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THE IMPACTS OF WTO EXPORT SUBSIDY ABOLITION ON THE AGRI-FOOD INDUSTRY IN THE EU: A PRELIMINARY ASSESSMENT

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Abstract: As a part of agricultural negotiations, the WTO members have agreed to phase out all forms of export subsidies. This study evaluates the current level and commitments of subsidised export quantities and subsidy expenditures of the EU, which is by far the largest user of export subsidies. The effects of removing subsidies are studied by a multi-region general equilibrium model GTAP on world-wide, EU wide and on the level of the Finnish agriculture. The results show decreasing prices and production in the EU for subsidised products especially in dairy, grain and meat production and slight increases in their world market prices. The effects for Finland are magnified compared to the rest of the EU and are seen especially in grains production.

Key words: Export subsidies, WTO Negotations, CGE Analysis

Tiivistelmä: WTO:n jäsenmaat ovat neuvotteluissaan alustavasti sitoutuneet luopumaan kaikista maataloustuotteiden vientituen muodoista. Tässä tutkimuksessa analysoidaan tuetun viennin tasoja ja nykysitoumuksia sekä vientitukiin käytettyjä menoja erityisesti EU:n kannalta, joka on selkeästi tärkein vientitukien käyttäjä globaalisti. Tukien poistamisen vaikutuksia on tutkittu numeerisesti usean alueen yleisen tasapainon mallilla (GTAP) niin globaalista näkökulmasta kuin EU:n sekä Suomen maatalouden tasolla. Tulokset osoittavat hintojen ja tuotannon laskua EU:ssa vientitukea saaville hyödykkeille, erityisesti maitotuotteissa, viljoissa ja lihatuotteissa ja näiden maailmanmarkkinahintojen lievää nousua. Suomen osalta tulokset ovat EU:ta voimakkaampia erityisesti viljan tuotannossa.

Asiasanat: Vientituet, WTO-neuvottelut, YTP-analyysi

Tutkimus on saanut rahoitusta Maa- ja metsätalousministeriön maatilatalouden kehittämisrahastosta (MAKERA). Tekijät kiittävät rahoittajaa sekä tutkimuksen tekemistä edistäneitä henkilöitä.

Sisällys

1 Introduction

World Trade Organisation (WTO) members are currently engaged in a new round of multilateral trade negotiations, often referred as the Doha Development Agenda (DDA). The declaration of the 4th Ministerial Conference in Doha in November 2001 – which followed the collapse of efforts to launch a round at the 1999 Seattle meeting – aims to lower barriers to international trade in agriculture, manufactured products and services. In reference to agriculture, the Doha declaration is fairly general in its goals, aiming for "substantial improvements in market access, and substantial reductions in trade distorting domestic support". The language for export subsidies is however more specific, stipulating "reductions, in view to phase out, all forms of export subsidies".

The call for the elimination of all export subsidies by the end of the Doha Round implementing period was further renewed by WTO members in August 2004 when they agreed to the 'Framework for Establishing Modalities in Agriculture' (the 'framework agreement'). Further negotiations are still needed to establish the date by which export refunds must disappear, and the rate at which existing refunds must be phased out. Also included in the framework agreement are new moves to reduce import tariffs and trade-distorting domestic subsidies. The framework paper thus sets out basic principles and concepts for a new WTO deal on agriculture, but without any detail in terms of percentages or precise formulae. A final deal is scheduled to be reached at the next ministerial in Hong Kong in December 2005. Implementation would then possibly start in 2007 over a time frame that has yet to be agreed.

Under pressure from virtually every other participant in the WTO negotiations, the EU took the historic step of agreeing to abandon export subsidies over time. The EU agreed to this after extracting more binding language in the final text to ensure that the export subsidy elements within the US's export credit and food aid programmes are similarly disciplined. The text also states that the monopoly selling powers of bodies like the CWB will be "subject to further negotiation" – a significant concession by Canada.

The present round of WTO negotiations is therefore likely to put an end to export subsidies on agricultural and food products. This paper seeks to evaluate such a policy scenario in isolation from other negotiations chapters. The study examines the overall global economic effects of export subsidy abolition and, for the EU, more precise sector-specific consequences of this policy scenario. The study employs the multiregional numerical general equilibrium model of the Global Trade Analysis Project (GTAP) (Hertel and Tsigas 1997). The results of the simulations describe changing trade flows globally as well as within the EU. The production and trade positions of some member countries as well as groups of countries are illustrated in key agricultural and food products. The analysis aims in bringing

forth the relative and differential positions of different countries as a result of the export subsidy elimination. Effects in Finland are analyzed and compared to the effects in other parts of the EU, particularly in the main producer countries and northern areas of the EU which are most important when considering price changes in Finland. Economy wide effects of the export subsidy abolition are also illustrated by examining the welfare effects of such a policy change.

The paper is organized as follows. Following the introduction, section two briefly discusses the role of export subsidies in the international agricultural trade. In section three we briefly introduce the method and database used for the quantitative analysis. Results of the export subsidy elimination are presented in section four. Section five provides a summary and some concluding remarks for further research in the field.

2 Export subsidies in the WTO negotiations and implications for the EU

The European Union is by far the largest user of export subsidies. Between 1995 and 2001, global export subsidies amounted to over $39 billion cumulatively, of which over 89 % is from the EU (Figure 1). By comparison, the U.S. spent just over $US 556 million on export subsidies between 1995 and 2001, much of it for dairy exports under the Dairy Export Incentive Program (DEIP) and just over $US 10 million subsidizing poultry under the Export Enhancement Program (EEP). Other significant users of export subsidies include Switzerland, which subsidizes dairy products, fruits and vegetables, and other processed food, and Norway, which uses export subsidies for dairy and to lesser extent for non-bovine livestock. Appendix 1 shows the 2001 per-unit export subsidy for selected commodities in the EU.

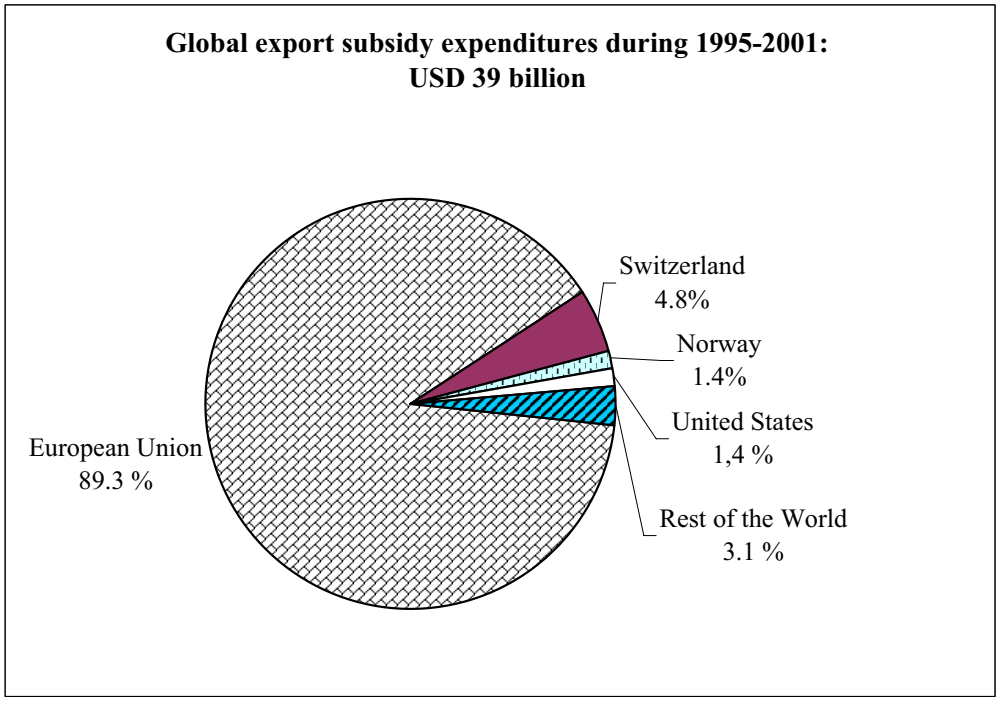

Figure 1. Countries' export subsidy outlays (as a % share of global export subsidy expenditures)

Source: WTO Notifications, USDA 2004

The EU's reliance on subsidies for agriculture stems from the Common Agricultural Policy (CAP). The CAP supports producer prices at levels above world market prices, stimulating production in the EU and resulting in large exportable surpluses of many commodities. The EU has been actively subsidizing the disposal of surpluses in many commodities to the world market, and thus, distorting

trade flows. By using export subsidies, the EU has also been expanding its world market share in agricultural products.

Under the Uruguay Round implementation period, the export subsidy expenditure was reduced by 36 percent and the volume of subsidised export was reduced by 21 percent over a period of six years from 1995 to 2001. The URAA has made it more difficult for countries to resort to direct export subsidies to shore up domestic prices or manage excess supplies. In the following, it will be analysed where does the EU stand currently in regard to the implementation of the present URAA commitments and projected future WTO export subsidy commitments for agriculture.

2.1 Dairy sector

The export subsidy commitments for EU's dairy products are divided into four different categories rather than as a single product grouping: butter & butteroil, skim milk powder (SMP), cheese, and other milk products.

Butter and butteroil

During the implementation of the URAA, both the export subsidy commitments for quantity (volume) and expenditure have not been binding for butter. Figure 2 plots the EU's subsidised export quantities for the marketing years from 1995/1996 to 2002/2003 against the allowable quantities for these years. The actual subsidised export quantities for butter and butter oil ranged between 30 to 73 percent of the quantity commitments during the period.

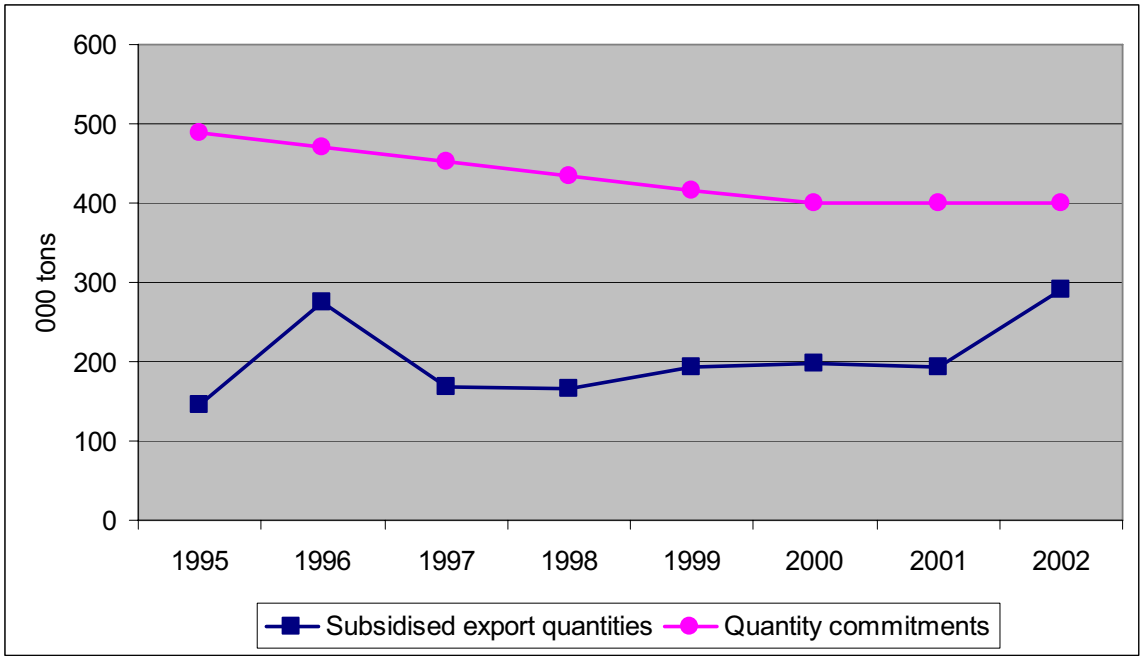

Figure 2. Actual subsidised EU-15 butter and butter oil exports versus quantity reduction commitments, 1000 t (WTO notifications)

In addition, the export subsidy expenditures for butter and butter oil have been between 18 to 58 percent of the budgetary commitments for the marketing years from 1995/1996 to 2002/2003 (Appendix 2). For example in 2002/2003, the volume of subsidized quantity exports was 292 000 tons and the actual export subsidy expenditure was Euro 545 million compared to quantity and budgetary commitments of 399 300 tons and Euro 948 million, respectively. The reason for the slack in the export subsidy commitments for butter was that the calculations for the base year commitments were higher compared to the actual level of exportable surpluses (Huan-Niemi et al. 2000).

Skim milk powder

Volume and expenditure commitments for skim milk powder reflect an irregular trend during the URAA implementation period as figure 3 below shows. Marketing year 1999/2000 in particular is characterized by excessive quantity and budgetary overruns. However, from marketing years 2000/2001 to 2002/2003, the volume of subsidized exports was between 32 to 81 percent of the quantity commitments and the export subsidy expenditures were between 9 to 59 percent of the budgetary commitments for skim milk powder.

The breach of the export subsidy commitments for skim milk powder in marketing year 1999/2000 (quantity by 46% and budgetary by 12%) occurred because of the EU's use of the "roll-over"4 feature. The EU utilised this prerogative in

order to empty the storage of skim milk powder accumulated from market intervention. In 2002/2003, the volume of subsidized export were 220 000 tons and the actual export subsidy expenditure was Euro 163 million compared to the export subsidy commitments of 272 500 tons and Euro 276 million (Appendix 2).

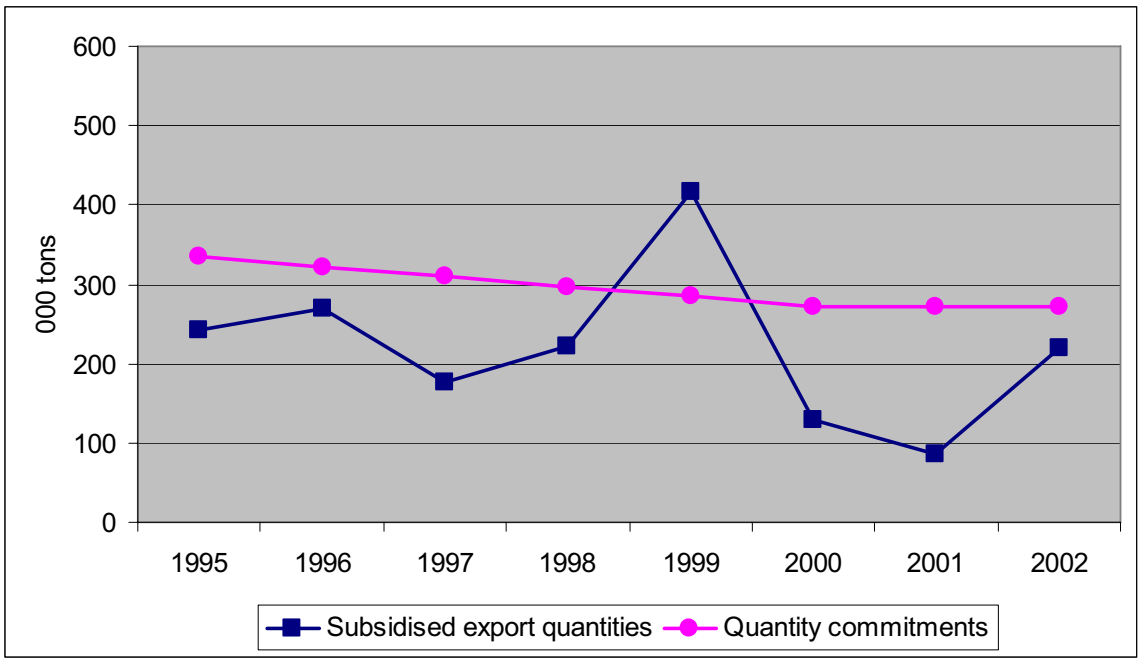

Figure 3. Actual subsidised EU-15 skim milk powder exports versus quantity reduction commitments, 1000 t (WTO notifications)

Cheese

The EU has been cutting the export subsidy expenditures for cheese in order to avoid breaching the quantity commitments for cheese and curb over-production. The actual export subsidy expenditures for cheese declined from 74 to 34 percent of the budgetary commitments from 1995/1996 to 1998/1999, but expenditures have increased again in recent years. In 2002/2003, the actual export subsidy expenditure was EUR 268 million compared to commitments of EUR 344 million. In comparison, the actual subsidised export quantities for cheese hovered between 87% and 99% of the quantity commitments (Figure 4). In fact, the inward processing relief (IPR) system1 has helped the EU to circumvent the binding quantity commitments for cheese by giving the illusion that the actual subsidised export quantities were declining or remaining within the stipulated range during the implementation period (Huan-Niemi et al. 2000).

[1] This scheme allows the importation of third country products tariff-free, processed in the EU and exported without a subsidy. However, the EU has had to use export subsidies on some of the reprocessed cheese claiming that it is an amalgamation of butter, skim milk powder, and natural cheese (Leetmaa, S.1998). Ordinarily, neither component nor finished product is entitled to any subsidy when exported.

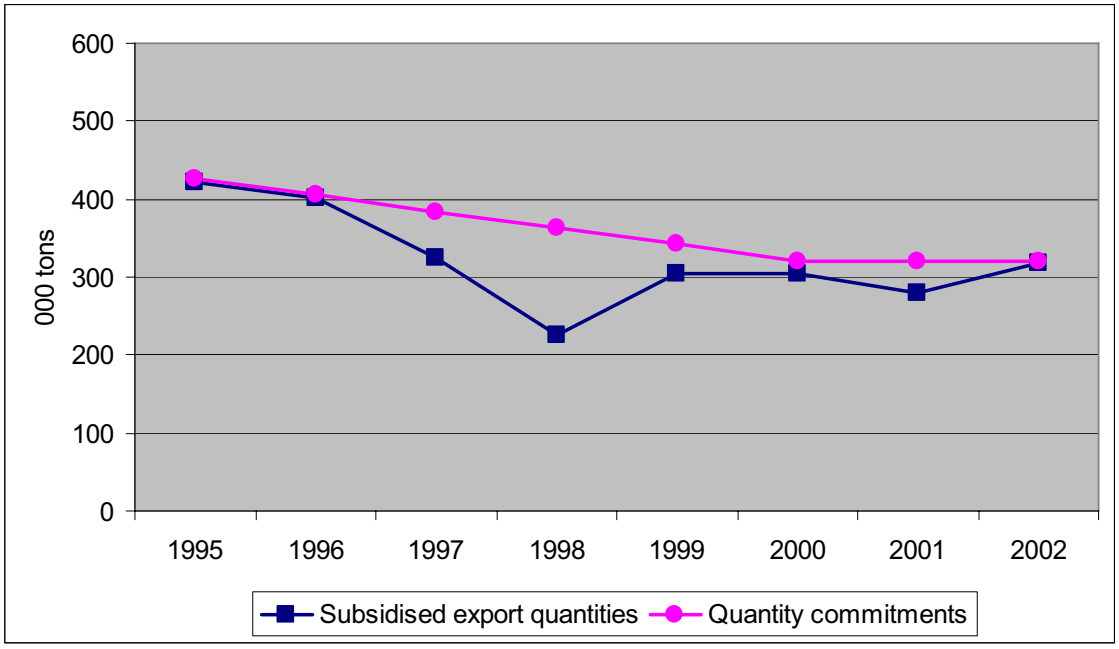

Figure 4. Actual subsidised EU-15 cheese exports versus quantity reduction commitments, 1000 t (WTO notifications)

Other milk products

The EU has been facing difficult challenges in case of other milk products as the EU has been struggling to stay within the URAA commitments. The category of other milk products is a combination of various dairy products including fresh milk, whole milk powder, condensed milk, and others (casein, yoghurt, etc). The actual subsidised exports have been between 87 to 110 percent of quantity commitments (Figure 5). The quantity commitments have been binding for the EU where the URAA commitment was breached in the marketing year of 1999/2000. The actual export subsidy expenditures for other milk products have ranged from 58 to 119 percent of the budgetary commitments (Appendix2).

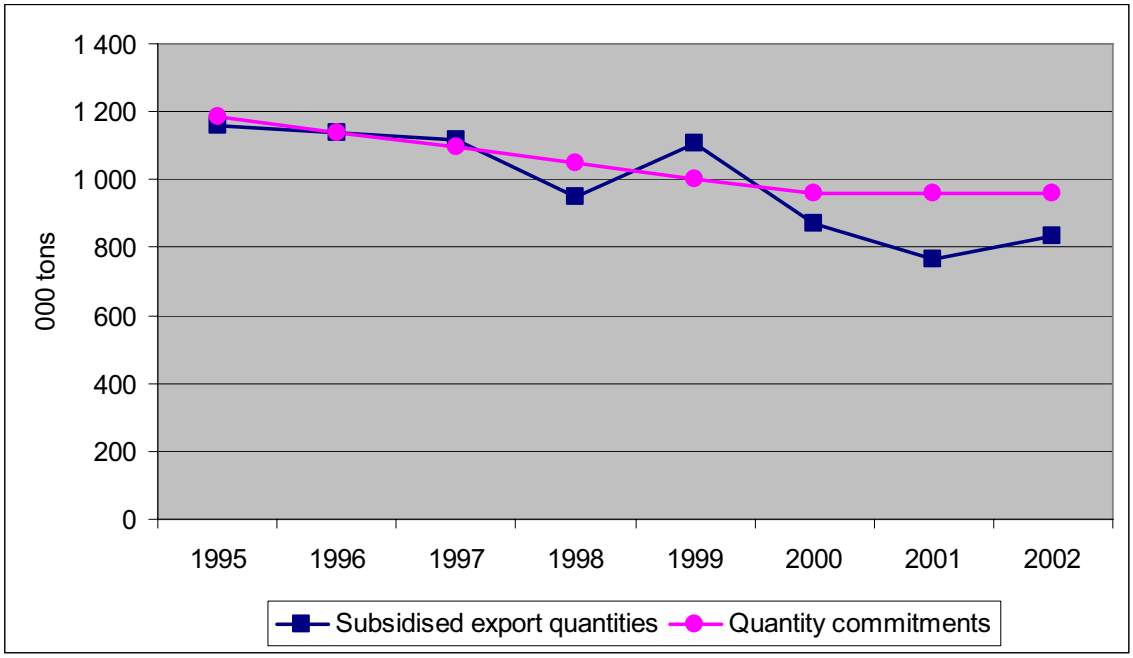

Figure 5. Actual subsidised EU-15 other milk products exports versus quantity reduction commitments, 1000 t (WTO notifications)

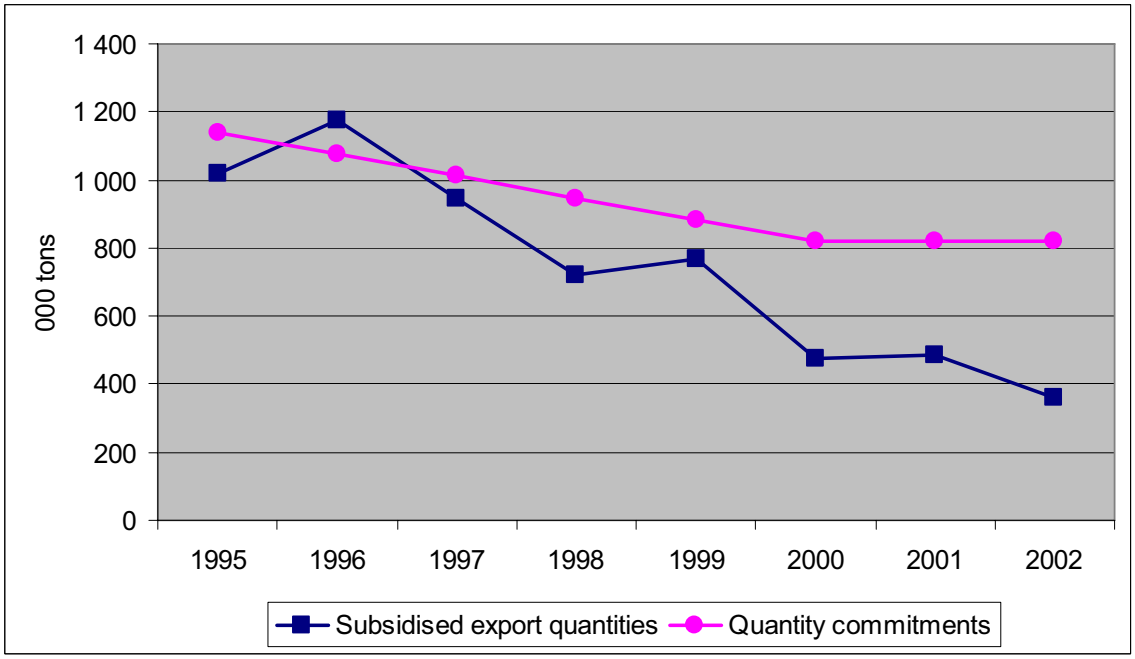

Figure 6. Actual subsidised EU-15 beef exports versus quantity reduction commitments, 1000 t (WTO notifications)

2.2 Meat sector

Beef

The EU has been cutting the actual subsidised export quantities for beef have from 110 percent of the quantity commitment in 1996/1997 to 44 percent in 2002/2003 (Figure 6). The breach of commitment in 1996/1997 was caused by the BSE crisis that resulted in a drastic decline in consumption. In addition, beef production at the time was at the peak of its production cycle (Huan-Niemi & Niemi 2001). In the marketing years 2000/01 and 2002/03, the actual subsidized quantity has ranged between 44 and 58 percent of quantity commitments. The actual export subsidy expenditures for beef have ranged from 85 to 23 percent of the budgetary commitments (Appendix 2).

Pigmeat

The actual export subsidy expenditures and actual subsidised export quantities for pig meat have been well beneath the URAA commitments in recent years (Figure 7). From marketing year 2000/2001 to 2002/2003, the actual subsidised export quantities have been between 14 to 29 percent of the quantity commitments, and the export subsidy expenditures have been only between 8 to 18 percent of the budgetary commitments.

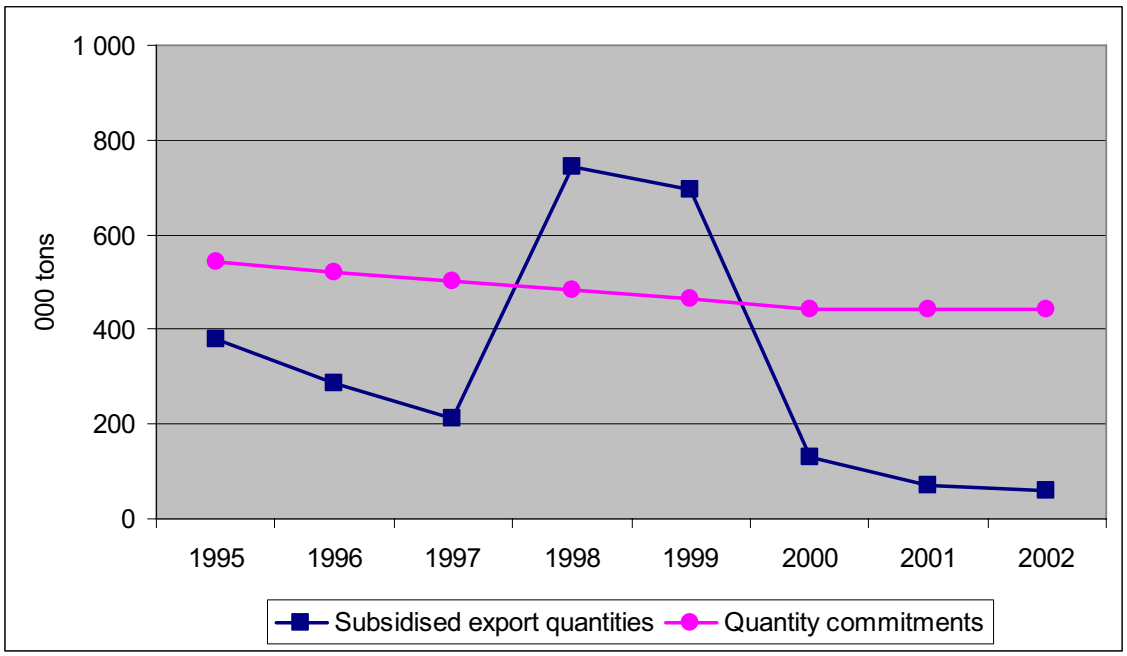

Figure 7. Actual subsidised EU-15 pigmeat exports versus quantity reduction commitments, 1000 t (WTO notifications)

However, in marketing years 1998/1999 and 1999/2000, both the budgetary and quantity commitments were breached with huge sums. In 19998/1999 the budgetary commitment was breach by a total of EUR 125.8 million (55%) and the quantity commitment was breach by a total of 259,900 tons (54%), but the EU had EUR 561.9 million and 689,600 tons of unused stocks from the previous marketing years to be rolled over to the breach year.

The amount (quantity and budgetary) of subsidized pigmeat for export corresponds with the cyclical nature of pig meat production. When there is an oversupply of pigmeat in the EU market, export subsidy is used to export the overproduction. The subsidized amount of pigmeat for export increased tremendously in 1998/1999, as the European Commission actively supported exports of pigmeat. This was also characterized by a depressive effect on world market prices. For other countries in the pig meat market, the EU production overruns and use of export subsidies have created losses in price competitiveness, potential export growth and in market share. The EU has made major market inroads particularly in Korea and in Hong Kong.

Poultry meat

The poultry meat markets, just as the beef sector, are characterized by irregularities arising from disease outbreaks such as avian flu. The EU poultry sector continues to face competition from low-cost producers such as Brazil and Thailand. However, this market trend is likely to change, maintains one OECD study, as new members countries such as Hungary, with low production costs, contribute to the EU poultry sector. However, this is contingent upon their ability to meet EU production and marketing standards. In general, the poultry meat market, which is a low production cycle, allows producers to quickly respond to market signals.

The actual subsidized export quantities for poultry meat have been between 81 to 105 percent of the quantity commitments for the covered period (Figure 8). The quantity commitment for poultry meat was breached in marketing year 1997/1998. The total breached amount was 18,600 tons (5%), but the EU had 19,700 tons of unused amount rolled over from previous marketing years to the breached year (Huan-Niemi et al. 2000). The actual export subsidy expenditures for poultry meat have been between 57 to 100 percent of the budgetary commitments (Appendix 2).

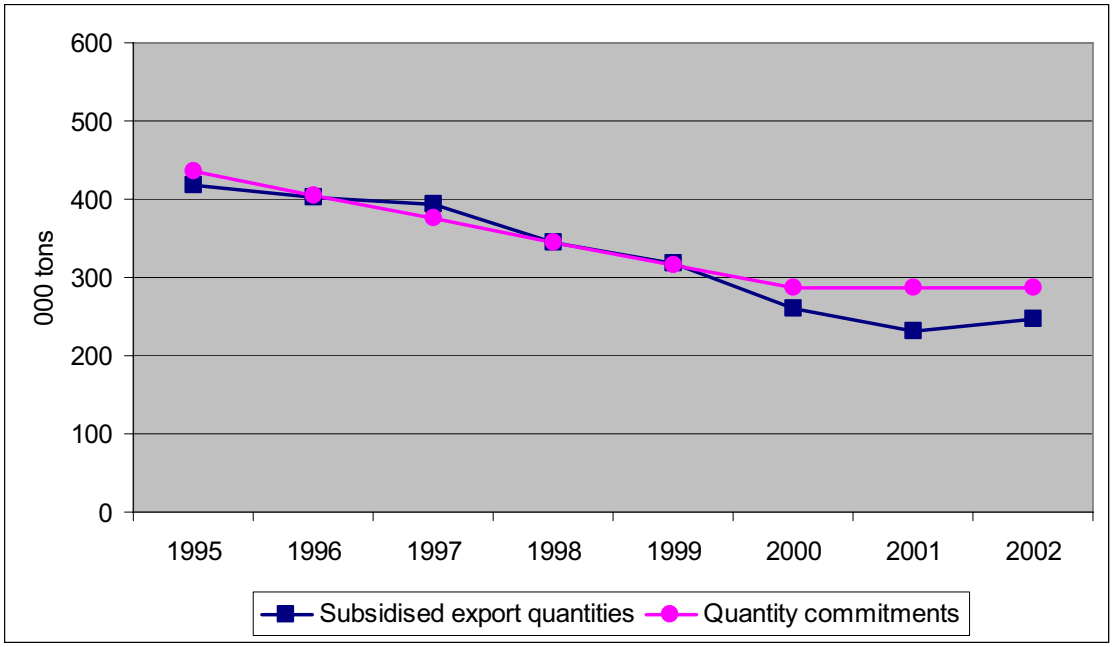

Figure 8. Actual subsidised EU-15 poultry meat exports versus quantity reduction commitments, 1000 t (WTO notifications)

2.3 Cereals sector

Wheat and wheat flour

The export subsidy budgetary commitments for wheat and wheat flour were not binding during the implementation of the Uruguay Round Agreement on Agriculture. EU's dependence on export subsidies in the export of wheat has clearly decreased over the years. From marketing years 1999/2000 to 2002/2003, the export subsidy expenditures for wheat decreased from 34 to 11 percent of the budgetary commitments. The subsidised export quantities for wheat have ranged from 11 to 100 percent of the quantity commitments during the same period. It is only in marketing year 1999/2000 that the quantity commitment was fully utilised (Figure 9).

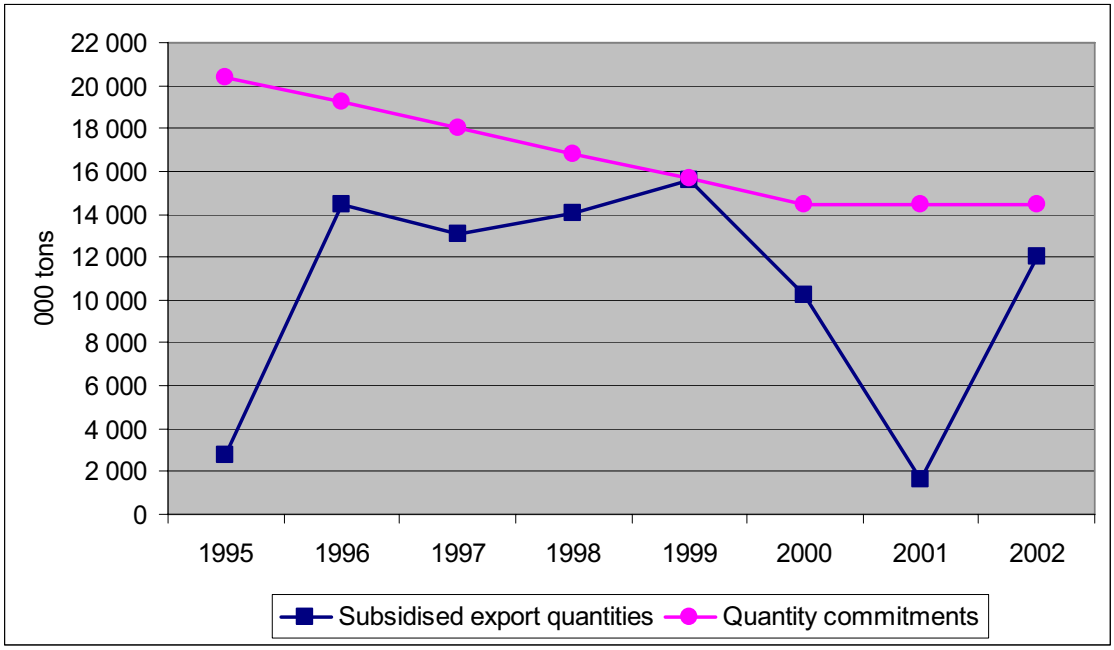

Figure 9. Actual subsidised EU-15 wheat exports versus quantity reduction commitments, 1000 t (WTO notifications)

The EU's dependence on export subsidies in the export of wheat is expected to decrease in the coming years. Both FAPRI and OECD have projected rising world prices for wheat in the coming years. As a result of Agenda 2000 Reforms in the Common Agricultural Policy, the EU internal price for wheat is now closer to the world market price, thus eliminating the need for export subsidies when world price is at the same level as EU market price for wheat. The recent strength of the Euro has, however, made it more difficult for the EU to export wheat without any export refund at all.

Coarse Grains

Under the URAA, both the export subsidy commitments for volume and expenditure for coarse grains were not binding at the beginning, but the quantity (volume) commitments became very binding by the end of the decade. Figure 10 shows a sharp decline in the quantity of subsidized exports before it begun to settle beginning marketing year 2000/2001. As the quantity commitments were not binding, the EU was able to increase its budgetary expenditure as reflected in marketing years 1995/1996 to 1999/2000. During this period alone, expenditure for coarse grains increased from 19 to 63 percent of the budgetary commitments. Subsidized export quantities also increased from 48 to 161 percent of the quantity commitments. Nonetheless, the EU had 12 151 300 tons of under utilised commitments rolled over from previous marketing years for the breached years (Huan-Niemi & Niemi 2001). Coarse grain production trends after 1999 were

mainly influenced by the implementation of Agenda 2000, which advocated for reductions in direct market intervention and increased acreage payments.

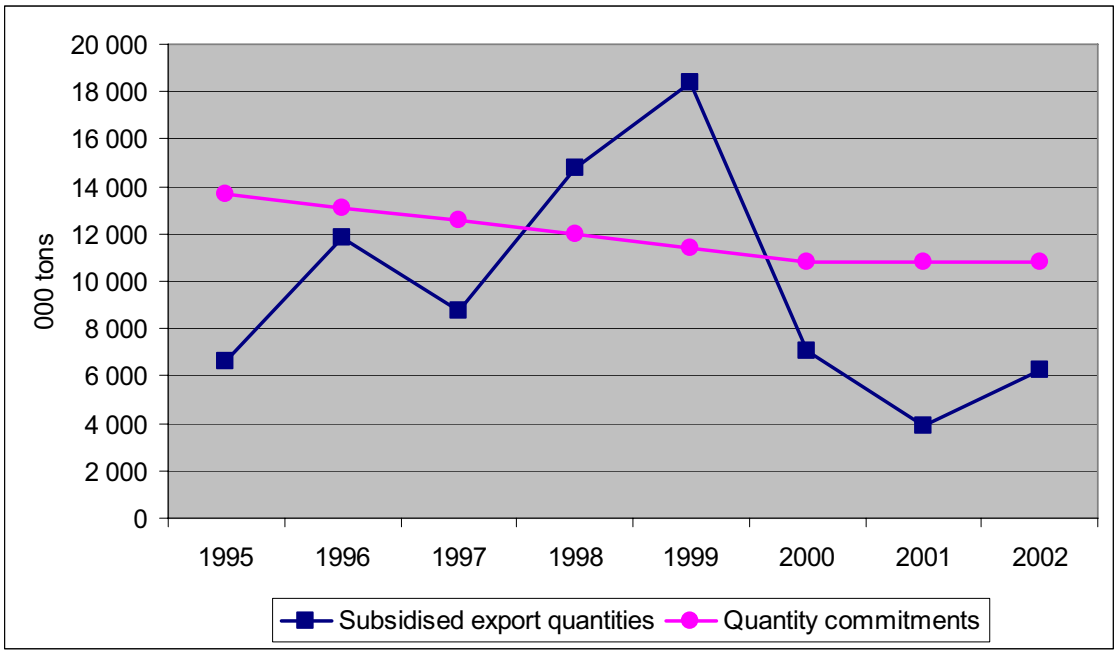

Figure 10. Actual subsidised EU-15 coarse grain exports versus quantity reduction commitments, 1000 t (WTO notifications)

3 Economic effects of removing export subsidies – methodology and database

In this study we analyse how the abolition of export subsidies affects the economies within the EU and agro food industries in general. Instead of looking at the stringency and cuts in current commitments for the WTO we take a snapshot of the levels in subsidies and model the behaviour in the economies if no subsidies were admitted any more. In this chapter we present the structure of the model analysis and the conclusive chapter we discuss some the themes that have not been taken into account here. One of such questions is e.g. how much the future and current commitments in other areas of agricultural negotiations like domestic support will affect the needed cuts in export subsidies. This chapter is divided to first tackle the theoretical analysis of export subsidies following by the model description and implementation.

3.1 Qualitative analysis

The figure 11 gives a stylized picture of the effects of export subsidies both on world market and in net exporting and importing countries. For purposes of this analysis, it is assumed that the EU is a net exporter of a product. This trade position could be a result of domestic subsidies that have moved the supply curve from original S_o to S (EU Market –graph). The export volume is the difference between the quantity demanded and supplied at price P_w.

With different domestic prices, the export supply schedule can be derived (XS). Respectively, the foreign market that is a net importer of the product, demands it from a global market according to demand for imports schedule MD. The imports are also depicted as the difference between supply and demand in the foreign market (as indicated in the graphs below). Globally, the markets balance so that exports equal imports. This analysis is a combination of partial equilibrium analysis in single markets (EU, Foreign) and a general equilibrium analysis globally. From the EU perspective, the export subsidy is a higher price P_E given to domestic producers with the resulting effect of increasing the global supply.

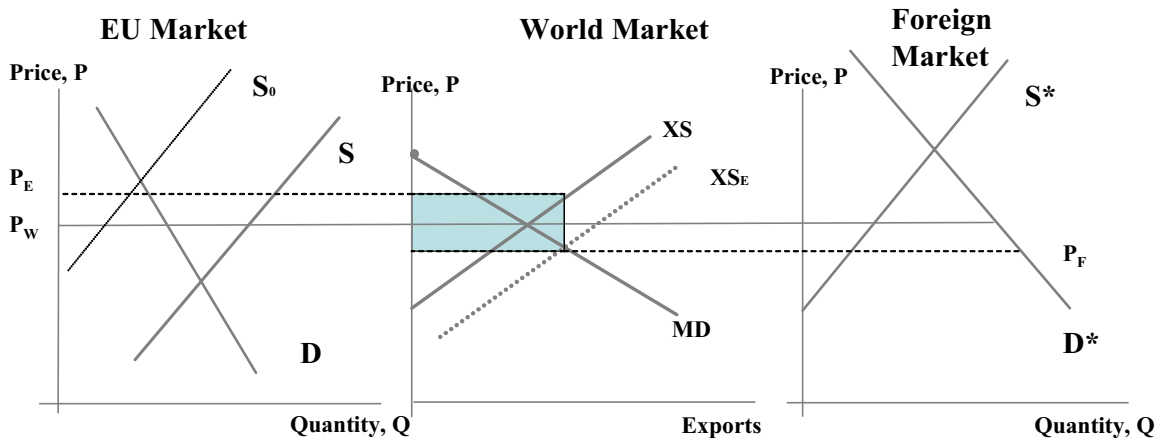

Figure 11. Effect of export subsidy in EU and world markets.

This subsidy moves the XS curve right to XS_E due to increased supply from the EU market. To absorb this increasing supply in the foreign market, the price of imports in foreign market decreases to P_F. The export subsidy drives a wedge between the price EU producers get (P_E) and the importers pay (P_F). The monetary costs of the subsidies are represented by the shaded area.

The effects of reduction in the subsidy can be analysed from the illustration above. Reducing a subsidy of a product in the EU market moves the XS_E curve to the left, reducing exports and decreasing the price producers get in the EU Market. This scenario is also likely to increase the price other countries pay for imports, i.e. there is an increase in the world market price. In the EU market the supply decreases and manpower is able to move from agriculture to other industries. The movement of resources into and out of a line production may cause minimal price cycles for factor costs, but this is rather negligible. As factors of production move from agriculture to other industries, the agricultural sector is able to stabilize and demand picks up without any major disruptions in price levels or factor costs. These possible scenarios render the consumers able to continue paying lower real prices for the raw material component of their food.

The computable general equilibrium analysis expands these market reactions by giving quantitative evaluations of each of these effects. This simulation further explains the connection between product prices and factor prices for land, labour and capital. The price system reveals how the prices of production factors are transferable to the final goods or food product prices. The simulation results facilitate understanding of the relative magnitude that both demand and supply can bring to bear on wider markets. Their relative resulting differences would identify the linkages from primary production to processed food industry through the input-output structure in the economy.

The welfare analysis is also numerically evaluated in the quantitative analysis that follows. In these simulations, export subsidies are considered to be exogenous variables that have an effect on the quantity produced. The following analysis thus assumes that both the quantities and expenditures are controlled.

3.2 Quantitative analysis

The effects on the markets when subsidies are removed are dependent on the model specification and the parameters defining the magnitude of the shocks. The multi-region and multi-sector general equilibrium model (GTAP) is used to analyze the changes made to the EU sugar regime. The GTAP model and database are standard tools for analysis in the changing world of commodity markets.[2] The standard model assumes a competitive environment where consumers and firms take prices of goods and factors of production as given. It is assumed that the outcome of the model is one of optimizing behaviour by firms and consumers restricted by their resources (land, labour, capital, natural resources), restraints (taxes etc.) and their objective functions. Based on these objectives, utility or profit maximization, the new outcome in the model as a response to changes, can be derived by behavioural equations that depend a lot on the elasticities used.

Different trade policies as well as domestic policies are implemented to the model and database as price wedges between different prices, e.g. the domestic and world market price. Exogenous changes such as trade liberalisation affect the relative prices between regions and commodities and the behaviour of consumers and producers within economies to produce a new equilibrium to the economy. Different regions in the model are combined by bilateral trade flows and the demand structure in foreign trade differentiates between commodities imported from different sources. This enables the equilibrium to remain in non-specialized pattern of trade where substitution possibilities play a central role.

Several specific features of the European agricultural markets, especially the Common Agricultural Policy, make the case for fully adjusting markets a suspicious one. The standard model is perhaps a good starting point for such an analysis. The GTAP network offers several options to continue modelling other simulations on the Common Market and how wider market policy changes may influence the behaviour of single farm households.

The GTAP database version 6.0 is a cross-section of data from year 2001 collecting balanced values for bilateral trade flows in sectors and description of the economies. The database includes 87 regions and 57 sectors that, in this study,

[2] Applications and references to the model structure can be found at the GTAP project webpage; http://www.agecon.purdue.edu/gtap. Hertel and Tsigas (1997) describe the model. Dimaranan and McDougall (2005, forthcoming) describe the GTAP Database.

have been aggregated to 11 regions and 14 sectors as shown on Table 3. All sectors, such as the dairy sector, are aggregates of several products, which in the case of export subsidies make the results more indicative than predictive.

Table 1. Regions and Sectors in the study

Regions	Sectors
EU -15	Wheat
Rest of ACCEU, Croatia	Other grains
Switzerland, Norway, Iceland	Vegetables, fruits,nuts
USA	Other crops
Mercosur (excl. Paraguay)	Raw milk, cattle
Australia and NZL	Animal products, nec
Russia	Bovine meat
China and Honkong	Other meat products
India	Dairy products
LDCs in Africa	Sugar
ROW	Other food
	Resources
	Manufacturing
Further disaggregations	Services
Finland	
France	
Germany and Austria	
Northern EU	
Southern EU	
Poland	
Rest of ACCEU	

Source: GTAP Data Base 6.0

In country aggregation, it is assumed that collective leverage renders export subsidy negotiation more meaningful; the EU, the United States and EFTA countries (comprising of Iceland, Norway and Switzerland). Mercosur, Australia and New Zealand are considered largest exporters in agricultural products, whereas Russia is an example of a single large country importing subsidised products from the EU market. For further analysis within the EU, we have disaggregated the EU to Finland and other five regions (see table above). Also Poland was disaggregated from other Eastern European countries.

The export subsidies are part of the database implemented as a price wedge between the value of exports f.o.b. and world market price. This is a measure of the export subsidy rate reported in the table 4 below. The data for export subsidies are collected from the 2000/2001 notifications to the WTO and compared to the f.o.b value of exports for 2000/2001 using UNCTAD trade data. Few assumptions on dividing the subsidies among the EU countries have bee made. First, the trade within Europe has been neglected in evaluating the export subsidy rates. It

has also been assumed that the subsidy is not dependent on the destination country. The notifications have been divided to all of the trade in each sector, i.e. all products in dairy sector are assumed to enjoy a similar rate of subsidy.

The export subsidy rates give the first impression of the impacts of their removal. The trade shares for selected commodities are listed after the rates. The EU is the largest trade in almost all of the agricultural goods. The bovine meat, where the figure may not present most recent rates, receives the highest subsidies. Their removal is likely to have an impact, especially for Australia / New Zealand which are also large exporters. The dairy sector is the highest user of export subsidies and this is a major export sector for the EU; accounting for two thirds of global trade. The EFTA countries exhibit large single rates with minimal share in global trade, thus their removal does not affect the global markets significantly.

Table 2. Export subsidy rates and trade shares for selected commodities and regions

	EU		REU		EFT		USA		MERCOSU	AUSNZ	
	ESR	Trade share	ESR	Trade share	ESR	Trade share	ESR	Trade share	Trade share	"	Sum of shares
Wheat	8,63	*24*		*1,9*		*0,1*		*23,6*	*10,7*	*10,3*	*..100*
Other grains	33,39	*20,2*	0,01	*1,7*		*0,3*		*41,3*	*14,2*	*3,8*	*..100*
Vegetables, fruits, nuts	2,31	*34*		*1,2*	125,5	*0*		*10,8*	*2,9*	*3,3*	*..100*
Other crops		*17,9*		*1,1*		*0,4*		*17,3*	*11,7*	*3,2*	*..100*
Milk and cattle		*33,5*	0,02	*4,8*	94,28	*0,3*		*11,1*	*0,6*	*10,5*	*..100*
Animal products, nec	0,67	*29,3*		*2,7*		*0,8*		*17,1*	*1,9*	*16,8*	*..100*
Bovine meat	84,62	*31,6*		*0,9*	3,9	*0,5*		*18,4*	*8,7*	*24,8*	*..100*
Other meat products	5,68	*52,6*	0,17	*3,8*	11,27	*0,2*		*13,7*	*5,9*	*1,5*	*..100*
Dairy products	30,78	*67,2*	2,09	*4,1*	30,99	*1,5*	7,83	*2,8*	*1,6*	*14,9*	*..100*
Sugar	60,22	*14,2*	6,73	*1,2*		*0,1*		*4,1*	*18,3*	*10,5*	*..100*
Other food	2,31	*41,7*	0,13	*2,1*	0,58	*2,4*		*9,4*	*5,4*	*2,4*	*..100*
Resources		*6,4*		*0,6*	0,24	*6,8*		*1,6*	*2*	*4,5*	*..100*
Manufacturing		*37,3*		*2,6*	0,13	*2,1*		*12,5*	*1,1*	*0,7*	*..100*
Services		*40,9*		*2,7*		*3*		*17,6*	*1,1*	*1,5*	*..100*

4 Results of the export subsidy elimination scenario

4.1 Global effects of removing export subsidies

The results in Table 3 suggest that the removal of export subsidies alone, while keeping in place other policies, raises world prices, lowers volumes of world trade, but increases world supply. World prices for dairy products increase by 4.2%, sugar increases by 1.1 % and coarse grains also increase by 1%. To a lesser extent, prices for bovine meat also rise by 0.8% and other meats by half a percentage point. World markets for dairy products are significantly affected by export subsidies because the EU is the world's largest agricultural market and the largest user of export subsidies. Subsidy rates in the EU for dairy products are as high as 30 per cent. The EU also has a substantial global market share for most dairy products. In effect, the removal of export subsidies for the respective markets would hurt those sectors relatively more.

Table 3. Global effects of removing export subsidies

	Global supply	Global Trade	Global price index
Wheat	0,12	-1,65	0,39
Other grains	0,03	-1,67	1
Vegetables, fruits, nuts	0,03	-0,25	0,19
Other crops	0,05	-0,31	0,08
Milk and Cattle	-0,02	-0,79	0,21
Animal products, nec	0,05	-0,34	0,12
Bovine meat	-0,12	-2,76	0,79
Other meat products	0,06	-2,08	0,54
Dairy products	0,08	-8,96	4,19
Sugar	0,01	-1,91	1,08
Other food	-0,02	-0,55	0,24
Resources	-0,03	0	0
Manufacturing	0	0,02	0,01
Services	0	-0,02	0,01

Source: Authors' simulations, GTAP model

Overall, the changes in world market prices as a result of export subsidy elimination are quite minimal. This can be partly attributed to the model structure, which assumes that the outcome is driven by the demand conditions and that supply only reacts to these changes. Incidentally, this is contrary to most partial equilibrium model results, which assume supply capacity to be fixed and price reactions to be much larger. In effect, the general equilibrium model results may be regarded as long term.

Global agricultural trade volumes are slightly lower under the export subsidy elimination scenario with the largest decrease in trade volume. These results show a decrease in dairy products of 9.0%, bovine meat decreases by 2.8% while other meats indicate a decrease of 2.1%. Considering the largest share of export subsidies paid by the EU, it is clear that the EU domestic markets are most affected by their removal in absolute terms (see Appendix 3). Exports of all the grains and processed food decrease under this scenario.

For many other exporters, such as Australia, the United States (US), and the MERCOSUR countries, higher world prices increase the volume of exports. Trade in dairy products decreases globally, though much of the decrease in the EU is compensated by increasing exports from Eastern Europe, USA, Mercosur countries, Australia /New Zealand as well as the rest of the world.

Australia would gain larger market shares in grains, other meat, dairy and sugar. The USA would gain larger share of agricultural products in most commodities except vegetable, other crops and milk and cattle but their industries are not that significant. The least developed countries (LDCs) would also gain market share in grains, and processed food.

In the EU, removing export subsidies lowers domestic prices and lowers output as productive resources are re-allocated from sectors like sugar, dairy, grains and into other sectors. For many other countries (such as Australia, the US, Russia, China and the MERCOSUR group) higher world prices stimulate domestic production, offsetting the EU output decline. Appendix 4 demonstrates the resulting production changes once the exports subsidies have been removed. The extent and scope of output expansion, or contraction, varies differently among countries. For net food importing LDCs (NFILDC), higher world food prices, following export subsidy removal, is the mostly likely market reaction. While this might stimulate domestic production, short term high prices may put pressure on their foreign currency reserves. In the long-run however, production would be assumed to resume particularly in response to high world market prices. In other LDCs, domestic output would increase in dairy, grains and meat sectors, as factors resources (machinery and labour) shift away from other sectors to take advantage of the rising prices for agricultural products.

For many countries, there is only a very modest increase in production, only up to 1 % for most commodities. For the case of dairy products, however, export subsidy elimination increases production by 29% in LDCs, 13% in Australia/New Zealand, by 7 % in China, and 5% in Russia. The 13 per cent increase in Australia and New Zealand demonstrates that those two countries are likely benefit under this scenario. The remarkable increase in LDC production does not represent all least developed countries, but those that have the capacity and competitiveness to do so. It is also possible that over time economic circumstances are likely to lean in their favour. In general, the aggregation of countries and re-

gions does not capture the production in specific output areas, but only provides the likely general economic trend resulting from elimination of export subsidies.

4.2 Implications for EU agriculture

The implications of export subsidy removal for agri-food markets in the EU from this study are shown in Table 4, along with results from previous quantitative studies on global export subsidy elimination. Generally, the phasing out of export subsidies will significantly decrease domestic prices and will have negative impacts on both production and exports in the EU. The impacts on domestic consumption are moderately positive. Even if the general directions of impacts are quite similar, results from previous studies are remarkably different from our own. It should be recognised that the underlying models differ in many respects, and several factors have a substantial bearing upon model predictions and outcomes.

Table 4. The impacts of export subsidy elimination for the EU according to different studies (differences in percentages from the benchmark)

Study	OECD 2000	Binfield et al. 2001	Gohin and Meyers 2002	Jensen and Yu 2005	Kerkelä, Lehtonen and Niemi 2005
Wheat					
EU price	-3.0	-7.0	0.0	NA	-1.0
EU production	NA	0.0	-0.3	-0.6	-5.4
EU consumption	NA	0.0	-0.4	NA	+0.1
EU exports	+14.0	+3.0	+0.4	-21.5	-13.0
Coarse grains					
EU price	-14.0	-9.3	-2.3	NA	-1.0
EU production	NA	0.0	-2.3	-3.6	-5.7
EU consumption	NA	0.0	+1.5	NA	+0.1
EU exports	-59.0	NA	-71.6	-7.0	-16.5
Beef					
EU price	-14.0	-17.0	+1.6	NA	-0.4
EU production	-6.5	0.0	-0.2	-3.3	-3.0
EU consumption	NA	0.0	-0.2	NA	+0.1
EU exports	-72.0	-70.0	-14.2	-3.1	-16.6
Pork/Poultry					
EU price	+2.0	NA	-0.4	NA	-0.3
EU production	-4.7	NA	+0.2	+0.4	-1.2
EU consumption	NA	NA	+1.5	NA	+0.1
EU exports	-32.0	NA	-35.4	-8.3	-6.9
Dairy					
EU price	-7.3	NA	NA	NA	-0.3
EU production	NA	NA	-2.0	-1.0	-4.4
EU consumption	NA	NA	+2.9	NA	+0.1
EU exports	-49.0	NA	-56.6	-58.2	-20.0

Milk					
EU price	-10.0	-17.0	-18.7	NA	-0.9
EU production	0.0	NA	-2.3	-0.2	-3.0
EU consumption	NA	NA	-2.3	NA	+0.3

NA, not available

The dairy market reaction to the simulation is an expected outcome, as export subsidies are substantial in the benchmark scenario. A large part of the EU world market share in dairy products are due to export subsidies. Therefore, their removal leads to lower internal market prices, and, consequently, lower production and higher consumption of dairy products. Accordingly, export supplies will contract. The magnitudes of price reductions naturally depend on the price elasticities of final demand as well as cross-commodity effects. The demand for many foods tends to be generally inelastic. Since the removal of the subsidy will have an almost identical effect on all sectors, price movements will tend to follow a similar path. Since prices are likely to fall slightly, the demand for some dairy products will tend to expand as a result.

According to the simulation results, domestic price of dairy products decreases by 0.3% relative to the benchmark, domestic supply decreases by 4.4%, consumption slightly increases by 0.1%, and finally exports decline by 20.0%. Similarly, domestic price of raw milk decreases by 0.9% relative to the benchmark, and its domestic supply decreases by 3.0%.

In a general way, domestic production, consumption and prices of all meats are also affected by the phasing out of export subsidies. In the benchmark situation, export subsidies for white meat (pork, poultry, lamb) are small. Accordingly, the export subsidy elimination has limited impacts on these markets. Domestic price marginally decreases (0.3%) relative to the benchmark, domestic supply decreases by1.2%, consumption slightly increases by 0.1%, and exports decreases by 6.9%. Effects on bovine are a little more marked, as they benefit from higher export subsidies than white meat in the reference situation. Domestic price of bovine meat decreases (0.4%) with respect to the benchmark; its domestic supply decreases by 3.0%, consumption slightly increases by 0.2%, and exports decrease (17%).

The most affected crop products in this policy experiments are obviously coarse grains, as export subsidies have been significant for coarse grains in the underlying scenario. Moreover, there is relatively larger price gap between internal EU price and world price in the case of coarse grain than in the case of wheat. The phasing out of export subsidies puts a downward pressure on the domestic price of coarse grains. The final reduction of the price depends on the price elasticities of final demand, as well as on price elasticities of intermediate demand for animal feed. Domestic demands of wheat and coarse grains increase due to the price reduction, but decrease due to a contraction of animal production. The lower EU

livestock production reduces coarse grain demand, leaving for more cereals available for exports

According to the simulation results, domestic demands of coarse gains marginally increase due to a price reduction, and a small contraction of animal production does not offset this first effect. Domestic price of coarse grains decreases by 1.10% while domestic supply decreases by 5.7%. On the other hand, consumption increases by 0.2% as overall exports decrease by 16.5%.

The EU wheat markets are only slightly less affected than coarse grains by the export subsidy elimination. Domestic price of wheat marginally decreases by 1.0% relative to the benchmark; its domestic supply decreases by 5.4%, consumption slightly increases by 0.1%, and exports decrease by 13.0%. The reduction of cereals production translates into an increase of other crop production by 0.9%.

The elimination of the export subsidies leads to production declines in the EU in all agricultural sectors apart from vegetables and fruits, and other crop production. However, there remain variances in the extent of production declines in each sector.

4.3 Implications for Finnish agriculture - short and long term effects

In addition to the impacts of export subsidy abolition on the world and EU level we also analyse the impacts on prices and production in Finland, and compare them to the impacts in other parts of the EU because price changes in Finland are highly dependent on price changes in the main production countries in the EU and in neighbouring northern parts of the EU. Furthermore the results suggest that there are obvious differences in short and long run impacts at the EU level and especially in Finland.

Price dynamics influence structural adjustments of agriculture which have been emphasized in many studies and economic analyses of Finnish agriculture. Production volume per farm is clearly smaller in Finland compared to most competitive production countries in the EU which utilize significant economies of scale in production. For example, the farm size distribution of dairy farms is concentrated close to the average farm size (appr. 20 cows/farm in 2005) in Finland. This also means that the number of large and efficient farms, which may be able to make profits even at low milk prices, is relatively low in Finland compared to many other EU countries. Hence the effects of price reductions on farm investments and growth of farms are likely to be significant in Finland. In this study, however, structural changes and other dynamic issues are not in focus but they are addressed in later studies of the project.

This study however provides an analysis which is made on two different cases:

(1) Assume capital is rigid in all sectors
(2) Assume capital is mobile across sectors

Capital rigidity means short run analysis and capital mobility long run analysis. Considering typical durations of agricultural investments, 10-15 years in the case of machinery and equipment, and 20-50 years in the case of buildings, short run means time period of 0-2 years and long run over 10 years. In a period of less than 2 years relatively little capital mobility between agriculture and other sectors can be observed. However in a period of ten years very significant changes in capital may take place in agriculture. For example, the number of dairy, beef and pig farms decreased by appr. 50% in 1995-2004 (Lehtonen & Pyykkönen 2005). Since there was little change in milk production volume, for example, in this period one can conclude that there were not only capital movement out of agriculture but also capital movement in agriculture. Small farms typically sell or rent out their land (and possibly some part of their usable machinery and equipment) when they exit production. A significant part of the remaining farms have enlarged their production and invested in new production facilities. For example, a lot of capital has been invested in pig farms since production volume has increased from 170 million kg up to 200 million kg in period 1995-2004. One can conclude that very significant capital movement can take place already in ten years even if it is often technically possible to use the machinery and other equipment up to 15-20 years and buildings up to 30-50 years. However fully flexible capital cannot be assumed in a period of ten years. In the GTAP model, fully flexible capital is not assumed since capital, as well as other production factors adjust according to price relations and defined substitution elasticities. It should be also noted that total capital (sum of capital over all sectors) is fixed in the model. Exact number of years related to the short and long runs cannot be accurately defined, however.

According to the model results, the price of wheat in Finland decreases by 2.4% in the short run (when capital is rigid) and only 1.9% in the long run, as a consequence of export subsidy abolition (Table 5.). The production of wheat increases slightly (less than 1%) in Finland whereas in main wheat producing countries of the EU production decreases up to 8% in the short run and up to 4% in the long run. This rather significant decrease of production in the EU is one factor why price reduction of wheat is relatively small in the EU and in Finland despite export subsidy elimination.

The prices of other grains (modelled as an aggregate group in the model) however decrease by 6% in the EU in the short run due to export subsidy elimination. The decrease in production of other grains is 11% in Finland in the short run and 14% in the long run. In the main production countries of the EU (France, Germany, and northern EU members) the changes in production are between 4-6% in

the short run and 5-8% in the long run whereas the decreases in prices are between 3-5% in the short run and only 1% in the long run. Also in Finland the prices of other grains recover in the long run (-1.6%) due to decreasing production in Finland and in the EU. However the prices of other grains decrease slightly more in Finland than in the other EU countries.

Since the wheat prices fall less than the prices of other grains due to export subsidy elimination, both in short and long runs, the relative profitability of wheat improves in Finland. This is affected by a reduction of wheat production in the main wheat production countries in the EU (appendix 5). The change in relative profitability leads to unchanged wheat production but to a significant decrease of the production of other grains in Finland. The same kind of development can be observed at the EU level. This means that the role of export subsidies is clearly larger in the case of other grains than in the case of wheat.

One should also note that grain area in Finland has increased by 20% in 1994-2005 and consequently there has been considerable overproduction and exports of feed grain in recent years. The production of wheat has also increased in recent years. From this point of view, the 14% reduction in area of other grains (except wheat) does not threaten domestic feed grain supply but instead it may improve the balance between supply and demand on Finnish feed grain markets.

However, CAP reform to be implemented in 2006 may also decrease grain area by 15-20%, grain production by 10-15%, increase set-aside area considerably, and stabilise grain markets (Lehtonen, Pyykkönen, Niemi 2004). Nevertheless the co-effects of CAP reform and export subsidy elimination were not analyzed in this study and they need to be studied separately in later phase of the project. In any case one can say already now that the joint effect of the two policy reforms cannot be inferred to be additive, e.g. the grain area is not likely to decrease by 14% + 20% as a result of both reforms. The joint effect on grain production is likely to be smaller than that because price changes at the EU and national level.

Export subsidy elimination and the consequent reductions of grain prices and production lead, according to the model results, to a 15% decrease in prices of agricultural land in Germany, France and northern parts of the EU. In Finland, however, the land prices decreases by 28%, both at the short and long run. This rather drastic change is driven by the structure and set-up of the GTAP model, where input prices is a major adjustment mechanism. Agricultural land is a highly agriculture specific input while labour and capital can be used in other sectors as well which are hardly at all affected by export subsidy elimination of agricultural products. Hence the other sectors can absorb the labour and capital of agriculture at a reasonable price, at least in the long run. Consequently the major input price adjusting is land price.

However, since CAP reform was not taken into account in this study the drastic reduction of land prices may be exaggerated. CAP reform means that a major part of agricultural support is paid for agricultural land (also for set-aside) independent of production. Hence the CAP reform effect is likely to mitigate the reduction in land prices due to export subsidy elimination. Also this joint-effect of CAP reform and export subsidy elimination will be evaluated in subsequent studies.

Milk prices decrease by 6.2% in Finland (1.5-2.6% in the other EU countries) in the short run due to export subsidy elimination. Milk production volume in Finland decreases by 4.1% in the short run. This means that exports of dairy products decrease even more than that. Long run price change due to export subsidy elimination, however, is only -2.5% since production in Finland decreases by 5.4% in the long run. This change is relatively more than in France and Germany (-2.3% and -2.6%, respectively) and in the northern part of the EU (-4%).

Prices of dairy products decrease in Finland by 3% (typically 1-2% in other parts of the EU) in the short run and 0.9% (0-0.5% in other parts of the EU) in the long run. Hence both producer price of milk and dairy product prices decrease more in Finland than in the other EU countries. However the production of dairy products in northern part of the EU decreases as much as in Finland (6.3% and 6.6%, respectively) in the long run due to export subsidy elimination.

Table 5. Changes in production and prices of agricultural products (%-change) in the short and long run when export subsidies are abolished

	Production – short run	Production – long run	Prices – short run	Prices – long run
Wheat	+0.1	+0.6	-2.4	-1.9
Other grains	-11.0	-13.9	-5.8	-1.6
Milk	-4.1	-5.4	-6.2	-2.5
Dairy products	-5.2	-6.6	-3.0	-0.9
Beef	-0.9	-1.2	-1.4	-0.5
Other meat	-0.7	-1.1	-0.9	-0.4
Sugar	-1.0	-1.1	-0.6	-0.2
Other food	-0.1	-0.3	-0.6	-0.4
Land price			-27.8	-28.1

Source: Authors' simulations

The results show that Finnish dairy sector is relatively more vulnerable on the elimination of export subsidies than dairy sectors in other EU countries. However the reduction in the production of milk and dairy products in other northern EU countries seems to be close to reductions in Finland. This may be due to relatively high wages and production costs in northern EU, despite the fact that the

structure of dairy production is rather efficient and most of milk production is produced on very large farms in many countries (such as Denmark and Sweden).

In addition to high production costs, another reason for the relative vulnerability on export subsidy elimination in Finland however is the relatively high share of butter exports of total dairy production. Demand of butter on domestic markets has been rapidly decreasing which increases the need for butter exports. Since a very significant part of butter has been exported to Russia with the help of export subsidies, the relatively large impacts of the elimination of export subsidies are understandable. The situation is perhaps similar to that in other countries which export a large part of their butter production (e.g. Denmark).

The effects of export elimination on Finnish dairy sector, according to the GTAP model results, seem to that of CAP reform studied earlier using a dynamic-recursive Dremfia model (Lehtonen 2004; Lehtonen & Hirvijoki 2004). Lower prices in the EU - either because of CAP reform or because of export subsidy elimination – reduce dairy production in Finland. The decrease in production result in recovery of milk prices. The explicit dynamics and the joint effects of the two policy reforms (CAP reform and export subsidy elimination) were not studied here. However the joint effects of the two reforms on milk production volume and prices are not additive, as already discussed in the case of grain production above.

The comparison of production and price changes in Finland and in different parts of the EU show clearly the dependence of Finnish prices on the EU price changes. Given a price reduction on the EU markets it is very likely that both production and prices decrease considerably and simultaneously in Finland while at the EU level it is still possible, though unlikely, that a significant decrease in production implies a slight increase in prices, facilitated by slightly increasing world market prices. Such changes are however typical in closed economies. Since a global GTAP model was used in this study the results show clearly that in almost all cases both production and prices decrease simultaneously at the EU level, especially in products where EU production has been higher than consumption (milk and dairy products). However in some new EU countries such as Poland the changes are more mixed, e.g. prices of almost all products increase slightly in Poland due to export subsidy elimination while production of many products increases and some decreases.

4.4 The aggregate effects

This far we have analysed the price, output and trade effects of the removal of export subsidies. To get an overall picture of the policy reform, an aggregate measure of the effects is needed to judge the reform. The GDP, gross domestic product, is often used for evaluating the economy wide effects of a policy sce-

nario. It measures the economic activity and the positive increase in GDP is a rough measure for a positive policy option. The agriculture and food industries form less than 5 percent of the GDP at the EU level, so any marginal changes in taxes can increase economic activity by very marginal level. This experiment increases the EU GDP by 0.03 percent.

The export subsidy removal is still positive, indeed for the EU. This result is mainly driven from those allocative effects that are born from the better use of resources. In all microeconomic analysis, taxes and subsidies produce a dead weight loss to an economy when demand and supply are not at their optimal level. By welfare analysis this loss can be measured relative to the productive value of the economy. The numerical welfare analysis gives a dollar measure value to the change in distortions there are in the economy. This measure is called equivalent variation (EV). It measures how much compensation is needed to keep the representative household at the same utility level it is with the original consumption pattern and prices.

Another source for positive gains from removing the export subsidies can be derived from the prices in international trade, i.e. the terms of trade. The terms of trade are measured by the price index of exports relative to the imports price index. An increase in the terms of trade is better for a trading nation as it can get a higher compensation in the form of imports for its exports. The terms of trade can be used as a measure of competitiveness.

Removing export subsidies improves the terms of trade when it increases the prices of exportables relative to imported commodities. For a large exporter like the EU, this effect should realize empirically as well. In the table 6 we report the welfare analysis results for all countries decomposed to allocative, terms of trade and investments effects. The model has an investment component which does not add to the capital stock, anyway.

Table 6. Welfare results

WELFARE	Allocative effect	Terms of trade	Investments	Total
EU	2185,5	924,8	23,7	3134,1
REU	-166,9	-75,0	-1,4	-243,2
EFT	-65,4	-70,6	37,4	-98,6
USA	-136,9	100,0	-37,8	-74,7
MERCOSU	-1,1	69,3	0,1	68,3
AUSNZ	-20,3	290,5	-5,1	265,1
RUSSIA	-144,8	-155,3	-17,4	-317,5
CHINA	-47,0	-110,6	11,9	-145,7
INDIA	-11,4	10,2	-0,5	-1,8
LDCs	-65,0	-169,0	-0,5	-234,4
ROW	-837,0	-813,9	-10,5	-1661,4
Total	689,7	0,3	0,1	690,1

Source: Authors' simulations

In aggregate terms, the welfare improvement is best for the EU but positive also the Australia / New Zealand and Mercosur countries that can benefit from the increasing prices and markets for their exportable agricultural products. Quite counter intuitively, some of the countries currently using export subsidies do not necessarily benefit from removing subsidies in aggregate terms. A closer look behind the results (not reported here) reveals that e.g. the contribution of prices to the terms of trade for EFTA is positive in dairy products but as the prices of imports to EFTA also increases, the net effect is negative.

The welfare results also show how many countries, including many developing countries, have actually benefited from the export subsidies in the form of cheap imports. The negative allocation effects are borne from the factors the reallocate resources to industries where distortions are larger compared to the original distortions.

5 Summary and concluding remarks

This paper examines the impacts of phasing out export subsidies without reforms to domestic support and tariffs. The paper evaluates the market as well as the welfare impacts of this policy scenario. The evaluation is conducted with the multiregional numerical general equilibrium model.

The results suggest that removal of export subsidies alone, keeping in place other policies, lowers domestic prices for subsidizing countries and raises world prices. The elimination of export subsidies affects more trade volumes than production, increasing world market prices for those commodities where export subsidies have been used most. These products are dairy and meat. The beneficiaries of the export subsidy elimination are large exporters of agricultural goods whereas the losers are net importers, including most developing countries. The EU as the largest user of export subsidies is the main gainer in terms of welfare and in terms of trade. In the EU, the biggest effects take place in sectors which have used most export subsidies, i.e. all the dairy industry, grains and meat.

The impacts of export subsidy elimination on most affected sub-sectors of agriculture (grain and dairy) in Finland were analyzed and compared to changes in other countries on short and long runs. However this part of the analysis is preliminary and can be deepened in later studies. For example, changes in EU prices in the short and medium run can be taken into account in the Dremfia model (Lehtonen 2004) which includes 18 production regions of Finland and where domestic and imported goods are imperfect substitutes. Since Dremfia is a recursive dynamic model and includes investments in the short run and long run, price changes drive structural and technical changes in the model. Hence in the Dremfia model, the price dynamics play a role as well; not prices and production at short run or long run economic equilibrium alone. Hence the coupling of GTAP and Dremfia model through prices from the GTAP model facilitate a dynamic-recursive production and structural change analysis at national and regional level, consistent to EU level markets and price changes.

The analysis presented in this study does not show any drastic effects of export subsidy elimination on the EU or Finnish agriculture. The analysis becomes more interesting in this respect if more drastic trade scenarios, such as reductions in import tariffs, on the top of export subsidy elimination, are evaluated. The mobility of resources across sectors assumed in the GTAP model, and which is also dependent on the used elasticity values, is one possible point of focus in later analysis, as well as the large reduction in land prices in Finland. The next step in the research project is however to include CAP reform into the GTAP model, define other policy scenarios, analyse them using the GTAP model, and integrate the DREMFIA model in such a way that it can use GTAP price changes (possibly both input and product prices) as input.

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Appendix 1. Average subsidy per ton calculated from EU notifications to the WTO

AVERAGE SUBSIDY PER TON								
(in euro/ton)	1995	1996	1997	1998	1999	2000	2001	2002
DAIRY PRODUCT								
BUTTER	1750	1999	1837	1728	1719			
SKIM MILK POWDER	584	631	663	865	810			
CHEESE	1036	675	543	659	773			
OTHER MILK PRODUCTS	629	642	677	798	820			
MEAT PRODUCT								
BEEF	1478	1297	888	891	948			
PIGMEAT	266	249	350	479	350			
POULTRY MEAT	277	182	193	261	236			
CROPS PRODUCT								
WHEAT	43	22	14	36	33			
COARSE GRAINS	46	33	31	52	40			
SUGAR	443	437	458	514	484			

Appendix 2. Evolution of export subsidies (in million of euros) and use of WTO commitments (in %) by commodities and countries

	1995	1996	1997	1998	1999	2000	2001	2002
European Union								
Grain								
Wheat	119 (5%)	318 (15%)	178 (9%)	500 (29%)	509 (34%)	108 (8%)	9 (1%)	141 (11%)
Coarse grains	303 (19%)	389 (26%)	273 (20%)	764 (60%)	730 (63%)	192 (18%)	113 (11%)	167 (16%)
Meat								
Beef	1507 (78%)	1527 (85%)	841 (51%)	643 (42%)	726 (52%)	383 (31%)	388 (31%)	285 (23%)
Pork	101 (35%)	71 (26%)	74 (30%)	356 (155%)	243 (115%)	34 (18%)	20 (10%)	15 (8%)
Poultry	116 (85%)	73 (57%)	76 (64%)	90 (82%)	75 (75%)	57 (63%)	60 (66%)	91 (100%)
Milk products and eggs	256 (18%)	552 (42%)	311 (26%)	286 (25%)	333 (32%)	338 (36%)	325 (34%)	545 (58%)
Butter and butter oil	141 (35%)	170 (45%)	116 (33%)	192 (58%)	338 (112%)	26 (9%)	37 (13%)	163 (59%)
Milk powder	438 (74%)	271 (50%)	176 (36%)	149 (34%)	236 (60%)	238 (70%)	189 (55%)	268 (78%)
Cheese	728 (71%)	732 (76%)	756 (85%)	759 (92%)	905 (119%)	410 (59%)	402 (58%)	596 (85%)
Other milk products	13 (21%)	7 (12%)	13 (24%)	17 (34%)	14 (30%)	8 (19%)	6 (14%)	5 (12%)
Eggs								
Sugar	379 (52%)	525 (76%)	779 (122%)	795 (134%)	470 (86%)	373 (75%)	483 (97%)	293 (59%)
Processed products	491 (68%)	566 (86%)	553 (93%)	573 (107%)	720 (151%)	414 (100%)	412 (99%)	414 (100%)
Other products	295 (53%)	365 (70%)	215 (45%)	212 (49%)	314 (79%)	183 (51%)	130 (37%)	152 (43%)
USA								
Total, of which:	21	95	93	162	80	14	56	n.a.
Milk products	16 (11%)	95 (68%)	91 (67%)	160 (98%)	79 (59%)	n.a.	n.a.	n.a.
Rest of the World								
Total	647	545	486	585	570	345	75	n.a.

Appendix 3. Changes in exports, in volume (Mio USD) and percentage change compared to the base data

		Wheat	Grains	Vegetables	Other crops	Milk and cattle	Ot. animal prod	Bovine meat	Other meat	Dairy	Sugar	Other food industry
EU	Volume	-448,4	-430,7	240,1	761,2	96,0	114,3	-1027,0	-1028,9	-3616,7	-229,9	-1163,7
	Percent	*-12,98*	*-16,5*	*0,45*	*3,2*	*0,13*	*0,67*	*-16,59*	*-6,9*	*-19,99*	*-24,25*	*-1,75*
REU	Volume	9,3	52,0	-4,5	-41,2	-13,8	-16,5	77,5	51,4	180,1	8,3	144,3
	Percent	*9,5*	*87,6*	*-1,3*	*-11,0*	*-7,0*	*-6,3*	*88,6*	*7,9*	*54,7*	*18,8*	*10,0*
EFT	Volume	18,7	11,8	-1,5	16,8	-8,8	1,6	48,2	16,1	-166,7	26,5	-116,6
	Percent	13852,0	2826,5	-6,9	13,9	-66,1	1,4	72,2	39,6	-42,4	903,2	-4,4
USA	Volume	75,4	127,3	-18,0	-146,2	-20,9	6,9	293,4	325,0	243,0	30,1	370,0
	Percent	26,5	155,8	-2,0	-6,3	-11,6	2,7	225,1	280,7	357,7	102,7	13,3
MERCOSU	Volume	28,4	30,9	-12,1	-101,7	-0,5	-3,5	27,9	61,9	163,0	44,3	41,8
	Percent	409,7	11,7	-1,7	-3,1	-5,9	-2,5	3,1	12,9	2304,1	224,9	0,9
AUSNZ	Volume	-12,9	10,7	-36,0	-79,5	-12,1	-71,0	-37,3	4,4	1093,3	13,1	-15,9
	Percent	-23,7	337,1	-9,1	-30,9	-218,1	-8,2	-4,7	3,0	253,5	12,4	-1,5
RUSSIA	Volume	-5,3	11,5	-4,1	-15,9	-1,8	-6,8	250,6	70,0	150,5	-0,4	45,1
	Percent	-8,1	53,7	-21,4	-22,1	-16,7	-5,1	8451,0	587,3	1097,2	-14,4	13,0
CHINA	Volume	5,3	28,9	9,8	15,4	0,3	9,0	10,6	134,6	102,0	1,9	103,9
	Percent	459,9	383,2	2,7	4,8	7,9	2,1	221,9	169,2	5566,1	476,9	11,8
INDIA	Volume	24,3	0,7	4,7	-4,5	-0,4	1,8	17,6	0,0	21,8	9,9	35,1
	Percent	347,7	21,7	3,2	-0,9	-3,6	5,6	546,8	-0,2	752,3	31,5	8,1
LDCs	Volume	14,9	9,1	-14,5	-62,3	-0,8	-2,0	32,2	50,2	167,7	24,2	99,3
	Percent	399,1	44,9	-1,8	-1,9	-7,2	-2,1	153,6	216,9	1839,8	6,6	5,3
ROW	Volume	322,5	145,9	-78,8	-313,9	-23,2	-29,6	531,3	595,1	2557,1	169,6	719,3
	Percent	77,1	124,1	-1,4	-6,3	-8,0	-3,8	165,8	66,5	1486,5	30,5	8,0

Appendix 4. Changes in production of goods globally, percentages

	EU	REU	EFT	USA	MERCOSU	AUSNZ	RUSSIA	CHINA	INDIA	LDCs	ROW
Wheat	-5,42	0,6	3,55	1,23	1,04	-0,4	0,51	0,15	0,19	3,31	1,06
Other grains	-5,69	2,64	2,9	0,78	0,79	1,44	1,2	0,45	0,01	0,15	0,7
Vegetables, fruits, nuts	0,44	-0,02	-3,97	-0,06	-0,23	-0,3	0,1	0,02	0,02	-0,1	-0,04
Other crops	0,94	-0,47	1,02	-0,26	-0,33	-1,31	-0,16	0,11	0,01	-0,12	-0,01
Milk and cattle	-2,98	0,51	-3,01	0,31	0,54	4,59	1,89	0,18	0,03	0,23	0,78
Animal products, nec	-0,77	0,06	0,1	0,3	0,41	-1,6	0,15	0,09	0	0,31	0,31
Bovine meat	-2,96	1,93	2,06	0,45	0,17	-0,5	16,3	0,38	2,93	1,85	0,84
Other meat products	-1,21	0,57	0,11	0,49	0,99	0,08	1,13	0,78	-1,23	1,69	0,72
Dairy products	-4,42	2,89	-5,89	0,27	1,63	13,45	4,77	6,61	0,48	28,88	4,29
Sugar	-2,51	0,46	2,59	0,17	0,99	0,79	0,08	0,63	0,17	0,71	0,49
Other food	-0,43	0,34	-0,95	0,09	0,08	0,07	0,26	0,08	0,09	0,21	0,11
Resources	0,05	-0,05	0,06	-0,02	-0,07	-0,27	-0,07	-0,02	-0,02	-0,03	-0,02
Manufacturing	0,19	-0,09	0,15	-0,03	-0,14	-0,75	-0,26	-0,03	-0,05	-0,31	-0,08
Services	0,04	-0,05	0,03	0	0	-0,02	-0,05	-0,02	-0,01	-0,07	-0,01
Investments	-0,04	0,04	-0,14	0,02	0,06	0,25	0,14	-0,01	0,01	0,04	0,02

Source: Authors' simulations

Appendix 5 A. Production

Changes in production of agricultural products (%-change) in the short run when export subsidies are abolished.

	Wheat	Other grains	Milk	Dairy products	Beef	Other meat
Finland	+0.1	-11.0	-4.1	-5.2	-0.9	-0.7
Northern EU	-1.8	-5.4	-2.5	-4.7	-2.1	-1.3
Germany and Austria	-3.6	-6.3	-1.9	-1.8	-5.1	-0.4
France	-3.5	-3.9	-1.7	-4.1	-1.2	-0.7
Southern EU	-1.6	-1.3	-1.8	-2.6	-1.8	-0.5
Poland	+0.5	+1.2	+0.7	+3.8	+1.3	+0.4
Rest of the EU	+0.1	+2.1	+0.2	+1.9	+2.0	+0.2
EFTA	+1.2	+1.7	-1.9	-4.8	+3.2	+0.1
USA	+0.3	+0.5	0.3	+0.3	+0.5	+0.5
Russia	+0.3	+0.9	1.3	+3.9	+11.3	+0.8

Changes in production of agricultural products (%-change) in the long run when export subsidies are abolished.

	Wheat	Other grains	Milk	Dairy products	Beef	Other meat
Finland	+0.6	-13.9	-5.4	-6.6	-1.2	-1.1
Northern EU	-3.2	-7.9	-2.5	-6.3	-2.9	-2.1
Germany and Austria	-5.7	-7.0	-2.6	-2.4	-6.2	-0.5
France	-8.4	-5.0	-2.3	-5.1	-1.7	-1.0
Southern EU	-2.7	-1.4	-2.2	-2.7	-2.1	-0.6
Poland	+0.7	+1.4	+0.8	+3.7	+1.3	+0.5
Rest of the EU	+0.3	+2.8	+0.4	+2.2	+2.4	+0.6
EFTA	+3.5	+2.9	-3.0	-5.9	-2.1	+0.1
USA	+1.2	+0.8	+0.3	+0.3	+0.5	+0.5
Russia	+0.5	+1.2	1.9	+4.8	+16.3	+1.1

Appendix 5 B. Prices

Changes in prices of agricultural products (%-change) in the short run when export subsidies are abolished.

	Wheat	Other grains	Milk	Dairy products	Beef	Other meat
Finland	-2.4	-5.8	-6.2	-3.0	-1.4	-0.9
Northern EU	-2.4	-5.4	-2.6	-2.1	-1.1	-0.8
Germany and Austria	-2.5	-3.3	-2.5	-1.9	-1.5	-0.6
France	-2.8	-3.4	-1.9	-1.8	-1.3	-0.7
Southern EU	-1.7	-1.4	-1.5	-1.2	-1.0	-0.5
Poland	+0.8	+0.9	+0.7	+0.9	+0.5	+0.4
Rest of the EU	+0.4	+1.7	+0.5	+1.0	+0.8	+0.4
EFTA	+0.9	+2.0	-4.6	-2.3	-0.8	+0.1
USA	+0.9	+1.1	+0.6	+0.4	+0.3	+0.3
Russia	+0.6	+1.0	+0.6	+1.8	+4.2	+0.6

Changes in prices of agricultural products (%-change) in the long run when export subsidies are abolished.

	Wheat	Other grains	Milk	Dairy products	Beef	Other meat
Finland	-1.9	-1.6	-2.5	-0.9	-0.5	-0.4
Northern EU	-1.1	-1.2	-1.1	-0.4	-0.4	-0.3
Germany and Austria	-1.1	-1.2	-1.3	-0.5	-0.4	-0.4
France	-1.2	-1.2	-1.0	-0.3	-0.5	-0.3
Southern EU	-0.5	-0.4	-0.4	-0.2	-0.2	-0.2
Poland	+0.5	+0.5	+0.5	+0.3	+0.2	+0.3
Rest of the EU	+0.5	+1.1	+0.5	+0.3	+0.2	+0.3
EFTA	-0.2	-0.2	-1.2	-0.3	+0.1	+0.2
USA	+0.5	+0.4	+0.2	+0.1	+0.1	+0.1
Russia	+0.5	+0.7	+0.4	+0.3	+0.8	+0.3

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