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Trade Patterns in Europe

An assessment of EU and EMU memberships

Bachelor Thesis within Economics

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Abstract

This thesis investigates in what way trade flows in Europe have been altered and differ for countries belonging to a preferential trade agreement as well as a common currency area. More specifically, how exports among the European countries are affected by memberships with the European Union and the EMU. A total of 72 countries have been chosen which represents the main trading partners between the EU and the rest of the world. Out of these 72 countries, 25 represent EU members which include 12 EMU member countries.

The econometric analysis employ a gravity model with 18 variables in order to determine their impact on trade flows. This is done through a regression with a log-log equation where the dependent variable is export. The other variables included are chosen to explain export flows among the EU members as well as their trade with EMU countries and the rest of the world. Furthermore, variables representing trade affinities are included to determine whether or not they have a significant effect on trade.

The regression is divided into four time periods in order to more easily determine how the trade pattern in Europe have altered from the establishment of the EU and the EMU. The first time period represent an early state of EU membership, the second a mature state of EU membership, the third when EU was reformed and the fourth an early state of EMU membership.

The regression results illustrate that the majority of the selected variables are significant but most importantly that the trade affinity variables are proven to have an impact on trade flows. The results also show that trade has increased and that in the case of EU membership it is more profitable to join than to remain outside. Moreover, the result show in particular that countries that belong to the EMU have a stronger orientation of their exports to the rest of the world then other EU countries. For the latter, the European market is of prime importance.

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1 Introduction

One of the most important insights from international economics is that there are gains from trade. Many economists have back and forth argued about the gains that arise from a free trade area and further on how a common currency area would be another source of continuous growth in the economy. Although, previous research show signs of positive effects on trade flows there are still a lot of hesitation regarding the question of joining or not. The EMU is still fairly young and it will take time before one can know with certainty whether or not it has proven to be a success for the member countries. Although, this does not hinder any attempts to analyse the existing trade results which are giving a strong indication on which way the growth is going.

As some of the European Union members have chosen not to convert to the EMU, further questioning have emerged on its importance for the whole union. By comparing the trade flows of those who have chosen not to convert to the EMU with members who have, this paper will hopefully bring some light on export patterns of countries being EMU members and other EU countries in comparison with world countries. Furthermore, the analysis stretches over a time period of 1982 up to 2005 which have been carefully selected in order to be able to compare trade flows of EU members in their trade with other EU members as well as with other countries for each period, where the number of EU members increases for each additional time period.

As once stated by Confucius; "Only the wisest and stupidest of men never change" and perhaps one of the most significant changes in modern European time is the establishment of the European Union. Since the establishment, there have been many debates on the success of the EU and today the discussion has been further extended to questioning the importance of the EMU. This paper aims to evaluate the affinities in the trade patterns of EMU countries and other EU countries in their exports to each other and to other countries of the world. With this paper, a conclusion will be drawn on whether or not the decision of joining has been wise or stupid for the parties involved.

1.1 Presentation of the Problem

This paper aims to analyse what the effects have been on trade for the European countries after the establishment of the European Union. Furthermore, we wish to see if trade patterns have been affected by the introduction of EMU in the European countries. We hope to be able to draw conclusions on to what extent the European countries may have gained from the continuous integration through the European Union as well as the EMU.

To be able to see these effects we have chosen to look at four time periods. Period 1 will represent 1982-1984, period 2 represents 1989-1991, period 3 corresponds to 1996-1998 and the final period 4 represents 2003-2005. These time periods were included in order to investigate how trade flows within the European Union have changed over time. Furthermore, the analysis is expected to show changes in trade flows by member countries converting to a common currency. More specifically we have chosen to look at the member states in 2005, commonly known as EU25 (See Appendix 1). Also, EU's 72 main trading partners in the world have been chosen in order to give a better estimation of the EU members trading. For a list of all included countries in the regression see Appendix 2.

The analysis of our regressions will investigate whether or not the European Union and the EMU have had a significant impact on trade patterns in Europe.

1.2 Purpose

The purpose of this paper is to test how trade flows among the European countries have altered due to the expansion of the European Union. The analysis also compares how export flows differ between EU- and EMU-members.

1.3 Background

With the demolition of the Berlin Wall in 1989 the features of Europe were changed and new countries emerged. In 1993 the Single Market was completed which included the "four freedoms" of: movement of goods, services, people and capital and this was to become the European Union that we know of today. Its purpose is to create a common entity between the member states in such a way that it is to be a "customsless" area where people, goods and services, easily can be transported between member countries (Europa, 2007).

In 1999 the EMU was introduced which was a further step in enforcing the affinity between the member states. By introducing a common currency, the Euro, the purpose is to strengthen the monetary cooperation between the member countries and their national banks. All members of the European Union are also members of the EMU but not all of them have adopted the Euro. Currently, 15 of the 27 member countries have adopted the Euro as their common currency while the others are either in a transition state of adopting or have chosen not to adopt for the time being (Europa, 2007).

1.4 Previous Research

There have been many debates of pro's and con's with EU membership as well as what the effect has been on trade. This discussion has been further extended with the introduction of a common currency in the European Union. When estimating the effects on trade most economists use the gravity model of world trade which is a convenient measurement to determine effects on trade flows. As in the case of Aristotelous (2006) who finds that "[…] EMU led to an overall increase in bilateral trade flows between EMU countries […]" (Aristotelous, 2006, p. 25) as well as that exports tend to differ between EMU countries. Furthermore, Aristotelous states that the extent to which member countries will benefit from EMU will be dependent on the countries' openness to trade. The more open to trade the countries are, the lower transaction costs and exchange rate uncertainty will be (Aristotelous, 2006). To this extent Midelfart, Overman, and Venables (2003) agrees in their studies on EMU's effect on economic activity in the EU where they argue that EMU is likely to promote specialization amongst member countries and that trade diversion matters more for trade with developing countries. Micco, Stein, and Ordoñez (2003) on the other hand find in their analysis no evidence of trade diversion for the member countries. Furthermore, their results show that trade among EU members is significantly higher than among member and non-member, as well as non-member to non-member countries.

1.5 Outline of the Paper

In section two, the theoretical framework for the thesis will be presented. This section discusses trade theories that are believed to have a significant effect on trade flows which will be the basis of the thesis.

The third section presents the model formulation, where an in depth description of the formula used for the regression in the thesis is presented. Each variable will be discussed in detail to facilitate the description of the regression and its results.

The fourth section provides descriptive data which will present facts and figures that will be used to support the findings in the regression as well as the arguments in the analysis.

In section five the results of the regression are presented as well as the methods performed to correct for the most typical problems resulting from regression statistics. The following section six will present the analysis based on the regression results as wells as the arguments and facts presented in the previous sections.

In the final section the conclusion is presented which will state our concluding remarks on the topic as well as determine whether or not our purpose has been fulfilled. Furthermore, this section will also provide suggestions for further research.

2 Theoretical Framework

One of the most important insights from international economics is that there are gains from trade. This is why countries trade with each other; trade simply provide both ends with mutual benefits. Why countries benefit from trade is mainly due to the fact that countries are different from each other and, for example, that they have different natural resources. By trading, each country can do the things it does relatively well and export these goods and import those goods that others do better. Furthermore, countries trade to achieve economies of scale in production which is when countries specialize in the goods they do relatively well and hence can produce at a larger scale and more efficiently and thus creating a comparative advantage in producing these goods. A country has a comparative advantage in producing a good if the opportunity cost of producing that good in terms of other goods is lower in that country than in other countries. Trade benefits arise when countries export the goods in which they have a comparative advantage (Krugman & Obstfeld, 2003).

Once a country has a comparative advantage in producing a good, specialization in that good will make production more efficient. This efficiency creates a lower cost of production hence the good can be sold at a lower price and this price fall will create a rise in demand for the good. Relative price of a product, the price of one good in terms of another good, is one of the main factors that influence demand and some of the other factors that affect demand are income, preferences, and price of related goods (Krugman & Obstfeld, 2003).

2.1 The Gravity Model of World Trade

There is a strong empirical relationship between the size of a country's economy and the volume of both its imports and exports (Krugman & Obstfeld, 2006). The gravity model dates back to 1962 when Jan Tinbergen applied its initial specifications and estimates of the determinants of trade flows (Soloaga & Winters, 2000). What the gravity model predicts in a very basic form is that the biggest economies will trade with each other the most and thus size matters when analysing who trades with whom. The largest economies are measured in terms of their GDP which measures the total value of all goods and services produced in an economy. Trade volume between two countries can be explained by this equation fairly precise;

$$T_{ij} = f\,(Y_i, Y_j, D_{ij}) \quad (2.1)$$

where T_{ij} is a function of Y_i, Y_j, and D_{ij}. T_{ij} is the value of trade between country *i* and country *j*, Y_i represents GDP for country *i* and Y_j represents country *j*'s GDP and D_{ij} shows the distance between the two countries. Furthermore, it is expected that the value of trade between two countries, ceteris paribus, is proportional to the products of their GDP's and reduces as distance increases. Basically, the gravity model states that a large economy has larger incomes and thereby can produce more goods and services. This leads to larger amounts spent on imports for that country. Because of the larger economies' wider range of products these countries will attract a large share of other countries' expenditure (Krugman & Obstfeld, 2006).

Even though equation 2.1 explains the importance of distance when it comes to analysing trade patterns one can suspect that there are many more factors that can help in further investigate trade. Among the many economists who have used the gravity model in analysing trade is Baier and Bergstrand (2005) and they state that the most common gravity equation estimation using cross-country data is;

$$PX_{ij} = \beta_o(GDP_i)^{\beta 1}(GDP_j)^{\beta 2}(DIST_{ij})^{\beta 3} e^{\sum \beta_k D_k} \varepsilon_{ij} \qquad (2.2)$$

where:

PXij is the value of the merchandise trade flow from the exporter *i* to the importer *j*,

GDP_i and GDP_j is the level of gross domestic product in country *i* and *j*,

$DIST_{ij}$ is the distance between the economic centers of countries *i* and *j*,

εij is an error term.

$e^{\sum \beta_k D_k}$, represents the effects of dummy variables, k, included in the equation. Baier and Bergstrand (2005) have chosen to include dummies that represent a common language, a common border, and a free trade agreement. All variables assume the value of 1 if *i* and *j* share a common language and 0 otherwise.

Baier and Bergstrand (2005) have merely extended the basic gravity model and included more factors that are believed to have an impact on trade. From its original appearance, as seen in equation 2.1, our objective is to extend the model even further in an effort to capture those variables that have an effect on trade flows. The equation used to test our stated problem will be presented in section 3 and will thus be based on the gravity model because of its famous applicability and its strength to give excellent results.

2.2 Economic Integration and Preferential Trade Agreements

The Maastricht Treaty was signed on February 7th in 1992 and paved the way for the new Europe to arise. The European Union was created and based on three pillars; the European Community, the Common Foreign and Security Policy and Cooperation in the fields of Justice and Home Affairs. Some of the objectives of the treaty were to integrate Europe with the creation of a common market with free movement of capital, labour, goods and services. Other important goals were to strengthen the democratic legitimacy of the institutions and improve their effectiveness and establish an economic and monetary union (Europa, 2007). Since the union adopts zero tariffs among its member countries and unified tariffs against non-member countries this is an example of a preferential trading agreement in which some countries are discriminated. The World Trade Organisation usually prohibits these kinds of agreements since countries are not to be treated differently but makes an exception to those agreements in which the member countries have free trade among themselves (Krugman & Obstfeld, 2006).

2.2.1 Trade Creation and Trade Diversion

The European Union is basically a group of countries that have decided to completely abolish all tariffs between them and unified the member countries tariffs against imports from the rest of the world, also called a customs union. The study of customs unions introduces the two terms; trade creation and trade diversion (Feenstra, 2004).

Trade creation discusses circumstances where two members of a customs union begin to trade with each other when they used to produce the goods themselves. In this case both countries will be better off and they both gain from this trade since there are no tariffs.

Trade diversion is when two countries within the union starts to trade with each other, when one of the countries had previously traded with another country outside the union because the costs were lower in that country (Viner, 1950).

Due to the customs union and its unified tariffs against all other countries outside the union, trade becomes more profitable within the union. Although, countries that traded similar goods with other countries before entering, at a lower price, may not be as profitable since they entered the union and diverted their trade. In the case of trade diversion, there is a negative efficiency effect that a country can loose from joining the union since it switches its imports from the lowest-price producer to a higher-price country (Feenstra, 2004). The probability of capturing the losses discussed above is an example of the "theory of the second best" which states that an unrestrictive policy is only attractive in one market if all other markets are functioning accordingly. If they are not, a government interference that seems to alter incentives in one market may actually increase welfare by offsetting the consequences of market failures somewhere else. Therefore, a customs unions' profitability depend on whether it leads to trade creation or trade diversion (Krugman & Obstfeld, 2006).

2.3 Common Currency Effects on Trade

The introduction of the Euro in 1999 required all EMU countries to give up their national currency and hand over the control of their monetary policies to a shared European System of Central Banks. The Euro also resulted in fixed exchange rates between all EMU member countries. The two main motives for the introduction of the Euro were to defend the EU countries economic interests more effectively on the world stage rather than being con-

trolled by the dollar. The second motive was to unify the European Unions member countries even more in the effort of eliminating all possible barriers of trade and by doing so enhancing free movement of capital, labour, goods, and services even more (Krugman & Obstfeld, 2006).

Many economists have analysed the theory that a common currency has a significant effect on trade. One of them is Torsten Persson (2001) who is one of those who claim that a common currency is more motivated from political concerns rather than economical. Andy Rose (2000) claims in his article that a common currency will expand trade flows among member countries by more than 200 per cent. Torsten Persson (2001) questioned these findings since observed results of that degree never had been seen before. He conducted an alternative approach to analyse the same data set that Rose used for his research but was more detailed in his analysis. Persson's results, on the other hand, are much more modest but still positive; 40 per cent is in the mid-range of his estimates. This indicates that by joining a common currency area trade will increase by about 40 per cent and this is a very good result when analysing the effect of a common currency.

Despite the different views of to what extent a common currency has an impact on trade; economists seem to agree upon the fact that a common currency to some extent has a *positive* effect on trade. Furthermore, Krugman, and Obstfeld (2006) describe an optimum currency area which consists of groups or regions with economies closely linked by trade in goods and services and by factor mobility. They find that a common currency and thus fixed exchange rates will best serve each member's interests if the output and trade among the included economies is high. The two economists state that the EMU is not an optimum currency area yet and that there is a lot of work to be done in further integrating the member countries in order to become one.

2.4 Trade Affinities

The relationship of liking or the attraction among countries that are alike are more commonly known as trade affinities. This type of liking arises between countries that are similar in many aspects such as; they share similar GDP, culture, infrastructure, language etc. The prediction is that countries that are similar tend to trade more with each other and naturally most of the trading is between neighbouring countries (Hacker & Johansson, 2001).

A common factor included in the theory of trade affinities is transaction costs. Transaction costs refer to the costs that arise from trading with others above and beyond the price, such as the cost of writing and enforcing contracts. This type of costs become very important when attempting to increase the level of affinity between countries as it, as well as transportation costs, decreases as countries become more alike (Carlton & Perloff, 2005).

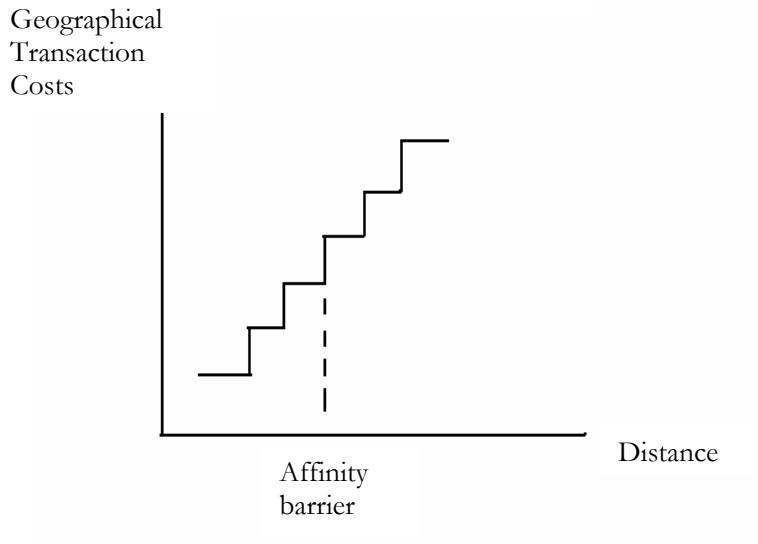
Trade affinities describe the friction that arises from interaction between countries and this friction has been proven to have a strong influence on location as well as on trade. As trade friction increases the level of affinity between the traders decreases. This means that the greater the similarities are between two countries, the lower the cost of transaction will be between them (Hacker & Johansson, 2001).

When measuring trade affinities Hacker and Johansson (2001) apply the theory of geographic transaction costs which they refer to as "All transport and transaction costs that vary with distances in geographical networks […]" (Hacker & Johansson, 2001, p. 76) this basically means that the more alike countries are the easier it is for them to trade with each other. Furthermore, they argue that as transactions between two countries become more

frequent it becomes easier for the parties involved to standardise these transaction procedures which in turn will generate a reduction in transaction costs for each separate delivery.

As illustrated in graph 2.1, the longer the distance between trading partners, the higher the geographical transportation costs will be. The curve in the graph is not straight since the geographical transaction costs are assumed to rise rapidly as they reach transaction barriers in form of borders. This implies that, in general, trading partners that have a short distance between them will share lower transaction costs and meet fewer trade barriers. This is due to the assumption that countries that are close geographically are also close culturally, historically, in language etc. and trade between such two countries would also imply lower transportation costs.

Figure 2.1 Trade Affinity



Source: Hacker & Johansson (2001)

The more people interact, the better they will understand each other over time. Hence, the levels in the graph will "flatten" out on the staircase steps. The European Union wants to level out this staircase completely and by doing so decrease transaction costs and increase the affinity among the member states (Hacker & Johansson, 2001).

Furthermore, Hacker and Johansson (2001) have chosen to deploy the countries in the Baltic Sea area in order to see if the affinities have influenced their trading with each other, in our research we have chosen to deploy the countries within EU25. We wish to measure if the EU25 member countries tend to trade more with each other due to trade affinities. In our data set we will include five variables to represent trade affinity; distance, common border, common language, members of EU, and common currency. Our intentions are that by including these trade affinity variables our results will be more extensive since, together, they include many more affinity aspects such as common history, culture, and traditions etc. Taking into consideration common denominators such as these we will try to draw conclusions on whether or not countries within EU25 tend to trade more with each other than with countries with which they do not share these attributes.

3 Model Formulation

In this part of the thesis we will define the selected variables for our analysis and present the regression equation used to test our problem. These will be used to determine what effect the establishment of EU and EMU memberships have had on trade flows within Europe.

The model will test the following years; 1983, 1990, 1997, and 2004. By analysing four years we will have two estimations before the Maastricht Treaty was signed and the EU we know of today began and two estimations after its establishment. The years have also been carefully selected with respect to years when the EU expanded with new members. All years are also seven years apart in order to even out their effects as many of our chosen variables are estimated to increase by time. In order to get more precise results in the regression four time periods have been created around the four selected years of which GDP, GDP per capita, and export averages have been used. Thus, calling the average of 1982-1984: period 1, the average of 1989-1991: period 2, 1996-1998: period 3, and finally 2003-2005: period 4. This has been done mainly due to the fact that the chosen year values may not represent the trade value, GDP or GDP per capita correctly. A high value one year may be followed by a significantly low value the next so therefore, in order to strengthen the accuracy of our data, averages will be used. For more elaborate information see Appendix 3 to find descriptive data for all years. Also, for a complete description of which countries belonging to the four separate time periods see Appendix 4.

3.1 Variable Formulation

In this section we will present the carefully chosen variables that we include in our regression model that we believe will have an impact on trade. The variables are somewhat altered compared to equation 2.2 that was presented in the previous chapter and some variables have also been added to specify it more to our problem at hand.

3.1.1 Dependent Variable

Export, X, is our chosen dependent variable and measures all sold goods and services in the economy. We look at exports and not imports due to the fact that export values are FOB, Free On Board, and thus do not include CIF, Cost Insurance and Freight, that imports do (Krugman & Obstfeld, 2006). This is important since we have distance as an independent variable, because if we would have looked at imports instead, the distance variable would have been less significant due to the fact that imports are influenced by the costs that it takes to import those goods themselves. Export data has been collected from UN Comtrade (2007).

3.1.2 Independent Variables

Gross Domestic Product, GDP, measures the total value of all goods and services produced in the economy in a given time period and has for a long time been the primary measurement of national economic activity. Thus, GDP measures total volume of production and represents income for a country and thereby its purchasing power. GDP is expected to have a positive effect on trade (Bade & Parkin, 2004). This variable will be included in our model since we want to see if there have been any changes in GDP since our selected countries joined the EU and when some of them further on joined the EMU. The data is collected from World Development Indicators (2007).

GDP per capita, GDPC, is our second independent variable and it is measured by dividing countries GDP by their population and thereby gives us the average wealth of the population and average wealth of the country. We use this variable in our model along with GDP because an increase in GDP does not always mean that population welfare is increasing. If the population increases more than GDP the population is actually becoming less wealthy. GDP per capita is expected to have a positive effect on trade since if trade increases, the income of the country increases, and thus more GDP per capita (Boyes & Melvin, 2005). The data is collected from World Development Indicators (2007).

Distance, **D,** is our third independent variable and a strong affinity factor**.** When discussing distance one must take both transport and transaction costs into account since both of them have a significant influence on trade flows. According to Brakman, Garretsen, and Marrewijk (2006) distance can be used as a determinant of trade flows and they argue that the relationship between the two is negative. This implies that the longer the distance between the trading partners the lower trade flows will be. When determining the distance between the largest economic centres (most commonly the capital cities) of our selected European countries with their trade partners the data will be collected from CEPII (2007) and measured in thousands of kilometres.

3.1.3 Dummy Variables

Language, L, is our first dummy and based on the findings of Jacques Melitz (2003) who states that a common language has a positive correlation with international trading both directly and via translation. Furthermore, a common language between countries tends to generate positive network externalities on foreign trade. Melitz (2003) also argue that all four of the dominant languages in Europe will have the same positive impact on trade, including English, and that literacy has a considerable effect on language and in turn on trade. If we find countries to have a common language the dummy will equal 1, and if they are found not to share a common language the dummy will equal 0. The data for this dummy is collected from CEPII (2007).

Common Border, B, represents our second dummy and implies that neighbouring countries will share the same border. Trade with a country on one side of a border might have a significantly different cost than that with a country on the other side of that same border. The greater the differences are between the two countries, the higher the costs will be (Hacker & Johansson, 2003). When analysing the trade flows of the EU25 we will look at each country separately and determine if they tend to trade more with the countries with whom they share a border. If the country that we choose to analyse has a common border with another country the dummy will be equal to 1, if it does not it will equal 0. The data for this dummy is collected from CEPII (2007).

European Union, EU to EU, is another dummy in our regression and, in this case, it refers to a preferential trade agreement among the member countries. The idea of the European Union is that it is to be a common market where both labour and capital can move freely without any type of trade barriers. By encouraging trade among the member states the intention is to lower transaction costs and increase internal trade (Bowen, Hollander & Viaene, 1998). In this regression this dummy will be equal to 1 if both the exporting and the importing country are members of the European Union, and zero if they are not. The collection of data for this dummy will collected from Europa (2007).

EU trade to EMU, **EU to EMU**, refers to trade between the European Union countries and the countries that have adopted the Euro and thus is a member of EMU. The dummy will equal to 1 if an EU member is trading with an EMU member and 0 if it is not.

EU trade to the World, **EU to WORLD**, refers to EU members' trade outside the union to the rest of our chosen trade partners. There are 47 trade partners who are neither a member of EU nor of EMU. The dummy will equal 1 if the reporting country is an EU member trading with a country outside the union, and 0 if it is not.

The European Economic and Monetary Union, EMU to EMU, is the dummy representing a common currency. Today, not all of the European Union member states have converted their currency into the Euro and therefore this dummy will analyse whether or not trade for members of EMU has increased or not (Europa, 2007). In the regression, this dummy will be equal to 1 if both trading partners are members of EMU and 0 if they are not. The data for this common currency dummy will be collected from Europa (2007).

EMU trade to EU, EMU to EU, will illustrate trade between EMU members and EU members. The dummy will equal to 1 if the reporting country is an EMU member trading with an EU member, and 0 if it is not.

EMU trade to the World, **EMU to WORLD**, represents EMU members' trade with all partner countries that are members of neither the EU nor the EMU. The dummy will equal 1 if the reporting country is an EMU member trading with a country outside the union, and 0 if it is not.

World trade to EU, WORLD to EU, represents the 47 countries that are neither members of the EU nor the EMU and their trade with EU. The dummy will equal 1 if the reporting country is a country outside the union trading with an EU member, and 0 if it is not.

World trade to EMU, WORLD to EMU, this dummy represents the 47 main trading partners outside the union and their trade with the EMU member countries. The dummy will equal 1 if the reporting country is a country outside the union trading with an EMU member, and 0 if it is not.

3.1.3.1 Dummy Matrix

This section presents a more elaborate explanation to our choice of dummy variables and their significance to estimating the regression. These dummies have been included to be able to separate trade flows among the European countries and follows this structure;

Table 3.1 Dummy Matrix

Trade Flow	**EU**	**EMU**	**WORLD**
EU	EUi to EUj	EUi to EMUj	EUi to WORLDj
EMU	EMUi to EUj	EMUi to EMYj	EMUi to WORLDj
WORLD	WORLDi to EUj	WORLDi to EMUj	-

Since we have collected export data from all 72 selected countries these dummies are very important for us to be able to see to what extent EU and EMU have had an effect on trade. As illustrated in the matrix; the variables are inversely correlated in order to give a better view of the overall impact the EU and EMU have had on trade flows. As illustrated in the matrix, trade between world countries, World vs. World, have been excluded since it is used as the reference point.

3.2 Regression Equation

In order to estimate the effect of the establishments of EU and EMU to the European countries we will use the gravity model and the following hypothesis;

H_0: $\sum\beta_i = 0$, where the null hypothesis state that all slope coefficients are simultaneously zero, thus none of the independent variables influences exports.

H_1: $\sum\beta_i \neq 0$, where all slope coefficients are *not* simultaneously zero, thus the independent variables influences exports.

The following log-log equation illustrates all variables included in our regression and will be further explained below.

$$\begin{aligned} \ln X_{ij} = \ln\alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln GDPC_i + \beta_4 \ln GDPC_j + \beta_5 \ln D_{ij} + \beta_6 L_{ij} + \beta_7 Bij + \\ \beta_8 EUij + \beta_9 EUEMU_{ij} + \beta_{10} EUw_{ij} + \beta_{11} EMUij + \beta_{12} EMUEU_{ij} + \beta_{13} EMUw_{ij} + \\ \beta_{14} WORLDEU_{ij} + \beta_{15} WORLDEMU_{ij} + \varepsilon_{ij} \end{aligned} \quad (3.1)$$

where,

Xij is the value of the merchandise trade flow from the exporter *i* to the importer *j*.

α is a constant.

β is a measure of the elasticity of the dependent with respect to the independent variables.

GDP_i and **GDP_j** is the level of gross domestic product in exporting country *i* and importing country *j*.

$GDPC_i$ and **$GDPC_j$** is the level of GDP per capita in exporting country *i* and importing country *j*.

D_{ij} is the distance between the economic centers of countries *i* and *j*.

L_{ij} is a dummy variable assuming the value 1 if *i* and *j* share a common language and 0 otherwise.

B_{ij} is a dummy variable assuming the value 1 if *i* and *j* share a common border and 0 otherwise.

EU_i to EU_j, is a dummy variable assuming the value 1 if *i* and *j* are both members of EU and 0 otherwise. This dummy will help us set out trade from one EU member to another.

EU_i to EMU_j, is a dummy included to illustrate EU members' trade with EMU members.

EU_i to $WORLD_j$, is a dummy variable included to capture trade flows between EU members and countries that neither are members of EU nor EMU.

EMU_i to EMU_j, is a dummy variable assuming the value 1 if *i* and *j* share a common currency namely the Euro and 0 otherwise. This dummy will assist us in showing trade flows from one EMU member to another.

EMU_i to EU_j, is a dummy included to illustrate EMU members' trade with EU members.

EMU_i to $WORLD_j$, is a dummy that captures trade between EMU countries and trade partners who are neither members of EU nor EMU.

$WORLD_i$ to EUj, is a dummy that captures trade flows between world countries and EU member countries.

$WORLD_i$ to EMU_j, is a dummy that captures trade flows between world countries and EMU member countries.

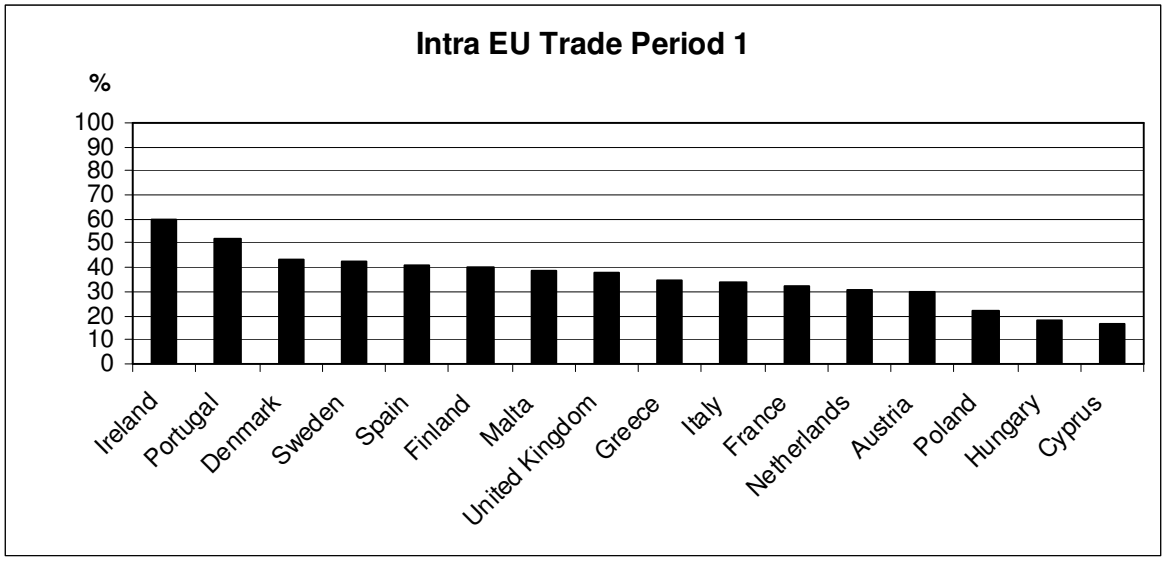
εij, is an error term.

4 Descriptive Data

This section will present facts and figures that will be used to support our findings in the regression as well as our arguments in the analysis.

The four figures below illustrate trade among the European Union members as an average of their trade with the rest of the world and are presented in per cent. Each figure illustrates trade among EU25 for which we were able to retrieve data. When comparing figure 4.1 and 4.2 it is obvious that there has been a significant increase in intra EU trade during

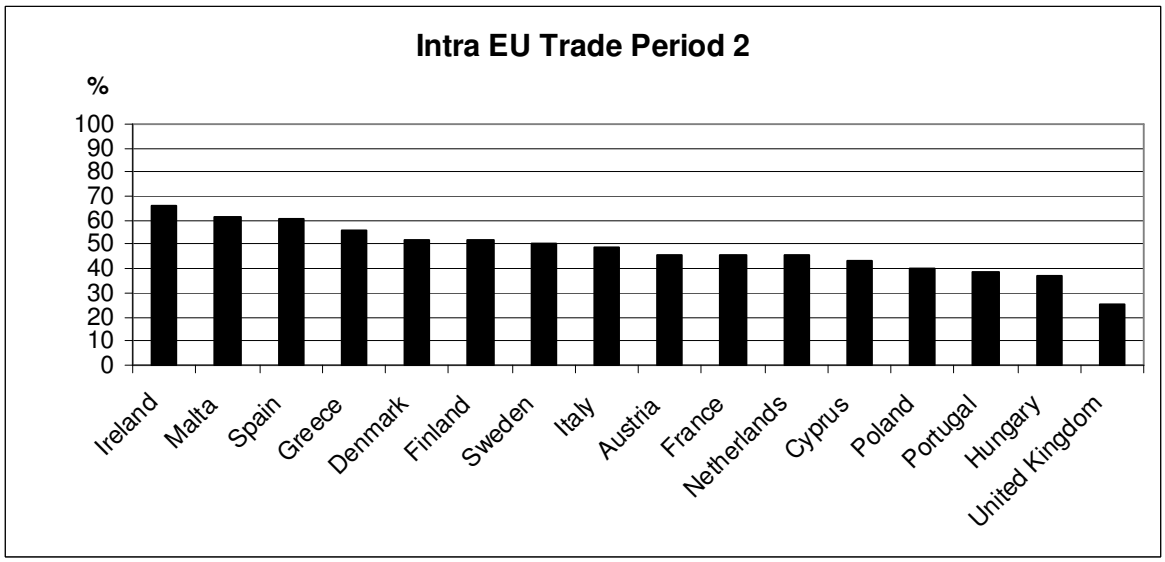
Figure 4.1



Source: UN Comtrade (2007)

the five years between period 1 and 2. A part from the fact that new countries have joined the European Union one can also see that the general trend in percentage trade has increased for all countries. In figure 4.1 the average trade percentage is around 40 per cent while in figure 4.2 it has increased to around 50 per cent which indicates a positive trend in intra EU trade.

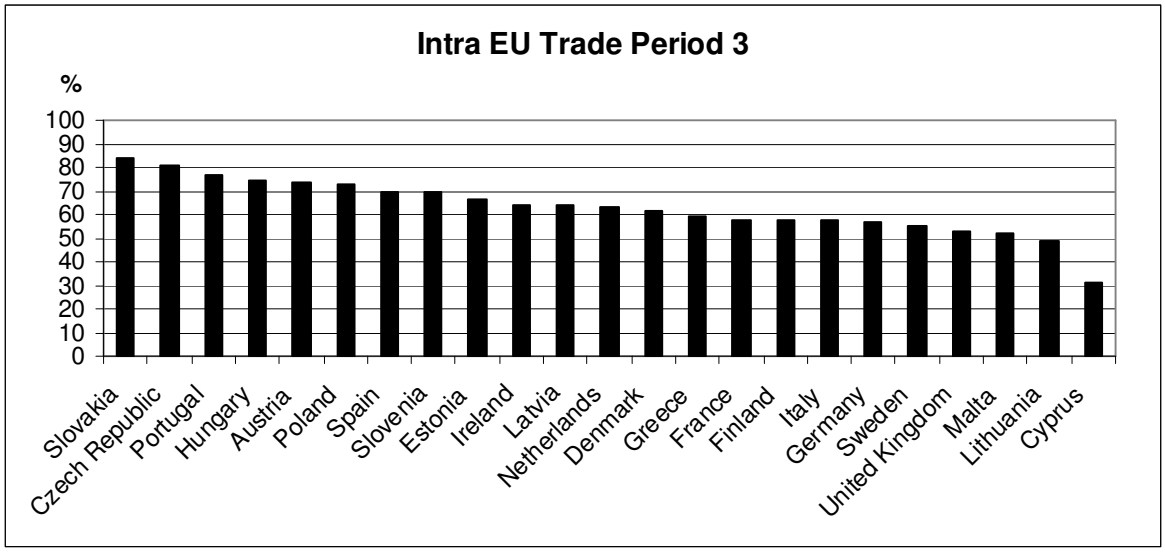
Figure 4.2



Source: UN Comtrade (2007)

In period 3 the number of member countries within the European Union has increased even more and so has the trade among them. As figure 4.3 illustrates; the average trade among the member countries is now up to approximately 65 per cent of their exports to the rest of the world. One can also see that some of the members with the highest intra EU trade are those who recently joined the union with examples such as Slovakia and the Czech Republic.

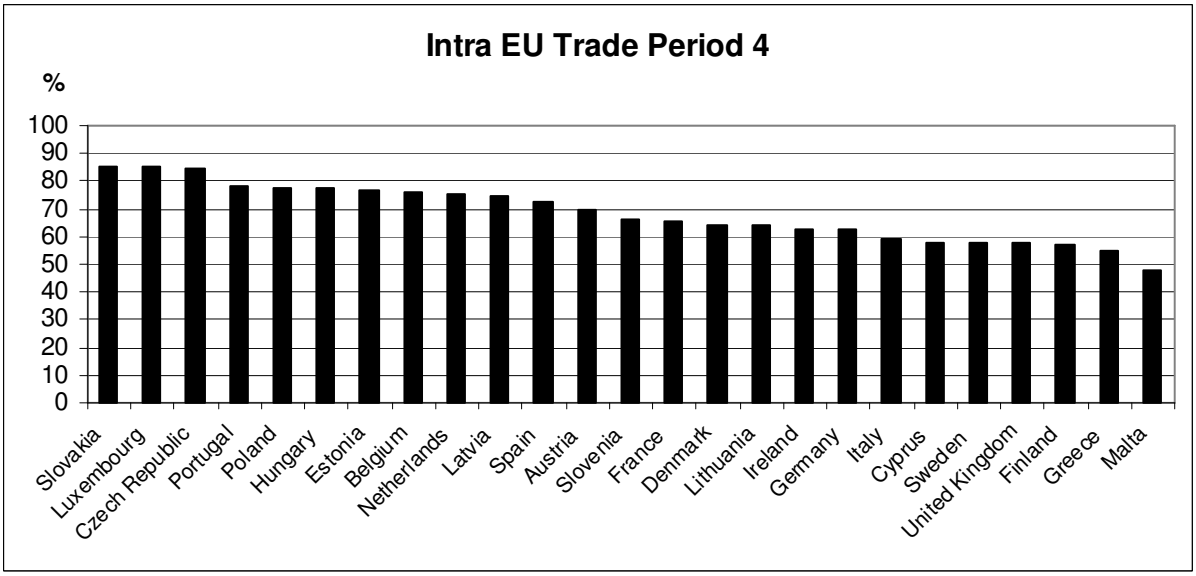
Figure 4.3



Source: UN Comtrade (2007)

By comparing the numbers in figure 4.3 and 4.4 one can clearly see that the positive trend in trade has continued throughout all four time periods. Figure 4.4 shows that as the European Union have increased by the number of member countries the average intra trade among them has increased up to approximately 70 per cent. This concludes that the overall trend for intra EU trade has been positive over the total time period of 1982 up to 2005.

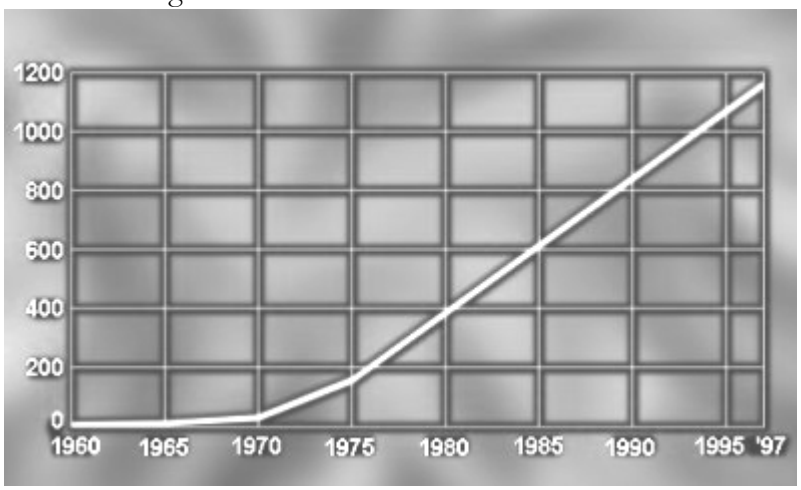
Figure 4.4



Source: UN Comtrade (2007)

The overall increase in trade within the European Union has been significant over the years which is clearly shown in figure 4.5. The upward sloping trend in exports, measured in real prices, indicates that as more members have joined the Union, their trade amongst each other has grown which in turn has lead to increased exports. This increase in exports has been steadily climbing since the early 1970s and will most likely continue to do so in the future as well.

Figure 4.5 Growths in Intra-EU Trade



Exports/dispatches in 1 000 Million EURO

Source: Eurostat 1997

Adding these figures to our regression results, which will be presented in the following section, our aim is to be able to determine which factors that have caused the most effects on trade flows within the European Union.

5 Regression Results

In this section of the paper we will present our results for determining if the introduction of EU and EMU has had an effect on trade flows and if so in what way. The first thing we will do is to present the tests that we have done to our data in order to verify its significance. Testing for multicollinearity and heteroscedasticity is done and presented below and since we are performing a cross-section analysis a test for autocorrelation will not be necessary since it will not be a problem for our data set.

We will do four regressions, implying that we split the data so that each time period gets its own model in order to see changes in the significance of our variables over time.

5.1 Test for Multicollinearity

A problem of multicollinearity exists when there is a perfect or exact linear relationship among some or all explanatory variables in a regression model. Examples of when multicollinearity occurs is when you have used a wrong collection method for the data or when you have an over determined model in which the number of explanatory variables exceeds the number of observations (Gujarati, 2003).

When working with the data we found that we had no significant problem with multicollinearity. In the table below the results from the test are presented. The VIF (Variance-Inflating Factor) test measures the speed in which the variance and covariance increases and thus how a variance of a variable is inflated by the presence of multicollinearity. As VIF =1 there is no problem with multicollinearity. Values equal to 10 and higher are considered affected by this problem (Gujarati, 2003). As illustrated in the table 5.1 all variables in the four time periods have no problem with multicollinearity as shown by their low VIF-values.

Table 5.1 Collinearity Statistics

	Period 1	Period 2	Period 3	Period 4
lnGDPi	1.260	1.214	1.343	1.348
lnGDPj	1.265	1.270	1.381	1.332
lnGDPCi	1.218	1.204	1.382	1.481
lnGDPCj	1.230	1.250	1.304	1.435
lnDij	1.385	1.395	1.536	1.792
BORDERij	1.205	1.208	1.238	1.253
LANGUAGEij	1.029	1.029	1.024	1.056
EUi to EUj	1.146	1.234	1.338	1.287
EUi to EMUj	-	-	-	1.317
EUi to WORLDj	1.205	1.247	1.428	1.359
EMUi to EMUj	-	-	-	1.306
EMUi to EUj	-	-	-	1.349
EMUi to WORLDj	-	-	-	1.749
WORLDi to EUj	1.204	1.250	1.296	1.290
WORLDi to EMUj	-	-	-	1.346

5.2 Test for Heteroscedasticity

Heteroscedasticity is the situation of unequal spread in the variance of each disturbance term of the explanatory variables and results in misleading regression results. When running a regression one must make sure that homoscedasticity is valid, that is: when there is an equal spread or variance. Heteroscedasticity is a common problem with cross-section data and is more often viewed as a rule rather than an exception because of its analysis over different time periods (Gujarati, 2003).

To check for heteroscedasticity we performed White's Test for Heteroscedasticity. These are the results we got and we can establish that there is a problem of heteroscedasticity in our data set.

Table 5.2 White's Test for Heteroscedasticity

	Period 1	Period 2	Period 3	Period 4
F-statistic	14.35168	17.19240	23.56129	17.81210
Obs*R-squared	736.24	870.81	1211.67	1552.81
No. of Observations	6840	7355	11856	13263

When looking at the Chi-Square table in Gujarati (2003) for our degrees of freedom the highest number of degrees of freedom (df) is 100 which should also be enough to cover for higher df as well. With a probability of 5 per cent we should have a value below 124.342 in order to be able to accept the hypothesis that our data is homoscedastic. Although, since 124.342<736.24, 870.81, 1211.67 and 1552.81 we clearly have to reject the hypothesis that there are an equal spread in our disturbance terms, thus we accept the fact that we have a heteroscedasticity problem in our data.

To correct for this problem we perform White's Heteroscedasticity - Consistent Standard Errors & Covariance remedial measure to be able to correct for our problem and get the significance values of the standard errors and the right probabilities for our variables (Gujarati, 2003). The final result is shown in section 5.4.

5.3 Test for Normalisation

One basic assumption in regression analysis is the assumption that all disturbance terms (u_i) should be normally distributed as;

$$u_i \sim N(0, \sigma^2)$$

this illustrates that the disturbance terms should be normally distributed with zero mean and constant variance. This implies that the variance of the disturbance terms should be equal for all observations.

When analysing our data we detected a problem with the normality assumption. In order to find the source of this problem we made an estimation of our regression by adding Cook's Distance. A large Cook's Distance estimate for one observation implies that the disturbance term is not normally distributed. The result will be that it has a negative effect on the regression and Cook's Distance helps in recognizing to what extent the coefficients are in-

fluenced by these observations. To solve this problem the standardized residuals were estimated and raised to the power of two. An estimate of this higher than nine is assumed to be an outlier in the regression meaning that the results will be better if these observations are excluded (Gujarati, 2003).

By excluding the outliers in our data set the disturbance terms have adjusted to be normally distributed. Our results when corrected for heteroscedasticity and normalisation are presented in the following section.

5.4 Presentation of the Results

The following table illustrates the final results for our regression and indicates all independent and dummy variables effects on the dependent variable: export.

Table 5.3 Regression Results

	Period 1		Period 2		Period 3		Period 4	
Variable	β-value	Prob.	β-value	Prob.	β-value	Prob.	β-value	Prob.
α	**-22.28027**	0.0000	**-24.15933**	0.0000	**-24.77751**	0.0000	**-25.15726**	0.0000
lnGDPi	**1.017887**	0.0000	**1.027300**	0.0000	**1.094659**	0.0000	**1.098681**	0.0000
lnGDPj	**0.827957**	0.0000	**0.812885**	0.0000	**0.859536**	0.0000	**0.911691**	0.0000
lnGDPCi	**0.169948**	0.0000	**0.162807**	0.0000	**0.061702**	0.0000	**0.051225**	0.0001
lnGDPCj	**-0.034775**	0.0358	**0.104139**	0.0000	**0.076541**	0.0000	**0.020659**	0.0913
lnDij	**-0.970120**	0.0000	**-0.855407**	0.0000	**-1.002878**	0.0000	**-1.032479**	0.0000
BORDERij	**0.094953**	0.4639	**0.498116**	0.0000	**1.137072**	0.0000	**0.875047**	0.0000
LANGUAGEij	**0.773417**	0.0000	**0.870021**	0.0000	**0.932123**	0.0000	**0.803005**	0.0000
EUi to EUj	**-0.134822**	0.0611	**0.244465**	0.0000	**0.227580**	0.0000	**0.881882**	0.0000
EUi to EMUj	-	-	-	-	-	-	**0.331818**	0.0000
EUi to WORLDj	**-0.025808**	0.6032	**0.001099**	0.9783	**0.346803**	0.0000	**0.013401**	0.7651
EMUi to EMUj	-	-	-	-	-	-	**-0.004771**	0.9563
EMUi to EUj	-	-	-	-	-	-	**0.063020**	0.4452
EMUi to WORLDj	-	-	-	-	-	-	**0.223575**	0.0000
WORLDi to EUj	**0.362027**	0.0000	**0.252568**	0.0000	**0.262286**	0.0000	**-0.088425**	0.0593
WORLDi to EMUj	-	-	-	-	-	-	**0.172110**	0.0003

Table 5.3 show all coefficients and their respective significance levels for all four time periods. For period 1 the dummies representing BORDERij and EUi to WORLDj as well as EUi to WORLDj in period 2 are proven to be insignificant at the 10 per cent significance level. Furthermore, in period 4 the dummies EUi to WORLDj, EMUi to EMUj, and EMUi to EUj are also insignificant at this level. The remaining variables in our four periods are all significant at the 10 per cent significance level and thus we must reject the null hypothesis that none of our independent variables have an effect on exports. This follows that they have a significant effect on the dependent variable, lnXij, namely export flows from country *i* to country *j*. For more elaborate information on the regression results for each time period see Appendices 4 and 5.

In all four regressions $R^2 \approx 70$ per cent, this means that the variables in our model explains about 70% of the variations in our dependent variable; lnXij. R^2 hence measures the "goodness of fit" and states how well the sample regression line fits the data.

The results in table 5.3 have been regressed based on the log-log equation 3.1 in section three of this thesis. As illustrated in the table, almost all dependent variables are found to have a positive effect on the independent variable, lnXij, except for distance. As expected, distance has a negative correlation to trade.

An interesting observation from table 5.3 is the EUi to EUj dummy which has made an overall increase through time. Most likely, the decline in period 3 is due to the slow expansion of the union during those years while in the fourth period the number of new members increased significantly causing the elasticity to boost to 88 per cent.

Another fascinating observation is the EUi to WORLDj dummy which is insignificant in periods 1, 2, and 4 but significant in period 3. Looking at the members in period 3 one finds that the largest economies in Europe are EU members which could be a possible explanation to this. Later on, as these countries adopted the Euro and became members of the EMU, the dummy's significance level alters to become insignificant in period 4. At the same time, the EMUi to WORLDj dummy in period 4 captures the same countries and this dummy is on the other hand significant. This implies that today's EMU members include the largest economies in Europe whose trade is strongly oriented towards countries outside the union.

In the case of EMU trade flows one must look at period 4 since that is the only period where EMU trade is present. Based on the results in the figure one can see that the common currency have generally simplified trade within the union as well as with the rest of the trading partners in the world. This can be seen by looking at both the EUi to EMUj and WORLDi to EMUj dummies which indicate to have positive effects on trade flows. One can also see that the world countries are trading less with the EU members than with the EMU members and this is further indication that the common currency facilitates trade. On the other hand, trade between EMU countries and between EMU and EU members are insignificant in our regression equation and can therefore not be used as measurement tools for trade flows. This means that the pertinent trade flows are explained by the ordinary explanatory variables only.

The results of the dummy variables in table 5.3 indicate that a common border and a common language are indeed positive in terms of trade. Therefore, a common border or a common language between trading partners increases the level of trade among them, as expected.

Our overall result is that the countries belonging to the EMU differ considerably from the non-EMU members of the European Union. This indicates that non-EMU countries are more oriented towards Europe in their exports.

5.4.1 Basic Gravity Model Regression

To be able to see to what extent our included variables have brought to our analysis a regression is performed originated from the basic gravity model of world trade by including only GDP for countries *i* and *j* and the distance between them; Dij. In table 5.4 the results from this regression are presented.

Table 5.4 Regression Results Based on the Basic Gravity Model

	Period 1		Period 2		Period 3		Period 4	
Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
α	-21.74818	0.0000	-23.33567	0.0000	-25.30833	0.0000	-24.59334	0.0000
lnGDPi	1.057539	0.0000	1.072180	0.0000	1.160138	0.0000	1.129948	0.0000
lnGDPj	0.834373	0.0000	0.869429	0.0000	0.919906	0.0000	0.940458	0.0000
lnDij	-1.014991	0.0000	-0.963895	0.0000	-1.151886	0.0000	-1.188191	0.0000

By comparing the results in table 5.4 with our own regression results in table 5.3 it is clear that the differences are minimal. In table 5.4, R^2 is approximately on average 66.5 per cent when running these regressions. The result of our regression gave approximately a 3.5 per cent higher R^2 than the basic gravity model. As expected, this indicates that the gravity model in its basic form provides a good estimate on trade flows.

6 Assessment of the Regression Results

In this part of the thesis we will analyse the regression results as well as incorporate the previous sections in order to be able to draw a conclusion about changes in trade patterns due to the enlargement of the EU and about the role played by EMU countries regarding trade within the union.

The outcome of the regression shows that if a country is a member of the European Union, it has larger than expected exports to all members of the union including members of the EMU. This indicates that countries who are neither members of the EU nor the EMU might be better off by joining the union. According to our regression, if Russia, which is neither a member of EU nor EMU, decides to join the EU their exports would increase to other members in the union and also to EMU members. This increase in trade between EU members as well as between EU and EMU members give signs of trade creation when joining the union.

As the dummy variable representing trade within EU in period four has an exceptionally high value we find that this is most likely due to the high addition of new members. Figure 4.3 and 4.4 support these arguments as both figures illustrate how some of the member countries with the highest intra EU trade are smaller economies such as Slovakia and the Czech Republic who recently joined the union. This implies that the newer economies tend to focus all of their trade towards the union which is a possible explanation as to why the EUi to EUj dummy has such a high value. Based on these findings, a most likely outcome in the future will be that non-members identify the advantages of membership and will therefore choose to join. To this, Midelfart, Overman and Venables (2003) as well as Micco, Stein, and Ordoñez (2003) all agree that trade has increased between member countries within the European Union.

The twelve EMU countries that are analysed in this thesis have already experienced the increase in trade by becoming members of the EU as seen in time periods 2 and 3. Furthermore, the dummy representing trade between EMU members and the trading partners outside the union is significant and has a positive effect on these export flows. Thus, the EMU contains countries with a large share of their exports going to the rest of the world. As shown by the regression results, EU members' trade with EMU countries is intense and illustrate the importance of the EMU for the EU members. On the contrary, the EMU countries show no signs of being disproportionately dependent on trade with other EU members.

Our econometric design does neither support nor discard Torsten Persson (2001) and Andy Rose (2000) arguments regarding trade effects between EMU members and between EMU and EU members. Although, by comparing the WORLDi to EMUj dummy with the WORLDi to EUj dummy in the regression, we find that trade flows are higher for EMU members. Since both EU and the world countries trade more with EMU members we cannot reject the idea that the common currency creates positive effects on trade both within and outside the union. This may reflect that it is generally easier for countries to trade with the EMU countries today since they have a stable and prominent currency.

Regarding the other trade affinities; common border and common language, both of them show a positive effect on trade, as were expected. This tells us that those countries which share borders, language, culture, and other affinities tend to have a positive impact on trade and that these attributes are essential for trade flows. This really illustrates the accuracy behind the gravity model by the fact that the largest countries will trade with each other the most and thus size matters when it comes to who trades with whom. Although, as shown

in figure 2.1, the main objective of the European Union is to eliminate all types of trade barriers and enhancing trade affinities among the member countries and by doing so lower transaction costs. Therefore, affinities such as borders, common language, and common currency are most likely assumed to play a less important role regarding trade flows among the member countries.

In all time periods the four different GDP measurements have increased their significance over time and thus export flows naturally have increased through time as well. This is also coherent with our expectations since the continuous integration among countries and the advancement of new technology contributes to the fact that transaction costs decreases over time. Also, the growth of countries as shown in their GDP's indicate that their purchasing power increases as the countries' economy expands leading to positive effects on trade flows. As illustrated in the figures in section 4, intra-trade among the EU25 countries shows the same results. On average, trade has continuously grown as the union has expanded and further integrated Europe. Through time, as new members have joined the union, the general trend has been an increase in trade flows. This indicates that, given the four time periods, the trade patterns within Europe have been altered towards a higher degree of trade.

Conclusion

In this thesis the subject of whether or not to join the EU and the EMU has been estimated and analysed. The European Union's main purpose is to promote trade among its members and the introduction of the EMU aims to further integrate and facilitate trade among the member countries. By becoming a member of the customs union, trade is favoured within the custom-free area and the union's strive to eliminate all trade barriers will promote trade affinities. This in turn has led to a continuous positive trend in trade flows and has promoted the "four freedoms" which are the fundamental idea of the European Union.

We find that there are gains to be obtained from trade by becoming a member of the European Union. This in turn indicates that non-members will recognize the advantages of a membership and thus more countries will strive to join in the long run. Furthermore, we find that it is wise rather than stupid to join the union in order to reap the benefits of membership.

By concluding that the trade flows in Europe have increased by EU membership we find that it is indeed beneficial for countries to join the EU. Furthermore, we find that the overall trade with EMU countries has increased which implies that a common currency facilitates trade. Although, we are unable to estimate the effects of an EMU *membership* due to the design of our econometric model.

Furthermore, we find that the change in trade among the European countries as well as the main trading partners outside the union have implied an overall increase in trade flows. Above all, it is by becoming a member one enhances the possibilities and benefits that arise from membership.

Suggestions for Further Research

An interesting suggestion to further research on this topic would be to analyse the effects of EU and EMU memberships with a panel data instead of using a cross-section analysis. This would provide more specific results for separate years and thus give a more detailed estimation.

The trade effects that EMU members experience might be more clearly recognized as the union becomes mature. Thus, it would be interesting to examine this topic in the future. It would also be intriguing to compare non-members within Europe with members in order to see if they may have experienced any benefits as outsiders. One can also include separate dummies for developing countries in order to see if they may have externally benefited from trade with the union.

Another interesting suggestion would be to include the volatility of exchange rates as another variable in the regression. This is due to the fact that by creating a common currency, the need to convert currencies and its associated risk with trade can be eliminated.

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Appendix 1

EUROPEAN UNION MEMBERS AND EMU COUNTRIES IN 2005

EU 25	**EMU members**
Austria	Austria
Belgium	Belgium
Cyprus	Finland
Czech Republic	France
Denmark	Germany
Estonia	Greece
Finland	Ireland
France	Italy
Germany	Luxembourg
Greece	Netherlands
Hungary	Portugal
Ireland	Spain
Italy	
Latvia	
Lithuania	
Luxembourg	
Malta	
Netherlands	
Poland	
Portugal	
Slovakia	
Slovenia	
Spain	
Sweden	
United Kingdom	

(Source: Europa, 2007)

Appendix 2

EU 25'S MAIN TRADING PARTNERS IN THE WORLD

Algeria	Libya
Angola	Lithuania
Argentina	Luxembourg
Australia	Malaysia
Austria	Malta
Belarus	Mexico
Belgium	Morocco
Brazil	Netherlands
Bulgaria	New Zealand
Canada	Nigeria
Chile	Norway
China	Pakistan
Croatia	Philippines
Cyprus	Poland
Czech Republic	Portugal
Denmark	Qatar
Egypt	Romania
Estonia	Russia
Finland	Saudi Arabia
France	Singapore
Germany	Slovakia
Greece	Slovenia
Hong Kong	South Africa
Hungary	South Korea
Iceland	Spain
India	Sweden
Indonesia	Switzerland
Iran	Syria
Ireland	Thailand
Israel	Tunisia
Italy	Turkey
Japan	Ukraine
Kazakhstan	United Arab Emirates
Kuwait	United Kingdom
Latvia	United States
Lebanon	Venezuela

(Source: Eurostat, 2007)

Appendix 3

DESCRIPTIVE STATISTICS

	N	Minimum	Maximum	Mean	Std. Deviation
Year	42201	1982	2005	1995,47	7,670
TradeValue	42201	$3	$30,100,000,000,000	$11,931,788,899.85	$430,421,703,545.203
GDPi	41289	1704789504	11046425198592	451477501724,00	1254872944330,121
GDPj	40806	1704789504	11046425198592	420587979562,55	1213346884122,878
GDPCi	41289	235,43	52182,86	11557,5808	10726,06541
GDPCj	40806	208,17	52182,86	11154,3509	10680,15900
Valid N	39913				

Year		N	Minimum	Maximum	Mean	Std. Deviation
1982	TradeValue	2523	$400	$45,433,520,128	$369,856,336.78	$1,736,335,375.475
	GDPi	2471	1715293824	5153600045056	335486785014,53	869197088450,287
	GDPj	2392	1715293824	5153600045056	296955063610,97	815507205092,376
	GDPCi	2471	235,43	39368,63	10504,3088	8758,17334
	GDPCj	2392	208,17	39368,63	9284,1564	8733,10593
	Valid N	2341				
1983	TradeValue	2469	$552	$52,173,074,432	$366,088,964.21	$1,877,584,873.315
	GDPi	2416	1704789504	5386300030976	349312061802,92	911914071038,124
	GDPj	2341	1704789504	5386300030976	309513057520,26	852823734441,106
	GDPCi	2416	246,73	28030,21	9782,7344	7982,19644
	GDPCj	2341	227,55	35226,51	9388,6025	8568,54917
	Valid N	2290				
1984	TradeValue	2526	$677	$63,773,671,424	$402,376,831.34	$2,279,737,998.591
	GDPi	2474	1720854912	5773999996928	363311799050,56	957040430629,752
	GDPj	2395	1720854912	5773999996928	322874688329,06	905015067026,741
	GDPCi	2474	251,55	28803,95	9932,5128	8322,38222
	GDPCj	2395	251,55	34845,57	9632,6638	8838,06000
	Valid N	2344				
1989	TradeValue	2686	$255	$93,765,579,690	$621,609,045.67	$3,491,767,664.613
	GDPi	2565	2239273984	6926300086272	427975430786,55	1141597826686,196
	GDPj	2548	2239273984	6926300086272	383224928677,98	1078894199112,443
	GDPCi	2565	305,85	32133,00	11424,4299	9557,07792
	GDPCj	2548	305,85	32133,00	10511,6988	9487,29993
	Valid N	2429				
1990	TradeValue	2635	$151	$94,757,115,108	$714,892,112.80	$3,784,836,939.054
	GDPi	2549	2379537664	7055000207360	444380237838,47	1173856029600,725
	GDPj	2498	2379537664	7055000207360	403146259843,08	1124270635616,544
	GDPCi	2549	317,15	33279,51	11054,8568	9719,91534
	GDPCj	2498	317,15	33279,51	10595,3122	9772,69039
	Valid N	2416				
1991	TradeValue	2859	$320	$94,348,109,163	$914,626,877.46	$4,328,443,644.425
	GDPi	2743	2529069824	7041300037632	463656027263,96	1162847817327,016
	GDPj	2723	2529069824	7041300037632	431512746384,69	1123912822083,143
	GDPCi	2743	313,74	34288,02	11480,7740	9709,52392
	GDPCj	2723	313,74	34288,02	10821,6533	9732,67512
	Valid N	2610				

1996	TradeValue	4094	$580	$15,900,000,000,000	$10,791,816,825.57	$368,013,288,997.017
	GDPi	4040	3230768896	8271399747584	437357715825,75	1207699554356,702
	GDPj	3984	3230768896	8271399747584	410269502432,07	1171804026995,167
	GDPCi	4040	386,75	36137,25	10812,2099	10051,77725
	GDPCj	3984	386,75	36137,25	10479,4693	10029,99529
	Valid N	3931				
1997	TradeValue	4164	$520	$17,500,000,000,000	$11,559,785,481.60	$400,281,087,946.946
	GDPi	4121	3385845760	8647599980544	443275102573,28	1242624819720,854
	GDPj	4051	3385845760	8647599980544	422071736499,22	1209090817680,248
	GDPCi	4121	387,27	36543,12	10899,1381	10325,40054
	GDPCj	4051	387,27	36543,12	10741,8495	10292,71588
	Valid N	4009				
1998	TradeValue	4313	$605	$18,000,000,000,000	$13,738,088,994.52	$432,176,442,967.940
	GDPi	4224	3504011776	9012500234240	445243864456,61	1265215074273,276
	GDPj	4198	3504011776	9012500234240	434942876858,00	1251670454848,452
	GDPCi	4224	384,92	35855,47	10998,4308	10451,78342
	GDPCj	4198	384,92	35855,47	10954,3941	10480,49452
	Valid N	4111				
2003	TradeValue	4700	$3	$23,200,000,000,000	$15,364,645,305.38	$499,491,507,889.319
	GDPi	4644	3843487488	10269300359168	492054074210,35	1396165561021,506
	GDPj	4636	3843487488	10269300359168	467447961008,49	1361223838263,819
	GDPCi	4644	423,25	48837,73	12521,0491	12089,55419
	GDPCj	4636	423,25	48837,73	12383,6849	11895,01085
	Valid N	4580				
2004	TradeValue	4610	$3	$26,600,000,000,000	$27,437,929,832.56	$660,556,789,484.872
	GDPi	4552	3786603776	10703900508160	518505668060,57	1464199681670,570
	GDPj	4546	3786603776	10703900508160	481867609486,70	1407229151608,509
	GDPCi	4552	546,12	50536,74	13078,1590	12505,35192
	GDPCj	4546	438,90	50536,74	12720,4653	12178,51418
	Valid N	4488				
2005	TradeValue	4622	$79	$30,100,000,000,000	$31,207,266,402.82	$750,510,729,502.222
	GDPi	4490	3881041664	11046425198592	545054749886,89	1518305225641,489
	GDPj	4494	3881041664	11046425198592	504659669035,18	1458238271193,299
	GDPCi	4490	588,44	52182,86	13658,9857	12886,94105
	GDPCj	4494	459,31	52182,86	13061,7599	12540,10459
	Valid N	4364				

Appendix 4

SELECTED COUNTRIES FOR EACH TIME PERIOD

Time Period 1					
EU	**World**				
Belgium	Austria	Czech Rep.	Kuwait	Philippines	Sweden
Denmark	Algeria	Egypt	Latvia	Poland	Switzerland
France	Angola	Estonia	Lebanon	Portugal	Syria
Germany	Argentina	Finland	Libya	Qatar	Thailand
Greece	Australia	Hong Kong	Lithuania	Romania	Tunisia
Ireland	Belarus	Hungary	Malaysia	Russia	Turkey
Italy	Brazil	Iceland	Malta	Saudi Arabia	Ukraine
Luxembourg	Bulgaria	India	Mexico	Singapore	UAE
Netherlands	Canada	Indonesia	Morocco	Slovakia	USA
UK	Chile	Iran	New Zealand	Slovenia	Venzuela
	China	Israel	Nigeria	South Africa	
	Croatia	Japan	Norway	South Korea	
	Cyprus	Kazakhstan	Pakistan	Spain	

(Source: Europa, 2007)

Time Period 2					
EU	**World**				
Belgium	Austria	Czech Rep.	Kuwait	Philippines	Syria
Denmark	Algeria	Egypt	Latvia	Poland	Thailand
France	Angola	Estonia	Lebanon	Qatar	Tunisia
Germany	Argentina	Finland	Libya	Romania	Turkey
Greece	Australia	Hong Kong	Lithuania	Russia	Ukraine
Ireland	Belarus	Hungary	Malaysia	Saudi Arabia	UAE
Italy	Brazil	Iceland	Malta	Singapore	USA
Luxembourg	Bulgaria	India	Mexico	Slovakia	Venzuela
Netherlands	Canada	Indonesia	Morocco	Slovenia	
Portugal	Chile	Iran	New Zealand	South Africa	
Spain	China	Israel	Nigeria	South Korea	
UK	Croatia	Japan	Norway	Sweden	
	Cyprus	Kazakhstan	Pakistan	Switzerland	

(Source: Europa, 2007)

Time Period 3				
EU	**World**			
Austria	Algeria	Hong Kong	Malta	Slovenia
Belgium	Angola	Hungary	Mexico	South Africa
Denmark	Argentina	Iceland	Morocco	South Korea
Finland	Australia	India	New Zealand	Switzerland
France	Belarus	Indonesia	Nigeria	Syria
Germany	Brazil	Iran	Norway	Thailand
Greece	Bulgaria	Israel	Pakistan	Tunisia
Ireland	Canada	Japan	Philippines	Turkey
Italy	Chile	Kazakhstan	Poland	Ukraine
Luxembourg	China	Kuwait	Qatar	UAE
Netherlands	Croatia	Latvia	Romania	USA
Portugal	Cyprus	Lebanon	Russia	Venzuela
Spain	Czech Rep.	Libya	Saudi Arabia	
Sweden	Egypt	Lithuania	Singapore	
UK	Estonia	Malaysia	Slovakia	

(Source: Europa, 2007)

Time Period 4					
EU	**EMU**	**World**			
Cyprus	Austria	Algeria	Iceland	New Zealand	Syria
Czech Rep.	Belgium	Angola	India	Nigeria	Thailand
Denmark	Finland	Argentina	Indonesia	Norway	Tunisia
Estonia	France	Australia	Iran	Pakistan	Turkey
Hungary	Germany	Belarus	Israel	Philippines	Ukraine
Latvia	Greece	Brazil	Japan	Qatar	UAE
Lithuania	Ireland	Bulgaria	Kazakhstan	Romania	USA
Malta	Italy	Canada	Kuwait	Russia	Venzuela
Poland	Luxembourg	Chile	Lebanon	Saudi Arabia	
Slovakia	Netherlands	China	Libya	Singapore	
Slovenia	Portugal	Croatia	Malaysia	South Africa	
Sweden	Spain	Egypt	Mexico	South Korea	
UK		Hong Kong	Morocco	Switzerland	

(Source: Europa, 2007)

Appendix 5

REGRESSION EQUATION PERIOD 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
α	-22.28027	0.494295	-45.07481	0.0000
lnGDPi	1.017887	0.014698	69.25553	0.0000
lnGDPj	0.827957	0.014612	56.66397	0.0000
lnGDPCi	0.169948	0.018240	9.317084	0.0000
lnGDPCj	-0.034775	0.016566	-2.099238	0.0358
lnDISTANCEij	-0.970120	0.025250	-38.42000	0.0000
BORDERij	0.094953	0.129644	0.732413	0.4639
LANGUAGEij	0.773417	0.061998	12.47494	0.0000
EUi to EUj	-0.134822	0.071966	-1.873401	0.0611
EUi to WORLDj	-0.025808	0.049648	-0.519816	0.6032
WORLDi to EUj	0.362027	0.064185	5.640371	0.0000

REGRESSION EQUATION PERIOD 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
α	-24.15933	0.439978	-54.91027	0.0000
lnGDPi	1.027300	0.013063	78.64333	0.0000
lnGDPj	0.812885	0.012748	63.76720	0.0000
lnGDPCi	0.162807	0.015001	10.85316	0.0000
lnGDPCj	0.104139	0.015133	6.881721	0.0000
lnDISTANCEij	-0.855407	0.021252	-40.25146	0.0000
BORDERij	0.498116	0.104579	4.763068	0.0000
LANGUAGEij	0.870021	0.057519	15.12587	0.0000
EUi to EUj	0.244465	0.059682	4.096143	0.0000
EUi to WORLDj	0.001099	0.040363	0.027232	0.9783
WORLDi to EUj	0.252568	0.053125	4.754227	0.0000

REGRESSION EQUATION PERIOD 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
α	-24.77751	0.336414	-73.65185	0.0000
lnGDPi	1.094659	0.346429	-71.52272	0.0000
lnGDPj	0.859536	0.009740	112.3896	0.0000
lnGDPCi	0.061702	0.010268	83.71368	0.0000
lnGDPCj	0.076541	0.013888	4.442894	0.0000
lnDISTANCEij	-1.002878	0.012838	5.962048	0.0000
BORDERij	1.137072	0.016974	-59.08378	0.0000
LANGUAGEij	0.932123	0.080307	14.15902	0.0000
EUi to EUj	0.227580	0.053421	17.44867	0.0000
EUi to WORLDj	0.346803	0.054851	4.149048	0.0000
WORLDi to EUj	0.262286	0.036266	9.562719	0.0000

REGRESSION EQUATION PERIOD 4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
α	-25.15726	0.325472	-77.29462	0.0000
lnGDPi	1.098681	0.009346	117.5526	0.0000
lnGDPj	0.911691	0.009469	96.28552	0.0000
lnGDPCi	0.051225	0.012673	4.041923	0.0001
lnGDPCj	0.020659	0.012232	1.688949	0.0913
lnDISTANCEij	-1.032479	0.017425	-59.25425	0.0000
BORDERij	0.875047	0.076382	11.45621	0.0000
LANGUAGEij	0.803005	0.048208	16.65721	0.0000
EU to EU	0.881882	0.081678	10.79713	0.0000
EU to EMU	0.331818	0.081663	4.063273	0.0000
EU to WORLD	0.013401	0.044847	0.298806	0.7651
EMU to EMU	-0.004771	0.086980	-0.054856	0.9563
EMU to EU	0.063020	0.082543	0.763481	0.4452
EMU to WORLD	0.223575	0.046779	4.779342	0.0000
WORLD to EU	-0.088425	0.046882	-1.886109	0.0593
WORLD to EMU	0.172110	0.048005	3.585212	0.0003