



JÖNKÖPING INTERNATIONAL  
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# **The Effects of EU's Subsidised Export on Developing Countries**

## The Case of Dairy Products

Bachelor's Thesis within Economics

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### **Abstract**

The purpose of the thesis is to examine the effect EU's subsidised dairy export has on developing countries' dairy production. This is done by constructing a model containing various factors that are assumed to affect production. Data was collected for 23 countries in Africa, Central- and South America and was pooled together using a least squared dummy variable model (LSDV). The variable of interest for this study is the imports from EU to the selected countries. The regression result showed that this variable was negatively correlated with the countries' domestic dairy production and was significant on the 1% level confirming the hypothesis of the variable. Due to the negative correlation, a reduction of the EU exports is thus assumed to increase these countries' own production within this agricultural sector. As shown in the thesis, agriculture is important for a country's development and hence, by exporting subsidised goods, EU might hinder development in the countries studied. However, over the years the EU has received a lot of pressure from the WTO to decrease its domestic- and export subsidies. Due to this, the EU has promised, based upon certain conditions, to remove its export subsidies completely by 2013. This is seen as positive for the developing countries' future development prospects.

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# 1. Introduction

*” The absurdity of the situation in the agricultural markets is the following: The rich countries, that is, the EU and the USA give subsidies to the farmers for the production and export of their produce last year to the tune of 349 billion dollar/.../ the consequences of that are dumping, the destruction of agriculture in the southern hemisphere where there is almost nothing else apart from peasant agriculture/.../. So the Senegalese peasant/.../ hasn't got a chance of being able to survive by working his own land. So what can he do? If he's still got the energy he risks his life as an illegal immigrant via the straits of Gibraltar and has to hire himself out somewhere or other in southern Spain or work as a street sweeper in Paris in inhumane conditions. ”*

Jean Ziegler, UN special Rapporteur on the right to food (Grasser, 2005)

The situation outlined above is a description of the world today. The European Union (EU) has developed a Common Agriculture Policy, known as CAP. This policy gives the European farmers large amount of subsidies, which during the 21<sup>st</sup> century has accounted for 40-50% of the total EU budget (European Commission, 2010). The subsidies are said to create incentives for overproduction and the EU encourages export of the excess food, by granting export subsidies. The export subsidies enable European farmers to sell their products on the world market to prices below their production cost. This contributes to an unfair world trade where the developing countries' export cannot compete with the developed countries' subsidised export; even though their production costs in many cases are lower (Oxfam, 2005).

The subject is widely debated in media today and the European Union has received a lot of criticism for its agricultural policy (Seth, 2004). Due to world trade policies, decided within the World Trade Organisation (WTO), the EU has discussed a removal of their export subsidies by 2013 (Agebjörn, 2007) and to make their agriculture more adapted to the market forces. Consequently, last year the EU farmers were protesting against the higher production quotas on dairy products in Brussels (SVT, 2009).

Within the EU, the light is shed mostly on the domestic consequences from CAP, however what about the consequences outside the EU? The thesis will investigate whether a relationship between the European subsidised exports and the production in developing countries can be seen. In those countries the main source of income comes from farming (Oxfam, 2005) and when these local farmers are driven out of business by cheap imports, they often do not have any other work opportunities. This has not only devastating effects for the affected farmers but also on the countries' future development prospects (Sarris, 2001).

The effects of the European agricultural policy are important to scrutinise due to its high costs to the European taxpayer, last year it amounted to 53.54 billion Euros (European Commission, 2009a). Additionally, it is claimed by many to have substantial costs for the developing countries (Matthews, 2008). As pointed out by Ziegler (Grasser, 2005) his also results in other problems, such as illegal immigration. Hence CAP is not only an issue for European politicians and farmers.

## 1.1. Previous Research

Several studies and analyses have been carried out on the subject of domestic- and export subsidies within the agricultural sector. Most of the studies regarding liberalising agricultural world trade have been in the context of measuring the effects of the Doha Round, the ongoing world trade negotiations within the WTO. Diao, Roe and Somwaru (2002) found that eliminating domestic support, export subsidies and agricultural tariffs worldwide, would cause agricultural prices to rise by an average of 12%. About half of that increase would be due to liberalising agricultural trade in EU and the EFTA<sup>1</sup>, whereas Japan, Korea, Canada and the United States would account for approximately the remaining half of this expected price increase. Diao et al. (2002) attributes this finding to three major reasons: those countries are all major players on the world agricultural market, they impose high tariffs on a few agricultural products and they use support policies, such as export subsidies in the case of the EU. As many developing countries' export markets are located in a few countries in "the north", they found that the majority of developing countries would benefit from a more open EU agricultural market. Diao et al. (2002) came to the conclusion that in the short-run, the welfare effects will be rather low for developing countries but recognised that agricultural trade reforms would increase production in developing countries, which would lead to an increased trade volume and hence an increased welfare over time. Their results propose that, following such trade reform, all developing countries would benefit in the long-run.

Frandsen, Gersfeldt and Jensen (2003) conducted a study where they analysed three scenarios to show the impacts of decoupling or eliminating the EU agricultural support. They found that the EU domestic support did affect production decisions and hence distorted international trade. This in turn showed to have negative effects on the export potential of developing countries. Hence, their conclusion was very much in line with that of Diao et al. (2002).

That the EU's domestic support is stated not to affect production decisions, due to being decoupled, is found by many to be highly unlikely due to the large amount of money spent by EU on CAP<sup>2</sup> (Matthews, 2008; Bureau, Jean and Matthews, 2006). This was also confirmed by the study conducted by Frandsen et al. (2003). Matthews (2008) found that reducing export subsidies, ending production subsidies and removing protection would generally be welcomed by developing countries. For those countries that have export capacity in products that receive support by the CAP, the EU farm policy is considered especially harmful as it constitutes unfair competition on the world market. However, whereas local producers in the importing countries always get damaged by the policies, countries that are net importers of CAP products benefit from CAP policies in the way that they contribute to lower world market prices and hence give those countries terms of trade gains on their imports. Consumers of those products also gain due to cheaper prices. This conclusion was reached by Diao et al. (2002) as well and explains why they recognised that not all developing countries were immediate winners of liberalising agricultural trade. Matthews (2008) presents in his research the often prevailing assumption that consumers that gain from cheaper supplies often are better off and live in urban areas, whereas those hurt by the subsidised export are the

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<sup>1</sup> European Free Trade Agreement

<sup>2</sup> See table 3.1

poorer, rural producers. Whether this is true or not, however, Matthews (2008) states can only be determined on a case-by-case basis. Even though Matthews (2008) found that EU farm policy has varied impacts on developing countries, he reaches the overall conclusion that the aggregate cost of distortion to developing countries from the CAP policies are greater than the benefits received in certain countries due to cheaper supplies. Bouët, Bureau, Decreux and Jean (2005) found, in contrast to Diao et al. (2002) that the ending of export subsidies would only have a limited effect on overall world prices; only in the dairy- and sugar sector will the reduction have a substantial effect. However, even though limited, the increase will contribute to an increase in the food bill of those developing countries that are net importers of food and do not have resources enough to sufficiently increase their production. Bouët et al. (2002) thus argue that the general conclusion that developing countries in general will gain from liberalising agricultural trade could be very misleading as the effects will be very uneven. Bureau, Jean and Matthews (2006) also conclude, much by using the Bouët et al. (2005) study, that even though removing export subsidies are necessary to combat unfair competition, caused by dumping, the overall positive effects must not be overestimated for developing countries. In addition the consequences, for net food-importing countries, are negative in the short-run.

Many non-government organisations have emphasised the side effects of CAP on developing countries. A report by Oxfam (2005) found that in the Dominican Republic, around 10 000 farmers were thought to have been driven out of business due to EU's subsidised export of milk. Additionally, an article by Fokker and Klukist (2000) published by Forum Syd shows several examples of how local markets in the southern hemisphere are negatively affected when their farmers are outcompeted by EU's subsidised export. The report highlights the policy incoherence occurring within the EU by showing how a large share, at the same time, of the EU's budget is given to those countries to support their economic development.

In a report by McMillan, Peterson Swane and Ashraf (2007) efforts are being made to analyse whether one can see a connection between developed countries' subsidies and poverty in the developing countries. To measure poverty they used average income. A clear connection between the variables could not be seen, which they partly attributed to poor data and partly to a poor choice of variables.

## **1.2. Problem & Purpose**

The previous literature within this area found various results for the overall net effects on developing countries of liberalising agricultural world trade. The purpose of this study is to see to what extent CAP is market distorting for developing countries by examining the effects of EU exports on local production. This is an important step towards being able to measure the overall costs of these subsidies in order to determine the overall net effects across developing countries.

Most previous research has focused on measuring the effects on prices when liberalising the world trade rather than how harmful CAP is for other countries' production. A study, made by Macmillan et al. (2007), attempting something similar tried to measure the effects on overall poverty and not on production.

The EU was chosen as an exporter in this study due to three reasons. Firstly, the EU is considered as one of the world's major economic powers and its world trade is assumed to have a great impact on billions of people (Agebjörn, 2007). Secondly, the EU has an explicit policy that says that the policies within all its sectors that affect developing countries should be coherent with its development promoting objectives as stated by the articles 177 and 178 in the Treaty of the European Union, found in Appendix 1. Lastly, the EU has received lots of criticism for its subsidised export (Seth, 2004).

Dairy products were chosen as the commodities of interest for this study due to three reasons. Firstly, the EU is an important actor on the dairy world market; the last fifteen years the EU was among the top two exporters in the world of whole milk powder, top two exporters of butter and the leading exporter of cheese (WTO, 2009). Secondly, today the EU has reduction commitments on all these commodities implying that these commodities are exported with subsidies. Lastly, dairy products are considered to be basic commodities.

Developing countries were chosen as importers of dairy products as they are seen as more vulnerable to the unfair competition export subsidies are said to cause (Grasser, 2005). The focus is on Africa, Central-and South America since they are the ones most frequently mentioned in previous studies (Fokker and Klukist, 2000; McMillan et al., 2007). Following this reasoning the problem will be outlined as follows:

*Does EU's subsidised export of dairy products have a negative impact on the production of cow milk in developing countries, and to what extent is it market distorting?*

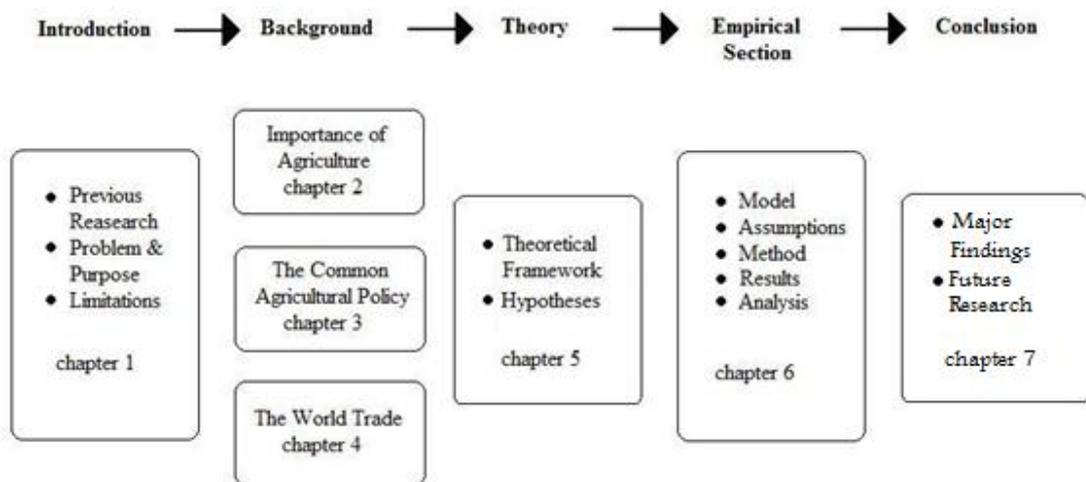
### **1.3. Limitations**

In the thesis there will be three limitations when investigating the stated problem. Firstly, the focus will be on the recipient of the European Union's export and not on the effects and consequences within the EU. Secondly, even though there are many suitable countries to investigate the focus will be on those developing countries, shown in Appendix 2, due to availability of reported data. Lastly, the data will range from the years 1975 to 2005, due to data availability.

### **1.4. Disposition**

In Figure 1.1., found below, an outline of the structure of the thesis is presented. The thesis starts with an introduction of the topic together with the purpose and limitations of the thesis. It continues with the background section which is split into three parts to provide a deeper understanding of the topic discussed in the thesis. It is followed by the theory section which outlines and states the hypotheses to be examined in the empirical section. The major findings of the thesis can be found in last section together with suggestions for future research.

Figure 1.1. Thesis outline



## 2. Growth and Agriculture

*Agriculture is an important economic sector in the society since it provides food supplies for its population. However, it is also considered important for development and growth, which are central issues for developing countries.*

As noted by Andreosso-O'callaghan (2003), there seems to be a relationship between the importance of agriculture in an economy and the level of development. This relationship is negative, which implies that in highly developed countries agriculture does not matter much. In poorly developed countries, Andreosso-O'callaghan (2003) states, the opposite can be seen; a large part of the labour force works with agriculture, which also makes up a large part of their GDP.

A way of interpreting this could be that poor developing countries should stop focusing on agriculture and try to develop manufacturing industries and services instead. Some researchers claim that is not the case, however. For example Rostow (1960) wrote "*The stages of economic growth*" in 1960 where he explains that there are five stages, altogether, of growth. The first stage comprises the traditional society where many resources are devoted to agriculture since the output cannot become more efficient due to lack or non-use of modern technologies. The second stage is called the preconditions for take-off and this is the stage during which the society is being transformed so that it can start to use modern technologies and enjoy the benefits they bring. Thirdly there is the take-off itself. An institutional structure is being developed and a steady growth can be seen in the economy and industries expand rapidly. The fourth stage is the so called drive to maturity where old industries are being replaced by new ones and the growth and progress continue to increase. Lastly there is the stage named the age of high mass-consumption. Here the most important features are the shift from manufacturing to services and the emergence of the welfare-state.

A similar theory was developed by Bela Balassa in 1977, which discusses the existence of different stages when it comes to comparative advantages. The structure of a country's export depends on the accumulation of capital which is a process that is constantly changing. As more capital is accumulated and the country gets a comparative advantage in a new sector it climbs on step further up on the ladder, replacing other countries. As explained more in detail by Andreosso-O'callaghan (2003), during the first stage the agricultural production becomes intensified and becomes the core of the economy. As the development and growth proceeds, the country switches to manufacturing which now becomes the good of which the country has a comparative advantage in. In stage three the structure changes in the economy and the focus moves to more skill-intensive activities. Finally, in the fourth stage services develop and are now the product for which the country has a comparative advantage.

Both theories show that agriculture is a natural and necessary part of the development and not to be regarded as something unnecessary that can be omitted. As pointed out by Andreosso-O'callaghan (2003); we have all been there. As shown by Andreosso-O'callaghan (2003), most EU countries relied heavily on agriculture 50 years ago, just like developing countries do today.

### **3. The Common Agricultural Policy (CAP)**

*The Common Agricultural Policy has been in use for over 50 years and is a complex policy that uses lots of tools to accomplish goals set up in a variety of areas. Examples are policies regarding fishing and rural development; however, the focus of the section will be on the policies that directly concerns agriculture. This creates an understanding for why the present situation has been able to develop and how the EU operates on the market.*

#### **3.1. The History and Development of CAP**

In the 1950's when the Treaty of Rome was negotiated agriculture had an important role. Not many years had passed since the Second World War and the food-shortages experienced then were to be avoided in the future by helping the involved countries to become self-sufficient again (European Commission, 2004). In addition, there was a risk that the country side would become empty when the industries in the cities required more workers (Altomonte & Nava, 2005). The urbanisation was dangerous in several ways; partly by the potential problems that could follow from a fast urbanisation and partly because the food production could become endangered. Hence, something had to be done to encourage farmers to stay in the agricultural sector.

According to Altomonte and Nava (2005), about 25% of the population in the six member countries<sup>3</sup> were farmers in the 1950's. In addition, the countries had individual agricultural policies that were already developed and they were very reluctant to abolish them. Hence the common agricultural policy (CAP) became a necessary ingredient in the Treaty on the European Economic Community (EEC) when it was signed in Rome in 1957.

As explained by El-Agraa (2004) the intention with an economic community was economic integration. By starting to integrate the agriculture, politicians hoped that a successful integration would facilitate for the same integration in other sectors of the society as well.

Only a few years after the establishment of CAP in 1957, the requests of reforms started. The first big reform being developed was the Mansholt Plan in 1968. The features of this reform, which was not implemented until 1972, was to actively try to reduce the number of people employed in the agricultural sector and to promote more efficient methods and larger sizes of the farms (Altomonte and Nava, 2005). This reduction in number of farmers was, according to Cardwell (2004), an attempt to decrease the overproduction that had become evident.

The next big reform made was the Delors I reform which was agreed upon in 1988. It had three important affects on the agriculture. Firstly, it tried to restrain the growth of the CAP expenditures; the expenditures could only increase to 74% of the total GNP increase. Hence more money would be made available for other policy purposes when the income increased in the area (Altomonte and Nava, 2005). Secondly, the target prices, export refunds and import tariffs were to be lowered so that the overproduction would be discouraged. Thirdly, production quotas were also set in place to discourage overproduction (Altomonte and Nava, 2005). Lastly, as mentioned by Cardwell (2004),

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<sup>3</sup> The six members can be found in Appendix 3.

a set-aside system was introduced, which implies that a part of the land owned by a farmer is left unfarmed.

The most famous reform is the MacSharry reform from 1992. The reform built a lot on the Delors I reform from 1988, although it had to be extended so that the other WTO members would accept it and be willing to close the Uruguay Round<sup>4</sup> (Altomonte and Nava, 2005). This was done by focusing more on direct support than price support, which was necessary to try to push the markets back in balance (Cardwell, 2004). The changes made include for example; various cuts in tariffs and target prices, making the set-aside scheme available to more farmers, making compensations through direct payments and introducing an early retirement scheme in order to reallocate labour (Andreosso-O'callaghan, 2003).

The most recent reform of CAP is the Agenda 2000 reform from 1997. The purpose was to prepare the EU for the big enlargement in 2004 where ten new members joined. The changes made in the CAP comprised of; further reduction of target prices, a new rural development policy, more environmental considerations, improvement of the safety and quality of food and a simplified legislation where the application process was decentralised to the member countries. This reform was evaluated in 2002 (Altomonte & Nava, 2005).

During the evaluation, the mid-term review, it was decided that some additional changes were to be made along the path of less market distorting subsidies (Altomonte and Nava 2005). The reform was adopted in 2003 and contained the following changes; direct aid was to be decoupled (independent of the production) and the aid was only to be given if the farmers complied with certain standards concerning the environment, food, animals etc. In addition, more resources were to be used for the rural development and the payments made to bigger farms were reduced in order to decrease the harm they caused small farms.

### **3.2. The Goals of CAP**

When the CAP was created in year 1957, goals were established that the EU should aim at fulfilling. The goals are stated in the treaty of the European Union in Article 33.

*"1. The objectives of the common agricultural policy shall be:*

*(a) to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour;*

*(b) thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;*

*(c) to stabilise markets;*

*(d) to assure the availability of supplies;*

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<sup>4</sup> One of the negotiating rounds as implemented by the General Agreement on Tariffs and Trade (GATT) which started in 1986 and closed in 1995.

*(e) to ensure that supplies reach consumers at reasonable prices.”*

European union — consolidated versions of the treaty on European Union and of the treaty establishing the European community (EU, 2006, p.54)

### **3.2.1. The Tools of CAP**

In order to fulfil the goals stated in the previous section the EU uses various tools whereof the most frequently discussed by El-Agraa (2004) are described here. One could say that there are two categories of tools, one which regulates the internal market and one which regulates the external trade.

The first method to be discussed is tariffs, which is a tool to control and to put a lowering pressure on the imports to the EU. An ordinary tariff is a sum that is put on the price of a good that is being imported, which makes it more expensive. An ad valorem tariff has the same effect of making the good in question more expensive, although it is a percentage that is put on the price of the good. Hence, more expensive products pay higher duties.

Another tool used to regulate imports is quotas which imply that a certain amount of a good is allowed to enter the EU at a specified condition. For example a good could be imported at a cheaper tariff rate or without any tariff. In some cases the quota decides the quantity of the goods allowed to enter, regardless of the tariff the exporter is willing to pay.

Preferential treatment is given to some countries or regions, which imply that they are allowed to export goods to the European Union without paying any tariff or paying a tariff below the general level.

On the exports from the EU, to the rest of the world, the exporters may receive export subsidies. This money is supposed to compensate for the loss they make since the world price is lower than the domestic price. Hence the export subsidies could be said to be equal to  $P_D - P_W$ , where  $P_D$  represents the domestic EU price and  $P_W$  represents the world price.

The second category is the regulations affecting the domestic EU market. The first tool discussed is the use of intervention purchases, where various agencies are obliged to buy the excess products on the market; should the price fall below a certain intervention price level. This is done in order to make the price increase again, due to the smaller quantity now available on the market.

In this category quotas can be found as well, although in this setting they are called production quotas and are put in place to restrict the production of a certain good. This is also done to decrease the quantity available on the market (El-Agraa, 2004).

Set-aside schemes are another method to decrease the production of goods by decreasing the amount of available land that farmers can use. The measures discussed help the politicians to keep the price of agricultural goods close to so called target prices. These prices are determined by decision makers in order to make sure that farmers earn enough money to be able to live on farming (Altomonte & Nava, 2005).

Direct support payments were introduced by the MacSharry reform and are payments given to farmers based on their potential income, rather than their actual income, in order to compensate for lost income due to lower target prices. These are meant to be less market-distorting than the previous price support (El-Agraa, 2004).

### 3.2.2. The Winners and Losers

Many actors are involved in the functioning of the CAP and many are those who in one way or another gain or lose from its existence.

The most obvious winner is the European farmer, the actor the policy was made for (El-Agraa, 2004). There is also another winner, the non-European consumer who manages to buy cheaper food due to the subsidies given within the EU (Matthews, 2008).

The most obvious loser is the European consumer who pays an artificially high price for his/her food. In addition, the European taxpayer is a loser since the CAP is funded by tax money. Below, in Table 3.1., it can be seen how costly the CAP is for the taxpayers. However, one has to take into account that more countries have joined the union throughout this period; hence larger sums of money do not necessarily translate to a higher cost per taxpayer. Additionally, the non-European farmer that produce the same goods that the EU exports is also considered to lose from the policy, according to Andreosso-O'callaghan, (2003). The EU uses export subsidies to sell their goods at lower prices on the world market, which constitutes unfair competition. The amounts spent on export subsidies and the share of the total CAP expenditure they constitute is also shown in Table 3.1. As can be seen, the largest amounts were spent on export subsidies between 1987 and 1993 and the share of CAP devoted to export subsidies has declined sharply over the years.

**Table 3.1.** Yearly costs of CAP and export subsidies

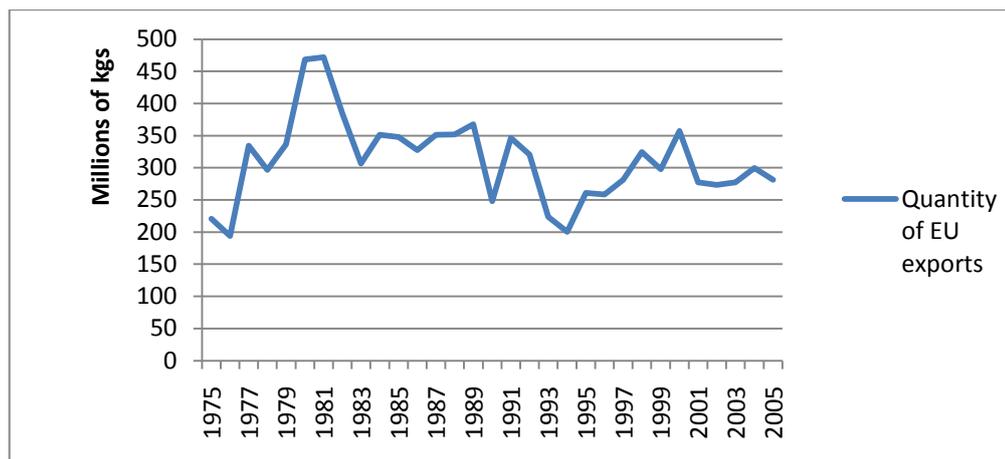
Year	Cost of CAP in current billions of Euros	Whereof spent on export subsidies	Export subsidies as share of CAP
1980	11.32	5.70	0.50
1981	11.87	5.21	0.44
1982	13.06	5.05	0.39
1983	16.73	5.56	0.33
1984	19.01	6.62	0.35
1985	20.63	6.72	0.33
1986	23.09	7.41	0.32
1987	23.89	9.38	0.39
1988	27.58	9.93	0.36

1989	25.87	9.71	0.38
1990	27.04	7.72	0.29
1991	33.97	10.08	0.30
1992	34.15	9.47	0.28
1993	37.84	10.16	0.27
1994	36.75	8.16	0.22
1995	38.11	7.80	0.20
1996	43.04	5.70	0.13
1997	44.81	5.88	0.13
1998	43.11	4.82	0.11
1999	45.12	5.60	0.12
2000	41.85	5.65	0.13
2001	45.59	3.41	0.07
2002	46.21	3.45	0.07
2003	47.57	3.73	0.08
2004	47.91	3.39	0.07
2005	52.17	3.05	0.06

Source: European Commission (2009a)

### 3.3. The Dairy Sector within the EU

As stated earlier milk is a basic good. Within the EU, about 14% of the farm output value consists of dairy products (European Commission, 2004). Regarding EU's position on the world market, Piccinini and Loseby (2001) state that the EU's share of the world trade of dairy products is about 40%. A picture of the EU exports of dairy products to the countries in this study is seen in Figure 3.1., which shows how the export varies from year to year to the countries in this study. In Appendix 4, a case study of the dairy export to three countries; Chile, Nicaragua and Madagascar can be found which shows even larger variations.



**Figure 3.1.** EU’s export of dairy products (Authors own construction, based on data from Comtrade).

The EU became self-sufficient in the dairy sector early and ended up with problems due to overproduction. Since milk is a perishable it cannot be stored for too long and the intervention purchases that were made were concentrated to milk powder, butter and certain types of cheese. The solution was to encourage a decrease in milk production which was done by introducing production quotas for milk in 1984. At the community level there is a production quota which is divided into two parts; one for sales to processing companies and one for direct sales. The member countries each have a quota, whose quantity is determined by a reference period. The individual farmer in each member country is then given an individual quota that he or she should not exceed. If that would happen the farmer has to pay a fine (Piccinini & Loseby, 2001).

The quotas are to be increased by 1% annually from 2009 to 2013 in order to provide a smooth adjustment for the farmers to actual market demand, for when the quotas are completely removed in 2015 (European Commission, 2009b). As noted earlier the farmers have been protesting against this increase of quotas and whether the decision to remove the quotas will be fulfilled in 2015 is uncertain (SVT, 2009).

## 4. The World Trade

*Today, global trade is rather complex and subject to many specific rules. The section introduces the Agreement on Agriculture established by the World Trade Organization, an organisation EU is a member of and hence need to comply with its trading rules regarding domestic- and export subsidies.*

### 4.1. Agreement on Agriculture (AoA)

Before the founding of the WTO<sup>5</sup> in 1995, no specific agreement regarding trade within agricultural products did exist. The original trade rules established under GATT did apply to trade within agricultural products; however, it allowed governments to use import-quotas and to subsidise its agriculture. Specifically, it allowed countries to use export subsidies which were not allowed for industrial products. As a result, the trade within agricultural products became much distorted (WTO, 2008). The WTO followed the subsequent reasoning that when import barriers and domestic subsidies were used, crops could become more expensive on a country's internal market. This in turn encouraged overproduction, creating a surplus needed to be sold elsewhere. If sold on the world market, export subsidies are needed to cover for the lower price. Countries that could afford to subsidise its agricultural sector could hence both produce and export more than they naturally would. This resulted in export subsidy wars between nations, whereas countries that could not afford to subsidise their goods suffered from unfair competition (WTO, 2008). A specific agreement, only concerning agricultural goods was needed, which was created under the Uruguay Round. The agreement regarding agriculture was the area the member states had most difficulties agreeing on. The United States (US) and the European Union, two economic powers which have considerably high and complex agricultural support systems, did not completely agree until the 7<sup>th</sup> of December 1993, one week before the finishing deadline of the Uruguay Round, (Seth, 2004).

The agreement implied regulations of how much domestic support and export subsidies each member country was allowed to use. Domestic support got categorised into three different boxes, with each box getting a specific colour. The amber/yellow-coloured box includes support that needs to be cut back on since it is considered having direct effects on production and trade. The reduction required was higher for developed countries than for developing countries, which also were given a longer time span to meet the requirements. (WTO, 2008). The base years used for the reduction were 1986-88, a period when the support levels within both the EU and the US was very high. This implied that both those economies were left with a high share of support they rightfully were allowed to use within their agricultural industries (Seth, 2004). No criteria of a minimum reduction per product existed, which implied that countries could increase support for one product as long as they compensated the increase by reducing its support even more for another product (Seth, 2004).

The green box includes support only considered to have a minimal impact on trade and can therefore be used freely. The box includes the decoupled support which are payments made directly to farmers that are not considered to encourage production (Seth, 2004). Examples of such support are direct income support and support to infrastructure, research, disease control and food security (WTO, 2008). The EU, USA

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<sup>5</sup> WTO was created on the 1<sup>st</sup> of January 1995 out of the Uruguay Round, implemented by the GATT.

and Japan are considered giving most support of the green kind (Seth, 2004). The last box has a blue colour and includes support that initially belonged to the amber/yellow box. This support is allowed without any reductions for now; as long as requirements exist to limit production and the support level does not exceed the one of the year 1992 (Seth, 2004). The box is said to be specifically designed to suit the EU's internal support system and many other members want it abolished (Seth, 2004).

The AoA does not allow export subsidies, however, there are exceptions. Members are allowed to use them as long as they are listed on a country's list of commitments (WTO, 2008). Those members are required to cut these subsidies by both a money value and a quantity value, using 1986-90 as the base level. The quantity reductions were higher for developed countries than for developing countries (WTO, 2008), like in the previous case of domestic subsidies in the yellow box. Members that did not use export subsidies when the AoA took effect are not allowed to start using them. However, the base years of which the allowed amounts are based on, were years when the EU's export subsidies reached a very high level<sup>6</sup>. This entails that the reduction the EU has to make is not very large leaving them with a high use of export subsidies they rightfully were allowed to use. The reduction the developing countries have to make is not expected to make any difference, as in many cases developing countries have seldom afforded to give subsidies in the first place (Seth, 2004). EU has not exceeded the allowed amount of export subsidies, within the dairy sector, they were allowed to use by the WTO from the 1995 AoA agreement. This can be seen in Appendix 5.

The agricultural agreement from the Uruguay Round did not bring about any immediate consequences. Reasons for that was due to that base years picked allowed for continuing high domestic support and that important areas such as USA's export credits and the EU's acre- and animal support were not affected by any reduction requirements (Seth, 2004). Important, however, was that an agreement regarding agricultural products was created which made further negotiations possible. In 2000, the negotiations did start again under the Doha Round. A new agreement is not yet reached but the negotiations are aimed at continuing to reduce and eventually phase out export subsidies and reducing domestic support that distort trade (WTO, 2008). An agreement has been difficult to reach as each country's negotiating proposals mainly includes abolishing support they do not give themselves and allowing support they do give. EU's proposal contains lowering tariffs whilst keeping acre- and animal support. Instead, USA's proposal contained abolishing export subsidies but keeping export credits (Seth, 2004). Another reason why problems have arisen is due to the developing countries demand on the EU and USA to deliver plans of how they will decrease and eventually remove their trade distorting support within agriculture (Agebjörn, 2007). In the mean time, the EU and USA have had their main focus on other issues, which led to the collapse of the meeting in Cancun in 2003. The negotiations started again in 2004 and under the Hong Kong meeting in December 2005, the EU promised to remove its export subsidies gradually until 2013, given that particular agreements were reached on a handful of other issues. Amongst others were rules and clarifications concerning USA's export credits.

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<sup>6</sup> See Table 3.1

## **4.2. Anti-dumping**

By using export subsidies a company can charge a price lower than it normally charges on its own market, or sell to a price that does not cover its production costs. In both cases the company is said to be “dumping” the product (Seth, 2004). Article VI of the GATT, called The Anti-dumping Agreement, gives a country the right to protect itself from this behaviour by applying anti-dumping measures. This is done by charging an extra import duty to bring the price closer to the “normal value” (WTO, 2008). However, in order to rightfully use this extra import duty, which normally would break against the WTO principles, the government importing the dumped product has to show that dumping is taking place and to which extent. This is done by showing how much lower the exporting price is in comparison to that country’s home market price (WTO, 2008). In addition, the government must also show that dumping is causing injury to the domestic production. If the margin of the dumping is insignificant, determined as being less than 2% of the export price, or if the volume of the dumped imports of one country is less than 3% of total imports of that product, dumping investigations must end immediately which leaves the country with no right to implement anti-dumping measures (WTO, 2008).

Even though an anti-dumping law exists, most developing countries do not fully use the amount of tariffs they rightfully could apply according to the WTO anti-dumping rule. Matthews (2008) suggests that this could be due to the benefits the dumped products bring to the food consumers in the country.

## 5. Trade Theory

*The section provides the theoretical framework needed in order to analyse the predicted effects policies outlined in section three and four are said to have on dairy production in developing countries. The theories give suggestions to model variables and their hypothesised effects.*

### 5.1. Comparative Advantages

According to Krugman and Obstfeld (2006) there are two basic reasons for countries to trade with each other. The first is due to the differences between countries and the second to economies of scale.

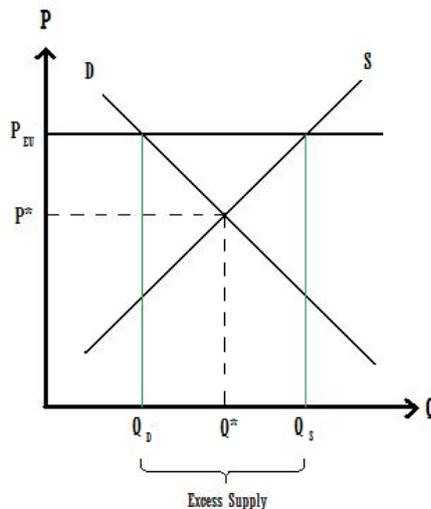
In the early 19<sup>th</sup> century, David Ricardo developed the theory of comparative advantages (McCulloch, 1888). The theory explains how countries can benefit from their differences by focusing their production on areas where they perform relatively well. By doing so the surplus can be traded for goods they produce relatively bad. Focusing their production on fewer goods will enable them to produce more efficiently at a larger scale, taking advantage of the economies of scale (McDowell, Thom, Frank and Bernanke, 2006).

According to Bouët et al. (2005), most developing countries have their comparative advantages within agricultural production. This is consistent with the theory developed by Balassa (1977), where comparative advantage within agriculture is said to be the first stage of the development process. The developed countries, such as the US and countries within the EU have passed this stage and have moved towards development of services. Despite this the developed countries are the largest exporters of agricultural products (Diao et al. 2002; WTO, 2009). This is said to be attributed to their use of domestic- and export subsidies (Oxfam, 2005).

### 5.2. Effects on the Market of Domestic Subsidies

The graph below, Figure 5.1., shows how the tools of the CAP give incentives to European farmers to overproduce. As previously explained in section 3.2.1.; the artificially high prices on agricultural products within the EU serves as a price floor. They have the opposite effect of price ceilings, which promote excess demand, as explained by McDowell et al. (2006). The graph represents a basic supply and demand graph, where the quantity demanded and supplied on the market is a function of the price.

$P^*$  and  $Q^*$  represents the price and quantity produced that would prevail in an equilibrium situation if the market was free from intervention. When a price floor is introduced, which is the lowest guaranteed price a producer can receive for its products, it is set above the equilibrium price ( $P^*$ ). This is shown in the graph by  $P_{EU}$ . At this artificially high price producers will increase their production from  $Q^*$  to  $Q_S$  to maximise their profit. The consumers on the other hand, facing higher prices, will demand less; a move from  $Q^*$  to  $Q_D$ .



**Figure 5.1.** The effects of a price floor in a market. (Authors own construction, based on Krugman et al, 2006)

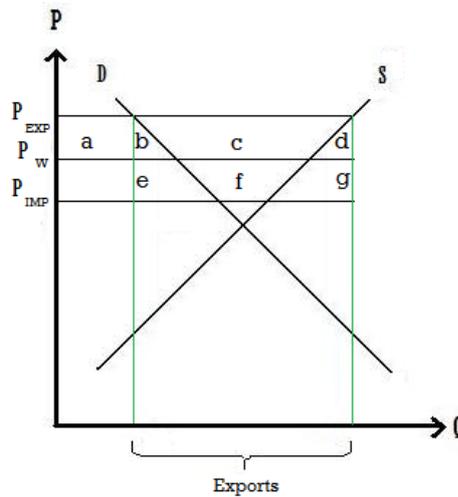
This results in an excess supply of agricultural goods on the European market. In order for this excess supply not to depress the intra-EU prices it must be removed from the market and this can be done in several ways. The government can purchase and store the excess goods for a future shortage, or the goods could be exported to the world market (Altomonte & Nava, 2005). The last option is to destroy the surplus, which is demonstrated in the movie by Grasser (2005).

### 5.3. Export Subsidies & Imperfect World Markets

This section examines the effects of the second alternative, export of excess supply, as suggested in section 5.2 but in a setting with export subsidies. An export subsidy is an amount of money paid to the producer that constitutes the difference between the domestic and foreign price levels (Krugman & Obstfeld 2006).

As mentioned earlier, in section 3.2.1., the prices within EU are artificially high; hence a producer cannot expect the same prices when selling its products outside EU. The export subsidy is then given as compensation to the farmers from the government (El-Agraa, 2004).

The price and welfare effects from this policy can be seen below in Figure 5.2. In a setting without any interventions, the price in both the exporting and importing country would be at  $P_w$ .



**Figure 5.2.** Welfare effects of an export subsidy (Authors own construction based on Krugman & Obstfeld, 2006).

With the export subsidy in place, the domestic price increases from  $P_W$  to  $P_{EXP}$  and in the foreign, importing country the reverse can be seen; the price will fall from  $P_W$  to  $P_{IMP}$ . The resulting welfare effects within the EU are seen below in Table 5.1.

**Table 5.1.** Distribution of welfare from an export subsidy within EU.

Group affected	Area of gain or loss
Producer gain	$+(a+b+c)$
Consumer gain	$-(a+b)$
Government gain	$-(b+c+d+e+f+g)$
Net welfare result	$-(b+d+e+f+g)$

Source: Authors own construction (based on Krugman & Obstfeld, 2006)

As can be seen from Table 5.1., producers gain from this policy, whereas both consumers and the government have net losses. The producer gain comes from higher prices received for their products, which in turn is paid by the consumer which hence experiences a net loss. The government pays out the subsidy but does not receive anything back in return. The net welfare outcome from the policy is thus negative for the society as a whole by the amount of the boxes  $b+d+e+f+g$ .

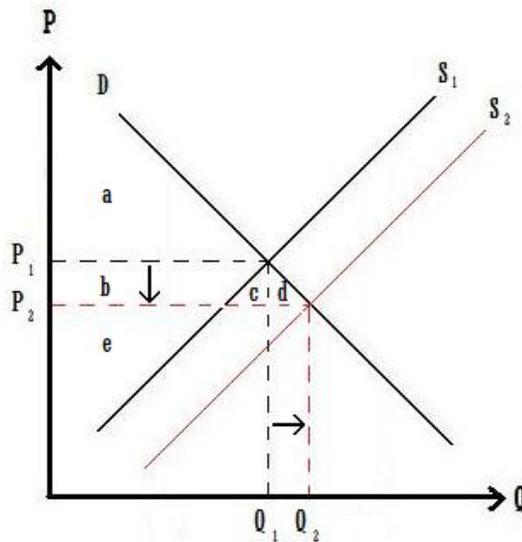
The previous discussion of export subsidies had several assumptions built in. The world market price does not change, only the prices of the exporting- and importing countries individually. This scenario assumes a world market of perfect competition, implying that no single country's export can affect the world price; everyone is a price taker. However, the world is more complex than that. In order to affect the price in any market, the actor needs to have a large share of the total trade of the market in question. Krugman and Obstfeld (2006), WTO (2009) and Piccinini and Loseby (2001) all conclude that the EU is one of the main exporters when it comes to agricultural products. As noted in earlier sections, the EU has as much as 40% of the market shares on the world market of dairy products. From this one can draw the conclusion that the

EU is a big actor on the agricultural world market and has price setting power. Hence these global markets can be said to be imperfectly competitive (McDowell et al, 2006).

The effects seen in this section has been analysed from an EU perspective only. Section 5.4 will show how this policy affects the importing country.

### 5.4. Supply Shock for the Importing Country

Figure 5.3. below depicts a situation for the country that imports the excess agricultural products from the EU. Under autarky, a situation where there is no trade between countries, the price for the good in question would be  $P_1$  and the quantity demanded and supplied domestically would be  $Q_1$ .



**Figure 5.3.** Effects of a supply shock for the importing country (Authors own construction).

As mentioned previously the EU has to export their excess products as to prevent a drop in intra-EU prices. In order to get their goods sold in the foreign market, the price has to be lower than the domestically produced goods. The price difference between what the farmers receive within the EU and in the foreign market is covered by the export subsidy.

The foreign market, which is already assumed to be in equilibrium, experiences a supply shock, when receiving these additional goods. The implication is that the supply curve shifts out. In order for the market to accommodate the additional goods the price has to drop and a new equilibrium is established (McDowell et al. 2006; Varian, 2006) which in the graph becomes the price  $P_2$  and the quantity  $Q_2$ .

Due to the lower prices consumers are generally better off by the area of  $b+c+d$ , which can be seen in Table 5.2. The producers on the other hand experience a welfare loss, equivalent to the area  $b$ . As can be seen in Figure 5.3 more goods are supplied to the market, however a large quantity of that consists of subsidised European goods. The domestic farmers are forced to compete with subsidised goods sold below their production cost. The least efficient domestic farmers will then be outcompeted, resulting in a market disturbance since the competing products are being dumped on the market. However, the society as a whole experiences a net welfare gain of the area  $c+d$ .

**Table 5.2.** Distribution of welfare from an export subsidy for the importing country.

Group affected	Area of gain or loss
Producer gain	-b
Consumer gain	+(b+c+d)
Net welfare result	+(c+d)

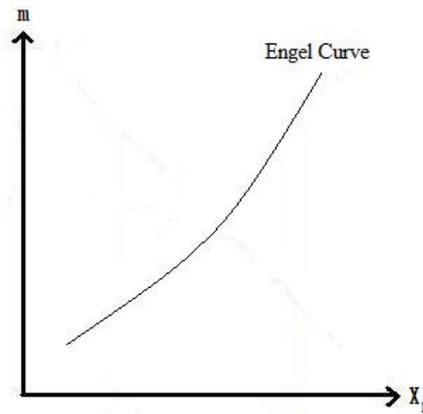
Source: Authors own construction.

The size of the market disturbance discussed above depends on several factors. Firstly, the protectionist measures taken by the importing country play a crucial role. That could for example be the use of WTO's anti-dumping laws to protect their domestic production against unfair competition from abroad (Matthews, 2008). In this case the EU export subsidies would not have as high effect on the country's agricultural production level; not as many producers would get outcompeted. Secondly, the more developed the country's agricultural production is, the more it can use scale economies and produce at lower average cost (Varian, 2006). This implies that the country's domestic production is more competitive and will not get outcompeted as easily. Lastly, the proportion of the population that depends on farming is an important factor. Generally this proportion is higher in developing countries and hence more people could get hurt from the CAP (Oxfam, 2005). One can thus conclude that the net welfare gain might not be an overall gain for the society, when applied to an undeveloped country where producers and consumers to a large extent are the same individuals. However, since there are so many factors involved, the net effect can only be determined on a case-by-case basis (Matthews, 2008) as mentioned previously in section one.

## 5.5. Additional Factors Affecting Production

The market for a specific good always consists of that market's potential buyers and sellers (McDowell et al., 2006). Since the countries studied trade on the global market, the market's potential buyers and sellers do not only exist within the countries' borders. The previous sections dealt with the foreign produced supply, which is thus one part of the total supply.

The domestic demand is a function of income (Varian, 2006), which can be seen from the Engel curve as depicted below in Figure 5.4. The figure shows how the consumption of the normal good  $X_1$  increases as the income ( $m$ ) goes up. A way of measuring the income of the consumer is to use the GDP per capita.



**Figure 5.4.** Engel curve for a normal good (Authors own construction based on Varian, 2006).

The foreign demand can be measured by the amount of exports. Thirlwall (2002) recognises the positive effect increased exports, i.e. increased foreign demand, have on the long run growth of output. This in turn is positive for a country's growth.

What have been covered so far are the actors that make up a market. However, there is always a risk of disturbances and noise when it comes to the production and/or the transportation of the good. One such factor the World Bank has recognised is natural disasters (Parker, 2006). According to the World Bank; natural disasters affect the economy negatively and developing countries are especially vulnerable. Floods and droughts, for example, have negative effects on agricultural activities.

## 5.6. Summary

The table below, Table 5.3., summarises the effects the variables discussed in section five have on a developing country's dairy production, as suggested by the economic theories presented. These effects are the hypotheses tested in the thesis with the main variable of interest being the import from the EU.

**Table 5.3.** Hypotheses

Variable	Effect
Import from EU	Negative
Import from other countries	Negative
Export	Positive
GDP per capita	Positive
Natural disasters	Negative

## 6. Empirical Section

*The section applies the theoretical framework on real world data. This is done in order to draw conclusions regarding the hypothesised effects CAP policies are said to have on the developing countries' dairy production. In addition, the general assumptions made in this study are outlined and described along with the method used.*

### 6.1. Presentation of Model and Variables

Initially the contemplated model contained six variables; imports from EU, imports from the remaining countries, export, natural disasters, GDP and population. When developing the model the first step was to look at how correlated the variables were in order to avoid future multicollinearity problems. It was discovered that population and GDP were highly correlated; instead of dropping one of the variables they were combined into GDP per capita. Taking the natural logarithms of the variables was considered useful in this model as it describes the marginal effects in percentages. Hence, the final model looks like the following:

$$\ln\text{prod} = \alpha + \beta_1 \ln\text{EUimp} + \beta_2 \ln\text{nonEUimp} + \beta_3 \ln\text{exp} + \beta_4 \ln\text{GDPperCAP} + \beta_5 \text{trend} + \beta_6 \text{ND} + \beta_7 \text{adj} + \beta_8 \text{Jamaica} + \dots + \beta_{29} \text{Sudan} + \varepsilon_i$$

#### *Production (lnprod)*

The dependent variable has been collected from the Food and Agriculture Organization (FAO), which is a division of the United Nations. In their database FAOSTAT figures of production were retrieved for “cow milk, whole, fresh”. The database reported the figures in metric tonnes; however, they were transformed into kilograms. This was done to facilitate the interpretation of this variable when looking at the descriptive statistics. The FAO only reports the top 20 commodities produced by a country. The observation for Belize in 1992 is therefore missing since the production that year was too small to be in the top 20.

#### *Imports from EU (lnEUimp)*

This explanatory variable was collected from Comtrade, a database created and maintained by the UN containing statistics on international trade. To find the commodity of interest the SITC (Standard International Trade Classification) rev.1 classification was used. SITC was preferred over the other classification HS (Harmonized System) due to more available data and revision 1 was used because it was the only revision that covered the years of interest. The unit used in the database was kilograms. In order to get a figure for the quantity of dairy products the subcategories 022(milk and cream), 023(butter) and 024(cheese and curd) had to be added together. Aggregated figures for the EU were only available from the year 2000 and onwards, hence for the previous years the figures for the individual member countries had to be added together. Consideration was given to the enlargements of the EU<sup>7</sup>. The figures taken were the export figures reported by the member countries.

#### *Imports from non-EU countries (lnnonEUimp)*

This explanatory variable was collected from Comtrade using SITC rev.1 categories 022,023 and 024 as previously explained for the imports from the EU variable. The

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<sup>7</sup> A list of member countries and when they joined the EU can be found in Appendix 3.

figures were calculated by taking the aggregated world imports as reported by each country and subtract the aggregate EU exports. The unit used was kilograms.

#### *Exports (lnexp)*

This explanatory variable was collected from Comtrade using SITC rev.1 categories 022,023 and 024 as previously explained for the imports from EU variable. It was retrieved by taking each country's reported export to the world. The unit used was kilograms. When an export value was missing the assumption made was that no exports occurred. However, a natural logarithm cannot be taken on a value of zero; hence it was replaced by the value 1.

#### *GDP per Capita (lnGDPperCAP)*

This explanatory variable has been calculated by combining the two variables GDP and population, i.e. GDP divided by population. The data for GDP was collected from the UNdata and is stated in constant 1990 USD. The population was collected from the database Gapminder.

#### *Trend (Trend)*

Some data showed clear trends over time. In order to adjust for this, a trend variable was included that ranges from 1 for the first year to 31 for the last.

#### *Natural disasters (ND)*

The dummy variable was comprised by collecting data for various kinds of natural disasters and combining them into one. The database used was The International Disaster Database (EM-DAT) and the types of disasters included were; drought, flood, storm and earthquake. A value of 0 means that there were no natural disasters reported for that year, whilst 1 means that at least one natural disaster of one of these four types did occur.

#### *Adjustment (adj)*

The dummy exists to adjust for the missing values of exports. The number 0 indicates that no modification was made; the country reported a non-zero export. The number 1 indicates that no export was reported.

#### *Country dummies (Jamaica,.....,Sudan)*

The country dummies are incorporated in the model to allow for each country's intercept to vary due to differences between the countries' domestic production levels.

#### *Error term ( $\epsilon$ )*

The error term is added to the model in order to capture the effects from the omitted variables and possible misspecifications.

## **6.2. Additional Assumptions**

Except for each variable's specific assumptions outlined previously, there are some additional assumptions that need to be presented.

The assumption made about the dairy products imported from the EU is that all dairy products have been subsidised in at least one stage. Either the good received subsidies during its production, during its export or during both stages.

Two different databases have been used to collect information about dairy products. The assumption made was that category 022,023 and 024 as reported in Comtrade correspond to the production of “cow milk, whole, fresh” as reported by FAO. This assumption is made since the milk produced can be used in the production of butter and/or cheese, which is not reported by FAO.

When determining which countries to use in the dataset Africa, South- and Central America were investigated. The criterion for including a specific country was a maximum of 5 missing observations for South- and Central America and 7 missing observations for Africa. This differential treatment is due to less reported data from the African countries.

For some years Comtrade only reported the value of the exports/imports instead of both the quantity and value as normally done. The quantity was then received by calculating the price per kg for two years preceding the missing value and two years succeeding the value. An average was calculated and the value given by Comtrade was divided by the estimated average in order to receive an estimated quantity. This has only been necessary in a few cases and is not expected to have an impact on the result.

When calculating the non-EU imports some years became negative due to reported errors by the countries. This would imply that more than 100% of the imports came from the EU which results in two problems; firstly the value cannot exceed 100% out of pure logic and secondly one cannot take the natural logarithm of a negative value. At the occasions when the value exceeded 100% the value was modified to 99.9999%, implying that almost all the imports were assumed to come from the EU. In addition, the non-EU imports become a positive number, albeit small. This is not assumed to affect the results of the regression.

### **6.3. Econometric Method**

To estimate the production regression function, the ordinary least square (OLS) method was used. In order to be more efficient with the degrees of freedom, the data was compiled into a pooled data set where the least-squares dummy variables model (LSDV) was used. The method implies that each country, except from one, is given a specific dummy variable that will take into account each country’s individual conditions by allowing their intercept to differ. However, the regressors’ slope coefficients are assumed to be the same (Gujarati, 2003). By using this method, a generalised result of the data can be received which leaves out the task of individual country-case studies. The base country, the country referred to when all country dummies are zero, is Brazil. The results of these dummies are not presented in the regression output but can be found in Appendix 6.

Due to the large amount of dummy variables included in the model heteroscedasticity was present. In order to correct for this, robust standard errors were computed instead of the ordinary standard errors (Gujarati, 2003).

A trend variable was included in the regression to deal with any trends in the data. The trend caused by  $\ln\text{GDPperCAP}$  on the  $\ln\text{production}$  variable is thus explained by the new trend variable and the remaining explanatory variables thus explain the variances in production not caused by time (Gujarati, 2003).

## 6.4. Descriptive Statistics of the Model Variables

As shown in Table 6.1 the countries in this study, on average, import more than they export. This can be seen by looking at the mean value for *lnexp* which is lower than the aggregated value for *lnEUimp* and *lnnonEUimp*, which constitutes the import from the whole world<sup>8</sup>. This suggests that the countries in question do not have a production that is sufficient for their own consumption needs. Their relatively low export also suggests that they may not be competitive enough to compete on the world market. In addition, the dummy variable *adj* has a mean value of approximately 0.175. This indicates that in 17.5% of the cases, no export at all of dairy products was reported from the countries in the study to the world. This translates to approximately every 5<sup>th</sup> year.

When considering the *lnprod* variable, conclusions regarding changes in the production level are difficult to make. This is because this is a pooled data set containing the production level of 23 countries during a time span of 31 years. The difference between the minimum and maximum values could be due to both country differences and to changes over the years.

**Table 6.1.** Descriptive statistics

Variable	Minimum	Maximum	Mean	Std. Deviation	No. of obs.
<i>Lnprod</i>	13.89	23.96	20,04	1.82	712
<i>lnEUimp</i>	4.61	19.14	15.10	1.74	708
<i>lnnonEUimp</i>	-7.50 <sup>9</sup>	20.50	14.68	4.55	684
<i>Lnexp</i>	0	19.43	10.87	5.67	713
<i>lnGDPperCAP</i>	5.33	8.78	7.22	0.70	713
<i>Trend</i>	1	31	16	8.95	713
<i>ND</i>	0	1	0.55	0.50	713
<i>adj</i>	0	1	0.18	0.38	713

The *ln GDPperCAP* in Table 6.1. has a fairly low standard deviation which could be due to several reasons. One reason might be that there has been a slow welfare development in these countries over time. The low standard deviation could also indicate that these countries are fairly similar economically, when it comes to their GDP per capita variations.

<sup>8</sup> The reader should be aware of that the import and export figures in the Table 6.1., may also be between the countries in the study. However, the intra trade is not assumed to have any impact on the conclusions drawn.

<sup>9</sup> When the original value is between 0 and 1 the natural logarithm is negative.

It is also interesting to notice that the mean of the ND dummy exceeds 0.5. This suggests that it is more common in these countries to experience a natural disaster than not.

## 6.5. Output of the Regression Model

Looking at the regression output in Table 6.2., one can see that the constant is positive and significant on the 1% level. The positive value suggests that there will always be a production of dairy products.

The main variable *lnEUimp* received a negative value of  $-0.034$  and is significant on the 1% level. The interpretation of this is that a 1% increase in the imports from EU to the countries in the study will decrease their own dairy production with 0.034%. The negative impact of the EU imports on the countries' own production of this commodity is in line with the hypothesis.

The variable *lnnonEUimp* has a value of 0.005 and hence affects the dairy production positively. This is in contrast to the EU import and not in line with what one could expect. The coefficient is significant on the 10% level.

**Table 6.2.** Regression output

Variable	B	t-statistic
Constant	21.608***	26.03
<i>lnEUimp</i>	-0.034***	-3.35
<i>lnnonEUimp</i>	0.005*	1.74
<i>Lnexp</i>	0.025***	4.68
<i>lnGDPperCAP</i>	0.203*	1.87
Trend	0.019***	9.58
ND	-0.006	-0.25
Adj	0.115	1.45
R <sup>2</sup>	0.974	
N	681	

Notes: \*\*\*=significant on the 1% level, \*\*=significant on the 5% level and \*=significant on the 10% level.

The *lnexp* variable has a positive value of 0.025 and is significant on the 1% level. This implies that when exports of dairy products increase with 1%, the production level of that commodity increase with 0.025%. This is in line with the theoretical expectations. A similar result can be seen from the *lnGDPperCAP* variable. Its coefficient value also affects the production positively with an increase of 1% in the GDP/capita resulting in an increase in the production of 0.203%. Thus, this variable has the largest impact on the dairy production for these countries.

The trend variable has a positive coefficient which indicates a positive trend in the production level. Looking at the dummy variables, the ND dummy has a negative value indicating that a natural disaster would cause the production to decrease, which is in line with the hypothesis in section 5.6. However, the low t-statistic indicates that this dummy is not significant which would imply that natural disasters do not have any impact on the dairy production level for these countries. The second dummy variable show that the years when no export occurs, the intercept would have to increase with 0.115 units. However, this dummy is not significantly different from zero either, which states that the adjustments made in the data set not is proven to have an impact on the result of the regression.

The  $R^2$  indicates the goodness of fit of the model. The value of 0.974 indicates that 97.4% of all variation in the production level is explained by the explanatory variables. The regression output also contains an additional 22 dummy variables which all are significant on the 1% level; more details can be found in the Appendix 6.

## 6.6. Analysis

As can be seen from the empirical results, the EU's exports do effect the dairy production in the countries studied negatively; when the imports from the EU increase with 1% the dairy production in these developing countries will decrease with 0.034%. This confirms the theory outlined in section five and confirms that EU's subsidised export is market distorting for the developing countries' domestic dairy production. Due to its negative effects, without the EU dumping its dairy products on their markets, the domestic production could be assumed to increase. As explained by Rostow (1960) and Balassa (1977), agricultural production is important for a countries development in the initial stages. Due to that the development in the agricultural sector is considered to stimulate further development in other areas, one could assume that the EU is slowing down the development for undeveloped countries. This is not in line with the development promoting objectives the EU has stated in article 177 of the EC treaty.

The study also found, by looking at the descriptive statistics, that these developing countries are net importers of dairy products. This suggests that they do not have a comparative advantage in dairy production, but the EU might have due to being such a large exporter of these commodities. However, the theory section showed how domestic support encouraged overproduction, which was found to be the case within the EU by the study from Frandsen et al. (2003). Hence, reasons why the EU is such a larger exporter of dairy products most likely comes from the domestic- and export subsidies their farmers receive, rather than having a comparative advantage in the production of dairy products.

By being net importers of dairy products, the developing countries in the study are assumed to benefit from the CAP, which can be seen from Table 5.2. This is due to the cheaper food prices created by the EU's policy, which also is a general consensus in previous literature (Matthews, 2008; Bouët et al., 2005). However, the countries in the study are in general undeveloped, or have been during the time period examined. This implies that the farmers do not have many other work opportunities when outcompeted by subsidised EU products, as highlighted in the reports by Oxfam (2005) and Fokker and Klukist (2000). Additionally, the thesis shows how the exports from the EU are very fluctuating since what is exported is the excess supply only. This implies that a

developing country cannot rely on steady supplies of agricultural products from the EU. Meanwhile, their own production is not given the opportunity to develop. It can thus be concluded that the short run gains, from cheap food supplies, might be very costly in the long run since their development might come to a halt. This might suggest why developing countries, which often not have been able to use export- and domestic subsidies, lobbied for a specific agreement regulating the world trade of agricultural products during the Uruguay Round. The regulated limits regarding export subsidies, which were decided during the negotiations, has not been breached by the EU within its dairy sector. However, even though having stayed within its allowed limits, the base years chosen allowed for a continued high use of this type of subsidy. Hence, pressure of further liberalising the agricultural trade has since then carried on from the developing countries within the WTO. This has made the EU, under the ongoing Doha Round, to consider removing its export subsidies by 2013.

The empirical result for the non-EU imports was the opposite of what was expected from the hypothesis. However, the Table 6.1 shows that the variation in non-EU imports is very large in comparison to the imports from EU; hence it might be more difficult to measure a relationship between these imports and the domestic dairy production. In addition, the EU imports are significant on the 1% level, whereas the non EU imports are not significant until the 10% level, hence there is a larger risk of committing a type I error in the latter case.

The variables  $\ln exp$  and  $\ln GDP_{perCAP}$  both confirmed the hypotheses made regarding their effects on production; both positively affected production in the countries studied. The GDP per capita variable was found to have the highest impact on the dairy production amongst all the variables studied. This could be due to the relatively low change in the GDP per capita over the years and the relatively high change in production. This would imply that a small, positive change in the GDP per capita results in a relatively large increase of the production. The high impact, in comparison to the export variable, also suggests that the domestic demand has a larger impact on production than the foreign demand. Consider the relatively low quantity of exports from the countries studied, this is not a surprising result.

Looking at the dummy variables, natural disasters showed the hypothesised sign but proved to be insignificant. One reason for the insignificance could be that the natural disasters occurred locally and did therefore not have a significant effect on the production in the country as a whole. The dummies assigned to each specific country all became significant and had a negative sign. This indicates that each country's domestic production were at a lower level when compared to the base country. The base country used in the study was Brazil; the largest country in the sample. Hence, the negative signs for the other countries were not surprising results.

On a whole, the model confirms the underlying theories used in this study. In addition, the high  $R^2$  value indicates that the model developed for this study does explain a lot of the variation in dairy production.

## 7. Conclusion

The purpose of the thesis was to analyse the effects of EU's subsidised dairy products on the production in developing countries and to quantify these effects. The empirical result showed that the subsidised imports from the EU distort the dairy production in developing countries by the amount of 0.034% for every additional percentage increase of import. This confirms the main hypothesis made in the study as well as answers the purpose of the thesis. By stopping this behaviour of exporting subsidised goods, the domestic production could be assumed to increase. Hence, the long run effects which could come from this could be welfare enhancing for the countries in the study. Thus, the thesis supports the study made by Diao et al. (2002).

The thesis found that the exports of dairy products from the EU most likely are a result of the use of domestic- and export subsidies rather than the result of comparative advantages. However, even though the use of these subsidies contributes to gains for net importing developing countries in terms of cheaper food supplies the policies might be very costly in the long run. This is due to the development gains that are expected to come from an increased domestic production.

Due to the negative effects the imports from the EU showed to have on the developing countries' dairy production, the conclusion can be drawn that the EU is not policy coherent with its development promoting objectives. However, over the years, CAP has been reformed and under the ongoing Doha Round, the EU has made suggestions to remove its export subsidies. This is seen as positive for the future prospects of developing countries.

Another result found was that the domestic demand showed to have a larger effect on production than the foreign demand. This is suggested by the relatively large coefficient for the GDP per capita variable on production in comparison to the coefficient for the export variable.

In general, most previous studies within this field have had their focus on the effects on world prices of liberalising agricultural trade. The focus of this thesis has been on the size of the distortion in domestic production caused by the EU's subsidies. Hence the conclusions of the thesis are therefore an important step towards being able to calculate overall effects of such policies in future research studies. However, the findings of the thesis support the previous studies made by, Oxfam (2005) and Fokker and Klukist (2000) in that the EU outcompetes local farmers.

A suggestion for future research could be to examine the effect of dumping by using the value of export- and domestic subsidies instead of the quantity exported, as done in this study. Another suggestion for future studies could be to compare developing countries that import subsidised goods versus countries that import non-subsidised goods to see whether the effects on their domestic production differ.

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## Appendix 1

Articles 177 and 178 of the EC treaty.

*”Article 177*

*1. Community policy in the sphere of development cooperation, which shall be complementary to the policies pursued by the Member States, shall foster:*

*— the sustainable economic and social development of the developing countries, and more particularly the most disadvantaged among them,*

*— the smooth and gradual integration of the developing countries into the world economy,*

*— the campaign against poverty in the developing countries.*

*2. Community policy in this area shall contribute to the general objective of developing and consolidating democracy and the rule of law, and to that of respecting human rights and fundamental freedoms.*

*3. The Community and the Member States shall comply with the commitments and take account of the objectives they have approved in the context of the United Nations and other competent international organisations.*

*Article 178*

*The Community shall take account of the objectives referred to in Article 177 in the policies that it implements which are likely to affect developing countries.”*

European union — consolidated versions of the treaty on European Union and of the treaty establishing the European community (EU, 2006, p.126)

## Appendix 2

### Countries in the study

Algeria
Argentina
Belize
Bolivia
Brazil
Chile
Colombia
Costa Rica
Ecuador
El Salvador
Guatemala
Honduras
Jamaica
Kenya
Madagascar
Morocco
Nicaragua
Panama
Paraguay
Peru
Senegal
Sudan
Venezuela

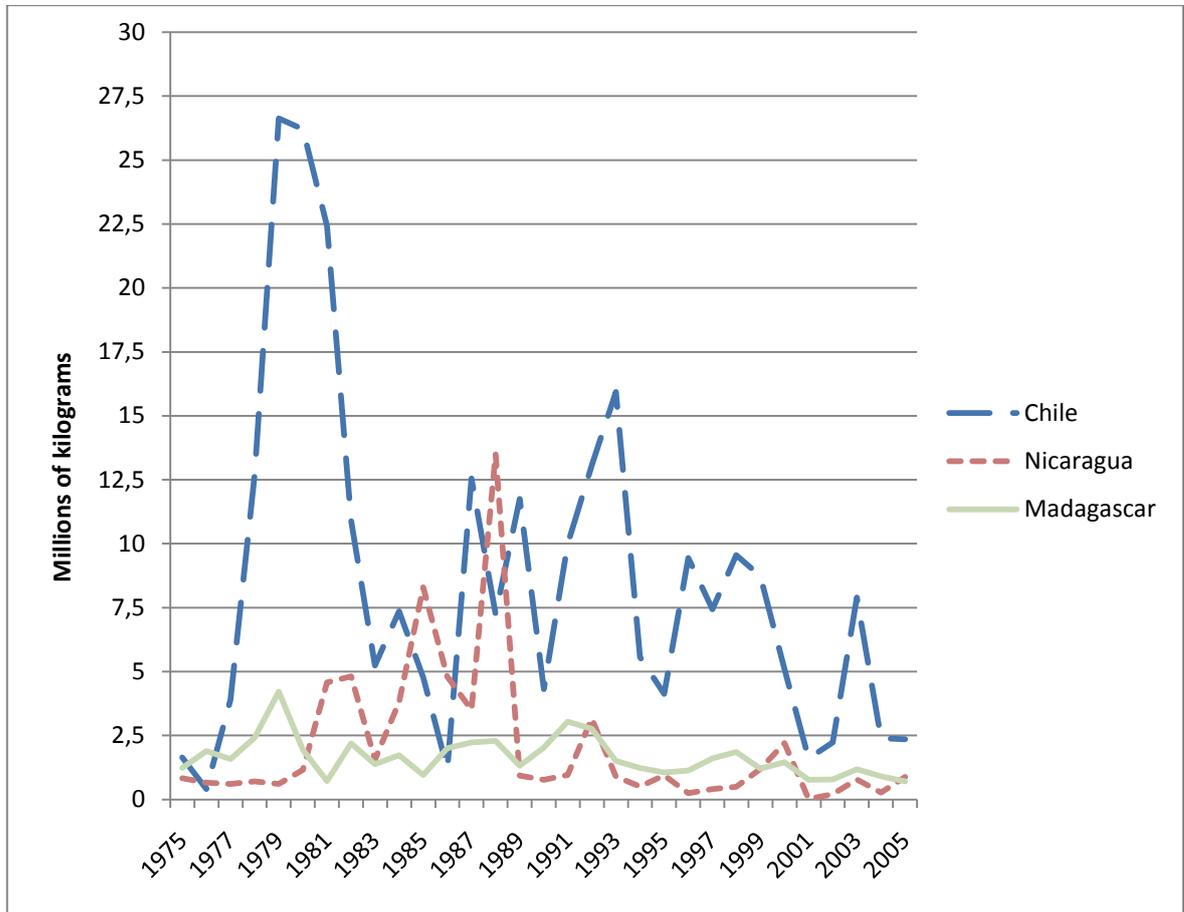
## Appendix 3

### EU members, until 2005, and years of entrance

Year	Country
1952	Belgium
	Netherlands
	Luxembourg
	France
	West Germany
	Italy
1973	Denmark
	Ireland
	United Kingdom
1981	Greece
1986	Spain
	Portugal
1990	East Germany
1995	Austria
	Sweden
	Finland
2004	Estonia
	Latvia
	Lithuania
	Poland
	Czech Republic
	Slovakia
	Hungary
	Slovenia
	Cyprus
	Malta

## Appendix 4

Three countries' import of dairy products from the EU.

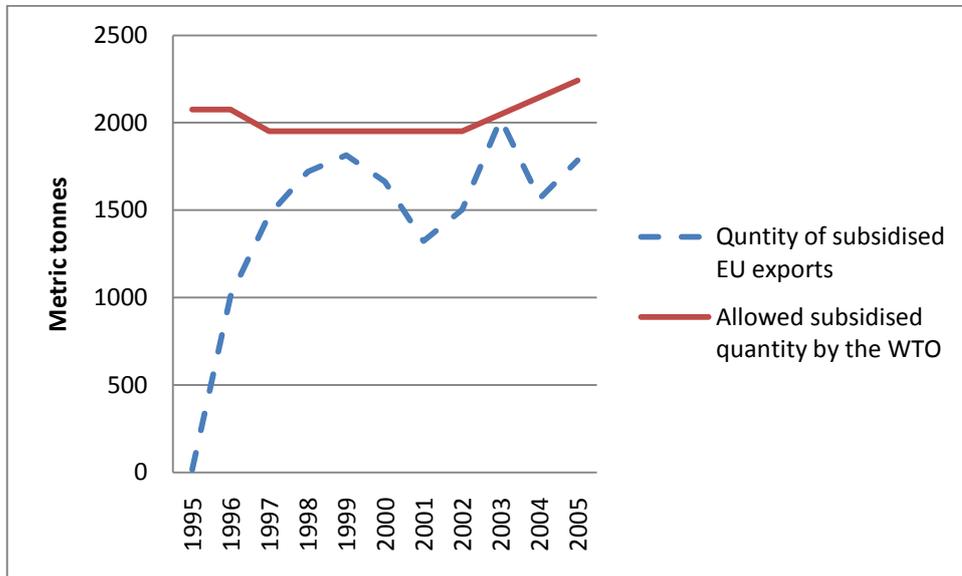


(Authors own construction, based on data from Comtrade)

These three countries were selected by a systematic sampling method. This means that every  $k^{\text{th}}$  observation is chosen for investigation (Aczel & Sounderpandian, 2006). In this case the  $k$  was equal to 7 and they were picked from the order they appear in the data set compiled for this investigation.

## Appendix 5

Export subsidies in the EU given to dairy products.



(Authors own construction based on data from WTO)

A graph showing the export subsidies EU is allowed to have in comparison to how much of it actually is used.

## Appendix 6

Complete results from the regression.

Variable	B	Robust Std. Errors	T	Sig.	Lower Bound	Upper Bound	VIF
<b>(Constant)</b>	21.608	0.830	26.03	0.000	19.978	23.238	
<b>lnImpEU</b>	-0.034	0.010	-3.35	0.001	-0.054	-0.014	3.77
<b>lnExport</b>	0.025	0.005	4.68	0.000	0.015	0.036	7.67
<b>lnNonEUimp</b>	0.005	0.003	1.74	0.083	-0.001	0.011	1.49
<b>lnGDP/capita</b>	0.203	0.108	1.87	0.062	-0.010	0.415	24.63
<b>Trend</b>	0.019	0.002	9.58	0.000	0.015	0.023	1.56
<b>Natural disasters</b>	-0.006	0.024	-0.25	0.805	-0.054	0.042	1.24
<b>dummy adjusted</b>	0.115	0.079	1.45	0.148	-0.041	0.267	5.86
<b>Jamaica</b>	-5.957	0.146	-40.86	0.000	-6.243	-5.671	2.84
<b>Algeria</b>	-2.773	0.065	-42.70	0.000	-2.900	-2.645	2.60
<b>Argentina</b>	-1.025	0.067	-15.20	0.000	-1.158	-0.893	2.89
<b>Belize</b>	-8.447	0.159	-53.23	0.000	-8.758	-8.135	2.56
<b>Bolivia</b>	-4.418	0.164	-26.99	0.000	-4.739	-4.096	6.30
<b>Chile</b>	-2.324	0.032	-72.87	0.000	-2.387	-2.262	2.05
<b>Colombia</b>	-1.234	0.085	-14.56	0.000	-1.400	-1.068	3.07
<b>Costa Rica</b>	-3.534	0.046	-76.19	0.000	-3.625	-3.443	2.48
<b>Ecuador</b>	-1.973	0.132	-14.94	0.000	-2.233	-1.714	4.71
<b>El Salvador</b>	-3.665	0.118	-31.16	0.000	-3.896	-3.434	4.63
<b>Guatemala</b>	-3.790	0.137	-27.64	0.000	-4.060	-3.521	5.46
<b>Honduras</b>	-3.422	0.152	-22.57	0.000	-3.720	-3.124	6.25
<b>Nicaragua</b>	-3.841	0.158	-24.27	0.000	-4.151	-3.530	5.01
<b>Panama</b>	-4.826	0.036	-134.19	0.000	-4.897	-4.756	2.07
<b>Paraguay</b>	-3.883	0.142	-27.30	0.000	-4.163	-3.604	5.91
<b>Peru</b>	-2.633	0.081	-32.32	0.000	-2.793	-2.473	2.86
<b>Venezuela</b>	-2.202	0.056	-39.22	0.000	-2.312	-2.092	2.17
<b>Morocco</b>	-2.553	0.117	-21.85	0.000	-2.782	-2.323	4.48
<b>Kenya</b>	-1.842	0.215	-8.55	0.000	-2.265	-1.419	10.15
<b>Madagascar</b>	-2.896	0.264	-10.98	0.000	-3.414	-2.378	13.96

<b>Senegal</b>	-4.820	0.156	-30.82	0.000	-5.127	-4.513	5.16
<b>Sudan</b>	-1.424	0.180	-7.92	0.000	-1.777	-1.072	5.22

The confidence interval is made on the 95% level.