Single Farm Payment in the European Union and its Implications on New Zealand Dairy and Beef Trade

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Klaus Kogler

Master Student at Lincoln University (NZ) and BOKU University (A)

koglerk2@lincoln.ac.nz

Caroline Saunders

AERU Research Unit, PO Box 84
Lincoln University, New Zealand

saunderc@lincoln.ac.nz

The 2003 reform of the European Union's Common Agricultural Policy (CAP) replaced the coupled direct support schemes by a Single Farm Payment (SFP), which will be mainly delivered to farmers irrespective of what they produce (hence 'decoupled' from production). The level of decoupling differs among the Member States. This paper assesses the implementation of the SFP across Member States and how far it has been decoupled. The expected changes in the European Union's and New Zealand's trade in dairy products and beef resulting from the 2003 reform of the CAP are simulated, using a partial equilibrium trade model (Lincoln Trade and Environment Model; LTEM).

Key words: Single Farm Payment, European Union, New Zealand, Common Agricultural Policy, direct payments

1. Introduction

Dairy and beef products belong to New Zealand's main export commodities, accounting for 22% of total merchandise exports (Statistics New Zealand, 2004). The European Union (EU) is commonly known for distorting international trade in these products through subsidised production and exports. This leads to lower world market prices and hence lower export revenues for New Zealand (NZ).

The Common Agricultural Policy (CAP) of the EU has already undergone several reforms since its beginnings in 1962. It was established partly in order to ensure food supply in Europe in the post World War II period. At this time, the countries of the present EU have been net importers of agricultural commodities. The principle used in the CAP was to support farmers through the market rather than by direct subsidies. This was achieved by the creation of a protected unified market within the Union where domestic agricultural products were given preference. Minimum prices were established and high often prohibitive tariffs for imported products. European farmers responded quickly to the high domestic prices and increased production. This was favoured by fast increasing agricultural productivity through the development of new technologies in the 1960s and 1970s.

The consequence was that the European Union switched from a net importer of food products to a net exporter in the late 1970s. Nevertheless, the policy did not change at this time and significant surpluses resulted. Agricultural surplus was (and still is) disposed of on the world markets by the aid of export subsidies. Export subsidies are necessary in order to offset the difference between the high domestic prices with the lower world market prices. Since the EU is a major exporter in many commodities, the subsidised exports depress world market prices in these commodities (Gardner, 1996). This can be particularly expected in the markets for dairy products where the EU is the major global exporter, followed by New Zealand. In the beef market, the EU is the 5th largest exporter, equal to New Zealand.

In order to limit the overproduction, the CAP has undergone several attempts to reforms in the 1980s. The introduction of a milk production quota in 1984 limited the excess supply of milk and the subsidised exports of dairy products. In addition to the internal difficulties, the CAP has become the main source of dispute with the EU's international trading partners since the late 1970s (Howarth, 2000). High internal budget costs and increasing pressure from other countries during the Uruguay Round of the GATT gave rise to a major reform of the CAP in 1992. The 1992 MacSharry reform redirected the emphasis of farm support from markets to direct subsidies. The aim of this reform was to reduce the internal price of EU agricultural products, without undermining farm incomes. This was achieved by a cut in the domestic prices for cereals and beef and the introduction of direct aid payments to farmers to compensate for the impact of price cuts on farm incomes. The direct payments introduced in 1992 have been coupled to production, which means that farmers had to produce a certain crop/livestock product in order to get subsides. In the beef sector, direct payments were based on the livestock numbers, so the more cattle farmers had the more subsidies they got. The MacSharry reform made no change to the support of the dairy sector.

The planned EU enlargement and the continuing WTO trade negotiations towards further liberalisation were the reasons for a further CAP reform in 1999. The Agenda 2000 reforms brought price cuts in the cereal, beef and dairy sectors, starting in 2005. Coupled direct payments were introduced in the milk sector and increased in the beef and cereal sectors, respectively. Agenda 2000 was the set of reforms which not only dealt with CAP reform but also the future financing of the CAP, the structure funds, EU enlargement; and most radically it replaced the original objectives of the CAP with a set of objectives for a rural policy. Rural development has officially become the 'second pillar' of the CAP.

The mid-term review of Agenda 2000 resulted in a new fundamental reform. The 2003 reform (also referred as the 'Luxembourg Agreement' or 'Fischler reforms') of the CAP introduced a new system of single farm payments (SFP) and cut - at least partially - the link between support and production. The SFP is delivered to farmers irrespective of what and how much they produce (hence 'decoupled' from production) and it is based on historical entitlements. The main purposes of the new SFP scheme are to support farm incomes and – at the same time - to allow farmers to become more market oriented, giving them the incentives to produce for consumers' demand rather than for CAP subsidies. However, Member States could choose individually to maintain a limited link between subsidy and production within clear limits. This is a new development of the CAP towards re-nationalisation of agricultural policy in the EU.

The recent reforms of the CAP also take other concerns into account, such as food safety and the environment. In order to receive the SFP, farmers must maintain their land in good agricultural condition and comply with standards on public health, animal and plant health, the environment and animal welfare (cross-compliance). Further details of the implementation of the 2003 CAP reform are explained in chapter 1.2.

The principle of the SFP has been used for other reforms of Common Market Organisations in products which haven't been affected by the 2003 reform. The '2nd wave of CAP reform' in 2004 introduced the SFP in the tobacco, hops, olive oil and cotton sectors. In the sugar sector, a reform was adopted in February 2006 and compensatory aids for sugar beet growers will be integrated in the SFP. Currently, the reform of the common market organisation in wine and fruit and vegetables is under discussion. Several reform options are assessed until end of 2006, but they will be in line with the principles of the 2003 CAP reform.

The EU has changed significantly the way how it supports its farmers during the last 15 years. Direct support schemes, introduced in 1992, have now been at least partially decoupled. The 2003 reform of the CAP enables a shift of a great part of farm support from the WTO blue box to the green box (European Commission, 2006a). Green box subsidies "*must not distort trade, or at most cause minimal distortion*" (WTO, 2006). However, subsidies that try to decouple payment from output levels may have the effect of keeping production in existence when the optimal solution may be for it to cease altogether (OECD, 2003). This means that even the new single farm payment scheme might contribute to distort production in the EU and its international trade. In particular its implementation in some countries is not fully decoupled.

The main objective of this paper is to look at the implementation of the SFP across Member States and assess the implications of the CAP reform on New Zealand dairy and beef sectors.

First, Chapter 1.1 briefly summarises the direct support schemes under the CAP. This is followed by a description of the CAP reform implementation in the Member States. Chapter 2 gives an overview about the present literature analysing the implications of EU agricultural policy on NZ and the effects of the 2003 CAP reform, particularly on the dairy and beef sectors. In Chapter 3 follows a description of the methodology used to answer the research question. A partial equilibrium trade model (Lincoln Trade and Environment Model) is applied to simulate the effects of the CAP reform on NZ agriculture. The scenarios used for the trade modelling are also described in this chapter. Chapter 4 shows the results of the trade modelling and discusses them with other studies. Finally, in Chapter 5, the conclusion summarises the results and evaluates future implications of the CAP on NZ.

1.1. Direct Support Schemes under the CAP

Direct payments now contribute to 63% of the total agricultural budget. In 2006, €34.8 billion are spent on direct payments (European Commission, 2006b). A major proportion of the direct payments to EU farmers is since 2005 the Single Farm Payment. In 2006, €14.6 billion will go into the Single Payment Scheme in the EU-15, which is 42% of all direct payments. The European Commission (2005) estimated that in 2012 approximately 90% of the budgetary transfers in the form of direct payments for the arable crops, milk, beef and sheep sectors will be part of the single farm payment for the EU-25 as a whole. The premiums relevant for the dairy and beef sectors are described in more detail below.

Dairy premium
The dairy premium was introduced in the Agenda 2000 reforms in order to compensate for the reductions in the intervention prices for butter and skim milk powder and the increase in the milk production quota. It was introduced as a coupled direct payment, granted per calendar year, per holding and per tonne of milk. Milk producers qualify for a dairy premium from 2004 to 2007. From 2007 on (in some Member States from 2005 on), the dairy premium will be decoupled and included in the SFP. The amount of the dairy premium is calculated by multiplying the reference quantity for milk available on the holding on 31 March of the calendar year concerned by:

- €8.15/t for the calendar year 2004,
- €16.31/t for the calendar year 2005,
- €24.49/t for the calendar year 2006 and for the following calendar years (European Commission, 2003).

Additional payments for milk producers
Member States can make additional payments to their producers on a yearly basis. The total amounts for each country are fixed by the European Commission and account for €1 294 million for the whole EU-15 in 2006 and 2007. Additional payments are granted as a supplementary amount per dairy premium amount as set out above.

Suckler-cow premiums
The suckler cow premium is an annual premium of €200 per eligible animal per calendar year. The condition to the premium is that the farmer does not supply milk or milk products from his farm as it was introduced to promote the conversion from dairy farming to beef cattle farming. National and individual ceilings in the number of eligible animals apply. The number of animals qualifying for the suckler-cow premium also depends on the application of a stocking density. The maximum stocking density is 1.8 livestock units (LU) per farm, hectare and calendar year. Several Member States (Austria, Belgium, France, Portugal, Spain) are keeping the suckler cow premium coupled even after the 2003 reform, whereas the other Member States include it in the SFP.

Additional suckler-cow premium
Member States may grant an additional national suckler cow premium, up to a maximum of €50 per animal. Under certain circumstances, this additional premium is financed partly or completely by the Guarantee Section of the European Guidance and Guarantee Fund (EAGGF).

Beef slaughter premium — Calves
The slaughter premium is granted on slaughter of eligible animals or their export to a third country. It amounts €50 for calves of more than one and less than eight months age and a carcass weight up to 185 kg. Some Member States (Austria, France, Belgium, Netherlands) made use of the option to keep the slaughter premium for calves coupled.

Beef slaughter premium — Adults
Like the slaughter premium for calves, the slaughter premium for adults is paid at slaughter or export to a third country. It amounts €80 and is granted for bulls, steers, cows and heifers from the age of eight months. The European Commission allowed Member States to keep 40% of the slaughter premium for adults (€32) coupled, the rest is included in the SFP. Austria, France, Portugal and Spain made use of this option, whereas the Netherlands keep the adult slaughter premium 100% coupled.

Beef special premium
A farmer holding male bovine animals may qualify for a special premium, granted per calendar year and per holding, set at €210 per eligible bull and €150 per eligible steer and age bracket. The beef special premium will still remain for 75% coupled in Denmark, Finland and Sweden and is included in the SFP in the other Member States.

Deseasonalisation premiums
Where the number of steers slaughtered in a Member State in a given year exceeds 60% of the total number of male bovine animals slaughtered that year and where the number of steers slaughtered from 1 September to 30 November of a given year exceeds 35% of the total number of steers slaughtered that year, producers may qualify for the deseasonalisation premium. The premium lies between €18.11 and €72.45, depending on the time of the year.

Beef extensification premium
Farmers receiving the beef special premium and/or the suckler cow premium may qualify for an extensification payment. It is €100 per special premium and suckler cow premium granted, provided that in respect of the calendar year concerned the stocking density on the holding concerned is less than or equal to 1.4 livestock units (LU) per hectare.

Additional payments to beef producers
Member States are allowed to make additional payments to farmers, according to objective criteria including the relevant production structures and conditions, in order to ensure equal treatment between farmers and to avoid market and competition distortions. Additional payments may be made in the form of headage payments (per male bovine animal, suckler cow, dairy cow or heifer, respectively) and/or area payments (per hectare of permanent pasture) and are subject to national ceilings.

In addition to the direct payments in the dairy and beef sectors, support schemes for sheep and goats, arable crops, rice, starch potatoes, grain legumes, protein crops, seeds, olive oil, nuts and energy crops have been affected by the 2003 reform of the CAP.

Limitation
Many support schemes are not part of the decoupling process (e.g. subsidies for agri-environmental programmes and payments for farms in less favoured areas). Also exempt from the decoupling process are national farm policy expenditures which add up to almost €15 billion per year. An evaluation of the impact of the CAP reform therefore may also be affected by the financial flows that are not affected by the reform, but have a significant influence on production decisions of farmers. In the case of Austria, for example, the sum of national agri-environmental payments plus support for farms in less favoured areas significantly outweighs EU direct payments.

1.2. Implementation of the 2003 CAP reform

As a new element the 2003 CAP reform has provided a large space for national initiatives (Halmai & Elekes, 2005). The following elements of the reform fell within national jurisdiction:

- possibility of partial decoupling
- selection of the SFP calculation model
- date of introduction (between 2005 and 2007)
- re-allocation of subsidies (modulation)

The possibility of partial decoupling was provided in order to avoid abandonment of production. Member States could choose to maintain a limited link between subsidy and production under well defined conditions and within clear limits. Germany, Ireland, Italy, Luxembourg and the United Kingdom chose to maximise, while France chose to minimise the degree of decoupling. The options chosen by three Member States (United Kingdom, Austria, France) are shown in *Table 1*. The United Kingdom was selected as an example for the highest degree of decoupling - contrarily to France which opted for the lowest degree of decoupling. Austria lies somewhere in between with only premiums in the beef sector remaining coupled.

The European Commission proposed different models to calculate the SFP, including a model based on historic data, a regional model and a hybrid system. The majority of Member States will base the SFP on farm level historical entitlements, with Denmark, Finland, Germany, Luxembourg, Sweden and the United Kingdom using a mix of both farm level historical and regionalised payments. In case of the United Kingdom, the individual countries (England, Scotland, Wales and Northern Ireland) have each chosen a slightly different option. Entitlements for single farm payments are calculated on the basis of direct payments received in the reference period 2000-2002. The majority of EU-15 countries started to implement the single payment scheme in 2005, with the rest (Finland, France, Greece, the Netherlands and Spain) commencing in 2006. The new Member States implemented single area payment schemes in 2004, providing a flat rate averaging EUR 48 per hectare for all agricultural land.

***Table 1*: National Implementation of the 2003 CAP Reform in Selected Countries.**

Country	Premiums that remain coupled
United Kingdom	None
Austria	Suckler cow premium (100%) Slaughter premium calves (100%) Slaughter premium adults (40%)
France	Suckler cow premium (100%) Slaughter premium calves (100%) Slaughter premium adults (40%) Eve premium (50%) Arable crops area payment (25%) Outhermost regions (100%) Seed aid (some species)

Source: European Commission, 2006b

The Member States play the leading role in ensuring cross-compliance is applied. Their responsibilities include establishing the definition of good agricultural and environmental condition for their agricultural circumstances. The maintenance of agricultural land in good agricultural and environmental condition is intended to avoid the abandonment of agricultural land and its environmental consequences. Basically, the regulations are very similar across the Member States and most cross-compliance regulations have already been part of existing law in all Member States, so farmers do not have to do anything different in order to comply. Hence, cross-compliance has not really an effect on production and therefore the introduction of cross-compliance is not included here in the modelling of the impacts of the 2003 CAP reform.

Furthermore, the Member States had to decide on the introduction of a national modulation. Modulation is the reduction of direct payments and re-allocation of subsidies to rural development measures. The obligatory modulation is 3% in 2005, 4% in 2006 and then 5% annually until 2012. This regulation shows the efforts to redirect the CAP from only farm support towards a more comprehensive rural development policy.

2. Literature Review

The Common Agricultural Policy of the European Union and its reforms are widely discussed in the literature. There are a number of relatively recent studies analysing the impact of the CAP reforms on the agricultural sectors of countries and regions around the world, but not that many publications address New Zealand particularly.

Saunders & Mayrhofer (2003) investigated the implications for NZ trade of change in EU agricultural policy; in particular the development of agri-environmental policy, and used the Lincoln Trade and Environment Model (LTEM) for that. This study was done before the introduction of the SFP scheme, but includes a very similar scenario, since the 2003 CAP reform was at a proposal stage at that time and called Mid-Term Review of the Agenda 2000 reforms. Saunders and Mayrhofer found out that dairy production in the EU will rise with the CAP reform and this has negative impacts on NZ for two reasons. Firstly, the lower internal prices in the EU cause the returns to NZ from its preferential access to fall. Secondly, higher production in the EU has a negative impact on world prices causing returns to NZ from other markets to fall also.

Similar results are presented by **Saunders** (2005). In this study, the impacts of Agenda 2000, the Mid-Term Review and the EU agri-environmental programmes on the EU and NZ were assessed. The Lincoln Trade and Environment Model was used to simulate the impact on the dairy sectors of the EU and NZ of four different policy scenarios. The results say that EU milk prices will fall by 8% over the period 1998 to 2010 as a result of the Agenda 2000 reform. The internal production quota for milk in the EU still binds even though it increases by 2.5% over the period. The Mid-Term Review will decrease EU milk producer prices even more. However, as before, the level of production in the EU actually rises due to the increase in the internal production quota, which even at the lower prices still binds. This has again the two negative effects on NZ, mentioned in the previous study. The introduction of agri-environmental policies, conversely, causes internal EU prices to rise as the level of production this time is constrained by production practice. NZ prices for raw milk rise by 5-13% with increases in NZ production of 5-13%.

Saunders et al. (2006) analysed global agricultural trade policy reforms and their impact on the EU, China and NZ, using the Lincoln Trade and Environment Model. Their results show that a reduction of export subsidies and tariffs by 50% all over the world results in an universal decrease in producer prices and production in the EU for livestock products. Price reductions are particularly significant for beef (38.2%). In this scenario, the EU switches from being a net exporter of beef, cheese and skim milk powder to being a net importer. The impact of the reduction of export subsidies and tariffs across all countries leads to benefits for the NZ livestock sector. NZ gains most if all countries completely liberalise (complete removal of all countries' export subsidies and tariffs in 2005). Another scenario simulated an increase in the milk production quota. In this case, prices for dairy products in the EU decrease, but production in the EU increases as a result of the increase in production quota. NZ reduces dairy production and NZ exports decrease.

The milk production in the United Kingdom (UK) following the 2003 CAP reform was modelled by **Colman & Harvey** (2004). They emphasise the difference between the producer 'incentive' price for milk and the 'market' producer price for milk. To the extent that any producers use the SFP to support their dairy business, the incentive price driving their decisions will exceed the actual milk price they receive. In this case, the UK milk production will remain at full national quota level until 2015. If producers treat the payment as decoupled, then a lower incentive price will apply, more producers will leave the industry and a short-term deficit in output is likely; that is, it would fall significantly below the UK national quota in 2010 and falling slightly below in 2015. Considering that the UK is one of the lowest cost milk producers in the EU-15 (Colman, 2002), this result suggests that milk production in other EU countries will fall below quota levels if the SFP is treated as completely decoupled. However, Colman and Harvey expect that most producers will effectively treat the SFP as coupled and as an aid to enable them to continue dairy farming.

The British **Milk Development Council** (Farmers Guardian, 2004) interviewed over 1,200 dairy farmers in the United Kingdom about their future plans after the introduction of the Single Farm Payment Scheme. In a survey in April 2004, 75% of farmers stated they would use the SFP to support them in dairy farming. Six months later, in another survey, this has fallen to 62%, suggesting that more farmers were planning to change enterprises if dairying is not profitable in its own right. However, still a large percentage of dairy farmers will treat the SFP as if it were coupled and hence will use it to subsidise milk production.

A survey conducted by **Trantner et al.** (2004) came to a similar result. They asked 4,500 farmers in each of three EU countries (the UK, Germany and Portugal) about their response to a proposed bond scheme, corresponding, more or less, to the Single Farm Payment Scheme. The survey was carried out in 2001/02, so before the latest CAP reform. Around 67-69% of the respondents said they would not alter their mix of farm activities after the proposed policy change was introduced. It is interesting to see how close this proportion was for each of the three countries (Germany and Portugal 67%, UK 69%).

Breen et al. (2005) assessed the impact of decoupling on farming in Ireland. Their result is that, despite the significant changes in profitability that decoupling could engender, the majority of farmers intend to continue as before and are unlikely to change their production patterns. A survey on farmers' intentions indicates that a large number of farmers still seem to consider the decoupled payment linked to production. Among other farmers, 499 dairy and 395 beef cattle farmers were surveyed about their intentions to remain in dairy/cattle farming. The survey indicates that 11% of dairy farmers and 14% of cattle farmers intend to cease their activities within the first four years of the Luxembourg Agreement. However, analysis of the profitability of Irish dairy farming suggests that up to 32% of farmers are likely to exit dairy production over the ten year period from 2002.

An analysis about the 2003 CAP reform from the **Organisation for Economic Cooperation and Development** (OECD, 2004) concludes that although milk production remains bound by the quota, further cuts in the intervention price for butter, compared to Agenda 2000, result in lower domestic prices for milk and most dairy products, leading to lower production of skimmed and whole milk powder.

Significant drops in EU dairy product exports cause world prices to increase. The OECD modelled two scenarios: a 'maximum decoupling' and a 'minimum decoupling' scenario, in which it is assumed that all Member States will either select the option that maximises or minimises the degree of decoupling. The impact of different direct payment decoupling assumptions on the dairy sector is negligible. In both scenarios, the production quota remains binding and the marginal effect of direct payments on milk production is zero. EU beef production decreases in both scenarios, but does not initially change export levels. However, imports will increase by 1.7% from 2004 to 2008 in case of full decoupling. Beef production is estimated to be reduced by less if the maximum possible share of beef payments is kept linked to beef production. Under these assumptions, beef production is reduced by less than 0.1% by 2008 compared to 0.6% with maximum decoupling.

Similar to the OECD, the **Food and Agricultural Policy Research Institute** (FAPRI, 2003) analysed the impact of the Luxembourg CAP reform agreement on EU agriculture. They also modelled a maximum and a minimum decoupling scenario, according to the Member State's decisions on the degree of decoupling. The baseline is represented by the policies agreed under Agenda 2000. The results for the dairy sector under each of the scenarios were very similar. Due to the reduction of the intervention price of butter the price of all dairy commodities will fall. Nevertheless, the production quota still remained binding and determined the milk supply. On the demand side, lower EU product prices meant higher consumption and lead to reduced volumes of EU dairy products available for export. Decoupling of beef direct payments had a significant impact on the sector. Compared to the baseline, EU beef production decreased by 2.6% in the full decoupling scenario and by 0.2% in case of minimum decoupling (in the average from 2007 to 2012). Net imports increased by 241.3% and 22.2%, respectively.

The **European Commission** (2005) modelled the impact of alternative implementation scenarios of the SFP on the EU-25 agricultural sector in 2012. The projected situation under the *status quo* policy implementation (as notified by Member States) was compared with two alternative scenarios: full decoupling and full coupling of direct payments in line with the provisions of the current legislation. The *status quo* policy implementation scenario predicts an increase in set aside and fallow land until 2012 through the introduction of the Single Farm Payment. Regarding livestock production, the projections indicate that the EU-25 cattle herd would slightly decrease until 2012. This would be the consequence of the quota-driven structural decline in dairy cow herd size, but also of beef meat production abandonment mainly in the Member States with fully decoupled cattle premiums. In comparison to the reference scenario, full decoupling of direct payments in 2012 would lead to a decrease of 1.8% in total EU-25 cattle herd. In contrast, the full coupling scenario assumes that Member States couple their direct payments to the maximum extent in line with the effective CAP provisions. Compared to the reference situation, overall EU-25 cattle herd would increase by 0.5%.

Huettel and Kleinhanss (2004) reviewed a number of studies about CAP reform impacts in the dairy sector in different EU countries. They focussed on milk supply effects of decoupled direct payments and on changes of producer prices. Their result is that the type of decoupling (SFP based on Historic Model or Regional Model) will not have significantly different supply effects in the short and medium term. With

regard to the national implementation schemes, only the date of decoupling the milk premium was predicted to affect milk supply. Most of the models show an almost stable milk supply, even in the case of total decoupling. The milk quota is still binding and therefore will be fully used.

According to the present literature, it can be concluded that milk production in the EU will continue to be at quota level. Maybe higher internal consumption due to lower domestic prices will decrease EU exports and increase NZ exports. EU beef production is expected to decrease in all the relevant studies, depending on the degree of decoupling.

3. Methodology

The analysis of the implications of the Single Farm Payment in the European Union on New Zealand dairy and beef trade will be assessed using an international trade model. Basically, there are two methods that are used for modelling international trade with a focus on the agricultural sector. These are the economy-wide general equilibrium (GE) and partial-economy partial equilibrium (PE) models. The main objective of both frameworks is to determine the equilibrium prices and quantities on sets of markets, which are subject to various policy shocks. An agriculture focused GE model analyses the interactions both within the agricultural sector and with the other sectors of the economy. In addition, a GE framework also analyses the interactions with the factor markets. An agriculture focused PE model on the other hand, analyses the interactions within the agricultural sector only without considering the linkages with the rest of economy. PE frameworks integrate technical change, population growth and income exogenously, while these variables are generally derived endogenously in GE frameworks (Cagatay & Saunders, 2003).

By definition, '*a partial equilibrium model includes those markets most immediately relevant to a problem and excludes everything else*' (Roningen, 1997: 231). While this causes practical limitations of applied PE modelling, it is also the source of its basic advantage. By focusing on a very limited set of factors, applied PE models allow for relatively rapid and transparent analysis of policy issues (Francois & Hall, 1997). In the economic literature, many different partial equilibrium models can be found. Examples are the AGLINK model developed by the OECD, SWOPSIM developed by the USDA, VOMM developed by the World Bank and WFM developed by the FAO. In order to answer the research questions of this dissertation, a PE framework (Lincoln Trade and Environment Model - LTEM) is used.

3.1. Lincoln Trade and Environment Model (LTEM)

This description of the LTEM is based on the work from Cagatay & Saunders (2003). The LTEM is a multi-country, multi-commodity PE model focusing on the agricultural sector. It includes 17 countries, 19 agricultural commodities and 51 variables (details in *Appendix Tables A1 – A3*). The EU is taken as one single country which is referred to the EU-15. The dairy sector is modelled as five commodities. Raw milk is defined as the farm gate product and is then allocated to the liquid milk, butter, cheese, whole milk powder or skim milk powder markets

depending upon their relative prices, subject to physical constraints. The commodities included in the model are treated as homogeneous with respect to the country of origin and destination and to the physical characteristics of the product. Therefore, commodities are perfect substitutes in consumption in international markets. Based on these assumptions, the LTEM is a non-spatial model, emphasising the net trade of commodities in each country.

The LTEM uses parameters adopted from the literature and hence is a 'synthetic' model. Interdependencies between primary and processed products and/or between substitute/complementary products are reflected by cross-price elasticities. The model is used to quantify the price, supply, demand and net trade effects of various policy changes. The policy impacts until 2013 are derived in a comparative static fashion based on the base year of 2000.

Generally, the LTEM framework contains six behavioural equations and one economic identity for each commodity under each country. The behavioural equations are domestic supply, demand, stocks, domestic producer and consumer price functions and a trade price equation. The economic identity is the net trade equation which is equal to excess supply or demand in the domestic economy.

The model basically works by simulating the commodity based world market clearing price on the domestic quantities and prices, which may or may not be under the effect of policy changes, in each country. Excess domestic supply or demand in each country spills over onto the world market to determine world prices. The world market-clearing price is determined at the level that equilibrates the total excess demand and supply of each commodity in the world market by using a non-linear optimisation algorithm.

The price traded in the model for each country is a function of the world price and the exchange rate. The producer price is a function of the traded price and policies such as producer subsidies, separated into market support and direct payments. The producer price for raw milk is a function of the relative prices of the five types of dairy products marketed as well as policies. The dairy products marketed are butter, cheese, skim milk powder, whole milk powder and liquid milk (the latter is not traded in the model but on national level the demand and supply must be in balance). Consumer prices are similarly a function of the relative prices and any relative policies such as consumer subsidies

The quantity produced is a function of the producer price, the prices of substitute/complement commodities and purchase prices of inputs. The consumption of a certain product in turn is a function of its price, the income per head as well as the price of substitute/complement commodities.

Various unilateral and bilateral agricultural and border policies are simulated through the LTEM with some modifications to behavioural equations. The unilateral domestic and border policy changes are incorporated in the LTEM via two channels. The first channel is through the supply function which allows the simulations of direct supply-related policies such as: production quotas, land set-aside policy and acreage reduction. The second channel is the price formation equations which allow the simulation of various per unit border policies and a minimum price policy, as

well as various per unit producer and consumer support and subsidy domestic and trade prices which are incorporated through the price functions. Bilateral policies such as preferential access and including trade quotas are also incorporated in the LTEM through modifications to the supply, price and net trade equations of the two countries.

The LTEM is built using a spreadsheet-based framework using Microsoft Excel software and is based on VORSIM, which evolved from SWOPSIM (Roningen et al., 1991) used to conduct analyses during the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) negotiations.

3.2. Treatment of the Decoupled SFP in the Model

A critical issue is whether the SFP introduced at the Fischler reforms will be treated as coupled or decoupled by farmers. Economic theory suggests that if coupled subsidies are replaced with payments that are totally decoupled from production, then production should fall to a level that would exist without any subsidies (Andersson, 2004). To date, relatively little is known about the supply inducing effects of decoupled payments. Research, as reviewed by Burfisher & Hopkins (2003) and Goodwin & Mishra (2006), has shown that even fully decoupled payments have a production inducing effect as they impact on farmers' exposure to economic risk, their access to capital, and their expectations about the criteria for future payments. Swinbank & Tranter (2005) conclude in case of the SFP that the retention of the link between the payment and land farmed (cross-compliance) weakens the EU's argument that these payments are truly decoupled.

In the following scenarios, however, it is assumed that the SFP will be treated by farmers as completely decoupled, as it is suggested in economic theory. Results in a test-run of the model have shown that the differences are negligible whether farmers treat the SFP as completely decoupled or only partially decoupled.

Direct payments are included in the LTEM as variable 'sd'. If the SFP is treated as completely decoupled, it can't be attributed to any farming product and has no influence on production. Hence, in case of full decoupling, the direct payments in the model are set to zero.

In the case that some direct payments remain still coupled to production (like in France and Austria), farmers perceive a higher producer price for the particular commodity than the market would give. The coupled suckler cow premium, for example, will be treated by beef farmers like a supplement to the beef price. Farmers base their production decisions on this higher (perceived) price. This is illustrated in *Figure 1*, depicting the EU markets for two different commodities. The left panel represents the market for a product exported by the EU and the right panel shows a market where the EU is a net importer. The world market price is depicted by the line p_w in both panels.

In a situation without direct payments (or completely decoupled direct payments), the consumer price (P_c) equals the producer price (P_p). The quantity produced is q_A, whereas the quantity consumed is q_B. The difference between q_A and q_B is the

amount of production exported (X_1 in Panel A) and the imports of the particular commodity (M_1 in Panel B), respectively.

If there are coupled direct payments in place, the producer incentive price is higher than the consumer price by the amount of 'sd'. This causes a movement along the supply curve from the original domestic production *A* to *A'*, whereas consumption remains at B. The quantity produced increases from q_A to $q_{A'}$. In case of a commodity exported by the EU (Panel A), the direct payment will increase the exports by X_2. If the EU is a net importer of the commodity (Panel B), imports will be reduced by M_2 as a result of the direct payments. *X* and *M* indicate the exports and imports, respectively, with direct payments in place.

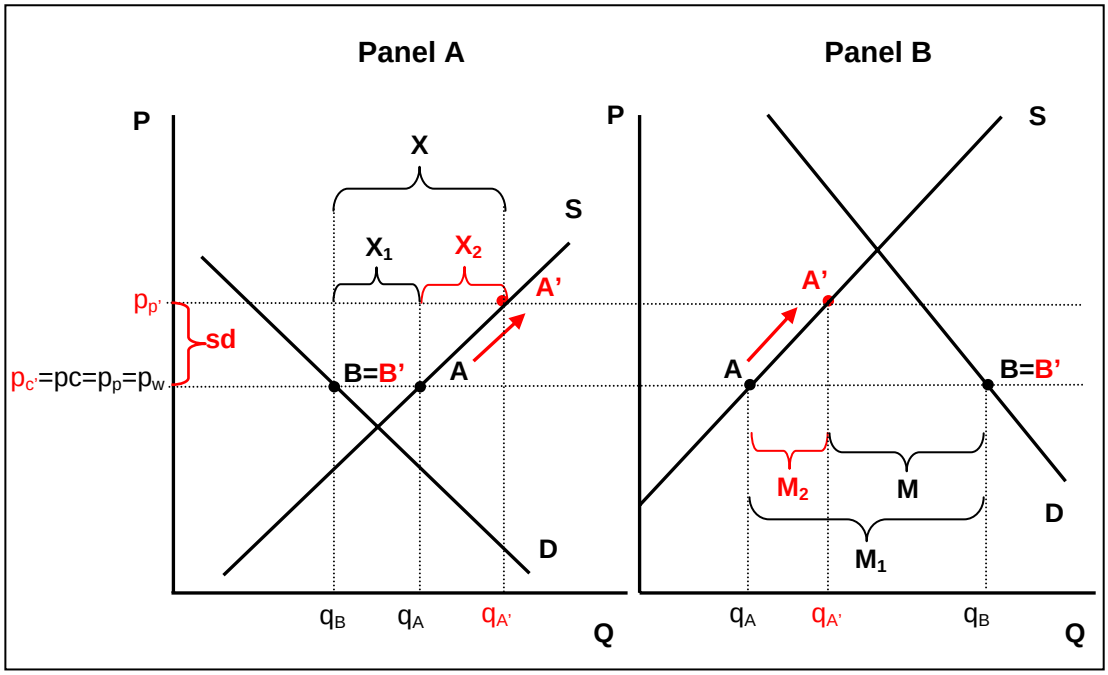

Figure 1: Effects of a Coupled Direct Payment on an Exporting Nation (Panel A) and an Importing Nation (Panel B). Source: own illustration, 2006.

The economic effects of the 2003 CAP reform should work exactly in the opposite direction as described in Figure 1. The reference scenario is the situation with direct payments in place and the other scenarios vary in different degrees of decoupling, which means a different reduction of the variable 'sd'. In the model, the variable 'sd' is included as a subsidy per unit of output ($/t). In the next chapter, it is explained how it is derived.

3.3. Data Sources

The basic data are already incorporated in the LTEM (based on OECD, 2001) and have been updated for the base year 2000. They include production, consumption and trade data as well as more specific variables like producer market subsidy, consumer market subsidy (for all countries included in the model), EU minimum prices and sink stocks for EU dairy and meat markets.

The values for the direct payments (DPs) are taken from the EU budget data (European Commission, 2006c). Data from the year 2001 are used because this in the middle of the reference period for the SFP from 2000-2002. The calculation of the direct payments is summarised in *Figure 2*. First, for each scenario the direct payments are selected, which will remain coupled even after the introduction of the SFP. Then, the direct payments for the different aid schemes are attributed to the different products covered by the LTEM. This is done by allocating the arable crops payments to wheat and coarse grains taking the ratio of area used for wheat and coarse grain production. Furthermore, payments from different schemes which benefit one commodity are added up, for example suckler cow premiums, beef slaughter premiums, male beef special premiums, and extensification payments are all attributed to beef and veal.

In order to receive a $/t value, the summarised direct payments for a specific product are divided by the amount of production in the year 2001 (FAO, 2006). The detailed data can be found in *Appendix Tables A4 and A5*. The currency unit used in the LTEM is US$. The exchange rate from € to US$ is assumed to be 1.0.

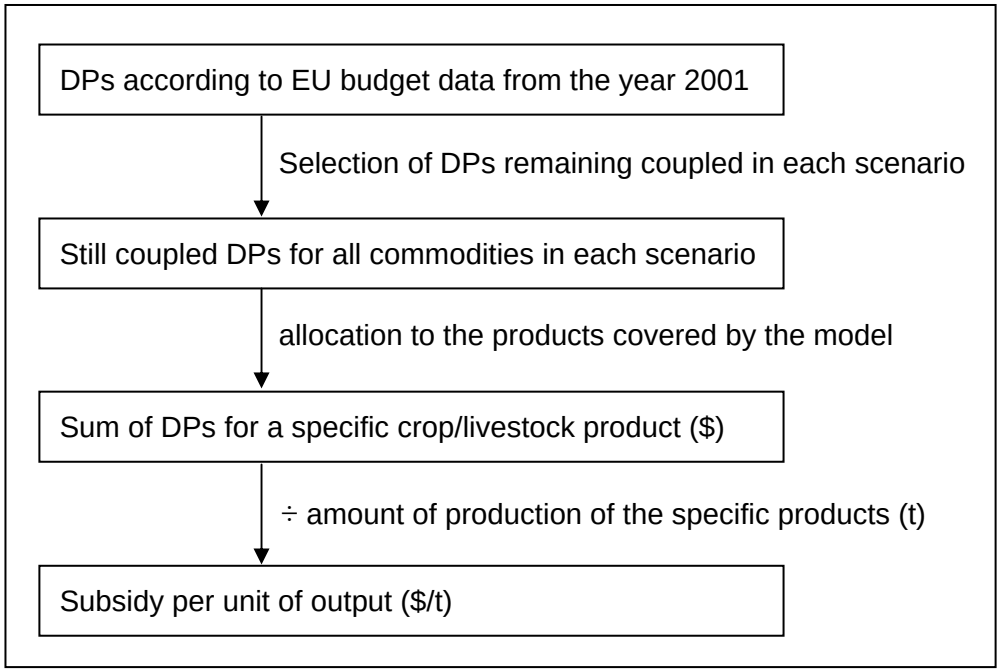

Figure 2: The Path of Calculating the Direct Payments (DPs) Used in the Different Scenarios. Source: own illustration, 2006.

3.4. Scenario Description

The **reference scenario** provides a base case from which all other policy changes can be simulated. It reflects the existing policies before the Agenda 2000 reforms and their continuation up to the target year 2013. The model includes EU minimum intervention prices for butter and skim milk powder, the internal milk production quota, export subsidies and the preferential market access for NZ butter and cheese to the EU. Direct payments from the different schemes are included as 100% coupled.

Table 2 gives an overview about the scenarios. The scenarios 1 to 3 include the 2003 CAP reform and the introduction of the decoupled Single Farm Payment. They vary in the degree of decoupling, since Member States had the possibility to remain some payments partially coupled to production. Compared to the reference scenario, the milk production quota was increased by 1.8% and intervention prices in butter and skim milk powder have been decreased. For comparison, scenario 4 assumes a complete liberalisation in the EU.

The **English implementation scenario** simulates a complete decoupling of direct payments across the EU. England decided to completely decouple all premiums which fall into the single payment scheme. Scenario 1 simulates this situation where all direct payments are given to farmers in form of the SFP and it is assumed that farmers don't use the money to subsidise production. There are no direct payments left which could be attributed to any specific agricultural commodity. Hence, farmer's behaviour is expected to be the same as if there were no direct payments.

The **Austrian implementation scenario** mirrors the Austrian implementation, where certain direct payments for beef remain coupled. It is the intermediate scenario, leaving the suckler cow premium and the slaughter premium for calves completely coupled and the slaughter premium for adults 40% coupled. Several Member States will use the partial decoupling possibility on beef direct payments. Scenario 2 considers only these direct payments for beef, all other direct payments are left away, since they are included in the SFP and it is assumed, that farmers treat them fully decoupled.

The **French implementation scenario** considers the French implementation of decoupling. It models the 2003 CAP reform with the minimal decoupling in the EU. France chose to keep coupled as many payments as possible and in this scenario it is assumed that all the other Member States would have done the same. Some direct payments for cereals, beef and sheep remain coupled. Scenario 3 takes into account these direct payments, neglecting the other direct payments which are assumed to be treated as completely decoupled.

Scenario 4 illustrates the situation of a **complete liberalisation** in the EU. This is not a realistic scenario so far, but it should give a comparison in order to see what changes would be possible with complete liberalisation and how far the 2003 CAP reform already liberalises compared to the Agenda 2000 reform. In this scenario, all agricultural subsidies in the EU are removed, minimum prices are eliminated and the milk production quota is abolished. However, the policies in all other countries are not changed.

Table 2: Scenario Assumptions about Different Degrees of Decoupling in EU Member States

Reference Scenario	Scenario 1 (England)	Scenario 2 (Austria)	Scenario 3 (France)	Scenario 4 (Liberalisation)
direct payments according to pre-Agenda 2000	no direct payments	only direct payments for beef	direct payments for cereals, beef and sheep	no agricultural subsidies at all, no minimum prices

Source: own illustration, 2006.

4. Results and Discussion

The model uses 2000 as the base year and simulates out to 2013. It produces a range of outputs: producer and consumer prices, quantities produced, quantities consumed, quantities traded, and more. Although results are produced for all countries and commodities in the model, selected commodities only will be discussed here (dairy and beef sectors), and only for the EU and NZ. The results are presented and discussed as the differences between the reference case in 2013, and the results of the particular policy scenario simulated, in 2013. The producer returns for the EU and NZ are calculated by multiplying the quantities produced by the producer price. A summary of the results is presented in *Table 3*, while all results are shown in the *Appendix Tables A6 and A7*.

Table 3: Change in Producer Returns from the Market (%) in the Different Scenarios, Compared to the Reference Scenario

EU	**England**	**Austria**	**France**	**Liberalisation**
Raw milk	-0.9	-0.9	-1.0	-11.3
Beef	-21.1	-13.5	-13.4	-64.3
NZ				
Raw milk	-2.0	-2.1	-2.0	1.4
Beef	2.7	1.0	0.9	23.4

Source: Results derived from the LTEM model, 2006.

4.1. English Implementation Scenario

Dairy Sector

This scenario simulated a complete decoupling of direct payments across the EU, like it has been implemented in England. It predicts that milk production will increase by the increase in the quota level. Although the intervention prices for butter and skim milk powder are reduced and the compensating dairy premium is decoupled, the quota still remains binding. The increase in raw milk production also leads to an increase in the production of the processed dairy products (around 2% for butter, cheese and milk powder). The producer price for raw milk falls by 2.7% while the consumer price remains stable. Consumption of dairy products does not change after the reforms and hence the increased production in the EU is exported. The producer returns from the market in the EU decrease slightly in this scenario (-0.9%). However, total farm incomes in the EU don't decrease since farmers in this scenario will get the Single Farm Payment. If the share of the decoupled dairy premium in the SFP is added to the market returns, EU milk producers are even better off in this scenario than in the reference scenario (3.8% increase in total producer returns).

The consequence of the increased exports from the EU is a slight decrease in the producer price for milk products in NZ. NZ dairy production and exports will decrease by between 1.5 and 2.0% as a result of the CAP reforms. The returns to NZ milk producers fall by 2%.

This shows again the effect already noted by Saunders (2005) and Saunders & Mayrhofer (2003): the latest CAP reforms have negative impacts on the NZ dairy sector due to the rise in the internal milk production quota. The quota increase overweighs the effects of a reduction in the intervention prices for butter and skim milk powder and the decoupling of the dairy premium.

Colman & Harvey (2004) argue that the decoupling of dairy premium might encourage some producers to cease production, but it can be expected that milk supply would not be greatly affected, as other producers would take over their milk quota. This will lead to a widespread restructuring of production in many countries, but the impact on the aggregate sector figures is likely to be limited.

Beef Sector

In contrast to the dairy sector, the effects of decoupling have a much larger impact on the beef sector. Before the 2003 reform, producers have been required to have the animal in order to claim the direct payments. This strong link encouraged production, although production effects of the payments were somewhat lessened by limits on eligible animals and other program provisions. As a result of the decoupling, the producer price for beef in the EU falls by 13.7% and this causes beef production to decline by 8.6%. Given reduced beef production, and with imports restricted by tariff rate quotas (TRQs), EU consumer prices for beef rise by 1.3%. Consumption of beef goes slightly down as a response to higher domestic prices. EU beef exports decrease significantly by 31.4%. The producer returns from the market fall by 21.1%. On the other hand, beef producers still get the Single Farm Payment and so their total income will fall only by 9.7%.

Although EU beef exports decrease by over 30%, this has only small implications on NZ exports (they increase by 0.4%). In the beef market, both, the EU and NZ are not such dominant global players like in the dairy market. The decrease of beef supply to the world markets will be mainly compensated by American beef producers, who respond to higher beef prices and hence beef exports from the USA (the main global beef exporter) will increase. However, the producer price in NZ rises by 2.5% in this scenario which leads to a 2.7% increase in producer returns.

4.2. Austrian Implementation Scenario

In Austria, the suckler cow premium and the beef slaughter premium for calves and adults will still remain coupled to production, whereas all other direct payments will be decoupled. The results in the dairy sector are the same like in the English implementation scenario. The only difference in the implementation of the SFP in the dairy sector is that England has already decoupled the dairy premium in 2005 and Austria will wait until 2007 with the decoupling of the dairy premium. But this won't have any effect in the target year 2013.

EU beef production and exports decrease less in this scenario than in the previous one. This shows that the coupled premiums encourage to maintain a higher production level than in case of full decoupling. There is a decrease compared to the reference scenario because only a part of the beef direct payments still remains coupled and not all of them. Beef production goes down by 5.7% and exports

decrease by 21.3%. This leads to a 13.5% decline in the producer returns from the market. Considering the Single Farm Payment farmers still receive, farm income will fall by 6.7%. Like in the previous scenario, the implications on NZ production and exports are negligible. Nevertheless, the returns to NZ producers increase by 1.0% in this scenario because of higher producer prices.

4.3. French Implementation Scenario

In this scenario, parts of the direct payments for beef, cereals and sheep meat remain coupled. Again, the results for the dairy sector can be compared with those from the English implementation scenario. Beef production (-5.4%), exports (-20.4%) and producer returns (-13.4%) will fall to a similar extent as in the Austrian implementation scenario. This shows that there is no difference in EU beef production whether only beef premia stay coupled or if a combination of beef and other premia remains coupled. For NZ, there is almost no difference whether the EU Member States implement the maximum or minimum degree of decoupling: neither in the dairy nor in the beef sector.

The comparison of the French and Austrian implementation scenario with the English implementation scenario shows clearly that EU beef production will be reduced less if the maximum possible share of beef payments is kept linked to beef production. The same results are obtained by the OECD (2004), FAPRI (2003) and European Commission (2005). The OECD estimates EU beef production to fall by 0.6% by 2008 with maximum decoupling and by 0.1% with minimum decoupling. Results obtained by the FAPRI forecast a 2.6% decline in the full decoupling scenario and a 0.2% decline in the minimum decoupling scenario. The European Commission predicts a decrease in the cattle herd as a consequence of beef meat production abandonment mainly in the Member States which have fully decoupled their cattle premiums.

4.4. Complete Liberalisation Scenario

Dairy Sector
The results from this scenario are expected to differ significantly to the previous ones, but in fact the implications on NZ are very small. Milk production in the EU is expected to increase, although the producer price for milk falls by 15.8% as a consequence of the removal of all export subsidies, import tariffs, minimum prices and the milk production quota. Milk production exceeds the current quota level by 7.4% and production of dairy products except whole milk powder increases. The returns to EU milk producers are reduced by 11.3% due to the lower prices. Consumer prices for dairy products fall between 15% and 20%. The lower domestic market prices of dairy products boost consumption in the EU more than production is increased. The consumption of main milk products rises between 6 and 8%. In the case of butter, the EU switches to a net importer. Cheese exports increase slightly, but exports in milk powder decrease significantly.

Surprisingly, the effects of a complete liberalisation in the EU on the NZ dairy sector are minimal. The producer price for milk rises in New Zealand by 1.8%, but there is

little response: neither production nor exports increase. However, the returns to NZ milk producers grow by 1.4%.

Beef Sector

A complete liberalisation in EU agricultural production and trade has significant effects on the NZ beef sector. In this scenario, the beef producer price in the EU decreases by almost 50%, causing production to fall by 30.2%. As a result, EU beef producer returns fall by 64.3%. The consumer price goes down by 40%, which results in a 41.4% increase in consumption. The EU switches from being a big net exporter in beef to being a big net importer. World market prices rise significantly (16.7%), giving NZ producers an incentive to increase production by 5.7%. Finally, NZ beef exports grow by 7.6% and producer returns by 23.4%.

5. Conclusion

The 2003 CAP reform introduced a partial shift from direct aid to European farmers being linked to production to direct aid payments decoupled from production. Farmers are expected to base their production decisions more on market signals rather than CAP subsidies. This should lead to a reduction in outputs, while keeping farm incomes stable. The hypothesis in this study was that a decoupling of direct payments would lead to a lower production in the EU and hence would increase NZ exports of dairy and beef products.

The introduction of cross-compliance links farm support with other societal objectives. In order to get the payments, farmers have to comply with certain environmental standards and maintain their land in good agricultural and environmental condition. However, the impact of cross-compliance on production might be moderate since the required environmental standards have already been existing law in all Member States. New is only that the compliance with these rules since January 2005 is prerequisite for farmers to get the full amount of the SFP.

Modelling results show in the dairy sector that the milk production quota increase in the CAP reform overweighs the reduction in the intervention prices for butter and skim milk powder in combination with the decoupling of the dairy premium. Although the price support in the EU dairy market is slightly reduced, producer prices will remain that high that there still is the incentive to produce at the increased quota level. The result is the opposite of the original assumption: EU exports in dairy products will increase following the reform and this implies NZ exports to fall by 1.5% to 2.0%. As a consequence of lower prices, the producer returns for raw milk decrease in the EU by 1% and in NZ by 2%. The different implementation schemes of the Member States have no influence on this result.

Outputs in the beef sector will be reduced as a result of the 2003 CAP reform. Beef production will become less intensive, with a reduction in the density of cows per hectare, particularly in the Member States which have fully decoupled their cattle premiums (like the United Kingdom). The modelling results show that the reduction in EU beef production, producer returns and exports is less when beef direct payments remain coupled (like in Austria and France). The market changes in the EU, however, are not well transmitted to NZ because other beef producers (like the

USA) are more important in world trade. Nevertheless, the returns to NZ beef producers increase due to higher world prices. NZ producer returns increase with a higher rate if full decoupling in the EU is applied then in case of only partial decoupling.

In another scenario a complete liberalisation of the EU's agricultural markets was simulated. The result is that milk production would be higher due to the abolition of the quota, but consumption would rise to a greater extent due to lower domestic prices in the EU, this leaving the implications on NZ insignificant. A complete liberalisation would lead to a change in the beef market from the EU being a net exporter to being a net importer. As a consequence, NZ beef exports would rise by 7.6% and producer returns by 23.4%.

This liberalisation scenario showed a result significantly different from the other scenarios modelling the 2003 reform implementations, which is explained by the fact that the latter still use important market price support tools. Domestic support and trade measures still prevent market forces from fully guiding production decisions and have implications on the EU's agricultural trade. Particularly in the beef sector NZ could gain from a further liberalisation in the EU.

The results from the modelling of the beef sector have shown that the 2003 CAP reform with the process of decoupling was an important step towards reducing trade-distorting agricultural policy in the EU. It is significant from the point of view of farmers since market forces will play a more important role in their production decisions. Output effects will depend on how farmers will use the money they receive from the decoupled SFP. However, the budget spent on the CAP will remain roughly at the same level from 2007 until 2013.

The Single Farm Payment will play a greater role in the future of the Common Agricultural Policy. The budget for the SFP has already been increased in the recent sugar market reform this year and eventually will rise further in upcoming reforms (wine and fruit and vegetable markets). Since the total budget for the CAP is fixed until 2013, there will be less and less money left over for non-SFP forms of agricultural market support. In addition, the pressure to get rid of export subsidies is significant. The EU agricultural Commissioner has shown willingness to accept the elimination of export subsidies by 2013 in the framework of the WTO Doha Round negotiations. These two factors will constrain the intervention mechanism in the milk market and therefore a further reform in the EU milk sector can be expected. According to the modelling results in this study it is not sure if such a reform is wanted by New Zealanders. A liberalisation in the EU milk sector does not increase New Zealand's exports, but probably would be the end of New Zealand's preferential market access to the EU butter market.

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7. Appendix

***Table A1*: Countries Included in the LTEM**

ID	*Country*	ID	*Country*
AR	Argentina	NI	New Independent States
AU	Australia	NO	Norway
CI	China	NZ	New Zealand
CN	Canada	PO	Poland
CZ	Czech Republic	SL	Slovakia
EU	European Union (15)	SW	Switzerland
HU	Hungary	TU	Turkey
JP	Japan	US	United States
MX	Mexico	RW	Rest of World

***Table A2*: Commodity Coverage of the LTEM**

ID	*Commodity*	ID	*Commodity*
WH	Wheat	WL	Wool
CG	Coarse grains	PY	Poultry meat
SU	Sugar (refined)	EG	Eggs
RI	Rice	MK	Raw milk
OS	Oilseeds	ML	Milk (liquid, other products)
OM	Oilseed meals	BT	Butter
OL	Oils	CH	Cheese
BV	Beef and Veal	MW	Whole milk powder
SH	Sheep meat	MS	Skim milk powder
PG	Pig meat		

***Table A3*: Policy Variables / Parameters and Non-Agricultural Exogenous Variables**

Policy Variable-Domestic Market	*Policy Variables-Border*	*Non-Agricultural Exogenous Variables*
Land set-aside	Import tariff	Gross domestic product
Production quota	Export subsidy	Country price index
Support/minimum price	Trade quota	Population
Producer market subsidy	In-quota tariff	Exchange rate
Producer input subsidies	Export tax	
Producer direct payments		
Producer general services		
Consumer market subsidy		

***Table A4*: Direct Payment Expenditure in 2001 for Selected Schemes in the EU-15 (in million €)**

Scheme	Direct Payments (€)
Suckler-cow premiums	1 705
Additional premiums for suckler-cows	72
Beef slaughter premiums	494
Beef special premiums	1 530
Beef extensification premiums	914
Additional payments to beef producers	148
Ewe and goat premiums	1 050
Ewe and goat premiums in less favoured areas	354
Aid for producers of maize	1 486
Aid for producers of cereals (except maize)	10 018
Aid for producers of soy beans, rape and sunflower seed	1 984
Supplementary aid for durum wheat	1 074
Aid for grass silage	58
Production aid for dried fodder	306
Set-aside	1 536

***Table A5*: Amounts of Production of Selected Commodities in the EU-15 in 2001 (in 1 000 tonnes)**

Commodity	Production (1 000 tonnes)
Raw milk (production quota)	118 392
Beef	7 361
Sheepmeat	1 098
Coarse grains	108 207
Wheat	92 103
Oilseeds	14 473

***Table A6*: Model Results for the EU for the Year 2013 (producer price (pp) and consumer price (pc) in US$; quantity produced (qp), quantity consumed (qc) and quantity traded (qt) in 1 000 tonnes; producer returns (pr) in 1 000 000 US$)**

	Scenarios								
	Ref	**UK**	***% UK-Ref***	**AT**	***% AT-Ref***	**FR**	***% FR-Ref***	**Lib**	***% Lib-Ref***
ppBV	4476	3865	*-13.7*	4103	*-8.3*	4099	*-8.4*	2289	*-48.9*
ppMK	761	741	*-2.7*	741	*-2.7*	740	*-2.8*	628	*-17.4*
ppBT	6152	5970	*-3.0*	5969	*-3.0*	5964	*-3.1*	4932	*-19.8*
ppCH	8626	8374	*-2.9*	8373	*-2.9*	8365	*-3.0*	7097	*-17.7*
ppMW	3275	3168	*-3.3*	3169	*-3.3*	3165	*-3.4*	2561	*-21.8*
ppMS	3743	3628	*-3.0*	3629	*-3.0*	3624	*-3.2*	2964	*-20.8*
pcBV	3816	3865	*1.3*	3841	*0.7*	3836	*0.5*	2289	*-40.0*
pcMK	482	482	*0.0*	482	*0.0*	482	*0.0*	482	*0.0*
pcBT	5987	5970	*-0.3*	5969	*-0.3*	5964	*-0.4*	4932	*-17.6*
pcCH	8417	8374	*-0.5*	8373	*-0.5*	8365	*-0.6*	7097	*-15.7*
pcMW	3178	3168	*-0.3*	3169	*-0.3*	3165	*-0.4*	2561	*-19.4*
pcMS	3636	3629	*-0.2*	3629	*-0.2*	3624	*-0.3*	2964	*-18.5*
qpBV	9598	8774	*-8.6*	9053	*-5.7*	9076	*-5.4*	6696	*-30.2*
qpMK	118392	120505	*1.8*	120505	*1.8*	120505	*1.8*	127173	*7.4*
qpBT	1766	1805	*2.2*	1805	*2.2*	1804	*2.2*	1827	*3.5*
qpCH	7508	7645	*1.8*	7644	*1.8*	7643	*1.8*	7922	*5.5*
qpMW	828	847	*2.3*	847	*2.4*	847	*2.3*	827	*-0.1*
qpMS	987	1009	*2.2*	1009	*2.2*	1009	*2.2*	1021	*3.5*
qcBV	7142	7089	*-0.7*	7119	*-0.3*	7121	*-0.3*	10096	*41.4*
qcBT	1763	1769	*0.3*	1768	*0.3*	1768	*0.3*	1866	*5.8*
qcCH	6214	6232	*0.3*	6231	*0.3*	6233	*0.3*	6585	*6.0*
qcMW	413	413	*0.1*	413	*0.1*	413	*0.1*	446	*8.2*
qcMS	924	925	*0.0*	925	*0.0*	925	*0.1*	985	*6.5*
qtBV	2456	1684	*-31.4*	1934	*-21.3*	1955	*-20.4*	-3400	*-238.4*
qtBT	3	37	*1069.1*	37	*1078.3*	37	*1069.6*	-39	*-1339.5*
qtCH	1309	1427	*9.0*	1428	*9.1*	1425	*8.9*	1337	*2.1*
qtMW	415	434	*4.6*	434	*4.6*	433	*4.4*	380	*-8.4*
qtMS	63	84	*34.2*	84	*34.0*	84	*33.2*	37	*-41.6*
prBV	42959	33911	*-21.1*	37146	*-13.5*	37203	*-13.4*	15327	*-64.3*
prMK	90114	89283	*-0.9*	89272	*-0.9*	89196	*-1.0*	79914	*-11.3*
prBT	10866	10776	*-0.8*	10772	*-0.9*	10761	*-1.0*	9013	*-17.1*
prCH	64763	64016	*-1.2*	64005	*-1.2*	63939	*-1.3*	56222	*-13.2*
prMW	2711	2683	*-1.0*	2684	*-1.0*	2679	*-1.2*	2117	*-21.9*
prMS	3695	3661	*-0.9*	3661	*-0.9*	3655	*-1.1*	3027	*-18.1*

BV = beef and veal; MK = raw milk; BT = butter; CH = cheese; MW = whole milk powder; MS = skim milk powder

***Table A7*: Model Results for NZ for the Year 2013 (producer price (pp) and consumer price (pc) in US$; quantity produced (qp), quantity consumed (qc) and quantity traded (qt) in 1 000 tonnes; producer returns (pr) in 1 000 000 US$)**

	Scenarios								
	Ref	**UK**	***% UK-Ref***	**AT**	***% AT-Ref***	**FR**	***% FR-Ref***	**Lib**	***% Lib-Ref***
ppBV	1532	1571	*2.5*	1552	*1.3*	1548	*1.1*	1788	*16.7*
ppMK	*245*	*244*	*-0.4*	*244*	*-0.4*	*244*	*-0.5*	249	*1.8*
ppBT	1952	1945	*-0.4*	1944	*-0.4*	1942	*-0.5*	1985	*1.7*
ppCH	3188	3168	*-0.6*	3168	*-0.6*	3164	*-0.7*	3213	*0.8*
ppMW	1963	1955	*-0.4*	1955	*-0.4*	1952	*-0.5*	2020	*2.9*
ppMS	2059	2054	*-0.2*	2054	*-0.2*	2050	*-0.4*	2110	*2.5*
pcBV	1527	1565	*2.5*	1547	*1.3*	1543	*1.1*	1782	*16.7*
pcMK	194	194	*0.0*	194	*0.0*	194	*0.0*	194	*0.0*
pcBT	1952	1945	*-0.4*	1944	*-0.4*	1942	*-0.5*	1985	*1.7*
pcCH	3188	3168	*-0.6*	3168	*-0.6*	3164	*-0.7*	3213	*0.8*
pcMW	1963	1955	*-0.4*	1955	*-0.4*	1952	*-0.5*	2020	*2.9*
pcMS	2059	2054	*-0.2*	2054	*-0.2*	2050	*-0.4*	2110	*2.5*
qpBV	658	659	*0.2*	656	*-0.3*	656	*-0.2*	695	*5.7*
qpMK	14689	14441	*-1.7*	14434	*-1.7*	14475	*-1.5*	14624	*-0.4*
qpBT	510	501	*-1.7*	501	*-1.8*	502	*-1.5*	509	*-0.2*
qpCH	457	449	*-1.8*	449	*-1.8*	450	*-1.6*	455	*-0.4*
qpMW	553	543	*-1.8*	543	*-1.8*	544	*-1.5*	552	*-0.1*
qpMS	380	374	*-1.7*	374	*-1.8*	375	*-1.5*	380	*-0.2*
qcBV	78	77	*-1.3*	78	*-0.6*	78	*-0.5*	72	*-8.1*
qcBT	26	26	*0.2*	26	*0.2*	26	*0.2*	26	*-0.7*
qcCH	35	35	*0.3*	35	*0.3*	35	*0.3*	35	*-0.3*
qcMW	1	1	*0.3*	1	*0.3*	1	*0.3*	1	*-1.1*
qcMS	7	7	*0.1*	7	*0.1*	7	*0.2*	7	*-1.0*
qtBV	578	581	*0.4*	577	*-0.3*	577	*-0.2*	622	*7.6*
qtBT	478	469	*-1.9*	469	*-1.9*	470	*-1.6*	477	*-0.2*
qtCH	407	399	*-2.0*	399	*-2.1*	400	*-1.8*	405	*-0.5*
qtMW	552	542	*-1.8*	542	*-1.8*	544	*-1.5*	552	*-0.1*
qtMS	373	366	*-1.8*	366	*-1.8*	367	*-1.6*	372	*-0.2*
prBV	1008	1035	*2.7*	1018	*1.0*	1016	*0.9*	1243	*23.4*
prMK	3597	3524	*-2.0*	3521	*-2.1*	3527	*-2.0*	3647	*1.4*
prBT	995	975	*-2.1*	974	*-2.2*	975	*-2.0*	1010	*1.5*
prCH	1458	1423	*-2.4*	1422	*-2.5*	1424	*-2.3*	1463	*0.3*
prMW	1085	1062	*-2.1*	1061	*-2.2*	1063	*-2.1*	1116	*2.8*
prMS	783	767	*-2.0*	767	*-2.0*	768	*-1.9*	801	*2.3*

BV = beef and veal; MK = raw milk; BT = butter; CH = cheese; MW = whole milk powder; MS = skim milk powder