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Current account imbalances in the European Union

- Can convergence and competitiveness explain the intra-EU current account imbalances

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Abstract

The current account within the EU has been balanced on an aggregate level; nevertheless divergences among the members have increased since the introduction of the common currency. This thesis aims to explain the intra-EU current account imbalances (in the period 1993-2013) through the convergence and competitiveness hypothesis. We distinguish between balances towards the EU and the rest of the world, focusing on the former. In order to capture the dynamics of the imbalances two breaks are considered; one for the introduction of the EMU and another for the financial crisis. Moreover, a subsample estimation between deficit and surplus countries are considered. The results contradicted depending on the estimation method. The Feasible Generalized Least Squares (FGLS) estimator provided evidence of income-convergence in the EU and an extra effect for the EMU countries. Furthermore, it showed that the financial crisis affected the imbalances in the EU countries negatively, however the EMU countries were affected positively. Using the fixed effects estimator, the competitiveness hypothesis was able to explain the current account imbalances in EU, but no evidence for further impact of the EMU countries. For the deficit countries the FGLS found evidence that the financial crisis affected the trade balances negatively, and that the EMU countries trade balances were less affected. Evidence for income-convergence was found but no extra effect for the EMU countries. The contradicting results can be explained by the omitted variables bias and structural changes in the determinants that the financial crisis might have given rise to.

Keywords: *Intra-EU current account imbalances, convergence, competitiveness, EMU, financial crisis*

Table of Contents

1. Introduction 5
2. Theory 9
   2.1 Current account and the European monetary union 9
   2.2 Convergence hypothesis 10
      2.2.1 Convergence in a monetary union 10
   2.3 Competitiveness hypothesis 12
   2.4 The financial crisis and the current account 13
3. Literature review 14
   3.1 Financial integration and current account 14
   3.2 Current account, convergence and competitiveness effects in the EMU 14
4. Methodology 18
   4.1 Empirical methodology 18
   4.2 Variable construction 19
      4.2.1 Current account balance 19
      4.2.2 Convergence variable 21
      4.2.3 Competitiveness variable 22
      4.2.4 Dummy variables 22
      4.2.5 Control variables 23
   4.3 Estimation techniques 23
      4.3.1 Fixed effects model 24
      4.3.2 Feasible Generalized Least Squares 24
   4.4. Data description and collection 25
   4.5 Robustness tests 25
5. Results and discussion 27
   5.1 Descriptive statistics 27
   5.2 Estimation results and discussion – Full sample 28
      5.2.1 Results 28
      5.2.2 Further discussion of the results 32
   5.3 Estimation results and discussion - Surplus and deficit countries 33
      5.3.1 Results 33
      5.3.2 Further discussion of the results 37
   5.3 Robustness tests 38
6. Conclusion 40

7. References 42
8. Appendix 45

1. Introduction

After the Second World War the European Coal and steel Community was founded in order to increase cooperation, interdependence and to prevent another war in Europe. From then on the integration grew deeper and deeper and the European Union (EU) was founded in 1993. During the 1990s the integration in the union intensified rapidly. A great step into further financial integration came in 1999 when the European Monetary Union (EMU) was formed between 11 European countries, with the Euro as a common currency (European Union).

The EU and the EMU have increased the integration among member countries in several ways. One of the main expected effects of a monetary union is increased financial integration among the member countries due to lower transaction costs and removal of customs duty within the union (Schmitz & von Hagen, 2011). Recent literature has shown that the EMU in fact has led to deeper financial market integration and that this in turn has led to more trade and increased capital flows among the countries within the union (Lane, 2008). The increased flows among countries should be seen in the Balance Of Payments statistics (BoP). The largest part of the BoP is represented by the current account (CA). The current account is the difference between a nation's savings and its investment. It can be defined as the sum of exports and import of goods, services, current income and transfers. Hence, the current account balance refers to the net value of the current account. A CA deficit implies a negative net value and a surplus implies a positive net value (Ghosh & Ramakrishnan, 2006).

While the EMU has increased the financial integration the current account imbalances has grown significantly, especially up until the recent financial crisis. Just like on a global level, there have been countries in the euro area with persistent current account surpluses while others has experienced persistent deficits (Gossé & Serranito, 2014). This raises questions about whether the widening of the intra imbalances in the last decade is a consequence of the common currency, i.e. if the monetary union in itself is a driving factor of the imbalances.

This thesis aims to explain the intra-EU imbalances and the widening of the EMU imbalances mainly through two channels. The first one is called the *convergence* hypothesis; it implies that when capital can move more freely it goes from high-income (capital abundant) countries to low-income (capital scarce) countries. Typically since the rate of return on capital is higher

in capital scarce countries. While building up the capital stock the poorer countries make it possible to converge towards the GDP in the richer countries. This induces a current account deficit in the capital scarce countries since investments go up and savings go down (Lane & Pels, 2012). The second channel is through the *competitiveness*; the hypothesis states that changes in the real exchange rate lead to shifts in competitiveness.[1] The income-convergence will lead to wages that exceeds the productivity growth, and thereby an appreciation of the real exchange rate which turns demand from domestic to foreign goods. In the presence of a common currency, changes in the real exchange rate are equivalent to changes in relative prices and unit labor cost. Consequently, an appreciation of the real exchange rate will make low-income countries less competitive since it increases domestic relative prices and unit labor cost more than foreign (Belke & Dreger, 2013). The convergence and competitiveness hypothesis then suggests, in line with the intertemporal approach, that it might not be optimal to have a balanced current account under the adjustment period and that a country can benefit in the long-run from having a non-balanced current account (Gourinchas & Rey, 2007).

The increasing imbalances within the EMU have raised questions about the sustainability of the common currency especially since the financial crisis in 2007, which led to sudden stops of capital flows. Furthermore, as the intertemporal approach suggests; capital scarce countries tend to run current account deficits in the converging period, while rich countries tend to run surpluses. Therefore, it is interesting to investigate if the convergence hypothesis and competitiveness effect differ between current account surplus and deficit countries. This translates into the following research questions:

- *Does the competitiveness and convergence hypothesis explain the intra-European current account imbalances?*
    - *Is the impact different for countries that adopted the euro?*
    - *How did the financial crisis affect the imbalances?*
- *Does the impact of the competitiveness and convergence effect on the current account differ between surplus and deficit countries within the EMU and did the financial crisis affect them differently?*

The empirical work in this thesis can be viewed as an update and extension of Schmitz and von Hagen (2011), who uses a data set consisting of the EU-15 countries over the time period

[1] The competitiveness could also be affected by terms of trade (Gossé & Serranito, 2014). However, this is not investigated further in this thesis.

1982-2005. We extend the empirical analysis by using an up to date panel dataset that contains the 28 EU member states for the period 1993-2013, in order to investigate not only the effect of convergence but also the effect of competitiveness on the current account. The updated panel dataset allow us to incorporate the effect of the countries that joined the EMU later than 1999 and also to account for the financial crisis in 2007. In addition, we consider not only the EMU countries, but also all the European Union member-states. This gives us a large control group, with similar characteristics, from which we hope to be able to analyze how the effect of convergence and competitiveness has changed for countries within the monetary union compared to those who choose to stay outside. Moreover we test the difference in convergence and competitiveness effects between all surplus and deficit countries within the EU and investigate if the effect differs for the EMU countries. Similar approaches have been taken before, however only for a few surplus or a few deficit countries, see Gossé and Serranito (2014). A potential disadvantage with our approach is that the financial crisis might have lead to structural breaks in the data, which might be difficult to capture in the empirical part.

The aim of this thesis is to evaluate the intra imbalances, which makes it important to distinguish between intra-EU and extra-EU current accounts. The trade balances of goods against the EU and against the rest of the world will be used as proxy variables for the current account balances. This distinction of intra and extra current account is something we do differently compared to most other studies on the topic. Using intra-EU trade balance instead of current account against the rest of the world will give us the advantage of actually being able to analyze the current account imbalances within the EU instead of on an aggregate level. Further, since we have a large control group consisting of all the EU-countries that did not adopt the Euro, we believe that using the intra-EU trade balances is more suitable. Schmitz and von Hagen (2011) uses the intra-EMU trade balances, however their control group only consisted of three countries, thereby it is more reasonable to use the intra-EMU trade balances. The disadvantage with using this proxy is that we only know that the correlation between the trade balance and current account is high on a global level, and there is no way of making sure that it is as high within the EU. In the empirical analysis both a fixed effects model and a Feasible Generalized Least Squared (FGLS) model will be used.

The empirical evidence presented in this study shows contradicting results depending on estimation method. The FGLS estimator provided evidence of income-convergence in the EU and an extra effect for the EMU countries. Moreover it showed that the financial crisis

affected the imbalances in the EU countries negatively, however the EMU countries where affected positively. Using the fixed effects estimator, the competitiveness hypothesis was able to explain the current account imbalances in EU, but no evidence for further impact of the EMU. In the subsample estimation no evidence was found for income-convergence, competitiveness or an impact from financial crisis in either of the model specifications for surplus countries. For the deficit countries the FGLS again found evidence that the financial crisis affected the trade balances negatively, and that the EMU countries trade balances were less affected. Evidence for income-convergence was found but no extra effect for the EMU countries.

The remainder of the thesis is organized as follows; in section 2 the theoretical framework is presented. This will be followed by section 3, which describes and discuss recent research on the subject of imbalances in Europe and EMU. In section 4 the methodological approach used in the empirical study is discussed and the chosen models are presented, followed by a description of the data. The empirical results and analysis of the results are presented and discussed in section 5. Finally section 6 then summarizes and concludes.

2. Theory

In this section the theoretical framework that underlies the dynamics of the current account and which motivates the empirical analysis is presented. First it should be stated that the EU increased financial market integration and thereby current account imbalances in Europe. This section will present how the EMU affected the current accounts and deepened financial integration even more. In addition theory about convergence in income and the divergence in competitiveness will be discussed from a monetary union perspective. Finally, some intuition on the financial crisis and how influences the current account will be discussed.

2.1 Current account and the European monetary union

Current account imbalances have grown considerably in Europe and especially within the European monetary union. In order to shed some light on the development of the current account it is important to understand how the economy and the current account should react when introducing a common currency. One of the main expected effects of a common currency is deeper financial market integration since markets become more transparent and transaction costs are reduced. This would imply more trade and capital flows between the member countries (Schmitz & von Hagen, 2011). In addition theory suggests that foreign bond and asset holding should increase between the countries in the euro area, i.e. reducing the home bias, due to the lower transaction cost, removal of uncertainty and relaxation of regulation (Schmitz & von Hagen, 2011). The increase in foreign bonds and assets is based on two arguments. Firstly, a monetary union will increase trade since the currency risk and exchange rate costs are eliminated. Secondly a monetary union also allows a country to import monetary policy- credibility, implying relaxed credit constraints for countries that before the common currency were considered unreliable (Arellano & Heathcote, 2010). Standard international macroeconomic theory predicts that when financial markets becomes more integrated, capital should flow from countries where it is abundant and where the marginal return is low to capital scarce countries where the marginal return on capital are higher (Obstfeld & Rogoff, 1996). In the case of the EMU this should in general imply that capital flows goes from northern (capital rich) to southern and eastern (capital scarce) countries of the monetary union (Gossé & Serranito, 2014).

2.2 Convergence hypothesis

One of the main concepts in explaining the current account imbalances within EMU is the convergence or catching-up hypothesis. According to this hypothesis capital will flow from relatively "richer" countries to relatively "poorer" countries. In this context rich countries are equivalent to capital abundant, while poor countries is equivalent to capital scarce. Capital scarce countries will according to growth theory attract foreign capital due higher marginal rate of return on the capital (Lane & Pels, 2012). Capital inflows helps finance domestic investments, in capital scarce countries, which suggest that investments overshoot savings within the country, implying a current account deficit. However, this is not the only effect of the abroad borrowing on the current account balance. As a consequence of the increased investments the capital-scarce countries will experience higher growth, and higher growth prospects since people will expect higher future output. The higher growth in the borrowing countries will induce income-convergence between the countries (Lane & Pels, 2012). According to international macroeconomic theory and the intertemporal budget constraint the future growth in output will reduce savings today and increase consumption today, due to the prospects of higher permanent income. From the intertemporal budget constraint it can be shown that a higher future output (Y_{t+1} increase) will reduce current savings (C_t increase) in order for the constraint to hold (Obstfeld & Rogoff, 1996).

$$C_t + I_t + \frac{C_{t+1}+I_{t+1}}{1+r} = Y_t - T_t \frac{Y_{t+1}-T_{t+1}}{1+r} \qquad \textit{Intertemporal budget constraint } \textbf{\textit{(Eq. 1)}}^2$$

The conclusion is that investments will overtop savings due to the borrowing. Moreover, savings will be reduced due to future income growth, which will have an additional negative effect on the current account balance. Capital abundant countries will instead run current account surpluses since they in contrast become net lenders (Belke & Dreger, 2013).

2.2.1 Convergence in a monetary union

According to neoclassical growth theory the speed of convergence differs depending on how far away a country's actual output is from its potential output. A country's potential output depends on its total factor productivity, savings and population growth (Giavazzi & Spaventa, 2010). The poorer, catching-up, countries will experience capital inflows due to the expectations of productivity growth, this will lead to income convergence and in the

[2] In equation 1, C_t and C_{t+1} is consumption today and in the next period. I_t and I_{t+1} is investment today and in the next period. Y_t and Y_{t+1} is income today and income in the next period. T_t and T_{t+1} is income taxes today and in the next period. $1 + r$ is the discount factor (Obstfeld & Rogoff, 1996).

meantime a current account deficit. Being in a monetary union is expected to simplify this convergence process due to higher financial integration, reduced uncertainty and lower transaction costs (ibid.). If considering the Euro area it can be shown, using an intertemporal model, that foreign borrowing is optimal for a converging country. Also the optimal level of borrowing is higher the higher the countries expected output growth is relative to the area's average, the lower the difference between domestic and foreign interest rate is, and the higher the elasticity of substitution between foreign and domestic goods are (Blanchard & Giavazzi, 2002). EMU plays an important role in deciding all the above circumstances, EMU has increased the elasticity of substitution between home and foreign goods and decreased the difference between interest rates. As a consequence of this, the lower income countries in the periphery of the union has increased its optimal level of borrowing due to the monetary union, leading to even bigger and more persistent current account deficits (Giavazzi & Spaventa, 2010).

On a global level the correlation is low between high growth prospects and capital inflows. However in Europe it has been suggested that the deficit in for example Portugal and Greece is a part of the economic integration process (Blanchard & Giavazzi, 2002). The EMU reduced borrowing costs and credit constraints, which gave poorer countries easier access to finance domestic investments. Meanwhile the increased goods market integration lead to better conditions for poorer countries to pay back their debt due to higher future export possibilities within the union. The reason to Europe being an exception that actually confirms the theory that net capital flows to poorer countries is because the EMU has a common institutional framework that lowers the frictions among the countries (Lane & Pels, 2012). However not only the low income countries experienced current account deficits, Ireland for example also had deficits. Once again the intertemporal model of the current account is able to predict these patterns. It states that if a country expects to be richer in the future, i.e. higher growth prospects, it will borrow from abroad to increase consumption today no matter of its level of current relative income. Furthermore, higher growth expectations tend to stimulate investments due to higher expected profitability from firms, also implying a worsening of the current account (Lane & Pels, 2012).

In the empirical analysis we therefore expect the convergence hypothesis to be more prominent for the countries that adopted the euro due to the financial integration than for the countries that have not yet adopt the common currency. Furthermore, in the subsample estimation this effect should be stronger for the current account deficit countries within the

EU, since they tend to be capital scarce see (Lane & Pels, 2012). The effect should be even stronger for the countries that have adopted the euro.

2.3 Competitiveness hypothesis

A second concept in the context of explaining the imbalances is the divergence in domestic prices and labor costs due to the common currency, this is also known as the *competitiveness hypothesis*. The expected increased market integration in Europe, both labor and financial, is expected to lead to (as stated before) convergence in income. The convergence will lead to higher wages that exceeds the productivity increase, which in turn will lead to a worsening in competitiveness and difficulties to have a competitive export sector. The expected reduced competitiveness for deficit countries induces a current account deficit due less export (Belke & Dreger, 2013).

The introduction of the monetary union is thereby also expected to lead to current account deterioration via changes in competitiveness. The effect can be seen through an appreciation of the real exchange rate (Belke & Dreger, 2013). The appreciation is expected to shift demand from domestic to foreign goods when countries have the same exchange rate, as in a monetary union. This deviation corresponds to changes in relative prices and unit labor cost. When domestic prices increase more than foreign it implies a reduction in competitiveness. As a consequence of this, imports will increase, while exports decrease since it is relatively more expensive for foreign countries to trade with them, leading to a worsening of the current account (ibid.).

In this theoretical framework a reduction of the competitiveness will lead to a current account worsening, and an improvement of competitiveness leads to an improvement of the current account. Nevertheless this does not have to be true. The Marshall- Lerner condition states that only if the sum of foreign elasticity of demand for exports and domestic elasticity of demand for imports is greater than one, will a depreciation of the exchange rate improve the current account (Pilbeam, 2013). There are normally two effects that have to be taken into account when a currency is devalued. Firstly it is the price effect, this implies that exports turn cheaper measured in foreign currency, while imports will be more expensive in the domestic currency. This effect will unambiguously worsen the domestic current account. The second effect is the volume effect, which states that it becomes cheaper for foreign countries to import from the domestic country, implying that more domestic exports than before. This effect will then improve the current account. Subsequently, it is not that easy to say if a depreciation of the

exchange rate actually improves the current account, it depends on if the price or volume effect is greatest (*ibid.*).

In light of this it is not perfectly clear what should be expected from the empirical analysis, however it is more intuitive that the quantity effect is larger in the EMU since an appreciation is expected to shift demand from domestic to foreign goods when countries have the same exchange rate.

2.4 The financial crisis and the current account

According to the above sections it might be a good thing or even preferable for low-income countries to have current account deficit in the converging period. However, exogenous shocks like the recent financial crisis might impact the convergence hypothesis in a manner that not goes in line with theory. The EMU is expected to decrease the home bias of international investors (Lane, 2008). Meanwhile, an exogenous negative shock such as the financial crisis naturally increases the uncertainty and thereby the home bias (Melisi-Ferretti & Tille 2011).

Even if a country will be able to cover its liabilities with future revenues, from investment that takes place today, the current account deficit might be unsustainable in the long run if the deficit country cannot secure the financing of investments. This is due to the risk of sudden stops and reversals of capital (Ghosh & Ramakrishnan, 2006). However, some countries have been able to run persistent current account deficits without any grave consequences for the economy. In spite of this, the risk of ending up with reversal of capital is present which should encourage countries to avoid persistent deficits if possible. The danger in these reversals is that a country might rely on foreign capital and investors in order to be able to grow. Whenever capital flows starts to reverse, further financing for building up the economy will disappear before the country has grown to its real potential, which is when the deficit should transform to a surplus. A reversal of capital will force the country to run big surpluses on an earlier stage and repay its borrowings. These sudden reversals were a factor during the financial crisis and therefore the financial crisis should lead to smaller imbalances compared to earlier when capital flows peaked between the member countries (ibid.).

3. Literature review

This section provides an overview of the relevant research on the subject. It contains previous research on current account imbalances and current account determinants in the context of the EU and the EMU. The section also will provide some insight about the financial crisis and how it affected the current account imbalances within the EU.

3.1 Financial integration and current account

Extensive research has been devoted to current account imbalances in the world. The main subject of interest has been the deficit in the U.S and the surpluses in emerging Asia. There have been studies trying to identify both the short- and long run determinants of the current account in global context as well as for advanced and emerging countries, see for example Gruber and Kamin (2007) and Gossé and Serranito (2014). However, since the introduction of the EMU and the recent financial crisis, there has been more research made on the imbalances within Europe and the EMU.

This thesis test if the deeper financial market integration due to the EMU has contributed to greater current account imbalances, a greater convergence effect and if it led to divergence in competitiveness between the countries that adopted the euro and those that did not. In order to test these hypotheses it is crucial to see if the EMU actually contributed to deeper financial market integration. Several empirical studies have investigated this by looking at data of financial markets. For quantity data, see for example Lane (2006) and Lane and Milesi-Ferretti (2008), and for price data see Jappelli and Pagano (2008). Regardless, these empirical studies find evidence of deeper financial market integration in the EMU. This indicates larger capital flows among the EMU countries.

3.2 Current account, convergence and competitiveness effects in the EMU

Blanchard and Giavazzi (2002) examine the capital flows in Europe and weather capital actually flows from capital abundant to capital scarce countries. The authors find that capital indeed flows from "richer" to "poorer" countries in Europe. The authors highlights that the EMU has played a major role in the reduction in savings and increase in investments. Further the authors conclude that the main channel through which the EMU affects the current account balances is through savings rather than investments. This result are in line with the

neoclassical growth theory, and thereby makes it interesting to examine if the increased flows towards poorer countries, which have induced a deficit, actually has led to income-convergence.

In a more recent paper Schmitz and von Hagen (2011) extend the analysis by Blanchard and Giavazzi (2002) by investigating the current account imbalances within the euro area. They examine both intra balances and extra balances i.e. trade balances against the euro area and against rest of the world. The authors test if the introduction of the euro increased financial integration and if capital flows follow difference in capital endowment. This is done using annual panel data over the period 1981-2005 for the ten (Luxembourg and Belgium is considered as one country) countries that adopted the euro in 1999 and Greece (2001) versus a control group containing Denmark, Sweden and United Kingdom. The authors finds that capital indeed flows from richer to poorer countries and that the effect for the EMU countries is even stronger than for those that did not adopt the euro. The authors argue that this result also gives support to the convergence hypothesis.

As far as we know, the study by Schmitz and von Hagen (2011) is the only one using trade balances that are only between the considered countries, in order to identify the imbalances among the EMU and EU countries. It is of great importance to be able to distinguish between intra and extra balances in order to be able to see the effect of EMU. This thesis will also consider the intra and extra balance even though we find it more appropriate to use the trade balance against EU rather than the EMU as proxy for the current account.

Further, Lane and Pels (2012) argue that the current account imbalances that increased significantly before the financial crisis is one of the keys to understand the European crisis. They examine the imbalances in Europe between 1995-2007, as in this thesis all the EU countries are considered in order to analyze the different effect for the EMU versus non-EMU countries. The analysis uses the concepts of convergence and growth expectations in order to identify the sources of the imbalances among the European countries. The results give support to the convergence hypothesis before the financial crisis. In addition, it is found that growth forecast played an independent role in this. Higher growth prospects will lead to larger deficits for optimistic countries, in line with the international macroeconomic theory. Lane and Pels (2012) also find that the link between growth forecasts and imbalances grew between 2002-2007. Due to the fact, that greater optimism about the future reduced savings and increased investments.

The topic of the current account imbalances and its determinants are further investigated by Belke and Dreger (2013). They use a dataset with eleven euro area countries that covers the period 1982-2011 and applying paneleconometric methods in line with this thesis. However, a cointegration analysis is used instead. Their main purpose is to study if catching-up effects can explain the increased imbalances. The main conclusion is that catching-up, or convergence, cannot explain the imbalances in the EMU. Instead they show that competitiveness effects and relative government debt are more relevant when explaining the imbalances, especially in the deficit countries. This further justified the purpose of this thesis since we build our empirical section on the same theoretical framework. Also this paper covers a period post the financial crisis. Since the financial crisis is expected to have a great impact on the results, our results should then be more in line with this paper (for the EMU countries), compared to papers that did not consider the financial crisis. However this thesis contributes with a larger dataset that distinguish between intra and extra balances and uses a large control group in order to actually compare the effect of EMU to countries with the same initial conditions.

In a recent paper Gosse and Serranito (2014) uses a dataset from 1974- 2009 for 21 OECD countries to examine the determinants of the current account balances. In the short run the competitiveness effect, seem to be one of the main drivers, while in the long other variables are better at explaining the current account imbalances. The authors also focus on the situation in the EMU, concluding that the speed of convergence seem to be much faster in deficit countries than surplus countries. In particular the convergence mechanism has not been present at all for the northern European countries since 2003. Furthermore, since the adoption of the euro the current account for some of the more capital endowed countries within the union (Finland, Austria, Netherlands, Germany) has diverged substantially from their structural levels. Meanwhile the PIIGS (Portugal, Ireland, Italy, Greece, Spain) have current account balances more aligned with their long run targets. In line with the convergence and competitiveness theory, which are both relevant in this thesis, they find that the speed of convergence is higher in the relatively poorer countries and that the exchange rate i.e. competitiveness is an important determinant for the current accounts. Also interesting is that there results suggest an absence of convergence in the surplus countries, however it is noticeable in deficit countries within the EMU.

Belke and Dreger (2013) and Gosse and Serranito (2014) find evidence that suggest that an appreciation of the real exchange rate has a negative effect on the current account, implying

worsening of the competitiveness. Therefore this is what is expected also in this paper. Boyd et al. (2001) however explicitly look at the demand elasticity of export and import, i.e. the effect of an exchange rate appreciation on the trade balances, for eight OECD countries in 1975-1994. Their findings was in line with the Marshall-Lerner proposal ambiguous in the short run, nevertheless in the long run they found evidence for the competitiveness theory, i.e. an appreciation lead to a decrease in competitiveness.

In another study Milesi-Ferretti and Tille (2011) examines the impact of the financial crisis on the capital flows. They find that the increase in capital flows that took place up until the crisis came to a sudden halt and reversed when the financial crisis hit, leading to increased home bias. Furthermore they find that countries more dependent on external finance and higher pre-crisis growth rates were more affected by the reversals. These findings are indeed interesting for this paper since the EMU lead to more financial market integration and thereby more dependence on external finance. Subsequently it can be assumed that the financial crisis had a great impact on the intra- EU trade balances.

In this thesis we further analyze the effects of EMU and the recent financial crisis on the current account imbalances among the considered countries. We contribute to existing literature with a larger data set which allows us to study the effects of EMU for a longer period including the financial crisis. Furthermore, Following Schmitz and Hagen (2011) this thesis distinguishes between intra and extra balances in order to see how the convergence and competitiveness hypothesis is adequate for the intra-EU imbalances.

4. Methodology

In this section we will present the empirical methodology in the thesis along with the models that will be used. We will also discuss the construction of the variables included in the empirical analysis. Further we discuss gains and potential weaknesses with the econometric approach. Finally we will provide a description of the data.

4.1 Empirical methodology

In order to investigate how the convergence and competitiveness effect influence the current account in the European Union and the European Monetary Union a panel data set was constructed. Compared to cross-sectional or time series data, panel data have the advantage that, even if the sample size are the same the estimators in panel data are most often more accurate, i.e. more efficient estimates (Verbeek, 2012).

The main purpose with the econometric analysis is to test if the hypothesis of convergence and competitiveness can explain the current account imbalances in the European union and if the EMU countries were affected differently than the rest of the EU. Finally, we want to investigate what impact the recent financial crisis had on the imbalances in EU as a whole and EMU. Following previous empirical studies, see for example Lane and Pels (2012), we estimate a model that can be expressed in the following general form:

$$CA_{it} = \alpha_i + \gamma_t + \beta_1 Relative\ income_{it} + \beta_2 REER_{it} + \sum \beta_j Control\ variables + \varepsilon_{it} \quad \textbf{(Model 1)}$$

The subscripts *i* and *t* denote country and time. The dependent variable is the current account balance (proxied by the intra-EU trade balance of goods) as a share of nominal GDP; a negative value indicates a current account deficit and positive value a surplus. α_i is the individual country-specific intercept, it catches the unobserved heterogeneity between countries. γ_t denotes the time-specific effects which are constant for all countries. $\beta_1$and β_2 is the coefficients for the relative income (proxy for convergence) and Real effective Exchange Rate (REER) (proxy for competitiveness). β_j is the coefficients for the included control variables. The control variables are; *Fiscal balance, Net Foreign Assets, Economic growth, demographic factors old and Young, Oil balance and interest rate.* Finally, ε_{it} is the error term.

Model *1* is the baseline of the econometric analysis. However, in order to evaluate how the introduction of EMU and how the financial crisis affected the current account, dummy variables and interaction variables was constructed. Consequently the empirical analysis will be based on the following estimated models:

$$CA_{it} = \alpha_i + \gamma_t + \beta_1 Relative\ income_{it} + \beta_2 REER_{it} + \beta_3 EMU_{it} + \beta_4 Relative\ income_{it} * EMU_{it} + \sum \beta_j Control\ variables_{it} + \varepsilon_{it}$$ **(Model 2)**

$$CA_{it} = \alpha_i + \gamma_t + \beta_1 Relative\ income_{it} + \beta_2 REER_{it} + \beta_3 EMU_{it} + \beta_4 REER_{it} * EMU_{it} + \sum \beta_j Conrol\ variables_{it} + \varepsilon_{it}$$ **(Model 3)**

$$CA_{it} = \alpha_i + \gamma_t + \beta_1 Relative\ income_{it} + \beta_2 REER_{it} + \beta_3 EMU_{it} + \beta_4 CRISIS_{it} + \beta_5 CRISIS_{it} * EMU_{it} + \sum \beta_j Contol\ variables_{it} + \varepsilon_{it}$$ **(Model 4)**

In *Model 2* it can be seen that two additional variables are included. The first one ($\beta_3 EMU_{it}$) tests whether the countries that joined the EMU experienced greater imbalances than countries that did not i.e. if the EMU in it self is a driving factor of the imbalances. The second one ($\beta_4 Relative\ income_{it} * EMU_{it}$) tests if countries that joined the EMU experienced a different pace in convergence than countries that did not. The EMU dummy variable takes the value one for the year that each of the country adopted the euro and for all following years. *Model 3* instead tests if the competitiveness effect is different for the countries that adopted the euro. Finally, *Model 4* includes a financial crisis dummy-variable that takes the value one for 2007 and onwards for all included countries. The coefficient β_4 should be interpreted as the impact the financial crisis had on the current account balances. The second additional parameter, β_5, should be interpreted as the extra impact the countries that are in the EMU experienced from the financial crisis.

In order to be able to test and analyze our second research question that is, if the competitiveness and convergence effect was different depending on whether they had a current account (Intra-EU trade balance) deficit or surplus, a subsample estimation was performed.

4.2 Variable construction

4.2.1 Current account balance

In the introduction we mentioned that the current account will be proxied with the trade balance of goods. Ideally, data on the current account for each country against the European

Union and against the rest of the world should be used in order to examine the effect of EMU on the current account imbalances within EU. Such data dividing the current accounts against different areas are not available. Instead, we follow the method used by Schmitz and von Hagen (2011) with some modifications. IMF's Direction of Trade Statistics (DOTS) provides data on trade balances of goods for each country against the EMU, EU and the rest of the world. Due to data unavailability trade balances are calculated as exports minus imports of goods and then divided by nominal GDP. Using this as a proxy variable for the current account balances raises questions about how good of a proxy it is. In order to be able to use this we calculate the correlation between the trade balance for each country against the rest of the world and the current account balance to the rest of the world. The current account balances was provided by IMF's international Financial Statistics. The individual country correlation and the overall correlation are presented in *table 1*.

The overall correlation is *0,5461* and for the individual countries the correlation is high and over 0,6 for all countries except for Croatia, Ireland, Luxembourg, Malta and Sweden. For Ireland, Luxembourg and Malta the lack of correlation is not that surprising since they have large service sectors which makes the correlation rather weak. For Croatia and Sweden there is no intuitive explanation. The conclusion from this is that the trade balances seem to serve as a good proxy variable for most countries in the sample. Due to the weak correlation it is decided to drop the five countries above from the sample. The overall correlation for the sample that contains the remaining 23 countries is 0,782. We therefore conclude that the trade balance is suitable to use as a proxy variable for the current account balance. This allows us to distinguish between intra-EU balances and extra-EU balances.

Table 1.

Country	Correlation	Observations
Austria	0,7667	21
Belgium	0,8966	12
Bulgaria	0,8918	21
Croatia	**0,3399**	**19**
Cyprus	0,6363	21
Czech Republic	0,9679	21
Denmark	0,9376	21
Estonia	0,8918	19
Finland	0,9497	21
France	0,9855	21
Germany	0,8831	21
Greece	0,6264	20
Hungary	0,9116	21
Ireland	**0,5333**	**21**
Italy	0,9431	21
Latvia	0,9833	21
Lithuania	0,8577	21
Luxembourg	**0,1452**	**17**
Malta	**-0,0361**	**21**
Netherlands	0,8224	21
Poland	0,8589	21
Portugal	0,7948	21
Romania	0,9499	21
Slovak Republic	0,8738	20
Slovenia	0,7724	19
Spain	0,9847	21
Sweden	**0,2867**	**21**
United Kingdom	0,7226	21
Overall 28 countries	0,5461	567
Overall 23 countries	0,782	468

4.2.2 Convergence variable

As mentioned earlier, capital should flow from countries that are more endowed with capital (richer) to countries that are less endowed with capital (poorer) as a consequence of the EMU. This will increase the current account imbalances. As stated in the theoretical section, the EU should lead to deeper integration and free flows of goods, people and capital. The EMU should intensify this flows due to the common currency that reduce uncertainty, transaction costs and credit constraints. Higher capital inflows is suggested leading to higher CA deficits today, however improving growth prospects and thereby the prospects of convergence in income. In order to capture the income-convergence effect we use relative

income, this is measured as real GDP per capita as a ratio of the EU-area average. This goes in line with Lane and Pels (2012), also suggested by Gruber and Kamin (2007). An increase in relative per capita income is expected to have a positive impact on the current account, i.e. convergence in income should increase the current account. The interaction between relative income and the dummy variable "EMU" is expected to have an even stronger positive impact.

4.2.3 Competitiveness variable

The competitiveness is usually proxied by either the real effective exchange rate, or the terms of trade, between countries in order to compare relative prices, see Gossé and Serranito (2014). In this thesis the real effective exchange rate (REER) is used. The implication of changes in the exchange rate is ambiguous and depends on whether the price or quantity effect is greatest. If the quantity effect is greater an appreciation of the exchange rate then implies a worsening of the current account (decreased competitiveness), while a depreciation of the exchange rate should imply an improvement of the current account (increased competitiveness). If the price effect is greater the opposite is true. As mentioned earlier the quantity effect tends to be greater (implying a negative sign) in the long run, however in the short run the effect is unclear. The sign on the interaction between the dummy "EMU" and REER are therefore uncertain. However, in accordance with previous empirical studies, see Gossé and Serranito (2014), we expect a negative sign.

4.2.4 Dummy variables

In order to test the hypothesis of catching-up and competitiveness in the EMU a dummy variable "EMU" is included. This dummy variable equals one from the year each country became a part of the monetary union. For example "EMU" equals one from 1999 for France and for Greece from 2002, see Appendix table A.6 for a complete list for when each country became a member of the EMU. This dummy is also included to see if the EMU in itself is a driving factor for determining the current account balances. Furthermore, another dummy is also created for the financial crisis in 2007, "CRISIS", that equals one for all included countries from 2007. This variable will show how the financial crisis affected the current account balances and the interaction of the two dummies "EMU" and "CRISIS" will show if the current account balances of the EMU countries were affected differently.

4.2.5 Control variables

In addition to the main variables *Fiscal balance, Net Foreign Assets, Economic growth, demographic factors old and Young, Oil balance and interest rate* are included as control variables. In the existing literature there are a lot different variables used in order to explain the current account. The chosen variables in this thesis are a trade-off between the most relevant for the EU case and the mostly used determinants that affect savings and investment behavior in the empirical literature.

Fiscal balance is expected to have positive impact on the current account (Schmitz & von Hagen, 2011). The stock of *Net Foreign Assets (NFA)* is expected to have a positive impact on the current account. The life-cycle hypothesis states that *demographic factors* affect aggregate savings. A higher share of the dependent (the sum of elderly and youth) population in the total population of a country should decrease national savings. A country with a relatively young or relatively older population is then expected to have a current account deficit. The effect of *Economic growth* is ambiguous since it depends on if the effect is temporary or permanent and the preferences to smooth consumption. Furthermore, higher growth due to increasing productivity will increase investment that will worsen the current account (Moral-Benito & Roehn, 2014) . Although most empirical studies finds a negative relationship i.e. higher economic growth leads to current account deficit. The *oil balance* is expected to have a positive sign (Gruber & Kamin, 2007). Finally, Standard international macroeconomic theory states that countries with higher (lower) *interest rate* will have more (less) capital inflows and have less (more) outflows of capital implying a current account deficit (surplus) (Obstfeld & Rogoff, 1996).

4.3 Estimation techniques

Since an ordinary OLS model does not take heterogeneity among countries into account, other estimation methods are considered, in line with previous research. The estimation technique will follow the empirical methodology in for example Schmitz and von Hagen (2011) and Aristovnik (2006), using fixed effects (FE) and Feasible Generalized Least Squares (FGLS). Using a fixed effects model is the conventional way of estimating country panel datasets. However, a panel dataset with many different characteristics among the countries often suffers from group-wise heteroscedastic, contemporaneously and serially correlated residuals (Aristovnik 2006). This implies that the error term structure is non-spherical and must be taken into account. A suitable way of dealing with this problem is to use FGLS instead,

suggested by Hagen & Schmitz (2011) and Aristovnik (2006). We therefore will use both these estimation methods for our models.

4.3.1 Fixed effects model

A fixed effects model is preferred when there is a correlation between individual unobserved heterogeneity and one or more of the explanatory variables (Verbeek, 2012). A OLS-estimation without fixed effects would indeed lead to omitted variable bias if there is individual heterogeneity in the data which is plausible to assume is a main characteristic for the countries under consideration in the European union. An ordinary OLS-estimation will give both inconsistent and biased estimates (Verbeek, 2012). The fixed effects model is preferred when the purpose is to analyze the impact of variables that vary over time. It can also be shown that the fixed effects estimator is unbiased when explanatory variables and the error term is assumed to be uncorrelated. That is the explanatory variables are strictly exogenous (Verbeek, 2012). The Hausman test for fixed versus random effects also indicated that using fixed effects was preferred (See appendix table A.2). Hence, using the conventional fixed effects estimator for both period and cross section is confirmed by the test and it is an appropriate model since it deals with the endogeneity problem in the panel dataset (Verbeek, 2012). However, the Wooldrige test for autocorrelation and the fixed effects model test for groupwise heteroscedasticty indicated presence of autocorrelation and heteroscedasticty (see appendix table A.3 and A.5) in the data, therefor we apply robust standard errors.

4.3.2 Feasible Generalized Least Squares

Applying robust standard errors is the easy and in general not the best way of accounting for autocorrelation and heteroscedasticity. This is the biggest drawback with the fixed effects model, i.e. not being able to fully account for these problems implying that the assumption that the explanatory variable and error term is uncorrelated might be violated (Verbeek, 2012). There are alternative model specifications to a fixed effects model that accounts for these problems (Aristovnik, 2006). Therefore we extend our analysis by also estimate our panel data models using Generalized Least Squares (GLS). The GLS approach allows the model coefficients to be different across individuals, i.e. letting the error variance to differ across countries in this case. When using the GLS estimator one produces weighted averages of the individual OLS estimates, in which the weights are inversely proportional to their covariance's matrices (Verbeek, 2012). Previous research applying GLS as estimation technique comes to the conclusion that GLS has optimal properties for panel data (Aristovnik,

2006). Disappointingly GLS is to be used when the variance-covariance matrix of errors is known. If not, Feasible Generalized Least Squares (FGLS) should be used. FGLS gives consistent estimate of the covariance of the errors i.e. the unknown matrix is estimated from the sample (Verbeek, 2012).

4.4. Data description and collection

The data used in order to estimate the models is collected for the 28 member-countries of the European Union for the period 1993-2013. The sample period chosen for this study is motivated by the fact that all the countries had become independent in 1993, this allow us to collect data for each country from that year. Moreover, in order to maximize the number of observations after the introduction of the euro and the financial crisis we consider data until 2013, as many of the included variables are not presented yet for 2014. The initial dataset thereby consist of 21 annual time periods for 28 countries which gives us a total number of 588 observations. After excluding five countries, the total number of observations is 483. The variable construction is in line with previous studies, see for example Gruber & Kamin (2007), Lane and Pels (2012), and Moral-Benito and Roehn (2014). Data for the variables are collected from Annual macro-economic database (AMECO), Bank of international Settlements (BIS), IMF Direction of Trade Statistics (DOTS), IMF international Financial Statistics (IFS), Lane and Milesi-Ferretti (database) and World Development Indicators (WDI). Hence, all data series are freely available and a list of measures and sources can be found in Appendix, table A.1. The estimates are based on an unbalanced panel data, since there are some missing observations for a couple of variables and countries due to data unavailability.

For the subsample estimations the criterion used to decide whether a country is considered to be a surplus or a deficit country was whether their intra-EU trade balance of goods on average where above or below zero, throughout the time series (1993-2013). For all countries except for France and United Kingdom this subsampling was rather straight forward since the countries run persistent deficits or surpluses. However, France and UK oscillated between surpluses and deficits and were therefore left out of the subsample estimation.

4.5 Robustness tests

In previous studies the sample period has rarely continued for long after the financial crisis. It is likely that the impact of the financial crisis in itself has such a great explanation power to the current account imbalances, as well as to changes in the explanatory variables that the

results from these estimations become insignificant. Due to this additional estimations are performed for the entire sample and for the subsamples that covers the period until 2006, i.e. when the financial crisis hit the world.

The mainstream papers on the subject use the current account balance to the rest of the world even when investigating the intra European imbalances, to see if the our results is in line with previous research we also estimate the models but with trade balances against the world as the dependent variable.

5. Results and discussion

This section will start of by presenting descriptive statistics of the included variables in the estimations. Thereafter the estimation results are presented; focus will lie on how the current account imbalances are affected by changes in relative income and the real exchange rate, after the introduction of the common currency and the financial crisis. Furthermore two subsample estimations will be presented in order to analyze how these effects differ depending on whether the countries have a current account deficit or surplus. Finally, robustness tests is presented and discussed.

5.1 Descriptive statistics

Table 2 presents summary statistics for all included variables in the estimated regressions.

Table 2.

Variables	obs.	mean	sd	min	max
TB vs EU	475	-2.19	8.07	-25.05	27.92
TB vs world	475	-5.74	9.08	-35.69	9.21
Old dependency	483	22.92	3.63	15.18	32.61
Young dependency	483	25.21	3.77	19.28	38.47
GDP per capita	479	27.12	10.11	7.80	47.31
GDP growth	477	2.36	3.66	-17.95	12.23
Fiscal balance	439	-3.10	3.28	-15.65	6.74
Interest rate	397	2.770	3.20	-12.41	24.52
REER	460	93.86	15.46	42.51	133.8
Relative GDP	479	1	36.2	34.5	164.7
NFA	437	-28.17	34.79	-165.5	61.29
Oil trade balance	443	-2.50	2.23	-14.22	1.82

As presented in *table 2*, the trade balances for the EU countries against the EU countries are almost balances on an aggregate level (mean *-2.188*). The trade balance for the EU countries against the rest of the world is on the other hand more negative on an aggregate level, the mean is *-5.744*. However, there are large differences among the countries in the EU, reflected in the large standard deviations from the mean (for the trade balance against EU *8.069* and against the rest of the world *9.078*). This goes in line with previous studies, which found similar characteristics. Furthermore, relative GDP per capita (relative income) shows large

differences among the countries with a standard deviation of *36,2*. This implies that there are large differences in income-levels across countries. The Real Effective Exchange Rate (REER) also reports considerable deviations from the mean. It should be noted that whether a country is above or below hundred is not of that great importance, what matters is whether their real exchange rate appreciate or depreciate during the sample period. The relatively high standard deviation in REER *15.46* implies that there are large differences in competitiveness among the countries. Finally, among the control variables the NFA shows large standard deviations *34.79*, this is not that surprising, since it is stated that there are great imbalances in the current account and NFA is the accumulation of previous CA balances.

5.2 Estimation results and discussion – Full sample

Turning to the results of our regressions, *table 3* shows the results for Model 2, Model 3 and Model 4 (presented in section 4.1). Column 1-3 reports the estimated regressions based on the FGLS. The result of the fixed effects estimator is presented in column 4-6. It should be stated that the fixed effect estimator is the conventional method, however since the data suffers from autocorrelation and heteroscedasticity the FGLS estimator also is used, in line with previous papers, see for example Schmitz and von Hagen (2011) and Aristovnik (2006).

5.2.1 Results

In column 1, we mainly focus on how the income-convergence can help explaining the intra-EU current account imbalances. We can see that relative income has a positive effect on the trade balances, which also is strongly statistically significant. The effect of an increase in the relative income on the intra-EU trade balances is 0.0558, implying that an increase in relative income affect the trade balances with 0.0558. Further, the dummy variable "EMU" is negative and strongly statistically significant, which implies that joining the EMU had a negative impact on trade balances. This means that EMU in itself is a driving factor of the trade balances within EU. The Interpretation of the EMU-dummy on the imbalances needs to be done carefully. Theory suggests that joining a monetary union leads to more financial integration and more capital flows among the countries. This should lead to a current account worsening for the capital scarce countries; consequently the EMU is a driving factor of the imbalances. However, both surplus and deficit countries have adopted the euro and the effect of EMU on the imbalances thereby depends on if the EMU mostly contains surplus or deficits countries.

Table 3.

Method	(1) FGLS	(2) FGLS	(3) FGLS	(4) FE	(5) FE	(6) FE
Relative income	0.0558***	0.0430***	0.0482***	-0.0453	-0.0179	-0.0244
	(0.0113)	(0.0121)	(0.0126)	(0.0889)	(0.0949)	(0.0941)
REER	0.0133	0.0119	0.0127	0.114***	0.0993**	0.0934**
	(0.0113)	(0.0119)	(0.0110)	(0.0386)	(0.0373)	(0.0352)
EMU	-5.056***	0.577	-0.448	-9.713	3.522	0.835
	(1.935)	(2.911)	(0.327)	(7.243)	(5.878)	(1.311)
Relative income*EMU	0.0358**			0.0857		
	(0.0152)			(0.0599)		
REER*EMU		-0.0103			-0.0312	
		(0.0301)			(0.0656)	
CRISIS			-0.979**			1.062
			(0.405)			(1.976)
EMU*CRISIS			1.090**			-1.068
			(0.491)			(0.845)
NFA	0.00980	0.00595	0.00588	-0.0114	-0.00247	-0.00238
	(0.00614)	(0.00638)	(0.00630)	(0.0185)	(0.0202)	(0.0197)
Oil balance	0.241**	0.326***	0.258**	0.329	0.372	0.339
	(0.114)	(0.124)	(0.121)	(0.329)	(0.383)	(0.359)
Fiscal balance	-0.0248	0.00135	-0.00249	-0.0555	-0.0275	-0.0330
	(0.0330)	(0.0355)	(0.0338)	(0.0986)	(0.104)	(0.0975)
Interest rate	0.175***	0.179***	0.181***	0.370***	0.382***	0.393***
	(0.0396)	(0.0411)	(0.0409)	(0.0939)	(0.0909)	(0.0861)
Economic growth	-0.0610**	-0.0504	-0.0527*	0.0682	0.0700	0.0999
	(0.0291)	(0.0312)	(0.0306)	(0.0884)	(0.0898)	(0.0805)
Old dependency	0.136	-0.138	-0.153	0.0143	0.000542	0.0171
	(0.108)	(0.106)	(0.108)	(0.300)	(0.315)	(0.307)
Young dependency	0.00983	-0.310***	-0.291***	0.0731	0.174	0.187
	(0.118)	(0.0976)	(0.104)	(0.375)	(0.454)	(0.446)
Constant	-12.33***	4.225	3.301	-11.16	-14.84	-14.53
	(4.591)	(3.605)	(3.837)	(19.49)	(21.12)	(20.98)
Observations	311	311	311	327	327	327
R-squared				0.344	0.311	0.316
country FE				Yes	Yes	Yes
Period FE				Yes	Yes	Yes

Note: Estimation result for full sample. In all regressions the trade balance against the EU is the dependent variable. FGLS are accounting for panel heteroskedasticity and autocorrelation of the residuals. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Moreover, the interaction between relative income and the dummy variable "EMU" shows that being a part of the EMU had a 0.0358 extra positive and significant impact of the relative income on the intra–EU trade balances. Consequently, for the countries in the EMU the income-convergence process is quicker than for the countries outside the monetary union. The

quicker income-convergence can be seen from the fact that the interaction term is positive, implying that countries relative income is approaching the euro area average in a quicker pace than the non-EMU members, leading to an improvement of the trade balances. This goes in line with the convergence hypothesis, stating that increased inflows into countries with lower relative income will increase the current account deficits. This result is also in line with previous papers whose result also gives support for the income-convergence as determinant of the increased imbalances in Europe (Lane & Pels, 2012). The REER shows a positive sign implying that an appreciation of the exchange rate improves the current account, consequently the appreciation in this case seem to have lead to an increase in the competitiveness. This implies that the price effect outweighed the quantity effect in this case. However, the variable is not significant and thereby makes the interpretation of the variable unreliable and we cannot conclude that the REER i.e. the competitiveness actually has an impact on the trade balances.

When considering the second column, we mainly want to see how the REER, competitiveness, affected the current account imbalances within the EU and the EMU. Notable is that the coefficient is positive, while the interaction variable between "EMU" and the exchange rate is negative. In theory the coefficient is suggested to be negative in the long run, yet ambiguous in the short run according to the Marshall-Lerner condition, empirically this is also confirmed by Boyd et al. (2001). However, neither the exchange rate nor the interaction term between the exchange rate and the EMU dummy is significant. Thereby we cannot draw the conclusion that REER is a determinant of the intra-EU trade balances. Previous studies have found a significant negative impact of the REER on the current account, see Gossé and Serranito (2014) and Belke and Dreger (2013), our result cannot support these results. However, these studies use panel-cointegration methods, which might explain the difference. Further it can be seen that the relative income variable still is significantly positive, while the EMU dummy now is insignificant.

In the third specification, we mainly want to see how the financial crisis affected the trade balances in the EU and if the effect was different for the EMU countries. The result from this estimation is rather interesting. Firstly, it can be seen that the dummy variable for the financial crisis had a significant negative impact on the current account for the countries in the EU. Secondly it can be observed from the positive sign on the interaction variable between the two dummies for financial crisis and EMU, that the EMU members experienced

a significantly lower current account worsening due to the financial crisis than the rest of EU. It should be noted that the coefficient of the interaction variable is greater than the coefficient for the financial crisis, implying that the crisis had a positive impact on the trade balance for the EMU countries. Theory and previous research predict that the financial crisis should lead to capital reversals and thereby smaller imbalances due the fact that the home bias increased again (Lane, 2008). The reason to this might be that the adoption of the common currency lead to increased flows and thereby more imbalances within the EMU members compared to the rest of EU. The financial crisis and the reversals helped decreasing these imbalances again, whereas for the rest of the EU where capital flows and thereby imbalances had not increased that much, these reversals did not affect in the same extent. Hence, the "positive" effect on the trade balances from the crisis never took place in the EU countries. Furthermore, the EMU member dummy now is negative and almost significant, implying a worsening of the trade balances for EMU members. Relative income still is positive and statistically significant.

In column 4-6 the estimation method is the fixed effects estimator, used in order to control for country specific heterogeneity, and get rid of omitted variables bias. Both country and period fixed effects are used, also all fixed effects estimations has clustered-robust standard errors, this is recommended when using panel data and fixed effects (Verbeek, 2012).

In all of the fixed effects estimations the results are quite similar. It can be observed that the real exchange rate has a significant positive impact on the current account, implying that a decrease in competitiveness improves the current account for the EU countries, which is rather surprising. Nevertheless, in accordance to the Marshall-Lerner condition, the results of a real exchange rate appreciation are ambiguous in the short run (Boyd et. Al, 2001). When interacting the REER with the EMU dummy the coefficient actually shows a negative sign in line with the competitiveness hypothesis and what Gossé and Serranito (2014) and Belke and Dreger (2013) also found for the EMU countries. However the coefficient is insignificant. Slightly surprising is that the variables relative income and EMU not are significant in this fixed effects estimation. However, the interaction variable between relative income and EMU as well as the EMU dummy is not far from being significant at a 10 % level, implying that the countries that adopted the euro might have experienced an improvement of the trade balances from rising relative income, which then would give support for the convergence theory also when using fixed effects. It should be noted that the interpretation of income-convergence

when using the fixed effects estimator is tricky, since it looks at the variation within the countries over time. It should also be noted that the financial crisis in itself had no significant impact on the trade balances for the EU countries. Although the interaction variable between the financial crisis and EMU is almost significant on a 10% level implying that the EMU members might have experienced a negative impact from being in the EMU due to the crisis..

For the control variables, the interest rate is the only variable that is significant throughout all the estimations and has a positive impact on the trade balances, contradicting the expected sign of the variable. In addition, the young dependency variable is significant in the FGLS and has the expected negative sign. Further, the Oil balance has the expected positive sign and is significant in the FGLS.

5.2.2 Further discussion of the results

The results from the FGLS and the fixed effects estimations contradict in many ways. When applying FGLS the convergence hypothesis helped explain the imbalances and we could also conclude that the countries that adopted the Euro had a stronger income-convergence. Though, the empirical results for the FGLS gave no support for the competitiveness hypothesis in the EMU or in the EU. On the other hand the fixed effects model gave no significant results for income-convergence in neither the EU nor the EMU. However, we could conclude that the exchange rate explained the imbalances in EU but there were no significant difference for the EMU i.e. none of the estimation techniques gave support for the competitiveness hypothesis in the EMU. Further, we observed trade balance deterioration in the FGLS estimation for countries that joined the EMU, but not in the fixed effects estimation. Also it was observed in the FGLS estimation that the financial crisis impacted the trade balances negatively in the entire EU, however the countries within the EMU actually experienced a positive effect of the financial crisis on the trade balances.

In general one should be caution when the FGLS shows such different results from fixed effects since the FGLS will not be able to account for omitted variables. Due to this the results might be biased. Especially since the financial crisis might have given rise to even more unobserved heterogeneity. The financial crisis had a great impact on the economies within the EU, there is a great risk that it changed the value of some of the beta parameters in our sample, this structural break might be the reason for the insignificance in our fixed effects estimation. By this we mean that the financial crisis is such an important driver for some of

the explanatory variables that the effect these variables have on the trade balance gets smaller or disappears. In order to test this hypothesis a robustness test was performed, where we subsampled the data and looked at the period 1993-2006 (see further in 5.3). This will give us the opportunity to examine whether the financial crisis changed the impact the variables had on the trade balances.

5.3 Estimation results and discussion - Surplus and deficit countries

In order to extend our analysis and investigate if the convergence and competitiveness effects differ among countries with a surplus or deficit in their trade balance and to see if these effects are stronger for the EMU countries we performed a subsample estimation. The results for the surplus and deficit countries can be seen table 4 and 5. Column 1-3 reports estimation from FGLS estimation and column 4-6 for fixed effects.

This will also give us the opportunity to say if financial crisis actually decreased the imbalances since a positive impact on the trade balance for the deficit countries would imply smaller imbalances, similarly, a negative impact on the trade balances for the surplus countries would imply a narrowing of the imbalances.

5.3.1 Results

As can be seen in the first column of the two tables, relative income tend to be weakly significant throughout all the FGLS estimations. Interesting is that the sign for the coefficient on relative income is positive for deficit countries and negative for surplus countries. For the deficit countries an increase in relative income leads to an improvement of the trade balance, while for surplus countries the opposite is true. This gives support to the theory of income-convergence in the deficit countries. Gossé and Serranito (2014) also found evidence supporting the income-convergence hypothesis for the PIIGS. The sign on the interaction variable is positive for the surplus countries and negative for the deficit countries, implying that the deficit (surplus) countries that joined the EMU experienced an extra negative (positive) impact on the current account from an increase in relative income compared to those that did not join. Convergence theory would predict an opposite sign for the deficit countries, i.e. joining the EMU should have an extra positive impact. Although, the parameter is insignificant in both estimations.

Concerning the REER, competitiveness, it can be observed that it has a positive, but insignificant effect on the trade balances in both subsample estimations. The interaction variable between the EMU dummy and the REER however is negative in line with previous research (Gossé & Serranito, 2014). Though, both coefficients are insignificant.

Table 4.

Method	(1) FGLS	(2) FGLS	(3) FGLS	(4) FE	(5) FE	(6) FE
Relative income	-0.0310*	-0.0227	-0.00898	-0.00960	0.0365	0.0346
	(0.0183)	(0.0249)	(0.0239)	(0.148)	(0.189)	(0.174)
REER	0.0280	0.00627	0.00505	0.176**	0.146	0.136
	(0.0228)	(0.0249)	(0.0197)	(0.0754)	(0.0867)	(0.0797)
EMU	-0.914	2.879	0.767	-8.613	0.101	3.434
	(4.306)	(4.040)	(0.484)	(8.911)	(10.90)	(3.089)
Relative income*EMU	0.0110			0.0983		
	(0.0307)			(0.0921)		
REER*EMU		-0.0220			0.0255	
		(0.0393)			(0.117)	
CRISIS			0.197			0.291
			(0.705)			(3.804)
EMU*CRISIS			0.168			-1.127
			(0.797)			(1.451)
NFA	0.0136*	0.0122*	0.0196**	-0.0280***	-0.0286***	-0.0270**
	(0.00772)	(0.00731)	(0.00764)	(0.00821)	(0.00748)	(0.00858)
Oil trade balance	-0.502**	-0.322	-0.382*	0.312	0.294	0.175
	(0.217)	(0.214)	(0.215)	(0.634)	(0.559)	(0.657)
Fiscal balance	0.0689	0.0463	0.0482	-0.00691	-0.00215	-0.0236
	(0.0564)	(0.0526)	(0.0534)	(0.211)	(0.220)	(0.201)
Interest rate	-0.0430	-0.123	-0.122	0.255	0.281	0.276
	(0.0908)	(0.0801)	(0.0832)	(0.228)	(0.208)	(0.219)
Economic growth	0.00931	0.0104	0.00573	0.200	0.260	0.299
	(0.0454)	(0.0390)	(0.0409)	(0.207)	(0.246)	(0.219)
Old dependency	-0.169	-0.216	-0.309**	-0.0297	0.0606	0.0211
	(0.129)	(0.141)	(0.128)	(0.560)	(0.495)	(0.514)
Young dependency	-0.00843	0.150	0.0167	0.624	0.731	0.802
	(0.160)	(0.196)	(0.187)	(0.945)	(1.220)	(1.179)
Constant	8.318	7.431	10.57	-26.61	-34.62	-34.77
	(6.036)	(7.184)	(7.146)	(41.81)	(51.71)	(50.22)
Observations	139	139	139	139	139	139
R-squared				0.424	0.385	0.389
country FE				Yes	Yes	Yes
Period FE				Yes	Yes	Yes

Note: Estimation result for countries with surplus in the trade balance. In all regressions Trade balance against EU is the dependent variable. FGLS are accounting for panel heteroskedasticity and autocorrelation of the residuals. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table 5.

Method	(1) FGLS	(2) FGLS	(3) FGLS	(4) FE	(5) FE	(6) FE
Relative income	0.0350*	0.0387**	0.0299	-0.0837	-0.0855	-0.110
	(0.0189)	(0.0190)	(0.0207)	(0.136)	(0.135)	(0.173)
REER	0.0242	0.0377	0.0284	0.0338	0.0271	0.00516
	(0.0228)	(0.0235)	(0.0215)	(0.0323)	(0.0299)	(0.0402)
EMU	-0.180	5.957	-0.614	-9.605**	18.59*	-1.653
	(2.673)	(4.503)	(0.428)	(4.314)	(9.416)	(1.379)
Relative income*EMU	-0.00219			0.0663*		
	(0.0236)			(0.0315)		
REER*EMU		-0.0694			-0.215*	
		(0.0487)			(0.105)	
CRISIS			-1.999**			2.092
			(0.799)			(1.848)
EMU*CRISIS			1.567*			-2.287
			(0.850)			(2.014)
NFA	0.0232**	0.0193**	0.0156	-0.0114	-0.00630	-0.00510
	(0.00958)	(0.00985)	(0.00982)	(0.0133)	(0.0159)	(0.0176)
Oil trade balance	0.646***	0.558***	0.502***	0.261	0.245	0.252
	(0.116)	(0.138)	(0.139)	(0.492)	(0.470)	(0.451)
Fiscal balance	-0.0817	-0.0697	-0.0574	-0.410**	-0.425**	-0.435**
	(0.0548)	(0.0512)	(0.0485)	(0.166)	(0.176)	(0.191)
Interest rate	0.269***	0.267***	0.264***	0.218**	0.212**	0.218**
	(0.0420)	(0.0461)	(0.0470)	(0.0870)	(0.0800)	(0.0828)
Economic growth	-0.0610**	-0.0633*	-0.0636*	-0.0288	-0.0222	0.0223
	(0.0255)	(0.0347)	(0.0367)	(0.0990)	(0.0953)	(0.121)
Old dependency	-0.130	-0.169	-0.163	-0.0605	-0.492	-0.0860
	(0.178)	(0.200)	(0.207)	(0.341)	(0.375)	(0.335)
Young dependency	-0.406***	-0.436**	-0.450**	-0.237	-0.0399	-0.158
	(0.151)	(0.179)	(0.186)	(0.466)	(0.436)	(0.472)
Constant	2.280	2.032	3.735	0.936	4.658	3.586
	(6.241)	(7.556)	(8.043)	(23.26)	(23.07)	(24.84)
Observations	154	154	154	154	154	154
R-squared				0.580	0.586	0.584
country FE				Yes	Yes	Yes
Period FE				Yes	Yes	Yes

Notes: Estimation for countries with deficit in trade balance. In all 6 regressions Trade balance against EU is the dependent variable. FGLS are accounting for panel heteroskedasticity and autocorrelation of the residuals. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Further, the EMU dummy shifts from being negative to positive in both subsamples depending on what model specification that is used. In both samples it is negative in column 1 and positive in the other specifications. Theory and previous research (Lane & Pels, 2012)

suggests that it should be negative due to the increased capital flows that comes from the relaxation of regulations, lower transaction cost and lower uncertainty that a monetary union lead to (Schmitz & von Hagen, 2011). Finally it can be seen that the financial crisis had a significant negative impact on the trade balances for the deficit countries, while it was positive and insignificant for the surplus countries. We could therefore not observe that the financial crisis decreased the imbalances, in contrast it actually seem to have increased the imbalances. In both samples the interaction variable between the EMU dummy and the crisis dummy is positive, implying that the EMU countries experienced an extra improvement on the trade balances from the financial crisis, however it was only significant for the deficit countries. This implies that the countries within the EMU actually experienced smaller imbalances due to the financial crisis.

We will now turn to the fixed effects estimations. In line with the whole sample estimation no significant results was found for relative income on the trade balances neither for deficit nor the surplus countries. Both for the deficit and surplus countries the interaction variable between relative income and EMU membership is positive. However it is only significant for the deficit countries. The fact that income-convergence only is significant for the deficit countries was also found by Gossé and Serranito (2014). This could be explained by the fact that deficit countries in the European union tend to be capital scarce and therefore are further away from their potential output and subsequently have higher growth prospects. The convergence hypothesis also predicts quicker income-convergence in capital scarce countries (Lane & Pels, 2012).

When continuing to the impact of the real exchange rate, it can be seen that it has a positive effect both for the deficit and surplus countries, yet only significant for the surplus countries. Again this is in contrast to theory and previous research, a decrease in competitiveness should worsen the current account. The interaction variable between the EMU dummy and the REER is positive for the surplus countries but insignificant, for the deficit countries on the other hand it is negative and significant. Belke and Dreger (2013) also found evidence for a negative sign implying that reduced competitiveness will worsen the trade balances for the EMU countries.

Further, adopting the euro had a significant negative impact on the trade balances for the deficit countries. The same can be said about the surplus countries however the results are insignificant. In accordance with the FGLS estimates the financial crisis has a positive impact

on the trade balances for the surplus countries, in contrast to the FGLS it is now positive as well for the deficit countries. The coefficient for the deficit countries (2.092) is greater than the coefficient for the surplus countries (0.291) this should imply a decrease of the imbalances however none of the variables are significant. Out of the two estimation techniques the fixed effect estimator can be assumed to be more reliable when trying to capture the effect from the financial crisis since it takes omitted variables bias into account. The interaction between the dummies "CRISIS" and "EMU" is in accordance with the FGLS estimates positive, yet insignificant.

5.3.2 Further discussion of the results

In conclusion it can be said that the competitiveness and convergence effect differed between surplus and deficit countries and the financial crisis seem to have affected the countries differently, both within the EMU and the EU. Relative income had a significant positive impact, using FGLS, on the trade balances for the deficit countries but negative impact for the surplus countries. Since the interaction between the EMU dummy and relative income was insignificant nothing can be concluded considering an extra impact from being a member in the EMU in any of the samples. Consequently we could observe income-convergence for deficit countries, but no extra effect for the EMU countries. For the REER variable no significant results was found using FGLS, consequently we could not say that it impacted the trade balances in neither deficit nor surplus countries. Furthermore, no significant results were found from the crisis dummy or the interaction between the EMU dummy and the crisis dummy in the surplus countries. However for the deficit countries the financial crisis had a negative effect, which was lower for the countries that joined the EMU. In the fixed effects estimations no significant results was found for relative income or the interaction between relative income and the EMU dummy in any of the samples. On the other hand positive significant results was found on the REER variable for the surplus countries and a negative significant result was found for the deficit countries that joined the EMU. No significant results were found for any of the samples from the financial crisis.

Again the results from the fixed effect estimation and FGLS is different in many ways, and the financial crisis is likely to be equally responsible here as in the full sample estimations. Therefore also for these estimations a time series that goes from 1993-2006 will be presented in the robustness analysis below.

5.3 Robustness tests

The estimated regressions showed that the FGLS and the fixed effects estimations contradicted for several of the main variables. The large impact of the financial crisis on European economies might explain these contradicting results. The full sample estimation of the models for the period 1993-2006 can be seen in table A.7. From the estimated regressions in table A.7 the FGLS and fixed effects now are more similar. The relative income coefficients are both significant but it is positive for the FGLS estimation and negative for the fixed effects. The interaction term is positive and significant in both, consequently this gives support for an extra convergence effects for the countries within the EMU. From this, we draw the conclusion that the income-convergence are, at least until the financial crisis, able to explain the intra-EU imbalances. The REER are positive but not significant in any of the model specification. The interaction variable is also positive but not significant which still are not in line with what we expected and what previous research has found evidence for. This result actually implies that a loss in competitiveness improves the trade balance even more for the EMU countries. Finally, it should be noted that the EMU dummy is significant and negative using both methods implying that EMU in itself actually was a driving factor, leading to a worsening of the trade balances for its members.

The subsample estimation before the financial crisis (see table A.8 and A.9) are also more robust since FGLS and fixed effects estimation is more in line. For both surplus and deficit countries the income-convergence for the EMU countries is positive and significant. Moreover the REER is insignificant in both samples, regardless the estimation method. The fixed effects estimation now goes in line with what is find when comparing paper that takes the financial crisis into account, competitiveness is more significant, and papers that do not take the financial crisis into account, income-convergence is more significant. Further the EMU-dummy is negative and significant in both samples.

This result confirms the suspicion that the financial crisis gave rise to structural changes in the determinants of the trade balances, and especially for relative income. It also gives validity to our suspicion that the FGLS estimator from our whole sample estimation might suffer from omitted variables bias, i.e. not being able to account for the changes in economic fundamentals the financial crisis gave rise to. This is motivated from the similarities between

the two methods before the financial crisis, and the dissimilarities between them after the crisis.

The results from the pre-crisis estimations is similar to those previous empirical studies on the topic, see Lane (2012) and Schmitz and von Hagen (2011), found, i.e. relative income has a positive impact on the current account, the EMU dummy had a negative impact on the current account, while increases in relative income for the EMU members lead to an extra positive effect on the current account. This implies a convergence in income until the advent of the financial crisis. Furthermore, when taking the entire sample period into account, we find that changes in competitiveness are a more important factor than relative income in explaining the trade balances at least when looking at the fixed effects estimations.

To see if the results are affected by the fact that we use intra-EU trade balance as a proxy for current account, we re-estimated the regressions again using trade balance against the rest of the world instead. Since the correlation between trade balances against the rest of world and current account was satisfactory. The estimated output can be seen in table A.10. As can be observed also when using the trade balances against the rest of the world our results become more robust, i.e. the FGLS and the fixed effects agrees with each other. Relative income is in general positive and significant and the and also a positive extra impact for the EMU countries can be observed using both methods. The REER is positive and significant using both methods, however no extra significant extra impact for the EMU could be observed. The EMU dummy is negative and significant, and a negative effect from the crisis can be observed for the EMU countries.

In table A.10 the most of the included control variables are significant in both estimation methods. Also The FLGS and the fixed effects estimator showed a significant income-convergence for the EMU countries which is aligned with earlier studies. The theory that the intra-EU and especially the EMU imbalances can be explained by the convergence and competitiveness can therefore not be verified throughout our estimations. The lack of evidence for this might be that our proxy variable, trade balance, not reflects the actual intra-EU current account. In addition, the findings in previous studies did not capture the actual intra-EU imbalances when using the current account to the rest of the world. Therefore it might be other factors that in larger extent drive the intra imbalances in the EU.

6. Conclusion

In the discussion of global imbalances the situation in Europe and the euro area has received less attention up until now. The current accounts in Europe have been balanced on an aggregate level; nevertheless divergences among the different members have increased since the introduction of the common currency. The aim with this paper was to empirically investigate the role of the convergence and the competitiveness hypotheses for the intra-EU current account imbalances, if the countries in the EU that adopted the euro were affected differently and what impact the financial crisis had. These theoretical hypotheses give reason to believe that the deeper financial market integration due to the EMU would increase the current account imbalances and that the financial crisis would again narrow the imbalances. This was investigated using data for the 28 (23) countries in the European Union and applying panel econometric methodology using both the FGLS and the fixed effects estimator.

The results from the estimations were inconclusive, and differed depending on the estimation method. The FGLS provided evidence for the income-convergence hypothesis in both EU and an extra effect for the EMU countries. However, no evidence supporting the competitiveness hypothesis in neither EU nor the EMU was found. On the other hand the financial crisis affected the EU countries negatively, for the EMU countries the effect was instead positive. The result for the fixed effects estimations contradicted in many ways. Firstly, no evidence supporting income-convergence was found. Moreover, the competitiveness hypothesis was able to explain the current account imbalances in EU, but no evidence for further impact of the EMU countries. However, in contrast to previous research the sign is positive. The financial crisis could not explain the current account imbalances when using the fixed effects.

The second research question was to see if the competitiveness and convergence effect differed between surplus and deficit countries. The FGLS and fixed effects estimations again contradicted. For the surplus countries we did not find any evidence for income-convergence, competitiveness or an impact from financial crisis in either of the model specifications.

For the deficit countries the FGLS again found evidence that the financial crisis affected the trade balances negatively, and that the EMU countries trade balances were less affected. Evidence for income-convergence was found but no extra effect for the EMU countries. The

fixed effects estimation found no evidence supporting that the financial crisis affected the trade imbalances. However evidence of income-convergence and the competitiveness effect was found for the EMU countries.

The contradicting results from the two estimation methods make the reliability of the results rather weak. Especially it should be noted that FGLS cannot account for omitted variables bias, which the financial crisis might have given rise to. In order to test this hypothesis a robustness test was performed. The result confirms the suspicion that the financial crisis gave rise to structural changes in the determinants of the current account, and especially for relative income. It also gives validity to our suspicion that the FGLS estimator not was able to account for the changes in economic fundamentals the financial crisis gave rise to.

Some suggestions for further research would be to investigate, which the main determinants of the intra-EU imbalances after the financial crisis have been, alternatively finding a more suitable proxy for the intra-EU current accounts. As could be observed in the results in this thesis many of the control variables, as well as main explanatory variables, were significant until the financial crisis. However, they turned insignificant after the crisis, whereas they still were significant when having the trade balance towards the rest of the world as dependent variable even after the crisis. Also deeper investigation into which the main determinants were during the financial crisis and how the prior important determinants parameter estimations changed would be of value.

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8. Appendix

Table A.1

Variable	Description	Source
Trade balance against EU	Trade balance of goods in % of GDP	IMF Direction of Trade Statistics (DOTS)
Trade balance against the ROW	Trade balance of goods in % of GDP	IMF Direction of Trade Statistics (DOTS)
Current account balance	Current account balance in % of GDP	IMF International Financial statistics (IFS)
Relative Income	Real GDP per capita in % of the sample average	World Development Indicators (WDI)
Real effective exchange rate	Exchange rate avrage 2010=100 annual (Real) Bis effective. ;	Bank of International Settlements (BIS)
EMU dummy	Dummy for the countries that adopted euro from the year they adopt	
Crisis dummy	Dummy for the financial crisis	
Net foregin Assets	Net foreign assets in % of GDP	Lane Milesi-Ferretti 2011
Oil balance	Oil trade balancce in % of GDP	IMF World Economic Outlook sept. 2012
Fiscal balance	General budget balance in % of GDP	IMF World Economic Outlook okt. 2014
Interest rate	Real long-term interest rates, deflator GDP	AMECO - Annual Macro-Economic database
Economic growth	Real GDP growth	World Development Indicators (WDI)
Old age dependency	Ratio of population over 65 in total population aged 15-64	World Development Indicators (WDI)
Young age dependency	Ratio of population under 15 in total population aged 15-64	World Development Indicators (WDI)

Note: Variables expressed in % to GDP that are not collected in a ratio of GDP are divided by the Nominal GDP from World development Indicators.

Table A.2

	Chi-squared statistic	Prob.
Hausman test for fixed and random effects	54.09	0.0000

Table A.3

	Chi-squared statistic	Prob.
Heteroskedasticity test for fixed effect model	4219.27	0.0000

Table A.4

	Prob.
Pesaran's test of cross sectional independence	0.2264

Table A.5

	F-statistic	Prob.
Wooldridge test for autocorrelation in panel data	263.167	0.0000

Table A.6

Country	Members of EMU (year adopting Euro)	Intra-EU trade balances
Austria	1999	Deficit
Belgium	1999	Surplus
Bulgaria		Deficit
Croatia		**Not included**
Cyprus	2008	Deficit
Czech Republic		Surplus
Denmark		Surplus
Estonia	2011	Deficit
Finland	1999	Surplus
France	**1999**	**Not included**
Germany	1999	Surplus
Greece	2001	Deficit
Hungary		Surplus
Ireland	**1999**	**Not included**
Italy	1999	Surplus
Latvia	2014	Deficit
Lithuania	2015	Deficit
Luxembourg	**1999**	**Not included**
Malta	**2008**	**Not included**
Netherlands	1999	Surplus
Poland		Deficit
Portugal	1999	Deficit
Romania		Deficit
Slovak Republic	2009	Surplus
Slovenia	2007	Deficit
Spain	1999	Deficit
Sweden		**Not included**
United Kingdom		**Not included**

Source: Data on included countries and when countries have adopted the Euro comes from official website of the European union (European Union).

Table A.7

Method	(1) FGLS	(2) FGLS	(3) FE	(4) FE
Relative income	0.0484***	0.0647***	-0.175**	-0.163**
	(0.00982)	(0.0121)	(0.0769)	(0.0718)
REER	0.00582	0.000303	0.0220	0.0139
	(0.0116)	(0.0118)	(0.0224)	(0.0235)
EMU	-8.981***	-4.438	-12.19*	0.0704
	(2.520)	(3.443)	(6.356)	(4.552)
Relative income*EMU	0.0673***		0.0952*	
	(0.0197)		(0.0521)	
REER*EMU		0.0475		0.00413
		(0.0357)		(0.0511)
NFA	0.0120	0.0211**	-0.0326***	-0.0218***
	(0.00874)	(0.00876)	(0.00653)	(0.00663)
Oil trade balance	0.197	0.0420	0.681*	0.835*
	(0.168)	(0.172)	(0.361)	(0.433)
Fiscal balance	0.00888	-0.00686	-0.173	-0.141
	(0.0523)	(0.0567)	(0.120)	(0.124)
Interest rate	0.0152	0.00771	0.199	0.199
	(0.0724)	(0.0709)	(0.135)	(0.136)
Economic growth	-0.108	-0.0962	0.0963	0.124
	(0.0746)	(0.0705)	(0.126)	(0.134)
Old dependency	-0.211	-0.210	-0.00165	-0.186
	(0.131)	(0.133)	(0.364)	(0.409)
Young dependency	-0.0215	-0.0107	-0.0679	-0.0443
	(0.114)	(0.130)	(0.311)	(0.375)
Constant	-1.172	-2.299	16.13	19.56
	(4.606)	(5.180)	(18.04)	(17.47)
Observations	201	201	214	214
R-squared			0.322	0.265
country FE			Yes	Yes
Period FE			Yes	Yes

Note: Estimation result before the financial crisis, 1993-2006. In all regressions Trade balance against the EU is the dependent variable. FGLS are accounting for panel heteroskedasticity and autocorrelation of the residuals. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table A.8

Method	(1) FGLS	(2) FGLS	(3) FE	(4) FE
Relative income	0.00763	-0.00478	-0.133	-0.133
	(0.0238)	(0.0236)	(0.110)	(0.122)
REER	0.0232	-0.000395	0.0233	0.0348
	(0.0233)	(0.0247)	(0.0560)	(0.0740)
EMU	-28.80***	2.191	-41.56**	-2.104
	(8.825)	(5.060)	(13.10)	(8.420)
Relative income*EMU	0.205***		0.302***	
	(0.0617)		(0.0721)	
REER*EMU		-0.0145		0.0664
		(0.0495)		(0.0816)
NFA	0.00706	0.0150*	-0.0337***	-0.0204**
	(0.00940)	(0.00890)	(0.00917)	(0.00715)
Oil trade balance	-0.762**	-0.508*	-0.105	0.716
	(0.315)	(0.302)	(1.013)	(1.139)
Fiscal balance	-0.131*	-0.0855	-0.0891	-0.230
	(0.0787)	(0.0703)	(0.193)	(0.156)
Interest rate	-0.199*	-0.205*	-0.124	-0.172
	(0.118)	(0.119)	(0.274)	(0.223)
Economic growth	0.152	0.0942	0.144	0.450
	(0.122)	(0.108)	(0.335)	(0.276)
Old dependency	0.535**	0.258	-0.0141	-0.965
	(0.212)	(0.170)	(1.035)	(1.181)
Young dependency	0.775***	0.421***	0.137	0.155
	(0.162)	(0.162)	(0.574)	(0.780)
Constant	-32.03***	-12.71*	15.00	34.19
	(8.464)	(7.707)	(40.57)	(45.44)
Observations	94	94	94	94
R-squared			0.438	0.307
country FE			Yes	Yes
Period FE			Yes	Yes

Note: Estimation result before the financial crisis, 1993-2006, for countries with surplus in the trade balance. In all regressions the trade balance against the EU is the dependent variable. FGLS are accounting for panel heteroskedasticity and autocorrelation of the residuals. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table A.9

Method	(1) FGLS	(2) FGLS	(3) FE	(4) FE
Relative income	-0.00614	0.0124	-0.430*	-0.361
	(0.0198)	(0.0191)	(0.237)	(0.251)
REER	0.0261	0.0351	0.00614	-0.00129
	(0.0307)	(0.0337)	(0.0186)	(0.0226)
EMU	-9.223**	7.588	-8.608	8.551
	(4.048)	(6.964)	(6.366)	(8.421)
Relative income*EMU	0.0769**		0.0666	
	(0.0362)		(0.0577)	
REER*EMU		-0.0870		-0.103
		(0.0735)		(0.0914)
NFA	-0.0178	-0.0132	-0.0687**	-0.0618*
	(0.0156)	(0.0170)	(0.0294)	(0.0309)
Oil trade balance	1.403***	1.490***	0.266	0.329
	(0.242)	(0.257)	(0.390)	(0.386)
Fiscal balance	0.0327	0.130	-0.675*	-0.729**
	(0.135)	(0.133)	(0.337)	(0.308)
Interest rate	0.586***	0.617***	-0.116	-0.0784
	(0.128)	(0.137)	(0.332)	(0.354)
Economic growth	-0.182	-0.106	0.268	0.279
	(0.123)	(0.123)	(0.222)	(0.241)
Old dependency	-0.209	-0.316	-0.0456	-0.690
	(0.235)	(0.248)	(0.651)	(0.685)
Young dependency	-0.997***	-1.052***	-0.982	-0.694
	(0.227)	(0.236)	(0.648)	(0.721)
Constant	22.89**	24.23**	53.79	52.68
	(10.01)	(10.67)	(39.35)	(42.44)
Observations	94	94	95	95
R-squared			0.597	0.589
country FE			Yes	Yes
Period FE			Yes	Yes

Note: Estimation result before the financial crisis, 1993-2006, for countries with deficit in the trade balance. In all regressions the trade balance against the EU is the dependent variable. FGLS are accounting for panel heteroskedasticity and autocorrelation of the residuals. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table A.10

Method	(1) FGLS	(2) FGLS	(3) FGLS	(4) FE	(5) FE	(6) FE
Relative income	0.140***	0.118***	0.126***	-0.00884	0.0327	0.00760
	(0.0122)	(0.0128)	(0.0129)	(0.0636)	(0.0680)	(0.0671)
REER	0.0296**	0.0206	0.0262**	0.121***	0.0983***	0.0908***
	(0.0128)	(0.0132)	(0.0125)	(0.0314)	(0.0317)	(0.0222)
EMU	-4.676**	-3.842	-0.304	-14.61***	-2.263	-0.424
	(2.146)	(3.510)	(0.376)	(3.612)	(6.125)	(1.102)
Relative income*EMU	0.0353**			0.112***		
	(0.0165)			(0.0272)		
REER*EMU		0.0383			0.00825	
		(0.0362)			(0.0680)	
CRISIS			-0.0605			-2.748
			(0.477)			(2.506)
EMU*CRISIS			0.489			-2.505**
			(0.568)			(1.020)
NFA	0.0137*	0.0191**	0.0139*	-0.0180	-0.00664	-0.00598
	(0.00737)	(0.00744)	(0.00739)	(0.0209)	(0.0229)	(0.0209)
Oil trade balance	0.819***	1.005***	0.948***	0.947**	1.031**	0.907**
	(0.133)	(0.140)	(0.136)	(0.416)	(0.486)	(0.434)
Fiscal balance	-0.0111	0.0102	-0.00112	0.153	0.191	0.174
	(0.0388)	(0.0399)	(0.0384)	(0.108)	(0.114)	(0.110)
Interest rate	0.242***	0.235***	0.270***	0.310***	0.325***	0.350***
	(0.0459)	(0.0453)	(0.0458)	(0.0914)	(0.0852)	(0.0874)
Economic growth	-0.151***	-0.136***	-0.135***	-0.324**	-0.322**	-0.250*
	(0.0334)	(0.0338)	(0.0328)	(0.118)	(0.121)	(0.131)
Old dependency	-0.127	-0.0194	-0.280**	0.433	0.429	0.445
	(0.128)	(0.120)	(0.130)	(0.333)	(0.376)	(0.372)
Young dependency	-0.471***	-0.622***	-0.683***	-0.739**	-0.631*	-0.561*
	(0.146)	(0.128)	(0.130)	(0.269)	(0.315)	(0.287)
Constant	-6.443	-1.651	4.507	-3.011	-7.741	-7.127
	(5.699)	(5.021)	(4.908)	(12.95)	(15.45)	(14.78)
Observations	311	311	311	327	327	327
R-squared				0.555	0.511	0.533
country FE				Yes	Yes	Yes
Period FE				Yes	Yes	Yes

Note: Estimation result for whole sample. In all regressions the trade balance against the rest of the world is the dependent variable. FGLS are accounting for panel heteroskedasticity and autocorrelation of the residuals. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1