Study of the International Competitiveness of the Irish Dairy Sector at Farm Level

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Foreword

Ireland's current economic difficulties have focused attention the importance of maintaining and improving the competitiveness of all areas of our economy. Given that it is highly export focused, the international competitiveness of the Irish milk sector at farm level has long received attention. Several studies over the last 30 years have compared the performance of the milk sector at farm level in Ireland with the milk sector in other countries.

Agriculture, and the dairy sector in particular, has entered a phase of considerable change. Traditional EU policy supports are now less prevalent due to CAP reform and the most significant policy in the dairy sector, the milk quota is to be removed in 2015. The Food Harvest 2020 report has been developed with dairy expansion as its centrepiece.

It was against this background that Teagasc was asked to conduct a study of the competitiveness of the Irish dairy sector at farm level. Allied Irish Banks generously agreed to part fund this initiative and the study was conducted in the first half of 2011.

Teagasc would like to acknowledge the active involvement of a wide range of stakeholders who participated in the advisory group which was established at the outset of this study. Their helpful suggestions and critical comment during the course of the study were greatly appreciated.

We would like to thank Kevin Hanrahan for his very helpful comments on the draft text. All errors and omissions remain the responsibility of the authors.

June 23rd 2011

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Executive Summary

Background

- This report examines the competitiveness of the Irish milk sector at farm level compared to that of a number of EU and non-EU countries.
- The analysis was based on two main data sources – the EU Farm Accountancy Data Network (FADN) for years 1996-2010 and the International Farm Comparisons Network (IFCN) for the years 2004-2010.

Context

- World trade in dairy products remains a small share of global production. Global dairy trade continues to grow, but the EU's share of that trade is in decline.
- The gap between world and EU dairy prices has been closing over time due to changes in EU policy and rising world prices. As a result, world (New Zealand) milk prices are converging on EU and US milk prices.
- Several EU Member States have a growing gap between their milk production and their milk quota. The elimination of milk quotas is unlikely to bring about a sizable increase in EU milk production.
- The increase in average US and NZ farm size is much greater than in Ireland. Ireland still has few herds of over 100 cows. In NZ the proportion of herds of less than 200 cows has declined considerably, as the proportion of larger herds increases. In the US, the proportion of herds of over 2,000 cows has increased considerably.
- Milk prices and input prices have exhibited considerable volatility in recent years with fertiliser prices exhibiting greater volatility than feed prices. Market mechanisms to address volatility remain under development in the EU.

Competitiveness Cost Measures

- Understanding the different measures of cost in vital in assessing competitiveness. While it is possible to focus on the ***cash costs*** of production alone, the wider definition of ***economic costs,*** which also includes an estimated value for own land, family labour and non-land assets, is important. To measure competitiveness, costs can be expressed relative to **output value**, **per unit of product** or **per hectare.**

Summary of Current Competitive Position in EU15

- Using the cost relative to ***output value*** approach, on a ***cash costs*** basis, Ireland is quite competitive in the EU15. Cash costs as a percent of output were relatively low in Ireland over the period 1996-2010.

- When ***full economic costs*** were considered however the competitive position of the selected countries changes. The competitive advantage experienced by Irish producers deteriorates when all imputed charges for owned resources are taken into consideration. The most significant imputed cost that contributed to the relatively high total economic costs experienced in Ireland over the period was the imputed charge for owned land. This was due to the relatively high rental charge used to calculate the imputed value for owned land, coupled with high levels of land ownership in Irish dairy production. (Note that if land is rented it appears as a cash cost, whereas if it owned it appears as an imputed cost). The relatively low stocking rates and milk yields per hectare on Irish dairy farms over the period also must be considered as a contributing factor.

- When total economic costs were considered as a percentage of output for larger specialist dairy farms with 50-99 dairy cows, total economic costs for this sample of farms were generally substantially lower then the average farm position. For example in Ireland, total economic costs as a percentage of output was reduced by just over 20 percent, when the larger size farm was compared to the average size farm. While Ireland still remained as a comparatively high total economic cost producer for farms with 50-99 dairy cows, the gap with other countries was narrowed for these larger specialist producers.

- When analysed over a longer time period (1996 to 2010), the analysis indicated that the relative costs of production (as a percent of output value) for Irish dairy farms has decreased relative to the average of the other EU15 countries examined. This is a positive indication for the relative competitive position of the Irish dairy sector over time.

- On a ***cost per unit of product*** basis, Ireland also tends to be above the EU15 average when full economic costs are considered. High agricultural land prices adversely affect the competitiveness of the Irish dairy sector. When farm size is controlled for, the variation is total economic costs per unit output across MS is much reduced.

- Compared with key competitor EU MS, Irish milk production continues to be characterised by low yields. On average productivity per ha and per labour unit in dairying in Ireland is low relative to competitors in the EU15. Even when adjustment is made for farm size, productivity in Ireland is below the average of key competitors in the EU15. This finding of below average productivity in Ireland was also a feature of earlier studies.

Summary of Current Competitive Position in a Global Context

- Given that EU15 competitors have increased their share of global dairy trade in recent times and with the elimination of the EU milk quota now imminent, the current competitive position of the Irish dairy sector in a global context requires consideration.

- Compared with key competitor non-EU15 dairy producing regions, the analysis of cash costs per unit of product and relative to output value confirms the strong competitive position of the larger size Irish dairy farm in a global context, in addition to the favourable position previously identified within the EU15.

- Total economic costs, which include imputed charges for owned resources, are considered more appropriate to examine the longer term outlook for the competitiveness of the sector.

- The competitive position of the Irish dairy sector beyond the EU15 deteriorates very substantially for the smaller size Irish dairy farm when total economic costs are considered.

- Typical farms in Argentina and New Zealand appear to consistently exhibit the lowest total economic costs per unit of milk produced.

Future Competitiveness

- As the opportunity costs of owned resources are not included in cash cost calculations, the competitive strength identified for the average size Irish dairy farm can only be considered to be valid in the short to medium term.

- The deterioration of the competitive position, when total economic costs are examined, should be considered as a warning signal for the future competitive performance for the average sized Irish dairy farm, where total economic costs per unit of product and relative to output value are well in excess of many EU and non-EU competitors.

- However, the competitive position of the larger Irish dairy farms has been maintained within Europe, even when total economic costs were considered. On a global scale, in recent years the larger size Irish dairy farms also faired relatively well in terms of margin earned over economic costs, not withstanding the fact that typical farms in Argentina and New Zealand had considerably lower total economic costs per unit of product than farms in Ireland.

- Part of the explanation of the deterioration of competitive ranking for the average Irish dairy farm when total economic costs are considered relates to the relatively small scale of dairying in Ireland in a global context.

Caveats and Conclusions

- This study had focused in detail on the current competitive position of the Irish dairy sector and has explored a number of scenarios in respect of how the competitive position of the sector will evolve into the future. There are, however, several important issues which will influence the future competitiveness of the sector which were not fully addressed in this study, since they would individually require separate study.

- The removal of milk quotas may lead to increased Irish milk production, as well as creating greater opportunities to increase farm size and the scale of processing facilities, all of which may improve the competitive position of the Irish dairy sector.

- Reform of the CAP in 2013 could lead to some redistribution of the SFP. While the SFP is defined as decoupled, it may still influence production decisions and therefore any changes to the value of the SFP would impact on production decisions, farm income, farm viability and competitiveness.

- The prospect of multilateral or bilateral trade agreements involving the EU cannot be ruled out in the short to medium term. The highly export focused nature of the Irish dairy sector means that it may be more exposed to the consequences of such reforms relative to competitors in the EU.

- The emergence of the biofuels industry may lead to a permanent relative increase in feed prices compared to grass production costs. Given the grass based nature of Irish dairy production this may cause milk production costs to increase in feed based competitor countries relative to milk production costs in Ireland.

- This study has found that the competitive position of the Irish dairy sector at farm level remains favourable is cash costs terms. However, when full economic costs are considered the competitive position of the average size Irish dairy farm is likely to become an increasing cause for concern.

- As Irish dairy farming transforms to larger scale production the milk sector's competitive position will be strengthened.

1 Introduction

The issue of the competitiveness of the Irish dairy sector has been addressed in a number of studies conducted over the last 20 years. (Boyle et al. 1992, Fingleton 1995, Boyle 2002, Thorne 2004). All of these studies took place in a period when milk quotas applied in the European Union (EU), relatively stable input and output prices prevailed and where the EU dairy sector continued to remain largely insulated from variations in world market supply and demand conditions.

Increasingly, it is the case that these factors no longer hold true. An annual series of milk quota expansions is producing a growing gap between EU27 milk quotas and milk production. Higher world market dairy product prices are now transmitted to the EU market to a greater degree that in the past and the gap between EU and world dairy prices has been seen to be greatly reduced. Milk prices and the costs associated with milk production have become increasingly volatile

Furthermore, the end of milk quotas in 2015 opens up potential opportunities for Irish dairying if the industry is competitive in international terms as outlined in Food Harvest 2020 (DAFF 2010). In that context it is now timely to consider the competitiveness of Irish milk production once again.

The Concept of Competitiveness

The concept of competitiveness is a much debated term. Chapter 3 of the report outlines in detail the main developments in the theory of competitiveness but for the purpose of setting the scene it is important at the outset to identify the meaning of the term competitiveness. For the purpose of this study profitability is used as a measure of competitiveness, hence both costs and returns are important in determining the competitive position. For further detail on the concept of competitiveness the reader is referred to chapter 3 of the report.

The focus of the report is at the farm level. While there are also issues of competitiveness further along the production chain, these are not considered in this study. It is envisaged that competitiveness beyond the farm gate will be addressed by other studies which are already underway.

The remaining sections of this report are divided into 6 further Chapters.

Chapter 2 provides a context for the study by reviewing the main developments in the dairy sector in Ireland and internationally in the recent past.

Chapter 3 provides a summary of the methodology used in the report. While some aspects of this chapter are technical, an understanding of the term competitiveness and the measurement approach used in this study is important. Readers can skip this chapter, if required, without any loss of continuity.

Chapter 4 examines how the competitiveness of the Irish dairy sector has evolved through time, relative to competitor countries in the EU, with a particular focus on the period 2000 to 2010.

Chapter 5 looks at the competitive position of the Irish dairy sector in a global context.

Chapter 6 looks at how the competitive position of the Irish dairy sector might evolve in the coming years. It is based on a selection of future scenarios that could arise and examines the impact that these scenarios would have on the competitive position of the Irish dairy sector relative to its competitors.

Chapter 7 details some caveats that need to be considered and summarises the report's conclusions

2 Context

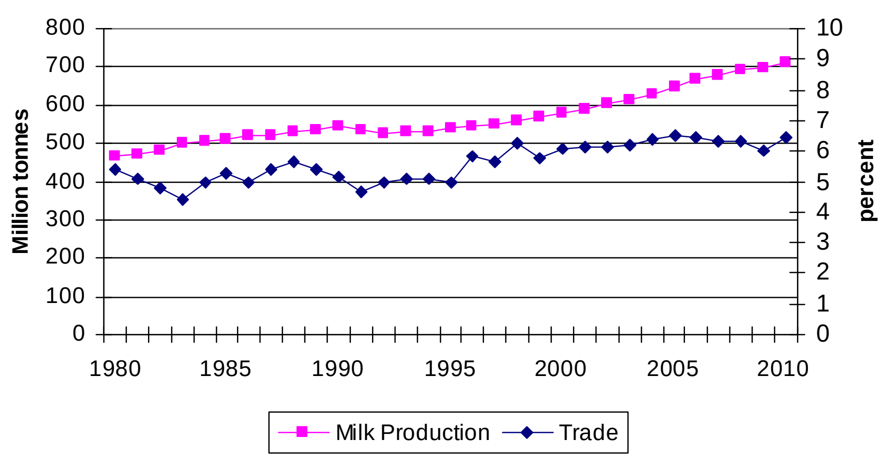
This chapter provides some background context on a range of issues that together create a focus for this study. Issues covered include the geographic regions of key growth in global dairy production and consumption, the evolution of world dairy trade, the growing gap between the milk quota and milk production in some EU Member States, increases in farm size, the increasing convergence between EU and world dairy prices, volatility in output and input prices and reform of the CAP, including the single farm payment.

2.1 Global Production and Trade

Milk production in the EU is entering a new phase. Since 1983 the milk quota has constrained the development of the sector in the EU. The main factor that motivated the introduction of the milk quota, income support through stable milk prices, was successful in limiting the variability in dairy farm incomes for a period. While the system had it virtues, its limitations also became more evident as the years passed. Milk quotas limited national milk output, hindered the expansion of individual producers, created barriers to new entrants and therefore limited competition between producers - both within and between EU Member States (MS).

After EU milk quotas were introduced world milk production and trade in dairy products continued to grow as illustrated in Figure 2.1. This increase in trade has met the increasing demand for dairy products in dairy deficit countries and has been facilitated through improvements in refrigeration and transportation technologies.

Figure 2-1: World milk production and % of milk in world dairy trade



World trade in dairy products remains a small share of global production

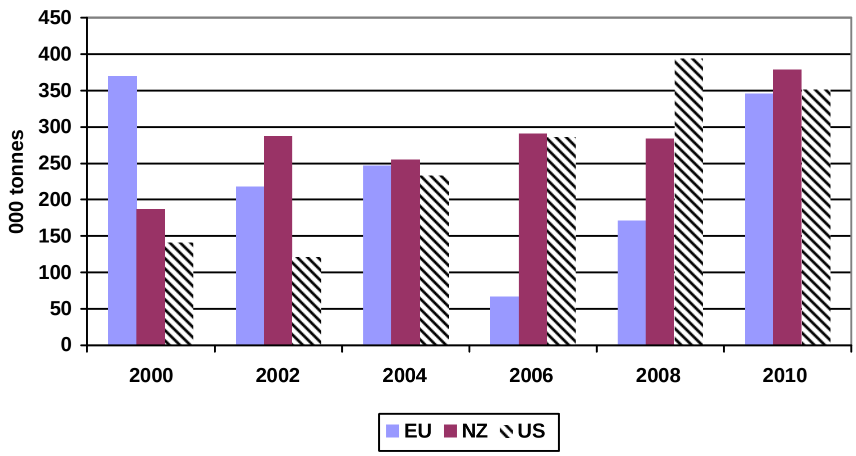
Source: FAO Stat, European Commission and Authors' Estimates

Over the period 1980 to 2010 the volume of dairy commodities (in milk equivalent terms) traded internationally has risen from about 25 million tonnes to 45 million tonnes, an increase of 80 percent. However, as a share of world milk production the proportion of milk that is traded internationally remains low, at less that 7 percent. By contrast about 30 to 40 percent of wheat and soybeans global production is internationally traded.

Over the last decade, the EU dairy sector has been overtaken as the number one player in world trade by international competitors such as New Zealand, which increased its milk production and exports by about 40 percent over the period 2000 to 2010. More recently the US has also emerged as a significant player in global dairy trade, notably in the SMP and whey markets. The growth in New Zealand and US SMP exports relative to the EU is evident in Figure 2.2.

Figure 2-2: SMP exports by EU, NZ and US

The EU's competitors have increased their share of global dairy trade

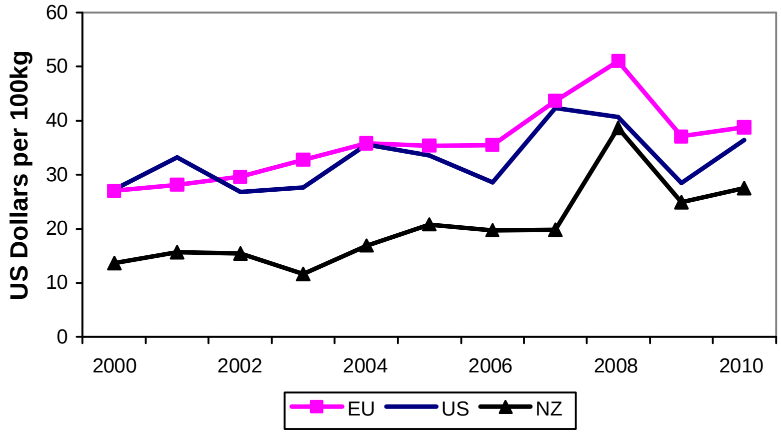


Source: IDF

EU Milk and Dairy Product Prices and Milk Production

The gap between world producer milk prices and producer milk prices in the EU and US is shrinking. Using New Zealand milk prices as a proxy for world milk prices, there has been a convergence towards EU and US milk prices in recent years, as shown in Figure 2.3.

Figure 2-3: Producer milk prices EU15, US and NZ

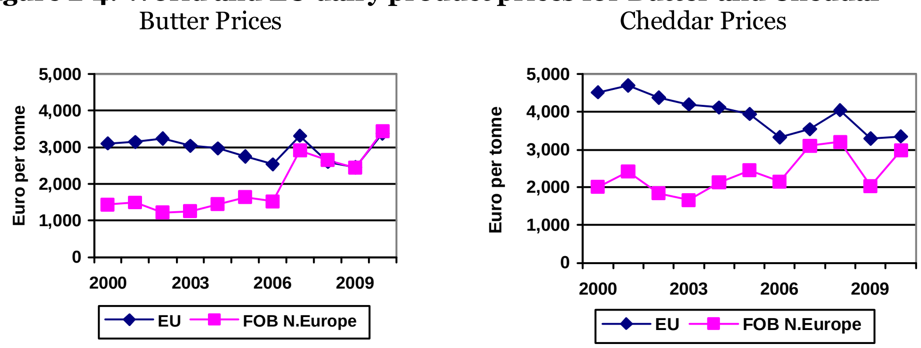


World (NZ) milk prices are converging on EU and US milk prices

Source: FAPRI

This convergence in producer milk prices reflects the convergence between world wholesale dairy product prices (FOB Northern European) and internal EU and US prices. EU internal dairy commodity prices and FOB Northern European prices are shown in Figure 2.4.

Figure 2-4: World and EU dairy product prices for Butter and Cheddar



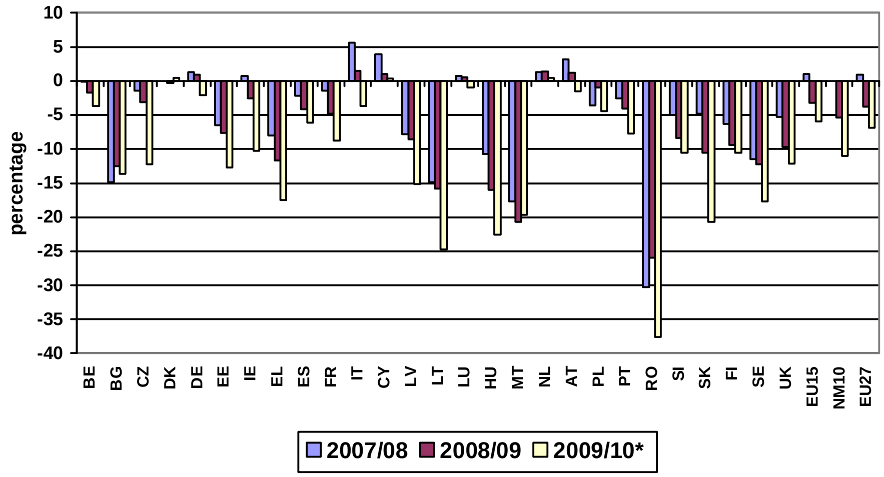
The gap between world and EU dairy prices is closing over time

Source: FAPRI

In considering the current competitiveness of dairy producers within the EU, it is useful to look at how milk production has evolved in the EU in recent years. Figure 2.5 shows the milk quota deficit/surplus recorded in each of the EU MS over the last 4 milk quota years. There has been considerable milk and input price volatility in the period since 2006, but these data suggest that there is an emerging incapacity to fill the milk quota in several MS.

Figure 2-5: Milk production and milk quotas in selected EU MS

Several EU Member States have a growing deficit in their milk production relative to their milk quota



Source: EU Commission

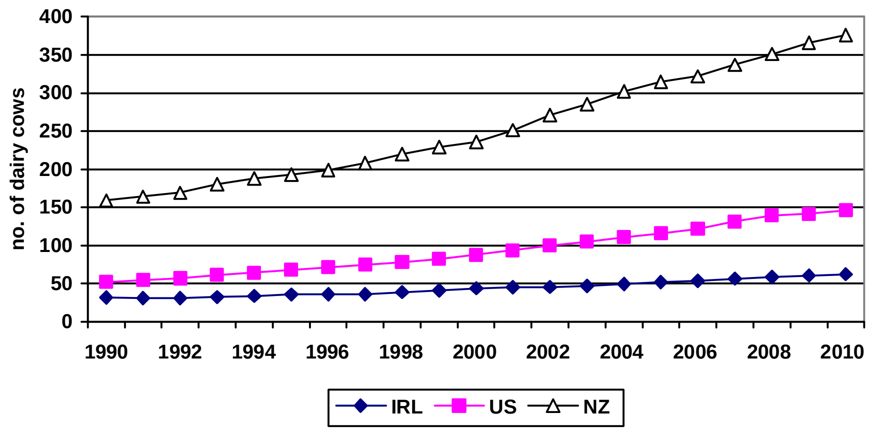
2.2 Farm Scale

Increasing farm scale is a feature of modern agriculture internationally. Over, time strong production growth has been facilitated through technological development and this has led to falling prices for many agricultural commodities and reduced margins per unit of output. Some producers have responded to these changes by exiting agriculture and others have responded by increasing farm size to maintain farm income from lower margins per unit of output.

The number of cows on the typical farm has increased over the recent decades in most countries. The rate of increase in the average herd size has been lower in the EU than in competitor countries such as the US, Australia or New Zealand. It can be argued that partially this may be due to the rigidities created by the EU milk quota system and associated milk management tools, but lying behind this is a greater political willingness in the EU to support smaller scale, family farms than is the case in competitor countries. Figure 2.6 shows the evolution of the average dairy herd size in Ireland, New Zealand and the US from 1990 to 2010.

Figure 2-6: Average dairy herd size in Ireland, NZ and US

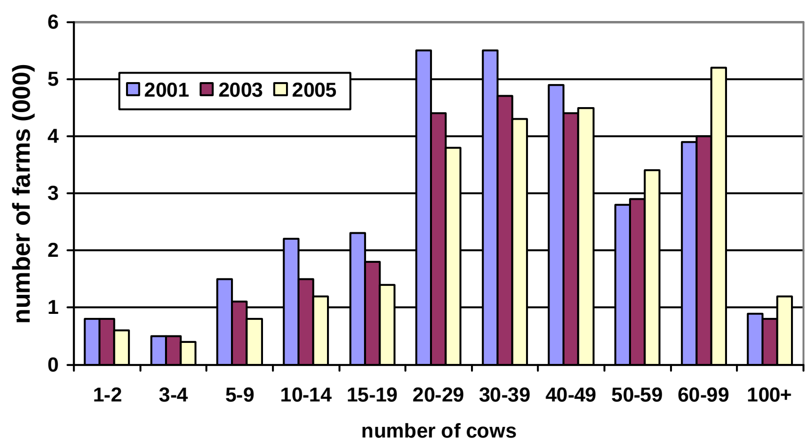
The rate of increase in average US and NZ farm size is much greater than in Ireland



Source: LIC, FAPRI, Teagasc

Data on average herd size can conceal substantial changes in the size distribution across the population of dairy farms. In the case of Ireland, it is clear that over the last decade much of the growth in farm size has been concentrated in herds of 50 to 100 cows and the proportion of herds with more than 100 cows still remains quite small. The dairy herd size distribution in Ireland (2005 being the most recent year for which data is available) is shown in Figure 2.7.

Figure 2-7: Ireland dairy herd size distribution



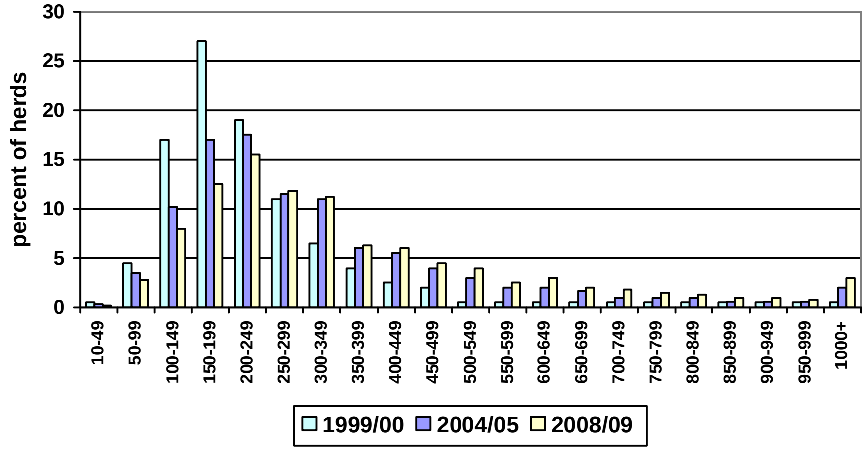
Ireland still has few herds of over 100 cows

Source: CSO

In the case of New Zealand the main growth category has been in herds of over 300 cows. In New Zealand, the share of herds in the fewer than 300 cow category has been falling rapidly. Dairy herd size distribution in New Zealand is shown in Figure 2.8.

Figure 2-8: New Zealand dairy herd size distribution

In NZ the proportion of herd of less than 200 cows had declined considerably

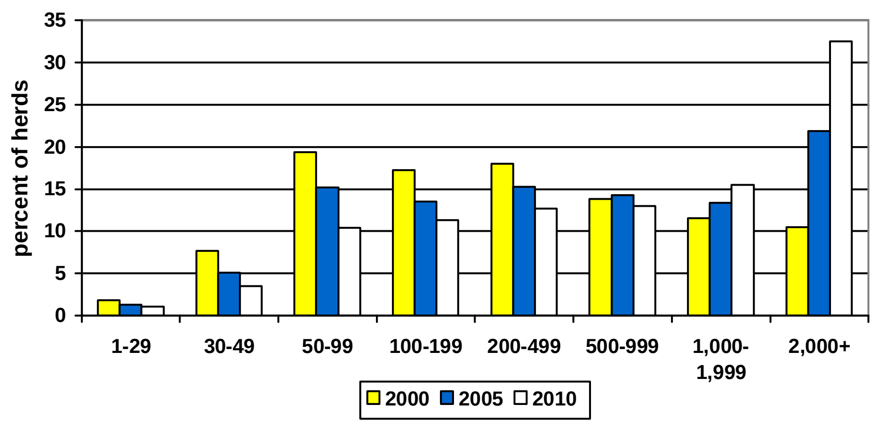


Source: LIC

Since 1990, milk production in the U.S. has increased by 30 percent. In Figure 2.9 the decomposition of the dairy cow population in the US is shown. It is clear that the big growth category is in herds of over 2,000 cows, which now represent over a third of total US milk production. These are typically the large scale confinement operations found in the mountain and pacific regions of the US. There is a noticeable decline in the share of smaller grass based herds that are more typical of the Midwest of the US. Dairy herd size distribution in the US is shown in Figure 2.9.

Figure 2-9: US dairy herd size distribution

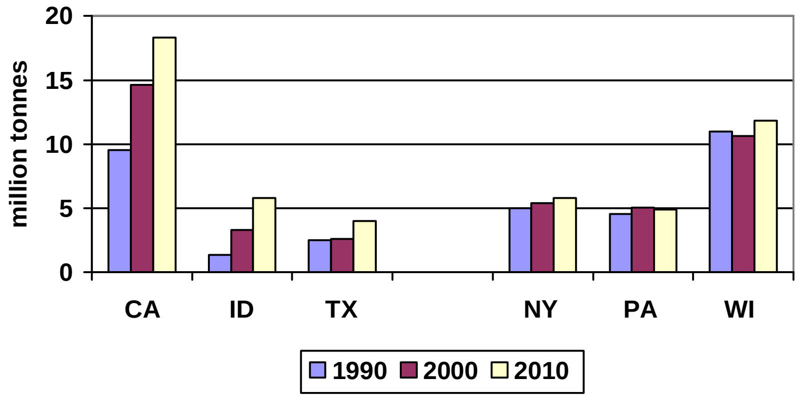
In the US, the proportion of herds of over 2000 cows has increased considerably



Source: USDA

Looking at regional US milk production, as shown in Figure 2.10, the growth of milk production in states where confinement type production predominates such as California (CA), Idaho (ID) and Texas (TX) and the relatively static production in the more traditional dairy states such as New York (NY), Pennsylvania (PA) and Wisconsin (WI) can be observed.

Figure 2-10: Westward growth in US milk production 1990 - 2010



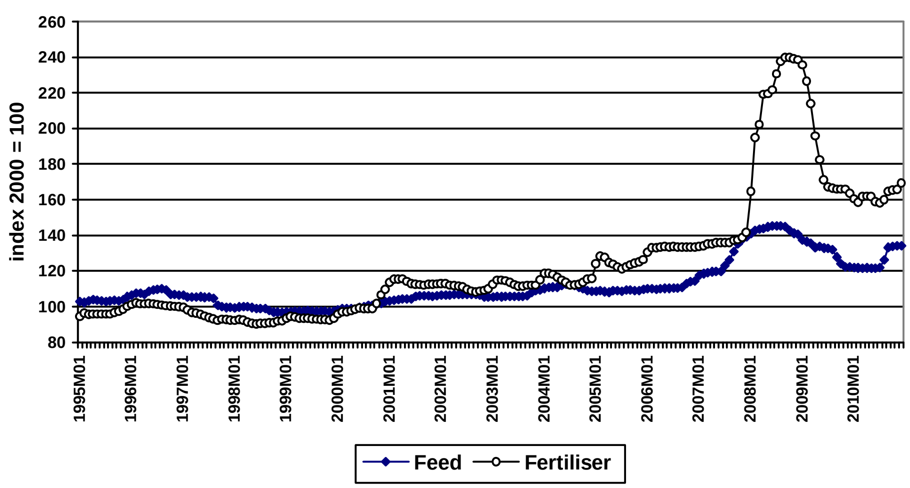
US milk production growth is dominated by States with confinement operations

Note: California (CA), Idaho (ID), Texas (TX), New York (NY), Pennsylvania (PA), Wisconsin (WI)

2.3 Input Price and production systems

Much of the focus on the volatility of prices associated with agriculture in the last decade has been on the price of output. This is understandable given that changes in the price of agricultural output is of concern to policy makers and consumers as such price changes impact on the prices of food at retail level. However, there has also been a pronounced volatility in agricultural input prices in recent years, which has had an adverse impact on producers and consumers. Figure 2.11 shows the extent of the variability of monthly feed and fertiliser prices in Ireland from 1995 to 2010.

Figure 2-11: Index of Irish Monthly Feed and Fertiliser Prices 1995 - 2010



Fertiliser prices have exhibited greater volatility than feed prices

Source: CSO

Animal feed and fertiliser are the main inputs which affect the cost of milk production. The impact which the price of these inputs will have on the cost of production will depend not alone on the extent of the price change, but also on the extent to which they are required in the production system and the capacity of the production system to adjust in order to minimise the impact that a rise in the price of an input has on per unit production costs.

While there has been a general upwards trend in these input prices over the period shown, the increase in prices has accelerated since 2005 and there was also a pronounced spike in prices in 2008. This pattern in fertiliser prices has also been observed internationally.

It is argued that the low input extensive grass based production system used in New Zealand and the somewhat similar system in Ireland presents advantages in times of high animal feed prices. This is because the input content of feed in these production systems is relatively low compared with confinement systems and the usage of synthetic fertiliser is kept to a minimum. Therefore any change in the price of such inputs has a lower impact on the cost of production than would be the case if these inputs were a larger component of production costs.

The flip side is that in these low input production systems, output per cow is low and yields can be up to three times greater in more intensive production systems than favour concentrates over grass. Production is also more seasonal under the (pasture based) NZ or Ireland system, which makes such systems more suited to regions with a large export capacity, allowing domestic consumption to be met by domestic production even in the trough of the production season. These low cost systems are less suitable where the domestic market for fresh products represents a large component of milk utilisation.

The cost advantages of grass based systems has implications for dairy processing

The cost advantages of strongly seasonal milk production at farm level are also offset to some degree by the higher costs such systems impose at the processing level. Principally this is due to the lower average rate of capital utilisation in these processing facilities, which need to be built to cater for peak period milk production but which only operate at this level for a limited period of the year. Processing costs would be lower if the peak and the average level of production over the season were similar.

Low input systems also face difficulties as the volume of the farm's output increases. To retain the production system whilst increasing the volume of output will ultimately require that either additional land is purchased or leased, or that increasing amounts of feed and fertiliser are used. Where land prices are high or where no land is available locally, the only feasible option may be to increase input usage which in turn will reduce the cost advantage of such systems relative to more intensive feed based systems.

As low input systems typically require more land per unit of output, this has implications for the opportunity costs associated with the calculation of the full economic costs of production, as will be observed in Chapter 4.

Given that low input systems produce relatively low yields, the volume of labour input per unit of output can be high. Low levels of productivity can be an issue when labour costs or land prices are rising, as labour costs and land prices can have greater implications for the total costs of production on a low input system than in more intensive production systems.

2.4 Global Dairy Product Consumption

Changes in global dairy product consumption are determined by changes in per capita consumption and population growth. A feature of global dairy product consumption is the fact that population and per capita consumption growth rates are higher in emerging and developing countries, than in developed countries. It remains the case however, that the level of per capita consumption of dairy products tends to be higher in developed countries. In part this reflects historical consumer preferences, but it is also important to remember that dairy products are a more expensive form of nutrition than some of the more traditional staple foods of developing countries. This means that in addition to dairy product prices, the price of rice and other grains and income growth are important factors determining the growth in demand for dairy products.

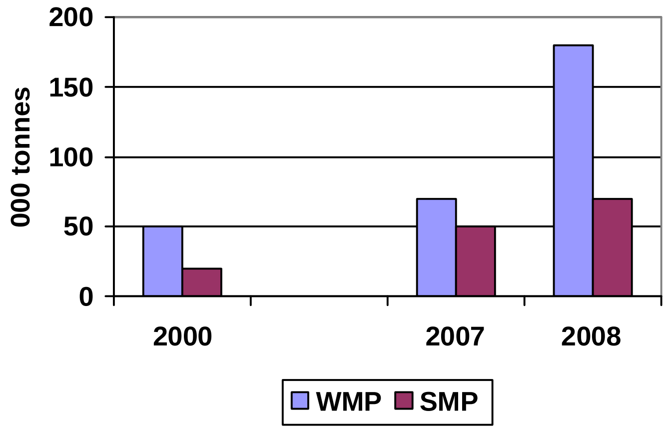
The market for dairy products in the main dairy exporting regions (EU, Oceania and US) is relatively mature. Population growth rates in these regions are generally low and per capita consumption is relatively static for most dairy products. The consumption of cheese and higher value added (fresh) dairy products is one area of continued growth in developed countries.

Dairy product consumption growth rates are highest in Asia, where consumption is growing from a low base. Rapid economic growth, urbanisation, increased use of refrigeration and the globalisation of the western diet are also contributing to this increase in dairy product consumption which is running at a rate of 10 to 15 percent per annum in China.

Outside of the Indian sub-continent, Asia does not have a strong tradition in dairy production, so the rapid increase in dairy consumption in Asia has been accompanied by a large increase in dairy product imports. While domestic dairy product production in Asia is also growing, the increase is not likely to keep pace with the growth in domestic consumption.

Given that the main areas of growth in dairy product consumption are in developing and emerging nations, milk powders are particularly in demand, notably in the area of infant formula.

Figure 2-12: China WMP imports (incl. infant formula) & SMP imports



Source: IDF 2010

2.5 Market Support and Price Volatility

In 2003 the Luxembourg Agreement brought about a fundamental change in dairy policy as a long term policy of market stability was replaced by a policy more akin to a "safety-net" protection for dairy markets.

Over the last decade, EU export subsidy expenditure has been severely curtailed, while butter and SMP intervention prices have been reduced, with the result that both mechanisms and are now used only in times of crisis. In the face of these policy changes support for the EU milk quota has eroded in the last decade and this resulted in a decision in 2008 to phase out the milk EU quota system by 2015. In advance of the elimination of the milk quota, a series of annual 1 percent milk quota increases will occur over the period 2009 to 2014.

The objective of these annual quota increases is to ease the transition from fixed production limits to production levels determined by market supply and demand conditions. Several studies (Binfield et al., 2008; Bouamra-Mechemache et al., 2008) have concluded that the removal of EU milk quotas is likely to lead to only a modest change in overall EU milk production, and that the end of milk quotas will bring about a reorientation of milk production from southern regions of the EU towards the more northern temperate regions of the EU, where grass based milk production prevalent and where it is suggested that costs of production are lower. Aside from the competitiveness of regions or Member States (MS) within the EU, there is also the wider question of the competitiveness of dairy production in EU MS in a wider, global context.

A Single Farm Payment (SFP) to directly support dairy farm incomes was introduced as part of the Luxembourg Agreement. The basis for this dairy payment was the reduction e in the intervention support prices for butter and SMP, which policy makers envisaged would lead to a reduction in the farm gate milk prices in future years.

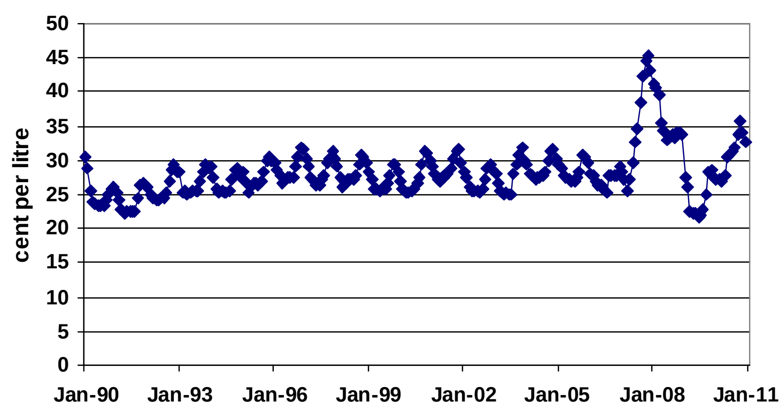
The reality has been somewhat different in that world and EU prices have generally strengthened. Over the period since 2005, intervention has not generally dictated the price level for dairy products and milk prices in the EU. The EU dairy product market has found equilibrium where prices have generally been above the intervention level, except for a period of extreme market weakness in 2009. EU dairy prices have become more volatile. Periods of tight supply and demand conditions on global markets have boosted EU prices beyond historical norms. Equally, there have been periods where the contraction in global dairy demand have brought EU dairy prices down towards the new lower intervention levels. This volatility in prices is expected to become a continuing feature of the EU dairy market. However, it can be argued that the decoupled SFP represents a fixed value income steam which offsets some of the adverse impact of price volatility.

Volatility is increasingly a feature of EU milk prices

Price volatility with regard to dairy farm output, including milk price in particular, and also with regard to farm inputs has emerged as a major phenomenon in Ireland and the EU over the last five years. Taking Irish farm milk price (actual milk solids) over the past 20 years, monthly prices were comparatively stable for the most part from 1990 to 2006, being mainly in the 25-30 cent/litre range.

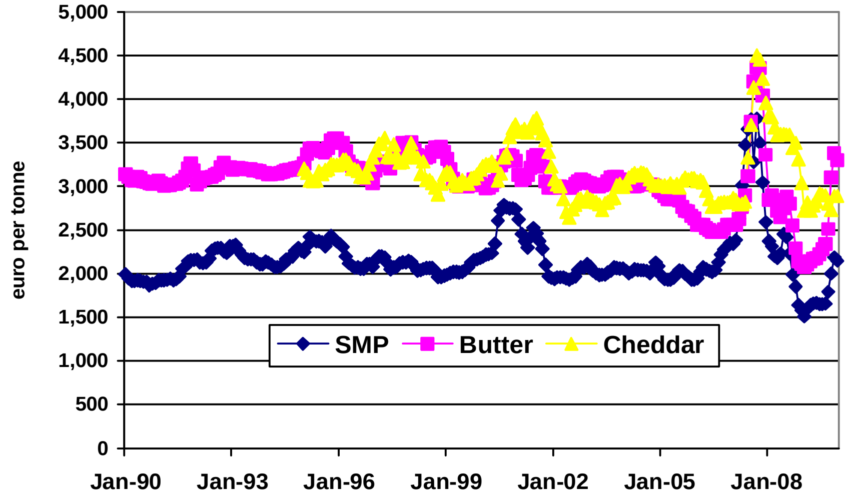
However extreme volatility emerged from 2007 onwards with prices rising to over 40 cent/litre, then falling dramatically towards 20 cent/litre and now rising very rapidly again as can be observed in Figure 2.13. Farm milk price in Ireland is derived very largely from dairy commodity prices in the EU market, and the volatility in these commodity markets shows a very similar pattern to that of farm milk price (Figure 2.14). Based on a technical measure of volatility (annualised standard deviation, ASD), it is seen that price volatility for both Irish farm milk and EU dairy commodities has doubled over the past five years (Figure 2.15), representing movement from what might be regarded as a comparatively stable situation to one of extreme volatility.

Figure 2-13: Monthly Irish Farm Milk Price



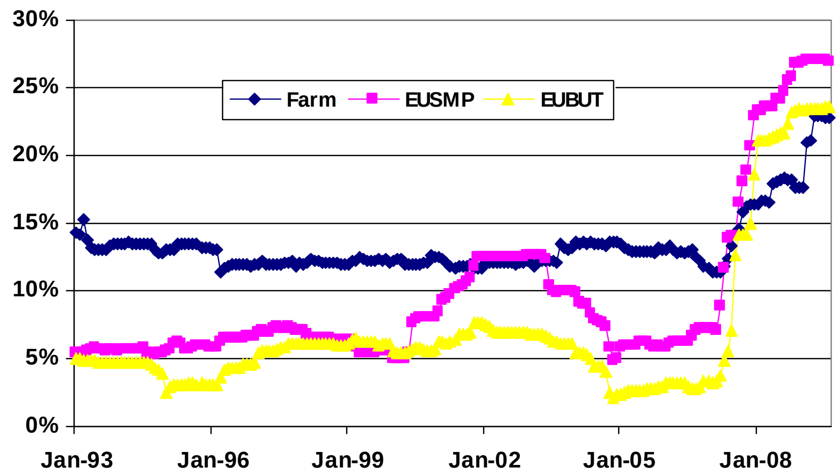
Source: CSO
Actual fat and Protein

Figure 2-14: Monthly EU Commodity Dairy Prices



Source: Agra Europe

Figure 2-15: Historic Volatility (ASD) Farm Milk Price, EU Butter and SMP



Source: CSO, Agra Europe

Studies of dairy commodity price volatility in Ireland and the EU relative to the world market over the past 20 years have shown that, while volatility has increased very substantially in both markets, particularly over the past five years, price volatility has increased much more substantially in EU markets, with EU price volatility over the past five years being much closer to that of world markets than in previous years (O'Connor and Keane 2009). A more detailed discussion on volatility in contained in Appendix B.

It can be argued that recent CAP reforms have exposed EU producers to a greater degree of world market price volatility. While this is true, an argument can be made that this does not imply that this volatility is reflected to a greater degree in farm income. The simultaneous introduction of the Single Farm Payment (SFP) counteracts to some degree the increase in income volatility that is associated with greater variability in output and input prices. Cafiero et al. (2007) point out that the advent of the SFP allows the variance of the production related income of the producer to increase to compensate for the fact that the other part of the producer's income is now fixed. The larger the size of the SFP relative to production income the greater the extent to which it can be seen as a damper on a producer's income variability.

The life of the SFP and its future value are uncertain. Where dairy producers intensify their production the value of the SFP as a damper on volatility will be diluted as it is likely to represent a decreasing share of the producer's income as production increases.

As far as the SFP and competitiveness are concerned, producers in Ireland and the EU are likely to remain more buffered from volatility and experience grater income stability than are producers in fully liberalised markets where supports such as the SFP are unavailable. This means that the adverse impact on competitiveness which extreme volatility might have (such as the impact on cash flow and investment decisions) is likely to be lower in the EU than would otherwise be the case.

2.6 Conclusion

Historically, much of the attention in respect of Irish competitiveness studies has been focused on other EU MS. As we move towards quota removal and trade reform, we will be looking at an EU milk sector that is more integrated with the global dairy market. There are several reasons why an increasing focus on competitor countries outside of the EU is now merited.

Compared to even five or ten year ago the dairy sector in Ireland and the EU faces new challenges. Competitor countries outside the EU are increasing exports and growing their share of global dairy trade. Farm size is growing more rapidly in these competitor countries than in Ireland and elsewhere in the EU.

There is a growing gap between milk production and the milk quota in a number of EU MS. This supports earlier research findings which suggested that the capacity of many MS to increase their milk production once milk quotas are removed in 2015 will be limited.

Demand for most dairy products within the EU is relatively flat and the sector will rely on cheese and fresh dairy products as the drivers of growth in EU dairy product consumption. Demand for dairy products in developing countries continues to increase at a much faster rate than in the EU, most notably in Asia where annual consumption growth rates of 15 percent have been observed. The relative proximity of other global competitors such as

Australia and New Zealand to these higher consumption growth markets may have a beneficial impact on the dairy sector in these competitor countries.

Average world dairy prices have risen over the last five years and the price premium available to producers in the EU compared with producers elsewhere is now smaller than previously. Volatility in world and EU dairy commodity and milk prices is increasing and price stability in the EU, previously offered by the milk quota and other EU market mechanisms, has been greatly reduced. Volatility has also been an increasing feature of input prices. Where output and input price volatility move in tandem, little income volatility will be observed, but if these upward and downward output and input price movements occur are not synchronised, income volatility will be observed.

Taken together the output and input price volatility that has occurred since 2006 has led to considerable market income volatility in the dairy sector in the EU, although the existence of the fixed revenue from the SFP has moderated the overall volatility in farm income in Ireland and the EU.

With the likely expansion of Irish milk production following milk quota elimination, there is increased likelihood that Ireland's competitiveness vis a vis competitors outside the EU will be what matters most. This will particularly be the case if Irish dairy processors heavily target increased WMP production for third countries rather than looking to grow their presence in the UK or continental EU cheese markets if Irish milk production expands in the post milk quota years.

3 Methodology and Data sources

This chapter examines earlier studies of competitiveness, summarises different theories of competitiveness, details the available data and describes the methodology selected for the study. In particular it draws a distinction between different cost concepts which are critical to the understanding of how competitiveness can be measured.

3.1 Previous Studies of Competitiveness

This review of previous studies focuses on the identification of:

(i) an appropriate definition of competitiveness;
(ii) relevant indicators of competitiveness;
(iii) examples of where the indicators were used previously;
(iv) features of the identified indicators;
(v) advantages and limitations of the identified indicators;
(vi) availability of data for Ireland; and
(vii) ease of international comparison.

Several definitions or concepts of competitiveness exist

Competitiveness is much debated by both economists and policymakers. However, nearly every study on the topic of competitiveness adopts a different definition of the term and this was noted by Reich (1992) who had the following to say about the term: "*Rarely has a term in public discourse gone so directly from obscurity to meaninglessness without an intervening period of coherence*" (p.1). Accordingly, it is imperative for the purposes of this study that the main developments in the theory of competitiveness are outlined in an effort to identify an appropriate definition of competitiveness.

The Theory of Competitiveness

The theory of competitiveness has been analysed using three approaches (Thorne, 2002b): traditional trade theory, industrial organisation theory and strategic management theory.

3.1.1 Traditional Trade Theory

Trade theory focused on relative prices as an indicator of competitiveness

Traditional economic trade theory provides useful insights into the development of the concept of competitiveness. However, McCalla (1994) identified the focus of traditional trade-based theories of competitiveness as being inherently structured on supply side economics. Relative price differentials have remained the primary indicators of competitiveness definitions based on trade theory. Therefore, it must be concluded that these theories do not account very well for demand side economics. There is an inherent failure amongst these theories to address qualitative differences in products, marketing and service abilities of firms and the strategies by which industries attain competitiveness (van Durren *et al.,* 1991). Following from the failure of trade models to address such issues, additional schools of thought must be investigated to develop a theory which defines the concept of competitiveness from a supply and demand perspective.

3.1.2 Industrial Organisation Theory

IO Theory sees competitiveness as being driven by pricing and market structure

The main focus of Industrial Organisation (IO) theory is the identification of variables that influence economic performance and is a derivative of the theory that governs monopoly and monopsony (van Durren *et al.,* 1991). A number of theories have been developed based on the identification of variables which influence economic performance, of which the most notable are: Bain type IO, the Schumpterian model, the Chicago school and Transaction cost economics (Conner, 1991). However, the main hypothesis upon which IO theory is based is the structure, conduct, performance concept (S-C-P), also called Main type IO (van Durren *et al.*, 1991).

This S-C-P model is based on the assumption that performance in an industry is said to be dependent upon the conduct of sellers and buyers in such matters as pricing policies and practices, advertising, and so on. Conduct in turn depends upon the structure of the relevant market, which is determined by characteristics such as the number of buyers and sellers and the presence or absence of barriers to entry. Subsequent empirical analysis of this concept has paid particular attention to the relationship between industry concentration and profits. According to Conner (1991) the empirical results of this analysis has been weak which has cast doubt on the legitimacy of the concept.

McCalla (1994) provided a framework which summarised the attributes of IO based theories of competitiveness in which a number of characteristics of the theory were identified:

(i) a limited use of theory, research is inductive in its nature and as a consequence the frameworks developed are complex and conceptual;
(ii) the belief that competitiveness is demand driven;
(iii) policy is not considered as an important construct variable;
(iv) non-price elements are much more important than price variables.

Based on this summary the transition between traditional trade theory and IO is evident. The difference between the two is based on the relative emphasis placed on supply side economics and demand side economics respectively.

3.1.3 Strategic Management

The strategic management school of thought can be viewed as a theory of competitiveness which brings together the concepts of both trade theory and IO. Kennedy *et al.*, (1997) defined competitiveness as outlined by strategic management theorists as “*the ability to profitably create and deliver value through cost leadership and or product differentiation*”

Strategic Management perspective emphasises costs base and product differentiation

(p.386). This definition implies that competitiveness is directly related to factors that influence both the cost and demand structure of a firm. Previously the traditional trade theory of competitiveness focused on the cost structure of the firm and IO focused on the demand structure of the firm. In addition to incorporating the concepts of previous theories of competitiveness the strategic management school has also introduced a number of new concepts which led Martin *et al.,* (1991) to state: *"This literature is pregnant with lessons that businesses are learning about the manner in which they combine their resources, the quality and distribution channels they chose through which to distribute their products and particularly, the use of strategic alliances with their customers or suppliers" (p.1457).*

Porter's "Competitive Advantage of Nations" (1990) has been identified as the leading source in strategic management literature that has been proved to have the ability to broaden and integrate many recent contributions to the theory of competitiveness as well as including many of the central concepts of more established theories (van Durren *et al.,* 1991). The basic question which Porter addresses in his thesis is "Why does a nation achieve international success in a particular industry?". Porter believes that the answer to this question is inherent in his *Porter Diamond* model. Porter's Diamond sets out to determine the various sources of competitiveness of individual firms which operate within the industry. Along with the four main sources of competitive advantage, i.e. factor conditions, demand conditions, firm strategy, structure and rivalry; and related and supporting industries, an additional two factors are included which Porter believes contribute to the position of competitive advantage. These are chance and government. Any given industry may gain a competitive advantage, relative to competitors, based on only one or two of the above factors but this is highly unlikely to be sustained for any relatively long period of time. Competitors will soon ascertain the source of advantage and will latch onto the factor providing the initial comparative advantage. Thus, Porter acknowledges the importance of continuing to upgrade individual sources of competitive advantage to remain competitive in the longer term.

Based on the approaches discussed above, the strategic management concept of competitiveness is often argued to be the strongest model. This conclusion derives from (i) its explanatory power (van Durren *et al.,* 1991) and (ii) the critical importance assigned to sources of competitiveness rather than indicators of competitiveness. However, Harrison and Kennedy (1997) argue despite of the importance of identifying sources of competitiveness it is also vitally important that there is an inherent link between the sources and measures of competitiveness, which the strategic management school, including Porter (1990), has failed to do. An additional critique of the strategic management concept of competitiveness is that it has not yet been advanced to the point where it provides generalised statistically hypotheses (van Durren *et al.*, 1991; Grant, 1991).

3.1.4 Defining Competitiveness

Based on the critique of the main theories of competitiveness outlined above it is appropriate at this stage to provide a definition of competitiveness that is considered appropriate for this analysis.

Earlier work by Pitts and Lagnevik (1998) accepted that "*a competitive industry is one that possesses the sustained ability to profitably gain and maintain market share in domestic and/or foreign markets*" (Martin *et al*, 1991). For the purpose of this study profitability is considered as a leading indicator of competitiveness and market share will be considered in subsequent research. From the above critique of competitiveness theory which highlights the importance of:

(i) consideration of both supply and demand and

(ii) identification of appropriate measurable indicators; measures of profitability are appropriate given that both cost and return variables are considered.

3.1.5 Levels of Competitiveness

Further to defining competitiveness it is necessary to accurately measure the term. Buckley *et al.,* (1988) identified a useful distinction between different measures of competitiveness:

There is a need to distinguish Competitive Performance from Potential

- *Competitive Performance* is the measurement of indicators of competitiveness of specific firms, sectors or countries. Profitability is considered for this study as a leading indicator of performance.[1]
- *Competitive Potential* is the measurement of sources of *competitive performance.* In this context an important question was raised by Boyle (2002): "*should competitiveness focus entirely on cost comparison or should it also include any product price difference*?"(p.31). This issue is addressed in Appendix 1 where various indicators of *competitive potential* are examined.
- *Competitive process* is the mechanism whereby *competitive potential* is translated into *competitive performance*. The majority of measures of the *competitive processes* are qualitative in nature and consequently are not considered for the purposes of this research whereby appropriate quantitative indicators of competitiveness are to be identified.

[1] Based on the theory of competitiveness, Brinkman (1987) identified profitability as a superior indicator of longer term competitiveness, relative to market share. However, the opposite case has also been proposed i.e. short term profit can be forfeited in the pursuit of long term market share gains. Based on this analysis it can be concluded that "…one 'best' measure of competitiveness may not exist…(but) market share and profitability provide useful insights into overall competitiveness"(Kennedy et al, 1997, p.24). Therefore, ongoing research is currently examining market share based indicators of competitiveness and will be reported separately.

3.2 Source of Data

The Farm Accountancy Data Network (FADN) was the primary source of data used in this analysis. The aim of the network is to gather accountancy data from farms for the determination of incomes and business analysis of agricultural holdings. The concept of the FADN was launched in 1965, when Council Regulation 79/65 established the legal basis for the organisation of the network.

The network consists of an annual survey carried out by the Member States of the European Union. Derived from national surveys, the FADN is the only source of micro-economic data that is harmonised, i.e. the bookkeeping principles are the same in all the countries. The information collected, for each sample farm, for each member country is transmitted by Liaison Agencies (FADN, 2003). Teagasc is the liaison agency for Ireland.

FADN covers 60,000 holdings collecting details of output and cost data

In 2007, the FADN annual sample includes approximately 80,000 holdings. They represent a population of about 5 million farms in the 27 Member States, which cover approximately 90 per cent of the total utilised agricultural area (UAA) and account for more than 90 per cent of the total agricultural production of the Union.

FADN data itemises costs on a whole farm basis only, consequently allocation of costs and output to the specific farm enterprises had to be attempted. For the majority of cost items, whole farm costs were allocated to the specific enterprise activity according to the share of specific enterprise output in total farm output. A number of exceptions to this general rule were adopted for individual cost items at the enterprise level. These are outlined in the chapter 4 of the report.

The specific FADN countries used in the analysis for the purpose of comparing competitiveness was selected based on export potential and outlined in chapter 4.

3.3 Measurement

All the measures of competitiveness used in this report are based on profitability as the leading indicator of competitive *performance*. Boyle (2002) in his analysis of the competitiveness of Irish agriculture said that '*returns and costs matter to competitiveness*' (p.153). Using profitability as an indicator of competitiveness means that both costs and returns are taken into consideration.

Understanding the different measures of cost in vital in assessing competitiveness

Costs were defined in the following way:

(i) **Total cash costs**, which include all specific costs, directly incurred in the production of a given commodity, for example fertiliser, feedstuffs, seeds etc. plus external costs such as wages, rent and interest paid.

(ii) **Total economic costs**, which includes all of the cash costs identified above, plus imputed resource costs for family labour, equity capital and owned land.

The calculation of total economic costs for the competing countries was one of the most problematic exercises in this analysis. If long-term competitiveness is to be examined the assumptions regarding the measurement of opportunity costs for family labour, owned land and other non-land capital must be as realistic as possible. The valuation methods adopted for the research in this study are outlined below:

- Family labour was assigned an opportunity cost equal to the cost of hired labour in each of the enterprises studied.[2] The hired labour charge was determined from the FADN data.

Economic cost includes an estimated value for own land, family labour and non-land assets

- Owned land was assigned an opportunity cost equal to the cost of rented land. The land rental charge was also determined from the FADN data. This approach follows the methodology adopted by Boyle *et al.,* (1992), Boyle (2002), and Fingleton (1995). However, this approach does not distinguish between the marginal and average cost of land rental. Based on Clark's (1973) argument '*that land has an average product and a marginal product which may differ, and that its rent should depend on its marginal product.....[therefore] we have to fall back on estimating economic rent as a residual, from the gross product after all other necessary inputs have been remunerated*' (p.14). Consequently, total economic costs were calculated with and without an imputed value for land. Further discussion on the implication of including and excluding owned land in the valuation of total economic costs can be found in the results and conclusions sections.

- Non-land assets also proved to be a problematic resource for valuation purposes.

Boyle *et al.,* (1992) and Boyle (2002) recommended using a (i) real interest rate which takes into account taxes, subsidies and inflation adjustments and (ii) a depreciation rate. However, Fingleton (1995) recommended using a long-term interest rate, rather than a real interest rate (derived from the FADN data) as proposed by Boyle, derived by subtracting the price deflator for private consumption from the nominal long-term interest rates for each country for each relevant year. Both of these approaches were considered but were not adopted for this research. Application of a derived real interest rate substantially increased the spread of rates charged on non-land assets between the countries examined. In addition the application of a long-term interest rate was not considered appropriate given the record of real interest rates over the time period 1996-2000 for Ireland. Due to relatively high rate of inflation in Ireland in some years in this time period, the computed long-term interest rate was negative in some time periods. For this study a nominal interest rate was applied for

[2] The determination of an appropriate opportunity cost for own family labour is always an issue in studies which examine costs of production on family farms. The use of the average agricultural wage to value owned family labour may in some instances over value (due to under employment) or under value (due to managerial or entrepreneurial ability) this resource. However, without any further evidence to suggest in which cases such situations arise, the average agricultural wage is used in the absence of this additional information.

each of the countries for each relevant year. This approach was considered to provide more realistic opportunity costs for the purpose of valuing non-land assets in this analysis than the two methods identified above.

To measure competitiveness, costs can be expressed relative to output value, per unit of product or per hectare

An important issue in measuring competitiveness is the distinction between the different *levels* of competitiveness. All too often research on the topic of competitiveness tends to focus on indicators of competitive *performance* and indicators of competitive *potential* are ignored (Harrison and Kennedy, 1997). Consequently, the indicators presented in this research go some way towards identifying the sources of competitiveness in addition to presenting results of competitive *performance*.

The individual measures:

(i) costs as a percentage of output;

(ii) margin over costs per product volume; and

(iii) margin per hectare;

provide an insight into the competitive *performance* of the countries examined, over the time period 1996 to 2010. However, they do not provide an insight into the sources of competitive advantage or disadvantage. The individual cost variables and associated returns are outlined in the appendices. These data provide an insight into the sources of competitive *potential* associated with the competitive *performance* of the dairy sectors in the countries examined. Furthermore, as competitive *potential* is concerned with the availability, quantity and quality of inputs and how they are formulated to produce superior performance (Pitts and Lagnevik, 1998), the partial productivity indicators presented are also considered indicators of competitive *potential*. However, it is important to reiterate again the significance of not examining indicators of competitive *potential* and *performance* in isolation. For example, indicators of low physical productivity cannot necessarily be inferred to mean low competitive *potential* without reference to comparative indicators of costs of production or profitability, as low production costs may more than compensate for low physical productivity.

4 Competitiveness: EU15 Context

This section of the report examines specific indicators of cost competitiveness and partial productivity among specialist milk producers in Ireland and selected EU 15 MS with a strong tradition in dairy production, namely: Belgium, Denmark, France, Germany, Italy, the Netherlands and the UK. Country specific information on the extent of intra-EU trade of milk products is not available but over 85% of the EU production of butter and cheese is accounted for by the countries specified (Eurostat, 2003).

The FADN is the main source of the data used for this analysis. Data analysis was confined to specialist dairy farms as defined by FADN (Farm Type 411), on which the standard gross margin from dairying accounts for at least two-thirds of the farm total gross margin. This allows a greater degree of accuracy in the allocation of costs (which are presented on a whole farm basis in the FADN) to the dairy enterprise than would be the case if all farms with a milk enterprise were selected for analysis (Fingleton, 1995).

4.1 Measurement and Methods

Two separate measures of cost comparisons are used for specialist dairy farms (farm type 411):

- Total costs as a percentage of dairy output
- Total costs per unit volume of milk production.

In calculating output value, calf sales value should not be ignored

The value of dairy output was calculated as milk receipts plus dairy calf sales. Fingleton (1995) found that the omission of calf output values could inevitably affect dairy enterprise comparisons between countries. Subsequently, it was decided for this analysis to try to include the value of calf output in the analysis. Whole farm calf sales were apportioned to the dairy enterprise based on the ratio of dairy cows to other cows. Due to data constraints it was only possible to include a value for dairy calf sales off farm. It was not possible to impute a charge for calves from the dairy enterprise transferred to the beef enterprise.

Most studies which examine the costs of milk production are made on a raw milk volume basis which does not account for possible variation in milk constituents between different countries (Fingleton, 1995). Results from these studies using this approach are biased in favour of countries where the levels of milk constituents are relatively low. To overcome this bias Fingleton (1995) measured unit costs per kilogramme of milksolids (i.e. butterfat plus protein). Average fat and protein percentages for each country were used to convert the milk volumes obtained from the FADN data into the equivalent quantities of milksolids. This approach was also adopted in this study. The average fat and protein percentages used for the analysis are provided in Table C1 of Appendix C (The Dairy Council, 2001 and Eurostat 2011).

In assessing costs, adjustment should be made for milk composition

In addition to the measures of cost comparison used for the dairy analysis a number of specific cost allocation methods were adopted for the dairy analysis. As mentioned in section 3 above, in the FADN all costs are specified on a whole farm basis. Consequently, it was necessary to devise a method whereby the costs were apportioned to the dairy activity. Table 4.1 below outlines the allocation keys used for the purpose of defining costs associated with the dairy enterprise. This allocation method is based on that used by Fingleton (1995) and further developed in a similar study carried out by the FADN (Vard, 2001).

Table 4.1 shows that a number of cost items are allocated based on the percentage of 'dairy' livestock units (LU) in the total of either grazing livestock or total LU. The definition of 'dairy' LU is also based on Vard (2001) and includes dairy cows, cull dairy cows and a share of the dairy enterprise share of total breeding heifers and young females. The share of breeding heifers and young females allocated to the dairy enterprise was based on the proportion of dairy cows plus cull dairy cows in the total number of cows (dairy cows, cull dairy cows and other cull cows). The cull dairy cows and the share of the total breeding heifer and young female population reflect the costs associated with cow replacement. Fingleton (1995) identified the omission of cow replacement costs as a problem in inter country cost comparisons where replacement rates differ.

LU rather that output value are used to assign costs to each enterprise

However, Vard (2001) proposed that owned land should be allocated according to the percentage of milk and milk products in the total value of output and subsides of the whole farm, whereas Fingleton (1995) proposed that owned land should also be allocated according to LU proportions. For this analysis it was decided that Fingleton's approach for owned land was more appropriate based on the work carried out by Fingleton which showed that '*applying the output ratio estimating procedure to all cost items in the FADN data resulted in significantly higher unit costs for milk production for Ireland compared to the unit costs derived directly from the Irish data, where direct costs can be allocated to each farm enterprise*' (p.4).

Another problem area identified by Fingleton (1995) in his analysis of costs and returns for milk production in EU countries was the method through which FADN data record fodder production used on the farm. Unit forage feed costs are recorded at market prices in some countries whereas in other countries they are valued at costs of production. Consequently, it was necessary in this analysis to impute a value for non-fodder crops and fodder crops rather than using the value supplied from the FADN data.

Table 4-1: Allocation Keys used to define costs associated with the Dairy Enterprise using FADN data

COSTS ITEMS	ALLOCATION KEYS
Purchased feed for grazing livestock (concentrates & coarse fodder)	% of 'dairy' livestock units in the total of grazing livestock units
Farm-use of non forage crops	% of 'dairy' livestock units in the total of livestock units
Farm-use of forage crops = "Specific forage costs"	% of 'dairy' livestock units in the total of grazing livestock units x
Seeds	% area of fodder crops , other forage crops and temporary grass in the total UAA - after exclusion of fallow lands, areas leased to others, meadows and rough grazing
Fertilisers	% area of fodder crops, other forage crops, temporary grass and meadows in the total UAA - after exclusion of fallow lands, areas leased to others and rough grazing.
Crop protection	% area of fodder crops and other forage crops in the total UAA - after exclusion of fallow lands, temporary grass areas leased to others, meadows and rough grazing.
Other specific livestock costs (e.g. veterinary costs)	% of 'dairy' livestock units in the total of livestock units
Owned land	% of 'dairy' LU in total LU
All other costs: - farming overheads - depreciation - external factor costs (wages, rent and interest paid).	% value of milk and milk products output in the total value of output & direct payments

The allocation of these costs can be seen in Table 4-1 above and the calculation of the cost items was based on methods proposed by Vard (2001). These allocation methods can be summarised as follows:

(1) The value of the farm use of non-fodder crops, produced on the farm, such as barley and rye, was retained in the cost item 'crops used for feed'.[3] However, the value of farm use of all crops used as forage (fodder roots, other forage plants –

[3] The value of the farm use of non-fodder crops produced on the farm (e.g. barley, rye, etc) is retained in the variable 'Crops used for feed', but the value of farm use of all crops used as forage (fodder roots, other fodder plants, e.g. silage cereals, temporary grass, meadows and pastures and rough grazing) is excluded.

e.g. silage cereals, temporary grass, meadows and pastures and rough grazing) is excluded.

(2) the cost of fodder crops is based on costs of production represented in specific crop costs (seeds, fertilisers, crop protection) and is estimated on the basis of area. As all types of forage crops do not incur the same specific costs, such as the case where no crop protection is used on temporary grass, the area taken into account varies according to the input. This cost item is called 'specific forage costs' and is shown in Table 4.1 above.

All other methodological issues for comparing costs of production identified in section 3 above are relevant for the dairy sector, including the valuation of owned resources, calculation of cost items etc.

The partial productivity indicators used in this analysis for the dairy sector were defined by Fingleton (1995). The measures relate to animal, land and labour productivities. They are:

- Milk yield per cow (kg)
- Milksolids per cow (kg)
- Stocking rate (LU/ha)
- Milk production per hectare (kg)[4]
- Milksolids per hectare (kg)[5]
- Milk production per labour unit (tonne).

4.2 Results

The results for the dairy enterprise are presented in two sections: (i) partial productivity indicators and (ii) comparative costs of production.

4.2.1 Comparison of partial productivity indicators on EU dairy farms

In Figures 4.1 and Figure 4.2 below the partial productivity indicators identified above are outlined for the eight EU countries compared in this analysis. The results are presented for all specialist dairy farms in the sample, weighted to present population means. The results presented here for each of the countries are the average for the years 2005 to 2007 and indexed relative to Ireland. This means that index values greater than 1 indicate higher levels of productivity relative to Ireland. The absolute levels of the indicators, for each of the years and for each of the countries are shown in Appendix C. In addition, historic partial productivity indicators (1996-2007) are also provided in Appendix C.

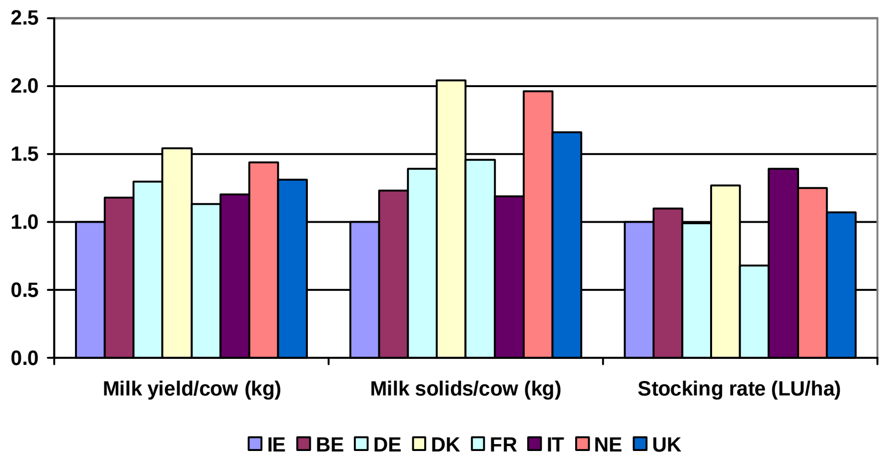
[4] By definition this partial productivity measure will be heavily influenced by relative stocking rates.

[5] By definition this partial productivity measure will be heavily influenced by relative stocking rates.

Figure 4.1 shows that average milk yields per dairy cow were much lower in Ireland relative to the other countries in the analysis. Average yields in the Netherlands and Denmark were substantially higher than the other countries in the analysis. In addition, milk solids per cow were substantially lower in Ireland than in the Netherlands and Denmark, where levels were approximately 100 per cent higher than Irish dairy herds.

Figure 4-1: EU partial productivity measures: milk yield, milk solids per cow & stocking rate (Avge. 2005-07)

Compared with key EU MS, Irish milk production continues to be characterised by low yields



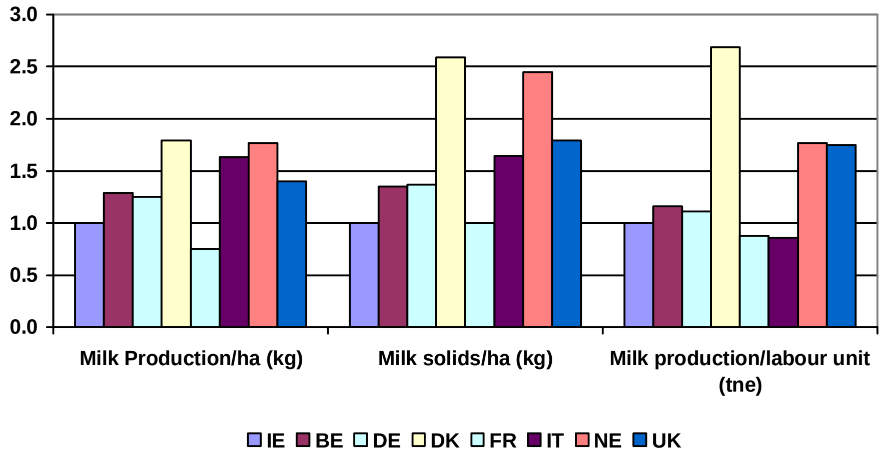
The levels of land productivity in the Netherlands and Denmark were relatively high, with rates 25 per cent and 27 per cent higher than in Ireland. Only France and Germany had stocking densities lower than Ireland, with densities 32 per cent and 2 per cent, lower than in Ireland.

Compared with key EU MS, productivity per ha and per labour unit in Ireland is low

Figure 4.2 shows partial productivity measures for milk production and milk solids per ha and milk production per labour unit. The combination of the relatively low stocking densities and milk yields for Ireland are aggregated in the next two measures of productivity. Milk production and milksolids per hectare were relatively low in Ireland with only France exhibiting lower rates.

The Netherlands and Denmark again exhibited figures well in excess of the other countries examined, with milk production per hectare 79 per cent higher in Denmark and 77 per cent higher in the Netherlands compared to Ireland. Furthermore, milksolids per hectare were quite substantially higher in other countries relative to Ireland, with levels in Denmark and the Netherlands in excess of 100 percent above Ireland.

Figure 4-2: EU partial productivity measures: Production, milk solids/ha & production/labour unit (Avge. 2005-07)



Even when adjustment is made for farm size, productivity in Ireland is below average in key EU MS

The final partial productivity measure shown in Figure 4.2, milk production per labour unit, was again highest in the Netherlands and Denmark, with levels in the UK also relatively high. Italy and France were the only countries that exhibited lower labour productivity measures than Ireland, but average levels in Germany and Belgium were very similar to those for Ireland.

The finding of below average productivity in Ireland was a feature of earlier studies also

All of the results presented in Figures 4.1 and 4.2 relate to all specialist dairy farms in the sample, however these results are influenced by distribution differences in the sample farms included in the FADN survey for the different countries (Fingleton, 1995). For this reason the productivity indicators for farms with 50-99 cows were also examined in each of the EU15 countries. However, despite the variations in sampling procedures adopted in the FADN survey, there was no evidence of pronounced differences in average productivity levels between the 50-99 cows sub sample and the whole sample. In general, the productivity rankings between the countries were similar in the two samples but the relative differences between the countries tended to be reduced in the more homogeneous sample of the 50-99 cow farms. This was particularly evident in the land and labour productivity measures, where the large disparities between the countries in the average sample of farms were reduced in the sample of 50-99 cow farms. The results for individual years (1996 – 2007) are presented in Table C2 of Appendix C. A linear regression model was fitted to these results to measure the trend over time for Irish dairy farms in relation to these indicators. The average sample and the more homogeneous sample did show a significant positive trend for the majority of the variables over time for Ireland in isolation from the other countries. However, this significant trend did not translate into relative terms, with Ireland continuing to remain below average productivity over time.

In conclusion, it appears that the selected productivity measures for Irish dairy herds were generally lower over the period 1996 –2007, compared to other important dairy producers in

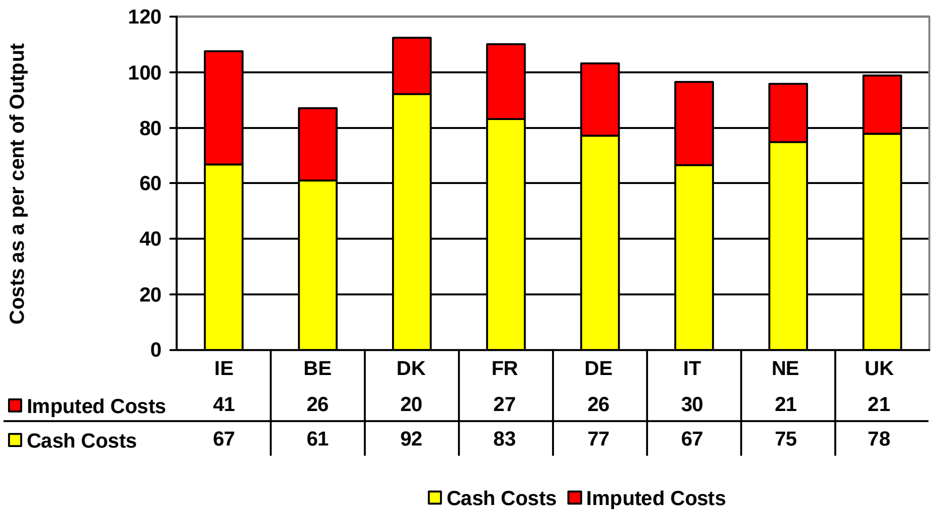
Europe. These results show a similar pattern to results established for the same EU countries in the period 1990 – 1993 (Fingleton, 1995). While the average Irish dairy farm and the larger Irish dairy farm did manage to improve productivity over time, so too did the main competitor dairy countries within the EU15, hence relative position of Irish milk production did not significantly improve.

4.2.2 Comparison of costs and returns in EU dairy farms

The first measure of comparative costs of production used in this analysis was costs as a percentage of total dairy output. Fingleton (1995) citing Boyle et al., (1992), outlined the relevance of this measure, whereby '…*it reflects the resilience with which a sector of production could cope with a cost/price squeeze. If, for example, there was a substantial fall in milk prices, producers locked into a high cost structure would have much lower chances of survival, other things being equal*' (p.11). This approach to measuring competitiveness seems appropriate given that volatility in input and output prices has been a significant feature of the European dairy scene in recent years and indications are that this volatility will remain a significant feature of the sector in the future.

Figures 4.3 and 4.4 below shows the average cost relative to output measure for the three year period (2005-2007) using FADN data and an estimated ratio for the three year average (2008-2010), for each of the selected countries, for all specialist dairy farms in the FADN sample.[6]

Figure 4-3: Economic and Cash Costs for specialist Milk Producers in EU (2005-2007)

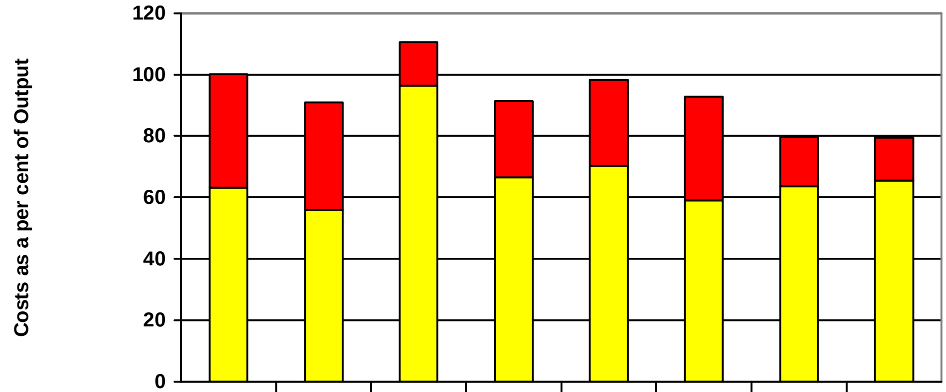


Using the output value approach, on a cash costs basis, Ireland remain quite competitive in the EU15

Cash costs and the imputed charges for owned resources are identified. Appendix C shows the data specified at the individual cost component level for each of the countries, for all specialist dairy farms and for the sub sample of farms that have between 50-99 dairy cows.

[6] Based on input and output price indices from EUROSTAT (Agricultural prices and price indices, EAA Economic Accounts for Agriculture). See chapter 3 for more details on this estimation method.

Figure 4-4: Estimates of Economic and Cash Costs for specialist Milk Producers in EU (2008-10)



	IE	BE	DK	FR	DE	IT	NE	UK
Imputed Costs	37	35	14	25	28	34	16	14
Cash Costs	63	56	96	67	70	59	64	65

Cash Costs Imputed Costs

Using the output value approach, on a full economic cost basis the competitive position of Ireland in the EU15 looks less favourable

Figure 4.3 and Figure 4.4 show that Belgium had the lowest cash costs as a percentage of output, with the cost structure in Italy and Ireland only slightly higher. The highest cash costs as a percentage of output were experienced in Denmark. Further analysis of the specialist dairy farms that had between 50-99 dairy cows did not show substantial deviation from these results.

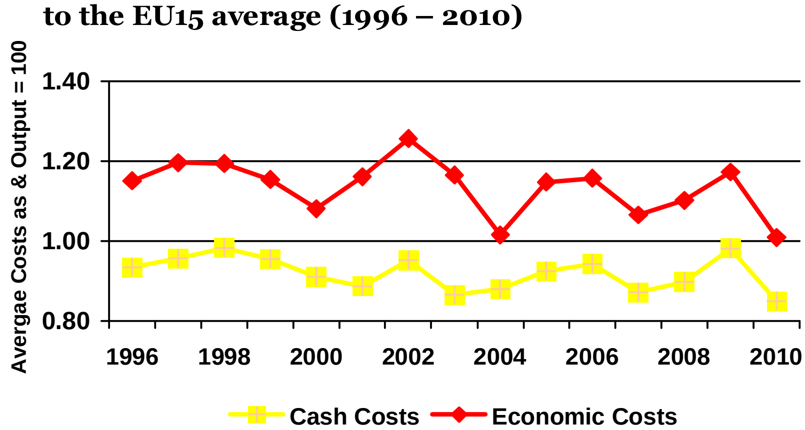
When total economic costs were considered, the competitive position of the examined countries changed. The competitive advantage of Irish producers deteriorates when all imputed charges for owned resources are taken into consideration. Total economic costs as a percentage of output were highest in Denmark where costs were 111 per cent of the dairy enterprise output (2008-2010). Ireland followed with the second highest total economic costs at 103 per cent of output (2008-2010). The most significant imputed cost that contributed to the relatively high total economic costs experienced in Ireland over the period was the imputed charge for owned land (see Table C3 of Appendix C). This was due to the relatively high rental charge used to calculate the imputed value for owned land, coupled with high levels of land ownership in Irish dairy production. Note that if land is rented it appears as a cash cost, whereas if it owned it appears as an imputed cost. The relatively low stocking rates and milk yields per hectare on Irish dairy farms over the period also must be considered as a contributing factor in Irish dairy farming's high economic costs.

The lowest total economic costs were experienced in the Netherlands, where 20 per cent of dairy output remained as profit for dairy producers on average over the period (i.e. total economic costs were 80 per cent of total dairy output).

When total economic costs were considered as a percentage of output for specialist dairy farms with 50-99 dairy cows, the rank order also changed from the average position shown in Figure 4.3 and 4.4. Total economic costs for this sub sample of farms were generally substantially lower then the average farm position. For example in Ireland, total economic costs as a percentage of output were reduced by just over 20 percent, when the larger size farm was compared to the average size farm. Ireland however, still remained as the second highest total economic cost producer for farms with 50-99 dairy cows. Denmark remained the highest total economic cost producer.

Based on the costs presented in Figure4.3 and Figure 4.4 and detailed in Table C3 of Appendix C, a 'competitiveness index' (following Boyle *et al.*, 1992; Fingleton, 1995) was developed, whereby the cost to output ratio for Ireland was expressed as a percentage of the unweighted average of the cost to output ratios for all the countries examined. Ireland was at a competitive disadvantage relative to the average for all the countries studied, when total economic costs were taken into consideration. Over the period 2008-2010, the average size Irish dairy farm had total economic costs which were on average 8 per cent higher relative to other competing countries in the EU. The relative position was less negative for the sub sample of dairy farms with 50-99 dairy cows, with total economic costs as a percentage of output value was just above the average of all countries examined. In terms of relative position over time, the time series data from 1996 to 2010 showed that there was a significant positive trend for Irish dairying. The analysis indicated that the relative costs of production (as a percent of output value) for Irish dairy farms have decreased relative to the average of the other Eu15 countries examined (Figure 4.5). This is a positive indication of improvement over time in the relative competitiveness of the Irish dairy sector over time.

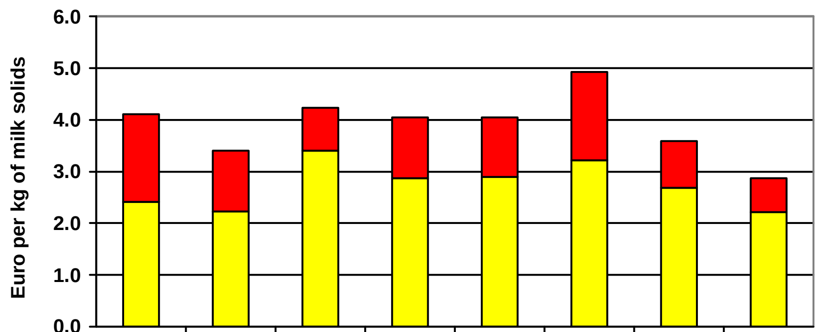
Figure 4-5: Cash & Economic Costs as % of Output Value: Ireland relative to the EU15 average (1996 – 2010)



The second measure of comparative costs and returns used in this analysis were costs (both cash and economic) per kg of milksolids produced. This measure takes into account the variation in the milk constituents (fat and protein) between different countries. The average cash and economic costs per kg of milksolids produced, over the period 2005 to 2007, and

2008 to 2010, for each of the countries in the analysis are presented in Figure 4.6 and Figure 4.7. Further detail on these components of the cash and economic costs are presented in Table C5 of Appendix C.

Figure 4-6: Cash and Economic Costs per kg milksolids – average (2005 – 2007)

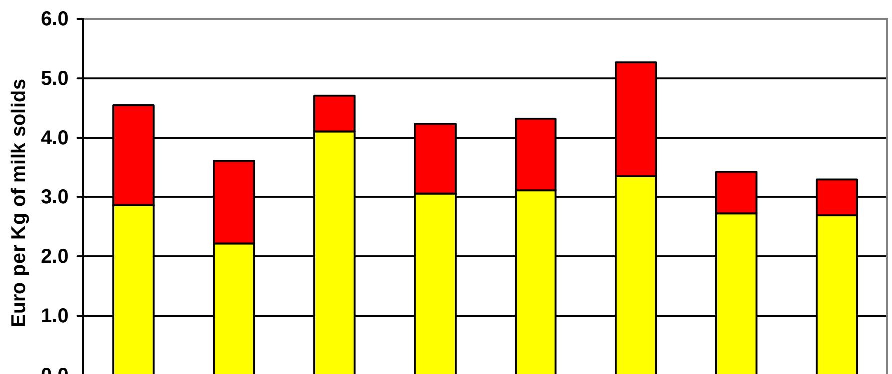


	IE	BE	DK	FR	DE	IT	NE	UK
Imputed	1.7	1.2	0.8	1.2	1.1	1.7	0.9	0.7
Cash	2.4	2.2	3.4	2.9	2.9	3.2	2.7	2.2

Cash Imputed

Using the cost per unit product approach, Ireland is about average in the EU15

Figure 4-7: Cash and Economic Costs per kg milksolids – average (estimated 2008 – 2010)



	IE	BE	DK	FR	DE	IT	NE	UK
Imputed	1.7	1.4	0.6	1.2	1.2	1.9	0.7	0.6
Cash	2.9	2.2	4.1	3.1	3.1	3.4	2.7	2.7

Cash Imputed

Using the cost per unit product approach, the competitive position of the UK is more favourable

Figures 4.6 and 4.7 show that the consideration of the milksolids produced, has a considerable influence on the competitive position of the countries examined. Based on total cash costs per kg of milksolids produced, Italy and Denmark still exhibit very high costs but notably the UK has significantly lower costs per kg of milk solids as opposed to costs as a percentage of milk output. The position in relation to Ireland is still positive on a cash costs basis per unit of milk solids, with costs approx 5 per cent below the average of all countries examined (2008-2010). On a total economic cost basis, the UK had the lowest costs per kg of

When farm size is factored in, the variation in total economic costs per unit output across MS is much reduced milksolids, Ireland had the third highest costs with only the Denmark and Italy experiencing higher units costs. When the sub sample of farms with 50-99 dairy cows were examined (Appendix C Table C6) cash costs did not change noticeably but economic costs were reduced significantly for these farms. The magnitude of the differences was much less between the countries when milksolids production rather than the volume of milk production was used. The ranking between other countries changed, but Ireland's position in the rank order remained unchanged.

On a full economic cost basis, high land prices are seen to adversely affect the competitiveness of Ireland

Based on the competitive index of total economic costs, which compares Ireland's position to the average position of the competing countries, Irish dairy farms had costs per unit of milk produced which were only slightly above the average of all countries. When the average sample was examined total economic costs per kg of milk solids were approximately 8 percent higher than the average for the period 2008 – 2010. In the specialist sub sample, average costs for Ireland were just above the average for the competing countries. Furthermore, when imputed charges for owned land were excluded, the competitive position of the average sample and the sub sample for Ireland improved substantially.

On a unit product basis Ireland now tends to be above the EU15 average on a full economic costs basis

Fingleton's (1995) results on the competitiveness of Irish dairy farming were slightly more positive in terms of relative positioning for Ireland on a total economic cost basis expressed per unit of milk solids for the average size dairy farm. This led Fingleton (1995) to conclude that '*...Irish dairy farmers held a continuous and relatively strong competitive advantage in the cost of milk production, over the years 1988/89 to 1992/93, when compared with the costs of production in other EU countries.*' (p.20) and '*...on the basis of using total economic costs as the yardstick of competitiveness, Ireland's position was about the same as the EU average*' (p.18). While the relative unit costs of milk production have not shifted dramatically, it is noteworthy from this study that Ireland only experienced lower total economic costs than the average of all countries in four out of the previous 15 years (1996 to 2010). On average unit costs of milk production were slightly higher in Ireland than in the competing EU15 countries examined.

Further analysis of the cost structures of the competing countries in Appendix C gives an indication of the sources of competitive advantage and disadvantage for Irish milk producers. As was discussed above, the cash cost structure for Irish milk producers over the period was relatively low compared to the other countries that were examined. The cost components seen in Appendix C indicates that this was associated in particular with relatively low costs for seeds and plants, crop protection, purchased feedstuffs and machinery. However, these relatively low costs were offset, in particular, by high costs for fertiliser and imputed charges for owned land. These cost components provide some indication of the sources of competitive advantage and disadvantage associated with milk production in Ireland over the period.

4.3 Conclusions

In summary, it appears that for the period 1996-2010, the competitive position for Ireland within the EU-15 was positive when cash costs were considered in isolation from imputed charges for owned resources. This is an indication of Ireland's competitiveness in the short to medium term.

In the longer term adjustment within the sector will be a reality which will be dependent on relative resource use and in this situation relative resource costs are needed to understand and analyse the adjustment process.

Consequently, imputed charges for owned resources are important when considering the longer term outlook for the competitiveness of the sector. In doing so, the competitive ranking for the Irish dairy sector slipped relative to the other countries examined. However, in most cases the exclusion of imputed charges for owned land from the analysis reinforced the competitive position of Irish dairy farms.

On a total economic cost basis, when size issues are factored in, Ireland's ranking improves.

A number of factors are important in explaining why the competitive position deteriorates when imputed costs for owned resources are included. Boyle (2002) concluded that part of this explanation relates to '*the relatively low scale of primary agricultural activity in Ireland*' (p.177). This particular chapter illustrated the economics of scale by examining the relative position of a sub sample of larger dairy farms. The analysis showed that while the competitive ranking of the countries remained unchanged the magnitude of the differences between countries was much less in this sub sample of similar sized farms compared to the differences between national averages for the whole farm population for these countries. In particular, economic costs on larger Irish dairy farms were substantially reduced compared to the national average. This result is indicative of the small scale farming that is predominant in the Irish dairy industry relative to competing industries. Furthermore, it could be concluded that larger scale producers in Ireland will be in a superior competitive position relative to the smaller scale producers in the long run, due to their ability to cope with a cost/price squeeze.

To further understand the relative strengths and weakness which underpinned the relative performance of the Irish dairy sector over the period, the indicators of competitive *potential* were examined, namely, partial productivity measures and the cost and return variables identified in Appendix C. Most of the indicators of partial productivity which were measured indicated that the technical performance of Irish dairying was lagging behind competing countries in the EU15.

The cost variables that were identified in the Appendix C, showed that Ireland had a relative advantage in terms of particular 'cash cost' items, but these particular advantages were outweighed on a total economic cost basis, due to the high imputed cost of owned resources on Irish farms. Certain 'cash cost' items consistently appeared as low cost items, such as seed and plant costs, interest charges, and fixed asset charges. However, imputed charges for owned land and labour were also consistently high for Ireland.

5 Competitiveness: The Wider Global Context

The preceding chapter examined the issue of the competitiveness of the Irish dairy sector in a EU15 context, with a specific focus on Ireland and some of the other key dairy producers in the EU. In this chapter we go beyond the EU15 to look at the competitiveness of the Irish dairy sector in a wider global context.

A consistent approach to the examination of competitiveness in the EU15 was made possible by the existence of the FADN dataset which extends over a long coverage period for MS which are long term members of the Union. However, as this is an EU compiled dataset, it does not provide an extensive time series of data for the EU New Member States (NMS) which only joined the EU in the period since 2004. In addition, for countries beyond the EU, other comparable data sources must also be obtained. The IFCN data network provides cost of production and return data which are used as the main source of reference for the analysis in this chapter.

To look at competitiveness in a global context we need to use the consistent dataset produced by IFCN

In this chapter the methodology used to assess competitiveness in a global context is described. Next, summary details on the dairy sector in the identified competitor countries are provided. This is then followed by the detailed analysis of competitiveness using the IFCN framework.

5.1 Measurement and Methods

The IFCN data network is a world-wide partnership that links agricultural researchers, advisors and farmers to create a better understanding the costs and returns of agricultural production world wide. The cost calculations within the IFCN network are based on individual representative farms, rather than on the results from stratified random samples of the population as is the case with FADN data. None the less, IFCN provides a data source which can be used to examine the relative competitiveness of 'representative' Irish milk producers in a global context. IFCN data is assembled and analysed using a common methodological framework. Like the methods outlined previously for FADN data, IFCN data also presents costs as total 'cash' costs, which consists of expenses from the profit and loss account and total 'economic' costs with opportunity costs calculated for farm-owned factors of production (family labour, own land, own capital).

IFCN relies on representative farms rather than a detailed sample of farms

IFCN dairy farms are either actual specialist dairy farms in the country concerned or synthetic representative specialist farms constructed by dairy experts. The IFCN is relatively new and the methodological approach is still under development. Therefore, it is probably more useful to view IFCN comparisons as indicative of rather than as an absolute statement on the competitive position of a country's dairy sector. Keeping this in mind, we present comparative results for some important measures of financial and economic performance for the years 2004-2008 (actual data) and estimates for the years 2009 and 2010.

5.2 Global Dairy Sector Country Summaries

Before a detailed consideration of competitiveness based on the IFCN data is presented we begin with a summary of the dairy sectors in the non EU15 countries covered in this section. The key countries for comparison outside of the EU15 were decided upon in consultation with the advisory group. These countries were selected based on expert judgement as to the regions which would play an important role in future trade of global dairy commodities. Based on this assessment the countries chosen were: Poland, the US, Argentina, New Zealand and Australia.[7]

Poland

Poland has a population of 38 million and is responsible for about 2 percent of global milk production. Poland's GNI per capita is about $12,500. Agriculture (value added) accounts for about 4% of GDP and milk output is the largest sub-sector in terms of value of agricultural output at about 30%, ahead of pigmeat. Summary statistics for the Polish dairy sector are provided in Table 5.1.

Table 5-1: Summary Statistics for the Polish Dairy Sector

Poland: Dairy Industry	Summary Statistics
	2009/10
No. Dairy Cows '000 head	2,678
Milk Production '000 tonnes	12,447
Self Sufficiency %	124
Exports as % Total Production (approx)	26
Exports Butter and Butteroil '000 tonnes	18
Exports Cheese '000 tonnes	143
Exports WMP '000 tonnes	20
Exports SMP '000 tonnes	81

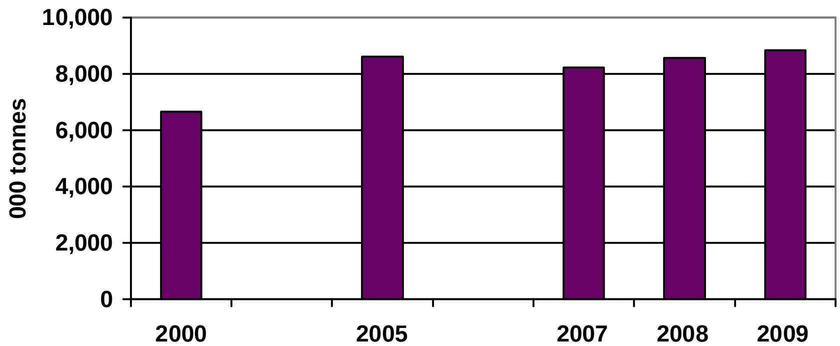
Polish milk deliveries increased significantly in the run up to EU accession in 2004 and have continued to increase at a modest rate as a greater share of total production enters the formal processing chain. While Polish milk production is about 12 million tonnes, deliveries to dairies amount to approximately 8.75 million tonnes.

This has been fairly stable since EU membership and the application of the milk quota system. Poland has a high level of per capita domestic dairy product consumption and, with a substantial domestic market, trade is secondary to home consumption. Nevertheless exports

[7] Additional country summaries which were considered important from a global production perspective (and not a global trade perspective) are provided in Appendix D.

can be as much as 25 percent of domestic production in some years, with imports accounting for 10 percent of domestic consumption. Polish milk deliveries for selected years over the last decade are shown in Figure 5.1.

Figure 5-1: Poland Milk Deliveries



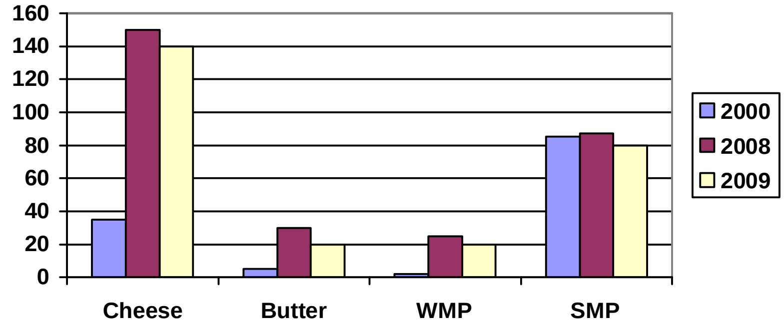
Source: IDF 2010

Significant change in herd composition is taking place and the number of producers has halved since 2004 to about half a million. It is estimated that a core of about 200,000 active dairy producers exists (IDF 2010). The average herd size is small in comparison with the EU15.

In the presence of a milk quota Poland has a relatively stable exportable dairy surplus, as domestic consumption in dairy products is static. There is some expectation that this export capacity could grow once the milk quota is eliminated. While Poland does have favourable agronomic conditions, it is also the case that is has a very large number of small farms and there are also competing farm enterprises, such as cereals, which may in some cases be better placed for development and expansion than the dairy sector. Arguably the development of dairy farming in Poland since EU accession has not been as impressive as might have considered possible in advance of Polish accession.

While Polish exports of butter are comparatively low relative in world trade terms, exports of cheese and SMP in particular are usually quite substantial. Polish dairy export volumes are summarised in Figure 5.2.

Figure 5-2: Poland Dairy exports



Source: IDF 2010

USA

The USA with a wealthy growing population of about 310 million and a GNI per capita of €46,500, is a very large consumer and producer of milk and dairy products. Agriculture in the USA now constitutes only about 1 percent of GDP and milk output has been about equal with cattle as the largest component of agricultural output in value terms, competing also with maize, chicken and soya which constitute the "big five". Summary statistics for the US dairy sector are provided in Table 5.2.

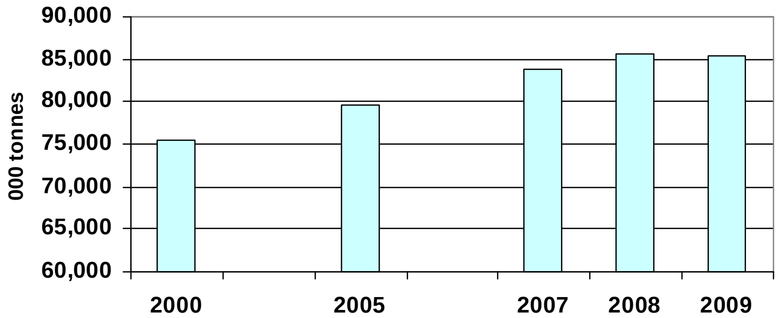
Table 5-2: Summary Statistics for the US Dairy Sector

USA: Dairy Industry	Summary Statistics
	2009/10
No. Dairy Cows '000 head	9,200
Milk Production '000 tonnes	85,874
Self Sufficiency %	102
Exports as % Total Production (approx)	5
Exports Butter and Butteroil '000 tonnes	22
Exports Cheese '000 tonnes	106
Exports WMP '000 tonnes	23
Exports SMP '000 tonnes	249

The US is responsible for almost 15 percent of global milk production. The cow population numbers more than 9 million and milk yields are among the highest in the world. As a vast country, dairy production in the US takes place under a variety of different conditions, ranging from modest scale family owned grassland based production to enormous highly intensive confinement operations heavily reliant on low cost immigrant labour. The major growth area in US milk production over the last 20 years has been in the large scale confinement operations, of over 2,000 cows per farm (USDA 2010). Milk production has shown a tendency in recent years to grow at a rate slightly higher than consumption, and this has increased US export capacity in dairy products, notably in the case of SMP which reached

250,000 tonnes in 2009 (USDA 2010). US milk deliveries for selected years over the last decade are shown in Figure 5.3.

Figure 5-3: US Milk Deliveries

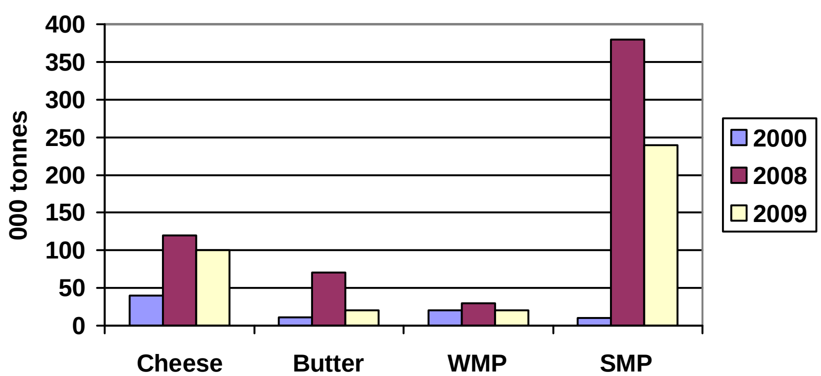


Source: IDF 2010

The US in recent years has become an extremely important dairy trade competitor, now competing with Australia as the world's third largest exporter behind New Zealand and the EU. Milk production in the US has exhibited a long term gradual growth pattern, rising from about 76 million tonnes in 2000 to about 86 million tonnes in 2009.

While US exports of butter tend to be comparatively low, exports of milk powder, SMP particularly, and cheese to some extent also, are particularly strong. US dairy export volumes are summarised in Figure 5.4.

Figure 5-4: US Dairy exports



Source: IDF 2010

New Zealand

New Zealand has a population of about 4.3 million with a GNI per capita of about $27,000. Agriculture (value added) accounts for about 6 percent of GDP and milk output is dominant, with milk alone accounting for about 40 percent of agricultural output, far ahead of cattle and sheep, each of which account for between 12 to 13 percent. Summary statistics for the New Zealand dairy sector are provided in Table 5.3.

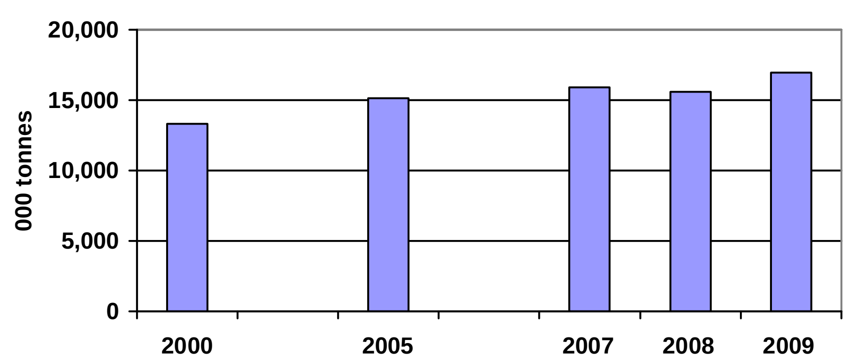
Table 5-3: Summary Statistics for the New Zealand Dairy Sector

New Zealand: Dairy Industry	Summary Statistics
	2009/10
No. Dairy Cows '000 head	4,597
Milk Production '000 tonnes	16,955
Self Sufficiency %	
Exports as % Total Production (approx)	> 90
Exports Butter and Butteroil '000 tonnes	451
Exports Cheese '000 tonnes	290
Exports WMP '000 tonnes	811
Exports SMP '000 tonnes	408

New Zealand produces almost 3 percent of world milk production. With its small home population and very large and growing dairy industry, dairy exports account for well over 90 percent of total production. NZ now accounts for about 40 percent of world dairy trade (USDA 2010). Its exports are very strong across the full range of dairy commodities, with New Zealand being particularly strong in WMP. China is now the main export destination for NZ WMP exports.

NZ milk production grew at a rate of about 3 percent per annum over the period 2000 to 2009, reaching close to 17 million. New Zealand milk deliveries for selected years over the last decade are shown in Figure 5.5.

Figure 5-5: New Zealand Milk Deliveries

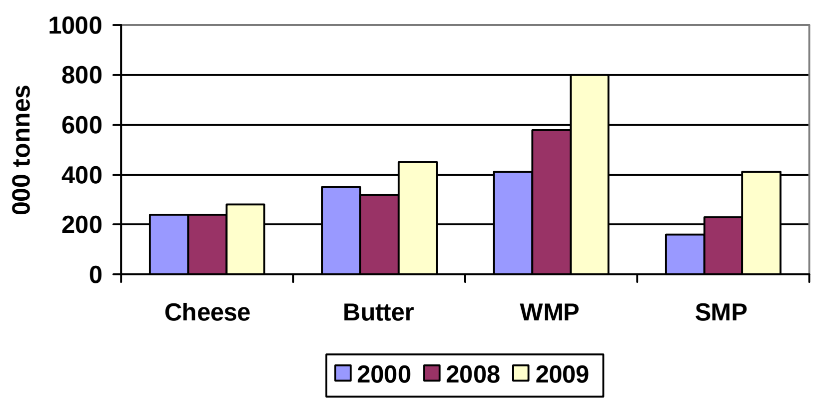


Source: IDF 2010

Herd sizes in NZ are extremely large by EU standards. While there is considerable regional variation, the average herd size in NZ has risen rapidly to about 350 cows per farm. The main production systems are family farm operations of between 300 to 400 cows. Larger scale farms with anything from 500 to 1,000 or more cows, which rely on hired labour, are becoming more common.

New Zealand's main dairy exports are bulk commodity dairy products in the form of butter and milk powders. Similar to Ireland, the system of milk production is grass based. Milk yields are low by the standards of the developed world, but this is a function of the low level of purchased inputs that are used which give NZ the lowest dairy production costs of any major exporting nation. New Zealand dairy export volumes are summarised in Figure 5.6.

Figure 5-6: New Zealand Dairy exports



Source: IDF 2010

Argentina

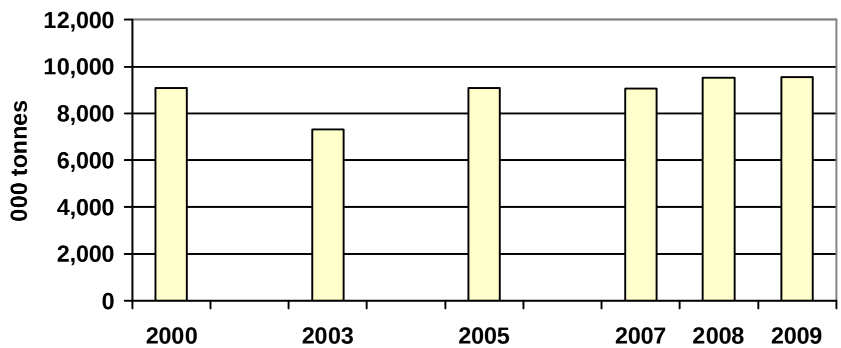
Argentina has a population of about 40 million and GNI per capita of about $7,500. Agriculture (value added) accounts for about 6% of GDP and milk ranks third in terms of value of agricultural output, being about one-third that of soya and half that of cattle. Summary statistics for the Argentinean dairy sector are provided in Table 5.4.

Table 5-4: Summary Statistics for the Argentinean Dairy Sector

Argentina: Dairy Industry	Summary Statistics
	2009/10
No. Dairy Cows '000 head	2,100
Milk Production '000 tonnes	10,340
Self Sufficiency %	127
Exports as % Total Production (approx)	22
Exports Butter and Butteroil '000 tonnes	17
Exports Cheese '000 tonnes	48
Exports WMP '000 tonnes	154
Exports SMP '000 tonnes	13

Argentina produces a little under 2 percent of world milk production. Its dairy industry has come through a difficult period which included a sharp contraction in the early years of the last decade. Milk production has fluctuated greatly over the last two decades, achieving strong growth of about 6% per annum during the 1990's, declining dramatically by 25% during the 2000-2004 crisis period and recovering gradually over the last few years to get back to about the level at the beginning of the last decade. Significant farm consolidation has taken place with the number of dairy farms continuing to contract at a rate of close to 5 percent a year (IDF, 2010). Argentinean milk deliveries for selected years over the last decade are shown in Figure 5.7.

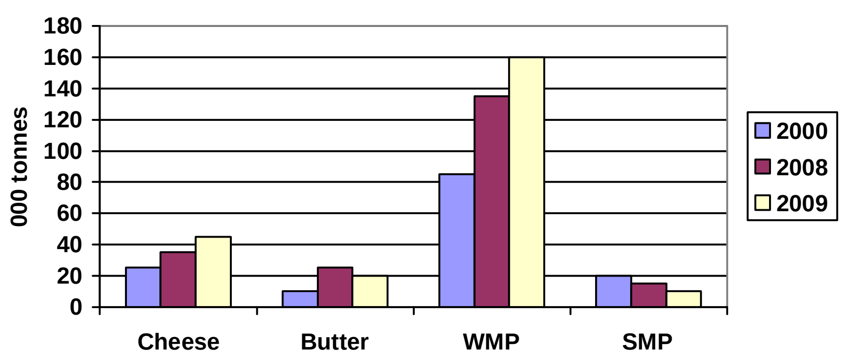
Figure 5-7: Argentina Milk Deliveries



Source: IDF 2010

Argentina's dairy exports continue to grow as production is increasing at a faster rate than domestic consumption. With a fairly large domestic population relative to the size of the industry, there has been only about a 25 percent surplus for export to date, with WMP in particular being the dominant export product, with exports growing from about 90,000 to 150,000 tonnes per annum over the period 2000 to 2009 and are projected to reach 200,000 tonnes by 2011. Cheese exports grew from about 25,000 to 50,000 tonnes over the last decade. Argentinean dairy export volumes are summarised in Figure 5.8.

Figure 5-8: Argentina Dairy Exports



Source: IDF 2010

While Argentina is often considered to have great potential for dairying, policy constraints such as export taxes and in particular competition with other farm enterprises including cattle and especially soya, has limited milk production and export growth to date.

Australia

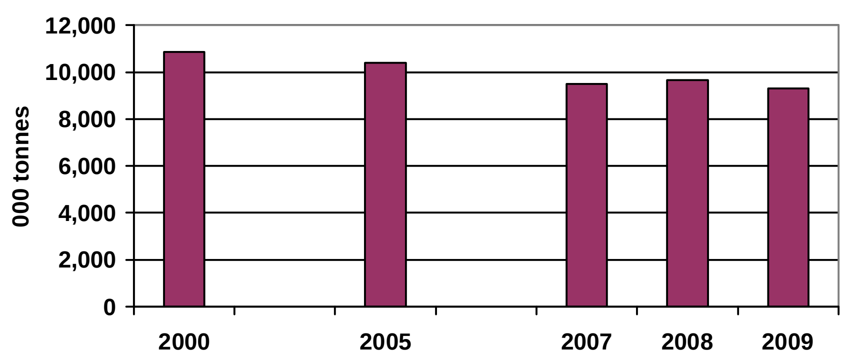
Australia has a population of about 22 million with a steadily growing domestic economy and GNI per capita of about $44,000. Agriculture (value added) accounts for about 3% of GDP and milk ranks third in terms of agricultural output value, behind cattle and wheat. Summary statistics for the Australian dairy sector are provided in Table 5.5.

Table 5-5: Summary Statistics for the Australian Dairy Sector

Australia: Dairy Industry	Summary Statistics
	2009/10
No. Dairy Cows '000 head	1,650
Milk Production '000 tonnes	9,294
Self Sufficiency %	159
Exports as % Total Production (approx)	46
Exports Butter and Butteroil '000 tonnes	69
Exports Cheese '000 tonnes	168
Exports WMP '000 tonnes	117
Exports SMP '000 tonnes	137

Historically, Australia has been an extremely important dairy trade competitor, usually competing with the USA as the world's third exporter behind New Zealand and the EU. Milk production in Australia at about 9.5 million tonnes over the last few years has been declining from the early years of the last decade when it peaked at about 11.5 million tonnes. This decline is due to, among other things, some very severe weather related episodes, especially drought conditions. Australian milk deliveries for selected years over the last decade are shown in Figure 5.9.

Figure 5-9: Australia Milk Deliveries



Source: IDF 2010

Dairy exports account for about 45 percent of total production. While Australian exports of butter are comparatively low, exports of cheese, WMP and SMP are considerable. While future market prospects for increased exports are favourable, especially in Asia, increased dairy product exports will depend crucially on more favourable weather conditions than have been experienced over the past decade.

5.3 IFCN Based Analysis[8]

Like FADN, IFCN distinguishes cash costs from imputed costs. However, IFCN is a less sophisticated data source

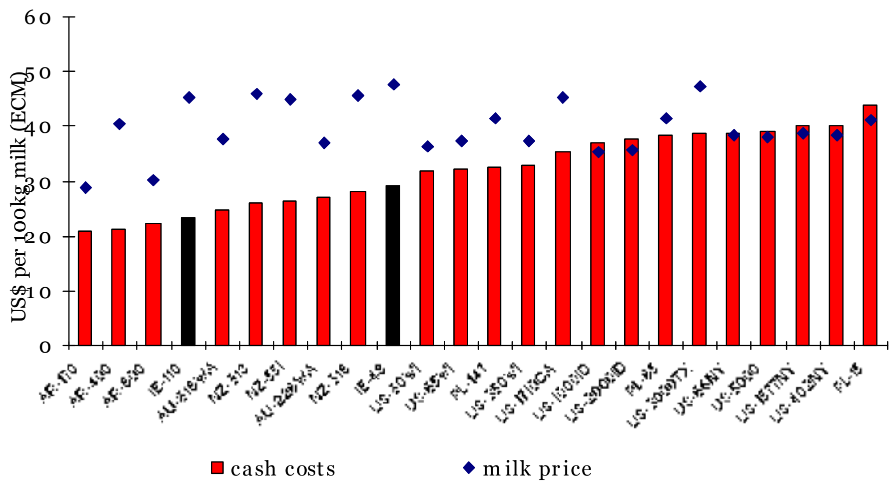
The comparisons based on the IFCN data are presented on a 'two-tiered' basis (i) cash costs and (ii) economic costs compared to milk price received. The comparisons include results from typical Irish specialist dairy farms of 'average' and 'larger' sizes shown along with results from typical dairy farms in other dairy producing countries considered important for future international dairy trade. Actual data from the IFCN were available for the years 2004 – 2008 for most countries examined. The authors own estimates were used to update the data to reflect input and output price movements for 2009 and 2010.[9] The most recent three year average for 2008-2010 is presented below and data for earlier years are presented in Appendix E to illustrate the consistency of results over time. The US dollar was chosen as the common currency measure for all countries' results and all the remaining figures in the chapter are measures expressed on US$ per 100kg milk (ECM). [10]

On a cash cost basis Ireland ranks favourably in a global context

In Figure 5-10 the first measure used for comparison is cash costs and milk price per 100kg of milk (average 2008-2010). Included are two representative Irish farms, a 48 cow farm (IE 48) and a 110 cow farm (IE 110). This measure indicates how well placed typical farms would be if prices or costs moved adversely relative to each other, especially in the short to medium term. This measure shows that the typical Irish dairy farm appears to have a relatively good position compared to most other dairy countries examined in the analysis with only New Zealand and the larger size farms in Argentina showing comparable profit margin levels (i.e. margin over cash costs). The typical US farms in Wisconsin, California and Texas and the larger size typical farm in Poland were in intermediate positions in terms of margin over cash costs. But the results from typical farms in Idaho and the North East of the US and the small family run farm in Poland were reported to having significantly higher cash costs per kg of milk than farms in competing countries. This meant that for the years 2008-2010 the aforementioned typical farms struggled to maintain a positive margin over cash costs. Therefore, those farms would be most vulnerable to a cost/price squeeze.

[8] Actual data for 2008 were available from IFCN and author's own estimates were used for 2009 and 2010.
[9] Based on input and output price indices from various sources
[10] ECM – shows each country's milk price has been standardised for fat and protein.

Figure 5-10: Cash Costs of Milk Production and Milk Price: Ireland v other non-EU countries (2008-2010)



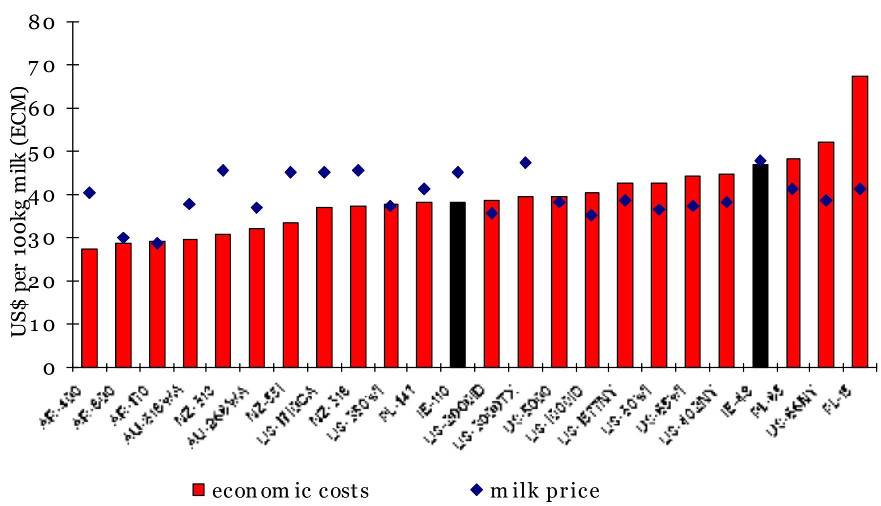
Cash costs on both Irish farms were below the average for the countries considered

Source: IFCN Data (2008) and Authors' Own Estimates (2009 & 2010)

Note: AR – Argentina ,AU – Australia, IE – Ireland, NZ – New Zealand, PL- Poland, WI – Wisconsin, CA – California, ID – Idaho, TX – Texas, NY – New York, WA – Western Australia

The set of comparative results based on IFCN data also includes measures of total cash costs and imputed charges (opportunity costs for own land, labour and other non land capital). The combination of cash costs and opportunity costs for owned factors of production equate to total economic costs of the milk enterprise. Hence the following inter-country comparisons shown in Figure 5-11 provides further evidence as to the relative competitive position of Irish dairying beyond the EU15.

Figure 5-11: Economic Costs of Milk Production & Milk Price: Ireland v other non-EU countries (2008-2010)



On a full economic cost basis the smaller 48 cow Irish farm ranks poorly among the countries considered

Source: IFCN Data (2008) and Authors' Own Estimates (2009 & 2010)

Note: AR – Argentina ,AU – Australia, IE – Ireland, NZ – New Zealand, PL- Poland, WI – Wisconsin, CA – California, ID – Idaho, TX – Texas, NY – New York, WA – Western Australia

On a full economic cost basis the competitive position of Irish farms deteriorates, but the larger Irish 110 cow farm still ranks well

Figure 5-11 shows that Ireland's comparative position deteriorated very substantially when total economic costs were compared outside of the Eu15.

The average size Irish dairy farm (IE-48) had one of the highest total economic costs per kg of milk for the years 2008-2010, with only the average and small typical farms in Poland and the small typical farm in the North East US experiencing higher per unit total economic costs. However the larger size typical Irish dairy farm (IE-110) did exhibit somewhat lower total economic costs than the average size Irish farm, appearing about mid way in terms of total economic costs amongst the typical farms examined. The lowest per unit total economic costs were shown to be in Argentina Australia and New Zealand for the period 2008-2010.

In terms of margin over total economic costs, the top ranking position goes to typical farms in New Zealand, Argentina, Australia and the US (California and Texas). From an Irish perspective, it is reassuring to note that for the years 2008-2010 the larger size Irish dairy farm also achieved a positive margin over total economic costs, which is noteworthy given that a large proportion of typical farms in the countries examined did not derive a positive margin over total economic costs.

5.4 Conclusions

Globally, the picture is similar to the EU15. High imputed costs in Ireland impact on competitive position

In summary, it appears that for the period 2008-2010, the competitive position for Irish dairy farms outside the EU15 was very positive when cash costs were considered in isolation from imputed charges for owned resources. Based on data from the IFCN, and the authors' own analysis based on input and output price indices, for the regions examined, the larger representative farms in Argentina were the only farms that had higher profit margins than Irish dairy farms. This result is consistent with previous research by Thorne and Fingleton (2006)

However, as the opportunity costs of owned resources are not included in this calculation this indication of future competitiveness can only be considered to be valid in the short to medium term. In the longer term adjustment within the sectors will be a reality. Hence, total economic costs, which include imputed charges for owned resources must be considered to gauge the longer term ability of Irish dairy farmers to compete on a global scale.

When economic costs are considered, the competitive ranking of the Irish dairy sector and of the average size farm in particular, slips relative to the other countries examined. As was similarly concluded in chapter 4, for competitiveness within the EU15, this finding could also be considered as a warning signal for the future competitive performance for the average sized Irish dairy farm in a global environment. .However, based on the analysis in this chapter, the ability of the larger Irish dairy farms to compete in the longer term in a global context was affirmed.

Increasing scale is required to maintain the competitiveness of Irish farms over the medium term

While the larger size Irish dairy farm may not have the lowest economic costs in the world, it must be remembered that '*competitiveness is about survival in the market place and not always about been the best in the world,*' (Boyle, 2002) and (on larger farms) a considerable number of the typical farms examined internationally had economic costs well in excess of the Irish situation. Furthermore, if Irish dairy farming transforms to larger scale production units in a no quota situation and significant scale economies are achieved, the Irish milk sectors competitive position will be strengthened and be better able to cope with a cost/price squeeze in the future.

6 Forward Looking Scenarios

Chapter 4 and Chapter 5 of this study presented both a historical and up to date picture of the competitive position of the Irish dairy sector at farm level versus a range of other countries. Over time the relative competitiveness of countries has changed and it is reasonable to expect that further changes in relative competitiveness could continue to arise into the future. By examining how milk prices and milk production costs might evolve over time under a range of different scenarios, it is possible to assess how competitiveness might change into the future.

Scenarios can be specified to look at the impact which particular events would have on competitiveness. These could include, for example, an increase in the prices of particular cost item such as feed or fertiliser or could be based on a relative improvement in the price received for milk in one country relative to another.

Following discussions with the advisory group a number of scenarios for examination were agreed and the analysis relating to these is summarised below. Given the level of data disaggregation available in the IFCN database, it was not possible to examine the impact of the scenarios for countries outside of the EU15.

6.1 Scenario Descriptions

Fertiliser Price Scenario:

Given that volatility in fertiliser prices has significantly affected costs of production on Irish dairy farms in recent years, it was considered important to examine the impact of a shift in fertiliser price in Ireland as well as in competing countries. The fertiliser price scenarios agreed upon were a 50 percent increase and a 50 percent decrease in fertiliser prices over the 2008-2010 average price level. The results of these scenarios were not very dramatic, with the competitive position of Irish average and larger size dairy farms not altering very significantly from the baseline results presented in chapter 4. For this reason the results are not presented in the text of this chapter, but are included in Appendix G.

Feed Price Scenario:

Initial discussions with the advisory group suggested it would be appropriate to examine a scenario that involved (i) a 50 percent feed price increase relative to the average feed price of 2008-2010 and (ii) a 50 percent feed price reduction relative to the average feed price of 2008-2010. However, there were some reservations about the extent of the price variability that would be involved in these scenarios. Examination of the historical feed price data suggested that this price variation might be too extreme. This is because feed price variability has not been as high as farm gate cereal prices variability in the past five years, partly due to substitution of a greater share of cheaper inputs when cereal costs rise, but also due to the fact that in addition to raw materials, there are other costs associated with the production of feed, such as transport costs, compounding and sales margins. These factors mean that feed prices don not vary by as much as the raw feed material prices.

To investigate this issue further historical farm gate cereal price variability and feed input price variability over the past decade was empirically examined. This analysis showed that the variability in farm gate cereal prices was indeed much larger than the variability in feed input prices for livestock farms. The measure of variability used in this exercise was the well established co-efficient of variation (the standard deviation of a series divided by its mean value) and the results showed that for the period 2000 – 2010, the co-efficient of variation for the CSO dairy meal series (16-18% protein) was 13, and for the CSO rolled barley series the co-efficient of variation was 16.[11] However, the coefficient of variation for farm gate barley prices was 27.[12] This analysis indicates that the price of feed ingredients on dairy farms did not shift to the same extent as farm gate cereal prices. In line with the historic variability over the period 2008-2010, a feed price scenario involving a 25 percent feed price variation above and below the average feed prices paid in 2008-2010 period was determined as appropriate. No consequent change in volume used was assumed.

Milk Price Scenario:

The basis for conducting a producer milk price shock scenario is a sudden surplus or shortage of dairy products on the world market. As mentioned in chapter 2, only about 7 percent of world milk production is traded in the form of dairy products. In the absence of market management tools such as public stock holding, small changes in global dairy product production or consumption can yield large changes in the volume of product available for global trade and substantial price variations result.

This has been the pattern in world and EU dairy prices since 2006.

The extent of the volatility in milk price within the EU has not been consistent across EU MS in the past five years. The extent of MS producer milk price variability is related to the product mix and degree of export orientation of different countries. For example, Irish milk prices have been strongly influenced by both positive and negative global milk price shocks in the last five years, given the commodity nature of Irish milk products and the dependence on export markets. Producer milk prices in some other EU countries are not as strongly influenced by trends in global dairy commodity prices, since a much greater share of their milk production is absorbed by higher value added products for the home market.

[11] The coefficient of variation is useful because the standard deviation of data must always be understood in the context of the mean of the data.

[12] Feed price data was based on input price data collected by the CSO. Farm gate cereal price data were based on a data series collected by the Agricultural Economics Department, Teagasc

To investigate producer milk price volatility within the EU in particular, an empirical analysis of monthly milk prices (€ per 100kg) from 2001 – 2010, based on DG Agri milk price statistics was conducted. This analysis found distinct producer milk price volatility groupings within the EU countries examined, a result which is consistent with previous price volatility research, Curran (2010). While the co-efficient of variation was the highest in Ireland among the countries examined, it was not markedly higher than some of the other countries (such as Belgium, the Netherlands, and Germany), for which statistical analysis also indicated high milk price variability.

Based on this analysis it was decided to apply different producer milk price shocks to two distinct EU MS groups:

- Group 1: Ireland, Belgium, Germany and the Netherlands, which we will call 'more volatile' and
- Group 2: The remaining countries, Denmark, France, Italy and the UK, which we call 'less volatile'.

The two distinct scenarios examined were as follows: in the first scenario a shortage of dairy products emerges on the world market and the milk price is assumed to increase by 20 percent for the 'more volatile' group and by 10 percent for the 'less volatile' group. The second scenario assumes a surplus of dairy products on the world market and a 20 percent drop in milk prices occurs for the 'more volatile' group, while a 10 percent milk price drop occurs for the 'less volatile' group. The magnitude of the assumed price increase and decrease is in the range of historic data variability over the average 2008-2010 price. The results of this milk price scenario are presented in Section 6.2.

Breakeven Sensitivity Analysis

In addition to the scenario analysis, a sensitivity analysis was also conducted to examine the magnitude of the milk price change which would need to arise so that the average and larger size dairy farms in the individual countries failed to cover their cash costs. This would highlight the output price point at which a serious viability issue arises, other things being equal. The results of this scenario are presented in Section 6.2.

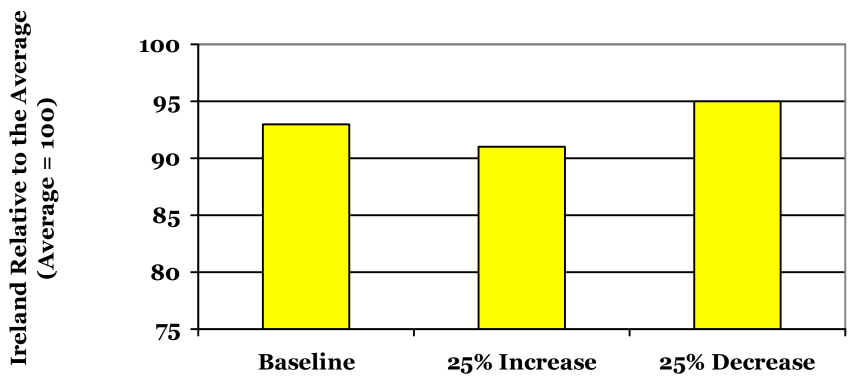
6.2 Scenario Results

Feed Price Scenario Results

Figure 6.1 shows the impact of a 25 percent increase and 25 percent decrease in concentrate feed prices relative to the average feed prices paid in the 2008-2010 period. These two scenarios are compared to the baseline position for Ireland for 2008-2010.

The average cash costs as a percent of output for all EU15 countries examined is set at 100 in Figure 6.1 for the baseline and the two scenarios examined. Hence any figure below 100 represents a competitive advantage in cash cost terms for Ireland. The baseline represents the position of the average size Irish dairy farm relative to the average of all EU15 countries examined in 2008-2010 (as outlined in chapter 4), where cash costs in Ireland were found to be 7 percent below the average.

Figure 6-1: Cash Costs as % of Output: Ireland v other EU15 countries: Feed Price Increase/Decrease Scenario



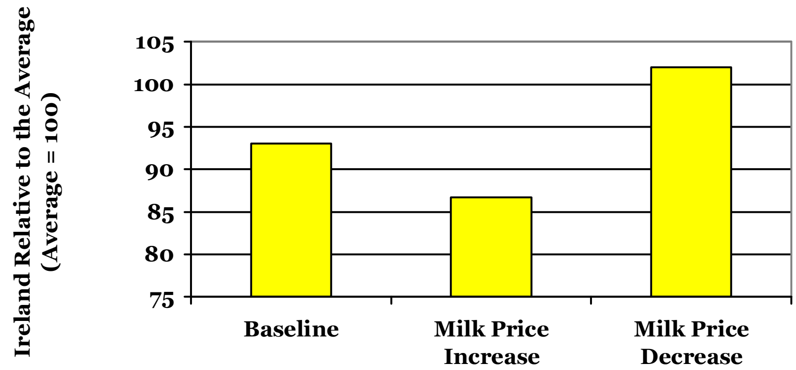
The results of the concentrate price increase and decrease scenarios are in line with a priori assumptions. An increase in concentrate feed price affects the non-grass based systems more than the grass based systems. Hence, the result of the feed price increase scenario indicates that in a situation where concentrate feed prices increase by 25% the competitive position of the average size Irish dairy farm increases by 2 percent relative to the average, i.e. cash costs as a percent of output in Ireland were 9 percent below the average. .The opposite is the case in a concentrate feed decrease scenario, i.e. Irish farms do not benefit from the price decrease to the same extent. Hence the competitive position of Irish dairy farms deteriorates relative to the average, with cash costs as a percent of output only 5 percent below the average of all countries examined.

Milk Price Scenario Results

Figure 6.2 below shows the impact on the average size Irish dairy farm relative to the EU-15 countries examined of (i) the milk price increase scenario and (ii) the milk price decrease scenario, specified in section 6.1 both relative to the baseline position for the period 2008-2010.

As was the case in Figure 6.1, in Figure 6.2 a value below 100 should be interpreted as indicating that Ireland has as a competitive advantage in cash cost terms for Ireland. The baseline represents the position of the average size Irish dairy farm relative to the average of all EU15 countries examined in 2008-2010 (as outlined in chapter 4), whereby cash costs in Ireland were 7 percent below the average.

Figure 6-2: Cash Costs as % of Output: Ireland v other EU15 countries: Milk Price Increase/Decrease Scenario



A 20 percent increase in milk price in Ireland, Belgium, Germany and the Netherlands, relative to only a 10 percent increase in milk price in Denmark, France, Italy and the UK, results in an improvement in competitive position for the average size Irish dairy farm. Figure 6.2 shows that a milk price increase scenario results in Irish farms having cash costs (as a percent of output) which are 13 percent below the average of all countries examined, a very positive movement from the baseline of 7 percent. The opposite is the result in the price decrease scenario, with Irish farms now exceeding the average cash costs of the countries examined by 2 percent.

Breakeven Sensitivity Analysis

The results of the sensitivity analysis on the extent to which milk prices would need to decrease in the individual countries, for cash costs to exceed output were in line with a priori assumptions.

The analysis showed that due to Ireland's position as low cash cost producer, the milk price decrease that would need to occur before cash costs would be in excess of dairy output was quite high compared to some of the competing countries. Countries such as Denmark and Germany would experience a cost/price squeeze much earlier in a decreasing milk price scenario than a low cash cost producer such as Ireland. Italy and Belgium would need to experience the largest milk price drop in order for cash costs to exceed dairy output.

Results from the sensitivity analysis are presented in Appendix G 2.

6.3 Conclusions

It is clear from the scenarios examined in this chapter that a large shift in milk prices would have a significant effect on the competitive position of Irish dairy farms. In line with historic variability in milk price over the past 5 years, a sustained decrease in milk price in the order of 20 percent in Ireland would result in Irish dairy farms struggling to compete within the EU even on a cash cost basis. However a sustained increase in milk prices would place Irish dairy farms in a highly competitive position.

The results of the other two scenarios on fertiliser price and concentrate feed price did not have a very significant impact on the competitive position of Irish dairy farms. In line with observed variability in these key inputs over the past 5 years, a decrease or increase in fertiliser or feed price in isolation from other price changes, would not alter the competitive position of Irish dairy farms very significantly.

Finally the breakeven sensitivity analysis showed that, due to Ireland's superior performance in terms of being a low cash cost producer, the level to which milk price would need to decrease before cash costs would be in excess of dairy output was quite high compared to some of the competing countries.

7 Caveats and Conclusions

In the context of assessing how competitiveness of the Irish dairy sector at farm level might change in the future, there are very many issues which could each individually merit a separate study. While it has not been possible to give these issues detailed consideration in this report, it is important that they are recalled when assessing the competitive position of the sector. In this chapter issues which are likely to affect the sector's future competitiveness are explored. The chapter concludes with some conclusions on the report's findings.

7.1 Caveats

Milk Quota Removal

The removal of the milk quota is expected to present new opportunities for expansion of the dairy sector in Ireland at farm level and for the dairy sector in aggregate. At the farm level and at the processing level this may present opportunities to increase scale and exploit cost efficiencies.

Studies such as Binfield et al., (2008) and Bouamra-Mechemache et al., (2008) have concluded that expansion in production is less likely to occur elsewhere in the EU following quota elimination, so it is conceivable that milk quota removal could allow scale economies to be exploited and thereby improve the competitive position of the dairy sector in Ireland relative to competitors elsewhere in the EU.

However, the removal of milk quotas does not mean that the sector in Ireland will not face other constraints. A particular concern is the high proportion of greenhouse gas (GHG) emissions in Ireland that come from agriculture including those from dairy production, which, dependent on political decision making, could represent a greater constraint on agriculture in Ireland than in EU MS where agriculture's share of GHG emissions is smaller.

CAP 2013 Reform

While no decisions have been taken in respect of the CAP reform in 2013, the outcome could see a change in the total budget for the SFP and may include a move away from the historical payments system towards a flatter payments system. This would involve a redistribution of the SFP between farms. While the SFP is categorised as a decoupled payment it may affect producers' attitudes to risk, their production decisions and the volatility of their farm income. At this point it is not possible to draw any firm conclusions as to the impact of potential changes to the SFP would have on the competitive position of the dairy sector in Ireland relative to competitor EU MS.

WTO and Bilateral Trade Agreements

Progress in the WTO negotiations has been very slow in recent years. However, this does not mean that negotiations aimed at liberalising trade have been abandoned. Lack of progress through the WTO mechanism has seen an increase in bilateral negotiations concerning trade. In the context of the next 5 to 10 years it is not possible to rule out reductions in trade barrier between the EU and third countries which could expose the EU dairy sector to greater competition on its home markets.

The Irish dairy sector is highly exported focused. In some product areas this export focus places the Irish dairy sector in the position of being a residual supplier to deficit markets. These characteristics distinguish the Irish dairy sector from some of our competitors in the EU who are much less reliant on export markets.

Increased Irish milk production would mean that given the mature character of the Irish market for dairy products, the export orientation of the Irish dairy sector would further increase. In such circumstances, trade agreements could have a negative impact on Irish dairy product markets and Irish producer milk prices, with adverse consequences for the competitive position of the Irish dairy sector relative to competitors in the EU.

Biofuels

The growing requirement to use renewable energy sources in the EU will generate an increased demand for biofuels in this decade. This will increase competition for crops as an energy feedstock rather than as an animal feed. The result may be a permanent increase in feed prices and a relative increase in the prices of animal feed relative to grass. The dairy sector in Ireland may be better placed than many competitor countries to deal with such an increase in feed prices, given that the dairy system in Ireland is mainly pasture based. The Irish dairy sector would be relatively insulated from the impact of rising feed prices. Such a development would have a positive impact on the competitiveness of the Irish dairy sector relative to countries where feed intensive confinement systems are the norm.

7.2 Conclusions

The results of this study indicate that over the last 15 years the competitive position of the Irish dairy sector in a EU15 context has relatively unchanged. On a cash cost basis the sector compares favourably with its main competitors in the EU. However, consideration of imputed costs allow for an evaluation of competitiveness based on total economic costs. In this context the Irish dairy sector would appears to be at about the average among the competitor EU15 MS dairy sectors examined.

While the Irish dairy sector has low cash costs of production, it is also characterised by relatively low productivity in terms of labour, milk yields and constituents. Land costs, as measured by land rental values are high in Ireland and are a key reason why the competitive position of the Irish dairy sector is less favourable on a total economic cost basis.

Taking Eastern Europe and countries outside the EU into consideration, the position in relation to cash costs is similar to that witnessed within the EU15, with Ireland appearing as a relatively competitive dairy producer. On a total economic cost basis, the average size Irish dairy farm in contrast had costs well in excess of some of the major dairy exporting regions of the world. However, the relative competitiveness of the larger size Irish dairy farm was more positive on a total economic cost basis. While the larger size Irish dairy farm may not have the lowest economic costs in the world, a considerable proportion of the typical farms examined internationally had economic costs well in excess of the Irish farms examined.

In conclusion, as Irish dairy farming transforms to larger scale production in a no quota situation, the competitive position of Irish dairy farms will be strengthened and better able to cope with a cost/price squeeze in the future.

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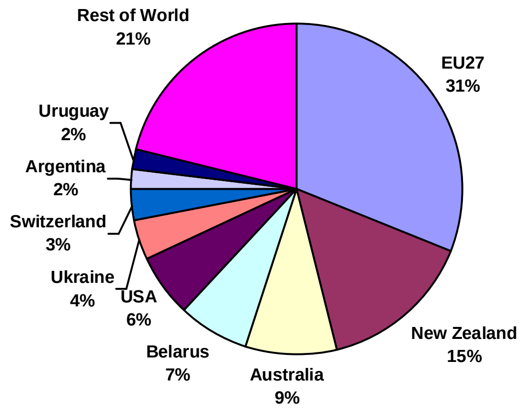
Appendices

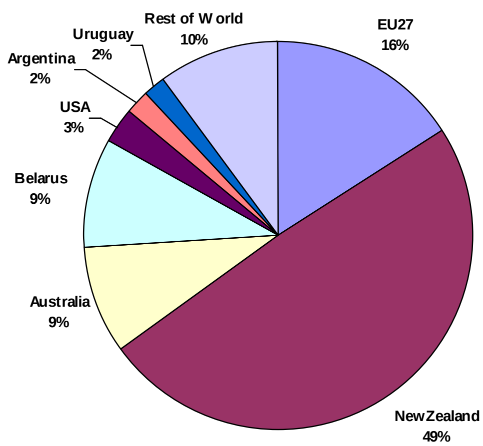
Appendix A: Major World Dairy Exports by Product

Figure A 1: Composition of World Cheese Exports 2009



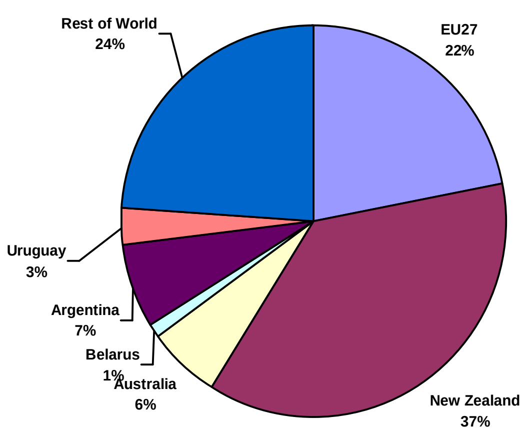
Source: IDF 2010

Figure A 2: Composition of World Butter and Butteroil Exports 2009



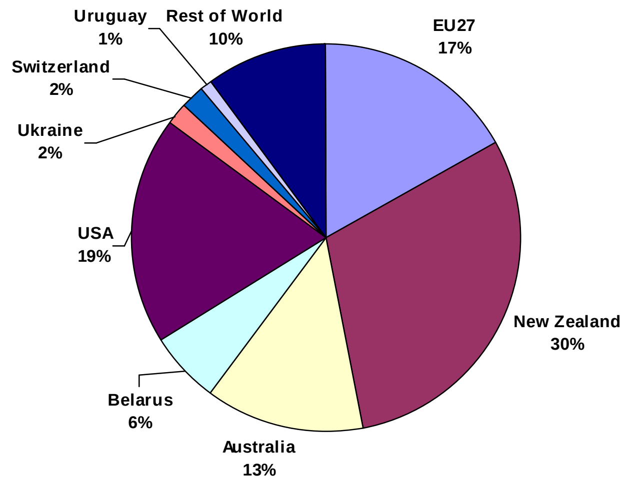
Source: IDF 2010

Figure A 3: Composition of World WMP Exports 2009



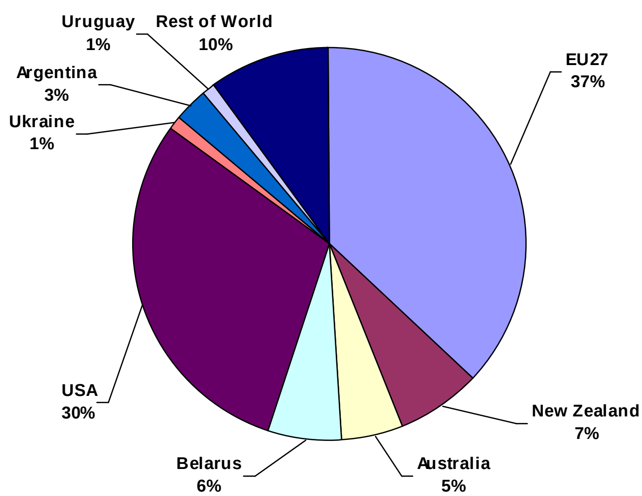
Source: IDF 2010

Figure A 4: Composition of World SMP Exports 2009



Source: IDF 2010

Figure A 5: Composition of World Whey and Whey Products Exports 2009



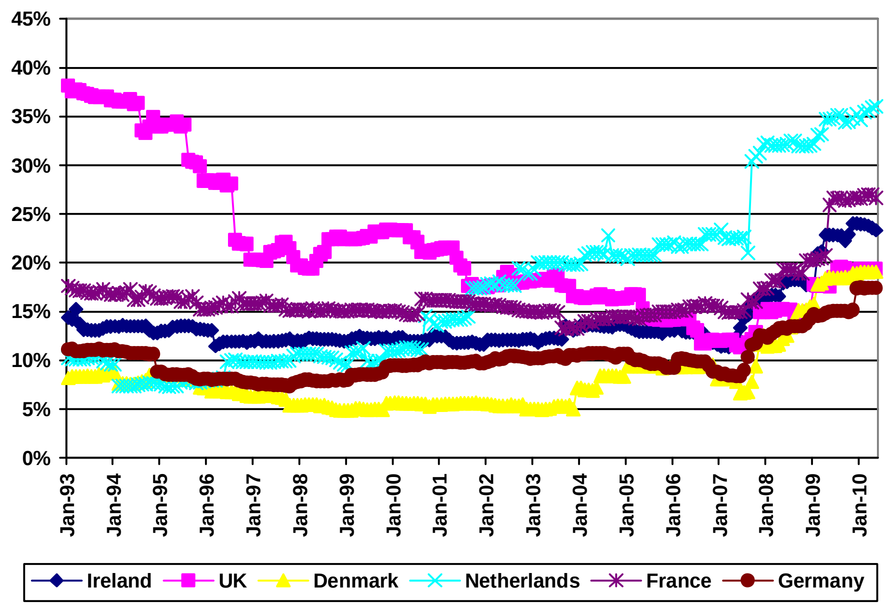
Source: IDF 2010

Appendix B: Volatility

Farm Milk Price Volatility – Ireland/EU comparison

It is often hypothesised that farm milk price volatility is higher in Ireland than other EU competitors, given that the Irish dairy industry is more dependent on dairy commodities relative to comparatively stable consumer product markets than other EU competitors, and also the Irish industry is much more exposed to more volatile 3rd country markets. Preliminary results from a comparison with some leading competitors (Curran 2010) show however that over the past 20 years Irish farm milk price volatility is not exceptional in EU terms (Figure B1). Further research on this topic, including differences in seasonality and incentives to mitigate seasonal variation, is desirable.

Figure B 1: Farm Milk Price Volatility in Selected EU MS



Source: Eurostat

Causes of Price Volatility

The extent, causes and implications of price volatility have been discussed in many domestic and international papers in recent years, O'Connor (2011), Matthews (2010), REAS (2010), DEFRA (2010), World Bank (2009), OECD (2008), FAO (2006). Three fundamental causes have been identified, economic fundamentals (demand and supply), policy change and the involvement of speculators in international commodity markets. Food commodity markets in particular are very vulnerable to extreme volatility due to the combination of the characteristics of demand (inelastic in economic theory terms) and the uncertainty of production due to changing natural phenomena, weather, disease etc. Changes in world economic growth, in particular in some leading food trading countries, can have a powerful effect on all markets. Thus there is the phenomenon of all commodity prices shifting together in a broadly similar pattern, as explained for example in Cevic (2011). Regarding dairying, this has the immediate effect of input cost volatility moving in a similar volatile pattern to output prices, with the volatility in milk prices shown above being matched by broadly concurrent grain price volatility (Thorne 2011). Given Ireland's comparatively unique position of mainly grass/silage dependence, a potential difference exists relative to the EU and some other major competitors in terms of farm margin and income volatility, although the impact of the SFP on income volatility (discussed later in this chapter) also needs to be considered.

Policy change can also lead to much increased price volatility, with the Luxembourg agreement (2003) in particular leaving EU dairy markets much more exposed to extreme price volatility. Finally, market speculation by hedge funds and index traders is also widely identified as a source of extreme price volatility. However, despite a considerable research effort, there is no consensus to date on their effect on food commodity markets.

Consequences of Price Volatility and Methods of Alleviation

While some level of price volatility is desirable in a market economy to reflect shifting preferences of consumers and cost change in the supply chain, extreme volatility has many undesirable consequences for both producers and consumers (O'Connor 2009). Public policy solutions for dairy markets were provided in the past through the extensive policy and budgetary support of the CAP pre Luxembourg agreement. However a return to such support is remote. Nevertheless the importance of finding policy responses to alleviate extreme price volatility is fully recognised at EU level as illustrated in the report of the High Level Group for dairy (HLG 2010) and the subsequent European Commission report "the CAP towards 2020" (ECOMM, 2010).The European Commission proposals on the future of the CAP post 2013 to be launched later this year will undoubtedly address the volatility question among others. With regard to private sector responses to volatility, futures and options markets have been widely available for many food commodities, allowing producers and traders to hedge and lessen their exposure to market risk. While these markets have been widely available for dairy commodities in the US, they are only beginning to develop now in the EU and world (e.g. New Zealand) markets. It remains to be seen if they can provide a useful support for the Irish/EU dairy industries as they seek to cope with the comparatively new phenomenon of extreme price volatility.

Appendix C: Country Specific Data for EU15 Member States

Table C 1: Average fat and protein percentages for selected EU member states

	IE	DE	FR	IT	BE	NE	DK	UK
Average butterfat content of milk								
1996	3.59	4.27	4.11	3.62	4.08	4.43	4.35	4.08
1997	3.61	4.24	4.10	3.66	4.07	4.40	4.36	4.07
1998	3.67	4.25	4.12	3.71	4.11	4.37	4.36	4.07
1999	3.70	4.22	4.08	3.70	4.06	4.34	4.32	4.03
2000	3.70	4.22	4.08	3.65	4.08	4.40	4.28	4.01
2001	3.74	4.23	4.09	3.65	4.10	4.43	4.33	3.99
2002	3.73	4.20	4.08	3.66	4.07	4.43	4.29	3.98
2003	3.73	4.19	4.07	3.67	4.09	4.43	4.29	3.96
2004	3.75	4.22	4.07	3.67	4.14	4.45	4.30	3.99
2005	3.77	4.17	4.06	3.71	4.09	4.40	4.30	4.02
2006	3.75	4.16	4.05	3.69	4.10	4.40	4.30	4.04
2007	3.79	4.16	4.03	3.71	4.07	4.38	4.26	4.05
Average protein content of milk								
1996	3.21	3.42	3.17	3.16	3.43	3.49	3.42	3.29
1997	3.21	3.40	3.24	3.25	3.36	3.46	3.44	3.30
1998	3.24	3.43	3.36	3.24	3.24	3.43	3.43	3.30
1999	3.25	3.42	3.36	3.25	3.26	3.46	3.41	3.30
2000	3.27	3.41	3.35	3.24	3.36	3.47	3.42	3.28
2001	3.28	3.42	3.36	3.27	3.35	3.46	3.41	3.29
2002	3.27	3.42	3.37	3.28	3.32	3.47	3.40	3.30
2003	3.30	3.43	3.38	3.26	3.26	3.48	3.40	3.30
2004	3.30	3.43	3.40	3.29	3.24	3.49	3.43	3.26
2005	3.30	3.42	3.40	3.30	3.17	3.49	3.42	3.27
2006	3.30	3.40	3.39	3.30	3.35	3.49	3.41	3.27
2007	3.32	3.43	3.40	3.31	3.39	3.50	3.42	3.31

Source: The Dairy Council (2001) & Eurostat (2011)

Table C 2: Partial Productivity Indicators for EU Countries (1996-2007)

	1996-1998	1999-2001	2002-2004	2005-2007
Milk yield/cow (kg)				
UK	6095.67	6409.33	6766.22	7039.39
Netherlands	7319.33	7514.33	7422.41	7708.66
Italy	5478.00	5886.67	6155.99	6420.85
Germany	5889.00	6292.67	6641.54	6954.24
France	5494.00	5713.33	5851.31	6055.37
Denmark	6652.33	7040.00	7605.21	8247.07
Ireland	4683.67	5008.33	5211.97	5364.08
Belgium	5658.67	5758.33	6000.23	6311.26
Milk solids/cow (kg)				
UK	549.73	573.30	602.64	630.87
Netherlands	682.54	720.21	716.77	742.60
Italy	377.33	407.36	427.40	449.90
Germany	451.68	480.76	506.76	527.12
France	489.52	518.35	534.59	553.37
Denmark	632.44	665.92	714.73	775.18
Ireland	320.51	349.28	366.25	379.61
Belgium	418.51	426.28	442.41	466.54
Stocking rate (LU/ha)				
UK	2.01	2.03	2.01	2.03
Netherlands	2.50	2.44	2.42	2.37
Italy	2.05	2.38	2.93	2.62
Germany	1.78	1.83	1.86	1.87
France	1.23	1.31	1.32	1.29
Denmark	2.48	2.32	2.28	2.40
Ireland	1.84	1.82	1.87	1.89
Belgium	2.03	2.06	2.03	2.07

Table C2: (Continued)

	1996-1998	1999-2001	2002-2004	2005-2007
Milk Production/ha (kg)				
UK	12201.32	12906.93	13366.82	14143.62
Netherlands	18288.05	18232.65	17630.44	17911.33
Italy	10357.10	12755.60	17142.28	16490.82
Germany	10269.37	11270.01	12047.40	12606.16
France	6648.89	7315.35	7503.09	7605.46
Denmark	15563.82	15073.38	15205.88	18087.49
Ireland	8607.26	9094.45	9724.67	10110.06
Belgium	11461.61	11834.99	12064.14	13064.64
Milk solids/ha (kg)				
UK	1104.56	1166.72	1210.28	1281.67
Netherlands	1708.25	1754.98	1736.67	1756.51
Italy	773.71	971.66	1259.30	1178.99
Germany	804.35	878.98	944.03	984.17
France	601.65	678.79	705.21	714.29
Denmark	1569.70	1546.99	1632.49	1859.82
Ireland	589.66	635.15	685.43	717.73
Belgium	848.23	879.46	896.80	968.19
Milk production/labour unit (tne)				
UK	271.99	321.52	366.06	395.42
Netherlands	311.03	333.01	365.53	400.75
Italy	114.76	143.42	180.44	194.14
Germany	163.72	179.19	214.44	250.00
France	155.29	176.57	182.78	199.20
Denmark	293.56	339.53	411.76	607.22
Ireland	147.11	174.34	200.97	226.06
Belgium	210.56	224.77	233.70	261.71

Table C 3: Costs as a Percentage of Total Output for Specialist Dairy Producers in the EU (2005-2007)

	IE	BE	DK	FR	DE	IT	NE	UK
Specific Costs								
Seeds and Plants	0.3	1.3	1.5	1.7	4.6	0.9	0.9	0.7
Fertilizers	6.3	2.7	1.3	3.8	2.3	0.9	1.9	3.4
Crop Protection	0.2	0.9	0.6	1.0	0.5	0.4	0.5	0.3
Feedstuffs for grazing livestock - non-fodder crops	3.8	2.3	7.2	2.9	3.0	10.7	0.4	1.9
Feedstuffs for grazing livestock - purchased	16.2	12.3	21.6	13.5	14.0	26.4	15.4	21.2
Other livestock specific costs	8.0	5.9	7.8	3.5	6.4	3.4	6.4	9.3
Farming Overheads								
Machinery and Building current costs	6.1	4.7	5.7	6.1	6.6	1.8	6.8	5.5
Energy	3.2	3.6	2.8	4.1	6.2	3.9	3.8	3.9
Contract Work	4.3	4.8	6.6	8.1	4.0	0.7	5.4	4.4
Other direct inputs	1.7	2.0	3.3	11.1	6.7	2.8	6.3	5.5
External Factors								
Wages Paid	3.2	0.3	6.2	1.2	3.0	3.1	1.2	6.8
Rent Paid	2.7	4.3	3.6	5.3	4.8	1.8	4.0	2.7
Interest paid (less subsidies)	2.2	4.5	14.1	2.8	2.6	0.4	10.5	3.5
IMPUTED COSTS								
Fixed Assets								
Buildings	2.6	2.0	6.4	2.3	1.9	2.6	2.5	1.1
Machinery	1.2	1.2	1.6	1.5	1.6	1.3	1.4	1.3
Breeding livestock	2.0	1.6	0.9	1.8	1.3	1.5	1.2	1.9
Working Capital								
Non breeding livestock	0.8	0.6	0.5	0.7	0.6	0.4	0.4	0.5
Agri. Product Stocks	0.2	0.0	0.4	0.1	0.0	0.2	0.0	0.2
Other Circulating capital	0.9	0.1	1.4	1.7	0.9	3.8	2.3	1.0
Family Labour	22.6	23.2	9.5	20.5	17.9	19.2	16.4	13.5
Owned Land	13.0	1.7	13.9	1.2	3.7	1.7	7.5	4.4

Table C 4: Costs as a Percentage of Total Output for Specialist Dairy Producers in the EU (2008-2010)

	Average for the full sample of herds							
	IE	BE	DK	FR	DE	IT	NE	UK
Specific Costs								
Seeds and Plants	0.2	1.4	1.6	1.7	0.9	0.9	0.7	0.5
Fertilizers	7.5	1.9	2.2	5.0	3.7	1.2	2.3	4.8
Crop Protection	0.2	1.0	0.7	0.9	0.6	0.3	0.5	0.3
Feedstuffs for grazing livestock - non-fodder crops	4.1	3.6	10.9	3.1	2.5	11.0	0.4	2.3
Feedstuffs for grazing livestock - purchased	16.4	16.7	21.1	14.7	16.1	26.5	17.5	22.7
Other livestock specific costs	9.4	7.0	8.4	3.6	7.5	3.3	7.3	7.5
Farming Overheads								
Machinery and Building current costs	6.5	2.9	5.4	5.8	7.9	1.9	7.1	6.4
Energy	3.7	4.2	3.6	4.2	7.1	4.2	3.9	3.8
Contract Work	4.8	4.4	6.5	7.9	4.9	0.7	5.7	3.8
Other direct inputs	2.4	2.9	3.0	11.0	7.4	3.0	6.5	4.3
External Factors								
Wages Paid	2.9	0.2	6.5	1.2	3.9	3.4	0.9	4.7
Rent Paid	2.7	4.4	3.9	5.3	4.8	1.9	3.3	2.6
Interest paid (less subsidies)	2.2	5.2	22.7	2.0	2.7	0.5	7.7	1.7
IMPUTED COSTS								
Buildings	2.9	2.8	6.1	1.8	2.2	3.0	1.9	0.7
Machinery	1.4	1.5	2.4	1.2	1.9	1.5	1.0	0.7
Breeding Livestock	2.0	1.9	1.5	1.3	1.5	1.6	0.9	1.1
Working Capital								
Non breeding livestock	0.8	0.7	0.8	0.5	0.7	0.4	0.3	0.3
Agri. Product Stocks	0.2	0.1	0.9	0.1	0.0	0.2	0.0	0.1
Other Circulating capital	0.9	0.2	2.2	1.3	1.2	4.7	1.8	0.6
Family Labour	19.3	31.7	9.1	20.1	19.3	21.1	12.3	9.0
Owned Land	11.9	1.7	13.8	1.1	3.4	1.8	6.1	3.8

Table C4: (Continued)

	Average for herds of 50-99 cows							
	IE	BE	DK	FR	DE	IT	NE	UK
Specific Costs								
Seeds and Plants	0.2	1.3	1.7	1.7	1.0	0.9	0.8	0.4
Fertilizers	7.1	1.9	2.4	4.6	4.0	1.1	2.1	5.3
Crop Protection	0.1	1.0	0.6	1.0	0.7	0.4	0.5	0.2
Feedstuffs for grazing livestock - non-fodder crops	3.7	3.2	14.0	3.5	2.2	10.3	0.4	2.0
Feedstuffs for grazing livestock - purchased	13.4	17.2	19.1	15.0	17.0	26.0	17.2	21.0
Other livestock specific costs	8.1	6.7	7.6	3.5	7.1	2.7	7.2	7.1
Farming Overheads								
Machinery and Building current costs	5.9	2.8	5.6	5.3	7.2	1.8	7.0	6.8
Energy	3.4	4.0	3.6	4.1	6.6	4.2	4.0	4.2
Contract Work	4.8	4.2	7.2	7.8	5.3	0.6	6.1	3.9
Other direct inputs	2.2	2.4	3.4	10.2	6.4	2.4	6.8	5.3
Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
External Factors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wages Paid	2.5	0.2	4.0	1.6	2.2	2.6	0.8	2.7
Rent Paid	2.9	4.1	2.3	5.8	5.7	2.2	3.1	2.6
Interest paid (less subsidies)	2.2	5.3	17.5	2.2	3.0	0.5	7.5	1.7
IMPUTED COSTS								
Fixed Assets								
Buildings	2.8	2.8	6.2	2.0	2.2	2.6	2.0	0.9
Machinery	1.4	1.4	1.8	1.1	2.0	1.4	1.0	0.9
Breeding livestock	1.7	1.8	1.5	1.3	1.4	1.5	0.9	1.1
Working Capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non breeding livestock	0.7	0.6	0.8	0.6	0.7	0.4	0.3	0.4
Agri. Product Stocks	0.2	0.0	0.8	0.1	0.0	0.1	0.0	0.1
Other Circulating capital	0.9	0.1	1.8	1.3	1.1	4.4	1.7	0.6
Family Labour	15.8	17.3	13.1	17.3	12.9	15.4	11.4	12.6
Owned Land	9.8	1.6	10.7	0.4	3.4	1.4	5.7	3.9

Table C 5: Costs per kg milksolids for Specialist Dairy Producers in the EU (2005-2007)

	IE	BE	DK	FR	DE	IT	NE	UK
Specific Costs								
Seeds and Plants	0.01	0.06	0.06	0.08	0.19	0.1	0.0	0.0
Fertilizers	0.26	0.12	0.05	0.17	0.11	0.1	0.1	0.1
Crop Protection	0.01	0.04	0.03	0.04	0.02	0.0	0.0	0.0
Feedstuffs for grazing livestock	0.16	0.1	0.3	0.13	0.13	0.6	0.0	0.1
Feedstuffs for grazing livestock - homer grown	0.67	0.56	0.88	0.59	0.64	1.5	0.7	0.7
Other livestock specific costs	0.33	0.26	0.32	0.16	0.29	0.2	0.3	0.3
Farming Overheads								
Machinery and Building current costs	0.25	0.21	0.24	0.27	0.3	0.1	0.3	0.2
Energy	0.13	0.16	0.12	0.18	0.28	0.2	0.2	0.1
Contract Work	0.18	0.22	0.28	0.36	0.18	0.0	0.2	0.1
Other direct inputs	0.07	0.09	0.14	0.49	0.3	0.2	0.3	0.2
External Factors	0	0	0	0	0			
Wages Paid	0.13	0.01	0.26	0.05	0.14	0.2	0.0	0.2
Rent Paid	0.11	0.19	0.15	0.23	0.21	0.1	0.2	0.1
Interest paid (less subsidies)	0.09	0.2	0.59	0.12	0.11	0.0	0.4	0.1
IMPUTED COSTS								
Fixed Assets								
Buildings	0.11	0.09	0.26	0.1	0.09	0.1	0.1	0.0
Machinery	0.05	0.05	0.07	0.07	0.07	0.1	0.1	0.0
Breeding livestock	0.08	0.07	0.04	0.08	0.06	0.1	0.1	0.1
Working Capital								
Non Breeding livestock	0.03	0.03	0.02	0.03	0.03	0.0	0.0	0.0
Agri. Product Stocks	0.01	0	0.02	0	0	0.0	0.0	0.0
Other Circulating capital	0.04	0.01	0.06	0.07	0.04	0.2	0.1	0.0
Family Labour	0.94	1.05	0.4	0.9	0.8	1.1	0.7	0.4
Owned Land	0.54	0.08	0.57	0.05	0.17	0.1	0.3	0.1

Table C 6: Costs per kg milksolids for Specialist Dairy Producers in the EU (2008-2010)

	Average for the full sample of herds							
	IE	BE	DK	FR	DE	IT	NE	UK
Specific Costs								
Seeds and Plants	0.01	0.05	0.07	0.08	0.04	0.05	0.03	0.02
Fertilizers	0.34	0.08	0.09	0.23	0.16	0.07	0.10	0.20
Crop Protection	0.01	0.04	0.03	0.04	0.03	0.02	0.02	0.01
Feedstuffs for grazing livestock	0.19	0.14	0.47	0.14	0.11	0.63	0.02	0.09
Feedstuffs for grazing livestock - homer grown	0.74	0.66	0.91	0.68	0.72	1.51	0.75	0.93
Other livestock specific costs	0.43	0.27	0.36	0.17	0.33	0.19	0.31	0.31
Farming Overheads	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Machinery and Building current costs	0.29	0.12	0.23	0.26	0.35	0.11	0.30	0.26
Energy	0.17	0.17	0.15	0.20	0.31	0.24	0.16	0.16
Contract Work	0.22	0.18	0.28	0.36	0.22	0.04	0.24	0.16
Other direct inputs	0.11	0.11	0.13	0.50	0.32	0.17	0.27	0.18
External Factors								
Wages Paid	0.13	0.01	0.28	0.05	0.17	0.19	0.04	0.19
Rent Paid	0.12	0.18	0.17	0.24	0.21	0.11	0.14	0.11
Interest paid (less subsidies)	0.10	0.21	0.97	0.09	0.12	0.03	0.33	0.07
IMPUTED COSTS								
Fixed Assets								
Buildings	0.13	0.11	0.26	0.09	0.10	0.17	0.08	0.03
Machinery	0.06	0.06	0.10	0.06	0.09	0.08	0.04	0.03
Breeding livestock	0.09	0.07	0.07	0.06	0.06	0.09	0.04	0.05
Working Capital								
Non Breeding livestock	0.04	0.03	0.03	0.02	0.03	0.02	0.01	0.01
Agri. Product Stocks	0.01	0.00	0.04	0.00	0.00	0.01	0.00	0.00
Other Circulating capital	0.04	0.01	0.10	0.06	0.05	0.27	0.08	0.02
Family Labour	0.87	1.25	0.39	0.92	0.85	1.20	0.51	0.37
Owned Land	0.54	0.07	0.59	0.05	0.15	0.10	0.26	0.16

Table C6: (Continued)

	Average for herds of 50-99 cows							
	IE	BE	DK	FR	DE	IT	NE	UK
Specific Costs								
Seeds and Plants	0.01	0.05	0.07	0.08	0.04	0.05	0.03	0.01
Fertilizers	0.32	0.08	0.10	0.21	0.17	0.06	0.09	0.21
Crop Protection	0.00	0.04	0.02	0.05	0.03	0.02	0.02	0.01
Feedstuffs for grazing livestock	0.17	0.13	0.62	0.16	0.09	0.59	0.02	0.08
Feedstuffs for grazing livestock - homer grown	0.61	0.68	0.84	0.70	0.75	1.48	0.74	0.84
Other livestock specific costs	0.37	0.26	0.33	0.16	0.31	0.15	0.31	0.28
Farming Overheads								
Machinery and Building current costs	0.27	0.11	0.24	0.25	0.31	0.10	0.30	0.27
Energy	0.15	0.16	0.16	0.19	0.29	0.24	0.17	0.17
Contract Work	0.22	0.17	0.31	0.37	0.23	0.04	0.26	0.16
Other direct inputs	0.10	0.10	0.15	0.48	0.28	0.14	0.29	0.21
External Factors								
Wages Paid	0.11	0.01	0.17	0.08	0.10	0.15	0.03	0.11
Rent Paid	0.13	0.16	0.10	0.27	0.25	0.13	0.14	0.11
Interest paid (less subsidies)	0.10	0.21	0.77	0.11	0.13	0.03	0.33	0.07
IMPUTED COSTS								
Fixed Assets								
Buildings	0.13	0.11	0.27	0.10	0.10	0.15	0.09	0.03
Machinery	0.07	0.06	0.08	0.05	0.09	0.08	0.04	0.04
Breeding livestock	0.08	0.07	0.07	0.06	0.06	0.09	0.04	0.05
Working Capital								
Non Breeding livestock	0.03	0.02	0.03	0.03	0.03	0.02	0.01	0.01
Agri. Product Stocks	0.01	0.00	0.04	0.00	0.00	0.01	0.00	0.00
Other Circulating capital	0.04	0.01	0.08	0.06	0.05	0.25	0.07	0.02
Family Labour	0.72	0.68	0.57	0.81	0.56	0.87	0.48	0.51
Owned Land	0.44	0.06	0.47	0.02	0.15	0.08	0.25	0.16

Appendix D: Country Summaries for Chinese & Indian Dairy Sectors

China

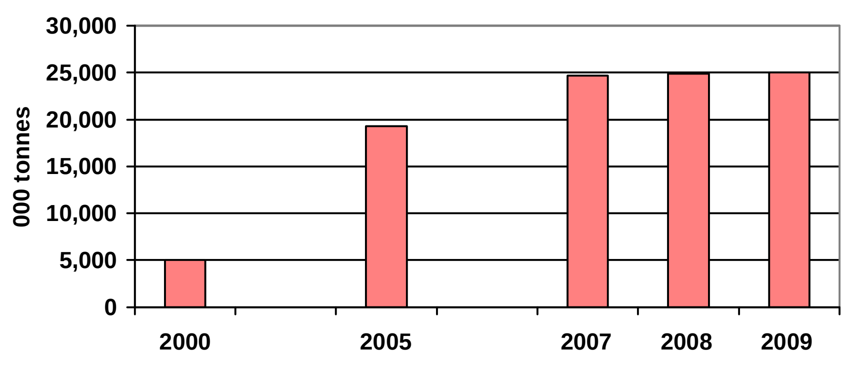
With its vast population of approximately 1.3 billion, rapidly growing incomes per head (GNI/capita $3,650) and dietary change, China has recently become a leading global market for dairy products. With rapid industrialisation agriculture (value added) now accounts for about 10% of the overall economy. Despite very rapid growth which was seriously interrupted by the melamine scandal, milk production in China ranks only in about 10th place in output value terms in the agriculture sector, well behind the leading enterprises such as pigs and rice. Summary statistics for the Chinese dairy sector are provided in Table D 1.

Table D 1: Summary Statistics for the Chinese Dairy Sector

China: Dairy Industry	Summary Statistics
	2009/10
No. Dairy Cows '000 head	**12,607**
Milk Production '000 tonnes	**30,100**
Self Sufficiency %	**91**
Imports as % Total Production (approx)	**9**
Imports Butter and Butteroil '000 tonnes (2009)	**28**
Imports Cheese '000 tonnes (2009)	**17**
Imports WMP '000 tonnes (2009)	**176**
Imports SMP '000 tonnes (2009)	**70**

China is responsible for about 6 percent of global milk production. (IDF 2010). While milk production is now about 30 million tonnes per annum about 15% of China's dairy cows were taken out of production due to the effects of the melamine crisis and production is still below the pre-melamine level of about 35 million tonnes. The Government Dairy Plan is to continue rapid growth in milk production. Chinese milk deliveries for selected years over the last decade are shown in Figure D 1.

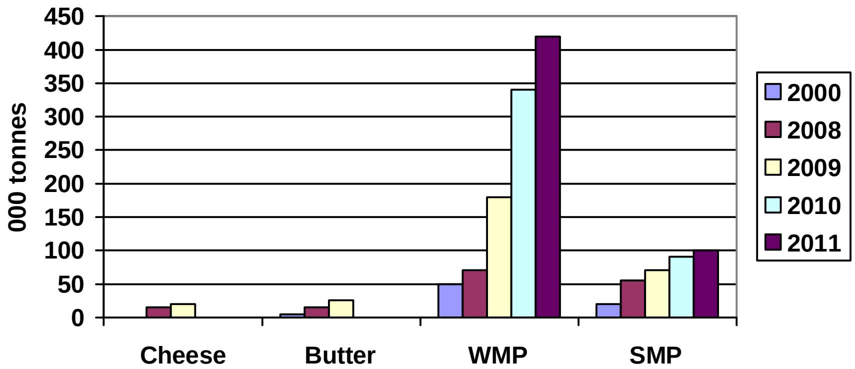
Figure D 1: China Milk Deliveries



Source: IDF 2010

The Chinese dairy products manufacturing industry is very much dominated by WMP, with WMP production being about 1 million tonnes in 2010. China is now a hugely important market for exporters and is also changing rapidly with the ongoing effects of recent scandals on demand for foreign products and continuing increases in prosperity. WMP imports are expected to be perhaps 400,000 tonnes in 2011, double that of 2009, while SMP imports may also be double the 2009 level. Chinese dairy import volumes are summarised in Figure D 2.

Figure D 2: China Dairy Imports



Source: IDF 2010, USDA 2010

Chinese dairy consumption has risen rapidly from a very low base. In urban areas dairy production consumption per capita (15kg/annum) is still less than 10 percent of the typical level in developed (circa 200kg/annum). Consumption of dairy products in rural areas remains very low especially in central China. China's growing imports of WMP have been a crucial driver of global dairy demand in last 3 years and are now in excess of 400,000 tonnes.

India

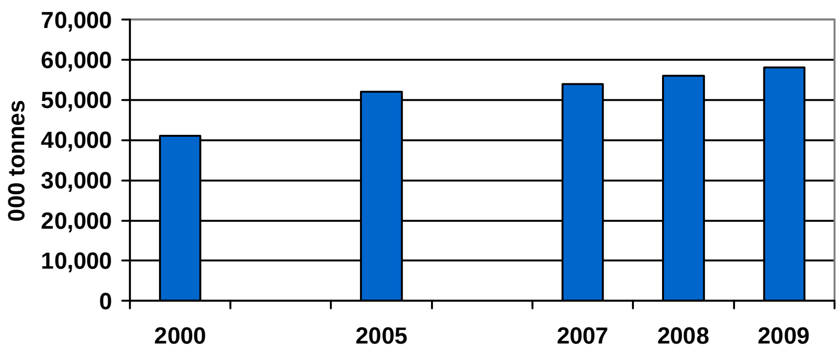
India has a huge and growing population of about 1.2 billion, with a rapidly growing domestic economy. However GNI per capita of about $1,200 is well behind that of China. Agriculture (value added) accounts for about 17% of GDP and buffalo and cow milk combined rank first in terms of value of agricultural output. Summary statistics for the Indian dairy sector are provided in Table D 2.

Table D 2: Summary Statistics for the Indian Dairy Sector

India: Dairy Industry	Summary Statistics
	2009/10
No. Dairy Cows '000 head	**38,500**
Cow Milk Production '000 tonnes	**46,565**
Self Sufficiency %	**100**
Exports as % Total Production (approx)	**1**
Exports Butter and Butteroil '000 tonnes	**16**
Exports Cheese '000 tonnes	**3**
Exports WMP '000 tonnes	**4**
Exports SMP '000 tonnes	**24**

When buffalo and cow milk production are combined, India is the world's largest milk producing country. Buffalo milk production is hugely important, accounting for close to 60 million tonnes per annum compared with cow milk production of about 47 million tonnes. The trend in production for both has been gradually upwards for the last decade. Indian milk deliveries for selected years over the last decade are shown in Figure D 3.

Figure D 3: India Milk Deliveries



Source: IDF 2010

Despite its enormous size, the Indian dairy industry is almost completely self contained, with minimal imports and very modest exports on an occasional basis. Government policy plays a very important role in this regard. Engagement with the world market consists mostly of modest exports of SMP mainly which can occur on an irregular basis.

Appendix E: Country Specific Data for non Eu15 Countries (2004-2007)

Figure E 1: Cash & Economic Costs of Milk Production & Milk Price: Ireland v other non-EU countries (2004)

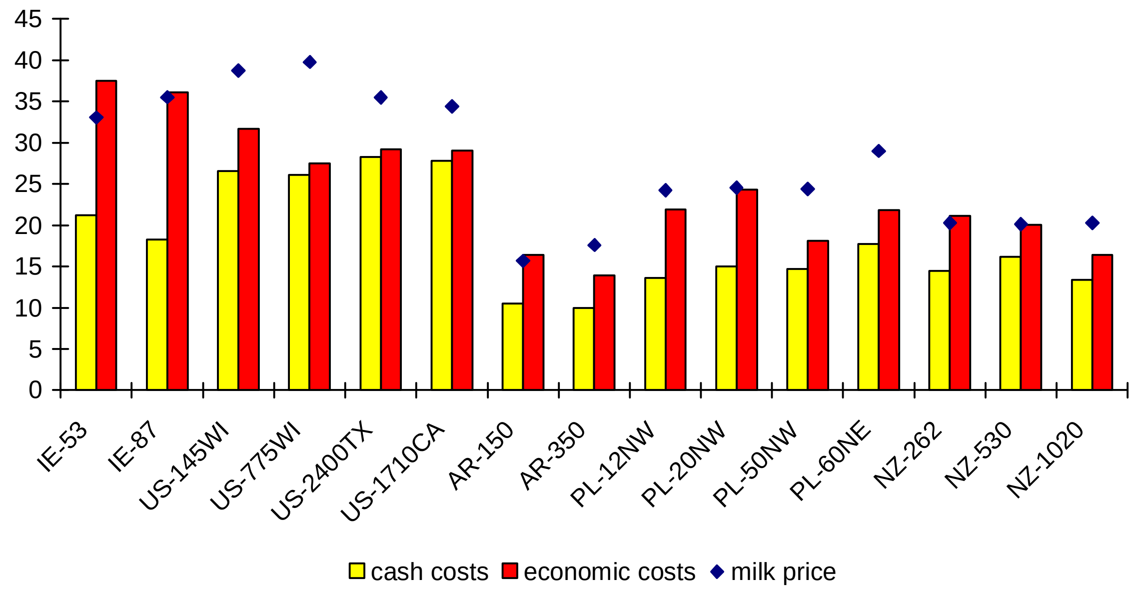


Figure E 2: Cash & Economic Costs of Milk Production & Milk Price: Ireland v other non-EU countries (2005)

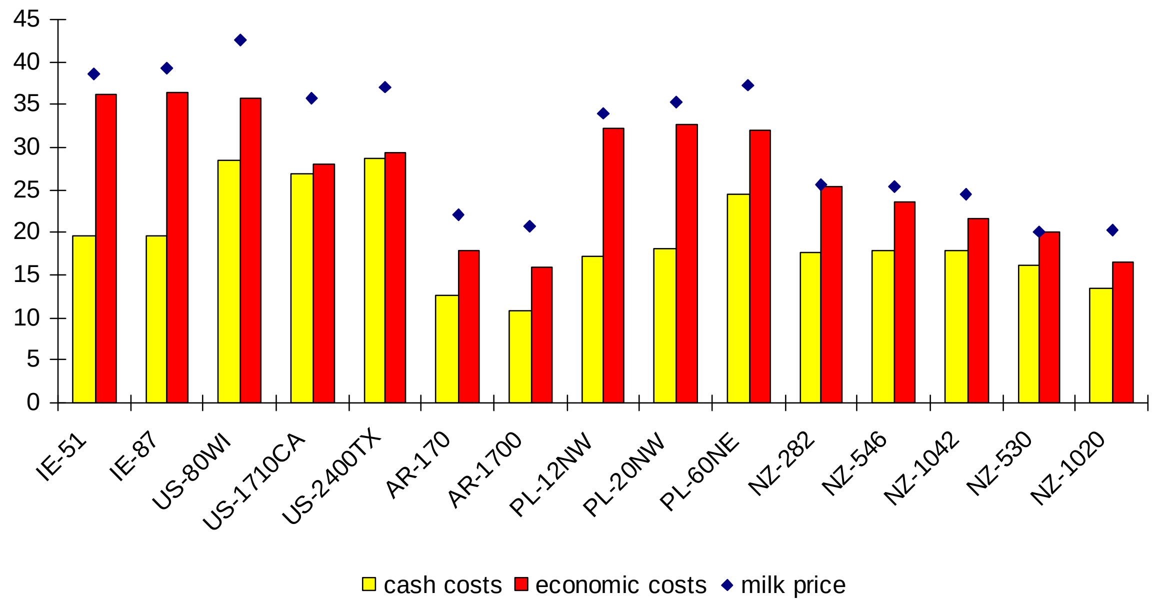


Figure E 3: Cash & Economic Costs of Milk Production & Milk Price: Ireland v other non-EU countries (2006)

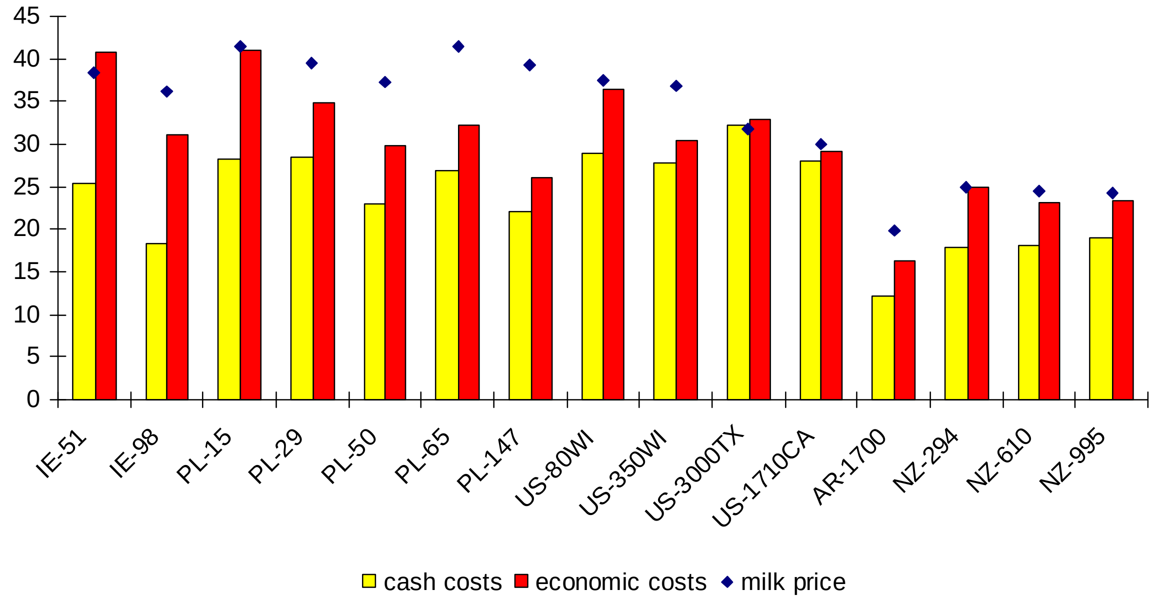
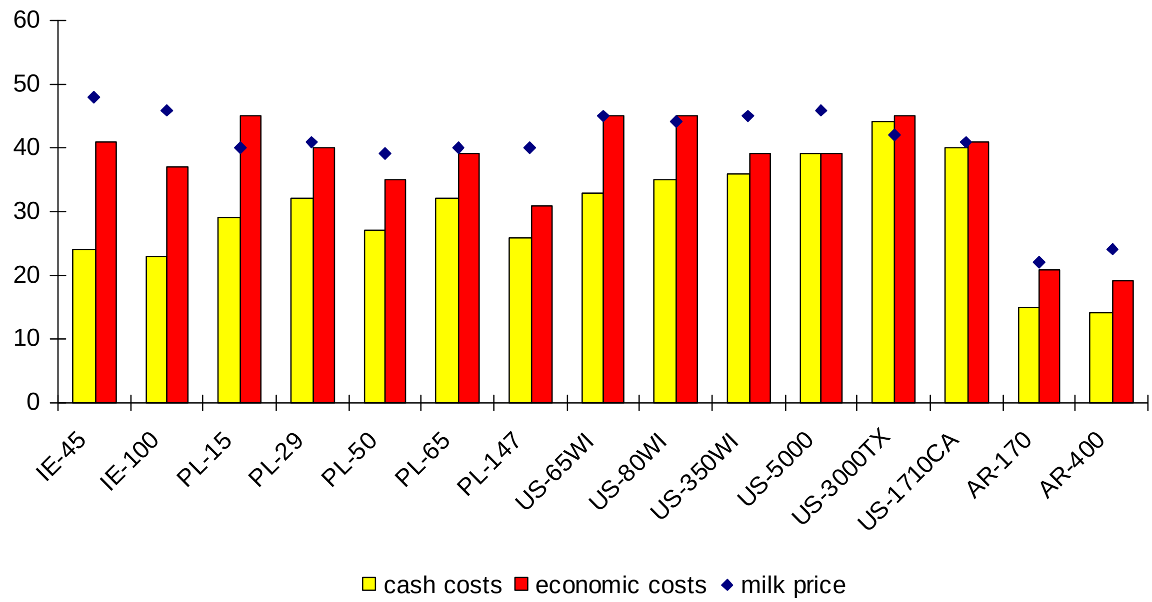


Figure E 4: Cash & Economic Costs of Milk Production & Milk Price: Ireland v other non-EU countries (2007)



Appendix F: Typical Farm Descriptors used in Chapter 5

Table F 1: Country Specific Data for non EU15 Countries (2004-2007)

2004		2005		2006		2007		2008-2010	
Typical Farm Name (country_ no. of dairy cows)	Typical Farm Short Description	Typical Farm Name (country_ no. of dairy cows)	Typical Farm Short Description	Typical Farm Name (country_ no. of dairy cows)	Typical Farm Short Description	Typical Farm Name (country_ no. of dairy cows)	Typical Farm Short Description	Typical Farm Name (country_ no. of dairy cows)	Typical Farm Short Description
IE-53	Gr	IE-51	Gr	IE-51	Gr	IE-45	Gr	AR-400	Gr
IE-87	GR	IE-87	Gr	IE-98	Gr	IE-100	Gr	AR-600	Gr
US-145WI	St	US-80WI	St	PL-15	St	PL-15	St	AR-170	Gr
US-775WI	St	US-1710CA	Fl	PL-29	St	PL-29	St	NZ-913	Gr
US-2400TX	Fl	US-2400TX	Fl	PL-50	Fs	PL-50	Fs	NZ-551	Gr
US-1710CA	Fl	AR-170	Gr	PL-65	Fs	PL-65	Fs	US-1710CA	Fl
AR-150	Gr	AR-1700	Gr	PL-147	Fs	PL-147	Fs	NZ-316	Gr
AR-350	Gr	PL-12NW	St	US-80WI	St	US-65WI	Gr	US-350WI	Fs
PL-12NW	St	PL-20NW	St	US-350WI	St	US-80WI	St	PL-147	Fs
PL-20NW	St	PL-60NE	Fs	US-3000TX	Fl	US-350WI	Fs	IE-110	Gr
PL-50NW	Fs	NZ-282	Gr	US-1710CA	Fl	US-5000	FS	US-2000ID	FS
PL-60NE	Fs	NZ-546	Gr	AR-1700	Gr	US-3000TX	Fl	US-3000TX	Fl
NZ-262	Gr	NZ-1042	Gr	NZ-294	Gr	US-1710CA	Fl	US-5000	FF
NZ-530	Gr			NZ-610	Gr	AR-170	Gr	US-1000ID	Fs
NZ-1020	Gr			NZ-995	Gr	AR-400	Gr	US-1577NY	Fs
						AR-1700	Gr	US-80WI	St
						NZ-307	Gr	US-65WI	Gr
						NZ-610	Gr	US-402NY	St
						NZ-960	Gr	IE-48	Gr
								PL-65	Fs
								US-66NY	St
								PL-15	St

Legend: Description of the classification of the production system
St – Stanchion barn: farms with stanchion barn
FS – Free stall barn: Farms with free stall barns
Fl – Feedlot: Farms operating mainly on purchased feed with little or no land.
Gr – Grazing: Farms which are based on grazing (with a small supplementary feedings of concentrates).

Appendix G: Forward Looking Scenario Results

Figure G 1: Fertiliser Price Increase/Decrease Scenario: Cash Costs as % of Output: Ireland v other EU15 countries

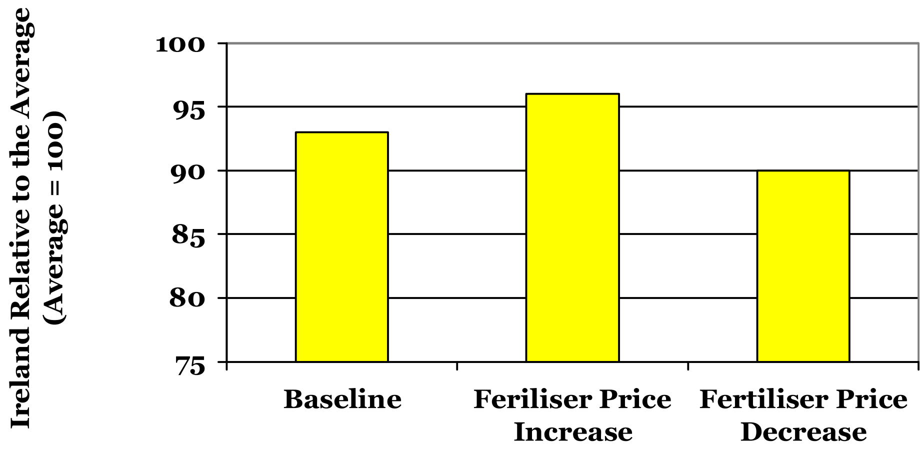


Figure G 2: Breakeven Sensitivity Analysis: Milk Price % Decrease Required for Cash Costs to Exceed Output