] Complete vertical integration at the producer level may be inefficient.[155] For example, there may be economic advantages to farm-ownership being at the family or corporate level, and potential management disadvantages to having farm ownership at the scale-required for full vertical integration between farming and processing. Cooperatives, however, can unlock efficiencies through vertical coordination between producers and processors, in particular by reducing transaction costs (similar to fully vertically integrated firms).[156]

[151] Staatz, J. M. (1987). Farmers' incentives to take collective action via cooperatives: a transaction cost approach. Cooperative theory: New approaches, 18, 87-107.

[152] Grashuis, J. (2018). An exploratory study of cooperative survival: Strategic adaptation to external developments. Sustainability, 10(3), 652.

[153] Peterson, H. C., & Anderson, B. L. (1996). Cooperative strategy: theory and practice. Agribusiness: An International Journal, 12(4), 371-383.

[154] Cook, M. L. (1995). The future of US agricultural cooperatives: A neo-institutional approach. American Journal of Agricultural Economics, 77(5), 1153-1159.

[155] Sykuta, M. E., & Cook, M. L. (2001). A new institutional economics approach to contracts and cooperatives. American journal of agricultural economics, 83(5), 1273-1279.

[156] Nilsson, J. (2001). Organisational principles for co-operative firms. Scandinavian journal of management, 17(3), 329-356.

Ability to direct investment strategy

Farmers may seek to form cooperatives to enable them to direct the investment strategy of downstream processors. In particular, farmer members may wish the processors to follow a conservative investment strategy as a means of risk management.[157] A conservative investment strategy may be preferred to increase the likelihood that the processor remains in the market to act as a reliable purchaser of farm output. This may be particularly the case if a farmer has made large fixed or sunk on-farm investments. The failure of a large monopsonist buyer of farm output would strand those farm investments, since farmers would have no or few alternative ways of selling what they produce. Hence, directing processors to follow conservative investment strategies may be a way of ensuring that farmers have a market for their output. One study of US agricultural cooperatives found that 95% had a conservative investment strategy.[158] We discuss issues of portfolio problems further below, which provide further reasoning why cooperatives may follow a conservative investment strategy.

Risk pooling

Cooperatives may also be formed to pool risk. The notion underpinning risk pooling is that individual farmers may be better able to face financial difficulties together, and to spread the risk associated with farming returns, through a cooperative structure, compared to a situation where they exist as single entities. For example, cooperatives may raise their milk price for the benefit of its members during a period of adverse weather, thereby 'cushioning' the impact of hard times on individual farmers.[159] Therefore, if the farming sector faces a collective challenge such as a temporary supply or demand shock, the cooperative is better able to face these challenges by sustaining a higher milk price for its members. The cooperative should therefore, be viewed as a method for farmers to deal with risks that may affect all the members of the cooperative. Moreover, it allows the cooperative to meet these challenges as a collective rather than individually.

Diversification

Farmers often have concentrated risk as they invest a significant proportion of their capital in one industry. Cooperatives have often sought to diversify that risk by expanding into new product and/or geographic markets.[160] If returns in these industries are not positively correlated with the returns in the suppliers' main industry, then that diversification may lower their overall risk. For example, Kerry Group diversified both its product business to become a food ingredients and consumer food business, and its geography, by investing the US.[161] In doing so, farmers becomes less reliant on the demand for one particular product because the cooperative has diversified their interest into a number of markets. This raises the likelihood that farmers can keep selling their output even if one or some of the downstream markets experiences downturn.

[157] Evans, L., & Meade, R. (2005). The Role and Significance of Cooperatives in New Zealand Agriculture, A Comparative Institutional Analysis.

[158] Peterson, H. C., & Anderson, B. L. (1996). Cooperative strategy: theory and practice. Agribusiness: An International Journal, 12(4), 371-383.

[159] Briscoe, R., & Ward, M. (2006). Is small both beautiful and competitive? A case study of Irish dairy cooperatives. *Journal of Rural Cooperation*, *34*(2), 113.

[160] Peterson, H. C., & Anderson, B. L. (1996). Cooperative strategy: theory and practice. Agribusiness: An International Journal, 12(4), 371-383.

[161] Wagner, J., Chandera, Y., & Dobson, W. D. (2000). The Evolution of Ireland's Kerry Group/PLC-Implications for the US and Global Dairy-Food Industries (No. 37660).

We note, however, that if farmers invest in a processing cooperative whose returns are highly (and positively) correlated with on-farm returns, then this would have the opposite effect, and may lead to portfolio costs. This is also affected by the risk aversion of farmers who tend to invest all of their economic and social capital in the cooperative. Farmers may be unwilling to allow the cooperative to diversify into other markets, favouring instead a conservative investment model.[162] We discuss these problems and their relationship further below.

Summary of reasons to form cooperatives

These reasons for cooperative ownership imply that cooperatives allow farmers to:

- mitigate against exploitation by significant buyer power in the milk processing market;
- benefit from economies of scale in the milk processing market; and
- limit their risk through conservative investment strategies, diversification and risk-pooling.

Are there costs associated with cooperative ownership?

As discussed above, cooperatives seek to maximise the returns to suppliers (such as farmers) rather than the returns from downstream processing alone. Of course, the institutional design of cooperatives may also create some costs to its owners. We discuss in this section the literature on the key potential costs of cooperative models. As outlined throughout this section, various mechanisms to mitigate the impact of these costs have been developed by cooperatives.

The economic literature identifies a number of problems that may arise from cooperative models, which can be classified as follows:[163]

- free rider problem;
- horizon problem;
- portfolio problem;
- control problem; and
- influence cost problem.

Free rider problem

One of the main problems that can arise from the cooperative model is the possibility of free riders. Free riders can either be external or internal.

- **External free rider**: An external free rider may exist where those outside the cooperative receive some of the benefits or costs of cooperative membership without being a member. An example given of this is where a cooperative is successful in shifting the market price for the inputs that its owners supply, and other non-member suppliers also enjoy the benefit of that same price.[164] Open cooperatives, who operate with no restriction on members' ability to enter the cooperative, or expand

[162] Staatz, J. M. (1987). The structural characteristics of farmer cooperatives and their behavioral consequences. *Cooperative theory: New approaches*, *18*, 33-60.

[163] Cook, M. L., and Iliopoulos, C. (1999). "Beginning to Inform the Theory of the Cooperative Firm: Emergence of the New Generation Cooperative." Finnish Journal of Business Economics 4(99): 525-535.

[164] Evans, L., & Meade, R. (2005). The Role and Significance of Cooperatives in New Zealand Agriculture, A Comparative Institutional Analysis.

supply, may also face a free rider problem if existing members are paying for the underutilised processing capacity that is required to accommodate an open membership.[165]

- **Internal free rider**: This is when some members engage more actively in patronage/supply than others who still gain similar benefits from their membership.[166] This may be the case where suppliers are not required to be exclusive. It may also be the case if new entrants do not pay the full costs of their membership.[167] This might occur, for example, if the cooperative share price is undervalued.

  Internal free riding can also affect quality. That is, while a cooperative may collectively benefit in delivering high-quality products – such as in relation to food safety and animal welfare requirements – individual members may think it is in their own interests to not undertake the necessary investment to deliver high quality output.[168] Evidence suggest that cooperatives with sufficient control of member actions (including outputs and supply processes) and/or market or financial incentives (such as for higher quality output) can overcome these free rider problems.[169]

The antithesis of free riding is the "glue" of commitment.[170] Commitment to an organisation, such as a cooperative, can comprise:[171]

- **The affective component**: An emotional attachment, a feeling of belonging, and a wish to remain a member of the organisation.
- **The normative component**: A feeling of obligation to remain with the organisation.
- **The continuance component**: A lack of choices other than to remain a member of the organisation when leaving it would entail costs and the loss of acquired advantages.

Organisational commitment both decreases the probability of exit and reduces free riding behaviour. There can be a tension, however, between organisational commitment and a cooperative's need or desire for control over members' actions to reduce free riding, such as in relation to quality as discussed above.[172]

Closed cooperatives, which restrict entry or members' ability to expand supply, may also be able to overcome some of the issues of free riders. For example, a closed cooperative would not be required to invest to the same extent in surplus capacity compared to a cooperative with open membership. This is because a closed cooperative can have greater certainty in relation to future supply volumes. Therefore, closed cooperatives are one mechanism which has been developed to increase commitment.

[165] Saitone, T. L., & Sexton, R. J. (2009). An evaluation of cooperatives' comparative strengths and weaknesses in a vertically differentiated agricultural product market. Discuss. Pap., Cent. Coop., Univ. Wis., Madison.

[166] Mazzarol, T., Limnios, E. M., & Reboud, S. (2011, December). Co-operative enterprise: a unique business model. In Paper submitted for the Australia and New Zealand Academy of Management (ANZAM) Annual Conference, Wellington.

[167] Evans, L., & Meade, R. (2005). The Role and Significance of Cooperatives in New Zealand Agriculture, A Comparative Institutional Analysis.

[168] Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the member relationship in agricultural cooperatives: Implications for commitment. Agribusiness, 29(1), 39-61.

[169] Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the member relationship in agricultural cooperatives: Implications for commitment. Agribusiness, 29(1), 39-61.

[170] Fulton, M.E. (1999). Cooperatives and member commitment. The Finnish Journal of Business Economics, 4, 418–437.

[171] Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the member relationship in agricultural cooperatives: Implications for commitment. Agribusiness, 29(1), 39-61.

[172] Cechin, A., Bijman, J., Pascucci, S., & Omta, O. (2013). Decomposing the member relationship in agricultural cooperatives: Implications for commitment. Agribusiness, 29(1), 39-61.

The horizon problem

Woodford (2008) argues that traditional cooperatives (i.e., cooperatives that do not have a clear mechanisms for capital gain on the shares held by members) tend to have equity that is often under-priced or not fully allocated when compared to modern or hybrid cooperatives which often allocate their assets to individual members.[173] An example of this is PPCS, in New Zealand, which holds most of its assets as unallocated reserves. Under these circumstances, cooperative owners may have little reason to provide additional capital if their investment in the cooperative will be for a shorter time period as they are free to leave the cooperative at any point with no cost to themselves. This is referred to in the literature as the horizon problem.

The resulting impact of this is for the shareholder members of the cooperative to have less commitment to the company than would be the case for investor-owned firms. This may be particularly the case where the investments involve intangible assets such R&D, brand development, etc.[174] As a result, if the entry and exit price of a cooperative does not fully reflect members' equity, those members would be incentivised to maximise the present price for their produce rather than in investing in the firm's capital to allow it to grow into the future. Members and the cooperative view the market with different horizons.

A mechanism to overcome the horizon problem is to fully allocate equity and allow those equity rights to be traded. For instance, if a cooperative's shares are priced at true "fair value", and open supplier entry and exit exist, this can overcome the traditional cooperative horizon problem.[175]

The portfolio problem

The portfolio problem refers to the issue of the organisation's investment portfolio potentially not reflecting the interests or risk attitudes of any given investor/member.[176] A typical investment portfolio reduces the risk to the investor by diversifying across investments whose returns are negatively correlated. However, cooperatives' returns are typically highly positively correlated with member returns (such as on-farm returns) as they operate in the same industry. Therefore, some members may be less willing to invest in a cooperative than they may be in alternative investments that would allow them to diversify their risk.

This is a typical problem faced by cooperatives members who have an inability to diversify their investment. In particular, a lack of tradability, liquidity and appreciation mechanisms for members' equity will imply that cooperatives are unable to distribute their risk in the cooperative based on their own risk preference.[177] This is because the investment decision is "tied" to the decision to sell the cooperative milk implying that patrons are all equally linked with the cooperative despite having different preferences around concentration of risk. Therefore, the reason for risk aversion among members of cooperatives can in part be attributed to the lack of diversification in their investment portfolio.[178]

[173] Woodford, K. (2008). The Diversity of Co-operative Structures in New Zealand Agribusiness. Journal of Co-operative Studies, 41(1), 4-10.

[174] Evans, L., & Meade, R. (2005). The Role and Significance of Cooperatives in New Zealand Agriculture, A Comparative Institutional Analysis.

[175] Evans, L., & Guthrie, G. (2006). A dynamic theory of cooperatives: The link between efficiency and valuation. Journal of Institutional and Theoretical Economics JITE, 162(2), 364-383.

[176] Sykuta, M., & Cook, M. (2001). A New Institutional Economics Approach to Contracts and Cooperatives. American Journal of Agricultural Economics, 83(5).

[177] Cook, M. L. (1995). The future of US agricultural cooperatives: A neo-institutional approach. American Journal of Agricultural Economics, 77(5), 1153-1159.

[178] Basterretxea and Martinez (2012)

Empirically, this has been shown to leave members of cooperatives experiencing a significant loss compared to a situation in which they pursue a diversified portfolio. Maher and Emanuel (2005) argue that Fonterra member-patrons are worse off by approximately 63% of the value of their original investment. They find that the costs to farmers depends on the level of under-diversification of the farmer's assets. They further find that the farmer would endure a loss of up to 20% of their initial investment if a quarter of their assets were invested in Fonterra.

The above literature suggests that cooperatives will face a higher cost of capital, or lower access to capital, compared to investor owned firms of similar risk, unless they can adequately mitigate the portfolio problem.

Control problem

The control problem arises from a divergence of interests between members and the cooperative's management – the classical principal-agent problem.[179] Control problems can be an issue for all companies, but can be a particular concern for cooperatives due to the lack of concentrated ownership and a lack of tradable ownership rights.

The significant decision-making costs associated with overseeing cooperatives can result in significant power being placed in the hands of managers. Cooperative owners can face difficulty monitoring the performance of management if the cooperative has a large, dispersed ownership base that is not involved in the day-to-day running of the business. This makes principal-agent problems (i.e., the risk that management acts in their own interests rather than in the interests of owners).[180]

Kanter et al (2013) points out that patrons of investor owned firms have a natural mechanism for ensuring the efficient operation of managers of a business through equity market prices, which asses both the present and future performance of the firm. A traded share price can also provide a signal to the wider capital market if a firm is under-priced, thus inviting takeovers if management fails to perform.

Cooperative firms typically do not have traded equity and are insulated (e.g., through shareholder agreements and constitutions) that prevent takeovers.

As such, the actions of managers in cooperatives typically face less external discipline from potential investors seeking out opportunities for under-priced firms, whose value could be improved through efficiency improvements.

Where an equity market exists for cooperative shares, this can increase the ability of members to monitor their cooperative's value or evaluate managers' performance, or external discipline that helps mitigate principal agent problems.[181]

However, cooperatives have developed certain other mechanism, such as shareholders' councils and direct representation of owners on Boards, to reduce agency costs.

Influence problem

The influence problem refers to the scope for the interests of its owner-patrons to diverge. In the case of heterogeneity of the membership, there can be additional costs associated with the model. In

[179] Cook, M. L., and Iliopoulos, C. (1999). "Beginning to Inform the Theory of the Cooperative Firm: Emergence of the New Generation Cooperative." Finnish Journal of Business Economics 4(99): 525-535.

[180] Spear, R. (2004). Governance in democratic member-based organisations. Annals of public and cooperative economics, 75(1), 33-60

[181] Ortmann, G. F., & King, R. P. (2007). Agricultural cooperatives I: History, theory and problems. Agrekon, 46(1), 18-46

particular, interest groups can form and seek to influence the cooperative's operation to their benefit and at the expense of other owners.[182] If this occurs, then some members may be made better off at the expense of others.

Cooperatives can have higher influence costs than investor owned firms as member interests, which are linked on-farm activities, are more diverse than the normal shareholders, who are likely to be solely interested in profit maximisation.[183]

Summary of costs associated with cooperative ownership

The above potential problems with cooperative models can result in:

- non-profit maximising behaviours due to control and influence problems;
- higher costs of capital, or lower access to capital, due to the free-rider, horizon and portfolio problems, which may then impact upon the chosen commercial strategy; and
- higher costs due to free-rider, control and influence problems.

Do cooperatives have different motivations and incentives?

As discussed above, cooperatives differ from investor owned firms in that their ownership is often tied to patronage (or, for supplier cooperatives, to supply). Cooperatives are formed for a variety of reasons, which may not necessarily translate directly to maximising the profits of the cooperative as a standalone entity. Rather, cooperatives typically seek to optimise joint returns from the upstream activities of their owners (e.g., farming) and downstream cooperative activities (e.g., processing).[184]

The potential problems with the cooperative model may also influence cooperative behaviour if the problems are not addressed adequately.

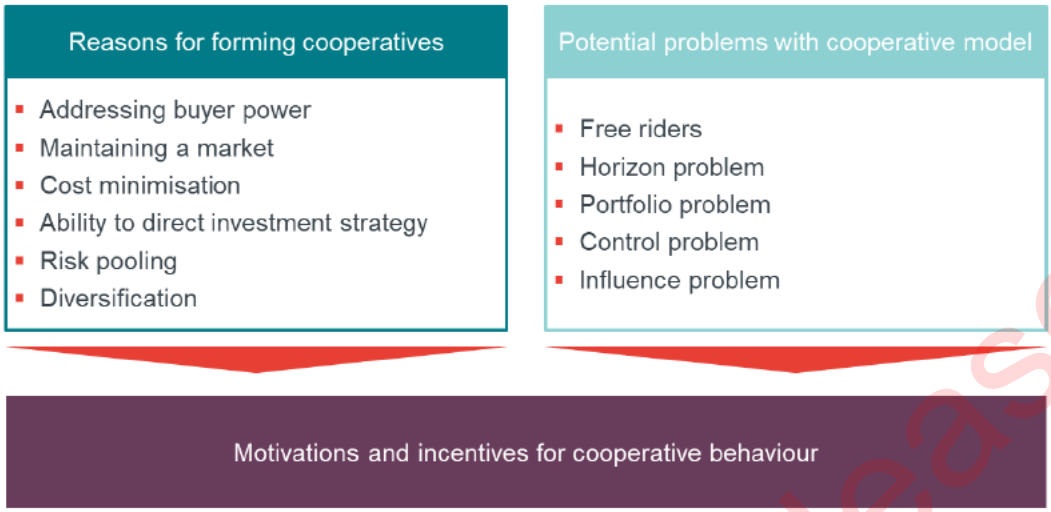
The combination of the influence of these factors is depicted in the Figure below in a stylised manner. The remainder of this Section draws together the literature in relation to the influence of these factors on cooperatives' motivations and incentives.

[182] Evans, L., & Meade, R. (2005). The Role and Significance of Cooperatives in New Zealand Agriculture, A Comparative Institutional Analysis

[183] Royer, J. S. (1999). Cooperative organizational strategies: A neo-institutional digest. Journal of cooperatives, 14(1), 44-67.

[184] Bontems, P., and Fulton, M. (2009). "Organizational Structure, Redistribution and the Endogeneity of Cost: Cooperatives, Investor-Owned Firms and the Cost of Procurement." Journal of Economic Behavior & Organization 72(1): 322-343

Figure 25 Influence on cooperatives' motivations and incentives



What are cooperatives' profit objective?

The profit objective of a cooperative depends on the view of how a cooperative structure should be classified. This view can be categorised into one of three approaches, as outlined below, each with implications for the metric that the cooperative is trying to maximise.

Figure 26: Different Theoretical Views of Cooperatives

	VERTICALLY INTEGRATED FIRM	INDEPENDENT FORM	COALITION OF FIRMS
Assigned objective to maximise	Members return	Profit	Allocation of optional profit across different parties
Price to members for supply	Highest	Lowest	Depends on negotiation & compromise across the different groups
Profit to cooperative	Lowest	Highest	Depends on negotiation
Performance indicator	Gross price and dividends	Profitability	Profit to each side

Source: Soboh, R. A., Lansink, A. O., Giesen, G., & Van Dijk, G. (2009)

If cooperatives are seen as a type of vertically integrated firm, where member-owners care about both their on-farm business profitability and off-farm business profitability, then the objective of the cooperative is to maximise the surplus of its members. Maximising this benefit requires.[185]

- paying the highest possible price for members' products; and
- then the optimal members' dividends or returns after that payout.

The optimal level of dividend or return will take into account members' motives in relation to risk or lack of diversification, which may result in them optimally investing less in the cooperative than would otherwise be the case.

The major motivation for a cooperative is to maximise the price at which their members sell to them while still being operationally effective. Since the major stakeholders in cooperatives are their members, the activities of cooperatives are to maximise the surplus that these members derive from their transactions with the cooperative. In the literature, this is represented by the cooperative purchasing outputs from its suppliers at a higher price than would be profit-maximising, if it had any market power as a buyer (Garshuis 2018, Sexton and Iskow 1993[186] and Kanter et al 2013). Nevertheless, a cooperative that succeeds in maximising total surplus to its owners would, from a total welfare perspective, be more allocatively efficient than one that an otherwise identical arm's length firm that sought to maximise its profits alone. This is because a monopsony buyer seeking to maximise its own profits would impose a deadweight loss on society (as well as taking some surplus away from its suppliers).

Porter and Scully (1987) in their initial regression analysis of the technical and allocative efficiency of cooperatives provide empirical analysis which reinforces the theoretical literature around the inefficiency of cooperatives in the theoretical analysis.

The above suggest that cooperatives are not profit-maximising in the traditional sense, but rather seek to maximise benefits to members. A challenge for cooperative management and members then becomes how best to monitor cooperative performance? As single indicators such as return on assets are less meaningful for cooperative performance, cooperatives are challenged with developing a more complex set of performance metrics compared to investor owned firms.[187]

Are there other factors that may influence cooperatives' incentive to profit maximise?

As noted above, cooperatives may require a more complex set of performance metrics than investor owned firms.[188] This is because they are typically tasked with maximising member benefits rather than maximising profits. Maximising member benefits primary revolves around maximising the payout for the products supplied. However, for members to determine whether the payout is maximised, they need a benchmark against which to compare. In some sectors, cooperatives were established to create this "competitive yardstick" so that suppliers could contextualise the price they were receiving from their

[185] Soboh, R. A., Lansink, A. O., Giesen, G., & Van Dijk, G. (2009)

[186] Sexton, R. J., & Iskow, J. (1993). What do we know about the economic efficiency of cooperatives: an evaluative survey. *Journal of Agricultural Cooperation*, *8*.

[187] Cook, M. L. (1994). The role of management behavior in agricultural cooperatives.

[188] Cook, M. L. (1994). The role of management behavior in agricultural cooperatives.

investor owned buyers.[189] In other words, farmers could compare the price they received from their investor owned firms to the one provided by the cooperative.

However, in concentrated agricultural processing markets, cooperatives are the predominant purchaser. Therefore, there may be no external benchmark against which to assess if payouts, or member benefits are being maximised. Cooperatives are therefore tasked with developing an information network to assess organisational performance that is more complex than for investor owned firms.[190] Such performance monitoring could include a number of metrics or other proxies for maximising payout. For example:

- revenue and revenue growth;[191]
- volumes;[192] and
- market share or market position.[193]

These metrics are also used in some academic literature to assess the performance of cooperatives, in particular revenue[194], revenue growth[195], and market share.[196]

These metrics could be used to show members that the cooperative is operating successfully. For instance, if a cooperative was losing market share, this may imply that it is no longer maximising some members' benefits compared to alternative options.

Principal-agent problems within cooperatives could also lead to management targeting objectives that do not maximise member benefits. That is, if members do not have full oversight of managers' actions within the cooperative, then managers may take actions that further their own objectives, such as pursuing mergers or expansion plans ('empire building') that may not be welfare enhancing for members.[197]

The principal-agent problem can be exacerbated in cooperatives that have greater difficulty of designing incentive schemes for managers that align their personal objectives with those of the cooperative.[198] For example, publicly-listed corporations might issue stock options to managers as part of their remuneration packages. Linking of executive compensation to the performance of the firm in this way would be an attempt to align the interests of managers and owners, and incentivise managers to maximise the value of the firm (since doing so would also maximise their own wealth). However, in cooperatives in which

[189] Peterson, H. C., & Anderson, B. L. (1996). Cooperative strategy: theory and practice. Agribusiness: An International Journal, 12(4), 371-383

[190] Cook, M. L. (1994). The role of management behavior in agricultural cooperatives.

[191] See, for example, Arla Foods annual report 2017 pg 5; Fonterra annual reports 2018 pg 52; Glanbia Cooperative Annual report, 2017.

[192] See, for example, Arla Foods annual report 2017 pg 4; Dairygold 2017 annual report; and Glanbia cooperative annual reports 2015 pg 10 and 12.

[193] See, for example, Arla Foods annual report 2017, in relation to retail markets, Glanbia Cooperative, Annual Report, 2015 pg 7; Fonterra 2017 Annual report in relation to non-New Zealand markets; FMG 2018/18 Annual Report, page 3;and FrieslandCampina 2017 annual report (for certain markets).

[194] Kenkel, P. L., Spence, B., & Gilbert, A. (2003). Post merger financial performance of Oklahoma cooperatives (No. 1363-2016-107887).

[195] Richards, T. J., & Manfredo, M. R. (2003). Post-merger performance of agricultural cooperatives. *Agricultural Finance Review*, *63*(2), 175-192.

[196] Kyriakopoulos, K., Meulenberg, M., & Nilsson, J. (2004). The impact of cooperative structure and firm culture on market orientation and performance. Agribusiness: An International Journal, 20(4), 379-396.

[197] Spear, R. (2004). Governance in democratic member-based organisations. Annals of public and cooperative economics, 75(1), 33-60.

[198] Ortmann, G. F., & King, R. P. (2007). Agricultural cooperatives I: History, theory and problems. Agrekon, 46(1), 18-46.

ownership is linked directly to supply of an input, it may be much harder to link executive compensation directly to the value of the firm.

Does the cooperative form impact upon commercial strategy?

Cooperatives' commercial strategy may be risk averse and less capital intensive than an investor owned firms, as:

- one of the reasons for forming a cooperative is to mitigate risk, and therefore they may be more likely to pursue a lower-risk commercial strategy; and
- portfolio, horizon and free rider problems may limit cooperatives access to capital.

Therefore, cooperatives may be risk averse as they seek to decrease overall risk for their members.

There are numerous mitigation options that cooperatives have developed in order to address the issues of capital constraints and the effect that those constraints have on commercial strategy. For example:

- **Raising debt**: There is evidence to suggest that cooperatives are more leveraged, on average, than comparable investor owned firms.
- **Outside equity**: Cooperatives have raised outside equity through listing B-shares, partial listings, or raising equity as part of a spin-off company that the cooperative retains shareholding in.[199]
- **Tradable shares**: Tradable share may allow members to invest not in proportion to their supply volumes, and therefore take account of different preferences of investment risk.
- **Closed cooperatives:** Closed cooperatives can decrease free-riding and increase commitment, which may make members more likely to invest.
- **Mergers**: Lerman and Parliament (1990) argue that a large amount of horizontal integration that has occurred amongst cooperatives is driven by the lack of access to capital for organic growth, and a focus on achieving economies of scale.[200]

Do cooperatives tend to oversupply?

There is some evidence in the literature that suggests traditional cooperatives may oversupply. Open-membership cooperative will have less control than investor owned firms in the magnitude of product it receives.[201] Members of such cooperatives will fail to internalise the full cost of increasing their supply, which includes lost revenues to other suppliers if the market price falls in response to such an increase.[202] Therefore, cooperatives are predicted to have higher supply volumes compared to investor owned firms, and a larger market share compared to a situation where the cooperative maximised members' total profit.

Over-supply of input may also be induced by suppliers responding to average rather than marginal revenue. This efficiency can be resolved if two conditions are met. Firstly, if the shares were priced at

[199] Frontier Economics, 2018, 2018 DIRA Review: Analysis of industry performance, A Report to the Ministry of Primary Industries

[200] Lerman, Z., & Parliament, C. (1991). Size and industry effects in the performance of agricultural cooperatives. Agricultural Economics, 6(1), 15-29

[201] Saitone, T. L., & Sexton, R. J. (2009). An evaluation of cooperatives' comparative strengths and weaknesses in a vertically differentiated agricultural product market. Discuss. Pap., Cent. Coop., Univ. Wis., Madison.

[202] Albæk, S., & Schultz, C. (1998). On the relative advantage of cooperatives. Economics Letters, 59(3), 397-401.

the present value of expected dividends.[203] Secondly, if entry and exit decisions are taken solely on the basis of profitability of membership of the cooperative.

So-called "member opportunism" can be a problem in open entry cooperatives. This refers to a situation whereby the member of the cooperative considers their interests above those of the cooperative. As a result of this phenomenon, the cooperative is unable to control the volumes supplied by members.[204] This problem can be overcome if the cooperative is able to contract for delivery of certain volumes.

Is there evidence of different performance from cooperatives?

As the above literature suggests that there are certain problems that may arise with cooperatives. This section considers the empirical evidence for any such problems.

Financial performance

There is significant empirical evidence that suggests some cooperatives perform worse than investor owned firms using traditional financial metrics.[205] For example, a study of 170 European dairy companies found that cooperatives are on average less profitable but operate more efficiently and have a stronger financial position than investor owned firms.[206]A study of the financial performance of the 39 largest dairy firms in Greece found that cooperatives were less profitable than investor owned firms which they attributed to their capital structure and their market share.[207] However, more recent studies indicate that cooperatives are similarly efficient when compared with investor owned firms.[208] However, the financial performance of a cooperative depends on the form of the cooperative. Evaluating the financial performance of cooperatives is more complicated than that of investor owned firms because the two types of firms have different motives. Therefore, traditional metrics such as return on assets and return on investment may be inadequate to describe performance if members have broader objectives (such as risk minimisation). For example, empirical analysis has shown that cooperatives are less leveraged than their investor owned counterparts.[209]

The owners of cooperatives, contrary to the owners of investor owned firms, are not mainly interested in the return on their investment but in other services and benefits provided by the cooperatives, such as a high milk price and a secure market outlet (Staatz, 1989). Consequently, cooperatives are expected to have a lower profitability and higher material cost (including raw milk) than investor owned firms (Lerman and Parliament, 1990).

[203] Evans, L., & Guthrie, G. (2006). A dynamic theory of cooperatives: The link between efficiency and valuation. Journal of Institutional and Theoretical Economics JITE, 162(2), 364-383.

[204] Harris, A., Stefanson, B., & Fulton, M. E. (1996). New generation cooperatives and cooperative theory. Journal of cooperatives, 11(1142-2016-92720), 15

[205] Soboh, R. A., Lansink, A. O., Giesen, G., & Van D jk, G. (2009). Performance measurement of the agricultural marketing cooperatives: the gap between theory and practice. Review of Agricultural Economics, 31(3), 446-469.

[206] Soboh, R. A., Lansink, A. O., Giesen, G., & Van D jk, G. (2009). Performance measurement of the agricultural marketing cooperatives: the gap between theory and practice. Review of Agricultural Economics, 31(3), 446-469.

[207] Notta, O., & Vlachvei, A. (2007). Performance of cooperatives and investor-owned firms: the case of the Greek Dairy Industry. In *Vertical markets and cooperative hierarchies* (pp. 275-285). Springer, Dordrecht.

[208] Nilsson, J., & Dijk, G. V. (1997). *Strategies and structures in the Agro-food industries*.

[209] Hardesty, S. D., & Salgia, V. D. (2004). *Comparative financial performance of agricultural cooperatives and investor-owned firms* (No. 1262-2016-101837).

Efficiency performance

The empirical evidence on cooperatives efficiency performance is mixed and inconclusive. Initial empirical analysis suggested that cooperatives are less efficient than investor owned firms.[210] Some surveys of efficiency studies suggest that there is little credible evidence to support that cooperatives are more or less efficient than investor owned firms.[211] There is also empirical evidence that the financial constraints forced upon cooperatives by the lack of capital allow them to perform more efficiently during times of financial difficulty.[212] This is understandable given that one of the purposes of a cooperative is to account for times of financial difficulty in the industry.

Evidence in relation to dairy cooperatives in Europe, finds that dairy cooperatives have more productive technology, but are overall slightly less efficient than investor owned firms. While other surveys have found that dairy cooperatives tend to outperform their investor owned counterparts in terms of various efficiency performance measures.[213] A study of the 39 largest Greek dairy producers found that cooperatives have a lower rate of return on assets and a lower market share than comparable investor owned firms.

Managerial performance

There is some evidence that cooperatives have less ability to attract managerial talent compared to investor owned firms. This has been shown by Basteretxia and Martinez (2012) empirically to cause cooperative firms to have less effective managerial performance because of their inability to raise liquidity to pay them effectively or to convince their members of the need to pay them high wages.[214] Of course, there are a wide range of cooperatives, with some very large, global firms that may be better able to attract managerial talent through remuneration and non-monetary benefits.

Spear (2004) argues that the lack of strategic focus on profit as well as the risk aversion of cooperative members make it difficult to design an effective incentive structure to motivate managers to act in a way that meets the objectives of the cooperative. He suggests that this can lead to member-driven cooperatives moving toward cosy manager-board relationships, which may have a negative effect on firm performance.

The evidence suggest that larger cooperatives are better able to mitigate against managerial performance issues found in smaller cooperatives. Basteretxea and Martinez (2012) indicate that large cooperatives are better able to summon liquidity to incentivise better managerial performance and improve innovation through investment in capital. Spear (2004) argues that the market for mergers and acquisitions is a mechanism for “waking up sleepy managers” because mergers in the cooperative sector are often highly Board and management focused.

[210] Porter, P. K., & Scully, G. W. (1987). Economic efficiency in cooperatives. *The Journal of law and economics*, *30*(2), 489-512.

[211] Sexton, R. J., & Iskow, J. (1993). What do we know about the economic efficiency of cooperatives: an evaluative survey. Journal of Agricultural Cooperation, 8.

[212] Maietta, O. W., & Sena, V. (2010). Financial Constraints And Technical Efficiency: Some Empirical Evidence For Italian Producers' Cooperatives. *Annals of Public and Cooperative Economics*, *81*(1), 21-38.

[213] Evans, L., & Meade, R. (2005). The Role and Significance of Cooperatives in New Zealand Agriculture, A Comparative Institutional Analysis.

[214] Basterretxea, Imanol, and Ricardo Martínez. (2012) "Impact of management and innovation capabilities on performance: Are cooperatives different?." Annals of Public and Cooperative Economics 83.3: 357-381.

Innovation

As previously outlined, some types of cooperatives can face limits on their ability to raise capital. This may hinder their ability to invest in innovation. Therefore, capital-constrained cooperatives can be less innovative than their investor owned counterparts. Chaddad and Cook (2004) argue this inability to access capital as an important reason for the lack of innovation in cooperatives compared to investor owned firms.

Basteretxea and Martinez (2012) argue that the risk aversion that may be inherent to some cooperatives may mean that R&D is viewed by cooperative owners as an inherently risky activity. This could result in underinvestment in innovation.

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