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EMU's Effect on a Bystanders Trade Margins - The case of Sweden

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Abstract

This paper characterizes the impact of the adoption of the euro on Swedish export pattern. Present papers present a new method in order to analyze trade patterns by empirically analyze the effects on trade by estimating the changes via the trade margins. In this paper I also use this method in order to analyze if the export of Swedish products has generated new trade in new goods or increased trade in annual exported goods since the adoption of the Euro. The question I want to answer is: How has the Swedish export change, in terms of goods exported, due to the adoption of the euro?

I calculate the question by examine the changes in different products exported to two destination groups (EMU countries and EU15 partners) for two periods. I found that the common currency, euro, has an impact on the Swedish export in a positive way in average for the years 1997-1999 compared to 2000-2002. The percentage increase was higher for products that were exported every year during the sample period than for products that were introduce in the second period. This indicates significant effects on the intensive margin of trade and smaller effects on the extensive margin.

Keywords: Monetary and Economic currency union, EMU, Eurozone, Euro, Swedish Export, Extensive and Intensive margin

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1. Introduction

For a long time researchers and scholars have examined international trade flows and trade patterns in order to understand the structure of the world's trading systems. Many of these researchers have analyzed the impact of increasing economic integration between countries, as countries over time have become more open to trade. In the beginning of 2006 Baldwin presented a new way of estimating trade in order to understand trade patterns. He determined the changes in trade by measuring two trade margins; the intensive and extensive margin. The intensive margin denotes that trade has increased in terms of larger quantity are traded with products that already existing on the market. The extensive margin predicts that trade increase by introducing new products to the market. As the overview of the trade margins was presented, many of researchers started to pay attention to the intensive margin. There are due not as many papers that determine the extensive margin in order to estimate the changes in trade flows. Therefore I will examine both the intensive and the extensive margin for the change in Swedish export that are related to the adoption of the Euro.^{1,2}

As countries decide to participate in a currency union the trade costs and the uncertainty for companies tend to be lower compared to countries with their own money. According to Glick and Rose (2002) this leads to that trade between member countries increase and due to the lower cost minimization in the union the trade with outsiders may change. In fact, there may be a shift of the supply source from a trade partner that is outside to a member country in the union. In order to analyze if this happened in my case between EMU and Sweden I calculated the average trade for both EMU and Sweden. I found no evidence for that the common currency would reduce trade in terms of Swedish export to the participating countries in EMU. In fact, trade within the Eurozone has increased with 26 % but also the Swedish export to EMU has increased by over 6 % since 1999. This leads me to the aim of this paper: to determine how the trade margins has changed in terms of Swedish export due to the establishment of the EMU. This is to facilitate a deeper understanding for how economic integration effect the development of trade and which of the trade margins that plays a dominate roll for the Swedish export sector.³

¹Helpman, E. Melitz, M. and Rubenstein, Y. (2008) Estimating Trade Flows: Trading Partners and Trading Volumes. National Bureau of Economic Research.

²http://www.merit.unu.edu/MEIDE/papers/2009/1235714398_SS.pdf

³Newfarmer, R et al (2009). Breaking into new markets. World Bank Publication

In order to calculate how the establishment of the EMU has impacted Swedish export in terms of the trade margin I will use data over products that are classified after the combined - 6-digit level - classification of internationally traded products (CN6).⁴ I will calculate Swedish export to two groups, EMU and EU15. These groups include both countries that become a member in EMU before 2002 (10 countries) and also countries that are a part of the rest of Europe plus Norway and Switzerland. Based on my calculation, I found that the export to EMU has both increased via the extensive and intensive margin, but they are not impacted in the same extent.

Hence, before I present an empirical calculation of the effects from EMU on the Swedish export pattern, I will provide the reader with an understating of a currency union and specifically, the EMU, international trade history and information about the trade margins.

The structure of this paper is as follows. In section 2 I will shortly explain the meaning of a currency union and the history of the establishment of Economic and Monetary Union, EMU. In section 3 I present previous literature that discuss the impact from a currency union. I mostly focus on the empirical findings from present researcher. In section 4, I discuss general trade patterns that have characterized EMU and Sweden. After that, in section 5, I go through important theories and concepts regarding international trade. These theories try to explain the effects of different trade flows between countries. In section 6, I present my database and also the estimation strategy that I use in order to analyze the trade margins for the Swedish export. In section 7 I will analyze the results that I find by using a difference-in-difference method. Finally I will summarize my findings about the trade margins for Swedish export to EMU before and after the adoption of the Euro in section 8.

2. Theoretical framework

In this section I will give a deeper understanding of the meaning of a common currency. I will present how EMU was established, the structure of the currency union and what the main goal is. This is important to introduce in order to understand the significant impact that a currency union has in terms of economic integration on trade in the world.

⁴Berthou, A. and Fontagné, L. (2008) The Euro and the Intensive and Extensive margins of Trade: Evidence from French Firm Level Data. CEPII, Working Paper No 2008-06

2.1 History of the EMU

A custom union, also called a monetary union, is an area consisting of a group of sovereign countries with a common monetary policy. Such unions are usually characterized by only one single currency and external rate policy that is managed on the union level.⁵ Custom unions are formed with the intention of increasing integration between the member countries and also to increase the economies performance in terms of trade. As a country enters a currency union the common currency reduces the trade cost in terms of currency exchange and trade barriers. It also reduces the uncertainty about market that companies faces. This in turns lead to that the trade between member countries typically increases as a result from the cost minimization.^{6,7}

Cobham and Robson (1994) distinguish between two union approaches, formal and informal. The latter is the most common currency union and denotes complete adoption of one single currency that is used by every member nation. The formal currency union do exist but not in the same extent as the informal. It implies an agreement between countries of a common currency conducted in tandem with the sovereignty currency of each participating country.⁸

Since the end of the Second World War the number of countries in the world have more than doubled, followed by an enlargement in numbers of currencies in the world economy. The trend of increasing sovereignty money in circulation has however decreased during the last decades due to the rising importance of economic integration in terms of among other things currency unions.⁹

Small and poor countries that adopted the currency of larger and richer counties formed historically monetary unions. There are constant different preferential agreements in the world across countries but only some of the agreements in terms of monetary unions exist today. One of the largest and most significant currency union is the economic and monetary union, referred as EMU.¹⁰

⁵Masson, P. and Pattillo, C. (2001) Monetary Union in West Africa (ECOWAS) Is it desirable and how could it be achieved. International Monetary Found

⁶Flam, H. and Nordström, H. (2007) Explaining large euro effects on trade: the extensive margin and vertical specialization. CESifo Working Paper Series No. 3387

⁷http://www.dartmouth.edu/~worldoutlook/archives/fall12/12F13W_tradediversio.pdf

⁸<http://repec.org/mmfc04/13.pdf>

⁹Rose, A.K. (2006) Currency Unions. The New Palgrave

¹⁰Alesina, A. and Barro, R.J. (2000) Currency Unions. National Bureau of Economic research

The EMU is commonly considered as a transparent link between member states in order to strengthen the binds across the EU countries and feature open markets. It plays a particular important role for the monetary and exchange rate policy within the Euro area.¹¹ The cornerstone of the decision to establish EMU was to achieve price stability, growth and employment within the Eurozone. A membership to the EMU also implies that these countries adopt the euro.¹²

The idea of a common currency within the EU was proposed in both the 1970's and 1980's but it was not until the beginning of the 1990's that the member states agreed upon introducing/adopting a common currency, euro.¹³ EMU was successfully established through three phases and put into effect 1999. The elimination of collar for capital transaction in order to make capital move free across member states emphasized the beginning of EMU and the first phase, 1990.¹⁴

During this time the member states also agreed upon and established five conditions for membership to the EMU in order to secure the union from an economic breakdown. These conditions are important because one economic difficulty in one member country has a direct effect on the other members due to the increase economic integration. These conditions are called the convergence criteria and states;

1. The inflation of the applying county must not be 1,5 % higher than the inflation of three member countries with the lowest inflation rate
2. The central government debt should not exceed 60 % of the national gross domestic product (GDP)
3. The fiscal deficit must not be larger than 3 % of the national GDP
4. The domestic exchange rates are not allowed to be more than 2 % higher than correspond rates in the three countries with lowest inflation

¹¹<http://www.ecb.int/pub/pdf/scpops/ecbocp66.pdf>

¹²<http://www.eu-upplysningen.se/Om-EU/Vad-EU-gor/EMU/>

¹³Flam, H. and Nordström, H. (2007) Explaining large euro effects on trade: the extensive margin and vertical specialization. CESifo Working Paper Series No. 3387

¹⁴ http://europa.eu/legislation_summaries/economic_and_monetary_affairs/introducing_euro_practical_aspects/l25007_en.htm

5. The rate of exchange in the applying country must have been stable for at least two years.^{15,16}

The second phase implied the establishment of the European monetary institution (EMI) in 1994. The EMI was formed in order to, together with the national banks in the Eurozone, prepare for the future common monetary policy and the activity of the European Central Bank (ECB).

Five years later, in 1999, the heads of state and government in the EU-countries decided which countries that were allowed to participate in the euro area. The decision was built on how well the applying countries satisfied the convergence criteria's for membership. Eleven countries were allowed to become members and imply the new currency. Those countries were; Belgium, Germany, Spain, France, Ireland, Italy, Luxemburg, Netherlands, Austria, Portugal and Finland. During the same year the EMI went in liquidation and the cooperation between the national central banks instead continued under the European System of Central Banks (ECBS).^{17,18}

1999 preamble the third and final phase and predicted that the domestic exchange rates were locked against the euro and the Stability and Growth Pact (SPG) was put into effect. The EU-countries started to adopt the common monetary policy and in 2002 the euro was fully implement and became the official currency inside the EMU. ECB became the head authority over the member states monetary policy, which lead to that the national central banks become a part of the euro system.^{19,20} Presently there are seventeen member countries in the EMU. Apart from the original members Greece, Slovenia, Cyprus, Malta, Slovakia and Estonia has entered the euro zone.²¹

3. Survey of previous literature

To analyze and calculate the effects of a currency union are important and central for both member countries and for nations that considering a membership. Yet it was not until Rose

¹⁵http://ec.europa.eu/sverige/key_issues/euro/index_sv.htm

¹⁶<https://www.ecb.int/ecb/history/emu/html/index.en.html>

¹⁷http://www.riksbank.se/Upload/Dokument_riksbank/Kat_publicerat/Broschyrrer/EMUbroschyr.pdf

¹⁸ <https://www.ecb.int/ecb/history/emu/html/index.en.html>

¹⁹Ibid

²⁰http://www.riksbank.se/Upload/Dokument_riksbank/Kat_publicerat/Broschyrrer/EMUbroschyr.pdf

²¹<http://www.eu-upplysningen.se/Om-EU/Vad-EU-gor/EMU/>

(2000) analyzed the relationship between currency unions and trade as researchers started to explore the effects on trade from a currency union. According to Rose (2006) this depends on that unions that were formed before EMU consisted of small and poor countries and no one thought these countries had any significant effect on the world trade.²² Rose (2000) proved in his analyze that the impact from a single currency had been underappreciated. To demonstrate the importance of the effects on trade associated with a currency union, Rose used the gravity model and estimated the direct effects for every existing currency union in the world. Rose found that country pairs with a common currency traded three times as much with each other compared to countries with their sovereignty money.²³ Two years later Rose, together with Engel, extended the analysis by Rose (2000) by estimating the impact of a currency union on country income. They also found that countries that are a member of a currency union are more open and integrated and therefore trade more than countries with their own money.²⁴

Micco, Stein and Ordoñez (2003) developed the study made by Rose (2000) by only use empirical data and estimated the effects of the EMU when the euro was fully adopted. Their data consisted of 22 countries whereof 12 of these countries became a member of EMU during the estimated time period. Similar to Rose (2000), Micco, Stein and Ordoñez (2003) only found a positive effect in terms of trade creation and no proof of trade diversion. They found that trade increased by 15 % inside the Euro area and trade between the member countries of EMU and rest of the world increased by 9 %. Finally, they pointed out that trading in Euro had a significant and economically important effect on trade.^{25,26}

Baldwin (2006) has criticized the previous findings and argued that the data used when estimating the effects of a common currency must not consist of countries that not are a part of a currency union. Baldwin denoted that non-member states have peculiar characteristics that make a lack in the estimation results. To prove this, Baldwin (2006) used data that consisted only of EMU countries and found a positive effect on trade due to the adoption of the euro, but compared to Rose (2000) the effect was much smaller.²⁷ Baldwin (2006) was also one of the first researchers to determine the effect of a common currency by estimate two

²²Rose, A.K. (2006) Currency Unions. The new Palgrave

²³ <http://www.frbsf.org/econsrch/wklyltr/2000/el2000-03.html>

²⁴ <http://www.ssc.wisc.edu/~cengel/PublishedPapers/Rose-Engel.pdf>

²⁵ [http://onlinelibrary.wiley.com/store/10.1111/1468-0327.00109_1/asset/1468-](http://onlinelibrary.wiley.com/store/10.1111/1468-0327.00109_1/asset/1468-0327.00109_1.pdf?v=1&t=hfxovrn&s=62cb83d51e30d4e68f6bb6f423753c1ccec3e49)

[0327.00109_1.pdf?v=1&t=hfxovrn&s=62cb83d51e30d4e68f6bb6f423753c1ccec3e49](http://onlinelibrary.wiley.com/store/10.1111/1468-0327.00109_1/asset/1468-0327.00109_1.pdf?v=1&t=hfxovrn&s=62cb83d51e30d4e68f6bb6f423753c1ccec3e49)

²⁶Di Nino, V. (2009) Trading in Euros: estimates of the Intensive and Extensive margins.

²⁷<http://www.ecb.de/pub/pdf/scpwps/ecbwp594.pdf>

margins: extensive and intensive.²⁸ The former denotes that new products are introduced to the market due to new trade agreements and the expansion of new country pairs trading with each other. The intensive margin predicts that increasing trade is characterized by existing products that are still traded but in larger quantities.²⁹ This new empirical findings lead to the conclusion that one single currency also have an impact on the sunk cost of exporting, i.e. costs that consist of transport, trade and distribution that are related to export activity.³⁰ This part is further developed in section 5.

New parts of literature were reviewed that shows the effects of a currency union on a more detail data level. For example, Flam and Nordstrom (2007) used product-level data in order to analyze the euro impact via the extensive margin. They confined their analysis by only estimate the effects of on one-way trade (export). Flam and Nordström (2007) found a positive impact on trade but also that the effect of the euro mainly goes via the extensive margin.³¹ Berthou and Fontagné (2008) also investigated the effects determined by the margins but instead they used French firm-level data. They found that trade is affected via the extensive margin when French firms exports to countries inside the euro area. Berthou and Fontagné (2008) also found that the euro effects arise via the intensive margin when French firms export to non-member countries in the world.³²

A paper by Bergin and Yi-Lin (2008) also sheds the lights on estimating the effects that occurs via the two margins. In order to do estimate the trade margins they combined earlier theoretical findings with empirical estimations. Bergin and Yi-Lin (2008) then found that the impact of common currency on trade arises via the extensive margin while the fixing exchange rate increases trade via the intensive margin.³³

This paper presents an empirical calculation of the effects from EMU on Swedish export pattern. Focusing on the effects from the euro via the extensive and intensive margin and the importance of the change in variety of export, Helpman, Melitz and Rubinstein (2008)

²⁸ http://www.eea-esem.com/files/papers/EEA-ESEM/2009/1214/eurto_ext_int_09_08.pdf

²⁹ Felbermayr, G. and Kohler, W. (2010) Modelling the Extensive Margin of World Trade: New Evidence in GATT and WTO Membership. *The world Economy* (2010)

³⁰ http://www.merit.unu.edu/MEIDE/papers/2009/1235714398_SS.pdf

³¹ Flam, H. and Nordström, H. (2007) Explaining large euro effects on trade: the extensive margin and vertical specialization. *CESifo Working Paper Series No. 3387*

³² Berthou, A. and Fontagné, L. (2008) The Euro and the Intensive and Extensive margins of Trade: Evidence from French Firm Level Data. *CEPII, Working Paper No 2008-06*

³³ http://www.eea-esem.com/files/papers/EEA-ESEM/2009/1214/eurto_ext_int_09_08.pdf

confirms a part of this analyze. They were the first researchers to present gravity estimation, where the gravity model takes both effects in to account and also accounts for zero trade. Previous papers only considered trading partners where trade is positive and ignored whether two countries are trading with each other or not.³⁴ As Helpman, Melitz and Rubinstein (2008) estimated the effects by using the new model they draw the conclusion that countries become more integrated by a common currency and that trade increased between members. They also found that most of the trade effects are driven by the extensive margin.³⁵

It is also important to examine the welfare effects related to a currency union when estimating the impact of a single currency. In order to analyze this Jacob Viner (1950) presented two concepts: trade creation and trade diversion. The first denotes that the supply shifts from a high-cost producer to a low-cost producer and trade diversion predicts the opposite. Viner (1950) founded significant evidence that currency union were associated with a diversion effect for outsiders. The prior papers have not found any empirical evidence for trade diversion associated with a currency union. This may also be confirmed for my case, as I presented before, the Swedish export to EMU has increased, which indicates a trade creation effect and not trade diversion. Due, the reader should be aware of that there can also be a trade diversion effect that is not as large as the creation effects, which leads to that the diversion effect becomes obscured. These two concepts are extended in section 5 and analyzed in section 6.^{36,37}

4. Export history

4.1 Export of EMU

The main goal with EMU is to increase investment and exchange of goods and services inside the euro area. To do this the nominal exchange rate volatility between member states has been eliminated and the trade cost in terms of currency exchange does no longer exist. This has led to an increased transparency on prices and rising competition between firms and in turn increased trade within the eurozone.³⁸

³⁴<http://people.su.se/~flam/Extensive%20Intensive%20Margin%20Estimation-1.pdf>

³⁵Helpman, E. Melitz, M. and Rubenstein, Y. (2008) Estimating Trade Flows: Trading Partners and Trading Volumes. National Bureau of Economic Research.

³⁶http://www.dartmouth.edu/~worldoutlook/archives/fall12/12F13W_tradediversion.pdf

³⁷Viner, J (1950) The customs union issue. New York: Carnegie endowment for international peace

³⁸Berthou, A. and Fontagné, L. (2008) The Euro and the Intensive and Extensive margins of Trade: Evidence from French Firm Level Data. CEPII, Working Paper No 2008-06

Since the definitive adoption of the euro 2002, the trade inside the euro zone, according to Flam and Nordstrom (2007), has increased by 26 % when comparing trade patterns between 1995-1998 and 2002-2005. They also found that the trade between euro member countries and the rest of the world had increased with 12 % during the same estimated period. Furthermore, Flam and Nordstrom (2007) discovered that the increase of trade both inside and outside the euro zone mainly rose via the extensive margin. The percentage increase for products that annual were exported was not affected in the same way as products that were introduced during the given estimated period. Today, EMU accounts for one-fifth of the global output.^{39,40}

4.2 Swedish trade

Sweden is a country with large factor endowments in terms of raw material. The Swedish export consists mainly of high technological products such as vehicles, machines but also forest-industry products. As integration has increased, during the last decade, between the world's countries the Swedish export has benefited by decreasing sunk costs and export has become an important key for the Swedish welfare system and economy. As the export has increased, the total share of Swedish export of the world export has decreased due to higher competition that is an effect from the rising economic integration.⁴¹

The export sectors in Sweden are extremely concentrated and dominated by only a small fraction of Swedish internationalized firms. As presented in table 1 only the largest companies represents the aggregate export. I collected data regarding Swedish export between the years 1997-2008 (year 1-11). As shown in the table 1, 1 % of the companies' concentrate 30 % of the total value of Swedish aggregated export in 1997 and 42 % in 2005. From this one can draw the conclusion that the total number of exporting industries tends to decrease over the estimated period. This can be explained by the expansion of mergers between companies during the 1990th century.^{42,43}

³⁹ <http://www.tradingeconomics.com/euro-area/gdp>

⁴⁰ Flam, H. and Nordström, H. (2007) Explaining large euro effects on trade: the extensive margin and vertical specialization. CESifo Working Paper Series No. 3387

⁴¹ <http://www.ekonomifakta.se/sv/Fakta/Ekonomi/Utrikeshandel/Sveriges-export--och-importprodukter/>

⁴² Hammar, T. (1999), "Europa kör om USA i fusioner", Svenska Dagbladet,

⁴³ Berthou, A. and Fontagné, L. (2008) The Euro and the Intensive and Extensive margins of Trade: Evidence from French Firm Level Data. CEPII, Working Paper No 2008-06

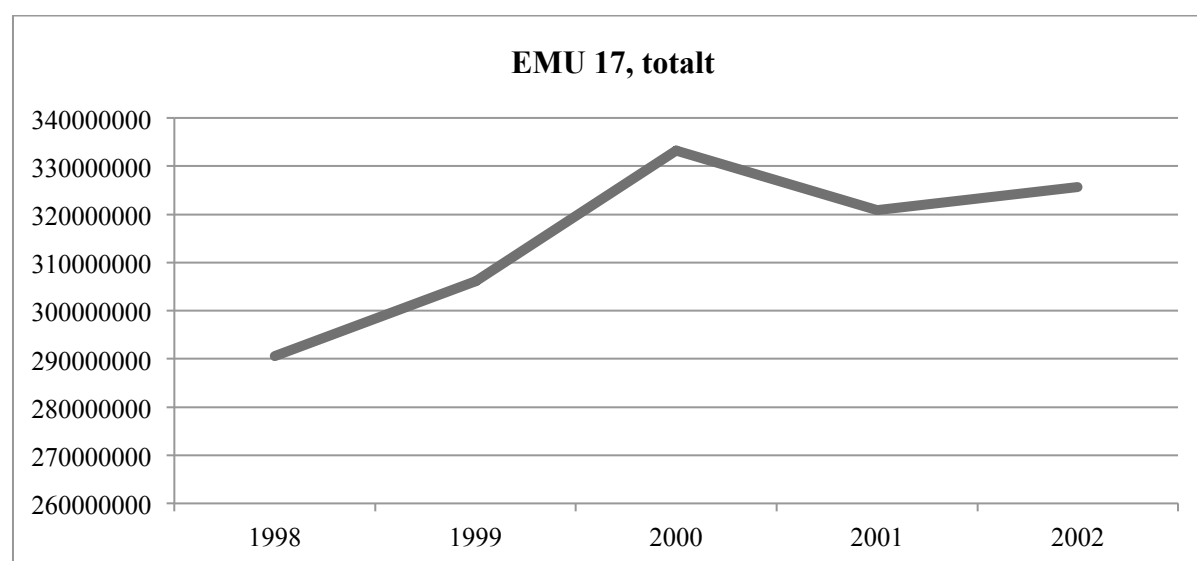
Table 1: The concentration of Swedish Firms- The Firms are Ranked by Their Individual Export

Year	Top 1%	Top 5 %	Top 10 %
1	0,3	0,76	0,93
2	0,33	0,76	0,93
3	0,44	0,8	0,94
4	0,41	0,77	0,93
5	0,38	0,78	0,93
6	0,4	0,78	0,92
7	0,39	0,77	0,92
8	0,4	0,77	0,92
9	0,42	0,77	0,91
10	0,4	0,78	0,92
11	0,43	0,79	0,92

Presently, the ten largest export partners for Swedish firms are; Norway, Germany, Great Britain, the United States, Finland, Denmark, France, Belgium, China and the Netherlands. They cover approximately 10 % of the total Swedish export and 4,8 % of these countries are members in the eurozone.⁴⁴

Figure 1 represents the Swedish pattern of exports to the EMU countries between the years 1998-2002. The curve shows the volume of export from Sweden to the specific countries. It is clear from the figure that the trade has increased since the adoption of the Euro. The decrease in the beginning of the 20th can be explained by the financial crisis that arose.⁴⁵ This is not controlled for in my calculation.

Figure 1: Swedish Export to EMU between 1998-2002



⁴⁴http://www.scb.se/Pages/TableAndChart___26637.aspx

⁴⁵Helpman, E. Melitz, M. and Rubenstein, Y. (2008) Estimating Trade Flows: Trading Partners and Trading Volumes. National Bureau of Economic Research.

5. Theoretical foundations

5.1 Viner's ambiguity

Jacob Viner analyzed the welfare effects of economic integration across countries. Specifically, he analyzed the effects associated with custom unions by introducing two new concepts to the international trade theory: trade creation and trade diversion. His theory is commonly referred as the Viner's ambiguity and generally states that unilateral preferential trade liberalization has ambiguity effects on country's welfare.⁴⁶

According to the theory, when a country decides to become a member of a trade group there are possible effects via both trade creation and trade diversion depending on the country's characteristics such as historical trade patterns, previous trading agreements and endowments. Trade diversion occurs when the elimination of a tariff relocate the production away from a low-cost non-member supplier to a high-cost member country. According to Viner, this trade relocation does not increase trade, whether it creates a welfare loss for the participating countries in terms of higher import prices.⁴⁷ The second welfare effect, trade creation, denotes the opposite trade pattern to trade diversion. Through new trade agreements there are welfare gains because the production is relocated from the least efficient non-member country to the most efficient member producer, which leads to that the price of products faced by consumer decrease.^{48,49}

In order to understand this theory I will explain by two different cases. Assume there are three countries, Home, Foreign and Rest of the world (Row). In the initial stage the nondiscrimination tariff are equal independent goods and country of origin. Im_H stands for the import demand for a specific product from Home.⁵⁰

In the first case, presented in Figure 2, Foreign is a low-cost supplier and Row is the high-cost supplier. In figure 2 the import price from Foreign is $P_{\text{Foreign}} + t$, which consists of the production price (P_{foreign}) plus the tariff fee (t). The import price from Row is P_{Row} plus the tariff fee, $P_{\text{row}} + t$. Because of the constant tariff towards Foreign and Row, the import price

⁴⁶ Panagariya, A (2000) Preferential Trade Liberalization: The Traditional Theory and New Developments. Journal of Economic literature.

⁴⁷ Panagariya, A (2000) Preferential Trade Liberalization: The Traditional Theory and New Developments. Journal of Economic literature.

⁴⁸ Ibid

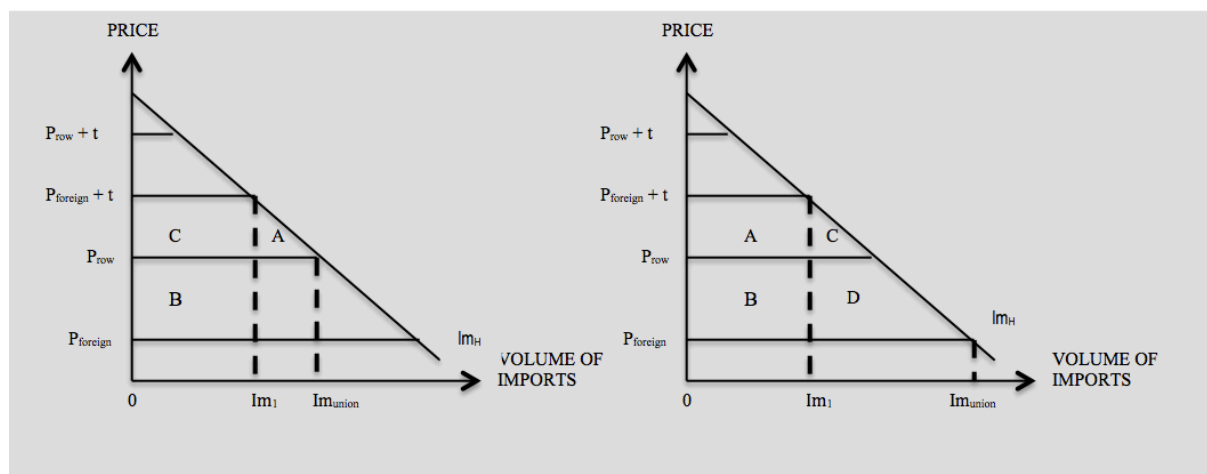
⁴⁹ Viner, J (1950) The customs union issue. New York: Carnegie endowment for international peace.

⁵⁰ Bhagwati, J and Panagariya, A. (1996) Preferential trading Areas and Multilateralism: Strangers, Friends or Foes? Washington DC: The Economics of Preferential Trade Agreements.

from Row will exceed the import price from Foreign. This leads to that Home will only import from Foreign and the volume of imports are Im_1 and collect are C and B in terms of tariff revenue. Assume that Home forms a free trade area together with Row. This follows that the import price from Row decrease by the same amount as the tariff, P_{row} , and the source of import will relocate from Foreign to Row. The import will increase from Im_1 to Im_{union} . This trade relocation diverts trade from Foreign to Row, but it has a small trade creation effect as well in terms of a reduction in the import price. The welfare loss is represented by area B and it is a result from the inefficient trade pattern and the tariff revenue loss. Area A shows the welfare gains from this relocation, but it is smaller than are B, indicating that trade diversion dominate and there are welfare losses for Home.^{51, 52,53}

In the second case, presented in figure 2, the assumptions are the same for the trading partners but in this case Home creates a trade union with Foreign instead. The elimination of the nondiscriminatory tariff against Foreign leads to that Home continue to import only from Foreign but in a larger quantity, the import expand from Im_1 to Im_{union} . The tariff revenue disappears but the import price decrease from $P_{foreign} + t$ to $P_{foreign}$, which is capture by the consumers in Home in terms of a increased surplus. Because of that Foreign is the low-cost supplier there will be a positive trade creation and no trade diversion effect. The welfare gain is represented by area C and D.^{54,55}

Figure 2: Viner's Ambiguity - Right diagram predicts trade diversion and the left diagram denotes trade creation



⁵¹ Ibid

⁵² Panagariya, A (2000) Preferential Trade Liberalization: The Traditional Theory and New Developments. Journal of Economic literature. s 290-291

⁵³ Baldwin, R And Wyplosz, C. The economics of European Integration (2009) London: McGraw-Hill Higher Education.

⁵⁴ Bhagwati, J and Panagariya, A. (1996) Preferential trading Areas and Multilateralism: Strangers, Friends or Foes? Washington DC: The Economics of Preferential Trade Agreements.

⁵⁵ Pugel, T (2012). International Economics. McGraw Hill Higher Education

These concepts are important when calculating the effects from the adoption of the Euro on Swedish export in order to get a better understanding of the impact from EMU. When EMU was established the trade costs among the member countries were reduced, which in turn could lead to asymmetric effects on Swedish export. Thus, a process of cost minimization may result that member countries shift their supply away from Swedish exporters towards producer in the EMU, in other words trade diversion. Hence, there are only few evidences presented that this will happen due to the creation of a trade group and I will therefore analyze the concepts more closely for Swedish export.

5.2 The new trade theory

During the last four decades there has been an expansion of the international trade theory. The most important theory in this paper is the new trade theory that includes variables that are significant for my calculation and understanding for the effects.

The natural starting point of the new trade theory was in 1970 when Paul Krugman presented a new equilibrium model for estimation of trade patterns and location of economic activity in the world, called monopolistic competition model.⁵⁶ The new theoretical tools used in this model enrich the empirical foundations about trade creation via comparative advantages such as differences in factor endowments and technology across countries. Krugman added elements of imperfect competition, increasing return to scale and product differentiation to the existing international trade models in order to present a model that explained the "real" trade patterns in the world.⁵⁷ Due to the expansion of international trade theory two concepts were introduced: intra-industry and inter-industry trade. The former denotes that a country's import and export the varieties of goods and services that is classified to the same sector. The latter predicts that a country exports one type of good or service in exchange for another different good or service.⁵⁸ Presently, it is important when explaining trade to distinguish between the two concepts.⁵⁹

⁵⁶Neary, P.J. (2009) Putting the "New" into New Trade Theory: Paul Krugman's Nobel Memorial Prize in Economics. *Journal of Economics*

⁵⁷ Feenstra, C.R (2004) *Advanced international trade: theory and evidence*. Princeton, N.J.: Princeton University Press.

⁵⁸ Grubel H. and Lloyd, P. (1975) *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products*. London: MacMillan.

⁵⁹ Krugman, R.P and Helpman, E. (1982) *Market structure and foreign trade: increasing returns, imperfect competition, and the international economy*. Cambridge, mass: MIT press

The model presented by Krugman was later criticized for performing poorly due to ignorance of heterogeneity and sunk costs. The monopolistic competition model only uses homogeneity within sectors, in other words; only one representative firm is used to explain the world trading system. Krugman also ignore to include sunk cost that occurs in terms of market research and new distribution networks.⁶⁰ Melitz (2003) adjusted and enrich the monopolistic competition model by defining the importance of sunk costs and characteristics of international firms as determinants for participating in trade areas. Further, Melitz (2003) argued that one needs to control for firms different features and previous trade history in order to estimate a correct result on trade patterns.⁶¹

5.3 The importance of sunk cost

Sunk costs, as stated above, are fixed costs that occur when a firm decides to enter a foreign market. These costs do not impact the export level for a firm, whether they are irrevocable costs that only occur as a country participate in trade on a distance market.⁶²

Most of the existing firms in the world do not export their goods, but those firms that do, commonly only export to a few destination markets.⁶³ Melitz (2003) explained the reason behind this export pattern by stressing the importance of sunk cost and firms characteristics as determinants when a firm considering to export or not. He argued that firms only decide to export after they know that they can manage to overcome a sunk cost in terms of exporting. This can be a problem because, commonly firms are not aware of their future production and market structures which makes the decision of exporting hard for each firm that want to participate in a new market. Melitz (2003) also stated that firms are more commonly to export to destination countries that were familiar, then to markets that were unfamiliar because of lower sunk costs. Previously papers also estimate the importance of sunk cost when it comes to different knowledge about markets. In these papers the researcher concluded that trade increases to a familiar destination primarily via the extensive margin.^{64,65}

⁶⁰ Gullstrand, J. (2011) Firm and destination-specific export costs: The case of the Swedish food sector. Food policy.

⁶¹ Greenway, D. and Kneller R. (2007) Firm heterogeneity, Exporting and Foreign direct investment. Economic Journal.

⁶² Gullstrand, J. (2011) Firm and destination-specific export costs: The case of the Swedish food sector. Food policy.

⁶³ Sofronis K. Clerides, S.L. and Tybout J.R (1998) Is Learning by Exporting Important? Micro-Dynamic Evidence from Colombia, Mexico, and Morocco. The Quarterly Journal of Economics

⁶⁴ <http://www.adbi.org/discussion-paper/2008/05/23/2545.firm.heterogeneity.global.cge/the.melitz.model/>

⁶⁵ Bernad, A.B et al (2007) Firms in International Trade. National Bureau of Economic research.

Gullstrand (2011) has also analyzed the importance of sunk cost and has reviewed that former decisions taken about sunk cost have an important impact on current market participation. Gullstrand (2011) concluded that firms that previously had exported to distance markets are more common to export in current time compared to firms that have not participated in trade on other markets before.⁶⁶

Other researchers have also analyzed the impact of previous decision of companies when it comes to sunk costs of exporting. Most of them have argued that firms that had exported but have been out from the distance market more than two years, would have the same probability to enter again as firms that never had exported before. This depends on that mostly firms that once decide to participate in a foreign market and does not have negative profits stays due to sunk cost. If they however leave the market they probably had a loss and are not prepared and sufficient endowed to enter the foreign market due to sunk costs and higher competition.⁶⁷

5.4 The importance of sunk cost for Swedish exporting industries

In order to estimate the importance of sunk cost for Swedish industries that have decided to export to a foreign market, I use empirical data over aggregate trade flow for the exit and entry pattern. When analyzing historical exit and entry from/to a new market I assess the previous export decision on present export. The database provides annual panel level data for Swedish industries with employment between 11-999 employees and covers two periods, 1 and 2 and a total of 11 years.^{68, 69}

Table 2 illustrates the basic pattern over entry and exit and the importance of sunk costs in Sweden. Exporting firms that once already entered a new market in the previous period are 55 % more likely to continue exporting in the current period. This result proves that sunk costs are an important key for export decisions and is commonly observed in multiple articles for different countries. To summarize, once a Swedish exporting industry paid a sunk cost for

⁶⁶ Gullstrand, J. (2011) Firm and destination-specific export costs: The case of the Swedish food sector. Food policy

⁶⁷ http://www.eea-esem.com/papers/eea-esem/eea2002/689/sunk_cb2.pdf

⁶⁸ http://liveatlund.lu.se/departments/economics/NEKN72/NEKN72_2013VT_50_1_NML__1281/CourseDocuments/Literature_GullstrandPersson_Exportsurvival_WP.pdf pp. 10

⁶⁹ Roberts, M.J and Tybout, J.R (1997) The decision to Export in Columbia: An Empirical Model of Entry with Sunk Costs. American Economic Review.

entering a foreign market half of the firms do not exit the market because if the considering exporting a again they need to pay the cost additional once more.⁷⁰

Table 2: The importance of sunk costs for Swedish trade

Variable	Export in current period
Export Status	55%

6. Empirical framework

6.1 Descriptive statistics

In order to calculate the impact of the euro on Swedish export and how large part of the impact that arises via the extensive margin respective the intensive margin, I identify one benchmark. The benchmark consists of a destination region in terms of large trading partners for Sweden that are located outside the eurozone. I also define a treatment group that consists of Swedish trading partners that are participating in EMU.

The benchmark will consist of the remaining EU 15 members (EU15) less Sweden and plus Norway and Switzerland (EU15 includes: Denmark, Great Britain, Norway and Switzerland).

The treatment group consists of countries that entered the EMU before 2002 less Greece, i.e. Belgium, Finland, France, Italy, Ireland, Luxemburg, Netherlands, Portugal, Spain, Germany, Austria.⁷¹ I will calculate the extensive margin of Swedish export to each of the two destination regions that are stated above.

6.2 Data

I use data provided from Statistic Sweden (SCB). The dataset include information over the value of export by each product for each country. The products are classified after the combined - 6-digit level - classification of internationally traded products (CN6).⁷² I use pa el with no restrictions to a specific sector, whether it counts for 6139 products categories per year for each destination country. This leads to a sum of 171892 data points for both calculated periods. This will hopefully lead to that my result in terms of the role of the

⁷⁰ Ibid.

⁷¹ Berthou, A. and Fontagné, L. (2008) The Euro and the Intensive and Extensive margins of Trade: Evidence from French Firm Level Data. CEPII, Working Paper No 2008-06

⁷² Ibid.

extensive margin will not become overestimated and it gives me a clear overview of the changes that occurs within each product category.

The data provides material for the 14 mention destination countries (EMU and EU15), products and volume of export for the period between 1997-2002. I divided the calculated time in two periods, the first consist of year 1997-1999 and the second period covers the year 2000-2002. I only calculate for a relative short period but the data set is hopefully sufficiently large to study the effects on Swedish trade since the adoption of the euro. Hence, most important is that the data I use is able to distinguish between the numbers of goods that are exported to each receiver country.

Using the Swedish data over exporting industries I calculate the extensive and intensive margin of Swedish trade. I only provide information of the trade margins on a one-way- trade flow dimension within country pairs. All the export results are expressed in thousands of Swedish kronor.

6.3 Statistical overview

Before I turn to the econometric part of the paper, I will present some basic facts about Sweden in order to illustrate how the export pattern has changed.

Table 3: Statistical Overview - Every Export Destination and Industries

	1997	1998	1999	2000	2001	2002
Total value of Swedish exports (mkr)	632800	675100	700800	804200	806500	805800
Number of Swedish firms	791385	810337	797340	814733	829250	842358
Number of Swedish exporters	37961	38054	37525	36839	37455	37022
Average value by exporters (mkr)	17	18	19	22	22	22

Table 3 covers important values when analyzing the export pattern. The numbers predict values for Swedish export to every destination country in the world that Sweden exports to. I have value for the total export and number of firms that have decided to export. This flows that I compute the average export value for each firm. I also received information about the

Swedish shipments from a Swedish customs called Trafikanalys. According to their data the value of shipment has increased considerably during the calculated period 1997-2002.^{73,74}

Overall the number of firms that export has decreased, which can be explained by the extreme concentration that is mentioned in table 1. The value of exports has increased which indicates that more products are exported i.e. the trade has increased via the extensive margin. The shipments have also increased which indicates that products are exported to more destinations in other words, increase through the intensive margin. This indicates that the increase of the Swedish export has raised both through the extensive and intensive margin.⁷⁵

6.4 Calculation

I first calculate the overall increase in trade in terms of export to the euro area partners, EMU and to countries located in Europe but not adopted the common currency in 1999, EU15. Next I analyze if the trade has increased via the extensive or by the intensive margin by performing a simple difference-in-difference method.

As stated before, past literature does not take zero trade into account. In my difference-in-difference method I need to take the zero trade into account in order to treat a possible estimation biases. To do this I create a dummy variable for export that indicating whether Sweden export the product to the destination country or not. For instance, the dummy takes the value one if Sweden exports a specific product and zero otherwise.⁷⁶

Finally I create dummy variables for each margin in order to capture the changes in export via the trade margins and then I take the difference between them. I also control for the robustness of the method that I use by divide the total result for every destination country that is analyzed by divide the result in two parts, one for the EMU and one for the EU15 in order to capture the real effect of the euro on Swedish export.

7. Result

7.1 Empirical results

⁷³http://www.trafa.se/PageDocuments/Rapport_2012_8_Godsfloeden_i_Sverige.pdf

⁷⁴http://trafa.se/PageDocuments/ss_ban2000.pdf

⁷⁵Berthou, A. and Fontagné, L. (2008) The Euro and the Intensive and Extensive margins of Trade: Evidence from French Firm Level Data. CEPII, Working Paper No 2008-06

⁷⁶Felbermayr, G. and Kohler, W. (2010) Modelling the Extensive Margin of World Trade: New Evidence in GATT and WTO Membership. *The world Economy* (2010)

I first calculated the overall increase of Swedish export for both destinations groups and then for the treatment group, EMU and also for the control group, EU15. The results are presented in table 4.

Table 4: Total Increase of Swedish Export

	Total	EMU	EU15
Increase in trade (1997-2002)	6,40%	59,20%	40,80%

The total value of export between 1997-2002 has increased by 160000 thousand Swedish kronor. This change represents an increase of 6,4 % whereof 59 % is represented by an increase of export to the EMU countries and the remaining increase is represented by the export to EU15 (40,8 %).

Sweden has average increased their export to EMU, with 94400 thousand Swedish kronor. This can be explained to some extent due to the adoption of the Euro. As the Euro was implemented the integration between the participating countries increased and also the integration between non-Euro area members increased, which can be seen as a source to the increasing export.

7.2 Main results

In the next step I focus on the change of Swedish export by determine the trade margins, intensive and extensive. In order to do so I measured three different sources (1) new products that are exported in only period 2 to the mentioned destination countries, (2) existing products that are exported in both periods to the mentioned destination countries and finally (3) products that no longer on the market in period 2 (2000-2002). The last decomposition is included in order to take zero trade into account.

Table 5, 7 and 9 covers the changes of the three decompositions stated above for the whole calculated period and for each destination sample. Table 6, 8 and 10 present the net diversification for the whole sample and also for each destination groups. The first column in the table for the decomposition indicates that new products are introduced to the market and shows a positive effect of the euro on the extensive margin of Swedish exports. In other words, the first column represents the trade creation effect related to EMU. There are due products that are retired, i.e. they are exported in the first period but not in the second period. The values of the retired products are presented in column two. These products indicate that member countries have shifted their export away from Swedish industries towards member

countries, trade diversion. The trade diversion effect needs to be withdrawn from the value of the new products (trade creation) in order to calculate a correct value of the extensive margin. The last column represents the change of export for existing products that are annual exported in both periods, i.e. the intensive margin.

Table 6, 8 and 10 represent the value of the extensive margin when the value of the retired products is withdrawn from the value of new products that are introduced. This value is called the net diversification. The intensive margin and the total increase of Swedish export are also presented in order to conclude if the trade has increased mostly by the extensive or the intensive margin.

Table 5 represents the changes in each of the three sources covering the whole sample of destination. From the table I can conclude that the trade creation effect has a larger impact on Swedish export compared to the diversion effect. This leads to that even if some products are retired, the overall welfare for Swedish industries that exports has increased.

Table 5: Decomposition of changes for Swedish Exports (thousands of Swedish kronor)

Partner	New products	Retired products	Annual exported products
Austria	1275193	-157585	1718628
Belgium and Luxemburg	0	23900000	0
Denmark	7434656	-240795	12100000
Germany	61300000	44400000	13400000
Finland	3432530	-620818	19500000
France	4045609	-552158	18000000
Great Britain	8047328	-879807	9728672
Ireland	475881	-507453	-84801
Italy	2912768	-794797	16200000
Netherlands	6316015	-904136	-1109434
Norway	5054229	-337055	30300000
Portugal	824541	-289582	1002391
Switzerland	904705	-229550	-2111258
Spain	2479641	-677498	6675098
Total	104503096	74491234	125319296

Table 6 presents the total net diversification of the extensive margin and the intensive margin for both EMU and EU15. From table 6 I can conclude that the average rise in the Swedish export has increased via the intensive margin. The value of the increasing export in existing products, in other words the intensive margin, for the whole sample is 80,6 %. On the extensive margin the increased export counts for 19,4 %. This indicates that for the whole

sample the increase of the export is mainly via the intensive margin, i.e. the export has changed due to an increase of trade in existing product between Sweden, EMU and EU15.

Table 6: Net diversification

Diversification total	Swedish Kronor	Percent
New Products	104503096	
Retired Products	-74491234	
Net Diversification	30011862	
Net extensive margin	30011862	19,40%
Net intensive margin	125319296	80,60%
Total increase	155331158	100,00%

Table 7 represents the value of the three sources when EU15 is dropped from the whole sample. The table shows that the values of new products that are introduced exceed the value of exported existing products, when the retired products are not withdrawn. This result can also be seen for the whole sample in table 5. From this I can also conclude that the trade creation exceeds the trade diversion effects related to Swedish export towards EMU.

Table 7: Decomposition of changes for Swedish Exports to EMU (thousands of Swedish kronor)

Partner	New products	Retired products	Annual exported products
Austria	1275193	-157585	1718628
Belgium and Luxemburg	0	-23900000	0
Germany	61300000	-44400000	13400000
Finland	3432530	-620818	19500000
France	4045609	-552158	18000000
Ireland	475881	-507453	-84801
Italy	2912768	-794797	16200000
Netherlands	6316015	-904136	-1109434
Portugal	824541	-289582	1002391
Spain	2479641	-677498	6675098
Total	83062178	-72804027	75301882

In table 8 I have calculated the extensive and intensive margin in the same way as in Table 6 but only for the countries that have adopted the Euro. Again, the increase of export to the EMU is mainly via the intensive margin and only a part is through the extensive margin. The positive effect of the Euro on Swedish export on the intensive margin covers 88 %, while the extensive margin only represent 12 % of the increase in export. As one can conclude, the dropping of the control groups has a big impact on the extensive margin in this case.

Table 8: Net diversification for countries participating in EMU

Diversification EMU	Swedish Kronor	Percent
New Products	83062178	
Retired Products	-72804027	
Net Diversification	10258151	
Net extensive margin	10258151	12,00%
Net intensive margin	75301882	88,00%
Total increase	85560033	100,00%

Finally, I calculated the same numbers for the control group, EU15. Table 9 shows the decomposition for the products exported to EU15. The extensive margin, before subtracting the products that are out from the market in the second period, does not change in the same extent as for the change in the value of annual exported products. As concluded for the other calculations, the existing products are traded more than the new products, which indicates that also in this calculation the intensive margin, is more affected by the adoption of the Euro.

Table 9: Decomposition of changes for Swedish Exports to EU (thousands of Swedish kronor)

Partner	New products	Retired products	Annual exported products
Denmark	7434656	-240795	12100000
Great Britain	8047328	-879807	9728672
Norway	5054229	-337055	30300000
Switzerland	904705	-229550	-2111258
Total	21440918	-1687207	50017414

Table 10 shows the net trade flow via the extensive margin and the intensive margin for EU15. Similar to the other calculations of the net diversification, the intensive margin is larger impacted then the extensive margin when it comes to export to the EU15 as well. The export increase via the intensive margin by 71,7 % and on the extensive side the export has increased with 28,3 %.

Table 10: Net diversification for countries participating in EU

Diversification EU15		Percent
New Products	21440918	
Retired Products	-1687202	
Net Diversification	19753716	
Net extensive margin	19753716	28,30%
Net intensive margin	50017414	71,70%
Total increase	69771130	100,00%

My results compared to other papers results are quite similar. Bernard et al (2009) and Lucio et al (2011) estimate the changes in export via the extensive and intensive margin for US export respective Spanish trade. They both estimate the changes in the short and the long run. The short run covers the same time period as I calculate. Similar to my results they found that the extensive margin is only affected in a small way and is not as important as the effects of trade in terms of exporting existing goods.^{77,78}

Amadon and Opromolla (2008) also analyze the trade change by determine the trade margins for Portugal's export growth. They also found that the existing products, i.e. intensive margin are the important variable as explaining the trade increase.⁷⁹

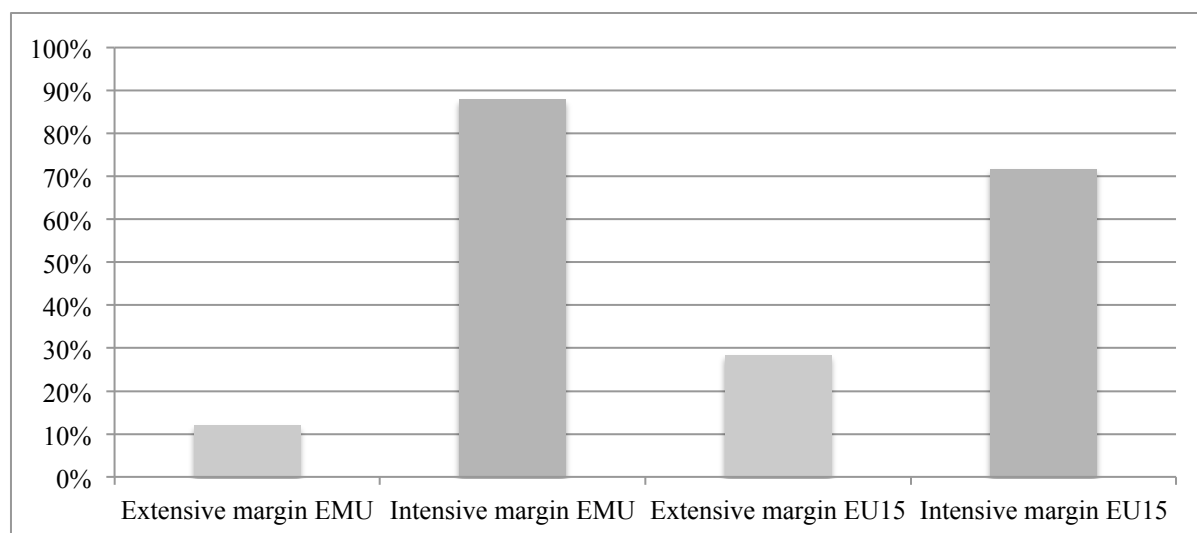
To summarize my results I have presented the trade margins for each group (EMU and EU15) in diagram A. The intensive margin has been affected in a larger extend compared to the extensive margin for each country group. For the case of EMU the intensive margin counts for 88 % of the increased Swedish export, meanwhile the extensive margin present 12 % of the arise in export. For EU15 the Swedish export has raised by 71,7 % via the intensive and 28,3 % via the extensive margin. In fact, this means that the increase of Swedish exports to EMU mainly arise via trade with existing products since the adoption of Euro.

Diagram A: Total change in percent for the calculated destination groups

⁷⁷Lucio, J et al (2011) The extensive and intensive margins of Spanish trade. International Review of Applied Economics. Vol. 25, No 5

⁷⁸http://www.fondazionemasi.it/UploadDocs/356_Bernard__Grazzi__Tomasi.pdf

⁷⁹Lucio, J et al (2011) The extensive and intensive margins of Spanish trade. International Review of Applied Economics. Vol. 25, No 5



8. Conclusion

In this paper I calculate the contribution of the trade margins in order to analyze the impact of the adoption of the Euro on Swedish export. I use product level data over two periods, 1997-1999 and 2000-2002. The data covers 14 countries, where 10 of the countries are a member of EMU. Based on my analysis, I find that the increasing trade in terms of export is mainly explained by the variable of trade in exiting products, i.e. the intensive margin for every destination group. The average value of the extensive margin is not affected in the same extent. Hence, this is only analyzed for a short time horizon, which may have an impact on the results compared to an analysis for a long time dimension. I also find that the average welfare effect is dominated by trade creation, which indicates that the impact from EMU on Swedish industries is generally positive.

Moreover, the first analysis shows that the Swedish export has changed during the calculated time period. I found that the export has increased with over 6% to EMU and remaining European trade partners between 1997-2002. The second calculation that I present shows that there are both a trade creation effect and a diversion effect for both calculated groups. The trade creation is due the dominant effect compared to the diversion effect for both EMU and EU15.

Furthermore, I found that trade in exiting products are the mainly explaining variable for the Swedish export increase. This result could be concluded for the treatment group, EMU where the intensive margin almost represented the whole increase in trade. Also in the case for

Swedish export to the EU15 partners the export increase are mainly explained by the intensive margin.

The reason for that the results for both EMU and EU15 are quite similar can be determined by the policy driven in the area. The reason for this is that different types of policy are used to foster trade. Then it is important to determine the explanatory variables for the increasing trade when determined the policy in the country. The evaluation for EU and EMU are similar when it comes to the period that I analyze. The last policy activity in the European area that was implemented in order to increase economic integration and increase trade was the adoption of the Euro. This can also be the reason that the intensive margin was mainly the explanatory variable for that the export increases.

Overall, I find that the adoption of the Euro has affected the Swedish trade and the impact can be translated into trade margins, intensive and extensive. Hence, the intensive margin has been affected more compared to the extensive margin. The establishment of the EMU also tends to generate a trade creation effect for Swedish exporter in terms of increased welfare even if there are some evidence showings that trade diversion occurs.

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