CONCENTRATED MARKET POWER AND INFORMATION ASYMMETRY WITHIN THE SOUTH AFRICAN DAIRY SUPPLY CHAIN

By

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Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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Abstract

Concentrated market power and information asymmetry represent forms of market failure within the South African dairy supply chain. Following deregulation, instead of large numbers of buyers and sellers so that no buyer or seller holds significant amount of power to influence the market; and perfect information availability and accessibility, the supply chain is characterised by market concentration at processor and retailer level as well as information asymmetry. South Africa's number of dairy farmers has declined by up to 50% since 1997, and they face a small number of processors which have regional dominance. These processors sell to a concentrated retail sector which is the main distribution channel for milk and dairy products. As processors and supermarkets emerge as major drivers within the dairy supply chain; processors in South Africa utilise the information asymmetry to engage in anticompetitive behaviour while supermarkets exert their power through the conditions of sale in contracts with processors as well as the threat of in-house brands. Farmers have less bargaining power and receive lower farm gate prices than they would have in the absence of concentrated market power and information asymmetry. Consequently, these market failures are detrimental to allocative efficiency and the enhancement of equity objectives.

By method of a literature based comparative analysis, this study investigates the nature and extent of concentrated market power and information asymmetry within the selected dairy countries namely; South Africa, Australia, Canada, New Zealand, UK, and USA. The dairy supply chains in these countries show a spectrum of government control, such as Canada's system of supply management, Australia's deregulated system, and the US system which is mostly characterised by government intervention. The study then analyses how the selected countries address market failure within the dairy supply chain. An analysis of agricultural and dairy policies and strategies within the selected countries shows that systems that are designed to consider broader social goals (equity) apart for economic efficiency are more successful in preventing problems of concentrated market power and information asymmetry. The ways that the selected countries address the problems of concentrated market power and information asymmetry are analysed for applicability to the South African dairy supply chain.

Is it recommended that in order to position the South African dairy supply chain to address problems of concentrated market power and information asymmetry effectively, a departure from the strict adherence to the market, to move towards a reregulated system in which broader social

and environmental goals are considered by multiple stakeholders in formulating policy and strategy within the supply chain is required.

Opsomming

Markkonsentrasie en inligting asimmetrie as vorme van markmislukkings kom voor in die Suid-Afrikaanse suiwelbedryf. Sedert deregulering het die getalle kopers en verkopers steeds nie voldoende toegeneem sodat geen van hulle genoeg bedingingsmag het om die mark beduidend te beïnvloed nie. Verder is markinligting se beskikbaarheid en toeganklikheid steeds ontoereikend. Die suiwelaanbodketing word gekenmerk deur markkonsentrasie op verwerkings- en kleinhandelvlak. Inligting asimmetrie heers ook steeds. Die getal suiwelprodusente in Suid-Afrika het sedert 1997 met 50% gedaal. Die suiwelprodusente verkoop melk aan ‘n klein getal melkverwerkers wat die mark op plaaslike vlak oorheers. Hierdie verwerkers verkoop weer aan ‘n gekonsentreerde kleinhandelsektor wat as die belangrikste verspreiders van melk en verwerkte suiwelprodukte dien. Die verwerkers en kleinhandelaars is die pasaangeërs in die suiwelaanbodkanaal. Die verwerkers gebruik inligting asimmetrie in onmededingende optrede jeens primêre produsente en supermarkte oefen hul markkrag jeens verwerkers uit deur middel van verkoopsvoorwaardes en afdreiging met voorkeur vir eie handelsmerke. Primêre produsente se bedingingsmag krimp en hulle ontvang laer plaashekpryse as wat hulle sou ontvang in die afwesigheid van markkonsentrasie elders in die aanbodkanaal en in die afwesigheid van inligting asimmetrie. Hierdie markmislukkings benadeel die mark se allokasiedoeltreffendheid en die bevordering van billikheidsoorwegings.

Hierdie ondersoek behels ‘n vergelykende ontleding van die aard en omvang van markkonsentrasie en inligting asimmetrie in geselekteerde suiwellande gegrond op ‘n literatuurstudie. Die suiwellande is Suid Afrika, Australië, Kanada, Nieu Zeeland, Verenigde Koninkryk en die Verenigde State van Amerika. Die suiwelaanbodkettings in hierdie lande bevind hulself op ‘n wye spektrum van regeringsbeheer, byvoorbeeld Kanada se aanbodbestuurstelsel, Australië se gedereguleerde stelsel en die VSA se stelsel wat die groter mate van statutêre regulering verteenwoordig. Die ondersoek fokus op die wyse waarop die geselekteerde lande markmislukkings in hul onderskeie suiwelaanbodkettings aanspreek. Die ondersoek toon dat daardie suiwelaanbodkettings wat ingerig is om breër sosiale doelwitte soos billikheid te verreken, en dus wyer te fokus as bloot ekonomiese doeltreffendheid, meer suksesvol is om magskonsentrasie en inligting asimmetrie te voorkom. Die wyse waarop die geselekteerde lande magskonsentrasie en inligting asimmetrie hanteer word geevalueer in terme van die toepaslikheid daarvan vir die Suid-Afrikaanse suiwelaanbodketting. Teen hierdie agtergrond word aanbeveel dat afgewyk word van ‘n streng navolging van die vrye mark beginsel om die probleem van markkonsentrasie en inligting asimmetrie effektief aan te spreek. ‘n Meer gereguleerde stelsel waarin verskeie belangegroepe se breër sosiale en

omgewingsbewaring doelwitte in ag geneem word by strategie- en beleidformulering in die suiwelaanbodketting, word voorgestel.

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1. Introduction

The idea of the market as an efficient, self-regulating system forms the basis of the reforms undertaken in South African agriculture within the last three decades. Proponents of the free market system set their belief in the market as the mechanism for delivering a social best through optimal resource allocation. This belief was anchored on certain important assumptions or necessary and sufficient conditions. Yet, in today's agricultural markets, these necessary and sufficient conditions for perfect competition do not hold true. While traditionally, agricultural markets closely modelled the perfectly competitive ideal by having large numbers of buyers and sellers of homogenous goods in a system governed by an "invisible hand", today's agricultural markets are more complex. Historically it was assumed that farmers would look after their own interests and be primarily focused on making a profit as would processors and retailers. Consumers on the other hand would be interested in getting fair value for their money. Consequently, forces of supply and demand would dictate who produced what and when, as well as who would buy and sell and at what price along the supply chain. But the current reality of agricultural markets is a deviation from this historical ideal. Based on these preconditions, the perfectly competitive market was adopted as the model for reform, and policy was geared toward it. Instead of the historical picture of agricultural markets, today's dairy supply chain represents an hour-glass shape in which "a large number of farmers at the base sell to a small number of processors and distributors and supermarkets in the middle, who sell to a very large number of consumers at the top" (Murphy, 2006, p. 12).

The South African dairy supply chain has undergone a noticeable metamorphosis. This change has been driven by various factors, including political, social and economic reforms within the dairy industry, the agricultural sector, the economy and within the country as a whole. South Africa is the largest economy on the African continent, with a per capita gross domestic product (GDP) that is more than four times the African average (OECD, 2006). South Africa's agriculture sector is dualistic, where a developed commercial farming sector co-exists with a large number of subsistence (communal) farms. More than 80% of South Africa is dry to semi-arid with an unreliable rainfall. This makes most of the country unsuited for intensive agricultural production systems like dairy farming. With a milk producer base of 3608 as of August 2008, the South African Dairy industry has experienced a 48% decrease in the number of producers since 1997. The largest decrease in producers occurred in the Northern Cape (74, 4%), while the number of producers in the Free State decreased by 23%. In 2006, the average number of cows in milk was about 150 with average milk production per cow per day being just over 15 litres per day. Of the

country's total milk production, 89% was sold in the formal market and 3% informally. The remaining 8% was directed towards production uses such as feeding calves (Lacto Data, 2008).

As does the bulk of the agricultural sector, the dairy supply chain operates in a neo-liberalised economy and deregulated market, and is governed by the Agricultural Marketing Act of 1996 and Competition Policy of 1994 among other legislative instruments. The 1996 Marketing Act's states its objectives as outlined in its Section 2, as:

- increased market access for all market participants;
- the promotion of efficiency in the marketing of agricultural products;
- optimisation of export earnings from agricultural products;
- enhancing the viability of the agricultural sector (Vink & Kirsten, 2000, p. 23).

The broad goals of the Marketing Act were intended to promote free and open agricultural commodity markets and facilitate access to these markets for new black producers (Qeqe & Cartwright, 2004, p. 2).

The deregulation process saw South African agriculture transitioning from a highly protected and regulated sector to one of total liberalisation and state deregulation. The government withdrew much of its financial support for agriculture. These agricultural reforms in South Africa took place on the basis of assumptions that were not met then, and still have not been met today. As a result, the outcome of these reforms has not been consistent with the desired expectations and there have been unintended consequences from reform. Within the deregulated environment, while farmers may receive prices that are largely undistorted by government intervention, other forces are at play still determining and influencing farm-gate prices and the farmers' share of the food dollar.

Deregulation and the subsequent promulgation of the Marketing Act in 1996 marked a commitment towards a market-based economic approach within the agricultural sector. But deregulation and market liberalisation have done little to bring the perceived benefits to the majority of farmers within the dairy supply chain. Within the deregulated environment has emerged a dairy industry characterised by falling producer numbers, and a largely concentrated processing and retail sector. Buyer power, the ever-decreasing number of farmers, the declining farm numbers, trends towards increasing farm-sizes, the declining farmers' share of the food dollar, the emergence of retailers as greater powerhouses within the dairy supply chain, processors collusion and displays of anti-competitive behaviour are all characteristics of post deregulation dairy supply chains. In the period following deregulation dairy processors instituted their own form of supply management within the South Africa supply chain. The Competition Commission of South Africa released a press statement

with allegations of surplus removal from the market in order to keep prices high as well as the sharing of sensitive information by milk processors enabling them to fix prices (Competition Commission of South Africa, 2006).

The process of deregulation "dismantled the existing state-managed marketing infrastructure that had linked co-operatives, agri-processors, marketing boards and marketing agents" (Qeqe & Cartwright, 2004, p. 2). While, "agricultural Control Boards disturbed the industry's commercial activities for decades" (Vink & Kirsten, 2000, p. 4), today, farmers and agribusinesses have to shoulder responsibilities and risks in agricultural markets that were previously assumed by government agencies (Doyer et al, 2007, p. 495).

While the benefits of deregulation have been that South African Agriculture has become more efficient and flexible, with farmers productivity and ability to adjust production processes to relative prices increasing (Van Zyl et al, 2001). This same process of deregulation and liberalisation exposed farmers and agribusinesses alike to international trends.

Operations and subsequent power dynamics within supply chains have become more complex. What has emerged following reform is a dairy supply chain comprising a diminishing farmer base, selling to smaller numbers of milk buyers, distributors and processors and even fewer retailers who sell to a large number of consumers. In this emergent 'hourglass' market structure, the relationship between price, supply and demand has become more complex as the market is no longer strictly ruled by an "invisible hand". The dairy industry is characterised by a consumer body with dynamic needs, the ever-growing powerful retailer, a processing sector under pressure to innovate or perish and the family farmer; an endangered species facing extinction. Within the dairy supply chains, sources of processor power come from dealing with large number of mainly fragmented sellers (dairy farmers). At the same time, processors have to contend with an increasingly powerful and concentrated retail sector which is their main distribution channel. The same deregulation that was meant to see benefits accruing to all players within supply chain has seen emergence of power imbalances, information asymmetries and other externalities. That all these players with varying degrees of power, convergent as well as divergent goals and strategies, would all operate freely and fairly as players within a dairy market with only a set of rules to guide them, is an exceedingly high expectation that has not and is unlikely to be met without some effort.

The position of South Africa's dairy supply chain is not unique. This study will show how, globally, countries such as New Zealand, Canada, the United States (US), the United Kingdom (UK) and

Australia, have instituted various socio-economic and political reforms with varying results. Deregulation and trade liberalisation opened dairy markets worldwide to exchange rate fluctuations and the volatility that is characteristic of commodity markets. Yet in this dairy supply chains have continued to perform with varying degrees of success, varying degrees of alignment to the free market. Concentration is evident both upstream and downstream in the supply chain. The emerging and seemingly consistent result is a declining farmer's share of the food dollar and an increasingly powerful retail sector.

This study focuses on two of the problems; concentrated market power and information asymmetry, that have arisen as the "market" model has been pursued within the context of dairy supply chains worldwide. As market developments such as closer vertical coordination have taken place, these have been accompanied by rationalisation and increasing concentration in the input supply, processing, and retailing and distribution sectors. This presents a challenge for governments to ensure that the social welfare losses and misallocation of resources that result from an abuse of market power are avoided (Young & Hobbs, 2002, p. 438).

Governments attempt to maximise the strengths of the free market system, while correcting and compensating for its weaknesses in order to provide a stable framework for which private individuals and firms can freely and confidently plan and make their own decisions. This has been done through legislative or institutional reforms (Sagoff, 1990, p. 21). In order for markets to be more effective in achieving goals set, there are institutions that serve to aid them. Within the South African context these institutions include;

- Legislation like Competition Law
- Institutions like SAFEX
- Tools such as contracts

Government intervention through institutions such as the Competition Commission sets out not to achieve a state of perfect competition but of "effective'' competition (Symeonidis, 2004, p. 2). Competition Policy emerged from an attempt by governments to coordinate the behaviour of firms often arising from concerns about fair price and the competitive process. It attempts to create a level playing field in a market-led economy.

However, the responsibility of correcting market failure cannot lie within government only if goals of both efficiency and equity are to be obtained and maintained within the supply chain. This study draws from the experiences of dairy supply chains worldwide, and observes how dairy farmers,

processors and retailers together with government, have positioned themselves in response to the developments within the market. In the course of the study, it will be evident that with a move towards the market system, and the ensuing deregulation to the exclusion of broader social and environmental goals, has come unintended consequences within the system. These have manifested themselves in a wide range of ways which shall be explored.

Food does not only have to meet nutritional needs but increasingly how this food is produced and marketed and the effects of this at a broader social and environmental level have become more important. This study is about what South African dairy farmers can learn from dairy supply chains worldwide about adapting to the evolving world food system. It explores what strategies and policies can be adopted to ensure the functioning dairy supply chains in a manner that satisfies the socio-political as well as economic needs of the nation.

1.1 Hypothesis

The extent of deregulation has resulted in more unintended consequences within the dairy supply chains, to the detriment of the farmers who are the most vulnerable. This study proposes that;

- Partial reregulation of the South African dairy sector will address the power and informational imbalances within the supply chain.
- Setting and implementing broader social goals for the dairy sector will address the failure by the market to achieve allocative efficiency.

1.1.1 Importance of Research

This study challenges indiscriminate adoption of “the market” as a mechanism for equitable and efficient operation of the South African dairy supply chain. This is based on the observation that the necessary and sufficient conditions for the market do not exist within the South African supply chain. As a result, what arises is a “distorted’ system that does not ensure efficient and equitable production and distributional efficiency.

Evidence of market power and information asymmetry can be found at various stages of the agricultural supply chain, such as production, processing and distribution. There has been evidence of the growth of buyer power within dairy supply chains in recent years (Vorley, 2004). In recent years, the South African dairy supply chain has been facing a number of problems; with dairy

processors being brought to the Competition Tribunal for violating the process of competition within the supply chain; the milk shortages incurred; the decreasing number of milk producers in the country and the increasing cost of dairy products. This study is important for addressing buyer power concerns within the South African context. "Many a study has been done on seller power and on monopolies but "the dismissive treatment of buyer market power is not reasonable for economists interested in agriculture and agricultural markets" (Sexton & Rogers, 1994, p. 1143).

In order for broader goals of fostering, sustainability, competitiveness and profitability in the agricultural sector to be achieved, the way the supply chain is operating must be put in perspective. Dairy industries worldwide have taken varying measures in order not only to increase competitiveness but meet strategic goals unique to their sectors. Dairy supply chains function differently in different parts of the world. South Africa's dairy supply chain can draw lessons from other countries that have and are currently undergoing similar issues. This study will show by example, various mechanisms and systems that have been adopted in the selected dairy supply chains worldwide, to best enable the operation of a more efficient and equitable supply chain. The study will also show that even in countries where the "market" has been adopted as the economic system, it has been found necessary to "support" the market where it fails.

1.2 Research Questions

The study considers two problems that have arisen from market failure within supply chains; concentrated market power and information asymmetry. Within the dairy supply chains of South Africa, Australia, Canada, New Zealand, UK and the US, the following questions are explored;

- What are the preconditions for an efficiently operating market, focusing specifically on:
    - Many buyers- sellers (market concentration)
    - Information (adverse selection)
- What happens when any of the preconditions are not met?
- Are there any broader social and environmental goals set?
- Are there any efforts to create a picture of a socially desired outcome?
- How are "unintended consequences" of the free-market system dealt with?
- How does the problem of concentrated market power manifest within the selected dairy supply chains?
- How does the problem of information asymmetry and adverse selection manifest within the selected case studies of dairy supply chains?

- How do selected dairy countries accommodate broader social and environmental goals?
- How do other economies/ dairy supply chains justify the use of policy measures that cause a deviation from "free-market" allocation if such policy measures are applied?
- What policy measures are undertaken to address the problem of concentrated market power?
- What policy measures are undertaken to address the information asymmetry problem?
- What is the outcome of these policy measures?
- Which are the most successful policy steps?
- How applicable are these policy steps for South Africa?

1.3 Research Objectives

The South African dairy supply chain is operating in an emerging new market economy following deregulation in 1996. The study explores how the problems of concentrated market power and information asymmetry manifest within dairy supply chains worldwide particularly following market reforms such as deregulation. This study aims to show how players within the supply chain from producers to consumers have been affected and responded. The study will explore the possibility of adjusting the levels of regulation or intervention within the supply chain through legislative instruments such as the country's competition policy. The need for broader social and environmental objectives within agricultural policies is also explored. This research will reveal by drawing from experiences of countries such as New Zealand, Australia, UK, USA and Canada, what is regarded as the "best possible" environment for the functioning of the dairy market and how this is accomplished.

The descriptive study will reveal the strategies and policies that have been used in other dairy supply chains to solve the problems identified and analyse whether these strategies are adaptable to the South African context. This is important in South Africa because of the need to maintain an agricultural industry that is not only competitive, sustainable and profitable, but also addresses equity and development objectives.

1.4 Methodology

The study is conducted by method of comparative analysis of the dairy supply chains of selected countries. The literature used is drawn from a range of sources including academic papers, and

"grey literature" produced by organisations representing various stakeholders within the dairy supply chains.

1.5 Thesis Layout

This study begins with examining the decentralised decision making system in which most dairy supply chains operate. Chapter 2 provides the theory of the market and the preconditions of perfectly competitive markets. The problems that arise in relation to the efficient operation of the market, especially when the preconditions are not met are discussed. This chapter further explores the goals underlying the use of the market mechanism and the unintended consequences that arise from taking into account limited considerations within the market. The importance of broader social and environmental goals is highlighted. The manifestation of problems within the selected country's dairy supply chain is considered in Chapters 3 and 4. In Chapter 3, a quantitative and qualitative account of how concentrated market power is observed within the selected dairy supply chains is given. Chapter 4 shows how the problem of information asymmetry is observed within the selected dairy supply chains. The chapter also sheds light into how broader social and environmental goals are accommodated within the supply chains. Chapter 5 then describes and evaluates the policy steps that have been taken in each of the selected countries to address the problems of concentrated market power and information asymmetry. This includes the outcome of policy measures undertaken. Chapter 6 focuses on the conclusions that can be drawn from the findings of the study, with the intention of relating these to the South African context. By drawing from the experiences of the dairy countries under study in dealing with concentrated market power and information asymmetries within the supply chain, the chapter summarises some of the "best-practices" for the dairy supply chain so that productive and allocative efficiency objectives are met. Chapter 6 ends with recommendations drawn from the most successful strategies and policy steps observed in the dairy supply chains under study. These recommendations are proposed in view of their applicability to the South African context.

2. Problems Relating to the Operation of the Market

"Criticism of accepted classical theory of economics has consisted not so much in finding logical flaws in its analysis as in pointing out that its tacit assumptions are seldom or never satisfied, with the result that it cannot solve the problems of the real world" Keynes (1936).

2.1 Introduction

Market theory provides the canvas against which the problems of this research are observed. It is within the preconditions of perfectly competitive markets namely; "many buyers and many sellers", as well as "perfect information", that the problems of concentrated market power and information asymmetry are borne. This chapter presents the theoretical framework for the two problems. In this chapter, the preconditions for efficient markets are discussed, as well as the consequences and responses when preconditions are not met. The chapter provides a critique of the market by focusing specifically on the assumptions upon which the theory of perfectly competitive markets is based.

2.2 Market Theory

Economic systems determine who produces what and for whom. The objective of markets is to bring about some desired results in terms of wealth distribution and social welfare. In theory the well functioning perfectly competitive market is supposed to produce: Economic Growth, Allocative Efficiency (producing what consumers want), Technical Efficiency (optimal use of production means), Equity and Full Employment (Lipsey et al, 1999). This expectation is based on certain assumptions about the environment in which the market operates. In order for a market to be perfectly competitive:

- There must be a large number of buyers and sellers so that no market participant can influence price or quantity
- A homogeneous product must be produced
- No barrier to entry or exit either to or from the industry
- The goal of all market participants should be profit maximization or utility maximization
- There should be no government interference in the industry

- Factors of production should be perfectly mobile
- All buyers and sellers within market should have perfect information of the market (Koutsoyiannis, 1975, pp. 154-5).

It is only under such a market structure that competitive efficiency can be achieved (Gill, 1973, pp 510-511), otherwise market failure occurs. Within market economies, demand and supply forces are central to determining price. Price greatly influences what is produced, when, and the quantity. This system relies on information about price and product being available and accessible to all market participants. The price system acts to coordinate the market in an unplanned, decentralised manner. It is the changes in price and profits that lead to responses by producers and consumers within the market (Lipsey et al, 1999).

Market economies are best known for flexibility and decentralised decision making. The defence for markets is that they "are effective mechanisms for coordinating the decisions of decentralized decision makers" (Lipsey et al, 1999). This is because theoretically, it can be argued that within efficient market systems there are:

- Provision of automatic coordination for actions of decentralized decision makers
- Innovation and economic growth that is stimulated by the pursuit of profit
- A self-correcting mechanism which make situations of disequilibrium only temporary
- A decentralization of economic power

Competition is an important pillar in market economies acting as a mechanism of control for the market system. It not only guarantees that industry responds to consumer wants, but it also forces firms to adopt the most efficient production techniques. According to the First and Second Theorems of welfare economics:

- Competition leads to efficiency.
- Any efficient outcome that one might desire can be attained through the operation of competitive markets

Apart from the highlighted pre-conditions for the market, self-interest and incentives play a crucial role in decision making within markets. Deregulation and privatisation also lie at the heart of market economies. The advantage of the market lies in its coordination of decentralised decisions by a very large number of economic agents without the need for conscious control. Not only does the market provide strong incentives and discipline producers against wasteful use of resources, but it also conveys information about constantly changing market conditions, allowing for flexibility in

decision-making" (Symeonidis, 2004, p. 1). This type of economic system is more apt to cope with ever-changing market trends, making it faster and more reactive. Market economies are therefore often regarded as a fertile breeding ground for innovation, and entrepreneurship as private enterprise positions itself in response to consumer demand. By adopting strategies ranging from "response to demand" to "anticipating demand", and even "influencing and creating demand", only the "crafty" survive in the market. Finally, "the market does not usually lead to excessive concentration of economic power" (Symeonidis, 2004, p. 1).

The government has a limited role within the market beyond creating and maintaining an enabling environment for business. While being a contentious matter, it has been found that government interventions are sometimes necessary within the market. In these cases, the government mainly deals with the formation and implementation of rules and regulations and ensures that anti-competitive behaviour does not obstruct competition in the marketplace.

In practice, the free-market system is rarely if ever, efficient on all levels. Efficiency seems elusive as the necessary and sufficient conditions for "free-markets" are never met unless in hypothetical situations. In a market economy, imperfect competition is a source of inefficiency. Yet the appeal of the market has not diminished. So when the market mechanism does not bring about economic efficiency, this is deemed as "market failure". Pure markets, free markets, can fail; have failed to bring about the desired freedom, autonomy, competition, property rights and efficiency. Given the nature of South Africa's markets, attention to the issue of imperfect competition in markets is important to achieving policy objectives.

2.2.1 Market Failure

When the assumptions for perfect competition are unmet within the market, market failure occurs. Market failure arises from the presence of concentrated market power, public goods, externalities and information asymmetries within the system (Symeonidis, 2004). When preconditions are not met, the expected goals of economic growth, allocative and productive efficiency, equity, income distribution, full employment as well as preservation of value systems will also remain unmet. The now "kinked" system fails to achieve its goals. Therefore market failure is really "a circumstance in which the pursuit of private interest does not lead to an efficient use of society's resources or a fair distribution of society's goods" (Rocha, 2007, p. 1).

When the market fails, it is not to say that nothing good has happened and society would be better off in the absence of this system. Rather, it means that "the best possible attainable outcome has not been achieved" (Lipsey et al, 1999). Within an economy there are broader social and environmental goals that the market is supposed to meet. When these goals that go beyond allocative efficiency are unmet, then the market has failed. To obtain allocative efficiency, the marginal cost for society of producing each good must equal the marginal benefit to society of that good. In the presence of concentrated market power, public goods, externalities and information asymmetries, the marginal benefit does not equal the marginal cost to society (Lipsey et al, 1999).

The problems of concentrated market power and information asymmetry examined in this research are both departures from the assumptions necessary for competitive equilibrium and are therefore sources of market failure. The objective is to investigate and reveal the manner in which market failure has occurred within the dairy supply chains based on these two departures, and how this has been dealt with in the different economies under study.

2.3 Precondition 1: Many Buyers and Many Sellers

Perfectly competitive markets require the participation of many buyers and many sellers to the extent that no market participant has power to influence price or quantity within the market. Under conditions of perfect competition, the presence and participation of large numbers of buyers and large numbers of sellers is such that each has an insignificant market share and are small enough such that their individual actions (buying or selling) have a relatively small impact on the overall market (Lipsey et al, 1999). They are price takers.

The nature of markets is that they are not always characterised by many buyers and sellers. When this precondition of "many buyers and many sellers" is not met within the market, problems arise. Since the presence of many buyers and many sellers within the market means that none of these have significant market power, it follows then that deviation from this state will mean a change in the way in which power is distributed. The distribution of buyers and sellers may also take the following forms;

- Few buyers and many sellers: Oligopsony
- Many buyers and few sellers: Oligopoly
- One seller and many buyers: Monopoly
- One buyer and many sellers: Monopsony

When a firm has the ability to affect price, reduce competition and to set standards for a sector of economic activity, that firm posses market power. Market power "is the ability to set customer prices above competitive levels (seller power) and/or the ability to set supplier prices below competitive levels (buyer power)" (Murphy, 2006, p. 9). The phenomenon of concentrated market power arises from the number and size distribution of firms with the market.

2.3.1 Market Power

Market power can take two forms: Buyer power and Supplier power. In each case, either the demand or supply side is concentrated such that buyers and sellers respectively can exercise market power over other players within the supply chain. This power extends beyond "the ability to reduce prices" and encompasses all "terms of supply" or all "buying terms", conditions, contractual obligations such as listing fees, slotting allowances, volume rebates, contribution to promotional expenses, most favoured customer clauses, and exclusivity requirements (Chen, 2008, p. 245).

Although there may be some industries where it is less costly (more efficient) for production to take place with a few producers relative to the market size (Lipsey et al, 1999, p. 387), market power is regarded as a danger to efficiency. Market power worries economists because it interferes with the distribution of benefits from economic exchanges, usually in the interests of a few at the expense of the majority. The exercise of concentrated market power does not always only result in welfare losses (efficiency and dead weight losses). In some instances, the effects may be distributional, such that surplus is transferred to the market agent possessing the power (Sexton, 2000, p. 1096). When exercised, market power distorts incentives to undertake market-expanding activities. For instance, the exercise of market power by either processors or retailers within the supply chain transfers surplus from farmers. This causes incentives to undertake investments at the farm level to be attenuated. If this surplus is transferred to the marketing sector, then the marketing firms have incentive to undertake some investments that may not have been possible within a competitive environment. In the long run, oligopoly or oligopsony power reduces production of the primary farm commodities and threatens supply (Sexton, 2000, p. 1100).

Within the market, vertical and horizontal competition and market power are closely intertwined and reinforce each other. Firms with market power posses it because of the combination of both horizontal and vertical clout as well the capabilities of their internal departments as compared to their competitors and to the category average (Steiner, 2008, p. 252).

Market power undermines competition. A firm with market power can increase its profits at the expense of its suppliers or customers or both. Even modest market power has the effect of reducing consumer and producer welfare relative to competition. This is because both consumer and producer welfare is a function of output. And output diminishes in the supply chain on account of the exercise of market power (Sexton, 2000, p. 1096). Market power also has political, legal, social and cultural implications. Concentrated market power is identified as one of the obstacles preventing the emergence of fairer more ecologically sound trade rules for agricultural commodities and foods (Murphy, 2006, p. 3).

There are two prime reasons why an understanding of who exercises market power, how much power they have and how it is exercised is important. Firstly, it's important in conceptualising competition within the food chain and how it implicates producers, consumers, and competition policy directed towards the food sector. Secondly, understanding competition influences how policy evaluation occurs (McCorriston, 2002, p. 350). In South Africa, an understanding of firms' exercise of market power is important as South Africa aligns its policy, post deregulation.

2.4 Precondition 2: Perfect Information

It has been stated that "One of the implicit assumptions of fundamental welfare theorems is that the characteristics of all commodities are observable by market participants" (Mas-Colell et al, 1995, p. 436). Theoretically, within markets, there exists perfect information about price, and quality; resulting in substitution effects when firms change their prices. Information is available and accessible. However, this precondition for the efficient functioning of the market is not always met. In reality, this information is asymmetrically held by market participants. As a public good, information is often under-produced within free markets. Even in circumstances where information is not a private good, the market for expertise is prone to market failure (Mas-Colell et al, 1995).

2.4.1 Information Asymmetry

When information asymmetries are present, it implies that one party to the transaction is in a position to (and as is often the case), take advantage of special knowledge in ways that change the nature of the transaction itself. When the party in possession of information is in that position of being able to use personal expertise to manipulate the transaction in their favour, this is market

failure (Lipsey et al, 1999, p. 403). "The basic reason asymmetric information destroys markets is that it is hazardous to do business with someone who has relevant but hidden information. The uninformed party is liable to be exploited and may be unwilling to participate" (Bardsley et al, 2002, p.37). Two problems arise from asymmetrical information; moral hazard and adverse selection.

The problem of adverse selection is a "hidden information" problem. "Adverse selection arises when an informed individual's trading decisions depend on her privately held information in a manner that adversely affects uninformed market participants" (Mas-Colell et al, 1995, p. 436). "Whenever either party to a transaction lacks information that the other party has or is deceived by claims made by the other party, market results tend to be changed and such changes may lead to inefficiency" (Lipsey et al, 1999, p. 403).

The combination of concentrated market power and information asymmetry in the hands of a few firms within the supply chain represents problems. Firms with concentrated market power may be able to "withhold" information to other players within the supply chain to the detriment of those "less powerful" players and the whole chain in general. Within the dairy supply chains, it is the firms with the most power that are in a position to manipulate the availability and accessibility of information.

2.5 Theory of Second Best: When any of the preconditions are unmet

Markets work well as long as all the preconditions are met. Within our economic systems, these preconditions are not always, if ever, met. The Theory of Second Best states that:
"If there is introduced into the general equilibrium system, a constraint which prevents the attainment of the Paretian conditions, the other Paretian conditions, although still attainable are in general no longer desirable" (Davis & Whinston, 1965).

In a general equilibrium system, the assumption is that all industries and markets are perfectly competitive and therefore the interaction between them will yield an efficient outcome. Deviations from the assumptions upon which the perfect market economy model is based, make it impossible for the laissez-faire market economy to attain a state of social efficiency (Bohm, 1987, p. 61). Failure of any of the assumptions means that the efficiency of the resulting general equilibrium (if one exists) can no longer be asserted. Because "the efficiency of competitive equilibria is an all-or-

nothing proposition, if any of the necessary and sufficient conditions is not met, then an optimum situation can only be met by departing from all other conditions. All the necessary and sufficient conditions are rendered "unimportant" and, there is no guarantee that remedying separate market failures will improve efficiency" (Hammer, 1999, p. 853).

Economic policy in the form of allocation policy, in principle can be applied to help the economy reach an efficient state. This is however not always favourable as policy measures may give rise to real costs for information, control and administration that may outweigh policy benefits, and policy intervention may reduce the rates of innovation and technical improvements in general. An economic policy may also prevent efficiency while pursuing other goals. Following this, it may be justified to consider a "second-best" position for the economy (Bohm, 1987, p. 75). In some instances, if the market economy does not by itself reach a first best pareto optimum, due to technical, institutional and or political constraints, the government cannot reach one either. There are some constraints that may be immovable (Durlauf & Blume, 2008).

Second best problems are therefore about determining a new set of decision rules given the behavioural rules or deviants (constraints), which best compensate for the effect of the deviants upon welfare. Currently within the South African dairy supply chain, the issue is of abuse of market power as well as information asymmetries. These deviations from the idealist free market pre-conditions serve to render "pareto optimality" virtually impossible. In the presence of concentrated market power and information asymmetry, then according to the Theory of Second Best, the remaining preconditions are rendered "unimportant" and an optimum situation can only be met by departing from all conditions. A new set of decision rules that best results in "optimality" given the constraints face by the market is required.

2.6 No "best" allocation: Arrow's Impossibility Theorem

Also known as the "General Possibility Theorem," Arrow's Impossibility Theorem is concerned with combining the set of preferences of members of an aggregate community into an aggregate social preference (Sen, 1985, p. 1765). Using formal logic, Arrow shows that if no prior assumptions are made about the nature of individual orderings, there is no method of voting which will remove the paradox of voting, no matter how complicated. Similarly, the market mechanism does not create a rational social choice.

Arrow's Impossibility Theorem challenges the concept of "desired outcome". In a divided and increasingly individualistic society, whose "desired outcome" should be allowed and by whom and by what method? There are as many criteria for choosing social actions as there are individuals in society. In the dairy farming system, farmers, processors, retailers and consumers are all economic agents with different preference orderings in terms of resource allocation, perceived benefits, income and all manner of resources. Given differing equity and efficiency objectives, who then determines what happens especially as there is no social choice mechanism that satisfies a number of reasonable conditions (Durlauf & Blume, 2008).

The Social Welfare Function is an aggregation procedure that determines a social ordering on the basis of the preferences of members of society. Modern welfare economics proposes that given independent preference orderings for consumers, independent technologies for producers, and certain conditions on the shapes of these functions, then if consumers maximize utility subject to income and price parameters, and if producers maximize profits subject to these price parameters, there is a set of prices such that a social maximum is achieved in which no individual can be made better off without making another individual worse off. Granted further assumptions, this Pareto welfare maximum can be achieved via pricing mechanisms and decentralized decisions (Davis & Whinston, 1965, p. 12).

But Arrow found that no satisfactory method of aggregating a set of orderings into one ordering exists. When the properties which every reasonable social choice function should possess are set forth and the possibility of fulfilling such conditions is examined, with "luck", there will be exactly one social choice function that will satisfy these conditions, otherwise there are either many social choice functions satisfying the conditions, or none at all! (Sen, 1985, p. 3). This translates in it being generally impossible to construct a set of rules for making social choices that is at once 'comprehensive, democratic, efficient and consistent'.

The goals of economic policy can be summarised as; economic stability, allocative efficiency, and distributive equity. Conflicts often arise between efficiency and equity in resource allocation. The question of what efficiency and equity are is a matter of long-standing dispute. Efficiency and equity are both judgments. They are statements of preference about allocations of resources (Arrow, 1984, p. 191). Resource allocations are greatly influenced by the nature of the economic institutions in place from pure market economies to socialist economies and all else that lies in between. Democracy and efficiency cannot be simultaneously achieved in issues of social choice (Lipsey et al, 1999, p. 401).

Arrow defined equity to mean as much equality of income as is possible, stating that the only reason that can be raised against policies leading to equalization of income is that they impair efficiency. While social choice theory concerns itself with deriving the objectives of the policy maker as an aggregation of preferences of agents in the economy, and doing so in a manner satisfactory to all the agents in the economy, Arrow's Impossibility Theorem proves that this is "impossible". There can be no constitution simultaneously satisfying the conditions of; Collective Rationality, the Pareto Principle, the Independence of Irrelevant Alternatives, and Nondictatorship (Arrow, 1984, p. 72). In reality, the policy maker rarely knows the individuals' preferences with certainty, as this information is known by the individuals themselves. This information is observed privately by individuals with no incentive to make it available to policy makers and other agents within the economy (Mas- Colell et al, 1995, p. 787).

Markets are a way in which governments may endeavour to create an enabling environment for business. "The aim of government policy is not therefore to achieve a state of perfect competition, but to ensure that competition between firms is "effective", that is, firms do not collude or otherwise abuse their market power and there are no barriers to entry" (Symeonidis, 2004, p. 2). The free market achieves efficiency only under assumptions of perfect competition. Where effective competition is difficult or impossible because firms possess a lot of market power and are likely to abuse then it is conceivable that steps that interfere with the market such as the direct regulation of firms may improve both equity and efficiency (Arrow, 1984, p.193; Symeonidis, 2004, p. 2).

2.7 Problems with regard to narrow/limited considerations taken into account within decentralized decision making

"For every action on a complex, interactive, dynamic system, there are unintended consequences. In general, the unintended consequences are recognised later than those that are intended" Brown (2003).

Agriculture is not simply about food, but encompasses livelihoods and societies. There are three major types of "multiple functions" of agriculture: the food security function, the environmental function, and the socio-economic function. "Beyond its primary function of supplying food and fibre, agricultural activity can also shape the landscape, provide environmental benefits such as land conservation, the sustainable management of renewable natural resources and the preservation of biodiversity, and contribute to the socio-economic viability of many rural areas" (OECD, 2001, p.

9). However, one of the principal characteristics of the market; decentralised decision making, does not cater for the exchange of such "goods" and most often than not, pursuing social goals conflicts with goals of allocative efficiency. There is no way to redistribute income without changing the incentives that private households and firms face.

Even if free markets generated allocatively efficient outcomes, they would be unlikely to generate outcomes consistent with most people's social goals (Lipsey et al, 1999, p. 273).In a functioning, well-developed market economy, the forces of supply and demand send price signals that assist in the efficient allocation of resources, facilitating investment and encouraging economic growth. 'Market failure' occurs when price signals fail to adequately reflect society's true valuation of a good, service or resource, leading to a misallocation of resources. This can result in too little being produced of a good or service that yields economic or social benefits. Alternatively, market failure can result in too much of a good being produced which then results in harm to consumers, other producers, agricultural workers, and the general public (Hobbs, 2003, p. 4).

If the invisible hand of "supply and demand market forces" is allowed free-will to dictate the price and value of non-economic aspects of agriculture, what would that value be? Do current market practices sufficiently consider the multi-functionality attributes of agriculture in the economy? When the pursuance of economic objectives counters the achievement of social and environmental goals, then policy must be evaluated. How does society value the non-economic benefits of an agricultural system? How much value is placed on preserving the rural landscape and farmer welfare? Would society benefit more from the extinction of the family farm making way for privately oligopolised factories in the field? With farm numbers dropping and farm sizes increasing, the commercial family farm is threatened with extinction leaving "only a privately oligopolised group of 'factories in the field'" (Dubov, 1962, p. 51).

Agricultural welfare policy should not only be reflective of the need to achieve efficiency goals but must increasingly encompass other broader social as well as environmental objectives. As illustrated in Figure 1 below, these economic, social and environmental objectives and goals constitute a sustainable agricultural system and the point where all these are convergent is small. In the market, there is a general trade-off between allocative efficiency and the achievement of social as well as environmental goals (Lipsey et al, 1999, p. 396).

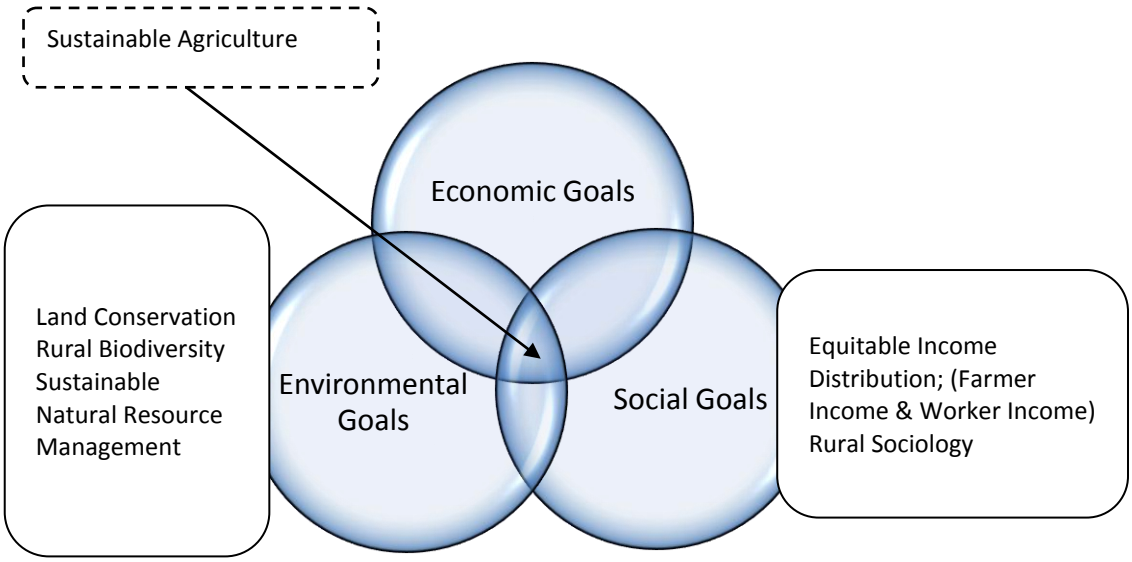

Figure 1: Illustration of components of sustainable agricultural systems

Agriculture policy has a number of diverse objectives relating to the various components of society. These have evolved with society's attitude towards agriculture. Among these objectives are; Objectives related to farmers such as to;

- Achieve an acceptable level of farm income (or income for farm families)
- Reduce income variability (or downward fluctuations of income)
- Improve competitiveness of the agricultural sector
- Objectives related to consumers such as to;
- Assure provision of safe and high quality food (at fair prices)
- Assure food security
- Contribute to energy security
- Objectives related to society at large such as to;
- Protect the natural environment and biodiversity
- Preserve cultural landscapes
- Contribute to the viability of rural areas (Van Tongeren, 2010, p. 6)

South African agricultural policy has key outcomes of; Vibrant, equitable and sustainable rural communities contributing towards food security for all, Protect and enhance environmental assets and natural resources, Decent employment through inclusive economic growth (Department of Agriculture, Forestry and Fisheries, 2010). In its strategic plan, the South African Department of Agriculture, Forestry and Fisheries is concerned with the promotion of environmentally sustainable production systems and ensuring the sustainable management and efficient use of natural resources. Most articulated objectives of agricultural policy serve to either address issues relating to equity and

income distribution, or are concerned with the correction of market failures (Department of Agriculture, Forestry and Fisheries, 2010).

Table 1: Objectives of agricultural policy

Objective	EU	Canada	Australia	New Zealand	US
Satisfactory and equitable standard of living for farmers	x	x	x		x
Income stabilization		x	o	x	x
Stabilise domestic agricultural prices	x	x	x	x	x
Ease adjustment to exogenous shocks	i	x	x	i	i
Maintain healthy rural communities	o	o		i	x
Regional Development	o	o			
Preservation and encouragement of family farming	x	x	i	o	
Environmental protection	o	i	i		o
Safe, secure, stable sufficient food supplies	x	x			x
Fair Price for Consumers	x	x			x
Agricultural efficiency and competitiveness	x	x	x	x	x

x- Denotes that the objective referred to in the objectives section of the relevant national report.
o - Denotes that the objective is mentioned elsewhere in the text of the relevant national report.
i- Denotes that the objective has been imputed from the enactment of legislation directly impinging upon it, as reported in the relevant national report.
NO entry indicates that no direct reference is made to the objective.
Source: Adapted from (Winters, 1988)

Table 1 above shows the declared objectives of agricultural policy in various countries under observation. The UK's objectives are represented under the EU column. Although the table applies to broader agricultural policy and not particularly to dairy, it represents the perspective of different governments in relation to the broader goals in agricultural policy.

While economic theory postulates that losses in primary agriculture will be offset by opportunities created in other sectors (such as services) as economies progress, the transition is hardly smooth. Firstly, in that the services sector may not create as many opportunities, or opportunities fast

enough to absorb and offset losses in primary agriculture. Secondly, and more important to this study is the fact that non-economic aspects and benefits of the primary agricultural system may be lost. The trajectory of globalisation and its concomitant rural restructuring has led to the marginalisation of large segments of the dairy industry (as in agriculture in general) (Davidson, 2002, p. 126).

Even in cases when markets are perfectly competitive, and there are no problems of externalities, public goods and asymmetrical information, and the market achieves allocative efficiency, it may not always achieve broader social goals. Broader social goals such as equitable income distribution, protection of individuals from others, paternalism, and social obligations may fail to be achieved via the market (Lipsey et al, 1999, p. 304).

2.8 Broader Social Goals

2.8.1 Farmer Income

Concentrated market power has been identified as an important factor behind the erosion of farm income. In today's food system, low farm income results from weak economic power (Levins, 2002, p. 18). As the farmers' share of the food economy shrinks, leaving most of them dependent on non-agricultural income sources such as government transfers and off-farm jobs, many farmers lose confidence and exit the industry. This has long run consequences on food security. Farmer income is important even in the context of the rural economies in which farmers operate as well as the welfare of farm workers.

Farmers left to face the full extent of the vagaries of the free market system are vulnerable and exposed. Although farmers may do much in preparing for, and adjusting to the dynamic operating environment, the issue of farm incomes has been a contentious one since perhaps time immemorial. Historically, some economies have had long standing "social contracts" with farmers which served to secure their incomes. These have been embedded within the objectives of agricultural policy (Batie, 1990).

2.8.2 Worker Income

"Farm workers are a vital and ignored part of production agriculture" (Murphy, 2006, p. 24). The market mechanism does not usually provide an equitable income distribution and good living and working conditions for farm workers. Consequently, the world's 450 million waged agricultural workers being mostly the least educated and least organized are among societies' poorest (Murphy, 2006, p. 24). Because the welfare of farm workers is usually not considered as part of broader policy-making, they bear the brunt of increasing power concentration and market failures. For instance, as the pressure on food processors and retailers to keep costs down becomes stronger, and farmers are paid less for their produce, this translates into strong downward pressure on wages for workers.

Planning and deliberate action is necessary for the attainment of "social goals" such as good working conditions, dignity, respect and fair wages for farm workers. The government most often "interferes" within the market following market failure, by setting minimum wages, through legislation. For example, in South Africa there are labour laws that apply to the agricultural sector; which have resulted in the adoption of a minimum wage, differentiated by region. The consequence has been a shift from permanent workers to temporary and seasonal workers and increasing mechanisation (Sandrey & Vink, 2006, p. 7). While minimum wage law exists, employers often do not have any incentives to pay above that. As a result, while minimum wage has increased income in some households, in most the enforcement has increased poverty and unemployment (Vink, 2003, p. 22).

2.8.3 Rural Sociology

A significant proportion of the world's population is still rural and the entire world population is still dependant on agricultural production which mostly takes place within the rural context (commercial and communal). Total reliance on the market with little or no regard for the unintended effects on rural sociology has significant consequences on rural populations. Problems arising from the free market system have an effect of rural systems. When agriculture is central to the economy, the marginalisation of agricultural production can lead to the erosion of regional and community vitality and make painfully clear the vulnerability of rural people and their local institutions to economic forces beyond their control (Davidson, 2002, p. 126). As such, increasingly concentrated market power and its effects undermine the viability of the local economy (Murphy, 2006, p. 23).

With the strategic goal of "generating equitable access and participation in a globally competitive, profitable and sustainable agricultural sector contributing to a better life for all", agriculture is central to rural development in South Africa. "The agricultural sector remains a primary source of economic livelihood for a significant number of people in Southern Africa, and specifically South Africa. It is also a springboard for agribusinesses, and creates linkages with both the private and public business sector" (NAMC, 2006).

Consumer interests and the economic welfare of producers are equally important. The strategic plan for South African Agriculture envisions a united and prosperous agricultural sector. This vision "implies sustained profitable participation in the agricultural economy by all stakeholders, recognizing the need to maintain and increase commercial production, to build international competitiveness and to address the historical legacies and biases that resulted in skewed access and representation" (NAMC, 2006).

Europe has made inroads by identifying the rural areas as important in the socio-political economy and formulating policy that is geared towards sustaining them. For European communities, the key to preserving an active and dynamic rural population lays in preserving agricultural activity, especially in very isolated areas. The EU uses structural and rural development programs to meet that objective. The programs encompass a wide range of tools such as; training and placement of young farmers, financial support for farm adjustment and; support for disadvantaged areas or areas subject to environmental constraints; and support for diversification beyond agriculture (Forge, 2002).

2.9 Broader Environmental Goals

2.9.1 Good Agricultural Practices

Good Agricultural Practices (GAPs) are principles, standards and regulations that govern the management of agricultural production systems so that agricultural production and processing occurs in a socio-economically and environmentally sound manner. " GAPs cover a wide range of on-farm and post-farm activities related to food safety, food quality and food security, the environmental impacts of agriculture and often various social objectives including animal health and welfare and agricultural workers rights" (Hobbs, 2003, p. 1).

As the world faces the challenge of feeding a growing world population (expected to reach 8 billion by 2030) while preserving environmental benefits and minimising environmental costs from agriculture (FAO, n.d); there is recognition that the market mechanism may result in allocative efficiency yet still fail to achieve any desired social and environmental goals. Initiatives such as Global GAP attempt to "bridge that gap" by setting voluntary standards for the certification of production processes of agricultural products globally, and thereby serving as a practical manual for Good Agricultural Practices.

The GAP approach, attempts to solve the market failure problem in agriculture through the establishment of guidelines and standards for agricultural producers and post-farm handlers, the monitoring of these standards, and the communication of these standards through credible quality signals to downstream firms, consumers and the public in general (Hobbs, 2003, p. 1). When effectively implemented, GAPs lead to the adoption of production practices that are socially acceptable and environmentally non-degrading thereby promoting sustainable agriculture and contributing to meeting national and international environment and social development objectives (FAO, 2008).

The adoption of GAP can help improve the flow of information along the supply chain (Hobbs, 2003, p. 4). GAPs have a critical role to play in the attainment of environmental goals in agriculture. Hobbs (2003) stated that market-driven GAPs produce food or non-food agricultural commodities with attributes that are valued in the marketplace. When the market articulates the importance of the environment through their willingness to pay, this pushes forward the agenda of broad environmental goals. While producers are at the centre of GAPs, there needs to be a system through which other players within the value chain can be held accountable for decisions and actions that have a bearing on the environment, workers' rights, farmers' rights and rural viability among other broader social and environmental goals of the economy.

2.10 Conclusion

Market theory assumes, among other things, profit maximisation of the supplier and utility maximisation of the consumer. These are narrow goals which result in welfare maximisation in a narrower sense (in monetary terms). Certain social structures are regarded as necessary and sufficient to attain an ideal even when the ideal is not clearly defined. These narrow goals fitted into

the simplistic economic and socio-political construct of times gone by. Today, broader goals are needed which take into account the socio-political and environmental conditions.

Both macro and micro economic policy require more than just consideration of a narrow set of economic goals to become efficient tools with which the society runs. Economic policy does not operate in abstract and therefore its success lies not only in implementation but from formulating the right kind of policies. The challenge is reviewing national policy as regards to trade and competition so that it embraces not only efficiency issues but goes further and addresses producer, industry and consumer interests. Debate has historically focused on final price and efficiency with the exclusion of other equally important concerns, including the impact of market power on equity (how are costs and benefits shared) and on price stability (especially for producers).

Arrow's work is important to policy makers today who face the task of designing and implementing policy that embraces a wider range of goals and objectives. The existence of the conflict of desired outcome as highlighted by Arrow begs for a more innovative approach to policy making. While many countries subscribe to the market as the mechanism of choice, and policy is designed around promoting the free market, the assumptions governing the efficient resource allocation under market conditions are problematic to begin with. History has shown that these assumptions have not and cannot be met with consistency. The resultant market failures and other problems have prompted a need for closer examination into the workings of this system.

While the purpose of this research is not to advocate for a full departure from the market, to more socialistic systems, it is clear that for the greater good of our economic, social and political systems, the market may need a "hand". The market is a tool which by itself will not yield results consistent with a sustainable economic and socio-political system.

3. Manifestation of Concentrated Market Power in the Selected Dairy Countries

3.1 Introduction

This chapter examines market power dynamics within dairy supply chains of South Africa, Australia, Canada, New Zealand, the United States (US) and the United Kingdom (UK). The chapter begins by defining market power and then it offers both qualitative and quantitative evidence on the nature and extent of market power within the selected dairy supply chains. The chapter also shows the impact of concentrated market power on farm-gate price. The evolution of the economic, socio-political and cultural landscape has been accompanied by a metamorphosis of the characteristics of market power. This evolution has come partly in the form of the emergence of new economic drivers such as retailers and conglomerates. Evidence of market power can be found at the various stages of the agricultural supply chain such as production, processing and distribution.

3.2 Power Dynamics within the dairy supply chains

Market power can be defined from the perspective of both buyer and seller power. Both buyer and seller power may be present within a single supply chain and this is often the case. Processors and retailers within the dairy supply chain are both buyers and sellers. Within the supply chain, vertical and horizontal competition and market power are closely intertwined and reinforce each other. As a result, a firm's market power is a joint function of its horizontal and vertical clout and the capabilities of its internal departments, all of which must be compared to those of rival firms in the same category (relevant market) and to the category average (Steiner, 2008, p. 252).

Firms have power to the degree that others depend on them for resources. Resources create dependencies when they are important, when control over them is relatively concentrated, or both (Crook & Combs, 2007, p. 548). Although processors and consequently retailers are dependent on farmers, the nature of milk is such that one cannot withhold milk for extended periods in anticipation or negotiation for better prices.

Players at all levels along the agro-food chain from producers to the final consumers respond to and may influence the dynamic aspects of market power. The balance of power in food supply chains is however skewed. Consequently, while other players reap benefits accruing from more power

through vertical as well as horizontal integration, there are those within the supply chain who suffer. Players will have unequal power within the supply chain. It is the extent of this power and the abuse of such power or even the potential for abuse. It is excessive power in the hands of any of the players, or the powerlessness of any player that causes concern. Competition or the lack of it lies at the crux of the concentrated market power phenomenon.

The determination of extent of market power is done through the use of various standard economic parameters, namely; Concentration Ratio (CR), Herfindahl-Hirschman Index (HHI), Gini Coefficient and Rosenbluth Coefficient. This study will focus on Concentration Ratios and the Herfindahl-Hirschman Index as measures of concentration. Concentration Ratios present an intuitive indication of relative concentration while also noting that the number of firms which constitute this group can vary considerably (Fourie & Smith, 1989, p. 247). For instance, CR4 refers to the value of an industry's four largest firms expressed as a percentage of that industry's total output (Gould, 2010, p. 4).

The Herfindahl-Hirschman Index (HHI) uses the market shares of all the firms in the industry, and these market shares are squared in the calculation to place more weight on larger firms. When using HHI as a measure of concentration, the results can be interpreted as shown in Table 2 below.

Table 2: Herfindahl-Hirschman Index (HHI) as a measure of concentration

HHI	Concentration Level
HH1 < 1000	Unconcentrated market
1000 < HHI < 1800	Moderately concentrated
HHI > 1800	Highly concentrated

Adapted from Gould (2010)

These measures of concentration have their strengths and weaknesses and may be applied depending on the availability of data. "The lack of data on relevant markets and on concentration measures that span international boundaries makes the drawing of conclusions about changing concentration and market power difficult" (Rude & Fulton, 2002, p. 143). "Increased concentration should not be taken as a proxy for increased market power. The presence of small numbers of firms does not necessarily indicate a lack of competitive rivalry" (OECD, 2003, p. 6).

3.3 Concentrated Market Power in the South African Dairy Supply Chain

Milk production in South Africa has moved from inland to become more concentrated in the coastal areas where the system of production is mainly vast rain-fed and irrigated pasturelands. This has been mainly influenced by the need to gain efficiencies in production and reduce costs following increasing feed and fodder prices on the markets.

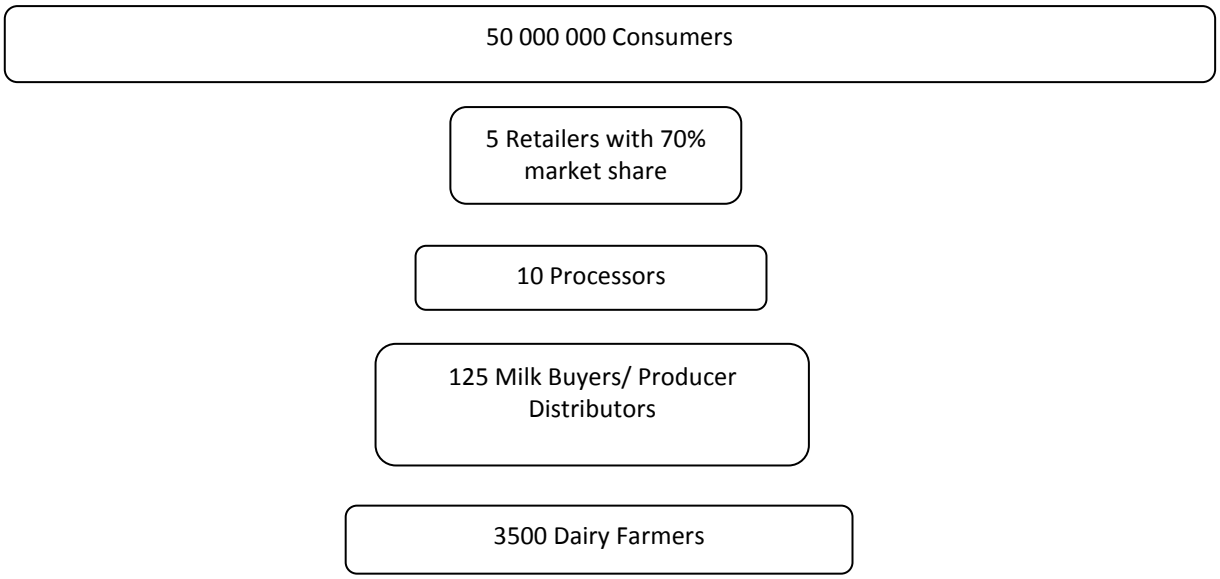

Figure 2: Illustration of South Africa's Dairy Supply chain
Source: Adapted from (Lacto Data, 2008)

As illustrated in Figure 2 above, in the South African context, the country's fluid milk supply chain is such that there are just over 3500 dairy farmers, who sell their milk to about 125 milk buyers and producer distributors nationally. Farmers are price takers subject to milk buyers and processors. The major milk buyers use comparative base-pricing purchasing systems in which pricing is based on the composition (milk fat and non-fat solids) and hygienic quality of milk. To this base price a variety of premiums are added and penalties deducted (NAMC, 2001, p. 36). The farmer's share of full cream milk and low fat milk stood at 42.6% and 25.3% respectively of retail price in 2007 (NAMC, 2008, p. 15).

The country's milk output is sold in an oligopolistic market where four of the largest processors account for roughly 65% of the total commercial milk delivered (Cutts & Kirsten, 2006, p. 6). This represents a decrease in concentration from the between 74% and 78% levels in the year 2000. The growing competition within dairy processing is also reflected by decreasing CR4, CR10 and HHI indicators. The CR4 for 96 dairy firms decreased from 0, 76 to 0, 68 and the CR10 for 113 dairy

firms decreased to 0, 80 from 0, 89 (CR10). The HHI fell from 1763 to 1598 (NAMC, 2003, p. 214). An HHI of between 1000 and 1800 indicated that the sector is moderately concentrated (See Table 2 above).

Milk markets are mostly regional owing to the "fragility" of milk and the resulting transport and storage logistics. As Table 3 below shows, regions are often characterised by the presence of one dominant buyer. The presence of dominant buyers in regions that are characterised by large numbers of fragmented farmers represents problems in the power dynamics of the supply chain. In essence the options for the supplier are limited.

Table 3: Regional market share in respect of raw milk procurement for major producers in South Africa

	Ladismith Cheese	Dairy-belle	Woodlands Dairies	Parmalat	Clover	Nestle	Other
Western Cape		32.1%		30.1%		11.5%	26.4%
Eastern Cape			9.9%	27.8%	29.2%	26.4%	5.1%
KZN		3.6%			78.1%	11.5%	7.1%
Free State			9.3%			68.3%	19.5%
North West		50.5%			36.6%		13.1%
Mpumalanga					77.3%		22.9%
Southern Cape	10.9%		47.3%		27.8%		13.9%

Source: BFAP (2006) as cited in (Roberts, Rakhudu, & Chabane, 2008).

Evidence of concentrated market power can be drawn from the market shares of these dairy processors within the supply chain. As observed in Table 3, farmers potentially face the oligopolistic power of the most powerful South African dairy processors. The regional nature of the major dairy processors (shown in Table 3), means that within the localities where they are most dominant, the potential to exercise excessive buyer power in relation to the dairy farmers exists. At a national level, Clover Industries Limited is the largest competitor in the South African market. Clover processes some 30% of South Africa's milk in 17 factories and distributes its range of dairy and related products through over 30 distribution depots. Parmalat accounts for a further 18.8% of the market value. "Parmalat is dominant in the southern and western Cape and has a formal contractual agreement regulating milk flow and price formation with members of SAMILCO" (NAMC, 2003, p. 216). Prior to a merger between Clover and Fonterra, the Competition Commission found that; "Clover's market share stood at, 31% for buttermilk, 45% for skimmed

milk powder, while Nestlé's market share for whole milk powder was 75.8% and 30% for skimmed milk powder[1] (Competition Tribunal, 2004).

The market for UHT milk is also highly concentrated. As Table 4 shows, of the six processors of UHT milk the market, the top three supplied over 80% of milk in the UHT market in 2006; Woodlands Dairy (35%), Parmalat (35%) and Clover (12%) (NAMC,2009, p. 13).

Table 4: Suppliers of UHT milk and their market share in South Africa (2006)

Processor	Share of UHT Sales
Woodlands Dairy	35%
Parmalat	35%
Clover	12%
Dairy Belle	11%
Dew Fresh	5%
Montic	2%

Source: (NAMC, 2009)

The power of processors enabled them to "regulate" the milk market in the aftermath of deregulation. This "private regulation" was expressed through collusion in; the suppression of raw milk prices, the raising of barriers to entry through exclusive arrangements for raw milk purchase and through "surplus removal' and coordination of processed product prices. This "abuse of dominance" led to declining margins for farmers, while maintaining and improving margins for processors. Concentrated dairy processors were able to raise prices above competitive levels without transmitting any of this to producers.

For South Africa, downstream in the supply chain, retailers represent the primary outlet for dairy products to the consumer. The country is characterised by "oligopolistic competition at both the retail and processing levels of the milk market" (Cutts & Kirsten, 2006, p. 7). A structural oligopoly, the country's retail sector is dominated by four main supermarket groups (some of which have chains trading under different names). Shoprite, Pick and Pay, Spar and Woolworths, together have over 75% of retail market share and serve as the main distribution centres for dairy products. Table 5 below illustrates the market share of the largest supermarkets in South Africa.

[1] Statistics obtained from Tribunal Ruling in large merger between Clover Fonterra Ingredients (Pty) Ltd and Clover SA (Pty) Ltd and New Zealand Milk Products (SA)(Pty) Ltd, case number 92/LM/Nov04.)

Table 5: Market Share (%) by Supermarket in South Africa

Supermarket	Market Share % (1999)	Market Share % (2004)	Market Share % (2005)
Shoprite/Checkers	31.0	26.3	26.2
Pick & Pay	21.9	24.7	25.3
Spar	15	15.2	15.3
Woolworths	10.4	10.4	10.1
Other	21.7	23.4	23.1

Source: Adapted from Funke (2006)

The South African retail sector is characterised by intense competition for market share and as the supermarket chains gain a greater market share, the country's processors face greater buyer power. "Most dairy products are distributed through hypermarkets and supermarkets, which negotiate prices on a central and/or regional basis. This puts retailers in a stronger bargaining position (NAMC, 2003, p. 217). "Although large food processors can use popular and heavily promoted brands to improve their terms of trade, retailers have responded with 'no name' or house brands, which they use to pressure large processors to reduce prices. Recent data on food consumption patterns suggests that 'no name' and house brands are the fastest growing 'branded' processed food products" (Mather, 2005, p. 8).

"Given the continued consolidation of the retail sector across the world and in South Africa, the buying power of retailers may have adverse effects on the viability and efficiency of suppliers and which ultimately could be to the detriment to the agricultural and food industry at large" (NAMC, 2009, p. 9). Retailer power is important as "the power of retailers is therefore a concern because low returns leads to pressure on cash flow and limits the decision to expand production capacity. In the long run this could also have adverse effects on consumer welfare" (NAMC, 2009, p. 9).

3.4 Concentrated Market Power in the Australian Dairy supply chain

Australia's dairy industry is one of its three most important rural industries, and it ranks fifth in agricultural exports. Directly employing approximately 40,000 people on dairy farms and in manufacturing plants, further employment is represented by related transport and distribution activities, as well as research and development projects. Dairy production takes place in all states, but more than 60 per cent of all dairy farming enterprises are located in Victoria (ABARE, 2006).

As it has been world over, Australia has experienced declining numbers of dairy farms, as the industry is trending toward fewer and larger farms. “The number of dairy farms has more than halved over the past 25 years, from 22 000 in 1980 to 7 950 in 2008” (Commonwealth of Australia, 2009, p. 3). These farmers face an increasingly more concentrated dairy manufacturing sector while the dairy manufacturing sector also faces an increasingly powerful retail sector. Australia’s dairy manufacturing sector comprises farmer owned cooperatives as well as public and private companies, some of which are multinational. “There has been a trend towards increased concentration among both processors and retailers of milk in Australia” (Commonwealth of Australia, 2010, p. 53). The increase in concentration among retailers acts as an important driver of the increased concentration among processors. Farmers and consumers are left at the mercy of these developments.

In 1999, three of country’s five largest milk manufactures; Pauls/Parmalat, National Foods and Dairy Farmers Group, together held over 80% of the drinking milk market. The largest milk manufactures were the farmer cooperatives; Murray Goulburn, Bonlac and Dairy Farmers Group as well as National Foods Ltd and Pauls/Parmalat. At that time, Murray Goulburn and Bonlac processed 55 per cent of all Australia's manufacturing milk (Commonwealth of Australia, 2010, p. 15).

The diagram below (Figure 3) shows the composition of the manufacturing sector on a milk volume basis for 2008/2009. The processing industry is still characterised by high levels of concentration as evidenced by the fact that the three companies with the biggest share account for over 70% of milk purchased by volume (Murray Goulburn; 37%, Fonterra; 20 % and National Food; 15%) (Commonwealth of Australia, 2010, pp. 15-16).

National foods and Parmalat dominate the drinking milk market (National Foods, 81%; Parmalat, 12 %; Fonterra, 5% and other processors, 2% (Commonwealth of Australia, 2010, p. 16). Such is the nature of the industry that farmers, who are mostly fragmented, face. In Australia’s deregulated environment, no legislature exists over the price paid to farmers by milk processing companies. Farmgate prices can vary between manufacturers, states and international prices are the major price determining factor for farmers.

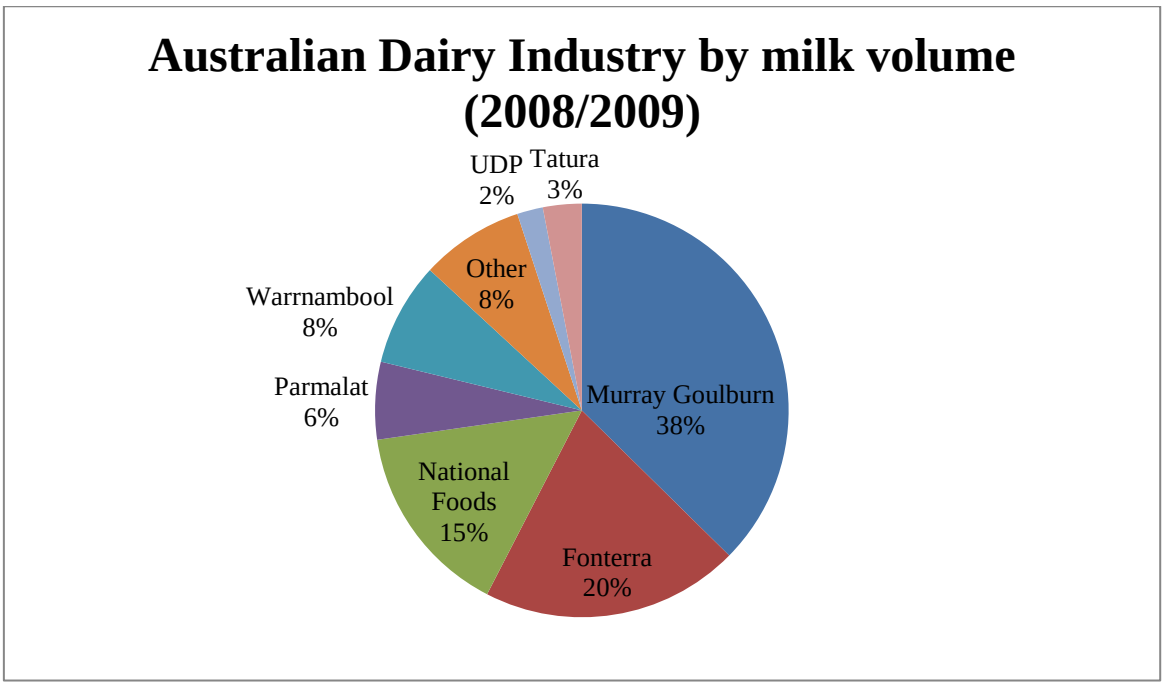

Figure 3: Australian Dairy industry by milk volume
Source: Commonwealth of Australia, 2010

There are three main distribution channels for Australia's domestic dairy market namely; major supermarkets, the smaller convenience and retail outlets as well as the food-service practitioners. Over half of Australia's drinking milk is sold by two major supermarket chains. Of this milk, half is in generic form; a situation which appears with increasing attendant risks to competition (Commonwealth of Australia, 2010, p. 53).This retail concentration and the oligopsonistic power that this provides have also been to the detriment of Australian dairy producers (Margetts, 2007, p. 82).

Figure 4 below shows how the ratio of the farm gate price to the retail price has declined over time. The lower blue line represents farm-gate price while the upper red line represents retail price (Commonwealth of Australia, 2010, p. 40). While retail prices have been increasing over time, farm-gate prices have remained relatively unchanged except for a small peak in the 2007-2008 seasons. Low and unchanging farm-gate prices in themselves may be as a result of various factors including supply and demand. When there is concentrated market power within a supply chain, this potentially affects fair price. The high levels of market concentration in the retail grocery sector have enabled the major chains to exercise market power to the detriment of the remainder of the dairy supply chain and consumers (NARGA, 2009, p. 1).

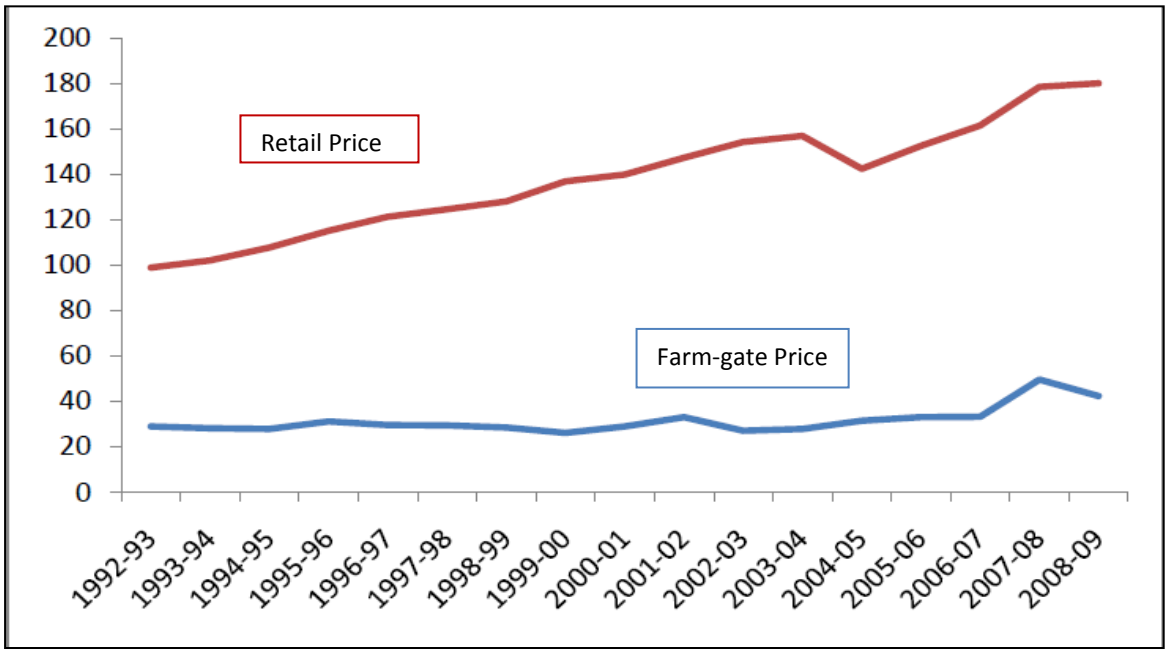

Figure 4: Australian retail and farm-gate milk prices (cents per litre)
Source: (Commonwealth of Australia, 2010)

Australian milk prices that were formerly set via regulation are now being set by retailers (NARGA, 2009, p. 4). Evidence of the "waterbed effect" has been found in the Australian supply chain where the market power of the major supermarket chains has translated in them forcing down the price they pay processors for generic milk. The processor then responds by charging a higher price on its other sales such as in generic milk to other retailers, branded milk and other products such as yoghurt. Processors are then providing large supermarket chains with milk at a lower price than the smaller supermarkets. While Australia's major supermarkets (Coles and Woolworths) pay lower prices for their generic milk, the same processors will then charge smaller retailers higher prices for branded milk to make up for the lower returns or shortfall from Coles and Woolworths (Commonwealth of Australia, 2010, p. 29).

Retail buyer power within the supply chain is also expressed by the terms of supply that are extended to processors. Because it is to the advantage of processors to have their branded milk prominently displayed at eye-level on supermarket shelves, they must; pay an explicit 'slotting' fee to the supermarkets; offer their branded milk at a lower price to the supermarkets; and/or provide generic milk to the supermarkets at a lower price than they would have in the absence of buyer power. All this is done in return for the processor being granted more favourable placement on the supermarket shelves. When any or all of this occurs, it represents an abuse of market power by supermarkets (Commonwealth of Australia, 2010, p. 27).

Formerly under a regulated system, cooperative principles and averaged or pooled returns drove the processor-producer relationship. These have however been replaced by forward contracting. The market power of processors over producers is sometimes reflected within these contracts. A case in point is in the Tasmanian Dairy industry. Of the multiple provisions in the contract between farmers and one of Australia's biggest processors;

- the processors are permitted to make unilateral changes to the terms of the contract regardless of whether the producer consents or not;
- farmers are required to supply minimum quantities of milk per month and penalised for failure to meet the supply requirement even given the seasonality of milk production (Commonwealth of Australia, 2009, p. 18).

This presents producers with a challenge of having to adapt to new conditions of operation such as managing and understanding contractual obligations and the attendant risks that come with contracting (Issara et al, 2004, p.463). This is especially challenging in the absence of critical information within the supply chain.

Another area of great concern by farmers and processors in the market power struggle is the case of private labels and house brands of milk. The supply of generic milk is "tender based" with contracts running for two or three years. A supermarket will call a tender for its private label milk and set a national price. The supermarkets prefer one regional or national processor as a supplier. The sheer volumes of milk involved, coupled with the fact that there are only two major supermarkets chains within Australia not only reflects potential supermarket power but also serves to encourage consolidation within the processing sector. "Only large processors can credibly bid for the contracts and without any such contract half the drinking milk market is effectively closed to a processor" (Commonwealth of Australia, 2010, p. 25).

3.5 Concentrated Market Power in the Canadian Dairy Supply Chain

The business of dairy farming has been a characteristic of rural Canada for many generations now. Canada accounts for 5.6% of the dairy market in the Americas region. The dairy industry ranks fourth in the Canadian agricultural sector and generates employment for over 160,000 Canadians, making it one of the largest employers in agriculture. Canada's 13,621 dairy farms, with an average of 70 cows, not only employ 57,500 on farms but through the sale of goods and services to dairy farmers 28,200 more jobs are created. These include feed, machinery, veterinary and breeding services, transportation and promotion. The dairy processing industry generates directly and

indirectly another 74,300 jobs through processing, packaging, transportation, handling, marketing and inspection, to name a few. Furthermore, as of 2007, there were 445 dairy processing plants (including 280 federally-inspected) contributing to more than 22,130 jobs. About 81% of Canadian dairy farms are located in Ontario and Quebec, 13.7% in the western provinces and 5.5% in the Atlantic Provinces (Agriculture and Agri-Food Canada, 2007).

The Canadian Dairy industry operates under a relatively robust supply management system. Its "three key features are: 1) prices are determined by a cost of production formula that includes imputed costs for farmer supplied labour and a return to equity and management; 2) production is limited to what the domestic market will consume at the cost-determined price; and 3) border measures are used to keep out less expensive foreign products" (Meilke et al, 2007, p.1).

The system of supply management is sustained by active lobbying from farmers and farmer groups resulting in federal and provincial legislative initiatives. It is apparent that Canadian dairy farmers have long since discovered the power that lies in collective bargaining and continue to use it. From over 13000 farms, Canada's dairy farmers sell an average of 7.6 billion litres of milk annually to three main processing companies and a myriad of smaller companies (Dairy Farmers of Canada, (n.d)). On a provincial basis, Canadian dairy producers negotiate with milk buyers and processors collectively, determining elements such as milk prices, terms of payment and plant supply. The Canadian food and beverage retail market is concentrated with market players generally selling to a small number of large buyers such as Loblaw, whose buyer power is strengthened.

Table 6 : Food and beverage concentration in the Canadian dairy supply chain

	Average HHI for (1983-1988)	Average HHI for (1989 -1996)[2]
Other dairy	0.0846	0.1161
Fluid Milk	0.0772	0.0889

Source: Adapted from Rude & Fulton (2002)

Using HHI, Rude and Fulton found that there existed a significant positive relationship between concentration and market power in the Canadian supply-managed sectors, namely; fluid milk and other dairy products, poultry products, as well as in the bakery, vegetable oil and snacks sectors

[2] The Data for Herfindahl indexes were not available after 1996 therefore the degree of concentration may be understated.

(Rude & Fulton, 2002, p. 158). As shown in Table 6, where the HHI was calculated for fluid milk and other dairy products, there is a trend towards increased concentration.

So while the Canadian supply management has been in place, it has not prevented increasing concentration downstream of the supply chain. Figure 5 below shows the CR4 of Canadian food processors in 2006. The dairy processing sector is the most concentrated in the food processing sector. It far exceeds the 0.4 national industry average.

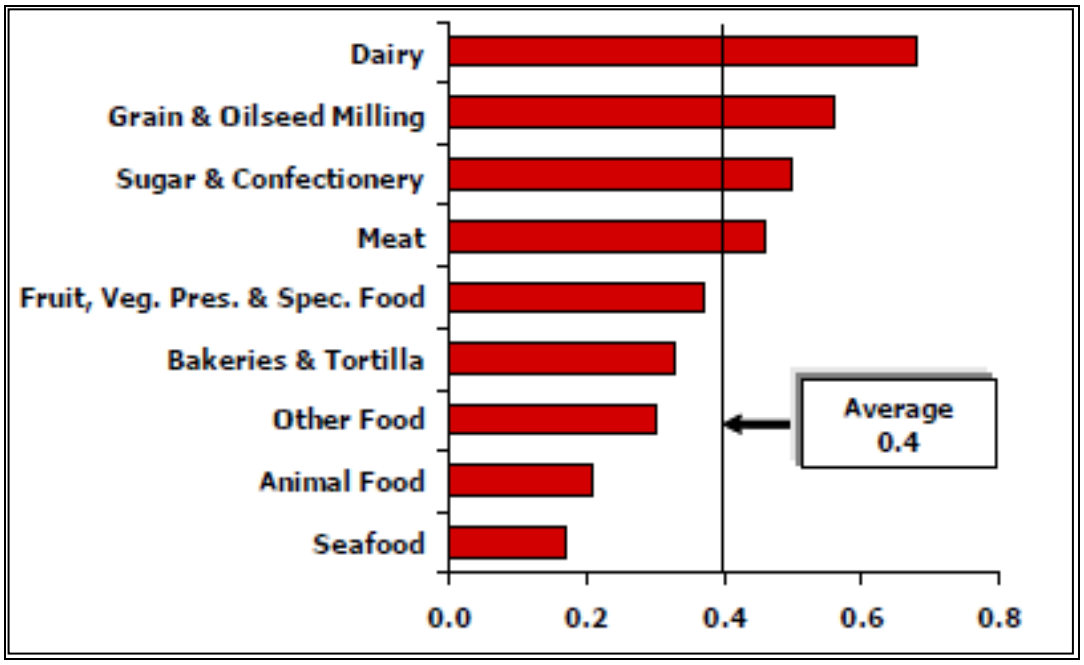

Figure 5: Concentration Ratio (CR4) in Canadian Food processing (2006)
Source: (AAFC, 2009, p. 87)

In 2008, 14% of Canadian dairy plants were owned by the three largest processors in the country (Saputo, Agropur, and Parmalat), processing approximately 70% of the milk produced in Canada. Although the dairy processing sector is highly concentrated, the supply management system ensures that players within the supply chain are not exposed to the full extent of market power.

A comparison of farm, processor and retail price indices for milk and milk products over time within the Canadian dairy supply chain shows that, with the exception of the processed cheese slices, price movement has been consistent from farm, processor up to retail level (Sparling et al. 2005) From 1981 to 2005, the retail price of milk increased by 125% while the farm price increased 55%. The farmers' share of the retail price of milk in 1981 was 56%, 47% in 1986 and has hovered between 38% and 40% since 1990. The retail price of milk between 1981 and 2003 increased by 110% while the farm price increased by 44% (CRSE, 2006).

Despite these changes in the early 1990's, "market power relationships do not appear to have changed over the last decade" (Sparling et al, 2005). The supply management system provides farmers with considerable market power through the ability to limit supply, restrict imports and set prices. The result is "security" to farmers as they are assured a stable income as well as protection from the vagaries of the marketplace (Charlebois et al, 2007, p. 82).

Government and various partners in industry work in close cooperation to coordinate the movement of milk from the farm to the consumer (Agriculture and Agri-food Canada , 2007). The Dairy Farmers of Canada (DFC), the Dairy Processors Association of Canada (DPAC), the Canadian Dairy Commission (CDC), provincial marketing boards and Agriculture and Agri-Food Canada (AAFC) work as partners to ensure a strong and dynamic Canadian dairy industry (Agriculture and Agri-food Canada , 2007).

3.6 Concentrated Market Power in the New Zealand Dairy Supply Chain

The 'average' New Zealand dairy farm in 2004-05 was 115 hectares in size, and milked 315 cows. The New Zealand dairy industry had approximately 12 000 herds as at June 2005. The total number of herds in the 2006/07 season dropped to 11,630 and average herd size increased to 337 in 2006/07, continuing the consistent upward trend for the last 30 seasons. In the past twenty years, the number of dairy farms has fallen, but average farm and herd sizes have increased, while productivity, both per hectare and per cow, has substantially improved. New Zealand is a competitive global player, with a dairy industry anchored on; an efficient, all-grass farming system, large-scale processing, high research and development expenditure; and creative marketing capability (New Zealand Trade and Enterprise, 2006, p. 4).

As a result of New Zealand's relatively small population and small domestic market for dairy products, 95 per cent of manufactured dairy products are exported. Exports from New Zealand, the European Union (34 per cent) and Australia (13 per cent) provide over 80 per cent of dairy products traded worldwide. New Zealand is the world's largest exporter of butter, skim milk powder and casein, and the second largest exporter of cheese and whole milk powder (excluding intra-EU trade) (New Zealand Ministry of Agriculture, 2006).

The farmer's share constituted 25% of the retail milk price in 2004 and 35% in 2008. New Zealand farmers received 5% of retail prices for cheese in both 2004 and 2008. One influence on the gap

between retail food prices and farmers' returns is changes in general prices in the economy (inflation), particularly from goods such as petrol (NZIER, 2008, p. 15).

In spite of the adoption of a more neoliberal economic system based on the "market", the importance of New Zealand's dairy sector is such that it has its own "special" modus operandi. Following restructuring in 2001, the New Zealand dairy industry became highly vertically integrated around its largest player, Fonterra. The industry retained, however, a fringe of highly competitive niche processors who have market access and milk supply guaranteed by the reform legislation. While for several years since its establishment, Fonterra processed up to 95% of New Zealand's milk; in the 2008/2009 season indications are that Fonterra's share had dropped to about 90%. This is mainly due to the entrance of new players in the dairy market and growth of Fonterra's competitors. From 36 in 1983, five key players now compete for milk supply in New Zealand, namely: Westland, Tatua, Synlait, and New Zealand Dairy Foods Limited. However, price setting is mainly in line with the biggest player, Fonterra (New Zealand Trade and Enterprise, 2006, p. 5). New Zealand Dairy Foods is a major player on the domestic market, supplying about 40% of the domestic market (Conforte et al, 2008, p. 61).

Evidence from New Zealand shows the positive results that come from having specific goals for the dairy industry. Success can be measured against the picture of success that has been painted in formulation of strategy and policy. Within the New Zealand dairy supply chain, by articulating the vision of the supply chain as well as specific goals and objectives, supply chain participants painted a picture of success that has become a reality.

3.6.1 The story of Fonterra

Fonterra Co-operative Group Ltd (Fonterra) is a co-operative group owned by 11,600 New Zealand dairy farmer-shareholders, and over 18,000 staff in 40 countries. Fonterra collects and processes more than 1.16 billion kilograms of milk solids each season, and exports over 95% of its shareholders' total production, making it the world's largest exporter of dairy products. Fonterra was formed in 2001 as a result of major industry reforms, the objective of which was to integrate the dairy industry and to provide the critical mass and efficiencies needed for New Zealand to successfully compete in the global market. However, the reforms also capped the barriers to entry into the milk supply and processing market requiring Fonterra to supply certain volumes of raw milk to independent processors on competitive terms and by preserving farmers' right to supply

milk to companies other than Fonterra. The consumer businesses of the previous large dairy companies were combined into a new entity - New Zealand Dairy Foods (NZDF) (New Zealand Trade and Enterprise, 2006, p. 10).

The extent of retailer dominance within New Zealand's supply chain is relatively small because the dairy supply chain is oriented towards exports and this serves as a major constraint on the monopsony power of supermarkets. The Commerce Commission has considered the concentration of buyers in wholesale food markets, and in particular, the competitive impact of supermarkets. Supermarkets now hold a lot of influence over suppliers. In some cases, supermarkets have vertically integrated into food manufacturing. For instance, Foodstuffs, a company constituting three cooperative entities trading under one common banner, owns its own milk processing company. The three companies that make up Foodstuffs are the largest supermarket retailers in New Zealand (OECD, 2003, p. 6).

New Zealand's Commerce Commission noted that over the past ten years there has been a significant shift in power between manufacturers, including agricultural wholesalers, and supermarkets. However, there would appear to be a degree of mutual reliance on each other; manufacturers need supermarkets as a distribution outlet, while supermarkets need the brands to draw customers into the shop. This applies to firms with strong, established brands, including Heinz Watties, Goodman Fielder, and the milk companies. Supermarket house brands are providing competition at the lower end of the market (OECD, 2003, p. 5).

3.7 Concentrated Market Power in the UK Dairy Supply Chain

The UK, a member of the EU, is the 9th largest milk producer in the world. The EU accounts for just over a quarter of all world dairy production. Dairy farmers in the UK are amongst the largest and most competitive in the European Union. The UK boasted 17915 farms and herds stood at 1.95 million head as of 2007. Average herd sizes were 112 cows. Figures for June 2008 show that the number of cows in UK dairy herds fell by 2.3% (45,000 cows) between June 2007 when the number of cows in a dairy herd stood at 1.954 million and June 2008, to stand at just 1.909 million. The average yield per cow also fell by 52 litres a year between 2006/07 and 2007/08 resulting in total production for 2007/08 falling by over 250 million litres when compared to 2006/07 (www.dairyco.org.uk). The UK dairy market generated total revenues of $14.4 billion in 2008. Of this, milk sales accounted for 42.8%.

As of 2004 the uneven distribution of power along the dairy supply chain was reflected in that the UK's 25000 or so primary producers supplied 3-4 dairy processors who in turn did business with 4-5 major supermarket chains. Farm-gate prices in the UK have historically been influenced by; international dairy commodity prices, EU market support, costs of manufacturing milk, supply and demand dynamics; and weak negotiation due to industry structure. The declining farm profitability has prompted farmers to seek efficiency gains through increasing herd size and cost-cutting (where feasible) (NFU, 2008, p. 6).

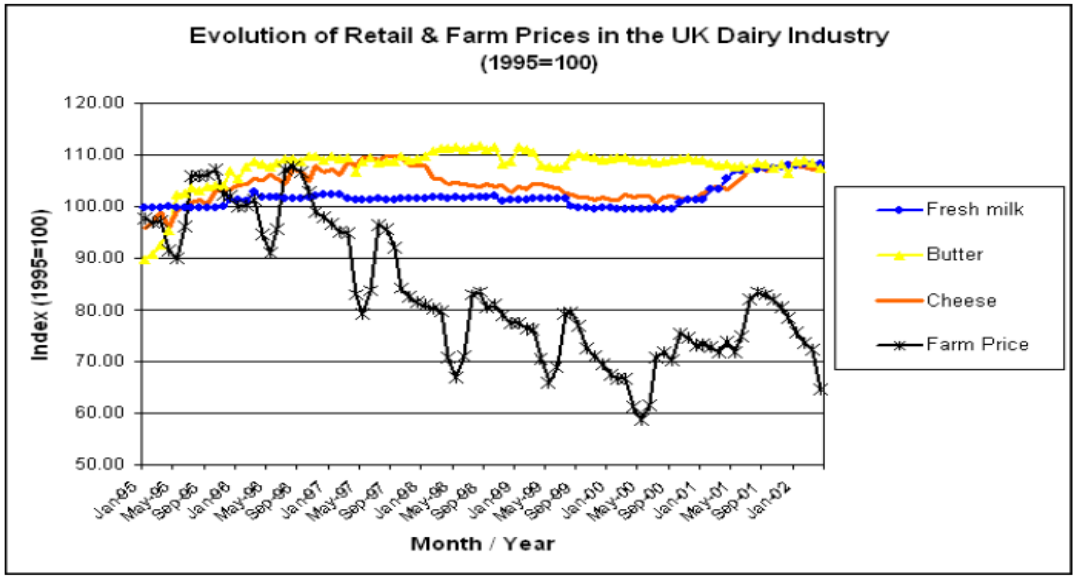

Figure 6: Evolution of retail and farm prices in the UK dairy Industry
Source: Fuller & Saunders (2004)

Until 2007, UK farm gate prices showed a declining trend (See Figure 6 above). With the average annual farm-gate price below 20 ppl from 1998 to 2007 many farmers have had little to invest to maintain their businesses let alone fund any expansion. However, the time lag between the price of dairy commodities increasing and the farm-gate price increasing is likely to have cost dairy farmers. The trends reflected in Figure 6 above are further supported by the data in Table 7 below. Table 7 shows how various components of the milk price have changed over time. The farmer's share has shown a declining trend while both the wholesale and retail margins show significant increases over time.

"The average farm-gate price for 2007 increased by 2.9ppl, compared to 2006 levels, to 20.9ppl" (NFU, 2008, p. 6). In 2006, farmers received 29 percent of the price of a pint of milk. It cost a dairy farmer from 18p to 22p to produce a litre of milk, but while it sold in the supermarket for around 70p, the farmer only got 19p. In July 2008 the average UK farm-gate price was 25.80 pence per

litre, an increase of 6.2 pence per litre on July 2007. Alongside the rises seen in farm-gate prices, farm input costs have increased rapidly meaning the long term profitability is not as good as the historically high milk prices would suggest and production is unlikely to recover, at least in the short term.

Table 7: Farmer's share within UK's Liquid Milk market

Milk Price in pence per litre within Liquid Milk market (1996-2006)						
(pence)	1996	1999	2001	2003	2005	2006
Farmgate Price	24.9	18.3	17.11	18.50	18.5	18.0
Wholesale Margin	15.5	14.8	15.89	15.91	16.8	18.0
Wholesale Price	40.4	33.1	33.00	34.40	35.3	36.0
Retail Margin	3.6	7.8	11.30	13.10	15.6	15.6
Retail Price	44.0	40.9	44.30	47.50	50.9	51.6

Source: Adapted from MDC Datum (2008)

While there are over 100 milk buyers in the country, six large dairy companies dominate the GB market. The largest dairy companies are; Dairy Crest, Arla Foods, Dairy Farmers of Britain, Robert Wiseman Dairies, Milk Link and First Milk (NFU, 2008, p. 4). Daily Crest Group is the largest competitor in the UK dairy market, with a 21.7% share of the value while Arla Foods UK accounts for a further 18.4% of market revenues. Arla Foods is the leading company in the milk market, holding a 33.4% share by value. Dairy Crest Group plc accounts for a further 28.1% of the market's value. There are also a large number of small to medium sized local or specialist processors and a small number of milk buyers that operate largely as intermediaries, supplying milk to a range of different markets (NFU, 2008, p. 4).

The milk market downstream of the supply chain is also highly concentrated. In 2004, there were four major dairy companies processing between 85% and 90% of the UK's raw milk; Dairy Crest, Glanbia, Arla Foods and Robert Wiseman Dairies (Brigstocke, 2004, p. 5). As of 2006, there were three main competing suppliers (processors) to supermarkets (Arla, Dairy Crest and Wiseman). It is estimated that the total market share of these suppliers to the supermarkets was 91% with market shares of 39% for Arla, 33% for Wiseman and 19% for Dairy Crest (Smith & Thanassoulis, 2008, p. 6).

The UK's processors then sell mostly to the four dominant supermarkets—ASDA/Wal- Mart, Morrison, Sainsbury, and Tesco—and some other much smaller supermarkets. The Competition Commission in the UK has used two main measures of concentration namely;

- The retailers' shares of groceries sales area as a proxy for share of sales (market share) which provides an indication of the extent of the competitive constraint that its store faces (Competition Commission, 2008, p. 106)
- "The number of competing fascias in a local market provides another indication of the extent of the competitive constraint faced by particular stores within that market" (Competition Commission, 2008, p. 106).

Table 8: Supermarket shares in Great Britain (2002 -2005)

Firm	All Goods	Milk
Tesco	0.27	0.25
ASDA	0.20	0.18
Sainsbury	0.16	0.12
Morrison	0.10	0.08
Other	0.18	0.16

Source: Smith & Thanassoulis (2008)

As shown in Table 8 above, the largest four supermarkets (in market share terms) accounted for up to 70% of grocery sales between 2002 and 2005. They accounted for over 60% of all milk sales during that period. Estimates as of October 2006, were that the top four supermarkets would have a market share of 61% of sales of the liquid milk produced in the UK. The remainder of the milk is sold by smaller chain stores, doorstep delivery, and convenience stores (Smith & Thanassoulis, 2008, p. 7).

In some cases size confers market power through acquisition, leading to logistical control, economies of scale, barriers to entry of competitors, and/or the ability to remould the social and political environment to a company's own benefit (Vorley, 2004, p. 25). The existence of substantial economies of scale within the milk market confers market power to larger supermarkets. The larger buyers in the supply chain can extract more favourable terms from suppliers. Retailers are able to do this by through bulk buying, through playing off suppliers against each other, or through threats of de-listing" (Vorley, 2004, p. 25). Evidence of this within the UK dairy supply chain is revealed when the prices paid to the suppliers by supermarkets is plotted against the supermarkets' market share. As Figure 7 below illustrates, given that the average price is 100%, the

largest supermarket, in this case Tesco can consistently obtain discounts from their suppliers at 4% below the industry average, while the smaller players pay above the odds.

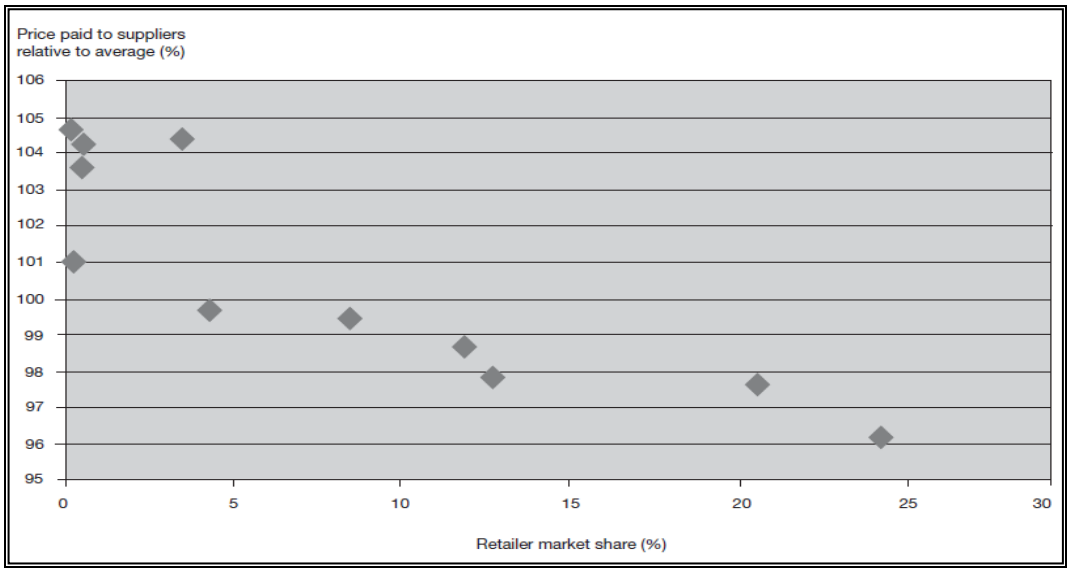

Figure 7: Supermarket buyer power in action: UK market share and prices paid to suppliers
Source: Vorley (2004)

"Fragmentation at the farm level amidst consolidation in milk processing has placed dairy farmers in a weak and vulnerable position" (Vorley, 2004, p. 11). This power imbalance proved detrimental to farmers who have lost confidence in dairying, resulting in many exiting dairy farming altogether. In the Milk Development Council's annual Farmers' Intentions survey, 30% of dairy farmers expressed an inclination towards exiting the dairy sector if milk prices were to drop by 2ppl and 65% of farmers if the price dropped by 4ppl (NFU, 2009, p. 4). The exit of farmers from the industry has implications on the milk supply especially when the expansion of existing farms does not take place at a rate which compensates the losses due to closure. Milk production within the UK has shown a discernable decline from 2003 and domestic supply can no longer meet the needs of the 'core' market. Now a new set of dynamics drives milk pricing in the UK;

- most major retailers now have dedicated groups of farmers supplying them with milk, who in return receive premium prices.
- buyers are paying more remunerative milk prices to farmers in order to secure supply following pressure from declining milk production (NFU, 2008, p. 7).

3.8 Concentrated Market Power in the US Dairy Supply Chain

On the farm, the Unites States' just over 9 million cows produced about 185 billion pounds of milk in 2007. Consistent with worldwide trends though is that the dairy supply chain is characterised declining farm numbers and increasing farm sizes (International Dairy Foods Association, 2008). "Between 1987 and 2007 the number of dairy farms in the United States decreased from 202,000 to 70,000 farms" (Gould, 2010, p. 3).The supply chain is also characterised by consolidation and greater market integration. Dairy markets have evolved from being local markets to becoming national markets that are served by fewer, larger operations (U.S. Department of Agriculture, 2004, p. 13).

The US dairy market has not undergone a deregulation process similar to New Zealand, South Africa, and Australia. US dairy policy like some 60 years ago is still characterised by price support programs and market loss payments, quotas and federal milk marketing orders as well as border measures. The minimum prices paid by milk processors and dairy product manufacturers for farm milk are regulated by the federal government. These regulated minimum prices are directly linked to the prices of manufactured dairy products in the wholesale market and calculated for four classes of milk based on the products made from the farm milk. "Off farm costs including marketing, processing, wholesaling, distribution and retailing account for 80 cents of every food dollar spent in the United States" (National Farmers Union, 2007).

Concentrated market power within the dairy cooperatives in the United States has been on the increase. The HHI for the 50 largest cooperatives increased from 472 in 1992 to 924.3 in 2008. (Gould, 2010, p. 7). In market share terms, data also indicates that there is increased market power in the largest of these cooperatives. "The two largest cooperatives accounted for approximately 30% of U.S. milk marketed in 2008 from less than 20% in 1987. In 2008, the 10 largest cooperatives accounted for nearly 70% of U.S. milk marketed compared to less than 50% in 1980" (Gould, 2010, p. 5).

Table **9** below illustrates the farmer's share for selected dairy products for the period between 2000 and 2008. "The farm-to-retail price spread remained fairly constant between 2000 and 2008. Retail prices tended to rise and fall with the farm value of the milk in the foods" (Stewart & Blayney, 2009, p. 45).

Table 9: Farm shares of the consumer price for selected dairy products in the USA (2000-2008)

Year	Percentage of Retail Price		
	Whole Milk	Butter	Cheddar Cheese
2000	48	42	27
2001	54	47	32
2002	47	33	25
2003	49	36	30
2004	51	49	35
2005	50	44	32
2006	45	38	27
2007	56	41	38
2008	53	42	38

Source: Stewart & Blayney (2009)

The trends towards consolidation and the ensuing concentration especially among cooperatives within the US dairy supply chain have been spurred on by the need to; improve the bargaining position for members and improve the ability to integrate operations to achieve economies of scale and scope. Tight operating margins and capital constraints, rapid increases in information technology and increased volatility of milk prices since the late 1980's have also contributed (Gould, 2010, p. 8).

Concentration is also evident within the processing sector of the dairy supply chain. "Between 1963 and 1987, the 20-firm concentration ratios for wholesale butter, cheese, and fluid milk companies increased from 31% to 94%, 59% to 68%, and 48% to 67%, respectively" (Liu et al, 1995, p. 301). As of 2008, "approximately 19% of the total value of dairy products produced in the United States was accounted for by the two largest dairy firms, Dean Foods and Kraft Foods-North America. Over 1995-2008, the top 20 firms increased their market share from 55% to 67%. In 1995, the top 100 processors generated an HHI index of 238. This increased to 382 by 2008, well below the critical 1000 level" (Gould, 2010, p. 10).

Between 1995 and 2008, the dairy processing sector became increasingly concentrated. As concentration has increased among dairy processors and manufacturers, the number of market participants has reduced. Within this new dynamic, contracts and other forms of prearranged

transactions have become more prevalent, and participants have begun to produce to custom rather than standard specifications (U.S. Department of Agriculture, 2004, p. 20).

In the US, the number of options in the dairy section of the supermarket may lead one to believe that there are many available options. However, the Agribusiness Accountability Initiative reveals that upon closer examination, the opposite is actually true. "Dean, the largest U.S. dairy company, controls not just its own name brand but also such milk brands as AltaDena, Berkeley Farms, Borden, Garelick, Land O' Lakes, Lehigh Valley, Mayfield, Oak Farms, Shenandoah's Pride, Verifine, Horizon Organic, Organic Cow of Vermont, Silk soymilk, and many others" (Agribusiness Accountability, 2000). This means that consumers' access to dairy products is dependent on the decisions of one company. At a producer level, it means that one processor has significant power in milk procurement (Agribusiness Accountability, 2000).

Pressure from downstream businesses, including high-volume retailers, large restaurant chains, and food processors, have spurred dairy processors and manufacturers to grow large enough to serve customers efficiently; to satisfy requirements for more retail and other support activities, adoption of compatible technologies, improved product quality and uniformity, and production to firm-specific standards; as well as to offset market power of the large downstream entities (U.S. Department of Agriculture, 2004, p. 18).

Retailers are the dominant distribution channel for dairy. "The advent of 'modern' food retail, with formidable buyer power associated with highly concentrated patterns of ownership in supermarket and food service sectors, has profound implications for farmers and enterprises" (Vorley, 2004, p. 38). "Retailer dominance and vertical integration, in the food system presents challenges for farmers, processors and distributors. As retailers grow larger through acquisitions and mergers, they develop their own vertically integrated distribution systems that tend to shut out wholesalers, small processors and smaller retailers – the supply problem that regional dairy processors tried to overcome. These large retail firms are able to develop one-on-one relationships with dominant food manufacturers that can service their far-flung systems" (Hendrickson et al, 2001, p.12).

3.9 Conclusion

Chapter 3 gave a synopsis of the problem of concentrated market power within the dairy supply chains under study. The chapter shows the evidence of how the concentrated market power problem

is increasing over time within the supply chains. It reveals how processors and retailers have emerged as the major drivers within the supply chain as they are in position of power. Dairy farmers emerge as the least powerful players within the supply chain. This puts to nought the assumption of many buyers and sellers which is among the preconditions for efficient markets.

In the US where the market is subject to regulation, market concentration is still on the increase. Market concentration has been observed at cooperative level, in response to high levels of concentration within the processing sector and retail sector. Although the processing sector became more concentrated over time, the farmer's share remained consistent because of the minimum pricing regulations that are in place in the US. US farmers also have much leverage as they have bargaining powers through cooperatives, which are becoming more concentrated in response to increased concentration downstream in the supply chain. The farmers are "shielded" from the full extent of the negative effects that arise from a more concentrated processing and retail sectors. Consequently, while concentrated markets can be observed within the processing and retail sectors in the dairy supply chain, this does not have the same effects as it does where deregulation has taken place.

One consequence arising within the US dairy supply chain is oversupply. While there are concerns in the UK about securing milk supply following deregulation, the US system of minimum price and federal orders creates an enabling environment for excess supply. This is unlike the Canadian system of supply management in which supply is predetermined.

This chapter shows how market concentration is evident in supply chains in both regulated and deregulated markets. However, the effects of market concentration differ according to the extent of regulation. In an unregulated market like that in Australia and South Africa, the consequences of market concentration have the most effects on the dairy farmer who is the least "powerful" in the supply chain. In totally regulated markets like the US, problems of oversupply arise which have negative impacts on the world's dairy market. Deregulated markets that are more structured like the New Zealand market have more success in satisfying the different needs of farmers, processors and consumers.

Market concentration within the dairy supply chain is an increasing trend that is observable in most countries under study. The chapter sheds light into the fact that it is not only numbers of buyers and sellers that are of concern, but the issue extends to just how much clout they possess within the market. The power imbalances that have become characteristic of the supply chain have significant

effects on the price. Farm-gate prices and prices paid to processors by retailer are all influenced by the market power dynamics. Market power dynamics are critical to the bargaining process. In the presence of unchecked concentrated market power, farmers are at risk of receiving “unfair” prices as opposed to “right prices”.

4. Information Asymmetry in the selected dairy countries

"The basic reason asymmetric information destroys markets is that it is hazardous to do business with someone who has relevant but hidden information. The uninformed party is liable to be exploited and may be unwilling to participate" (Bardsley, Chaudhri, Stoneham, & Strappazzon, 2002).

4.1 Introduction

This chapter provides more insight on the information asymmetry problem within the supply chains of the selected dairy countries. The information problem as it manifests within each country is analysed. The irony of such an analysis is in how the unavailability and inaccessibility of information on the problem of information asymmetry in dairy supply chains presents a major constraint to this study.

Dairy sectors worldwide are complex and characterised by lack of transparency. Information is not always available or readily accessible so information problems lie at the heart of transaction costs and many absent markets (Bardley et al, 2002, p. 216). Many problems of market failure and missing markets often arise due to asymmetric information (Wu, 2003) (Wu S. Y., 2003). Information availability and accessibility plays a critical role in bargaining. The presence of information asymmetries results in an informational advantage that could result in an advantage to one party in terms of bargaining power.

When producers have sufficient market information, this improves their bargaining power and reduces their transaction costs when dealing with traders and processors. Price formation and resource allocation is also more efficient when market information is available and accessible (Bayley, 2000). To identify the source of market concentration and to understand the relationship between market concentration and the exercise of market power, detailed sector information is required. This detailed sector information is however not always accessible (Rude & Fulton, 2002, p. 163). In some instances neither the incentive nor the market for information exists.

Information availability and accessibility may present a transaction cost in the supply chain. Or there may be information asymmetries in the supply chain. Where information asymmetries exist, the problem of adverse selection may manifest. Information plays a critical role as economic, social and environmental goals in the system are articulated through information.

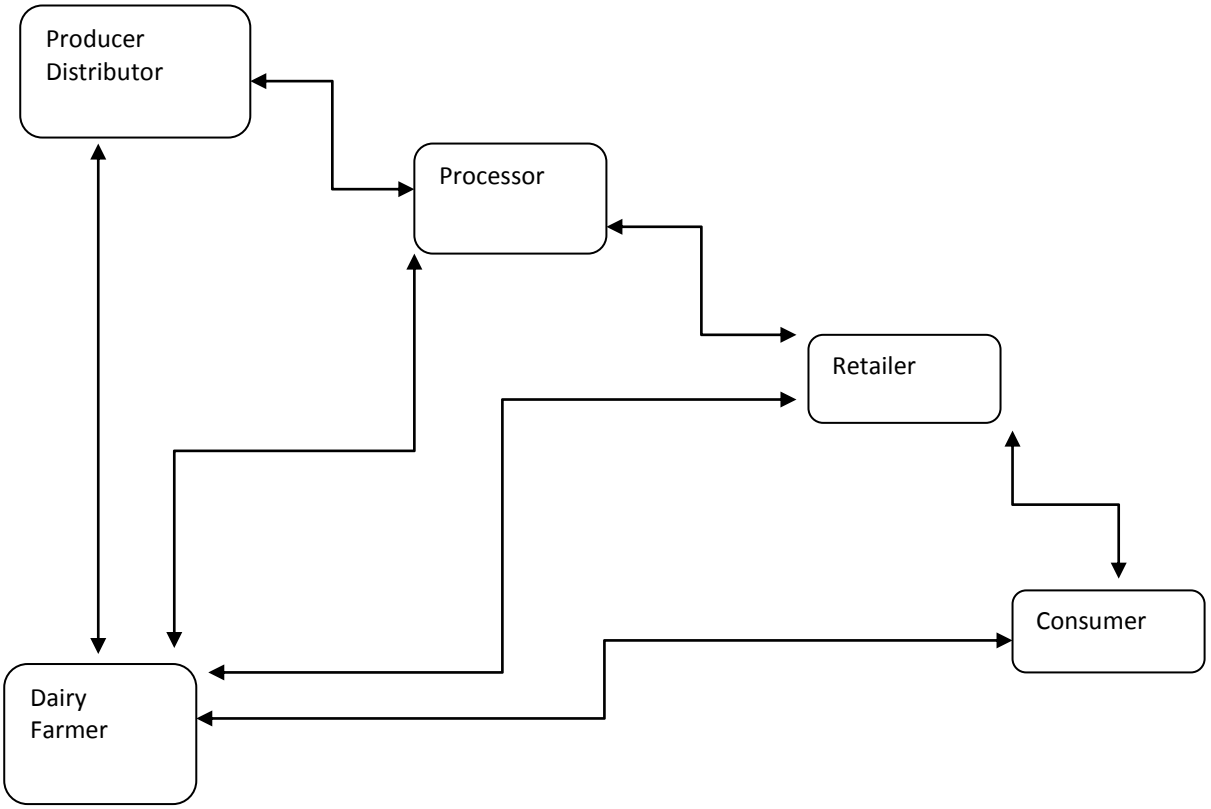

Figure 8: Information flow in relationships within the supply chain

Within the supply chain, ideally information is transmitted between all parties as illustrated in Figure 8 above. Price and quality information play a critical role in decision making within the supply chain and ideally, information flows in all directions readily. Under the idealised conditions of the Arrow-Debreu model, prices convey information efficiently from producers to consumers and vice versa (Boetkke, 2010, p. 368). However, information does not always conform to these ideals in the market.

Traditionally, consumers "informed" supermarkets quantitatively through their purchasing decisions, and this information was transmitted back to processors who took these signals back to farmers through standards and grades (Hennessy, 1996, p. 1034). This is not so clear anymore as consumers have become more "demanding" in their preferences and price signals have become too fuzzy for the farmers to determine the needs of the market from these alone. Today, there are

information asymmetries such that "consumers and downstream buyers (retailers, processors, traders) may not have full information about food safety and quality, or about production methods related to animal health and welfare, environmental sustainability, agricultural workers rights as well as sustainable development practices" (Hobbs, 2003, p. 5). The market is failing to respond to the heavier informational burden placed on it.

Information availability prior to deregulation was managed by commodity boards. Efficient markets are meant to reflect all available information through the price mechanism and are self- correcting. This changes when a market is characterised by "imperfections in the information that actors possess and deviations from perfectly competitive market conditions" (Boetkke, 2010, p. 368). Traditionally, the transparency of farmgate milk prices was relatively high in the dairy industry. However, as competition between processors has increased, the process of comparing prices offered by processors, and margins within the whole supply chain has become more complex (Spencer, 2002, p. 65).

The structure of the dairy sector is complex and there is a lack of transparency in the dairy supply chain. The real problem is that farmer and processor costs are either widely available or readily estimated. In contrast, retailers' costs and profits in respect of liquid milk and dairy products are virtually impossible to obtain (Brigstocke, 2004, p. 8).

4.2 Information Asymmetry in the South African Dairy Supply Chain

Following deregulation, the dynamics of information availability and accessibility within the South African dairy supply chain have shifted. While state marketing boards formerly dominated the provision of information in supply chains, this came to an end with deregulation. The South African dairy supply chain as already illustrated does not meet the perfectly competitive model. It is in fact a structural oligopoly and oligopsony at different stages and is characterised by high levels of concentrated market power. The result is market perversities in lieu of market perfection (Boetkke, 2010, p. 368).

The information asymmetry problem is such that even when the rising of food prices triggered suspicion about possible manipulation in the agricultural commodity markets, as well as concerns about the concentration and market power in the food manufacturing and retail section, the proprietary nature of information in the food manufacturing industry made it difficult to determine

which specific aspects were responsible for the increase of the margin between the farm gate and retail prices (Cutts & Kirsten, 2006, p. 2).

Milk is sold "raw" by farmers to processors who pay according to a pre-determined price. This price consists of a base price and then a premium based on quality. While the price is pre-determined and may change, the amount of milk on the market is not predetermined. When farmers, who are uncoordinated, produce milk, they do not have accurate information as to the amount of milk on the market. The current market system does not convey information to producers about quantity of milk available. Processors on the other hand, do not face the adverse selection problem as it pertains to milk quality. At farm level, the information on milk quality can be obtained by testing each batch of milk in the presence of representatives of the farm and processor.

In South Africa, the adverse selection problem has played itself out in the coordinated practices such as 'surplus removal' by dairy processors to prevent higher levels of production having a downward effect on wholesale prices, and information exchange in respect of procurement to depress the price to farmers" (Roberts et al, 2008, p.14).The milk processors engaged in price fixing and market allocation, both with respect to buying raw milk from producers (farmers) and in respect of selling processed milk products to retailers.

Processors used a system of surplus milk removals in which surplus milk products were exported so that they did not exert downward pressure on the selling prices of processed dairy products, including fresh milk within the local market (Roberts et al, 2008, p.16). This was achieved through coordination among the competing processors using information on the available milk supply and who was purchasing how much. This enabled them to continue receiving artificially "higher" prices from retailers. On the other hand, in dealing with producers, the processors maintained raw milk prices at lower prices than in the absence of uncompetitive behaviour, thus restricting supply, through exerting buyer power, individually and through co-ordinated conduct. Processors would forge exclusive supply agreements with farmers which governed a specified amount of milk to be purchased and prohibit the farmer from selling any surplus to another buyer. By limiting competitive rivalry in the raw milk market, processors suppressed prices paid to farmers (Roberts et al, 2008). Farmers and processors would enter into these agreements without this information.

Apart from the dismantling of price information systems that were in place via marketing boards, following deregulation, statistics and information available within the sector (compiled on a voluntary basis) is now incomplete and unreliable (NAMC, 2001, p. 4). In some supply chains,

namely wheat and maize, institutions such as SAFEX work to bridge the price information gap. The dairy supply chain does not utilise such institutions. As a result, the consequence of information asymmetry within South Africa's dairy supply chain manifested itself in the un-competitive behaviour displayed by processors.

4.3 Information Asymmetry in the Australian Dairy Supply Chain

The issue of a lack of price transparency as well as difficulties in establishing relative costs in the value chain was raised in evidence to the Parliamentary inquiry on Food Production in Australia. In the enquiry, the prices paid by the supermarkets, and consequently the profits earned by the processors, are quite different for branded and generic milk (see Table 10 below) but both processors and retailers were reluctant to provide much information about the difference (Commonwealth of Australia, 2010, p. 25).

Table 10: Retail milk prices by type, Australia 2008-09

	Branded milk		***Generic milk***	
	Price (cpl)	(% of market)	Price (cpl)	(% of market)
Regular whole	186	(14)	118	(32)
Reduced fat	210	(16)	135	(15)
No/low fat	214	(5)	164	(0)
Flavoured	371	(6)	212	(0)
UHT	190	(8)	119	(4)

Source: (Commonwealth of Australia, 2009)

There was greater transparency in pricing under the formerly regulated system where there was a price paid for the milk, semi-wholesale ex the factory price, a wholesale price and a semi-wholesale price and a recommended retail price. In that era, a change in the price of liquid milk usually made front page news in the paper. Under the current regime it is widely acknowledged that there are difficulties in obtaining cost estimates in the various phases of the value chain and that a lot of the 'intimate costs' in relation to distribution and retail costs are now 'in-house' and are therefore 'difficult to evaluate' (Commonwealth of Australia, 2009, p. 17).

Table 11 below represents an attempt to apportion the typical supermarket price of milk between the costs and profit margins of the various players in the chain using information obtained from

various industry sources. Industry sources did not fully disclose all components and there remained a residual "unclaimed" price component that represents a "commercial dark matter" of sorts (Commonwealth of Australia, 2010, p. 42).

Table 11: Apportioning the supermarket shelf price, Australia

Estimated components of the cost of full cream milk (cents per litre) in south-east Australia, late 2009/early 2010		
	Branded Product	Generic Product
Farmers' Costs	40	40
Farmers' Profit	2	2
Transport Costs- Farm to Processor	3	3
Processing Cost- packaging	20	19
Processor's costs- Other processing	15	15
Processor's costs- advertising	3	0
Processor's Profit	30	1
Transport Costs- processor to supermarket	2	2
Supermarket Operating Costs	21	21
Supermarket Profit	14	4
Unallocated Residual	25	18
Supermarket shelf price	175	125

Source: (Commonwealth of Australia, 2010)

4.4 Information Asymmetry in the Canadian Dairy Supply Chain

Under the supply management regime, critical information on the market is supplied by various commodity (producer, processor, grocer and foodservice) organisations that conduct research, and ensure information exchange as well establishing a political voice in the market (Agriculture and Agri-Food Canada, 2007).

Prices, production levels, and levels of imports are controlled within the supply chain. Price setting is done by the Canadian Dairy Commission (CDC). The CDC has been criticised for not sufficiently informing Canadian consumers about dairy prices as well as the entire food industry about its intentions and obligations (Charlebois, Langenbacher, & Tamilia, 2007). Within the Canadian

supply chain, even the information on concentration in the farm input sector is difficult to acquire (Rude & Fulton, 2002, p. 151).

4.5 Information Asymmetry in the New Zealand Dairy Supply Chain

"Producers often have difficulty in obtaining information about the markets in which they operate, including information on trends, consumer preferences and future demand. This may create the risk of exploitation by middlemen. However, this risk is reduced where forward markets exist or where information about price and supplies are available electronically at low cost (OECD, 2003, p. 3). In New Zealand's vertically integrated supply chain, information is available and accessible to players within the chain.

The regulations governing the operation of Fonterra which lies at the centre of the dairy market, are such that information is available to allow for entry and exit into the industry, quota allocations are transparent. The Livestock Improvement Corporation (LIC Ltd) also acts as a repository for information on dairy herds. The framework also protects competition in domestic consumer markets and prevents Fonterra's dominance from impeding the growth potential of smaller dairy businesses, especially where they depend on Fonterra for milk supply" (Conforte, Garnevska, Kilgour, Locke, & Scrimgeour, 2008, p. 59). This system is able to function successfully because information is available and accessible.

4.6 Information Asymmetry in the UK Dairy supply Chain

The problem of information within UK's dairy supply chain manifests itself in that while farmer and processor costs are either widely available or readily estimated, retailer costs and margins are virtually impossible to obtain (Brigstocke, 2004, p. 8). Lack of transparency within the dairy supply chain led to some investigation into price transmission in the supply chain in 2003. There was a 2 pence/litre retail price increase in milk and there were reservations as to whether this increase had been transmitted to farmers. While farmers concluded that they had been unfairly treated, the investigation revealed that the price increase had been transmitted along the supply chain. The House of Commons Environmental, Food & Rural Affairs Committee (EFRAcom) inquiry into 'Milk Pricing in the UK', published in June 2004, noted, that the dairy market is not operating properly. In its conclusions, EFRAcom found that they could not account for some parts of the

consumers “milk dollar” despite their best efforts to determine who takes what share of the retail price of a litre of liquid milk (Brigstocke, 2004, p. 8).

Information asymmetries are a major contributor to a loss of confidence in business culminating in other players mainly farmers exiting the dairy industry. For the UK, the exit of some dairy farmers has not been sufficiently compensated for by farmers who are growing larger in scale. Consequently, the milk supply has been decreasing in the UK. On the other hand, decreasing supply can translate to better prices being paid to dairy farmers. The presence of market power and information asymmetry however may prevent the full manifestation of this self-adjusting characteristic of the market.

Information asymmetries also make it difficult for bargaining and negotiation during contracts. In the UK supply chain, retailers are increasingly engaging farmers in dedicated supply chain arrangements. Without more transparency in the supply chain, the milk pricing systems which are already complex become more complicated and these arrangements between producers and retailers are marred by a lack of trust and threatened with failure.

4.7 Broader Social Goals

When broader social goals are not taken into account in economic and agricultural policy, there will be some unplanned for, unexpected consequences. This is because of the multifunctional nature of agriculture. When broader social and environmental goals are not considered, the consequences are felt not only in agricultural production activities but in all other areas associated with agriculture. For instance, in regions where the economy is highly dependent on agriculture, the lack of viability in dairy farming has extended effects on rural communities.

4.7.1 Farm incomes

“The level and variability of farm income has long been a central concern of agricultural policies. In the US, the traditional policy instrument is market price support: high domestic prices sustained through border measures” (Van Tongeren, 2010, p. 6). The problem with market price support is that the policies create a false sense of competitiveness by raising domestic prices to such levels that even inefficient producers are able to earn sufficient market receipts to survive.

Following deregulation, declining farm incomes have been a major characteristic in dairy supply chains worldwide, South Africa included. In the US, where there has been no deregulation, the government provides many different forms of support to producers, aimed predominantly towards providing a safety net" (OECD, 2010, p. 18).

The effects of declining farm income do not only affect farmers. They have a bearing on the communities in which they live, and the wellbeing of their workers. Declining farm incomes also have psychological effects on farmers and their families especially when farming has been their livelihood.

4.7.2 Rural viability

Dairying represents a vital part of the rural economy in which dairy farms are located. The presence of dairy industries has a multiplier effect on the rural economy. In Australia, the dairy industry is one of the most important rural industries, including adding value through further downstream processing. The bulk of dairy processing occurs close to farming areas, therefore generating significant economic activity and employment in country regions. The regional economic multiplier effect is estimated to be in the order of 2.5 from the dairy industry (Commonwealth of Australia, 2010, p. 11).This means that any changes within the dairy sector have an effect on income and employment levels within the rural community.

4.7.3 Broader Environmental Goals

"As a means of achieving environmental goals, agricultural policy is a blunt instrument at best" (Batie, 1990, p. 570)

There has existed a social contract of sorts between agriculture and society in history. The social contract effectively is defined as "the right for farmers to be protected against income instability" (Batie, 1990, p. 566). Subsidies and producer support as well as border measures have been used to "prop up" and protect farmers from vagaries of the market and international competition. Over time there have been various conditions attached to this social contract. As issues of climate and the environment increasingly become focal areas, the need to consider environmental goals within the context of agricultural policy becomes a feature of the social contract between agriculture and society.

Traditionally, farm programs in the US, were designed to address the "farm problem," that is, the gap between rural and urban incomes, instability in agricultural markets, and unequal economic power between farmers and buyers of agricultural commodities. Increasingly however, the rationale appears to have shifted from just "saving the family farm" to achieving broader social and environmental goals and objectives such as "sustainable agriculture" and concerns about unequal economic power between farmers and buyers of agricultural products (Antle, 1999, p. 1004).

Producer support, in some ways, has come to represent an attempt has to achieve broader social and environmental goals by attaching them as conditions to the social contract. For instance, in the US the benefits from the Farm Bill cannot be enjoyed without showing environmental responsibility as supported by the following statement, "the social contract of the American public with its farmers is now conditioned by the demand that farmers be good stewards of the environment" (Batie, 1990, p. 568). Increasingly, a feature of agricultural support is the condition that producers must follow specific production practices in pursuit of broader objectives, such as preservation of the environment, conservation of natural resources or animal welfare. Within OECD countries, such requirements now represent over a third of all producer support from 4% of aggregate PSE in 1986-88 (OECD, 2010, p. 6). Within the EU, agricultural policy reflects a broad array of objectives such as supporting farm income, conserving the environment, protecting animal welfare, preserving traditional areas, as well as increasing competitiveness.

Because support is increasingly linked to the pursuit of broader social and environmental goals, understanding the levels of support and the corresponding achievement of social and environmental goals is important. "The composition of support is important because how support is provided determines its impact on the agricultural sector and the distribution of benefits to society as a whole. Market price support can have a large effect on production and trade and has been a source of friction with trading partners, imposes additional and regressive costs on domestic consumers, while doing a poor job of addressing objectives such as farm income, environmental protection and preservation of rural areas. On the other hand, income support not based on current commodity production is much more effective at improving farm income with less spill-over effects. Policies that directly target non-commodity criteria such as landscape elements, environmental performance or traditional breeds of animals are also typically more effective at reaching these societal objectives, although concerns have been raised over the budgetary and transactions costs involved in some cases" (OECD, 2010, p. 20). "Input-based policies are growing in importance as a means of

achieving environmental and animal welfare goals, improving production efficiency, and achieving structural change in the sector" (OECD, 2010, p. 23).

Dairy has traditionally been among the most supported commodities. In Figure 9 below, commodities are ranked according to % SCT levels in 2007-09. The top bar relates to 1986-88, the bottom bar to 2007-09 (OECD, 2010, p. 22).

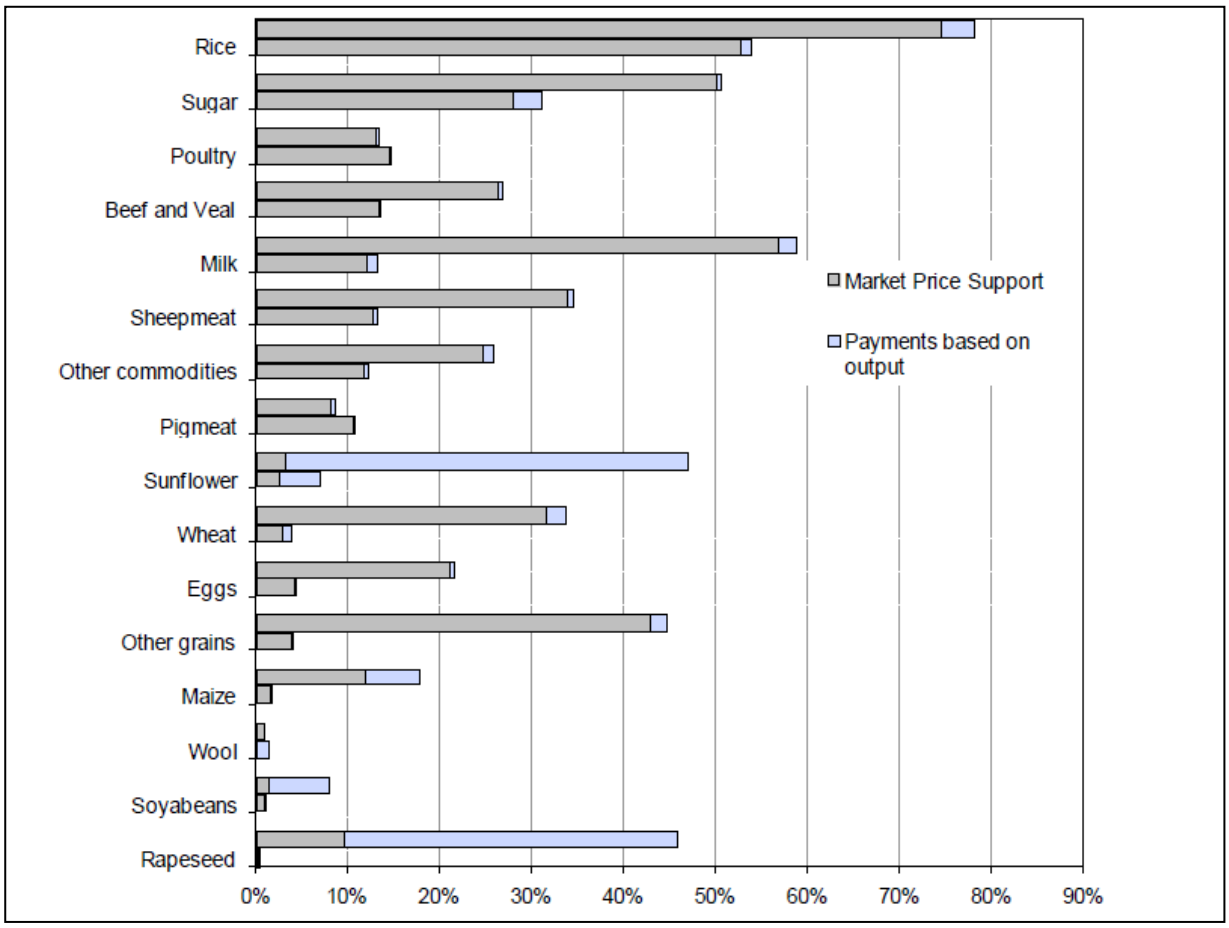

Figure 9: OECD: Support based on output by commodity, 1986-88 and 2007-09
Source: OECD (2010)

The bulk of support to dairy worldwide is in the form of market-price support. As shown in Figure 9 below, levels of support for dairy have decreased significantly on a global scale. This is due to reforms such as the phasing out of dairy quota systems as well as the reduction of intervention prices for dairy products in the European Union (OECD, 2010, p. 21).

Within the OECD, the EU remains the part of the world with the highest total support based on commodity output in monetary terms despite reforms that have drastically reduced market price support for dairy. The UK Dairy Supply chain has come up with a "Greener Dairy" strategy in order to improve its environmental footprint. A roadmap and targets are set for players within the UK

dairy supply chain. The initial roadmap was published in 2008 and the follow up to that roadmap is already out. This action by the UK Dairy Industry represents going beyond formulation, to implementing and evaluating progress on resolutions made. GAPs can correct market failures by leading to the adoption of production practices that are socially acceptable and environmentally non-degrading. They can help improve the flow of information along the supply chain" (FAO, 2003).

4.8 Conclusion

The assumption of full availability and accessibility of information remains unattainable within the supply chain. Information asymmetries are an inherent part of the supply chain. Yet, a great degree of information transparency is a prerequisite for effective bargaining within the supply chain. This refers particularly to "critical information" (Rueben et al, 2006, p. 228).

5. Description and evaluation of policy steps taken to address Market Concentration and Information Asymmetry in selected dairy supply chains

5.1 Introduction

Chapter 3 and Chapter 4 discussed how the problems of concentrated market power and information asymmetry manifest in each of the selected country's dairy supply chains. Chapter 5 analyses the various policy steps, methods and systems used to address the two problems within the countries under study.

Various agencies within the supply chain have taken steps to address the problems of concentrated market power and information asymmetry. Some measures have come directly from government while, in some instances, the farmers and other players have sought to address the market failures resulting from these two problems. Governments have through policy used the provision of public price reporting, publicly funded research and development (R&D) activities, education, and extension activities as ways in which to address the problems of market failure and information asymmetry within the agricultural markets (Young & Hobbs, 2002, p. 429).

But when the responsibility of addressing market failure lies squarely on government's shoulders, there is a risk of "government failure" associated with. This "government failure" may in turn reduce welfare worse than the "market failure" it is trying to offset. Sources of "government failure" may be; insufficient information and analysis available to design an appropriate intervention (bureaucratic failure); or deliberate action at the political level aimed at rewarding particular groups covertly for their political support, even though that intervention may be costly to the community at large (Anderson, 1998, p. 8).

5.2 Addressing the problem of Concentrated Market Power

There are "two different approaches to offset weaknesses in market power of farmers namely: (a) to build countervailing power through direct or indirect government action or special additional antitrust immunities for agriculture, and (b) to dissolve or lessen the market power of groups to

whom the farmer sells or from whom he buys" (Lanzillotti, 1960, p. 1246). Policy steps to address the problem of concentrated market power within the supply chain are mostly centred on these two approaches.

5.2.1 Protection and force to benefit smaller players

Using legislature, governments can intervene within the market to offer protection and or force some benefits to smaller players to mitigate the effects of concentrated market power and information asymmetry within the supply chain. This is reflected in New Zealand's dairy supply chain where the Dairy Industry Restructuring Act (DIRA) of 2001 imposes various obligations and constraints on Fonterra for the purposes of facilitating competition in New Zealand dairy markets, particularly the market for farmers' raw milk. "The DIRA does not seek to reduce Fonterra's market share, it simply eliminates entry/expansion barriers that might otherwise exist as a result of Fonterra's dominance" (Ministry of Agriculture and Forestry , 2010, p. 6). This piece of legislation, DIRA, is aimed at ensuring that there is open entry and exit for all dairy farmers into Fonterra. Under DIRA, Fonterra must;

- accept all milk supply offers from dairy farmers in New Zealand
- allow relatively costless exit from the co-operative upon the request of farmer-shareholders
- pay farmers a fair value for their milk vats
- allow farmers to divert up to 20 percent of their weekly milk supply to independent processors
- ensure 1/3 of all milk solids in a 160km range must either be on contract with an independent processor or on a contract with Fonterra that expires at the end of the season (Ministry of Agriculture and Forestry , 2010, p. 2).

It also ensures that small dairy processors are not forced out of the market. Through the Dairy Industry Restructuring (Raw Milk) Regulations 2001 (Raw Milk Regulations), the DIRA compels Fonterra to make available up to five percent of the raw milk it collects from farmers to independent processors at either an agreed price or at the default price specified in the Regulations (Ministry of Agriculture and Forestry , 2010, p. 2). This ensures that although Fonterra has the greatest market share and access to raw milk, the smaller processors are still able to obtain raw milk for their operations.

Following deregulation and the implementation of the Commerce Act and the Dairy Industry Restructuring Act (DIRA) 2001, there is evidence of changes with New Zealand's dairy supply chain. While previously Fonterra, maintained a monopoly status and associated market power in which it handled approximately 96% of New Zealand's milk production, and therefore may have had incentive and ability to create barriers to new milk suppliers joining the co-operative or switching from Fonterra to other processors, this is slowly declining with the emergence of newer players within the supply chain (ABARE, 2006).

5.2.2 Competition Legislation

It was Adam Smith who said "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public or in some contrivance to raise prices" (Smith, 1804, p. 109). The need for competition policy arises from the idea that if firms are left unmonitored, they may resort to actions that increase their profits but harm society such as; collusion, mergers which lessen competition, predatory behaviour and exclusionary behaviour (Gatdula et al, 2006). Competition legislation exists as an alternative to regulation in the face of market failure. Competition policy emerged from an attempt by governments to coordinate the behaviour of firms often arising from concerns about fair price and the competitive process. Competition policy is concerned with the maintenance, and or restoration of competition and may impact on either market structure or conduct (Smith, 1997, p. 1). It attempts to create a level playing field in a market-led economy. Government intervention through institutions such as the Competition Commission sets out not to achieve a state of perfect competition but of "effective" competition (Symeonidis, 2004, p. 2).

There are various bodies concerned with the stewardship of the competitive process within supply chains namely; South Africa's Competition Commission; Australian Competition and Consumer Commission; Canada's Competition Bureau; New Zealand Commerce Commission; UK Competition Commission; and the US Antitrust Federal Trade Commission.

For competition legislation to be effective in addressing market power concerns; there must be complainants making complaints that can be substantiated. The authorities respond by conducting investigations following complaints and allegations of anti-competitive behaviour. The perpetrators have to be caught before anything can be done. It can be appreciated that vigorous antitrust policy, while slow, offers the basic and most effective approach to redressing market power (Lanzillotti,

1960, p. 1246). Whether or not the existence of legislation governing competition is enough of a deterrent to anticompetitive behaviour is another issue altogether.

5.2.2.1 Competition Commission of South Africa

Today, South African Competition policy has taken its place as the preferred means of "regulating" private enterprise in the public interest. Currently, South African competition law does not adequately capture all forms and aspects of anti-competitive and unethical behaviour. It appears that South African Competition legislation is more concerned about 'horizontal' competition issues than the 'vertical' issues. The provisions of the Competition Act, despite various stipulations and definitions, are silent on the buyer-supplier relationship and the effect of dominance and market power position of the buyer on the suppliers (NAMC, 2009, p. 8). Given the rising importance of buyer power (at retail and processor level) within the supply chain, these are "inadequacies" that cost the whole industry. This is because buyer power and the constraints arising from the presence of concentrated buyer power within the supply chain have potential welfare effects (NAMC, 2009, p. 9).

5.2.2.2 Australia's ACCC and the Trade Practices Act (TPA)

The Australian Competition and Consumer Commission (ACCC) is a competition regulator whose objective includes; protecting fair and informed markets, the competitive process and the long term interests of consumers. The challenge for the ACCC is how, in this deregulated environment, to facilitate fair competition in the marketplace and avoid abuse of inequalities in bargaining power between participants in the supply chain. The ACCC core function is the enforcement of competition, fair trading and consumer protection laws. It is not the ACCC's role to protect any one sector of the economy, or any particular business, big or small. The National Competition Council (NCC) is the competition instigator established by all Australian Governments in November 1995 to act as a policy advisor to oversee their implementation of National Competition Policy (ACCC, 2004).

5.2.2.3 New Zealand: the Commerce Commission

New Zealand's agricultural sector is subject to the country's competition law, as well as the Commerce Act of 1986.The purpose of the Commerce Act is to promote competition in markets

within New Zealand for the long-term benefit of consumers. The key restrictive trade practices in the Commerce Act are:

- A prohibition against entering into or enforcing arrangements that have the purpose, effect or likely effect of substantially lessening competition (section 27);
- A provision deeming arrangements between competitors that control or maintain price to be per se illegal, unless the arrangement relates to certain limited exemptions (section 30);
- A prohibition against persons with a substantial degree of market power from taking advantage of that power for anticompetitive purposes (section 36).
- A prohibition against mergers or business acquisitions that have the effect or likely effect of substantially lessening competition (section 47).

Successive New Zealand governments have sought to progressively regulate agriculture under mainstream competition policy frameworks and under generic competition law. While some of the issues involved have been complex and politically contentious, New Zealand's experience in this respect has been generally positive (OECD, 2005). The general approach adopted by successive New Zealand governments has been to seek to remove sector specific regulation for agriculture and integrate all sectors into the mainstream of New Zealand's competition regulation.

5.2.3 Lobbying

"The strength of Farmers' Union is members like you,"……. "We must proactively, constructively and continuously engage policy makers to advance the opportunities and solutions that you develop at the grassroots level." NFU President, Roger Johnson

Farmers in the United States were calling for a less structurally complicated milk pricing system. In the United States, farmers head to Washington D.C. every fall, to have their stories heard and present their petitions to Congress. This represents a strong lobbying force. From this have emerged proposals of legislation such as the (NFU, 2009)

- Passage of the Milk Import Tariff Equity Act, introduced by Sen. Schumer, D-N.Y.;
- Passage of the Family Dairy Preservation Act of 2009 introduced by Sen. Gillibrand, D-N.Y.;
- Launching the Federal Milk Marketing Order review as directed in the 2008 Farm Bill;
- Launching antitrust and potential market manipulation investigations at the Department of Justice and Commodity Futures Trading Commission;

- Establishing a long-term supply management program.

The US dairy farmers are collectively seeking the above as measures to relieve the strain faced by dairy farmers within the supply chain. And history shows that this has most often times worked in the farmers favour as evidenced by the increases in Dairy Product Price Support administered by the USDA.

5.2.4 Farmer Protest Action

In the UK during the period between 2002 and 2005, the retail price of milk underwent significant retail price hikes. Two of these were significant in that they sparked farmer direct action against supermarkets. This action comprised picketing of shoppers and the blockading of various distribution centres with farmers arguing that farm gate prices were "too low" to even cover long run costs and price increases should be transmitted along the supply chain. The main retailers responded with price increases, called retail price initiatives, and the intention of the retail price initiatives was that these price increases would be passed on up-stream to the ultimate advantage of the milk farmer (Smith et al, 2007, p. 8).

5.2.5 Dedicated Supply Arrangements

In a simplified model of the supply chain, dairy farmers depend on processors and retailers as buyers, and processors and retailers depend on farmers as producers of the raw material. The nature of raw milk is such that dairy farmers are unable to withhold it from the market while negotiating for better prices. When fragmented farmers face increasingly powerful processors and retailers, and the trading relationship is much more important to one party (the dairy farmer) than to another, then the second may be able to demand from the first not only better trading terms but also some concessions, especially in the face of concentrated market power and information asymmetries. Bargainers cannot hold out indefinitely for their demands (Wagner, 1988). This is why farmers are on a perennial do or die quest to become low cost producers (efficiency). This has translated to farmers taking pay cuts and losses. The sustainability of this however is questionable (Vorley, 2004).

What is needed is a transition from exercise of market power within supply chains to relationships of dependence and influence. This is epitomised in the emerging models of trade between farmers and buyers such as dedicated supply arrangements and contracts.

Farmers continually bear the vast majority of price volatility within the supply chain. As a method of managing volatility, some retailers in the UK have adopted the use of supply contracts and dedicated supply chains (DairyCo, 2009). This system emerged from the need to ensure milk supply in the UK owing to an observed long term trend of decline in milk production. The low milk prices received by dairy farmers over extended periods in the past have resulted in underinvestment on the farm. Continual exit and lack of confidence within dairy production has the long-term effect of destabilizing the processing sector and subsequently the whole supply chain. DairyCo estimated that "UK milk production would fall to 12.1billion litres by the 2010/2011 milk year with those planning on expanding their businesses not covering the production lost by those leaving the industry. If production continues to decline at the same rate, by 2030 UK production would be just 7.5billion litres resulting in 53% of dairy products being imported. This in turn will mean that retailers may find it increasingly difficult to offer their consumers the current range of high quality dairy products at an affordable price" (DairyCo, 2009).

Under the dedicated supply arrangement system, the retailer obtains its supply of liquid milk exclusively from a defined pool of farmers. The raw milk from these farms is processed under segregated arrangements and delivered as liquid drinking milk to the retailer. Farmers generally receive a higher price under these arrangements, which vary from retailer to retailer. In exchange for participating in integrated supply arrangements, farmers may be required to deliver different welfare requirements or to meet particular environmental standards set by the retailer (DairyUK, 2010, p. 22).

Not all farmers within the supply chain are able to become part of this integrated supply arrangement. For participating farmers, the supply arrangements have helped insulate farm gate prices from the volatility of commodity markets. However, the sheer volume of milk purchased by the major retailers is such that the farm gate price they set is seen by many as setting a benchmark for the industry. As a result, the growing number of dedicated supply groups for liquid milk helped to increase average prices during 2007" (DairyCo, 2008).

5.2.6 Contracts

Contracts play an important role within the supply chain even in the dedicated supply arrangements. Milk contracts are made between producers and processors and increasingly between farmers and retailers. And as such, there is a need to equip farmers with business skills, negotiation skills, in order for them to know the "best" contracts to sign.

In the US, "contract production has improved the efficiency of the agricultural system, allowed a clearer transmission of consumer preferences, and spawned new value-added products for consumers" (Wu, 2003, p.19). The upside of contracts is that in systems that are characterised by asymmetrically informed parties, "a contract could guarantee the downstream firm delivery of exactly what they ordered and could insure the farmer completely against bad outcomes" (Wolf et al, 2001). Even this is not without glitches as "contractors have considerable difficulty in observing and verifying the farmer's behaviour at the field level" (Wolf et al, 2001).

5.2.7 Orderly marketing

In the 1960s and 1970s, Canadian farmers organised themselves to implement supply-management - a version of "orderly marketing" for dairy, poultry, eggs and turkeys. Canada's national supply management for milk was established in 1972. This arose from the decision by farmers to not stand by idly while the large companies took advantage of "surplus" production to drive down prices at the farm gate. Consequently, the farmers decided they could attain higher prices if they exercised self-discipline and produced only enough to supply the market.

The supply management system is anchored on quotas, border controls and limiting production to levels where the farm level prices remain high enough to cover costs and provide a profit. The result is that the use of the orderly marketing systems provides stability and predictably for Canadian farmers and processors, treats farmers equitably with regard to price, and provides Canadians with a guaranteed supply of high quality milk and poultry products at stable prices comparable to, and usually below, those in the US and other markets. "It is widely recognized that expanding and strengthening orderly marketing systems for farm commodities will increase farmers' market power, thereby restoring more balance to the overall economy" (NFU, 2008, p. 11).

Supply management has been soundly criticized by buyers within the supply chain as it is said to keep supplies too low and prices too high. However, it has been a means for producers to maintain considerable market power in the face of concentration of their input suppliers and processing and retail buyers (Sparling et al, 2005, p. 52).The success of Canadian dairy farmers in establishing and maintaining the supply management system lies in the political clout of dairy farmers. Milk producers are among Canada's most well-off farmers.

5.2.8 Building countervailing and bargaining power

Given that farmers have been identified as the "weakest link" in the supply chain, could power commensurate to agribusiness be the solution in this current system of concentrated market power and information asymmetry (Levins, 2002, p. 18). If the premise is that concentrated market power can to some extent be held in check by the countervailing power of those who are subject to it, then dairy farmers must build countervailing power in response to the market power of oligopsonistic buyers within the supply chain.

In the US, cooperatives play a critical role in the dairy industry even with regards to the building of countervailing power for their members within the supply chain. While some cooperatives' sole function is marketing milk to fluid processors and dairy manufacturers and negotiating the best price for their members ("bargaining" cooperatives), others perform commercial functions, including milk assembly, milk processing, manufacturing of dairy products as well as distribution. They act as intermediaries between member producers and their customers, and provide members an assured market for their product. More importantly to the concept of countervailing power is that cooperatives represent a 'united front for dairy farmers in the face if powerful agribusiness. As opposed to large numbers of fragmented farmers facing a more powerful processing and retail sector, cooperatives provide the "leverage" for dairy farmers (U.S. Department of Agriculture, 2004).

Consolidation among these dairy cooperatives has been primarily driven by consolidation trends in the rest of the dairy industry. In the United States, "consolidation among cooperatives usually followed consolidation among handlers or distributors, which had unbalanced the established power relationship. Consolidation allows cooperatives to integrate their operations in order to exploit economies of scale, more efficiently use manufacturing capacity, and reduce administrative overhead and transport costs. Dairy cooperatives are increasingly entering into strategic alliances,

including joint ventures with proprietary firms, to ensure outlets for milk of their members" (U.S. Department of Agriculture, 2004).

Firms with more countervailing power appear better positioned to bargain within the supply chain. In the US, a Federal law grants producer cooperatives limited exemptions from antitrust regulations, which allows them to use collective action to achieve and maintain market power" (U.S. Department of Agriculture, 2004). Lanzillotti was a critic of this "preferential treatment of collective bargaining organizations. "Greater insulation of cooperatives' activities from antitrust statutes, for example, serve no general social ends and are not economically justified and attempts to develop an economic policy in this area (cartelizing agriculture) along lines of countervailing power leave much to be desired. It does not work largely because it attempts to replace the "invisible hand" of Adam Smith with the 'invisible fist" of government" (Lanzillotti, 1960, p. 1246). Despite criticism, cooperatives may be in a better position to bargain with processors for prices that are higher than those paid to individual fragmented farmers. In the US, where there is a strong cooperative movement that handles over 80% of the country's milk supply, market power also derives from the fact that, although cooperatives do not regulate producer-members' milk production, they control the disposition of the milk supply. The USDA affirms that dairy cooperatives' market power is closely tied to the treatment of cooperatives under Federal milk marketing orders. Marketing orders allow cooperatives to vote on behalf of all their members (block voting). This block voting gives cooperatives considerably more "say so". Consolidation among dairy cooperatives and their increased share of milk marketing may have gone a long way toward redressing the imbalance in market power between milk sellers (producers, through cooperatives) and buyers (milk processors and dairy product manufacturers) (U.S. Department of Agriculture, 2004).

Galbraith found that cooperatives have inherent structural weaknesses that prevent the exercise of market power. Being loose associations of individuals, that rarely include all producers of a product, cooperatives cannot control member's production and have less than absolute control over their decision to sell. Cooperatives bargaining position would emanate from its ability to influence supply. But since cooperatives are powerless to make non-members wait, they are rendered ineffective to a great extent. "In practice, the cooperative cannot fully control even its own members. They are under constant temptation to break away and sell their full production" (Galbraith, 1993, p. 161) even at the expense of those who stand by the cooperative. In a completely free market, this would tend to decrease supplier power. However, the minimum prices paid by dairy processors for raw milk in the US are set by federal and state regulators which have the effect

of strengthening suppliers. Recent years have seen consolidation upstream, with the total number of small dairy farms falling, while the number of large operations increased (Datamonitor, 2008).

5.2.9 Government Support

Milk producers, in virtually every OECD country and in many non-member economies, benefit from government interventions that boost the prices they receive for their raw milk production. Government support and protection for milk producers is also more widespread than for any of the other commodities for which the OECD calculates Producer Support Estimates (PSE). As a result, milk is one of the most heavily protected agricultural commodities, with an average OECD-wide percent PSE in 2000-02 of 46%. The support to milk producers as measured by the PSE amounts to 16% of the total PSE as calculated for OECD countries (OECD, 2010).

The majority of support to milk producers is delivered through market price support. In general, milk price support at the farm level is achieved either through trade measures (import tariffs, tariff rate quotas and/or export subsidies) applied to dairy products or through a combination of trade measures and discriminatory pricing arrangements. Support forms less than 1% and 3% of producer revenue for dairy farmers in New Zealand and Australia respectively. They rely largely on world market signals to determine production (OECD, 2010, p. 18). In contrast, the OECD estimates that in 2004, support to milk producers through policy measures accounted for 34%, 39%, and 15% of gross incomes in the European Union, the United States and Australia respectively. For Australia, this support included payments associated with industry deregulation in 2000. Support also consisted of matching grants for industry research and development programs (OECD, 2010).

Policy transfers to South African agricultural producers, as measured by the OECD Producer Support Estimate (PSE), equaled 5% of gross farm receipts on average in 2000–03. This is well below the average level of support for OECD countries (31%) and similar to farm support in other non-OECD economies such as Brazil, China and Russia. This low level of support indicates a relatively moderate degree of policy interventions at the agricultural producer level and the overall trend shows some reduction of support since 1994 (OECD, 2006). Levels of support have been declining in absolute terms for Australia, the European and the United States, with a reduction in the %PSE of more than ten percentage points, with the greatest proportional decrease having occurred in New Zealand (with currently the lowest %PSE in all OECD countries (OECD, 2010).

5.3 Addressing Information Asymmetry

Governments can act as a third party in reducing information asymmetry. This can be achieved through playing a role in setting industry standards for information availability and accessibility, legislation and institutional development. The government can also support research and development (R&D) of technologies that reduce transaction costs associated with making information available and accessible within the supply chain. The market for information is also open to private enterprise given the right incentives.

5.3.1 Industry standards

"An industry-wide standard reduces information asymmetry to the extent that downstream buyers can be assured all products receiving the industry-wide quality assurance mark meet a common quality standard" (Young & Hobbs, 2002, p. 437). The Red Tractor represents a British standard. It signifies that the milk was produced in the UK on a farm that meets the minimum standards of production for the UK and EU under the National Dairy Farm assured scheme. The symbol communicates that farmers are achieving good standards of agricultural practice. The standards that have to be met ensure that milk is produced and stored in a safe and hygienic manner, the cattle's welfare needs are not compromised , animals can be traced back to the farm and that the environment is not adversely affected by dairy farming (Assured Food Standards, n.d.).

5.3.2 Institutions

The Milk Producers' Organisation (MPO) and South African Milk Processors Organisation (SAMPRO), who together form MilkSA, collect and distribute data for their respective members, the milk producers and milk buyers. They are also developing a common database (containing data series on dairy farmer production costs, imports and exports of dairy products, domestic and world stock of different traded dairy products), which their members can use in price and other negotiations such as with government departments, and users of dairy products such as the confectionary industry. Such a general database will also have to be diverse so as to promote transparency real price transmission in the dairy supply chain (NAMC, 2003, p. 215).

In the UK, owing to the difficult and often adversarial relations within the dairy industry, the Government set up the Dairy Supply Chain Forum (DSCF) in 2002 as a wide ranging industry

grouping to bring all sides together. “A significant achievement of the Forum is that it has enabled the sector to formulate joint messages. This approach has helped to provide information and signals about the future of the dairy industry, and has subsequently helped many make informed decisions about their own future” (DEFRA, 2007, p. 13).

The DSCF has also served as a repository of knowledge and information. “The Forum and its sub-groups have produced a considerable number of outputs in the form of reports, workshops and conferences. This has led to the Forum, Government and the wider dairy sector being able to take advantage of a more comprehensive and robust evidence base on which to stage discussions about future challenges and make decisions and has enabled some parts of the industry to make evidence-based decisions. The membership of the Forum allows for unique input from a range of industry bodies and representatives from all parts of the supply chain which is essential (DEFRA, 2007, p. 11). “The setting up by the MDC of a milk price information service, Datum, has been useful to try and draw together all the relevant information and greater transparency in a dairy market that is ‘not operating properly’” (Brigstocke, 2004, p. 8).

U.S. federal and state governments have put in place extensive networks of agricultural information gathering and dissemination in the form of county and land grant university extension services (Hennessy, 1996, p. 1035). The USDA through the ERS also acts as an information source.

Since its establishment in 2003, Dairy Australia produces a rolling 5 year Strategic plan. Together with industry stakeholders, Dairy Australia identifies the issues and challenges shaping the Australian dairy industry as well as opportunities and outcomes over the planning period. They also cast a vision for an internationally competitive, innovative and sustainable industry. “Dairy Australia recognises the need for ongoing, open collaboration both within dairy and across sectors to ensure its planning, activities and investment remain aligned to industry and community needs” (Dairy Australia, 2010) . In its Strategic Plan 2011-2015, Dairy Australia is committed to “information provision and analysis to develop context for stakeholders” so that “all sectors understand the risks, opportunities and options available to them and can make informed decisions” (Dairy Australia, 2010). This is achieved through information sources such as Situation & Outlook, Market intelligence and Grains2Milk which are useful for stakeholders in decision making. Dairy Australia represents a conduit of information on dairy dynamics to the whole dairy industry and nation.

5.3.3 Legislation

In New Zealand, the Dairy Industry Restructuring Act (DIRA) of 2001, "provides for open entry and exit to Fonterra for any farmers wanting to supply Fonterra at its posted share price. Under this system, Fonterra faces strong incentives to set market clearing milk prices and share prices". Information of Fonterra's prices is readily available and accessible to farmers (OECD, 2003, p. 10).

5.3.4 Good Agricultural Practices (GAPs)

Good Agricultural Practices (GAPs) assist in the provision of credible information so that consumer preferences for safe food, high quality food or sustainable production methods are transmitted back to producers through price signals – higher prices for food with desirable characteristics, lower prices for food with undesirable characteristics" (FAO, 2003). "GAPs facilitate the provision of information signals to downstream buyers and consumers by encouraging and certifying production practices that enhance the quality or safety of food" (FAO, 2003).

6. Conclusions, Summary and Recommendations

6.1 Conclusions

When broader goals are not purposefully taken into account in agricultural policy formulation and implementation, the market alone does not inadvertently meet those goals. The market alone falls short, fails and there arises many unintended consequences. With supply chains dynamics becoming increasingly complex worldwide, the need to consider these broader social-economic and environmental goals in agricultural policy formulation and implementation becomes more important. This study has revealed how the different dairy countries under study have incorporated broader socio-economic goals in their formulation and implementation of agricultural policy. The result has been a deviation from the use of the market alone as the sole mechanism of achieving economic and allocative efficiency.

The diminishing numbers of dairy farmers in each of the dairy countries under study cannot individually withstand the power of the increasingly consolidated and concentrated processors and retailers. However, this study has shown that when dairy farmers act collectively, they increase the bargaining strength and are able to make inroads into countering the effects of increasingly concentrated markets. In the US, the competition legislation makes special provisions for dairy farmers to act collectively, thereby giving them more power to bargain with processors and retailers. Apart from the bargaining power, farmers are also able to utilise the power of their numbers as a force of change within the supply chain. Dairy farmer movements have existed since the early 1900s worldwide and when active, have influenced how the supply chain operates. Where farmers have organised themselves, they have made significant gains in dealing with the problem and effects of concentrated market power and information asymmetry within the supply chain. This is evident in the success of farmer lobbying efforts in the U.S. and Canada. Canadian and US dairy farmers actively and collectively lobby for the protection against the consequences of market failure within the supply chain result in the maintaining of a widely opposed supply management system in Canada and a restructuring of the U.S. farm bill to meet their requirements. In the UK, when farmers have organised themselves to protest against retailers and processors for “unfair” pricing, the result has also been positive as they have effectively “forced” processors and retailers to reconsider the pricing system. South African dairy farmers are still largely politically inactive in comparison with farmers in the US, UK, Canada and Australia. Although South African dairy

farmers are organised in producer associations, there appears to be a less aggressive approach in engaging the supply chain to influence market power dynamics. South African competition regulations do not allow for unrestrained collective action.

However, even given farmer collective action, the problems of concentrated market power and information asymmetry have continued to persist with the supply chain. This leads to the conclusion that farmer action alone cannot address these consequences of the failed market system. More significant gains have come from a more organised system of multi-stakeholder cooperation across the supply chain.

Such is the case with New Zealand's dairy industry. The government plays a critical role as a coordinator in this more structured and organised supply chain where stakeholders have been brought together, and their needs identified and then together they have mapped a way of achieving the desired outcome within the supply chain. Critical to this is the decision as to what the desired outcome is. But first, you must decide what the desired outcome is. In New Zealand's case, Fonterra was established following the outlining of a vision of integrating the country's dairy industry and to provide the critical mass and efficiencies needed for New Zealand to successfully compete in the global market. The articulation of this objective is a major factor underlying the success of the New Zealand dairy sector. After identifying how critical the dairy sector was to the country, stakeholders in New Zealand's dairy supply chain, including the government, committed to reforms that geared them for achieving the set objectives. In New Zealand, the transparency, accessibility and availability of information is enabled by the legislative and institutional frameworks that exists such as the Dairy Industry Restructuring Act (DIRA) and the Commerce Act. Within the system, apart from considering the economic efficiency, the reforms were structured to cater to broader goals. The DIRA and the Commerce Act compel Fonterra, the market leader within the supply chain to act to ensure that the smallest players remain active and viable participants within the supply chain should they choose to do so. Farmers are able to supply other processors apart from Fonterra on competitive terms and other smaller but competitive processors are ensured milk supply. The result is that New Zealand farmers receive a fairer price for their milk than most dairy farmers around the world, and the problems that arise from concentrated market power are less prevalent within New Zealand's dairy supply chain.

The UK has made significant inroads in addressing the information asymmetry problem within the dairy supply chain. This has also been achieved not from farmer efforts alone or government efforts alone, but through multi-stakeholder cooperation across the supply chain. The government played

an important role is coordinating daisy supply chain stakeholders into the Dairy Supply Chain Forum (DSCF). The result has been an increase in availability and accessibility of information within the supply chain.

Support and protection for milk producers has emerged as an important factor in the success of dairy supply chains. With varying forms of support cutting across different countries worldwide, what is evident is that there are instances when support and protection are critical to the functioning of the supply chain. For the Australian dairy supply chain, support was in the form of payments made to farmers following deregulation. In New Zealand, the DIRA provides for the protection of smaller players within the supply chain ensuring they have a milk market. In the US, support to farmers comes through the form of subsidies such as through the marketing order.

Farmers' ability to compete fairly within the supply chain is seen to be enhanced in the presence of effective competition legislation. In New Zealand, they have successfully utilized the competition regulation to enable a more balanced environment. The success of US farmers' collective efforts has been a result of an enabling competition legislation that exempts these cooperatives from certain anti-trust laws.

Processors and retailers also have a role to play in addressing the problems of concentrated market power and information asymmetry within the dairy supply chains. While processors and retailers have emerged the drivers in the new economic system, market failure affects them too when their supplies are no longer guaranteed. In the UK, as more dairy farmers lost confidence in the dairy industry and exited the industry and expansion of existing farms did not take place at a compensatory rate, milk production declined significantly, threatening milk supply for processors and retailers. As a result, processors and retailers began to enter into dedicated supply chain arrangements with dairy farmers. This represented a transition from exercise of market power within supply chains to relationships of inter-dependence.

Farmers, acting alone to address the problems of market failure within the dairy supply chain achieves limited success. Similarly, when government acts alone and controls the supply chain, little success is achieved. Policy makers may design policies that take into account broader social and environmental goals. But if there is no buy-in from other stakeholders within the supply chain, these are bound to fail. This study reveals the importance of political will in addressing the problems of concentrated market power and information asymmetry. How countries (government, businesses and communities) value dairy farming; the value placed on the non-economic benefits of

agriculture; the importance of preserving family farms and the rural economy; and the political clout of dairy farmers and dairy organisations; are all central to the manner in which the problems analysed in this study are solved. For South Africa, food security, employment creation, market access as well as issues of social equity are important in considering the value of dairying.

- The strategies and policies that have emerged as solutions to the problems of concentrated market power and information asymmetry in this study have shown that;
- Partial reregulation of the South African dairy sector will address the power and informational imbalances within the supply chain.
- A stronger dairy sector will emerge in the presence of broader social goals because setting and implementing broader social goals for the dairy sector will address the failure by the market to achieve allocative efficiency.

The selected countries with strong dairy industries have and try to implement broader social goals beyond efficient market allocation and together these direct policy formulation, implementation and evaluation. The social goals extend even to include preferred structure of the dairy industry. What is also evident from this study is that the measures taken to counter the negative consequences of concentrated market power and information asymmetry within the dairy supply chain;

- need some significant economic, social and political investments
- require cooperation across the supply chain to succeed
- should be well planned.

What is evident from this study is that the most successful dairy supply chains have emerged from stakeholder cooperation with the government in a mix that benefits all players more than just letting the "invisible hand of the market" operate. The most successful policy steps have been those that have recognised the deficiencies of the market as the sole mechanism with which to simultaneously meet economic, social and environmental goals within the supply chain. Within these supply chains, participants have gone to explore the possibilities of what the dairy supply chain will look like in the future, and then prepared for it. In this respect, the self-adjusting mechanism of the market finds its use with a little aid from the otherwise more "visible" human hand. Those who have done best are those who have organised best.

6.2 Summary

Chapter 1 provided a motivation for this study by providing a brief background of the South African dairy supply chain, and how the two problems under study have come about. It was found that the South African dairy supply chain experienced 'market failures", following deregulation and that deregulation did not result in the perceived broader social goals. The chapter showed how the major weakness of this policy was the assumptions of a perfectly competitive market upon which it was based. These assumptions, which are in essence necessary and sufficient for a perfectly competitive market to be efficient both in production and allocation, were not met at the time and still have not been met within the South African context.

In Chapter 2, the necessary and sufficient conditions for a perfect market were examined, leading to the discussion on market failure. In economic theory it is known that failure of any of the assumptions upon which the perfect market economy model is based means that the efficiency of the resulting general equilibrium (if one exists) can no longer be asserted. When the precondition of many buyers and many sellers is unmet, the problem of concentrated market power arises. When the precondition of availability and accessibility of information is unmet, the problem of information asymmetry arises.

Chapter 3 and 4 focused on the manifestation of the problems of concentrated market power and information asymmetry within the dairy supply chains under study. It becomes evident in Chapters 3 and 4 that none of the selected dairy supply chains exhibited strict adherence to the principles of perfectly competitive markets. In each, the necessary and sufficient conditions for the perfectly competitive market have been shown to be unmet. Instead of large numbers of buyers and sellers, the market worldwide is mostly characterised by large numbers of fragmented sellers in the face of fewer numbers of more powerful buyers who are able to influence price. Availability and accessibility of critical information is asymmetric along the supply chain. Within the countries under study, these market failures were the norm rather than the exception.

The perfectly competitive market serves as a benchmark in policy making, but problems arise when broader social and environmental goals are not taken into consideration. Where broader social and environmental goals were taken into consideration, the result is that the market may be efficient in production but remain inefficient in allocation. In some of the countries under study, it is evident that the existence of broader social and environmental goals serves as a catalyst for any attempts to correct market failures.

In Chapter 5, the policy interventions to deal with the market failures were evaluated. In the dairy countries observed, what has emerged is a collection of varying policy measures which mostly consists of departure from the necessary and sufficient conditions of the market. Governments and stakeholders recognised that the market mechanism did not produce the best allocation, and that there was no "best allocation". All the dairy countries under study, with the exception of South Africa, have had to "assist" the market in various ways to achieve the set goals. The extent to which this "assistance" takes place varies from country to country. In Canada, the market was replaced by the system of supply management. The US dairy sector remains regulated. The success of New Zealand's dairy supply chains is hinged on how well planned integrated the system is.

In light of this, it emerges from the study that the most successful dairy supply chains are those that are "organised" rather than "totally free". Having recognised the elusiveness of that theoretical "best allocation", the most successful policy actions were found in countries where there was a sector specific dairy strategy as part of an overall policy and strategy for the agricultural sector. Key to this strategy was coordination between various members of the supply chain. A recurring feature is the existence of strategy for the future. In New Zealand it appears as an integral part of the strategic vision. This strategic vision is premised on the following questions:

- How will dairy farmers farm in the future?
- What will increase their value of production?

In Australia, the Situation and Outlook report prepared from the collaboration of dairy industry organisations serves as a tool to map the present and future of dairying within that country.

The degree of coordination and cooperation between players within the supply chains in as far as it affects relationships also emerges as a strong point in influencing how the supply chain responds to problems such as those under study here. Key to the success of any industry is the issue of healthy relationships between all players in the supply chain. As such, relationships between farmers, milk buyers and retailers are crucial to the healthy functioning of dairy industries worldwide. The study reveals how various stakeholders can come together to form strong organizations representing their interests with examples such as; the UK's DSCF, the Australian DairyCo, and DairyNZ in New Zealand. The success of these highly interdependent relationships that characterise the supply chain is hinged upon, among other factor; trust. The government then plays the role of that important third party useful to overcome or modify imbalances in bargaining power and create the necessary conditions for enhancing trust (Rueben et al, 2006, p.225). The collaboration between stakeholders means that the vision mapped out embraces the various diverse interests of parties involved such that even broader social and environmental goals have a chance of being realised.

In Chapter 5 it is also evident that success cannot be achieved in the absence of an enabling policy framework. Again this reflects the importance of politics within the operations of the supply chain. In Australia's supply chain, dairy farmers were able to obtain exemption from competition legislation allowing them to use collective bargaining to strengthen their position within the market. In New Zealand's dairy supply chain, legislation exists that ensures that smaller players within the vertically integrated system are able to operate without suffering from the potential exercise of monopoly power of Fonterra. In the US, not only do federal and state dairy programs affect minimum prices, processors of dairy products must pay farmers for raw milk. The 1922 Capper-Volstead partially exempts U.S. farm cooperatives from antitrust laws, allowing farms to coordinate on milk marketing and input purchases. The 1937 Agricultural Marketing Agreement Act and similar state legislation established milk marketing orders that regulate milk prices for dairy farmers (Cakir & Balagtas, 2010, p. 1).

In New Zealand, the dairy sector is one of the anchors for the agricultural system. As a result, there is a focus and concerted effort not only at farmer level but at government level, on making the country the world's most competitive dairy producer. The result has manifested itself in the vertically integrated system which exists in New Zealand's supply chain. So apart from a climate that favours lower cost dairy production, the key to New Zealand's success as a global player within the dairy lies in the vertical integration and high coordination that characterises the supply chain.

A pro-active farmer movement is critical to improving the position of farmers within the supply chain. The Canadian dairy supply chain represents an example where the political influence held by dairy farmers has resulted in the maintenance of a supply management system that appears unpopular with the rest of the supply chain. The consequence is that, Canada's dairy farmers are among the wealthiest farmers in the country. In the US, dairy farmers are great lobbyists and their efforts are rewarded by the continual support they receive from the government via the Farm Bill. In the UK, when farmers have come together and actively protested against low farm-gate prices in the time of increasing retail prices, they have successfully resulted in change.

The value placed on the non-economic benefits of agriculture and the importance of preserving family farms and the rural economy within the US and the UK have been central to the policy measure that these countries have taken to provide support and protection to farmers in the face of market inefficiencies. Attempts to solve the problems of concentrated market power and asymmetrical information within the supply chain cannot be piecemeal if any success is envisioned.

6.3 Recommendations

"I take seriously the moral obligation to achieve equity in income now and in the future. This obligation does not have to be properly balanced against the requirements of efficient allocation at a given moment of time and over time. No simplistic solution is possible but recognising the intrinsic imperfections of competition in capitalist system affords opportunities to reconcile the two aims" (Arrow, 1984).

The South African dairy sector remains a small but significant sector within agriculture. Dairy is an important part of the majority of the population's daily diet and contributes to employment within the country. The problems of concentrated market power and information asymmetry within the dairy supply chain have far reaching welfare consequences even at a micro level. This study reveals various ways in which dairying countries worldwide have worked at positioning the dairy supply chain to achieve set objectives. While some measures such as producer support and supply chain management are more likely to face wider criticism by proponents of the market system, and may not be easily applicable, the underlying fact remains is that; the successful implementation of any of the strategies and policy measures in the South African context, hinges on the political buy-in and willingness to cooperate of all stakeholders within the supply chain. Although supply chain participants may have different interests, given the evidence from the UK, New Zealand and US supply chains that a multi-stakeholder participatory approach yields good results for the supply chain, South African dairy supply chain participants may have incentive to cooperate.

It is observed that following the deregulation of South Africa's agricultural markets, virtually no government intervention can be observed within the dairy sector. Yet the failure to meet the necessary and sufficient conditions that are at the centre of the market can serve to open the door for government intervention in the form of partial re-regulation. Given that market failure is not unique to the South African dairy supply chain, but can be observed within agricultural systems, there are a few factors that justify partial re-regulation as well as the setting of broader social goals. These include;

- The need to ensure food security at both national and household level
- Creation of employment
- Market access for all farmers

The South African dairy sector needs to articulate a specific goal oriented strategy for the South African dairy supply chain indicating how the dairy industry should look and perform. This vision

and objectives would be formulated in a consolidated effort between the government, dairy farmers, processors and retailers as well as other stakeholders such as the National Agricultural Marketing Council, representatives of farm-workers, and other interest groups. It is also important to articulate the goals and objectives in a specific, measurable manner, and follow through with policy and reform that is directed towards the achievement of specified goals that include broader social and environmental goals.

This could be achieved through the establishment of a body or forum that represents the interests of the whole dairy supply chain. This body would act as a custodian for the dairy industry strategy, vision and action plan. Membership of the forum must come from representatives at all stages within the supply chain, academia, the government, regulatory bodies such as the Competition Commission and other stakeholders. While such an endeavour will come with "costs", a framework already exists via the Marketing Act (1996) and the Cooperative Act (2005) to implement statutory levies in order to raise funds to finance such a forum. This is important as the cost of an uninformed, dairy sector ill-prepared to tackle the challenges of operating within the market may be considerably higher than the transaction costs of establishing and maintaining a body that is responsible for that. Organisations such as MilkSA, which already exists and is currently functioning as a repository for information within the supply chain, play a key role in mapping how dairying will take place in the future. With multi-stakeholder cooperation, a successful strategy for the future, indicating how dairy farmers should farm in the future can be made and implemented. Players within the supply chain may pay a small fee to register and have access to information.

In order to fully utilise the forum, South Africa needs a more powerful dairy farmer movement that is capable of influencing agricultural and economic policy. Dairy farmers must do all it takes for their voice to be heard. A "Dairy Revolution" pioneered by socially, economically and politically strong farmers who are;

- Able to influence policy at formulation and implementation stage
- Able to set specific goals objectives for the dairy industry
- Able to work together with other stakeholders such as the government, processors, input suppliers, retailers and consumers.

South African dairy farmers should extend the use of producer organisations to encompass collective bargaining as a tool to strengthen their position within the market. Through these organisations, South African dairy farmers can negotiate collectively for better contractual terms, including fairer prices.

South African competition policy needs to be reviewed to accommodate and address buyer power concerns and enforcement of legislation that promotes more effective competition should be prioritised. This includes legislation for;

- a more transparent tender process for private brand milk;
- more transparency of margins within the supply chain;
- fairer and more favourable terms within contracts between farmers and processors as well as between processors and retailers.

The availability and accessibility of information is critical to the competition process. The Competition Commission as the custodians of "competitive processes" have the mandate to ensure that information that is critical to the bargaining process is available to players within the supply chain. The government and the Competition Commission could incentivise dairy processors and retailers to make information more available and accessible within the supply chain. As the consumer body becomes more demanding of how food is produced and where, the South African dairy supply chain must position itself to be able to communicate information on issues of animal welfare, farm-worker welfare, carbon footprint, waste disposal, and environmental awareness. South Africa's dairy supply chain needs a body to regulating standards and communicate information.

Therefore the recommendations for the South African dairy supply chain emerging from this study are as follows;

- Partial re-regulation of the agricultural sector
- Consider broader social and environmental goals in agricultural policy formulation and implementation
- Map out, and implement a vision for the dairy supply chain that articulates economic and broader socials goals that are important to South Africa.
- Increase coordination and cooperation within the supply chain
- Utilise collective bargaining to gain leverage in concentrated markets.
- Continue to ensure that the competitive process within the supply chain is nurtured.
- As far as possible, make information more available within the supply chain and use legislation, regulation and incentives to ensure more transparency within the supply chain.
- Create and maintain an enabling policy framework with the requisite "checks and balances".

The success of South Africa's Dairy supply chain may well lie within the coordination and cooperation between stakeholders in a system that departs from a "regulation versus free-markets" to a more intricate mix that enables the attainment of allocative and productive efficiency goals. Re-regulation is critical to reform within the dairy supply chain and improving the manner in which the industry operates. South Africa needs to depart from the perfectly competitive market façade towards a more coordinated market system in which stakeholders together establish and maintain the kind of industry they consider "ideal" for their economic and socio-political circumstances.

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