Current Account Imbalances in the Euro Area

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Abstract

The dispersion in current account balances among countries in the euro area has widened markedly over the past decade-and-a-half, and especially since 1999. We decompose current account positions for euro area countries into intra-euro-area balances and extra-euro-area balances and examine the determinants of these balances. Regarding intra-euro-area balances, we present evidence that capital tends to flow from high-income euro area economies to low-income euro area economies. These flows have increased since the creation of the single currency in Europe.
We construct a novel data set regarding extra-euro-area balances. The data set contains, for the euro area and the most important member economies, exports and imports to and from the 10 respective most important trade partners outside the euro area. This allows us to study the determinants of the extra-euro current account and its interaction with intra-euro area trade balances. We estimate a model of the trade balance of the euro area and individual euro-area countries with the rest of the world. We find that a real appreciation of the euro against the currencies of its main trading partners appears to have a substantial effect on the euro area's net exports in the long run, though the immediate effect is small. Our estimates for individual countries suggest that the adjustment to a real appreciation of the euro would not be equally distributed across euro-area countries. In particular, Germany would bear the largest share of the adjustment, while the other large euro-area economies would be relatively unaffected. Finally, we find that the introduction of the euro seems to have changed the dynamics of trade balance adjustment in three of the larger euro-area economies.

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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 for several reasons. For starters, current account imbalances within the EU and, in particular, among the countries participating in European Monetary Union (EMU) have grown considerably in recent years. A natural question to ask is whether these imbalances can be explained by fundamental economic factors or whether they might point to a potential unsustainability of the common currency.

In addition, as argued in Ahearne and von Hagen (2005), Europe, and the euro area in particular, might be forced to run significant current account deficits in the future, if the United States takes action to close its current account deficit or the U.S. dollar depreciates sharply and the Asian countries insist on running surpluses and start accumulating euro reserves instead of dollar reserves. The question here is: What are the consequences of a significant appreciation of the euro for the euro area's current account position?

This paper explores the determinants of the current account balances of the euro area and individual member countries of the euro area. We are interested in both intra-euro-area and extra-euro-area current account balances. Below, we look at the issue from two perspectives. The first interprets current account balances as the counterpart of capital flows and asks to what extent they can be explained by economic convergence among countries with different per-capita incomes. The second perspective interprets current accounts in the traditional way of exports and imports of goods and services and asks to what extent they can be explained by movements in aggregate real incomes and real exchange rates.

We have divided the paper into 5 sections. After this brief introduction, we present some stylised facts on current account balances in the euro area. In Section 3, we present evidence that capital tends to flow from high-income euro area economies to low-income euro area economies. These flows have increased since the creation of

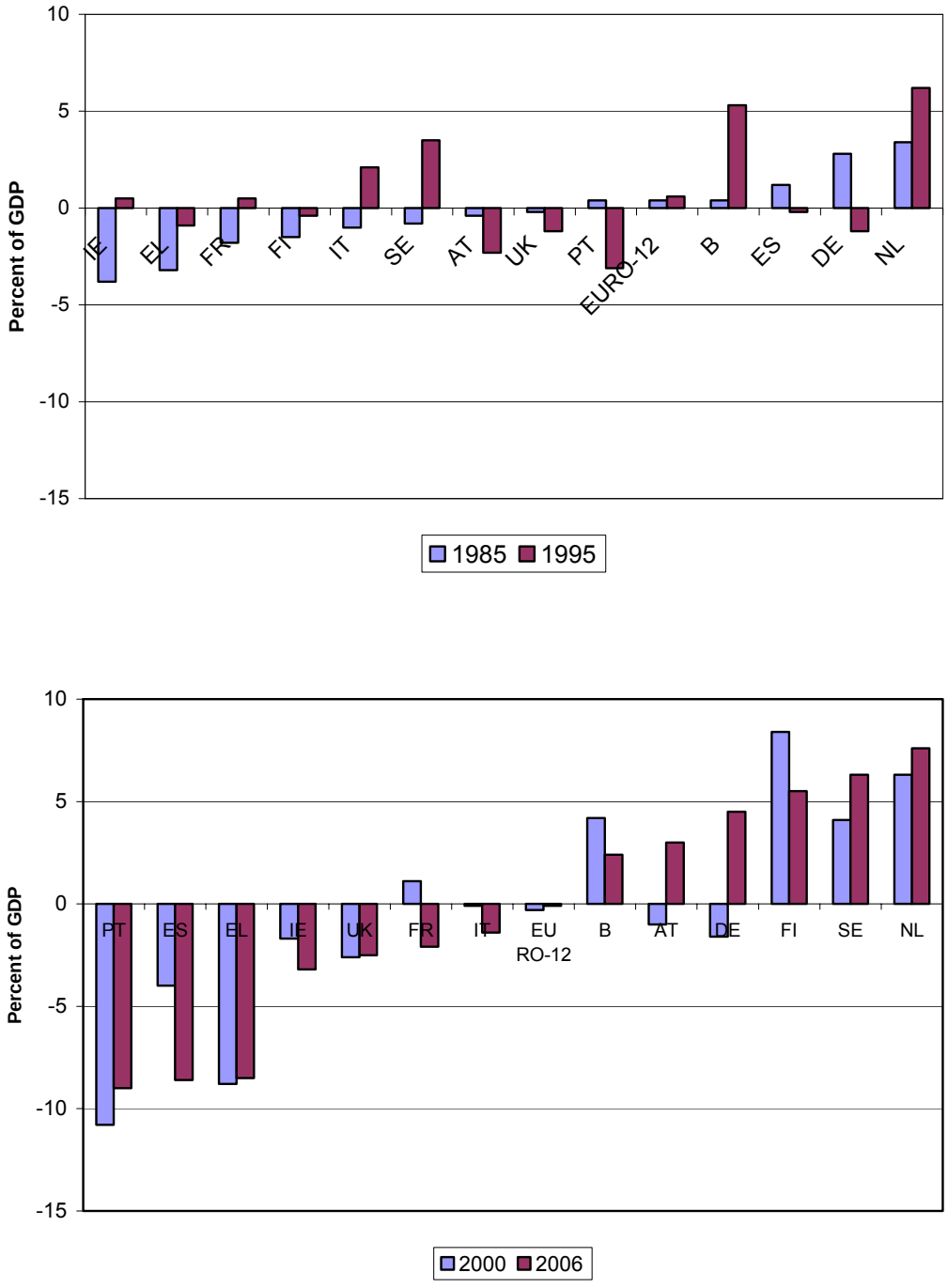
the single currency in Europe. In Section 4, we turn our attention to extra-EMU trade and estimate a model of the trade balance of the euro area and individual member countries of the euro area with the rest of the world. We find that a real appreciation of the euro against the currencies of its main trading partners appears to have a substantial effect on the euro area's net exports in the long run, though the immediate effect is small. Our estimates for individual countries suggest that the adjustment to a real appreciation of the euro would not be equally distributed across euro-area countries. In particular, Germany would bear the largest share of the adjustment, while the other large euro-area economies would be relatively unaffected. Finally, we find that the introduction of the euro seems to have changed the dynamics of trade balance adjustment in three of the larger euro-area economies. We close with a few concluding remarks.

2. Stylized facts

This section presents some of the main stylised facts about individual EMU member countries' current account 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. As an aggregate, the euro area tends to be financially largely self-contained and contribute little to absorb current account imbalances in other parts of the world. Current account balances were typically small over this 20 year period, with 1995 being a noticeable exception. This is not withstanding the fact that some EU countries have sizable current account imbalances. Germany, for example, has recorded annual surpluses of around $100 billion in recent years. Germany's surplus is estimated to have reached 4¼ percent of GDP in 2006. This has brought Germany back to its traditional position of surplus, which we observe in 1985. Finland, Sweden, and the Netherlands have run even larger 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.[1]

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

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



Source: Estimates from IMF WEO September 2006

Figure 2 shows the evolution of current account balances under EMU. There is a group of countries consisting of Luxembourg, Finland, the Netherlands, and Germany, that consistently ran surpluses during the past five years. Germany

registered small current account deficits averaging about 1 percent of GDP during most of the 1990s. The German balance swung into surplus in 2002 and the surplus has widened steadily over recent years as German exports have outpaced imports. 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.

At the other end of the spectrum, Greece, Portugal, and Spain have consistently run 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. All three countries 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 at present are unprecedented among euro area countries, with the exception of Ireland in the mid-1980s and Portugal in the 1970s (European Commission, 2006). Current account deficits of more than 8 percent of GDP are also large compared with other non-euro-area advanced economies. Continual current account deficits accumulate to the net international investment position. Net external liabilities relative to GDP have soared to nearly 80 percent in Greece, 60 percent in Portugal, and 40 percent in Spain.

One interpretation of the evolution of current account balances under EMU is that the increased dispersion of current account positions has been driven by trade flows that reflect shifts in relative competitiveness within the euro area. (See, for example, Blanchard 2006, European Commission 2006, and Munchau 2006).

Figure 2a: Current account balances under EMU (% of GDP)

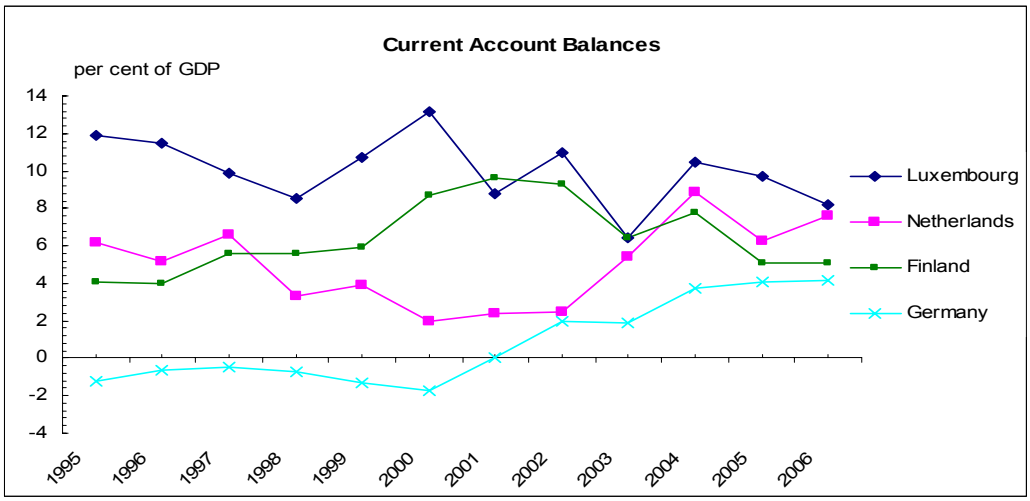


Figure 2b: Current account balances under EMU (% of GDP)

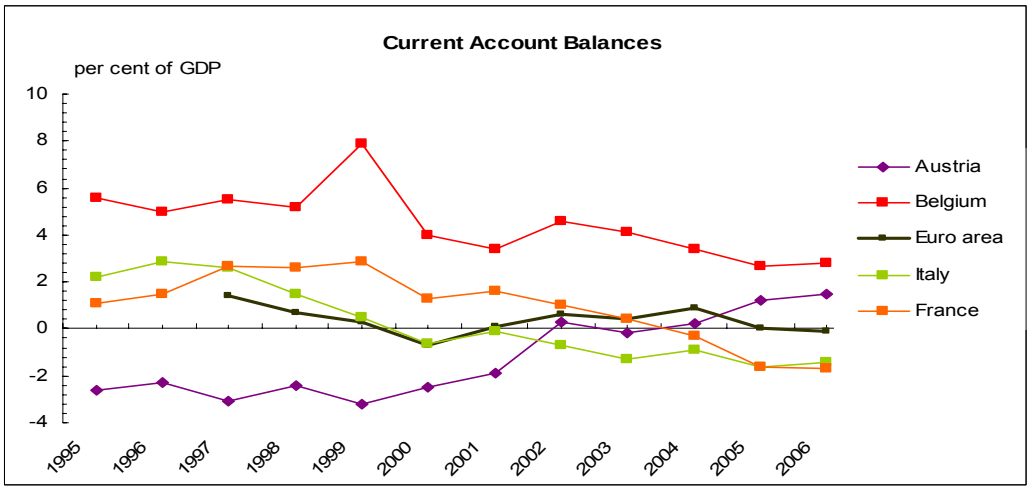
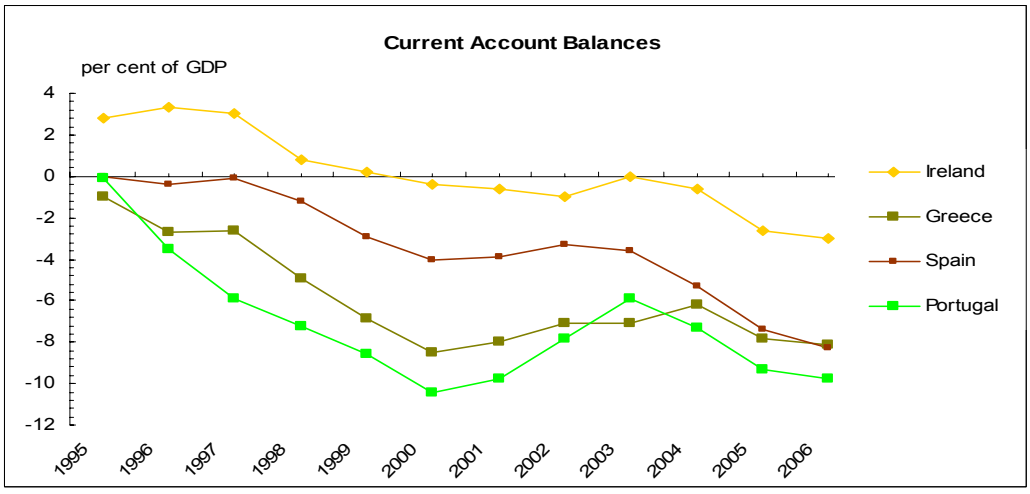


Figure 2c: Current account balances under EMU (% of GDP)



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

On this account, aggregate demand was too strong in some countries and too weak in others, resulting in persistent differences in inflation rates across countries. In fact, the size and persistence of inflation differentials at the national level is one of the most widely recognized and documented facts relating to the start of EMU. As a result of persistent differences in inflation across countries, euro area economies have experienced very sizeable swings in the real exchange rates vis-à-vis their peers, as shown in Figure 3. In turn, the changes in competitiveness associated with these movements in real exchange rates may have played a role in bringing about the large swings in current account balances. The relationship between real exchange rate developments and current account balances portrayed in Figure 4 appears to confirm that countries that have gained (lost) competitiveness relative to other euro-area countries during EMU are now running large current account surpluses (deficits).

In particular, Blanchard (2006) ascribes Portugal's economic boom in the late 1990s to the sharp drop in interest rates and heightened expectations for faster convergence that resulted from participation in EMU. Rapid economic growth and a decline in unemployment lead to an increase in wage growth to a rate substantially above the growth in labour productivity. As a result, competitiveness deteriorated sharply, export growth weakened, and Portugal's trade and current account deficits widened markedly. Ahearne and Pisani-Ferry (2006) document that over the period 1999-2005, cumulative growth in Portugal's gross exports was as much as 10 percentage points below the euro area average. Greece, Italy, and Spain also experienced relatively sluggish growth in gross exports over this period.

Figure 3a: Real exchange rates

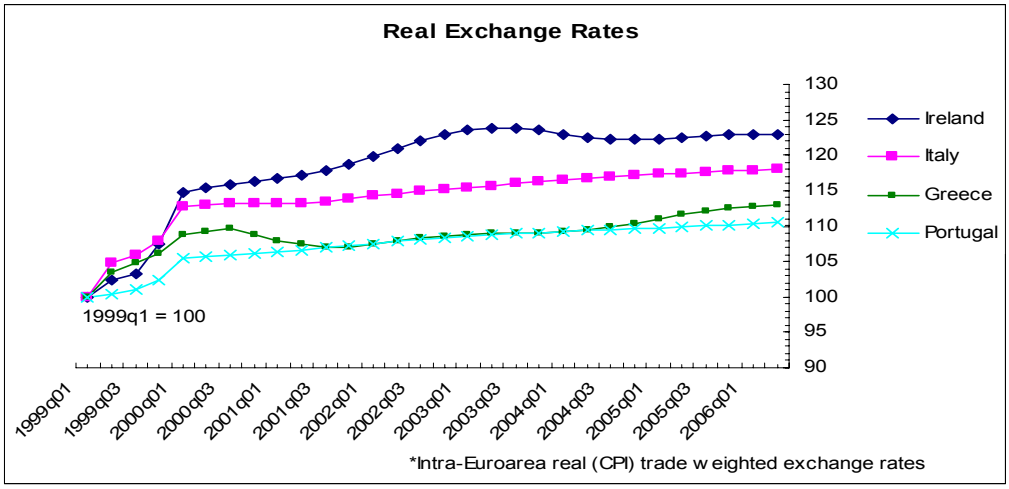


Figure 3b: Real exchange rates

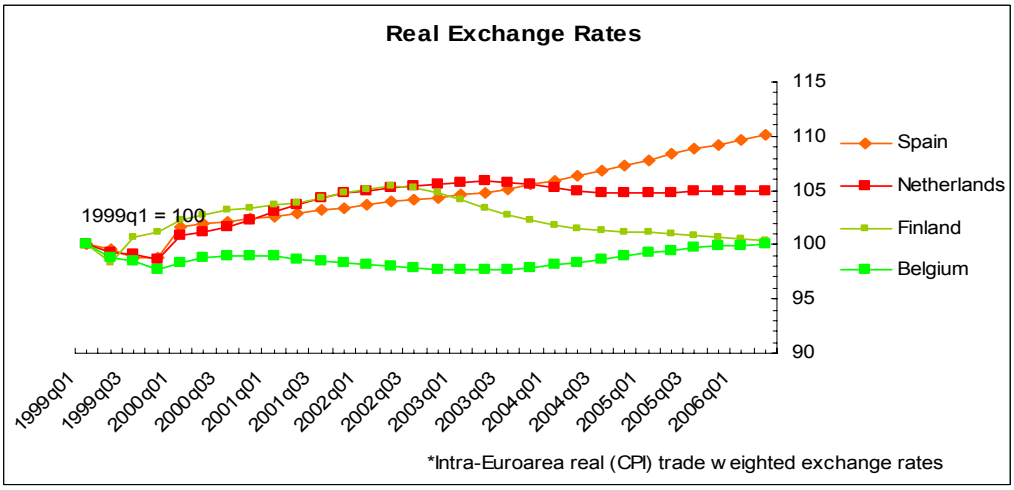
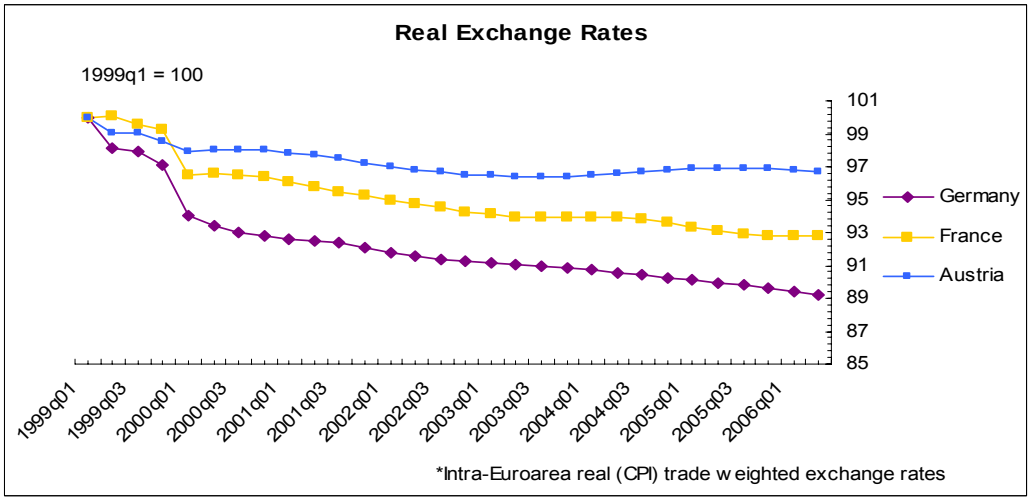
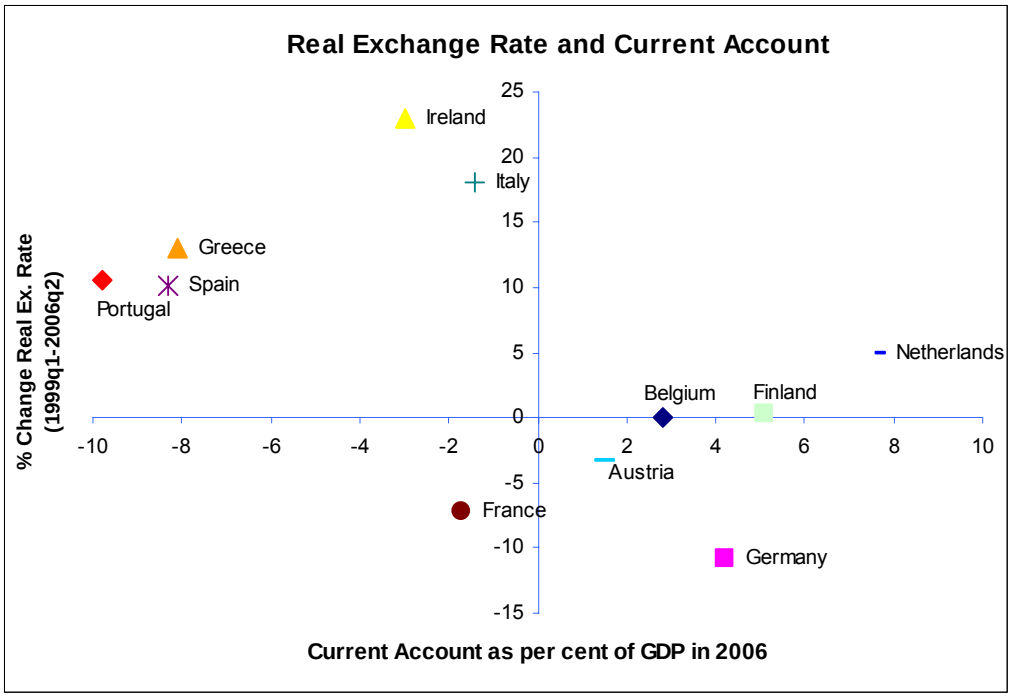


Figure 3c: Real exchange rates



Source: own calculations based on Eurostat data.

Figure 4: Real exchange rate and current account balances



Source: Eurostat and IMF. Estimates for 2006 current account balances are from IMF WEO, September 2006.

Some commentators have linked the strong performance of German exports over recent years to gains in competitiveness associated with a rate of inflation that has been persistently below the euro area average (see Ahearne and Pisani-Ferry, 2006; Münchau 2006). According to this view, wage restraint, facilitated by a decline in unionization in Germany's labour market, has kept growth in unit labour costs well below the euro area average, boosting the competitiveness of German exporters. Revealingly, two-thirds of the 1.2 percent annual average growth in German GDP over the period 1999-2005 came from net exports, with only one-third from growth in domestic demand (Ahearne and Pisani-Ferry, 2006).

The policy implication from this perspective is that, in order to achieve internal balance, deficit countries in the euro area need fiscal contractions to slow down aggregate demand and that the surplus countries ought to boost aggregate demand. One problem with this prescription, however, is that Germany and the Netherlands had troubles meeting their obligations under the Stability and Growth Pact until recently and have little room for manoeuvre with regard to fiscal policy. Most of the adjustment would thus have to come from the deficit countries.

An important question is how the large current account deficits in Greece, Portugal, and Spain are being financed. The European Commission (2006) documents that a large part of the net financial inflows into these countries during EMU have taken the form of bank loans. For Greece, net portfolio inflows have also been important. Outflows of foreign direct investment have generally exceeded inflows in each of the three countries. In Germany, lending abroad by German banks exceeded foreign borrowing by German banks to the tune of about 2½ percent of GDP annually on average over the period 1999-2005.

In contrast, in the period 1992-1998, German banks were significant net borrowers from the rest of the world. One hypothesis is that by eliminating exchange rate risk, the creation of the single currency in Europe has boosted financial flows from high-income to low-income countries in the euro area. Financial flows from high-income countries in the euro area to low-income countries outside of the euro area have not increased. Of course, EMU has coincided with other efforts to promote increased financial integration in Europe. In the next section, we examine in more detail the pattern of net financial flows between European countries and between European and non-European countries.

3. Net financial flows and EMU

The alternative interpretation of current account imbalances is that they reflect capital flows. 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. In poor countries, the scarcity of capital relative to labour should mean that the returns to capital are high. In response, savers in rich countries should look at poor countries as profitable places in which to invest.[2]

In this section, we present some simple econometric evidence on the determinants of capital flows between countries in the EU-15 and between EU-15 countries and non-EU-15 countries. Ideally, we would use individual country data on intra-EU-15 and extra-EU-15 current account positions to measure financial flows,

[2] In reality, surprisingly little capital flows from rich countries to poor countries (see Lucas, 1990). Several candidate explanations have been put forward, including differences in human capital between rich and poor countries as well as failures in international capital markets that might account for the lack of flows. However, none of these candidates can come near to explaining quantitatively the observed shortage of capital flows relative to what economic theory would predict.

but these data are not readily available. As a proxy for current account balances, therefore, we use intra-EU-15 and extra-EU-15 trade balances.[3] Our main aim is to examine whether capital tends to flow from rich to poor EU-15 countries, and whether the creation of the single currency in Europe has affected these flows.

3.1 Data

We use annual data on exports and imports of goods over the period 1981-2005. Our sample covers the EU-15 countries, excluding Luxembourg. We have individual country data on both intra-EU-15 and extra-EU-15 exports and imports of goods. Exports and imports of services are not included because of a lack of reliable data. We consider intra-EU-15 trade balances (calculated as a country's exports to other EU-15 countries less imports from other EU-15 countries), extra-EU-15 trade balances (calculated as a country's exports to non-EU-15 countries less imports from non-EU-15 countries), and total trade balances (calculated as the sum of intra-EU-15 and extra-EU-15 trade balances). We also focus on the subset of EU-15 countries that are members of the euro area. All data is taken from the European Commission's AMECO data bank.

Figure 5 plots over time the dispersion across countries of each of the five different types of trade balances, defined as the unweighted cross-section standard deviation. The dispersion in trade balances trended upwards during the 1990s and then accelerated somewhat after 1999. The observation of widening differences among the current account balances of EU member states is also found 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 5 shows that the dispersion of intra-EU trade balances is consistently larger than the dispersion of extra-EU trade balances, 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 6 shows the behaviour of the (unweighted) average of trade balances over the past 25 years. It indicates that the average EU-15 country had a trade surplus against its EU partners since the mid-1990s, and a slight deficit against non-EU

[3] Based on the AMECO data used below, the correlation between total trade balances and current accounts is above 0.91 for all countries except the UK (0.73) and Ireland (-0.16).

countries since the start of EMU. We also counted the number of years in which a country's trade balance against its EU partners had the same or the opposite sign from 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 EU 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.

Figure 5: Dispersion of Trade Balances
(Standard deviation, % of GDP)

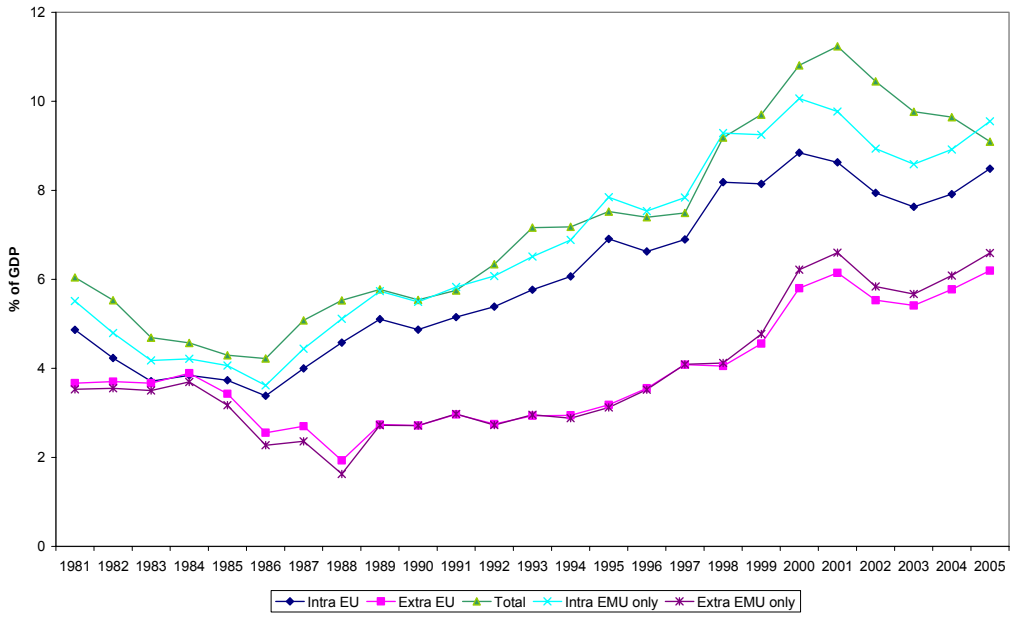


Figure 6: Average Trade Balances
(% of GDP)

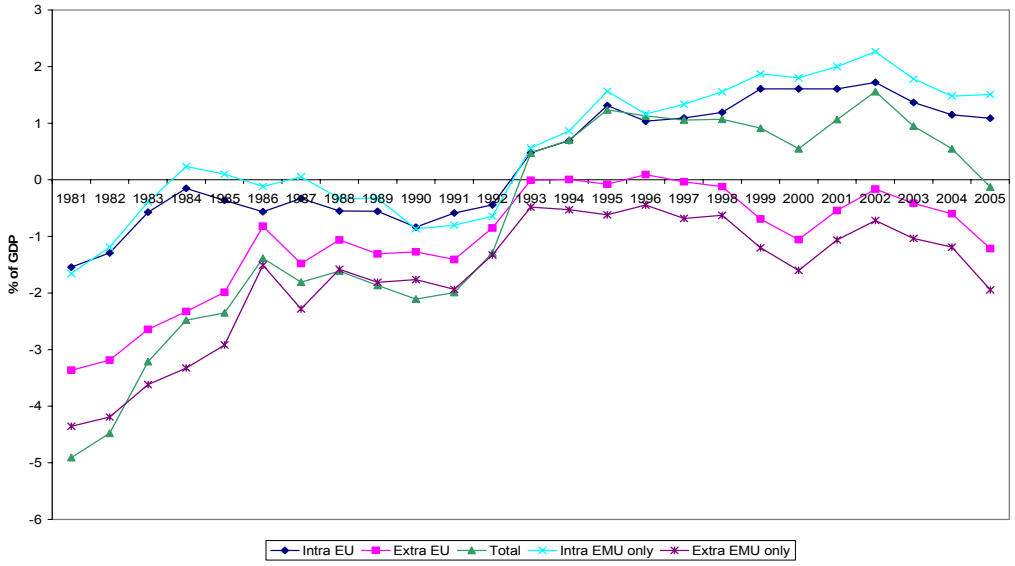


Table 1 shows the correlation coefficients between the intra and the extra EU trade balances for our sample countries. For Germany, Spain, the Netherlands, and Portugal, the correlation is significantly negative, i.e., an increasing trade deficit w.r.t. other EU countries tends to be compensated by a shrinking deficit w.r.t. the rest of the world. For the other countries, the correlation is positive. Table 2 reports the results of bi-variate causality tests between intra and extra EU trade balances. Generally, dynamic correlations between the two are small and insignificant. In Spain and Portugal, we find causality running from the extra to the intra EU trade balance with a negative effect of the former on the latter. In Finland, there is causality in the same direction, but with a positive effect. In Spain, Austria and the UK, we find causality from the intra to the extra EU balance, with a positive effect in the case of Spain and the UK, and a negative effect in the case of Austria.

Table 1: Correlation between Intra and Extra-EU Trade Balances

	1981-2005	1981-1998		1981-2005	1981-1998
Belgium	-0.13	0.10	Italy	0.79***	0.80***
Germany	-0.39*	-0.03	Netherlands	-0.96**	-0.84***
Denmark	0.04	0.02	Austria	0.14	-0.49**
Greece	-0.03	-0.59**	Portugal	-0.55***	-0.47*
Spain	-0.35*	-0.49**	Finland	0.49**	0.51**
France	0.61***	0.68***	Sweden	0.49**	0.65***
Ireland	0.67***	0.81***	UK	0.16	0.14

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

	Intra=>Extra	Extra=>Intra		Intra=>Extra	Extra=>Intra
Belgium	0.70	0.68	Italy	0.63	0.86
Germany	0.47	0.19	Netherlands	0.33	0.43
Denmark	0.80	0.23	Austria	**0.03**	0.39
Greece	0.57	0.24	Portugal	0.27	**0.02**
Spain	**0.05**	**0.005**	Finland	0.17	**0.009**
France	0.89	0.34	Sweden	0.35	0.02
Ireland	0.65	0.73	UK	**0.06**	0.93

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.

3.2 Trade balances and income per capita

We run some simple OLS regressions to examine the determinants of trade balances in individual European countries. We are particularly interested in any possible relationship between trade balances (and therefore financial flows) and income per capita. The dependent variable in our regressions is the ratio of the trade balance to GDP. We consider three variations of the dependent variable, corresponding to the different measures of the trade balance for EU-15 countries discussed above: total trade balance to GDP, intra-EU-15 trade balance to GDP, and extra-EU-15 trade balance to GDP.

The main explanatory variable is real per-capita GDP. We also include this variable interacted with a dummy variable for the start of EMU in 1999, and dummies for the euro and the non-eura area countries from 1999 on. We also included a dummy variable for German unification, but this turned out not to be statistically significant.

Our results are presented in Table 3A-C. We report four specifications for each dependent variable. The first uses only the dummies and GDP-per-capita as explanatory variables. The second adds the general government balance as a ratio of GDP and the real price of oil in US dollars. The former is motivated by the effect public sector deficits have on the current account in conventional macro models. The latter is motivated by the fact that EU countries except the UK are dependent on oil imports. The third specification adds time dummies to the model and uses a GLS estimator accounting for panel heteroskedasticity and first-order autocorrelation of the residuals. The final specification adds a number of additional explanatory variables as

a robustness check, namely real GDP-per-capita in the EU and a measure of the real effective exchange rate.

Consider Table 3A, column A. We find that trade surpluses within the EU are a positive function of per-capita income in the EU-15 and that the relationship is strongly statistically significant. Generally, countries with larger per-capita GDPs have larger intra EU trade balances. Before the start of EMU, the effect of a rising GDP per capita on a country's intra-EU trade balance is 0.59. This positive coefficient becomes notably and significantly stronger for the euro-area countries after the beginning of EMU, and significantly weaker for non-EMU countries. Thus, effect we observe is not merely a general effect for all EU countries. Instead, the estimates indicate that EMU has changed the direction of capital flows within the euro area significantly.

The remaining specifications show that this result is robust. Fiscal balances have a significantly positive effect on the intra-EU trade balance. In the simplest specification, a rise in the fiscal balance by one percent of GDP raises the intra-EU trade balance by 0.25 percent of GDP. Including time dummies and using a GSL estimator reduces that effect to 0.11 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 an instrument for the government balance based on two lags of the government balance and two lags of the total trade balance as well as using the lagged balance as an explanatory variable. In both cases, the government balance retained a positive coefficient, but its marginal significance level dropped below 10 percent.[4]

The real price of oil has a negative impact on the intra-EU trade balance, which is significant only in the GLS estimation in column C. We 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. A country's intra-EU real effective real exchange rate has a significant, negative effect on the trade balance, consistent with standard open-economy macro models. Adding these controls does not change the main result regarding the effects of per-capita GDP and the EMU and non-EMU effects.

[4] We also estimated models using instruments for the government budget balance for the extra-EU trade balance and the total trade balance. The results were similar and are not reported below.

Next, consider Table 3B, column A. Again, we find that trade surpluses are significantly and positively linked to real GDP per capital. However, this relationship does not change with the introduction of the euro, neither for euro-area countries nor for countries outside the euro area. This reinforces the suggestion that the introduction of the euro has changed net trade flows within the euro area alone.

Interestingly, the fiscal balance has a positive coefficient in these regressions, but it is not statistically significant. This suggests that the effects of changes in fiscal balances fall primarily on intra-EU trade. The real oil price has a significantly negative effect on the trade balance. This effect, however, is only significant in the smaller specifications of columns B and C.

Finally, Table 3C confirms the same results for total trade balances. The effect of per-capita GDP on total trade balances increases for the euro-area countries with the beginning of EMU, while it decreases for the non-euro area countries. The effect of fiscal balances on total trade balances is positive and significant. A rise in the fiscal balance by one percent of GDP raises the trade balance by about 0.2 percent of GDP. This indicates that only about one percent of Portugal's trade deficit of 12.6 percent in 2005 can be explained by its general government deficit of 5.6 percent. Meanwhile, Spain's trade deficit (8.6 percent of GDP in 2005) would have been even larger had the country not had a government surplus of one percent of GDP.[5]

These results suggest that EMU has increased capital market integration in Europe with the result that capital flows are now more in line with what neoclassical growth theory predicts. As capital flows from high-per capita GDP to low-per capita GDP countries, they can be expected to promote economic convergence among the euro-area countries. This means that the allocation of capital is becoming more efficient in Europe, and that the observed current account imbalances indicate that the monetary union works well. By implication, a fiscal expansion in the surplus countries would tend to absorb more of their domestic savings and slow down capital flows to poorer countries, thus rendering EMU less efficient.

Given the simplicity of our estimated equations, these results are suggestive rather than definitive. Nonetheless, our reading of the results is that monetary union

[5] 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 frm 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, extra, and total balances but did not find a significant effect.

seems to have made a difference in that high-income countries have become lenders to low-income countries within EMU much more than on a global scale. This shows that monetary union has greatly increased capital market integration among the participating countries. More efficient capital allocation within the region is a major benefit from monetary union. But note that monetary integration, not unlike trade integration, also seems to have had a negative effect on capital market integration between euro-area countries and non-euro area countries. This effect, which is in analogy to the well-known *trade diversion* effect of trade integration, implies a possible worsening of the allocation of capital between the euro area and the rest of the world.

Table 3A: Dependent Variable Intra EU Trade Balance

	A	**B**	**C**	**D**
Constant	-9.85***	-7.46***	-4.66***	-3.43
	(1.12)	(1.63)	(1.35)	(31.30)
Dummy EMU	-10.21***	-10.37***	0.13	-0.08
	(2.45)	(2.44)	(0.97)	(0.94)
Dummy Non-EMU	-1.05	-1.45	4.37***	-1.49
	(1.38)	(1.37)	(1.42)	(13.01)
GDP Per Capita	0.59***	0.51***	0.41***	0.42***
	(0.07)	(0.07)	(0.06)	(0.074)
(GDP Per Capita)*EMU	0.39***	0.40***	0.19***	0.16**
	(0.11)	(0.11)	(0.063)	(0.065)
(GDP Per Capita)*Non-EMU	-0.21**	-0.21**	-0.17***	-0.18***
	(0.035)	(0.04)	(0.04)	(0.041)
Fiscal Balance		0.25***	0.11***	0.11***
		(0.085)	(0.03)	(0.036)
Real Oil Price		-0.001	-0.03***	-0.00
		(0.004)	(0.008)	(0.012)
EU GDP Per Capita				-0.08
				(1.71)
(EU GDP Per Capita)*EMU				-0.28
				(0.48)
Intra EMU REER				-0.02*
				(0.011)
(Intra EMU REER)*EMU				0.009
				(0.07)
Time Dummies	No	No	Yes	Yes
Method	OLS	OLS	GLS	GLS
Adjusted R^2	0.34	0.36		
NOBS	350	350	350	350

Note: GLS estimator accounts for heteroskedasticity between countries and country-specific autocorrelation of residuals. Standard errors in parentheses. *, **, *** denote statistical significance of the 10, 5, and 1 percent level respectively.

Table 3B : Dependent Variable Extra-EU Trade Balance

	A	B	C	D
Constant	-7.86***	-5.21***	-4.10***	-26.89
	(0.76)	(1.10)	(1.10)	(29.32)
Dummy EMU	-2.04	-2.71	-1.08	-1.17
	(1.66)	(1.64)	(0.77)	(0.76)
Dummy Non-EMU	-1.83*	-1.95**	0.70	-4.75
	(0.94)	(0.93)	(1.08)	(11.99)
GDP Per Capita	0.36***	0.30***	0.22***	0.29***
	(0.043)	(0.048)	(0.06)	(0.05)
(GDP Per Capita)*EMU	0.03	0.06	0.08*	0.07
	(0.08)	(0.076)	(0.05)	(0.046)
(GDP Per Capita)*Non-EMU	0.03	0.035	-0.03	-0.01
	(0.026)	(0.026)	(0.04)	(0.03)
Fiscal Balance		0.09	0.035	0.03
		(0.056)	(0.025)	(0.026)
Real Oil Price		-0.008***	-0.017***	-0.007
		(0.003)	(0.006)	(0.01)
EU GDP Per Capita				0.31
				(1.61)
(EU GDP Per Capita)*EMU				-0.12
				(0.40)
Extra EMU REER				-0.17**
				(0.06)
(Extra EMU REER)*EMU				0.02
				(0.07)
Time Dummies	No	No	Yes	Yes
Method	OLS	OLS	GLS	GLS
Adjusted R^2	0.30	0.31		
NOBS	350	350	350	350

Note: GLS estimator accounts for heteroskedasticity between countries and country-specific autocorrelation of residuals. Standard errors in parentheses. *, **, *** denote statistical significance of the 10, 5, and 1 percent level respectively.

Table 3C: Dependent Variable Total Trade Balance

	A	B	C	D
Constant	-12.43***	-12.67**	-11.09***	-44.96
	(2.55)	(1.67)	(1.77)	(49.19)
Dummy EMU	-8.00***	-13.29***	-1.15	-1.06
	(2.01)	(2.49)	(1.36)	(1.36)
Dummy Non-EMU	-2.88**	-3.40*	4.14**	-9.09
	(1.43)	(1.41)	(1.87)	(20.05)
GDP Per Capita	0.95***	0.81***	0.78***	0.77***
	(0.07)	(0.07)	(0.07)	(0.074)
(GDP Per Capita)*EMU	0.42***	0.46***	0.22***	0.21***
	(0.11)	(0.11)	(0.07)	(0.073)
(GDP Per Capita)*Non-EMU	-0.18***	-0.17***	-0.22***	-0.22***
	(0.04)	(0.04)	(0.04)	(0.04)
Fiscal Balance		0.34***	0.19***	0.18***
		(0.088)	(0.04)	(0.04)
Real Oil Price		-0.007*	-0.042***	-0.004
		(0.0039)	(0.01)	(0.019)
EU GDP Per Capita				0.65
				(2.68)
(EU GDP Per Capita)*EMU				-0.44
				(0.67)
Extra EMU REER				-0.21**
				(0.10)
(Extra EMU REER)*EMU				-0.04
				(0.11)
Time Dummies	No	No	Yes	Yes
Method	OLS	OLS	GLS	GLS
R^2	0.53	0.55		
NOBS		350	350	350

Note: GLS estimator accounts for heteroskedasticity between countries and country-specific autocorrelation of residuals. Standard errors in parentheses. *, **, *** denote statistical significance of the 10, 5, and 1 percent level respectively.

4. Monetary Union and the Feldstein Horioka Puzzle

In a seminal contribution to open-economy macro economics, Feldstein and Horioka (1980) showed that, at the time, international capital market integration was much weaker than generally perceived. They did this based on a simple reasoning. With complete international capital market integration, a country's rate of investment should be uncorrelated with its rate of savings. Any excess of investment over savings would simply be absorbed by the current account balance. This suggests that the regression coefficient of the investment on the savings ratio, which is called the savings retention coefficient, should not be statistically different from zero. However,

Feldstein and Horioka showed that, in an international panel, that coefficient was much closer to one than to zero. Subsequent literature has shown that the savings retention coefficient has declined in international panels since the 1980s.[6] This is in line with the general perception that the degree of international capital markets integration has increased since then.

Blanchard and Giavazzi (2002) revisit this issue in the context of EMU. They use annual data for investment and savings ratios of OECD, EU, and euro-area countries from 1975 to 2000 and estimate savings retention coefficients. Blanchard and Giavazzi show that savings retention coefficients generally from levels of 0.5 to values close to zero for all three groups of countries.

Showing that savings retention coefficients declined would support our interpretation of the current account imbalances in the euro area, since it is another aspect of looking at capital market integration. With this in mind, we consider Feldstein Horioka regressions for our 14 countries and the period from 1981 to 2005. The dependent variable is the gross investment rate, which includes public sector investment. The explanatory variable is the gross savings rate, which includes public sector savings. All data are from the AMECO data base.

Table 4: Feldstein Horioka Regressions for EU Countries, 1981-2005
Dependent Variable: Gross Investment Rate

Variable	Coefficent
Constant	**12.25*** (1.09)**
Gross Savings Rate	**0.43*** (0.05)**
Gross savings Rate*EMU	**-0.64*** (0.10)**
Gross Savings Rate* Non-EMU	**-0.20 (0.17)**
EMU Dummy	**14.15*** (6.67)**
Non-EMU Dummy	**1.39 (3.59)**
R^2=0.49	**N=350**

Source: Own estimations

[6] See e.g. Obstfeld and Taylor (2004) and Hericourt and Maurel (2005) for a recent, comprehensive survey.

Table 4 reports the results. The coefficient on the gross savings rate is 0.43 and statistically significant. This is lower than what Feldstein and Horioka found, but well in line with Blanchard and Giavazzi (2002). Interacting the gross savings rate with an EMU dummy for the euro-area countries yields a negative coefficient of -0.63. The total effect post-1999 of -0.23 is not statistically different from zero. Thus, domestic investment has been completely decoupled from domestic savings in the euro-area countries. Interacting the gross savings rate with our non-EMU dummy yields a negative coefficient which is much smaller and not statistically different from zero. Thus, table 4 supports our results that EMU has increased capital market integration within the region, but not for outsiders.

5. Estimating trade balance models

The emphasis in the previous section was on capital flows within the euro area. In this section, we present empirical estimates of a model explaining the trade balance of the euro area and individual member countries of the euro area with the rest of the world. We use quarterly data for the period from 1980:Q1 to 2005:Q2. Exports and imports for the euro area are computed for the ten most important trade partners outside the euro area. This covers approximately 60 percent of the total trade with the rest of the world. For the member countries, we use total exports (imports) and subtract exports (imports) to other euro-area countries. We use data from the IMF's Direction of Trade statistics, and focus on exports and imports of goods since, as mentioned earlier, data for trade in services are not readily available, nor are current account data with regard to non-euro area countries. Exports and imports are measured in U.S. dollars for all countries. We normalize the trade balance by dividing by domestic GDP in U.S. dollars.

Our baseline model seeks to explain the trade balance using domestic and foreign real GDP and the effective real exchange rate. For each country and the euro area, we calculate "foreign" GDP by taking the nominal GDP of the ten most important trade partners outside the euro area converted into US dollars and deflating it by the US CPI. Our regressions use the ratio of domestic real GDP to foreign real GDP as an explanatory variable. Note that domestic real GDP is computed in terms of the relevant country's or the euro area's own currency, while "foreign" real GDP is calculated in terms of real US dollars. Converting the former into real dollars - or the

latter into real euros – would result in a series which is entirely dominated by real exchange rate movements such that the information about real GDP is wiped out. Both real GDP series are computed as indexes with the first quarter of 1999 as base period and are converted into logs.

Figures 7-13 show the trade balances relative to GDP together with the real exchange rates and the relative GDP variables. For the euro area, Figure 7 gives three measures of the trade account. The line CA gives the trade balance of the aggregate euro area according to the IMF's Direction of Trade Statistics (December 2006). "Extra CA" gives the sum of all of euro area-countries net exports to the rest of the world less the same countries' net exports to other euro-area countries. The figure shows that there are some data discrepancies that are due to the statistical separation of Belgium and Luxembourg in the late 1990s. The figure also shows the euro-area's net exports to its ten most important trade partners. This line tracks the total trade balance very closely except for a period in the mid-1990s.

Figure 7 shows that for the euro area as a whole the trade balance has remained within a band of plus/minus 2 percent of GDP in all but two years in the past 25 years, and the two exceptions are in the early part of the sample. In the past 10 years, it has hovered between zero and 2 percent of GDP. There are larger discrepancies across the four largest euro-area economies, Germany, France, Italy, and Spain, as shown in Figure 9. Individual trade balances range between plus and minus five percent of individual country GDP. While Spain consistently experienced trade deficits throughout the period, the other three large economies consistently had trade surpluses, and Germany had the largest of these.

Figure 7

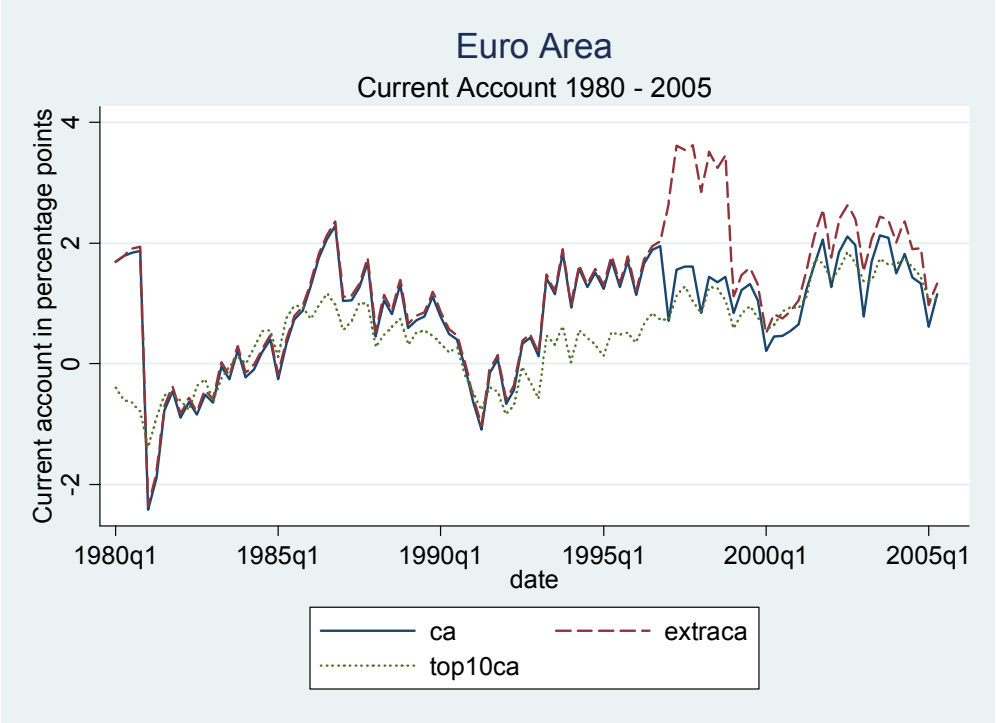


Figure 8

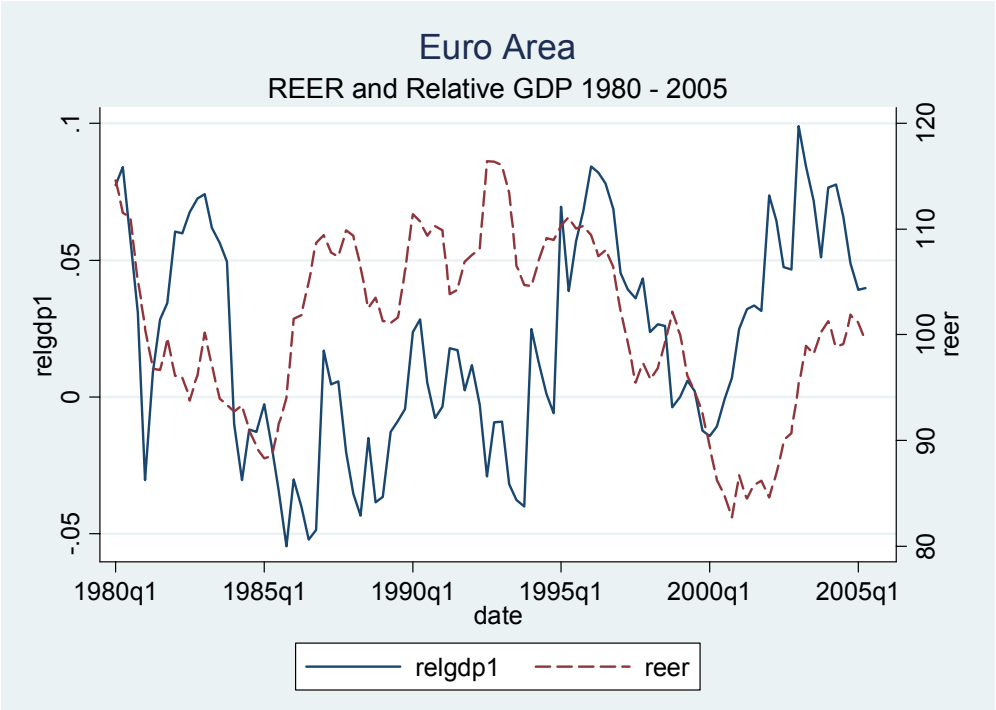


Figure 9

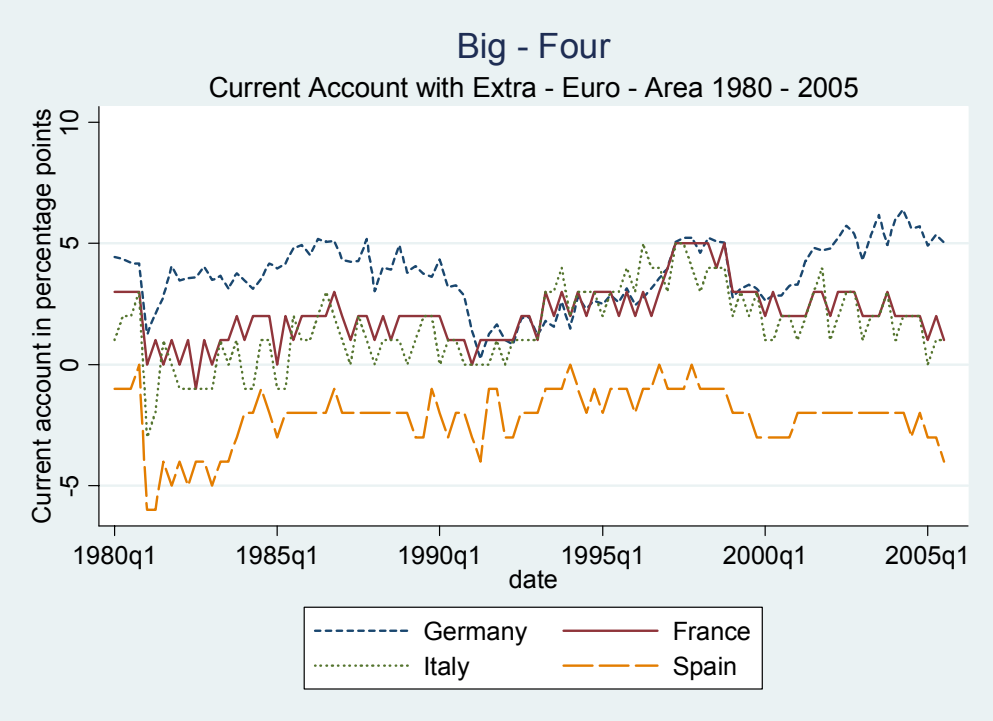


Figure 8 shows the relative GDP of the euro area against its ten largest trade partners (in logs, as explained above). The series oscillates between -0.05 and 0.1 with a slight upward trend since the mid-1980s. The figure also shows the real exchange rate of the euro area against its ten largest trade partners. Following a large real depreciation of the euro in the first half of the 1980s, we observe a real appreciation in the subsequent decade, and especially in the years 1992-1995. This was followed by a rapid depreciation which ended in an appreciation after 2001 that brought the real value of the euro back to its long-run average. Figures 10-13 show that individual country experiences exhibit similar patterns, although with swings of larger amplitudes. On aggregate, therefore, the euro area is less volatile against outside countries than its individual member countries. A notable exception to the general impression is the relative GDP series for Spain, which exhibits a continuous upward trend throughout the period.

Figure 10

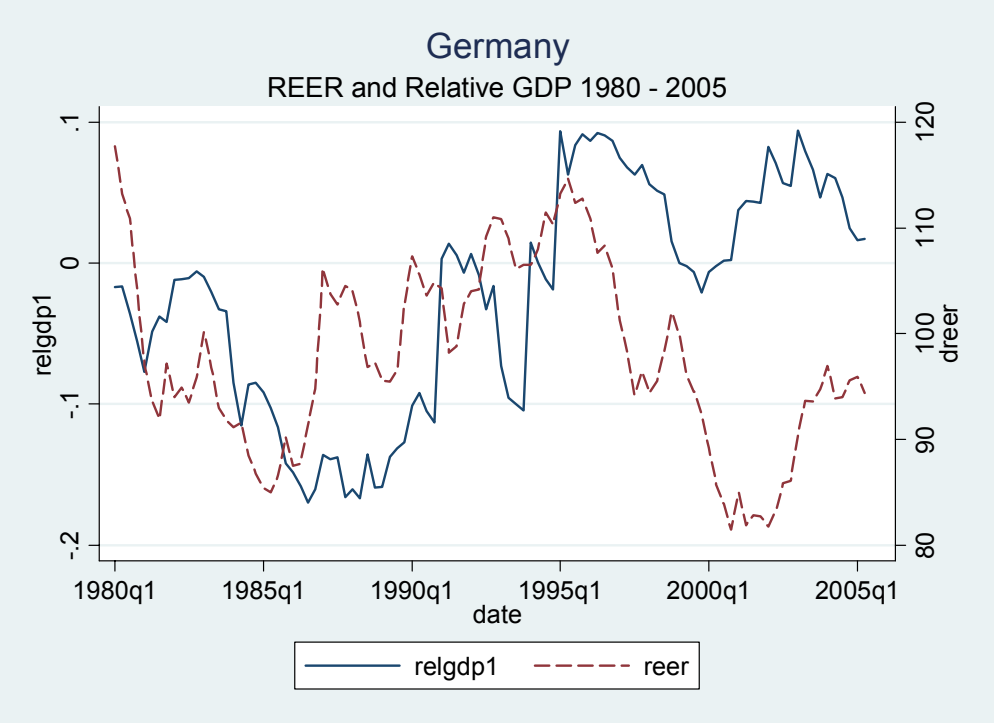


Figure 11

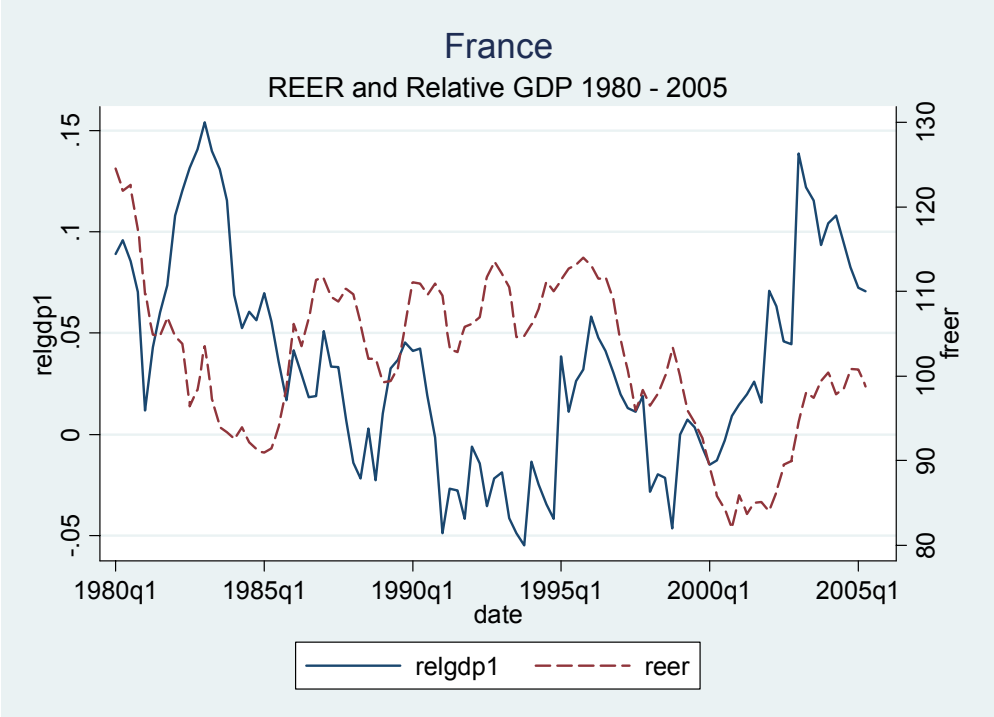


Figure 12

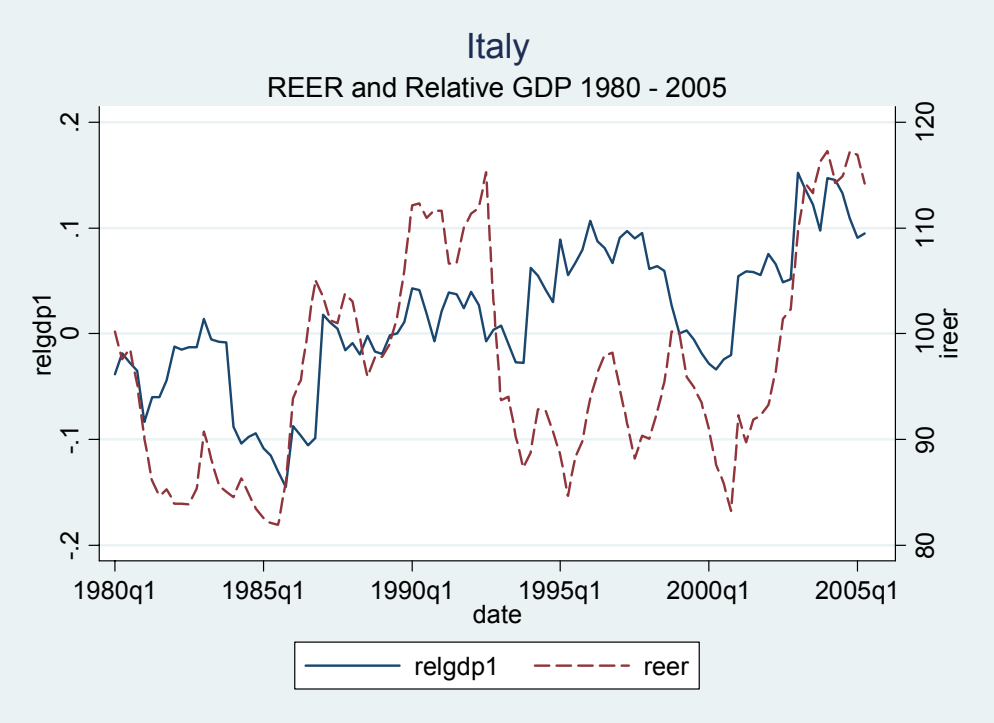


Figure 13

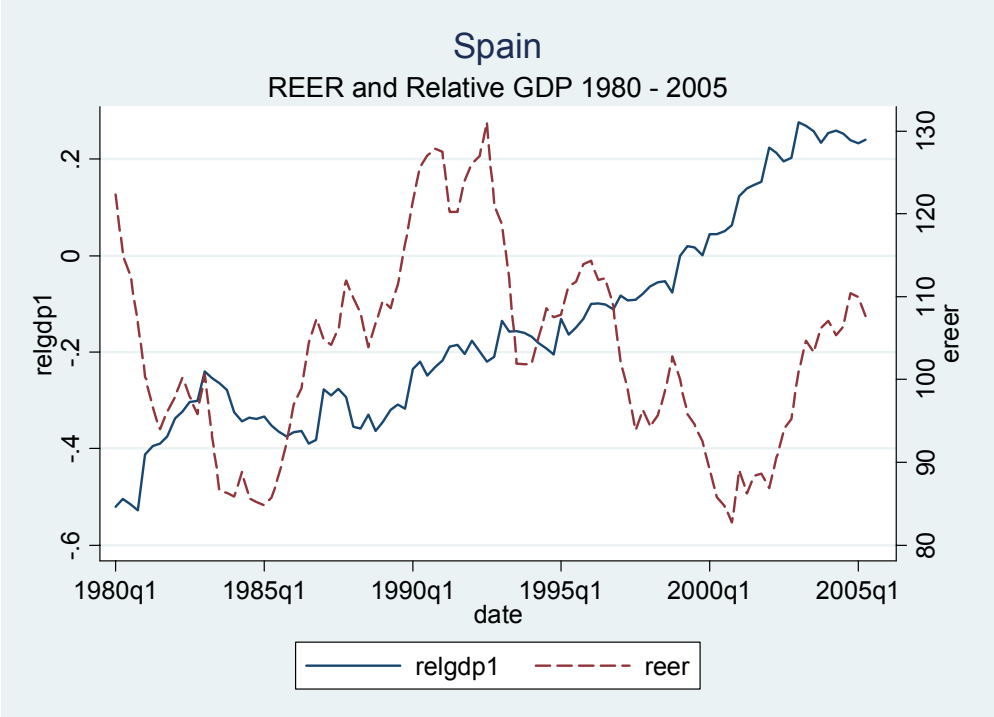


Table 5 presents estimates of a simple model of dynamic adjustment of the trade balance. The dependent variable is the trade balance of the euro area and its four largest constituent economies with regard to non-euro area economies. The explanatory variables are a lagged dependent variable, the growth rate of domestic real GDP less the growth rate of the real GDP of the ten largest (non-euro area) trade partners, and the effective real exchange rate against the ten largest non-euro area trade partners. The effective real exchange rate is measured in logs. The estimates are based on quarterly data. Preliminary estimates using more elaborate lag structures did not yield qualitatively different results.

The estimates show that trade balances are very persistent. The first-order auto-regression coefficients range between 0.7 and 0.8 for the individual countries and the coefficient for the euro-area aggregate is 0.89. For the euro area, the coefficients on the relative real-income variable and the real exchange rate are both statistically significant and correctly signed. An increase in the domestic real growth rate by one percent above the foreign growth rate leads to a fall in the trade balance by 0.024 percent of GDP on impact, and 0.22 percent in the long run. A rise in the real exchange rate by 10 percent lowers the trade balance by 0.084 percent on impact, and by 0.76 percent in the long run. Thus, a real appreciation of the euro against its main trade partners seems to have a substantial effect on net exports in the long run, although the immediate effect is small.

Table 5: Estimated trade balance models

	Variable	Coefficient	Standard dev.	t-ratio	Long-run effect
Euro Area	Constant	3.93	1.66	2.37	
	Lag 1	0.89	0.04	21.89	
	ΔRGDP	-0.024	1.31	1.83	-0.22
	Real ex. R.	-0.84	0.36	2.34	-7.6
	R-square	0.85			
Germany	Constant	9.97	3.94	2.53	
	Lag 1	.78	0.06	13.6	
	ΔRGDP	-0.055	2.66	2.06	-0.25
	Real ex. R.	-2.00	0.84	2.37	-9.1
	R-square	0.73			

France	Constant	2.71	3.57	0.76	
	Lag 1	0.79	0.06	13.01	
	ΔRGDP	-0.052	2.96	1.74	-0.25
	Real ex. R.	3.56	2.41	1.51	
	Real ex. R. Lag 1	-4.14	2.36	1.76	-2.8
	R-square	0.65			
Italy	Constant	2.06	4.82	0.43	
	Lag 1	0.74	.069	10.67	
	ΔRGDP	-0.047	3.89	1.22	-0.18
	Real ex. R.	-0.36	1.06	0.34	-1.4
	R-square	0.54			
Spain	Constant	-2.07	3.10	0.67	
	Lag 1	0.71	0.67	10.63	
	ΔRGDP	-0.13	2.46	5.59	-0.46
	Real ex. R.	0.33	0.66	0.50	1.1
	R-square	0.59			

Turning to the individual countries, the performance of the model estimates is considerably weaker. Germany is the only euro-area country whose trade balance with respect to non-euro area countries responds significantly to changes in both the relative real GDP growth rate and the real exchange rate. For Germany, a rise in the relative growth rate by one percent leads to a fall in the trade balance by 0.055 percent on impact and 0.25 percent in the long run. A real appreciation by 10 percent against the ten most important non-euro-area countries leads to a fall in the trade balance by 0.2 percent of GDP on impact and 0.9 percent in the long run. While the other countries show similar responses to changes in the relative GDP growth rate, the responses of the Italian and Spanish trade balances to changes in the real exchange rate are much weaker and not statistically significant. For France, we use the real exchange rate and its first lag in the model. While the current real exchange rate has a positive coefficient, the lagged real exchange rate has a negative coefficient and the total effect has the expected negative sign. These estimates indicate that the adjustment to a real appreciation of the euro against third countries would not be equally distributed across euro-area countries. Germany would bear the largest part of the adjustment, while the other large economies would seem relatively unaffected.

Next, we augment these models by a dummy variable which is zero until the fourth quarter of 1998 and one from the first quarter of 1999 onwards. This dummy allows us to test for and estimate the size of structural breaks in the model coefficients

at the start of EMU. We interact the dummy with all explanatory variables in the model. For the euro-area aggregate and for Germany, all terms with this dummy are statistically insignificant. We do not report them below. For France, Italy, and Spain, in contrast, we find evidence for structural breaks around the start of EMU. Table 6 shows the results.

For France and Italy, we find that the persistence of the trade balance is significantly weaker after the start of EMU. The combined first-order autoregressive coefficient is 0.28 for France and 0.09 for Italy after the start of EMU. For Spain, the persistence of the trade balance remains unchanged, but we find that the responsiveness of the trade balance to changes in the relative real growth rate vanishes after 1999. In contrast, the Spanish trade balance becomes responsive to changes in the real exchange rate, although the effect remains small. In sum, the introduction of the euro seems to have changed the dynamics of trade balance adjustment in three of the larger euro-area economies.

Table 6: Trade balance models and EMU

	Variable	Coefficient	Standard dev.	t-ratio	Long-run effect
France	Constant	1.77	5.40	0.74	
	EMU dummy	1.37	0.56	2.46	
	Lag dependent var.	0.86	0.07	13.13	
	*EMU effect	-0.58	0.21	2.77	
	ΔRGDP	-0.031	2.97	1.05	
	Real exchange rate	2.67	2.40	1.11	
	Real exchange rate Lag 1	-3.50	2.31	1.52	
	R-Square = 0.67				
Italy	Constant	2.48	4.86	0.51	
	EMU dummy	1.45	0.60	2.41	
	Lag dependent var.	0.78	0.07	11.05	
	*EMU effect	-0.69	0.27	2.55	
	ΔRGDP	-0.041	3.81	-1.11	
	Real exchange rate	-0.47	1.06	0.44	
	R-square = 0.57				

Spain	Constant	-4.64	3.48	1.33	
	Lag dependent var.	0.71	0.063	11.25	
	ΔRGDP	-0.181	2.72	6.67	
	*EMU effect	0.19	5.67	3.29	
	Real exchange rate	-0.38	2.33	-0.16	
Spain	*EMU effect	6.86	4.99	1.37	
	Real ex. rate Lag 1	1.27	2.31	0.55	
	*EMU effect	-8.97	5.07	1.77	
	R-square = 0.65				

The persistence of the trade balances reported in our results is closely in line with VAR results for Germany, France, and Italy by Lee and Chinn (2006). These authors also find a very weak and statistically insignificant response of the French and Italian current accounts to the real exchange rate, while the German current account responds negatively and significantly to changes in the German real exchange rate.[7]

One weakness of the data used so far is that the trade weights employed to calculate the real effective exchange rates and the real GDP of the ten largest trade partners are based on trade data in 2005. The group of the 10 largest trade partners therefore includes countries that did not exist as sovereign countries or did not participate in world trade as market economies in the 1980s. Furthermore, the opening of Central and Eastern Europe to international trade and the rise of China as a trading nation have changed the trade weights significantly over the past 15 years.

To avoid potential biases resulting from these changes, we calculate the shares of the euro area with non-euro area countries for each year since 1981 and recomputed the real GDP of the 10 largest trade partners and the effective real exchange rate on that basis. Figures 14 and 15 show the difference these recalculations make for the explanatory variables of our model. Figure 14 indicates that the new relative real GDP series lies above the original one for all years during the 1980s. This suggests that the trade weights from 2005 give too much weight to countries with relatively low GDP in the 1980s. The two series converge in the mid-1990s, suggesting that there are no large changes in the trade structure of the euro area thereafter. Figure 15 shows that the new effective real exchange rate series lies below

[7] Arghyrou and Chortareas (2006) report lower persistence of the current accounts of EU countries and similar effects of the real exchange rate. However, these authors do not distinguish between intra and extra EMU trade and do not account for the effects of income growth.

the original one during the 1980s, suggesting that the 2005 trade weights give too much weight to countries with relatively weak currencies in the 1980s. The series exhibits a noticeable jump in 1990, the year when China first appears among the top 10 trade partners of the euro area, while other countries like the former Soviet Union disappear from that group.

Figure 14

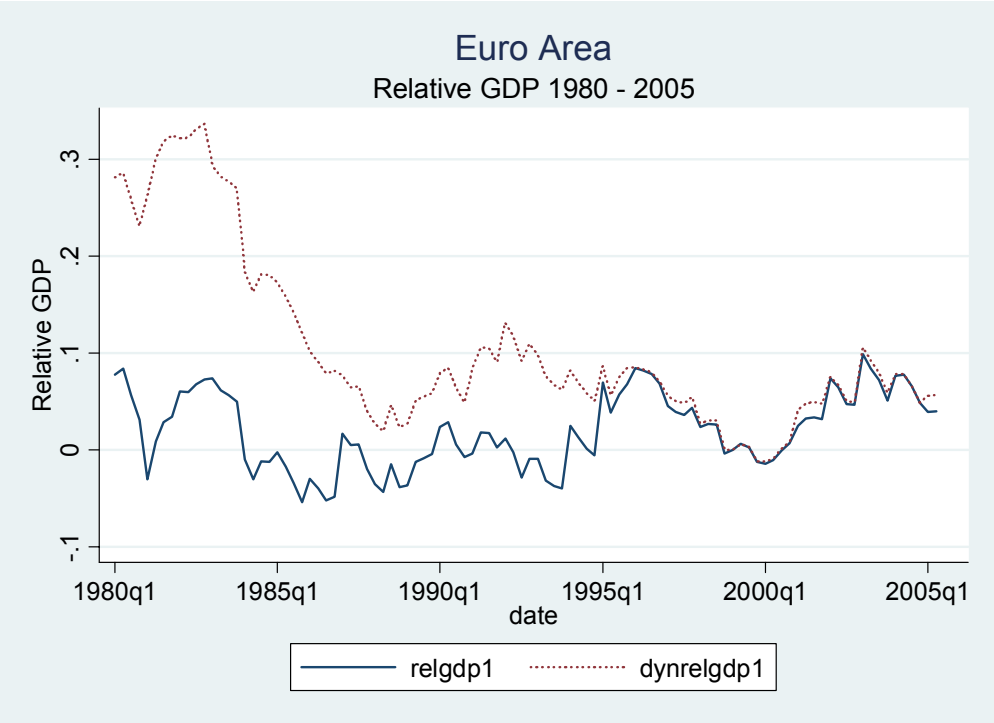


Figure 15

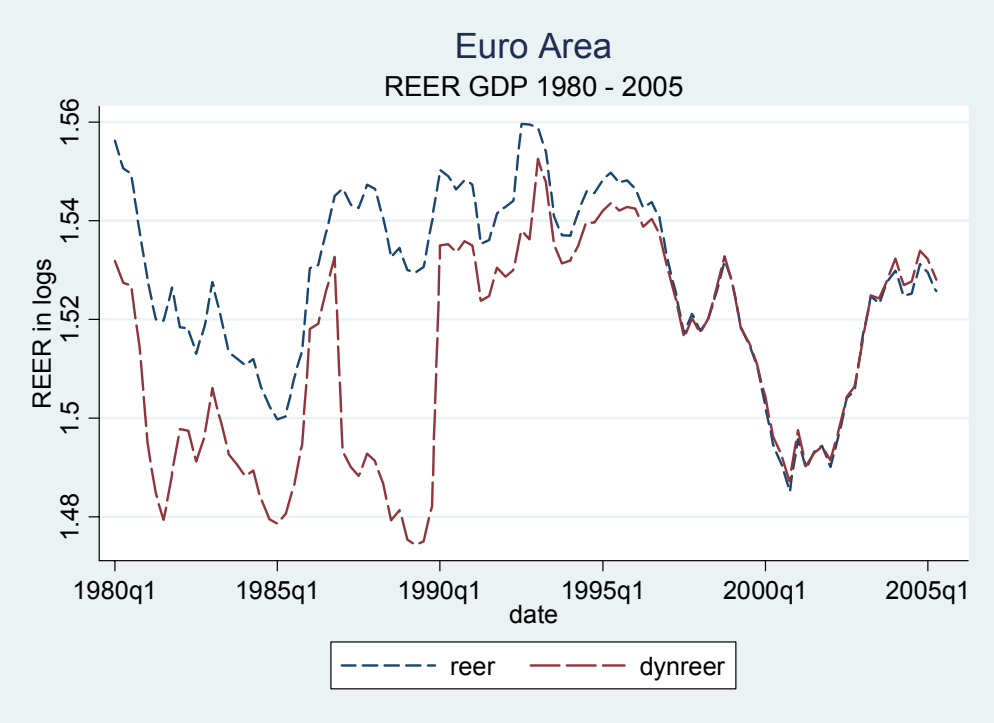


Table 7 reports the results of estimating our trade balance model with the new data series. The upper part of the table uses the full data set again. It shows that the persistence of the trade balance remains very large, while the coefficient on the relative real GDP growth rates has is somewhat smaller and the coefficient on the real exchange rate is considerably smaller in numerical value than in Table 5. Nevertheless, the long-run effects of changes in relative real GDP growth and the real exchange rate are similar to those estimated in Table 5.

Table 7: Trade balance models with dynamic trade shares

	Variable	Coefficient	Standard dev.	t-ratio	Long-run effect
Euro Area	Constant	2.23	1.36	1.66	
	Lag dep. var.	0.93	0.031	29.46	
	ΔRGDP	-0.016	0.015	1.08	-0.22
	Real Ex Rate	-0.50	0.30	1.66	-6.84
	R-square	0.90			
Euro Area 1991-2005	Constant	4.60	2.27	2.02	
	Lag dep. var.	0.82	0.065	12.62	
	ΔRGDP	-0.04	0.02	2.09	-0.22
	Real ex. R.	-1.00	0.50	2.02	-5.52
	R-square	0.80			

The lower part of Table 7 uses data only starting in 1991. We do this in view of the break in the real exchange rate series in 1990. Here, we note a considerable decline in the persistence of the trade account. At the same time, the coefficient on the relative real GDP growth rate more than doubles, and the coefficient on the effective real exchange rate is twice the coefficient from the upper part. Compared to the estimates using fixed trade weights, the short-run reaction of the trade balance to changes in relative real GDP growth is much stronger, and the short-run reaction to changes in the effective real exchange rate is moderately stronger. Nevertheless, the long-run effects of changes in relative real GDP growth remain unchanged, while the long-run effect of the effective real exchange rate is smaller than those based on the estimates with fixed trade weights. A permanent appreciation of the real exchange rate of the euro by 10 percent lowers the trade account by 0.55 percent of euro-area GDP in the long run.

6. Conclusions

We have documented a growing dispersion in current account balances among countries in the euro area since the early 1990s. The differences in current account positions widened significantly following the creation of EMU. We have shown, first, that EMU has changed the pattern of capital flows within Europe. Specifically, it has increased the tendency of capital flows to go from relatively rich to relatively poor countries within the euro area. This suggests that the observed current account imbalances are sign of the proper functioning of the euro area rather than a sign of improper macro economic management.

Furthermore, we have presented some preliminary estimates of current account adjustment of the euro area and its constituent economies. Our estimates indicate that the long-run effect of a real appreciation of the euro against the currencies of its main trade partners is sizeable. Thus, in a scenario in which the dollar devalues against Asian currencies, the US current account closes, but Asian countries stubbornly continue to run current account surpluses, the euro area would experience a large deterioration of its trade balance. Furthermore, this deterioration would be distributed unevenly across its member economies, at least in the short run. Such a development could indeed pose a serious challenge to the sustainability of the

common currency. More empirical work, currently under way, is needed to obtain more precise estimates of the outcomes of such a scenario.

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