Current Account Imbalances and Financial Integration in the Euro Area

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Abstract

While the current account of euro area as a whole has remained almost balanced in the past two decades, several member countries have sizeable deficits or surpluses. In this paper, we interpret these imbalances as indicators of net capital flows among the euro-area countries and show that these net flows follow differences in per-capita incomes. Our results show that the elasticity with respect to per-capita incomes of net capital flows between euro-area countries and the euro area has increased. This is not the case for net capital flows between non-euro area countries and the euro area, nor for euro-area countries and the rest of the world. We interpret this as evidence for increasing financial integration in the euro area. There is also some evidence suggesting that the introduction of the euro has lead to some financial diversion.

Key words: financial integration, current account imbalances, European Monetary Union

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1. Introduction

The observation of rising and persistent global imbalances has been the focus of lively debate among policymakers and academic economists in recent years. Most of that debate has concentrated on the large U.S. current account deficit and its main counterpart, the large current account surpluses of countries in Asia. Europe has not attracted much attention in this debate, most likely because European countries and the European Union as a whole have a long tradition of keeping their current accounts relatively close to balance (see Ahearne and von Hagen, 2005). Nevertheless, current account developments in Europe deserve attention, since current account imbalances within the EU and, in particular, among the countries participating in European Monetary Union (EMU) have grown considerably in recent years and are similar in size relative to GDP as those of the US or China. A natural question to ask is whether these imbalances can be explained by fundamental economic factors or whether they might point to a potential non-sustainability of the common currency.

EMU itself may, in fact, be one of these fundamental factors. One of the most important benefits to be expected from monetary union is deeper financial market integration, as markets become more transparent and transactions costs are diminished. Recent empirical studies have indeed found evidence suggesting that financial market integration has increased due to the introduction of the common currency. Lane (2008) provides a survey of recent studies of financial market integration in Europe. That financial integration has increased can be inferred from both price and quantity data in financial markets. Regarding price data, correlations in bond returns are very high in the euro area and, until recently, spreads across government bond yields have narrowed.[1] Asset prices in the euro area increasingly conform to the law of one price, as they should in integrated markets; see e.g. Jappelli and Pagano (2008), Pagano and von Thadden (2004) and Laopodis (2008) for bond markets and Lane and Walti (2007), Davis et al. (2005) and Kim et al. (2004) for stock markets.

Regarding quantity data, the introduction of the euro has led to a significant increase in cross-border asset holdings. Lane (2006) finds that, controlling for other relevant influences, bilateral bond holding in the euro area are almost twice the size of bilateral holdings among other countries. Lane and Milesi-Ferretti (2007) document a similar effect of EMU on cross-border equity holdings. Lane and Milesi-Ferretti (2008) document that, with the creation of

[1] The recent widening of those spreads during the financial crisis that began in 2008 can be attributed to markets pricing differences in sovereign bond risk and is, therefore, not a contradiction to the proposition of increased market integration. Schuknecht et al. (2009) and Bernoth et al. (2004) show that investors were asking for differentiated risk premiums on sovereign bonds in the euro area even before the crisis.

the euro, cross-border asset and liability positions increased faster in Europe than in the rest of the world. Based on a gravity model of international asset holdings, Pels (2008) finds a significant euro effect in bilateral asset positions. Berkel (2006) finds a similar result for German gross portfolio flows in a panel covering 47 countries from 1987 to 2002. Spiegel (2004) shows that Portugal and Greece significantly increased their borrowing from euro-area countries while reducing their borrowing from non-euro area countries, an observation which leads to the question whether the introduction of the common currency might have induced financial diversion similar to the possibility of trade diversion in the creation of a free trade area.

Hale and Spiegel (2008) pursue this issue further. Based on micro-level data for private bonds issued in 22 countries, they find that the increase in euro-denominated issues operated predominantly along the extensive rather than the intensive margin, i.e., it represents predominantly new market participants in euro-denominated bond market rather than rising volumes of market participants that were active in the European market before EMU. Spiegel (2008) shows that cross-border commercial bank claims among euro-area countries increased significantly relative to non-euro area countries and that this effect results predominantly from deeper financial integration. In sum, EMU has reduced the home bias that was previously found in national financial portfolios in the euro area (Lane, 2008).

Increased financial market integration in the euro area naturally leads to larger capital flows among the member countries, and this should be reflected in their statistical counterparts, i.e., current account balances. In this paper, we exploit a new data set to pursue that argument. Since current-account data of individual countries vis-à-vis the euro area and the rest of the world do not exist, we use the corresponding trade balances of the EU-15 countries vis-à-vis the euro area and the rest of the world as proxies.[2] By examining the current account balances of the EMU and non-EMU member countries and distinguishing between their current accounts vis-à-vis the euro area and vis-à-vis the rest of the world, we can see what difference the introduction of the common currency has made.

The observation of larger cross-border asset flows per-se does not say anything about whether or not these flows are driven by economic fundamentals. This is the second question we address in this paper. Standard international macro economics predict that capital should flow from countries where it is abundant and has low marginal rates of return to countries

[2] The EU-15 consists of the 15 members of the EU at the time when the European Monetary Union was launched, i.e., Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Sweden, and the UK. Of these, Greece joined the EMU in 2001, and Denmark, Sweden, and the UK remain outside.

where it is scarce and has high marginal rates of return. There is now ample empirical research showing that this is not the typical pattern one observes in capital flows between developed countries with sophisticated financial systems and developing countries and emerging market countries with less developed financial systems.[3] Recent papers have sought to explain this observation based on portfolio considerations and differences in the severity of agency costs, capital market imperfections, and regulatory regimes.[4] For the countries of the EU, where the levels of financial development are comparable and regulatory differences are attenuated by a common regulatory framework, it is still interesting to test this hypothesis. This is what we do in this paper.

Our empirical analysis has three main results. First, capital flows in Europe indeed follow differences in capital endowments of the European economies. Second, this tendency has become stronger for the countries belonging to the euro area, but not for those outside. We interpret this as showing that the introduction of the euro has deepened financial market integration in Europe, a finding which is consistent with evidence from asset price data. This indicates that financial markets have become more efficient in allocating capital across Europe. In sum, our paper adds to the evidence in favour of financial market integration in Europe.

The remainder of this paper is organized in 3 sections. In section 2, we present some stylised facts on current account balances in the euro area. In Section 3, we present econometric evidence for the determinants of capital flows in Europe. We close with a few concluding remarks in section 4.

2. Current Account Developments Under EMU

2.1. Global Balances

Figure 1 shows the current account balances for the euro area as a whole and for individual EU countries in selected years since 1985. It shows that, for the euro area as a whole, current account balances were typically small over these two decades, 1995 being a noticeable exception. In other words, net financial flows into and out of what is now the euro area have traditionally been small and continue to be small. Behind this aggregate balance, however, there are sizable current account imbalances. Germany, for example, had a surplus of 4¼ percent of GDP in 2006. Finland, Sweden, and the Netherlands have run even larger

[3] Lucas (1990) points out that, in reality, relatively little capital seems to flow from capital rich to capital poor countries. See Lane and Milesi-Ferretti (2006) and Prasad et al. (2006, 2007) for empirical documentations of capital flows between developed and developing countries and emerging market economies.

[4] For explanations based on portfolio considerations see Caballero et al (2008), Mendoza et al. (2007), Devereux and Sutherland (2007); for explanations based on capital market imperfections, see Ju and Wei (2007) and von Hagen and Zhang (2008)

surpluses relative to GDP in the past six years. In contrast, Portugal's current account deficit was nearly 10 percent of GDP in 2006, while deficits in Greece and Spain exceeded 8 percent of GDP. All three countries have had sizeable deficits since the start of EMU.[5]

Figure 2 shows the evolution of individual countries' current account balances from the mid-1990s to 2006. Three groups of countries emerge whose current account balances are very persistent. A first group, consisting of Luxembourg, Finland, the Netherlands, and Germany, consistently ran sizable surpluses since the start of EMU. Germany registered small current account deficits averaging about one percent of GDP in the aftermath of German unification, but the German balance swung into surplus in 2002 and has widened steadily since then. Recent years have also seen a marked increase in the current account surplus in the Netherlands, while Finland's surplus has returned to roughly its level at the beginning of EMU, after widening to nearly 10 percent in 2001.

A second group, consisting of Austria, Belgium, France, and Italy, exhibited medium to large current account imbalances in the mid-1990s but converged to more moderate positions since then. Belgium experienced persistent surpluses between three and four percent of GDP, while Italy had persistent deficits ranging between one and two percent of GDP. Finally, a third group of countries, consisting of Greece, Ireland, Portugal, and Spain, have consistently run sizable current account deficits in the past five years, and their deficits have widened significantly under EMU and during the period in the run-up to EMU, after having had current account positions close to balance around the mid-1990s. Recent years have seen an especially sharp decline in Spain's current account balance from roughly 3½ percent of GDP in 2003 to an estimated 8¼ percent of GDP in 2006. Current account deficits of the magnitudes seen in Greece, Portugal, and Spain in recent years are unprecedented among euro area countries, with the exception of Ireland in the mid-1980s and Portugal in the 1970s (European Commission, 2006). They are also large compared with other non-euro-area advanced economies. As a result, net external liabilities have soared to nearly 80 percent of GDP in Greece, 60 percent in Portugal, and 40 percent in Spain.

2.2 Balances Against the Euro Area and the Rest of the World

To examine the effects of EMU on the member countries' current accounts, one would ideally look at their current accounts vis-à-vis the euro area and vis-à-vis the rest of the world separately. However, such data are not published neither by the national nor by the EU statistical offices. In view of this, we use intra-euro area and extra-euro area trade balances

[5] See Blanchard and Giavazzi (2002) for a discussion of Greece and Portugal in this regard.

calculated from the IMF's Direction of Trade Statistics as proxies for the current accounts. More specifically, we use annual data on exports and imports of goods from the IMF's Directions of Trade Statistics over the period 1981-2005 to construct trade balances between each EU-15 country and the euro area and each EU-15 country and the rest of the world. We do not include exports and imports of services because of lack of reliable data. We measure trade balances relative to national GDP. Our sample covers the EU-15 countries and we aggregate Belgium and Luxembourg because, as the two were a monetary union in the past, separate data do not exist. Data for all other variables are taken from the European Commission's AMECO data base.

Since we use trade balances as proxies for current account balances, a natural question is, how large is the correlation between the two? To answer this question, we estimate the correlation between a country's annual trade balance and its current account balance, both relative to GDP, using data from the IMF's International Financial Statistics. The correlation coefficients are above 0.90 for all EU-15 countries except the UK and Ireland. For the UK the correlation is 0.75, which is still large, while for Ireland it is less than 0.50. This may be due to the fact that, for these two countries, the balance on factor incomes is much more important than for the rest of the sample, and movements in that balance distort the correlation between the balance on the current account and the balance on the trade account. For the UK, the most likely reason is the importance of the London financial market in the global financial system, while for Ireland it is the role of foreign-owned companies.

Figure 3 plots the dispersion across countries of five different types of trade balances over time, each defined as the unweighted cross-section standard deviation. The dispersion in trade balances against the euro area has been trending upwards since the mid-1980s, with a period of decline in the immediate run-up to the EMU in 1995-1997. Relative to the rest of the world, the dispersion of trade balances began to increase much later, i.e., after the breakdown of the European Monetary System in 1992. The observation of widening differences among the total trade balances of EU member states from the mid-1980s to the early 2000s matches the evidence in Blanchard (2006), who looks at the total current account of each country with the rest of the world and shows that the dispersion also increases among OECD countries. Figure 3 shows that the dispersion of trade balances with the euro area is consistently larger than the dispersion of trade balances with the rest of the world, and that the former has risen faster than the latter since the mid-1980s. Separating euro and non-euro countries from the EU-15 group makes no significant difference.

Figure 4 shows the behavior of the (unweighted) average of trade balances over the past 25 years. It indicates that the average EU country moved from a small deficit against the euro area in the 1980s to a small surplus in the 1990s and 2000s regardless of whether or not it is a member of the euro area. The average trade balance with regard to the rest of the world was exposed to larger swings in the 1980s, but remained in a range of zero to minus one afterwards.

Table 1 shows the correlation coefficients between the intra- and the extra- euro area trade balances for our sample countries. Six euro area countries have significantly positive correlations; only for the Netherlands and Portugal the correlations are significantly negative. Overall, there is no clear pattern to be detected. Table 2 reports the results of bi-variate causality tests between intra- and extra-euro area trade balances. Generally, dynamic correlations between the two are small and insignificant.

To further study the relationship between the trade balances against the euro area and against the rest of the world, we counted the number of years in which a country's trade balance against the euro-area had the same or the opposite sign compared to its trade balance against the rest of the world. Greece had the same sign on both balances in all 25 years, Portugal in 23 years and Spain in 21 years. In contrast, Germany and the Netherlands had opposite signs on the two balances in all 25 years. Thus, countries running deficits against their euro area partners consistently in past years tended to borrow from those and from the rest of the world. In contrast, Germany and the Netherlands tended to borrow from the rest of the world and lend to other EU countries, thus positioning themselves as financial intermediaries in Europe.

3. Determinants of Capital Flows in Europe

3.1. Capital Flows and Per-Capita Incomes

Are the capital flows behind the trade imbalances observed in the previous section driven by economic fundamentals? This is obviously an important criterion to judge their sustainability. Standard international macroeconomics holds that, in integrated international financial markets, capital should flow from capital-rich to capital-poor countries. In this section, we test to what extent this may be true in Europe and what the effect of EMU has been in this regard. Since capital endowments are not readily observable, we use per-capita GDP as a proxy. This is based on the assumption that, among the EU countries, higher levels of income reflect higher productivity which, in turn, is due to larger capital endowments. Below, we also use estimated capital stocks per worker as an alternative. In order to test our

hypothesis, we run regressions to examine the relationship between trade balances and per-capita incomes controlling for a variety of other factors. The dependent variable in our regressions is the ratio of the trade balance to GDP. Corresponding to the different measures of the trade balance for the sample countries discussed above we consider two variations of the dependent variable: the trade balance against the euro area (intra balance) and the trade balance against the rest of the world (extra balance).

The main explanatory variable is real per-capita GDP. We also include three dummy variables. "Dummy EMU" equals one after the start of EMU in 1999, if the country belongs to EMU, otherwise it is zero.[6] "Dummy Non-EMU" equals one after the start of EMU, if the country did not adopt the euro, otherwise it is zero. Finally, we introduce a dummy variable "DKSEUK" for the countries that do not participate in EMU, Denmark, Sweden, and the UK. DKSEUK equals one for these three countries throughout the entire sample period, and zero for all other countries. It allows us to see whether there are any special characteristics of these countries even before the start of EMU. We interact the main explanatory variable with these dummies to see whether the introduction of the euro changed the determinants of net capital flows for EMU members.[7]

We also use the general government balance as a ratio of GDP and the real price of oil in US dollars as control variables. The former is motivated by the effect public sector deficits may have on the current account in conventional macro models. The latter is introduced because the EU countries, except the UK, are dependent on oil imports. We also used measures of the real exchange rate and real per-capita GDP in the EU as control variables, but these did not appear to be significant and the results are not reported here to economize on space. All data except those of the trade balances are taken from the European Commission's AMECO data base. Finally, we add time dummies to the regressions in order to account for the influence of other macroeconomic variables on the trade balance of the euro area countries, which are, however, not explicitly included.

The results for the individual balances with the euro area are presented in tables 3A and 3B. We report six specifications for each of the dependent variables. We have tested the residuals from preliminary estimates for heteroskedasticity, contemporaneous cross-sectional correlation and serial correlation and the results suggest using an estimator with appropriate corrections. For the first two regressions, we use a feasible general least squares estimator (FGLS) accounting for panel heteroskedasticity, cross-sectional contemporaneous correlation,

[6] Among the countries in our sample, only Greece adopted the euro later than 1999 , namely in 2001.
[7] We also included a dummy variable for the German re-unification, but this turned out to be not statistically significant.

and first-order common autocorrelation of the residuals. In columns three and four, we use the Prais-Winston-OLS estimator with panel corrected standard errors following the suggestion of Beck and Katz (1995) that the full FGLS variance-covariance estimates are overly optimistic when used with a panel size between 10 and 40 time periods. These estimators also allow for heteroskedasticity, cross-correlation and serial correlation of the residuals. Columns five and six report estimates using country fixed-effects with clustering on the panel variable.[8]

Consider table 3A, column 1. We find that trade surpluses within the euro area are a positive function of per-capita income and that this relationship is strongly statistically significant.[9] Generally, countries with larger per-capita GDPs have larger intra-EMU trade balances. Before the start of the EMU, the effect of rising GDP per-capita on a country's intra-euro area trade balance is 0.33. The effect is significantly weaker for the group of countries that did not join the euro area in 1999. In fact, the sum of the coefficients on per-capita GDP and the same variable interacted with the dummy for non-euro area countries (DKSEUK) is not significantly different from zero, indicating that capital flows between non-euro area and euro-area countries were not determined by different levels of income before 1999. There is thus a difference between the EU-15 countries that formed the monetary union and those that did not. If we take the extent to which net capital flows follow differences in per-capita GDP as an indicator of capital market integration, this difference suggests that the degree of capital market integration among the countries that formed the monetary union was larger than between these and the countries that stayed outside.

With the beginning of EMU, the positive effect of per-capita GDP becomes notably and significantly stronger for the euro-area countries, but it does not so for the non-euro area countries. Thus, net capital flows respond more strongly to differences in per-capita GDP within the monetary union than they did before and they continue to do so with non-members.

Fiscal balances have a significantly positive effect on the intra-euro area trade balance. A rise in the fiscal balance by one percent of GDP raises the trade balance with respect to the euro area countries by 0.04 percent of GDP. The inclusion of time dummies increases that effect to 0.08 percent of GDP. Since the government balance might be considered endogenous relative to the trade balance, e.g. because governments might pursue a current account target for fiscal policy, we also estimated models using two lags of the government balance and two

[8] This produces an estimator of the variance covariance matrix that is robust to cross-sectional heteroskedasticty and within-panel serial correlation.

[9] De Santis and Lührmann (2006) and Chinn and Prasad (2003) find that relative per-capita income has a positive effect on the current account balance in a large panel of countries running from 1970 to 2003. They also employ squared relative income as a regressor. Following their papers, we used squared per-capita income as an additional regressor in the models for the intra- and extra-euro area trade balances but did not find a significant effect.

lags of the total trade balance as instruments for the current government balance. In both cases, the government balance retains a positive coefficient but its marginal significance level stays below 10 percent. The results suggest that fiscal balances do not contribute much to the existing trade account imbalances in the euro area. Even for Portugal, where it reached -5.4 percent of GDP in 2005, the fiscal balance explains at most half a percent of a total trade deficit of almost 12,5 percent.

The real price of oil has a significant, negative impact on the intra-euro area trade balances when time dummies are included. Most importantly from our perspective, adding fiscal balances and real oil prices as controls does not change the main results regarding the effects of per-capita GDP on the intra-EMU trade balances.[10]

The remaining specifications show that these results are robust. The inclusion of time dummies increases the effect of per-capita GDP to 0.42 and the effect of the introduction of the euro to 0.25 for euro area members. Using the Prais-Winsten estimator with panel-corrected standard errors indeed results in larger estimated standard errors, but almost all coefficients remain significant at the 1% level. Only the coefficient for the fiscal balance is no longer significantly different from zero. Finally, the results remain robust to using country-fixed effects.

Next, consider table 3B, column 1, where the dependent variable is the trade balance with regard to the rest of the world excluding the euro area. Again, we find that trade surpluses are significantly and positively linked to real GDP per capita. The effect is of the same order of magnitude as in the case of intra-euro area trade balances. For the three countries that did not join the euro area, the sum of the coefficients on per-capita GDP and the same variable interacted with the dummy for non-euro area countries (DKSEUK) is not significantly different from zero, indicating that there has not been an impact of per-capita-GDP on extra-euro area trade balances before 1999.

Regarding extra-euro area trade balances, the result that the interaction term with the EMU dummy is not significantly different from zero signals that the impact of per-capita GDP did not change for the euro-area countries with the introduction of the euro. This reinforces the suggestion that the introduction of the euro has changed net trade flows within the euro area alone. The results are different, however, for the non-EMU countries. For these countries, the total effect of GDP per capita is significantly positive after the introduction of the euro. The results remain stable across other estimation methods and specifications.

[10] We also find that average EU GDP per capita has a negative effect on the trade balance, which is consistent with what one would expect from theory (e.g., Chinn and Prasad, 2003). However, the effect is not statistically significant and we drop this variable.

The fiscal balance has a positive and significant coefficient in half of these regressions and the real oil price has a significantly negative effect on the trade balance. The latter effect, however, is only significant in four out of six cases.

These results suggest that EMU has affected the responsiveness of capital flows within the euro area. Capital flows within the euro area are now more in line with what neoclassical growth theory predicts. If we interpret this fact as a sign of increasing financial integration, as other distortions no longer stand in the way of international capital flows according to capital endowments, the results show that the introduction of the common currency has increased financial market integration among the participating countries. This is consistent with the price and quantity indicators of financial integration mentioned above.

Capital flows from high per-capita GDP to low per-capita GDP countries can be expected to promote economic convergence among the euro area countries. From this perspective, our results indicate that the international allocation of capital is becoming more efficient in the euro area and that the observed current account imbalances indicate that the monetary union works well. Note, however, that monetary integration, not unlike trade integration, also seems to have had an effect on financial market integration between the non-euro area countries in the EU and the rest of the world, which seems to have increased since 1999. We do not find a similar effect between the euro-area countries and the rest of the world. This effect resembles the well-known *trade diversion* effect of trade integration, and may imply a possible worsening of the allocation of capital between the euro area and the rest of the world.[11]

3.2. Robustness Tests: Relative Per-Capita GDP

The validity of our results could be affected by the fact that per-capita GDP follows a trend over time. In view of this, our first robustness test uses relative instead of absolute per-capita GDP as the main explanatory variable. We normalize the income variable with respect to the relevant country group. For the regressions with intra-EMU trade balances as dependent variable, we choose the average real per-capita GDP of the euro area. For the regressions explaining the extra-EMU trade balances, we consider the average real per-capita GDP of the OECD countries, since the dominant share of capital flows goes to industrialized countries.[12] The results are reported in table 4, columns 1-4. We rerun the basic regressions for intra

[11] Spiegel (2004) speaks of financial diversion in this context.
[12] The OECD average per-capita GDP comes from the OECD National Accounts database.

balance and extra balance with the FGLS estimator and the Prais-Winsten estimator. The estimation results show that our findings from above are still valid.

On closer inspection of the relative income variables, Ireland could be a special case, since it is the only country that started with a below-average income in 1981 and ended with an above-average income in 2005. We run an additional set of regressions leaving out the data for Ireland to make sure that this special case does not solely drive our results. The results are reported in table 4, columns 5-8. We find that leaving out Ireland does not change the picture.

3.3. Robustness Tests: Capital Stocks

As we have said above, neoclassical growth theory predicts that capital should flow from rich countries to poor countries. Poor countries have lower levels of capital per worker—in part, that explains why they are poor. So far we have used per-capita GDP as a measure for the "richness" of a country and not the level of capital. In the following regressions we investigate whether our results still hold when we use the log of the real per-capita capital stock as the main explanatory variable. The respective data series is again taken from the AMECO database. Since we interpret the trade balance, our dependent variable, as capital flows, we have the additional problem of potential endogeneity between the capital stock and the trade balance. With all else remaining equal, higher capital inflows should lead to a higher capital stock. We therefore complement our regressions by an IV approach, using the fifth lag of the capital stock as the instrument. We implement this approach with two different procedures. First, we perform two-stage least-squares regressions pooling the observations and therefore cannot make explicit use of the time variation in the data, but can account for serial correlation and heteroskedasticity in the residuals. Second, we use a two-stage least–squares random-effects estimator by Balestra and Varadharajan-Kristhakumar (1987) with incorporates the panel dimension of the data but does not provide for the special characteristics of the residuals.

In table 5 we find very similar results in comparison to the regressions which use per-capita-GDP as a main regressor. Consider for instance table 5, columns 1-3. The intra-euro area trade balance depends positively on the capital stock. For Denmark, Sweden, and the UK the sum of the capital stock coefficient and the interaction term is not significantly different from zero, suggesting that the capital stock has not determined the intra-euro area trade balances of the EMU outsiders before 1999. For EMU members, however, the effect is even amplified with the introduction of the euro. Also, the control variables have the expected sign. These results also hold when the instrumental variable estimation approach is used, although

standard errors are larger. In the case of the panel IV regression, this leads to a non-significant coefficient for the interaction variable between the capital stock and the dummy for Denmark, Sweden, and the UK.

For extra-euro area balances the picture is less clear-cut. Table 5, column 4, tells us that they depend positively on the capital stock. The group of non-EMU countries shows a lower coefficient on average. There is no change in the relationship between the extra-euro area trade balance and the capital stock with the beginning of the EMU. Column 5 presents the results of the pooled IV regression. Here, the average positive effect of the capital stock on the extra-euro area balance is no longer significant, but the non-EMU countries show a positive influence of the capital stock on the extra balance which increases with the introduction of the euro. This indicates that financial market integration with the rest of the world has deepened for this group with the start of the EMU. The panel IV estimates instead show that there is a positive average effect of the capital stock on extra-euro area balances for all EU countries, but this effect is reinforced for Denmark, Sweden, and the UK after the start of EMU.

3.4. Time versus Group Effects

So far, we have found that the income effect on the trade balances differs between the groups of EMU and non-EMU member countries and changes with the introduction of the euro. We now ask, what is the relative importance of these effects are and how important the introduction of the euro is for the continuous process of financial integration in the EU.

To shed more light on this issue, we do three things with respect to the intra balance regressions. First, we introduce an additional interaction term into the regressions consisting of per-capita GDP multiplied by a euro membership dummy to extract the group effect of EMU membership. We also include an interaction term between per-capita GDP and the start of the EMU to find out the potential average increase in financial integration for all EU-15 countries. Now we can distinguish between a general per-capita GDP effect on the intra-euro area trade balance, an income effect for EMU members only, an income effect related to the start of the EMU for all EU-15 countries and an income effect only for EMU members after the start of the EMU.

Second, we run a regression allowing for a time-varying per-capita GDP coefficient and show the behavior of the coefficient over time.

Third, we test for parameter instability from 1999 onwards, using the end-of-sample stability test proposed by Andrews (2003).

The regression results in table 6, column 1, show that the income effects on the intra-euro area trade balance depend strongly on the group the country belongs to. The average income effect with a coefficient of 0.09 is relatively small. Being one of the designated euro area members increases the income effect by 0.33. The start of the EMU increases the income effect on the intrabalance for all EU 15 countries by 0.09, while the euro area members face an additional increase of 0.10. So the membership effect is very important, but there is an extra boost in financial integration because of the introduction of the common currency, which is larger for the EMU members than for the outsiders. Figure 7 shows the time-varying income coefficient estimates for the EU-15 countries, accompanied by two-standard errors bands. The income coefficient steadily increases over time reflecting the intensifying financial integration in the European Union. The level of integration however appears to differ strongly between the mid 90s and the period after the introduction of the common currency. This evidence supports the notion that the start of the EMU has been an important step forward for financial market integration in the euro area. This finding is further backed by the results of the test of parameter stability, which detects a structural break in 1999 with a significance level of 99%.

For the extra-euro area trade balances we present comparable estimates in table 6, column 2, and in figure 8. The regression results show that income is an important determinant of the extra-euro area trade balance, which is even more pronounced for EMU members. The respective interaction term has a positive coefficient of 0.30. The start of the EMU does not have an effect, neither for the EU-15 countries nor for the EMU members. Figure 8 shows the time-varying income coefficients with two-standard error bands. The income coefficient remains stable between 0.3 and 0.4 for the last 20 years without any remarkable change. We conclude from this evidence that the introduction of the euro has not changed the financial integration with the rest of the world.

4. Conclusions

Current account imbalances have widened significantly in the euro area since the start of EMU, raising concerns about the sustainability of the monetary union. In this paper, we interpret current account balances as the counterparts to international capital flows and use trade-balance data to investigate the patterns of capital flows within the euro area and between the EMU member countries and the rest of the world. We show, first, that EMU has significantly increased the tendency of capital flows to go from relatively rich to relatively poor countries within the euro area. A similar effect does not hold for capital flows between the euro-area countries and the rest of the world, nor between the UK, Denmark, and Sweden,

which do not belong to EMU, and the euro area. However, we do find that per-capita incomes in these countries explain capital flows to the rest of the world since the start of EMU. We show that these results are robust to a variety of changes in the econometric specification.

We interpret these results as further evidence of a deepening in financial market integration in the euro area. Capital flows from relatively rich to relatively poor countries should promote economic convergence of the economies. In this sense, the observed current account imbalances should be regarded as signs of the proper functioning of the euro area rather than a sign of improper macro economic adjustment. However, our results also suggest that EMU has caused some diversion of capital flows between member and non-member countries.

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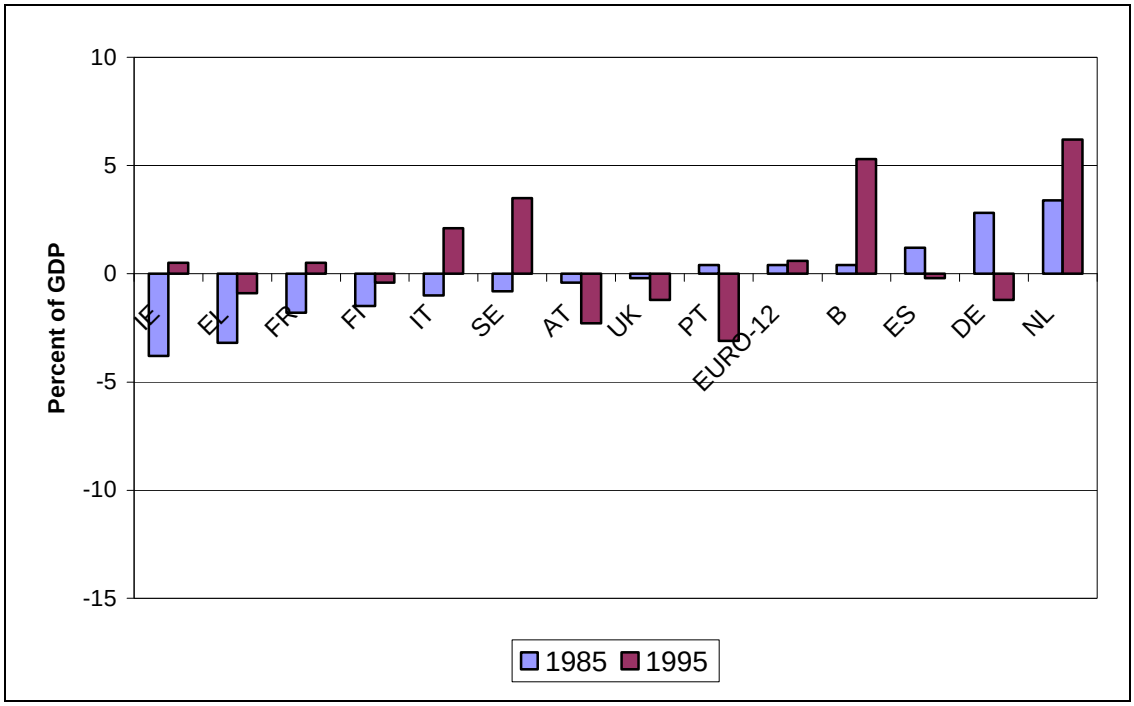
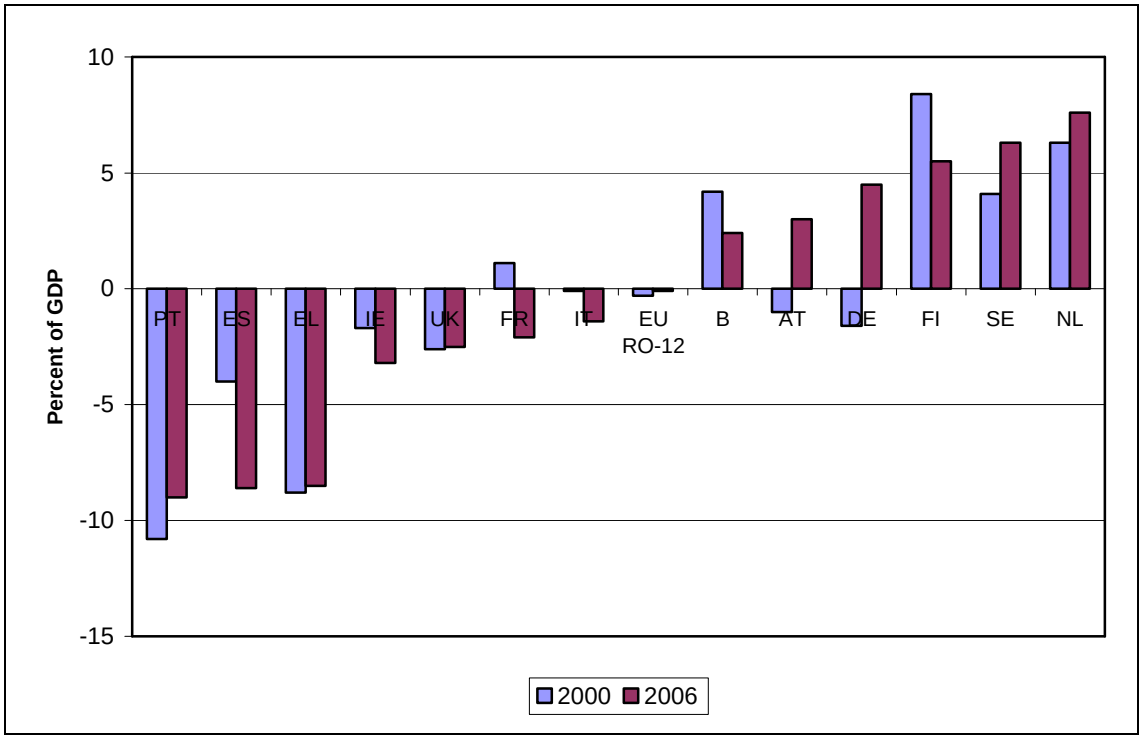
Figure 1: European current account balances (% of GDP)





Source: Estimates from IMF WEO September 2006

Figure 2a: Current Account Balances: Surplus Countries (% of GDP)

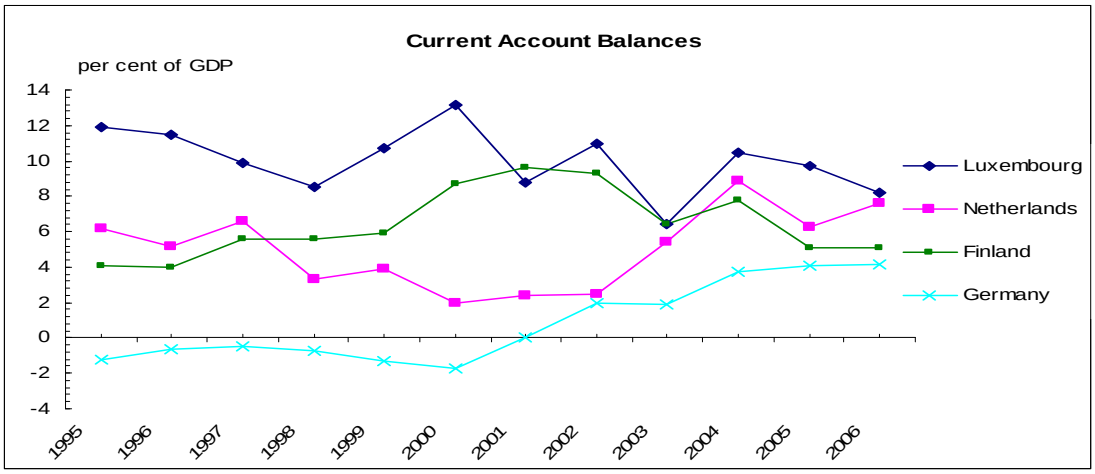


Figure 2b: Current Account Balances: Intermediate Countries (% of GDP)

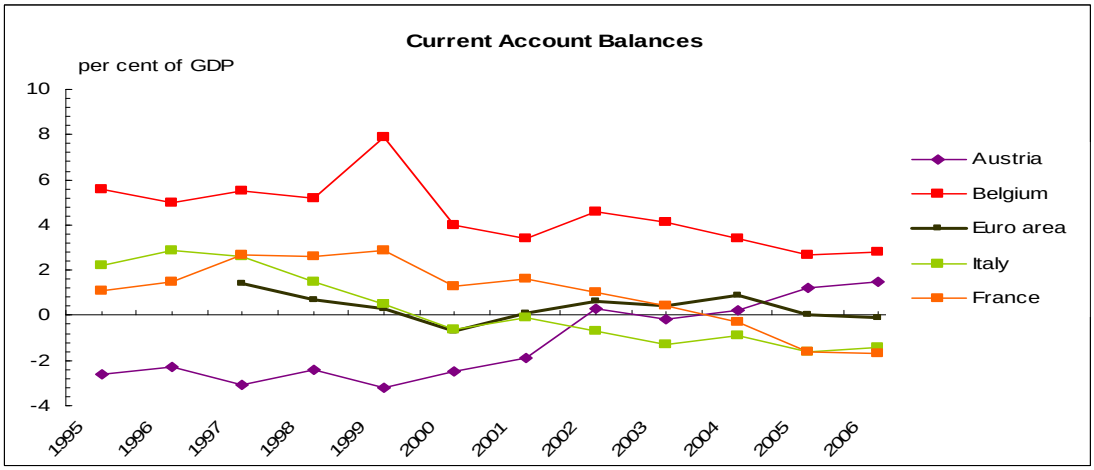
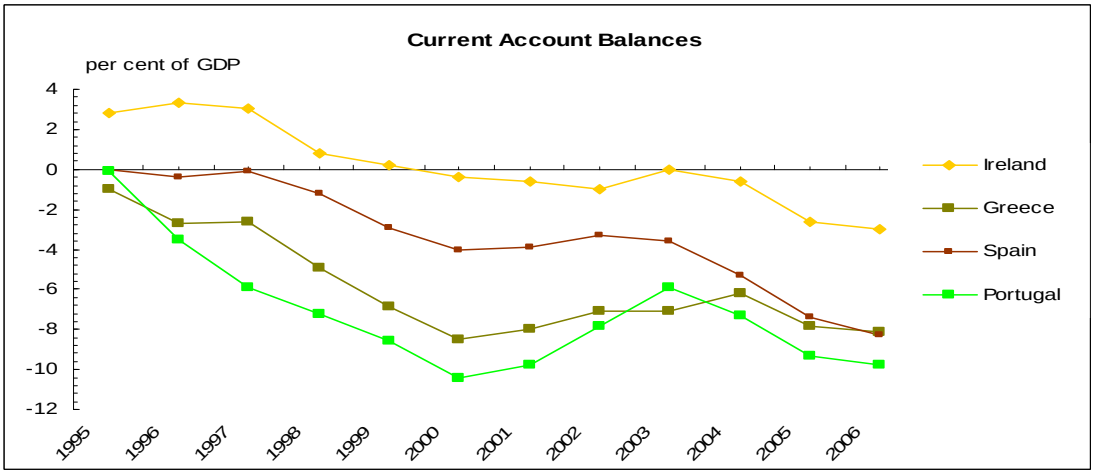


Figure 2c: Current Account Balances: Deficit Countries (% of GDP)



Source: IMF. Estimates for 2006 from IMF WEO September 2006.

Figure 3: Dispersion of Trade Balances (Standard deviation, % of GDP)

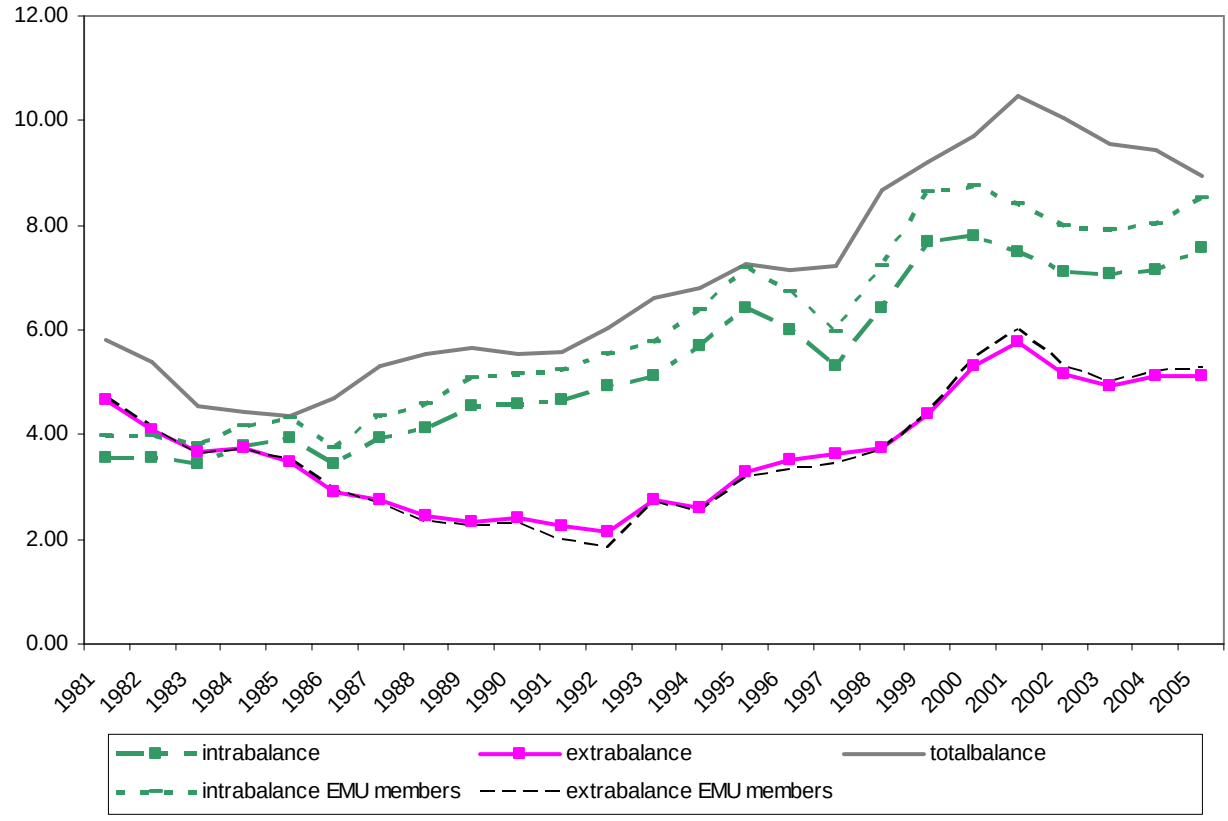


Figure 4: Average Trade Balances (% of GDP)

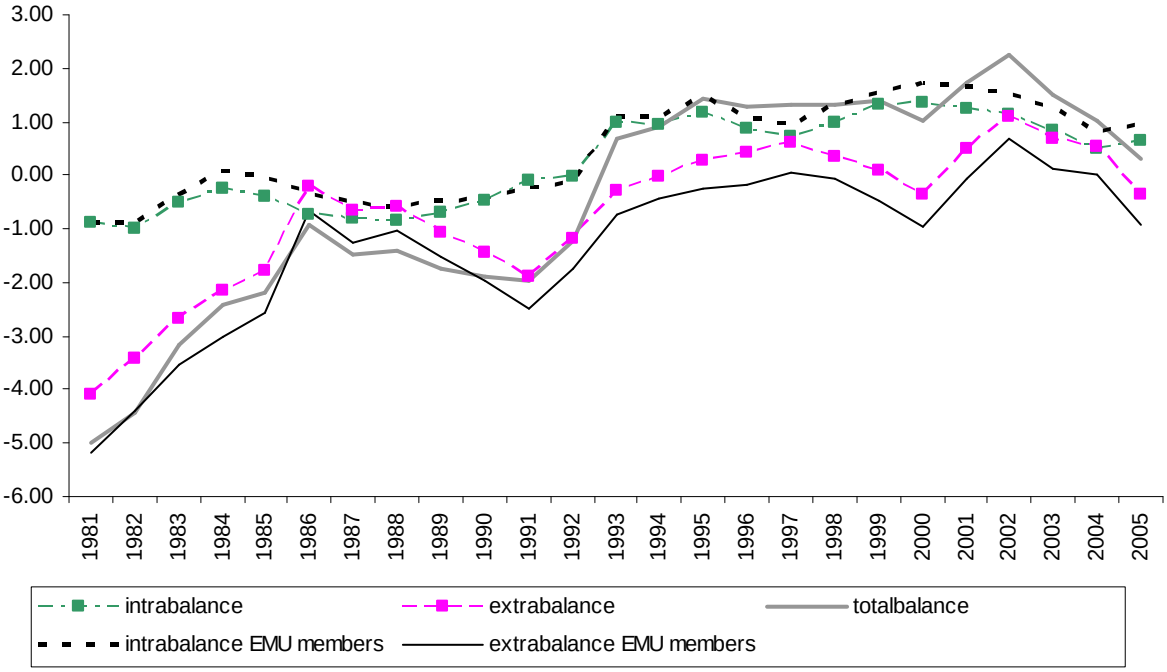


Figure 5: Time-varying income coefficient with intra balance as dependent variable

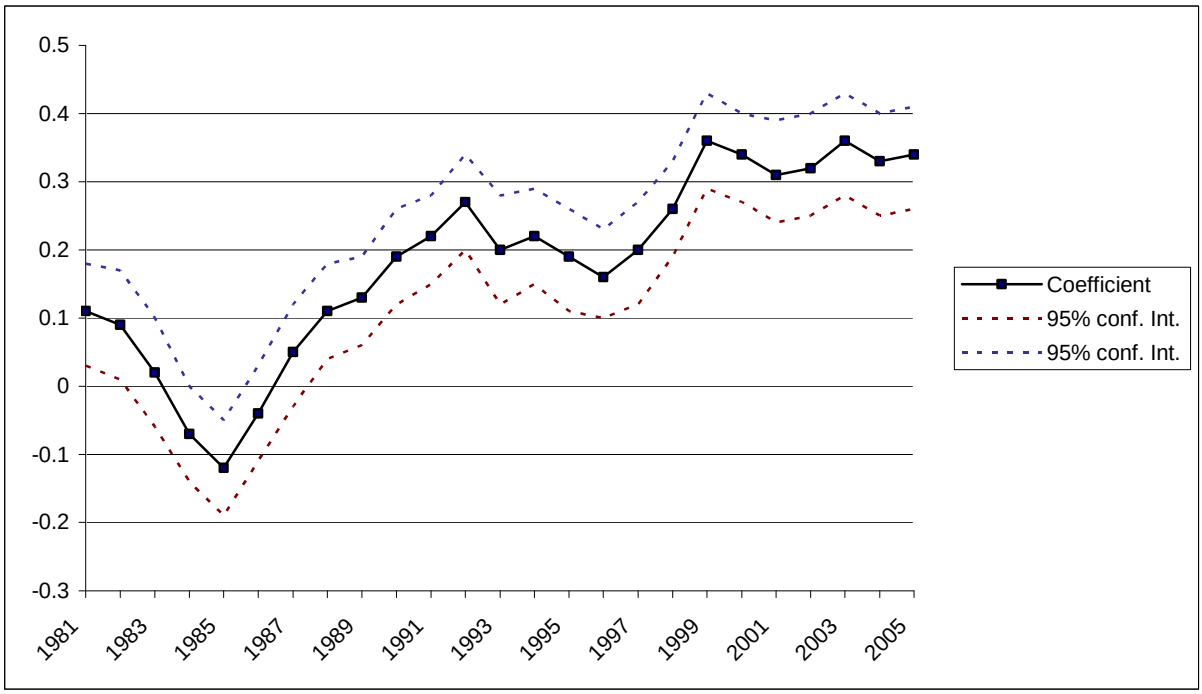


Figure 6: Time-varying income coefficient with extra balance as dependent variable

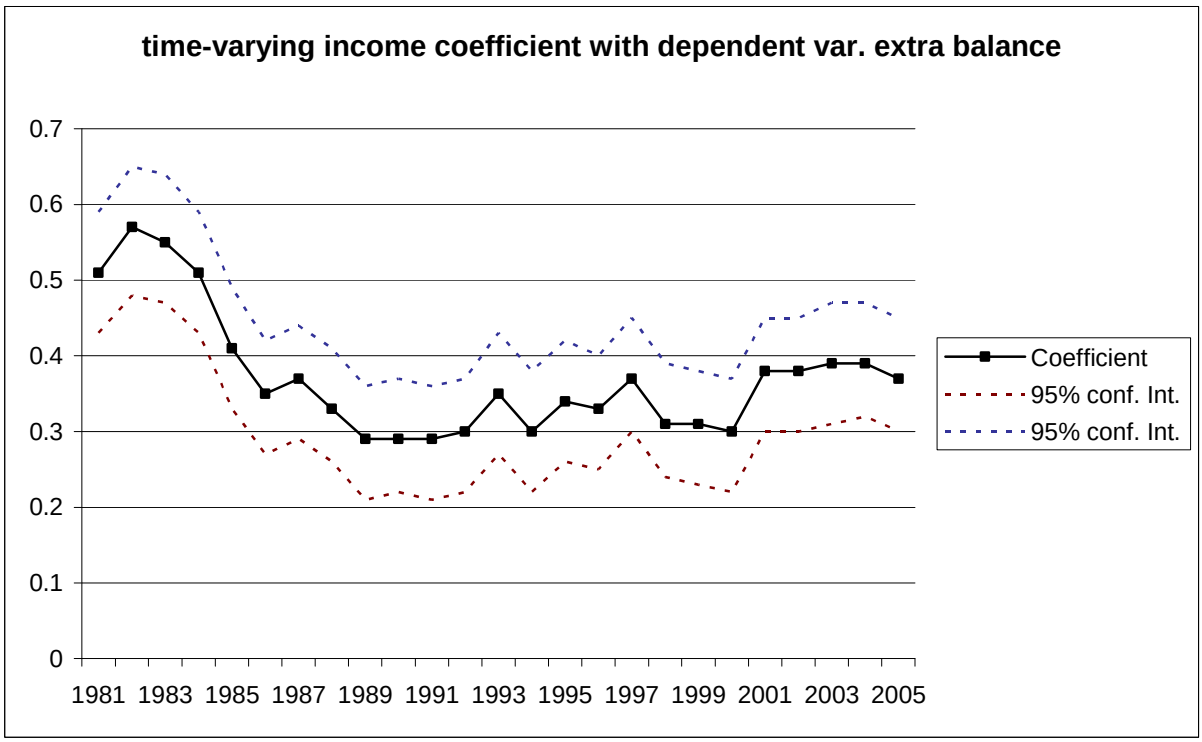


Table 1: Correlation between Intra and Extra-Euro-Area Trade Balances

	1981-2005	*1981-1998*	*1999-2005*
Belgium and Luxemburg	0.33	0.45 *	-0.55
Germany	0.75 ***	0.71 ***	0.85 **
Greece	0.17	-0.39 *	0.21
Spain	-0.31	-0.38	0.84 **
France	-0.10	0.54 **	0.76 **
Ireland	0.85 ***	0.84 ***	0.06
Italy	0.66 ***	0.81 ***	0.27
Netherlands	-0.94 ***	-0.80 ***	-0.63
Austria	-0.11	0.23	-0.54
Portugal	-0.48 **	-0.40 *	0.75 **
Finland	0.63 ***	0.61 ***	0.67 *
Denmark	0.62 ***	0.66 ***	-0.43
Sweden	0.17	0.25	-0.27
UK	-0.04	0.10	-0.24

Source: own calculations

Table 2: Causality Tests Between Intra and Extra-Euro Area Trade Balances

	Intra => Extra	*Extra => Intra*		*Intra => Extra*	*Extra => Intra*
Belgium	0.40	0.44	Netherlands	0.27	0.60
Germany	0.84	0.54	Austria	0.16	0.59
Greece	0.78	0.24	Portugal	0.20	0.14
Spain	0.13	0.08	Finnland	0.09	0.28
France	0.60	0.85	Denmark	0.41	0.12
Ireland	0.07	0.15	Sweden	0.38	0.18
Italy	0.87	0.99	UK	0.18	0.53

Note: Table entries are the p-values of an F-test of the significance of two lags of the potentially causal variable in a regression where two lags of the caused variable are used. All regressions are in first differences. Source: own calculations

Table 3A:

Dependent Variable: intra balance						
	(1)	(2)	(3)	(4)	(5)	(6)
Method	FGLS	FGLS	PW-OLS with PCSE	PW-OLS with PCSE	FE	FE
Constant	-5.31***	-5.32***	-6.67***		-4.20***	-4.46**
	(0.73)	(0.89)	(1.57)		(0.85)	(2.03)
Dummy EMU	-4.22***	-3.37***	-4.97***	-3.40**	-7.44***	-2.79
	(0.84)	(0.89)	(1.74)	(1.43)	(1.51)	(2.04)
DKSEUK	4.57***	3.43***	5.63***	4.47**		
	(1.03)	(1.18)	(1.80)	(1.80)		
Dummy Non-EMU	1.60	3.55*	0.28	1.76	-2.52*	0.40
	(1.47)	1.92	(2.36)	(2.51)	(1.36)	(1.90)
GDP Per Capita	0.33***	0.42***	0.40***	0.50***	0.35***	0.43***
	(0.03)	0.04	(0.08)	(0.08)	(0.09)	(0.11)
GDP Per Capita * EMU	0.19***	0.25***	0.22***	0.24***	0.28**	0.27**
	(0.03)	0.04	(0.08=	(0.08)	(0.01)	(0.12)
GDP Per Capita * DKSEUK	-0.33***	-0.30***	-0.38***	-0.36***	-0.28	-0.25
	(0.04)	0.05	(0.08)	(0.08)	(0.17)	(0.15)
GDP Per Capita * Non-EMU	-0.04***	-0.03	0.01	0.03	0.07*	0.11**
	(0.05)	0.07	(0.09)	(0.09)	(0.08)	(0.04)
Fiscal Balance	0.04***	0.08***	0.05	0.08	0.17	0.22*
	(0.01)	0.02	(0.05)	(0.05)	(0.12)	(0.12)
Real Oil Price	0.00	-0.02***	0.00	-0.05***	0.00	-0.03***
	(0.00)	0.00	(0.00)	(0.01)	(0.00)	(0.01)
Time Dummies	No	Yes	No	Yes	No	Yes
Adjusted R^2			0.18	0.25	0.26	0.33
Observations	350	350	350	350	350	350

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% level.
FGLS= Feasible general least squares accounting for panel heteroskedasticity, cross-sectional contemporaneous correlation, and first-order common autocorrelation of the residuals, PW-OLS with PCSE= Prais-Winston OLS estimator with panel corrected standard errors accounting for heteroskedasticity, cross-correlation and serial correlation of the residuals, FE=Panel fixed effects estimator robust standard errors with clustering on the panel variable

Table 3B:

Dependent Variable: extra balance						
	(1)	(2)	(3)	(4)	(5)	(6)
Method	FGLS	FGLS	PW-OLS with PCSE	PW-OLS with PCSE	FE	FE
Constant	-6.93***	-9.30***	-6.48***		-4.64	-7.88
	(0.67)	(0.84)	(1.12)		(2.75)	(4.59)
Dummy EMU	-0.60	-1.30	-1.13	-1.54	-2.30	-1.19
	(0.70)	(0.90)	(1.12)	(1.25)	(2.77)	(2.50)
DKSEUK	8.37***	6.96***	9.74***	8.82***		
	(1.20)	(1.37)	(2.16)	(2.16)		
Dummy Non-EMU	-3.47**	-1.11	-4.51	-5.49*	-5.78	-5.91
	(1.54)	(2.93)	(2.99)	(2.84)	(3.48)	(5.13)
GDP Per Capita	0.41***	0.47***	0.41***	0.49***	0.54**	0.66**
	(0.04)	(0.04)	(0.06)	(0.06)	(0.19)	(0.26)
GDP Per Capita*EMU	0.00	-0.04	0.02	-0.03	0.02	-0.02
	(0.04)	(0.04)	(0.06)	(0.05)	(0.14)	(0.15)
GDP Per Capita*DKSEUK	-0.35***	-0.32***	-0.40***	-0.38***	-0.92***	-0.93***
	(0.05)	(0.06)	(0.09)	(0.10)	(0.22)	(0.23)
GDP Per Capita*Non-EMU	0.15***	0.00	0.19*	0.17*	0.30**	0.32*
	(0.06)	(0.11)	(0.11)	(0.10)	(0.11)	(0.16)
Fiscal Balance	0.05***	0.06***	0.05	0.06	0.10*	0.09
	(0.02)	(0.02)	(0.04)	(0.04)	(0.05)	(0.05)
Real Oil Price	-0.01***	0.00	-0.01***	-0.04***	-0.01***	-0.01
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Time Dummies	No	Yes	No	Yes	No	Yes
Adjusted R^2			0.31	0.39		
Observations	350	350	350	350	350	350

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% level.
FGLS= Feasible general least squares accounting for panel heteroskedasticity, cross-sectional contemporaneous correlation, and first-order common autocorrelation of the residuals, PW-OLS with PCSE= Prais-Winston OLS estimator with panel corrected standard errors accounting for heteroskedasticity, cross-correlation and serial correlation of the residuals, FE=Panel fixed effects estimator robust standard errors with clustering on the panel variable

Table 4:

Dependent variable	**intrabalance**		**extrabalance**		**intrabalance**		**extrabalance**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Method	FGLS	PW-OLS with PCSE	FGLS	PW-OLS with PCSE	FGLS	PW-OLS with PCSE	FGLS	PW-OLS with PCSE
Constant	-6.76***	-8.41***	-3.98***	-2.97**	-7.04***	-9.93***	-3.27***	-2.86**
	(0.94)	(1.71)	(0.75)	(1.26)	(1.15)	(1.78)	(0.83)	(1.23)
Dummy EMU	-4.29***	-4.79***	-0.68	-1.20	-3.18**	-3.07**	-0.85	-1.39
	(0.93)	(1.58)	(0.78)	(1.22)	(0.95)	(1.34)	(0.92)	(1.11)
DKSEUK	6.31***	7.48***	5.33***	6.42***	6.24***	8.78***	4.42***	6.38***
	(1.26)	(2.10)	(1.01)	(1.71)	(1.41)	(2.13)	(1.30)	(1.56)
Dummy Non-EMU	0.91	-0.70	-3.33***	-3.65	1.04	-0.55	-2.49	-3.57
	(1.73)	(2.48)	(1.34)	(2.71)	(1.65)	(2.47)	(1.82)	(2.54)
rel. GDP per capita	7.91***	9.60***	4.57***	4.22***	7.13***	9.62***	3.31***	3.68***
	(0.90)	(1.61)	(0.70)	(1.16)	(1.06)	(1.63)	(0.75)	(1.14)
rel. GDP per capita*EMU	4.49***	5.10***	0.69	1.40	3.18***	3.27***	0.78	1.41
	(0.91)	(1.57)	(0.89)	(1.36)	(0.90)	(1.29)	(0.96)	(1.21)
rel. GDP per capita*DKSEUK	-7.99***	-9.18***	-3.46***	-4.07***	-7.20***	-9.39***	-2.36**	-3.82
	(1.06=	(1.86)	(0.80)	(1.32)	(1.18)	(1.81)	(1.02)	(1.22)
rel. GDP per capita*Non-EMU	-0.30	0.94	3.37***	3.54*	-0.38	0.84	5.56*	3.48*
	(1.35)	(1.91)	(1.04)	(2.16)	(1.29)	(1.91)	(1.40)	(2.04)
Fiscal Balance	0.39***	0.06	0.09***	0.11**	0.02	0.03	0.06***	0.08**
	(0.02)	(0.05)	(0.02)	(0.04)	(0.02)	(0.04)	(0.02)	(0.04)
Real Oil Price	0.00**	0.00	-0.01***	-0.01***	0.00	0.00	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Time Dummies	No	No	No	No	No	No	No	No
Adjusted R^2		0.19		0.26		0.16		0.25
Ireland included	Yes	Yes	Yes	Yes	No	No	No	No
Observations	350	350	350	350	225	225	225	225

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% level.
FGLS= Feasible general least squares accounting for panel heteroskedasticity, cross-sectional contemporaneous correlation, and first-order common autocorrelation of the residuals, PW-OLS with PCSE= Prais-Winston OLS estimator with panel corrected standard errors accounting for heteroskedasticity, cross-correlation and serial correlation of the residuals

Table 5:

Dependent variable	**intrabalance**			**extrabalance**		
	(1)	(2)	(3)	(4)	(5)	(6)
Method	FGLS	IV (2SLS)	Panel IV RE	FGLS	IV (2SLS)	Panel IV RE
Constant	-27.60***	-33.84***	-14.49*	-24.78***	-6.35	-30.98***
	(3.66)	(9.84)	(8.56)	(2.70)	(6.03)	(8.68)
Dummy EMU	-12.93***	-23.75*	-24.26***	2.16	-6.52	-6.48
	(3.28)	(11.56)	(4.14)	(2.55)	(10.79)	(4.41)
DKSEUK	19.30***	32.12**	10.80	19.49***	-35.84***	-13.99
	(6.01)	(12.56)	(16.46)	(5.90)	(6.95)	(17.39)
Dummy Non-EMU	-26.90***	-19.45	-5.85	-7.72	-33.22***	-43.30
	(7.16)	(12.92)	(12.33)	(7.03)	(6.10)	(13.00)
log Capitalstock	5.78***	7.65***	3.38**	5.17***	1.70	6.45***
	(0.72)	(2.26)	(1.73)	(0.58)	(1.27)	(1.75)
log Capitalstock*EMU	2.56***	4.62*	5.02***	-0.49	1.33	1.32
	(0.64)	(2.38)	(0.82)	(0.53)	(2.35)	(0.88)
log Capitalstock*DKSEUK	-4.33***	-7.03**	-2.45	-3.50***	7.65***	3.32
	(1.21)	(2.79)	(3.34)	(1.17)	(1.46)	(3.54)
log Capitalstock*Non-EMU	5.50***	3.65	1.19	1.66	6.59***	8.73***
	(1.44)	(2.58)	(2.49)	(1.38)	(1.15)	(2.67)
Fiscal Balance	0.03**	0.50*	0.10**	0.07***	0.35*	0.03
	(0.02)	(0.27)	(0.05)	(0.02)	(0.16)	(0.05)
Real Oil Price	0.00	-0.01**	-0.01***	-0.01***	-0.01**	-0.01***
	(0.00)	(9.84)	(0.00)	(0.00)	(0.00)	(0.00)
Time Dummies	No	No	No	No	No	No
Adjusted R^2		0.35	0.31		0.33	0.21
Observations	350	280	280	350	280	280

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% level.
FGLS= Feasible general least squares accounting for panel heteroskedasticity, cross-sectional contemporaneous correlation, and first-order common autocorrelation of the residuals, IV(2SLS)=Instrumental variables with two-stages least-squares, and Panel IV RE=Instrumental variables with random effects

Table 6:

Dependent variable	**intrabalance**	**extrabalance**
Method	FGLS	FGLS
Constant	-1.68	-2.78**
	(1.05)	(0.98)
Dummy Euro Member	-3.84***	-6.69***
	(1.23)	(1.15)
Dummy EMU	-2.68***	-1.35
	(0.92)	(0.87)
GDP per capita	0.09**	0.17***
	(0.04)	(0.35)
GDP per capita*Dummy Euro Member	0.34***	0.31***
	(0.06)	(0.05)
GDP per capita*Dummy start EMU	0.10***	-0.02
	(0.02)	(0.02)
GDP per capita* Dummy EMU	0.11**	-0.01
	(0.04)	(0.04)
Fiscal Balance	0.08***	0.08***
	(0.02)	(0.02)
Real Oil Price	-0.02***	0.00
	(0.00)	(0.00)
Time Dummies	Yes	Yes
Adjusted R^2		
Observations	350	350

Notes: ***, **, and * denote significance at the 1%, 5%, and 10% level.
FGLS= Feasible general least squares accounting for panel heteroskedasticity, cross-sectional contemporaneous correlation, and first-order common autocorrelation of the residuals