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CURRENT ACCOUNT "CORE-PERIPHERY DUALISM" IN THE EMU

by Tatiana Cesaroni* and Roberta De Santis**

Abstract

Current account (CA) dispersion within European Union (EU) member states has been increasing progressively since the 1990s. Interestingly, the persistent deficits in many peripheral countries have not been accompanied by a significant growth process able to stimulate a log run rebalancing as neoclassical theory predicts. To shed light on the issue this paper investigates the determinants of Eurozone CA imbalances, focusing on the role played by financial integration. The analysis considers two samples of 22 OECD and 15 EU countries, three time horizons corresponding to various steps in European integration, different control variables and several panel econometric methods. The results suggest that within the OECD and EU groups financial integration contributed to explain CA deterioration in the peripheral countries especially in the post-EMU period. The business cycle seems to have played a growing role over time, whereas the role of competiveness seems to have diminished with respect to the past.

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1. Introduction *

While the current account (CA) of the Eurozone as a whole has remained almost balanced since the 1990s, dispersion across member states' CAs has been increasing. Diverging trends among countries have become particularly evident in the post-EMU period and have been characterized by persistent CA deficits in the Eurozone periphery that have been complemented by growing surpluses in some core countries. Such heterogeneous behaviour has been called "Eurozone CA core-periphery dualism" and represents a shortcoming for both the long-run sustainability of peripheral EU member states' finances and the effectiveness of centralized intervention within the Euro Area.

The lack of a spontaneous rebalancing process[1] among Euro Area economies has stimulated a wide debate within the European institutions on the absence of proper rules and parameters such as ceilings for single countries CA imbalances into the existing EU treaties. The need to implement a stricter degree of policy coordination between the Eurozone members to prevent such imbalances expanding in the future has also been emphasized, and the adoption of the Macroeconomic Imbalances Procedure (MIP) within the EMU countries at the end of 2011 goes exactly in this direction.

According to the neo-classical theory of intertemporal utility maximization, diverging CA among countries is the natural consequence of a future convergence of economies with different levels of capital endowment. Specifically, countries with lower income per capita and higher productivity growth would be expected to attract foreign investment in view of the higher expected rates of return on capital. The productivity of the invested capital would eventually produce CA rebalancing through competitiveness gains in tradable sectors and reimbursement of the external debt.

[1] In the post crisis period (2009-12), there was a substantial adjustment in the external imbalances of the Euro Area peripheral countries. However, this rebalancing was mainly due to the decline in domestic demand and the contraction in private investment, particularly in construction, as result of the economic crisis and thus cannot be associated with a good rebalancing process.

Nevertheless, from the beginning of the EMU to the present there has been no clear evidence of a spontaneous CA rebalancing process within the EMU, despite a strong adjustment in the external imbalances of the Eurozone peripheral countries during the financial crisis.

In the literature various explanations have been proposed for the persistence of CA deficits among EU periphery members, including, for example, a lack of competitiveness due to high unit labour costs or unproductive investment in non-tradable sectors (i.e. housing investment). Blanchard and Giavazzi (2002) offered another interesting explanation immediately after the creation of the EMU. By analysing the causes of Eurozone imbalances the authors showed that national saving and investment correlations in the periphery decreased significantly, especially as European financial integration intensified (i.e. with the creation of the single currency). They considered this evidence to be an indication of the EMU suitability to create a well-integrated capital market (i.e. "home bias reduction"). They also found that the Feldstein and Horioka, 1980 puzzle (i.e. the absence of capital outflows from higher income per capita countries to poorer countries with higher expected returns) did not hold in the Eurozone, interpreting this fact as an increase of financial integration and a natural cause of CA divergences among EMU countries[2] that reflected opportunities for catching up and future convergence in the periphery.[3]

To explore the causes of the persistent CA divergences among Eurozone countries we investigate the "CA core-periphery dualism" with a particular focus on the role of the European financial integration process. To this end we examine the impact of capital flows liberalization (in addition to the main CA determinants) within the Eurozone using different time samples, groups of countries and econometric techniques and control variables. Robustness checks are also performed by taking into account the role of financial integration using two different indicators: the Chinn and Ito (2008) index of capital openness (known as the *de iure* measure) and a financial diffusion indicator that considers the ratio of financial assets plus liabilities to GDP for each country compared

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[2] This enables easier access to international capital markets of some "peripheral" countries and would therefore have helped to generate domestic demand pressures that finally led to the accumulation of large and persistent current account deficits.

[3] See Cesaroni et al. (2011) for a description of the main properties of the Euro Area business cycle and stylized facts.

with the rest of the world (a *de facto* measure); both are available for a broad set of countries. Although these two capital openness indices are very different (they capture different aspects of financial development), they allow complementary sources of information on the phenomenon of financial integration to be explored. Since Blanchard and Giavazzi (2002) a large literature has investigated the determinants of CA balances for different sets of countries using various regressors (income per capita, exchange rates, trade openness, Net Foreign Assets, budget balances, GDP growth, population growth, interest rates, oil price, dependency ratios, financial development measures and institutional factors).[4] However, to the best of our knowledge, no paper systematically analyses the CA core and periphery effects of financial integration and capital openness in the Eurozone countries.

Among the papers linking CA imbalances to financial integration indicators in the world economy Chinn and Prasad (2003) analyse the medium-run CA determinants but focusing mainly on developing countries (18 developed and 72 developing countries) using cross-section and panel techniques for the sample 1971-1995. They find evidence of a positive impact of financial deepening (approximated by an M2/GDP measure) on CA for the whole sample that is even stronger for the subset of developing countries.

Chinn and Ito (2008) extend the work of Chinn and Prasad (2003) and analyse the determinants of CA imbalances focusing on the role of financial development and institutions. They focus on a set of 19 industrial and 70 developing countries over the period 1971-2004 but do not control for European countries' specificities. To measure financial development they use the private credit/GDP ratio and they find evidence of a negative and significant effect of this indicator on CA for both industrialized and emerging groups. In the augmented regressions (considering institutions and financial integration effects) they also use the Chinn and Ito (2008) index of financial openness to account for financial development and find evidence of a negative effect on CA only for industrialized countries. They conclude that financial development as a solution for the global saving glut is not supported by empirical analysis. As robustness checks, the authors use three alternative measures of financial development (first principal

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[4] Income per capita, exchange rates, trade openness, Net Foreign Assets, budget balances, GDP growth, population growth, interest rates, oil price, and dependency ratios are the standard classical determinants of CA used in the literature. However, some of them have become less significant in explaining the more recent patterns of CA imbalances in both developing and industrialized countries.

components of private credit to GDP, stock market capitalization, private and public bond market capitalization, and so on), which for the most part confirm the previous results.

Among the papers focusing strictly on the Euro Area, Jaumotte and Sodsriwiboon (2010) consider a panel of 49 advanced (including 27 EU) and emerging economies in 1973–2008. They find that financial openness (approximated by a financial liberalization index and the Chinn and Ito, 2008 index) lowers CA in aggregate, but they do not consider the financial integration effects separately for core and periphery groups.

Schmitz and von Hagen (2012) distinguish between balances against the Eurozone and the rest of the world and examine these flows for the EU-15 countries, approximating financial deepening with income per capita data. In their main finding Eurozone members' net flows followed differences in income per capita even before the introduction of the euro. Their econometric investigation also reveals a quite substantial financial deepening of the European capital markets, whereby divergent capital endowments across the EMU countries triggered by financial integration are found to flow from countries where capital was abundant to countries where it was scarce.

Belke and Dreger (2013) compare the relative effect of income per capita differences and competitiveness on CA using panel co-integration techniques for 11 Euro Area countries and different sub-sample periods and conclude that diverging competitiveness (approximated with the real exchange rate) has been the main factor in external imbalances in the Eurozone. To account for differences in peripheral countries' behaviour they run separate regressions for Greece, Spain and Portugal and find evidence of a decreasing role of income per capita (used as proxy for catching up) for these countries over time. They conclude that an asymmetric policy response is required to reduce the imbalances (i.e. a depreciation of real exchange rates in the deficit countries by cutting unit labour costs) but in the analysis do not consider financial integration among the explanatory variables.

Finally, Sanchez and Varoudakis (2013) assess the contribution of some macroeconomic factors associated with CA imbalances in the Eurozone by estimating a panel-data vector autoregressive model for the period 1975–2011 without considering the impact of financial integration. In their findings demand shocks contributed more to CA balance dynamics in the Eurozone periphery than in the core, whereas competitiveness

(measured by real exchange rates or unit labour costs [5]) was a less prominent factor in the periphery but relatively more important than in the core.

This paper contributes to the existing literature in three ways. First, it provides a broad empirical analysis of the determinants of intra-Eurozone CA balances, including some European financial integration process indicators, using static and dynamic panel data techniques.[6] Second, it explicitly takes into account the different behaviour of core and periphery countries in relation to some selected regressors using interaction effects in the regressions. Finally, in order to study the role of governance and institutional quality in determining the imbalances within the EMU we expand the set of regressors to include qualitative variables.

The paper is organized as follows: Section 2 reports the main stylized facts concerning current account imbalances within the EMU, Section 3 describes data sources and sample selection, and Section 4 describes the empirical strategy, estimate results and robustness checks. Conclusions follow.

2. Stylized facts

There is strong evidence that CA balances have been progressively diverging among member countries since the beginning of the 1990s.[7] While in a small group of countries (mainly Spain, Greece, Portugal, Italy and Ireland) deficits became large and persistent, another group of countries (chiefly Germany, Belgium, the Netherlands, Finland and Austria) registered large surpluses. This finding reflects what in the recent literature has been called "European core-periphery dualism of current account". After the recent Eurozone debt crisis, concerns emerged over the suitability of common fiscal and monetary policies to reduce countries' divergences. The question whether core-periphery dualism existed before or was actually fostered by the intensification of European economic and financial integration process has also been a central point in this debate.[8] To

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[5] Giordano and Zollino (2014) for example find evidence that price and non-price competitiveness significantly affect export performance to a varying degree across the largest European countries.
[6] While the static panel approach has been widely used in this context, very few papers concentrate on dynamic panels.
[7] European Commission (2012).
[8] Caporale et al. (2014).

shed light on the question it is important to analyse carefully the determinants of the disequilibria.

In order to analyse these dynamics Figure 1 reports the current account balance for the euro area, US and Japan for the period 1991-2012. Looking at the overall dynamics we see that while Japan and the US were persistently in surplus and deficit (respectively), the Eurozone experimented a balance close to zero with a trend towards a small surplus after the 2008 crisis.

[Figure 1]

To disentangle the dynamics of CA within the Eurozone members, Figure 2 reports the trends of current account averages for core and peripheral countries. The core countries are Germany, Austria, Finland, Belgium, the Netherlands and France, while the periphery group is composed of Italy, Spain, Portugal, Ireland and Greece.

Observing the dynamics of intra-area CA balances it is evident that while in the pre-euro period there was no substantial divergence on average between core and peripheral countries, from 2000, when the EMU was completed, the divergences and the dispersion of current account positions in the member countries become evident. Although this trend can be considered part of a more global phenomenon among the advanced economies due to capital liberalization, it was particularly pronounced within the European Union.

[Figure 2]

In the period 1985-2008 Germany and a number of other smaller countries of Northern Europe (core countries) progressively built up larger current account surpluses versus some peripheral countries (Spain, Greece, Portugal and Ireland).[9] International investors purchased above all financial instruments issued by France and Germany that were then used as capital inflows within the euro area to finance demand components in deficit countries.[10]

More specifically, the intra-euro-area capital flows financed government debt (in Greece), financial sector borrowing such as real estate (in Spain and Ireland), or a combination of

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[9] Portugal's deficit remained at the very high levels reached early in the decade. See European Commission (2012).

[10] Germany was a net supplier for the euro area and a net receiver from outside the euro area. (See European Commission, 2012).

both (in Portugal and Italy). This pattern of capital flows suggests, among other things, that Eurozone investors viewed securities issued by peripheral European countries as close substitutes for securities issued by the core ones more than investors from outside the euro area.

Among the periphery and core groups, Italy and Germany displayed particular dynamics. Germany's current account surplus performed best among the core countries, while the deterioration in Italy's current account was not as severe as for the other peripheral countries.

In order to take these differences into account Figure 3 reports the dynamics of Italy's and Germany's CA together with the CA averages of the remaining core and periphery countries.

[Figure 3]

Looking at Figure 3 we note that although many recent economic analyses include Italy among the peripheral countries, its situation is quite singular and differs from that of both core and peripheral countries.

Italy's current account balance deteriorated steadily from 1996 to mid-2011. From a surplus of 3.2% of GDP in 1996, the CA balance turned slightly negative in 2002-05 and deteriorated significantly after the 2008 financial crisis, reaching a deficit of more than 3% of GDP in 2010-11.[11]

Part of the decline in the current account balance was driven by worsening terms of trade as the increasing price of imported oil – on which the Italian economy is structurally dependent – negatively affected the goods balance. Since the adoption of the euro Italy's net international investment position (NIIP) has also deteriorated: it stood at -8.3% of GDP at the end of 1996, but declined to about -22.5% by the end of 2012. However, unlike the other peripheral countries, the accumulation of current account deficits since 2006 is only partly explained by the deterioration in Italy's NIIP.[12]

Figure 4 reports the average current account of all the core and periphery countries for the two sub-periods 1986-98 and 1999-2012.

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11 As documented in Cesaroni (2013), whereas during the 1980s output fluctuations in Italy were driven mainly by a firm's catching up process, during 1990s demand side factors (i.e. currency shocks) became more important.
[12] See Lane and Milesi Ferretti databank EWN II (2012).

[Figure 4]

From the graph we see that the average CA balance switched from positive to negative for Italy, France and Ireland and from negative to positive for Austria and Finland. In 2009-12, there was a substantial adjustment in the euro-area peripheral countries' external imbalances. On average the CA balances of Ireland, Italy, Greece, Spain and Portugal improved and Spain, Ireland, Portugal and Italy eventually reached surpluses. The rebalancing of trade (and thus of CA balances) in the peripheral countries was mainly due to domestic demand declining faster than output. Moreover, the dispersion of CA balances in the EMU also remained high in the aftermath of the crisis and the rebalancing was mainly caused by a business cycle deterioration rather than a catching-up effect.

3. Data description and sample selection

We consider two different groups of countries: a full sample containing 22 emerging and industrialized OECD members [13] and a subsample of 15 EU countries, both of which include the 11 main EMU[14] economies. Although our analysis focuses on the Eurozone, the comparison with the full sample allows us to check the robustness results for the subset of EU countries, have a wider set of remaining countries of the group to use as control, and to compare our findings with those obtained in other empirical studies using a broader set of countries.

To account for core-periphery effects in the estimates we split the EMU countries into two different groups: core (Germany, Austria, the Netherlands, Belgium, Finland and France) and periphery (Italy, Spain, Portugal, Ireland and Greece) according to the prevailing definition in the literature.[15] The data come from different sources: OECD, Lane and Milesi Ferretti (2012) and World Bank databases (see Tables 1 and 2 in the Appendix for a detailed description of the data sources and summary statistics). The time

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[13] Australia, **Austria, Belgium**, Canada, Denmark, **Finland, France, Germany, Greece, Ireland, Italy**, Japan, Korea, Mexico, the **Netherlands**, Norway, **Portugal, Spain**, Sweden, Switzerland, the United Kingdom and the United States.

[14] 1999 marks the beginning of the euro period for all countries except Greece, which joined in 2001. Given the small size of their economies compared with the euro area as a whole, the omission of later entrants (namely Slovenia, Cyprus, Luxembourg and Malta) should not significantly affect the results. A similar choice was made by Caporale and Girardi (2011), among others.

[15] We also performed some sensitivity analysis, but changing the position of Italy from periphery to core does not change the empirical result.

sample spans from 1986 to 2012. 1986 is the year in which the Single Act[16] was signed and 2012 is the latest available year for most of the series in the dataset.

To explain CA determinants we selected a group of regressors on the basis of their economic importance and statistical significance. We divide the explanatory variables of CA into four groups: i) macroeconomic fundamentals;[17] ii) time and country dummies; iii) capital openness measures; and iv) governance indicators.

The first group includes:

i)   Real effective exchange rate (REEX).[18] This variable takes account of price level differences between trading partners. In particular, it considers variations in relative prices using consumer prices indices with base 2005. Movements in real effective exchange rates provide an indication of the evolution of a country's aggregate external price competitiveness.[19] An increase in the index indicates a real effective appreciation and a corresponding deterioration in the competitive country position (hence a worsening of the CA balance). It is expected to have a negative sign in the regression.

ii)   Fiscal balance ratio to GDP. The reason for using this is the potential effect of the fiscal balance (calculated as tax revenue and the proceeds of assets sold, minus any government spending) on the current account (positive or negative). Higher levels of public saving across countries historically tend to be associated with larger current account surpluses (theory of twin deficit[20]). We do not have any a priori on the sign.

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[16] A core element of the Single European Act signed in 1986 was to create a Single Market within the European Community by 1992.The most novel aspect of the Single Market Programme (SMP) was its focus on capital mobility. Some EU members had unilaterally liberalized capital mobility prior to the SMP, but substantial pan-European liberalization came only in the second half of the 1980s with a series of single market programme directives. The opening was completed in 1988 by a directive that ruled out all remaining restrictions on capital movements among EU residents. The definitive system was codified in the Maastricht Treaty.

[17] We tried also different specifications using more classical regressors such as dependency ratios or interest rates. The fitting was lower than the specification chosen.

[18] The role of real exchange rates in determining current account positions is a basic element of the theoretical framework of both traditional and modern approaches to international macroeconomics. For a discussion on the empirical application see Chen et al. (2012), J.B. Gossé and F. Serranito (2014), A. Belke and C. Dreger (2013).

[19] Percentage changes in the index are calculated by comparing the change in the consumer price index for a given country, converted into US dollars at market exchange rates, to a weighted average of changes in its competitors' indices. Chain-linked index takes as base period 2005. Source OECD.

[20] See Chinn (2005). This hypothesis underlines the fact that, according to the national accounts, the current account balance (EXP-IMP) is equal to saving (S= Sp+Sg) minus investment. Therefore, any expansion of the fiscal deficit (G-T) that lowers public saving (Sg), the other variables being equal, should cause a worsening of the current account balance. (Sp+SG)-I=(G-T)+(EXP-IMP). In the more sophisticated version of the hypothesis, which takes into account the endogeneity of private saving and investment decisions, fiscal expansion boosts domestic spending, pushing up domestic interest rates relative to foreign rates; this attracts foreign investors and buoys the national currency, thereby widening the current account deficit.

iii)   Business cycle. A positive business cycle (measured as output gap) will produce a higher income, leading to an increase in consumption expenditure, including imported goods and services, and lowering the CA. This variable should also catch the impact of the financial crises and it is expected to have a negative sign in the regression.

iv)   Income per capita. Higher levels of income reflect higher productivity due to larger capital endowments. This variable has been used extensively in the past as a proxy of productivity and competitiveness (Blanchard and Giavazzi, 2002). It is expected to have a positive sign in the regression.

v)   Real oil price in US dollars. This indicator accounts for the influence of the oil price on the current account balance.

The second group includes:

i)   Dummies for steps to deepen European economic integration such as the Single European Act, ratification of the Maastricht Treaty and the introduction of EMU. We do not have any a priori on the signs.

ii)   Dummies for different countries' subsets such as OECD, EU, core-periphery groups. We do not have any a priori on the signs.

The third group includes indicators of financial openness. Financial openness indices capture the degree of financial market liberalization and development affecting cross-country capital flows. Looking at the financial account as the difference between saving and investment and considering the link between current account and financial account, the expected sign of financial integration on the current account balance will depend on the prevailing transmission mechanism to these two components. More specifically, the greater is financial development, the higher will be the expected returns on investment projects (and the lower the associated risk). The effect of financial development on saving is controversial due to possible substitution effects; more developed financial markets and a more sophisticated financial system would, according to one point of view, lead to greater saving; from another point of view they would reduce the need for precautionary saving and could decrease the saving rate. Thus, considering net saving, if the magnitude of the financial development effect on saving exceeds that on investment, we will have an improvement in the CA; if the effect on investment is greater than the effect on saving, we will have a deterioration in the CA. Specifically, we use the following two indicators in the analysis:

i)   The Chinn-Ito index of capitals movement restrictions (*finopen*).[21] Higher values of this index indicate greater financial openness as the country is more open to cross-border capital transactions. The expected sign on the current account balance depends on the prevailing transmission mechanism (Chinn and Ito, 2008).

ii)   Financial openness index (*finopen1*). The index is given by the sum of financial assets plus liabilities divided by GDP and it represents a *de facto* measure of financial diffusion in a given country. We do not have an a priori on the CA balance effect of this indicator as the expected sign depends on the prevailing transmission mechanism described above (see Figures 5 and 6 of the Appendix).

The fourth group includes governance indicators taken from two different sources: the Worldwide Governance Indicators (WGI) database (see Kaufmann et al., 2010) and the Economic Freedom of the World database produced by the Fraser Institute.[22] These indicators, coming from opinion surveys, are qualitative and are used as control variables for a check of robustness results. The indicators used are Voice and Accountability, Corruption Reduction, Government Effectiveness, Capital Market Regulation, Capital Control and Regulatory Quality. All the indicators, with the exception of corruption, capital controls and credit market regulations (available from 2000 on an annual basis) are only available starting from 2002. We expect all these indicators to have a positive impact on the CA balance as they all proxy "institutional quality". The improvement in institutional quality is a drag on moral hazard and adverse selection and leads to more effective capital allocation in the international financial market (see Table 1 of the Appendix for a full description).

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[21] The index is the first principal component of the binary variables pertaining to cross-border financial transactions based on the IMF's categorical enumeration taken from the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).

[22] The Worldwide Governance Indicators (WGI) are a research dataset summarizing views on the quality of governance of a large number of enterprises, citizens and expert respondents in industrial and developing countries. The data are gathered from several survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms. The Fraser Institute measures and studies the impact of competitive markets and government interventions on individuals and society. See Economic Freedom of the World, 2013.

4. Econometric analysis

In this section we empirically investigate to what extent European financial integration and other EU specific effects (i.e. the creation of EMU) accounted for CA divergences among the Eurozone members using both static and dynamic panel econometric models.

Static panel data approach

As we have cross-country time series data and in order to compare the results with previous studies based on pooled regressions we first consider static panel regressions. We estimate the following equation:

$$CA_{it} = \beta_i + \beta_1 * REEX_{it-1} + \beta_2 * bcy_{it} + \beta_3 * I(k)finopen_{it} + \beta_4 * I(k)fisbal_{it} + \beta_5 * Z_{it} \qquad [1]$$

where the dependent variable CA_{it} is the CA balance to GDP ratio in nominal US\$ determined by the difference between Exports and Imports plus Net Income and unilateral transfers.[23] The country and year indices are respectively i and t and β_i collects the fixed country effects. REEX is the real effective exchange rate of the currency included with a time lag to avoid possible endogeneity; bcy_{it} is a proxy of the business cycle (output gap); $fisbal_{it}$ is the public budget balance divided by GDP; and fin_{openit} is the financial openness indicator (i.e. a de facto capital openness indicator and the Chinn-Ito index). Z_{it} contains common factors affecting the CA and includes indicators of real oil prices, income per capita, internal distance, geographical area and governance.[24] Finally, I(k) is a binary indicator accounting for interaction effects among groups of countries that takes the value one (and zero otherwise) for (a) countries belonging to core (k = 1), (b) countries belonging to periphery (k = 2), and (c) countries belonging to the OECD but not to the core or periphery (k = 3). This interaction is considered for both capital openness and budget balance data. Regarding the decision to split the budget balance effects as well as the capital openness effects on the CA, it is important to stress that while the impact of the

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[23] We decided to take as dependent variable the overall CA balance and not the intra-area CA balance because the evidence showed a strict correspondence between the CA deficit and surplus within the area that could potentially lead to some statistical misspecification once the regression was run for the EU sample.

[24] The internal distance of a country (taken from the Cepii database) is approximated by the area of the country or its square root multiplied by a suitably defined proportionality factor. The area is the geographical area of the country in km². We decide to introduce these two variables in the estimate as proxies of market potential to control for the dimension of the national markets in line with the relevant literature. See for example Melitz (2005).

fiscal stance is not our main focus, it might be relevant to explore the link between the sign and magnitude of budget balance and capital openness coefficients in the regressions.

Dynamic panel data approach

A dynamic panel is used in the analysis because trade flows, and thus the CA, are affected by marked persistence effects due to the existence of sunk costs in entering foreign markets. However, considering dynamics raises econometric problems. If trade were a static process, the fixed-effect estimator would be consistent for a finite time dimension T and an infinite number of countries N. But since we consider CA evolution a dynamic process, the transformation needed to eliminate the fixed effects produces a correlation between the lagged dependent variable and the transformed error term that renders the least square estimator biased and not consistent. To avoid the inconsistency problem, Arellano and Bond (1991) suggested transforming the model into first differences and running it with the Hansen two-step GMM estimator.[25] Arellano and Bover (1995) described how additional moment conditions could increase efficiency if the original equations in levels were added to the system of first-differenced equations. This estimator, the "System GMM" estimator, has been refined by Blundell and Bond (1998). The estimated dynamic equation takes the following form:

$$CA_{it} = \beta_i + \beta_0 CA_{it-1} + \beta_1 * REEX_{it-1} + \beta_2 * bcy_{it} + \beta_3 * I(k)finopen_{it} + \beta_4 * I(k)fisbal_{it} + \beta_5 * Z_{it}$$
[2]

Although the System GMM provides many advantages, we should also consider some caveats. First of all, the approach is complicated to implement and can easily generate invalid estimates. To cope with the complexity, the key is to obtain proper instruments, to guarantee the overall validity of the moment conditions, and to control for serial correlation in the error term of the equation in levels. In the analysis we employ the Hansen test to check for the overall validity of the selected moment conditions and we use the Arellano and Bond (1991) test to check for possible serial correlation in the level

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[25] They show how the two key properties of the first differencing transformation – eliminating the time-invariant individual effects while not introducing disturbances for periods earlier than period t-1 into the transformed error term – can be obtained using any alternative transformation (i.e. forward orthogonal deviations).

equation. In addition, there is a specific issue associated with our exercise when using the System GMM. The long time dimension of our dataset (1986–2012) may cause too many instruments, which potentially makes the two-step System GMM not appropriate for inference. To deal with this issue, in what follows we use the one step System GMM, although theoretically less efficient than the two-step counterpart. However, according to Bun and Windmeijer (2010), the difference between both is only marginal.

4.1 Full sample analysis

Table 3 reports the estimate results of static fixed effects and dynamic panel regression models for the OECD and the EU country groups in the full sample 1986-2012. To evaluate the possible impact of time invariant factors such as area and internal distance, we also compare the Fixed Effects results with the Hausman and Taylor (HT) estimator. [26]

To determine the static econometric strategy (i.e. Random Effects versus Fixed Effects) we performed a Hausman specification test to check the presence of correlation between explanatory variables and individual effects. Results show that the null hypothesis of zero correlation is refused, indicating that for our purposes the Fixed Effects model provides more efficient estimates than the Random Effects one.[27]

In addition to the main macroeconomic determinants an EMU dummy[28] taking into account the effect of the EMU countries joining the common currency on the CA is also included in the estimates. For the OECD group, we checked for possible different effects of financial integration and fiscal stance in the "core and periphery" Eurozone countries by including in the estimates three complementary interaction terms for the financial

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[26] The HT method is a 2SLS instrumental variable estimator without external instruments that deals with correlation between regressors and unobserved individual effects and is used when time invariant variables are included in the estimates. The HT model uses variables already included in the model as instruments. In the empirical literature there are different procedures to select the variables correlated with μij. It is possible to select instruments on the base of economic intuition or following different procedures. Our preferred selection of instruments includes real effective exchange rates, output gap and internal distance.

[27] The two most widely used panel data models are the random effect model (REM) and the fixed effect model (FEM): both can control for heterogeneity. Their assumptions are different. REM models require unobserved bilateral effects to be ~ n.i.i. and orthogonal to the remaining part of the error term. Regressors have to be uncorrelated to individual effects and error term for all cross-sections and time periods. If the orthogonality conditions hold, the REM provides more efficient estimates than FE estimators. If explanatory variables are correlated with unobserved individual effects FEM is consistent.

[28] This dummy considers the different entry dates of the various countries in the EMU.

integration indicator (finopen*core, finopen*periphery and finopen*OECD_EZ) and three for the fiscal balance (fiscalbal*core and fiscalbal*periphery and fiscalbal*OECD_EZ[29]), all built by multiplying the core, periphery and OECD_EZ dummies for the above indicators. Core, periphery and OECD_EZ dummies take into account the effect of financial openness and fiscal balance on the CA respectively for the core, periphery and OECD countries excluding the Eurozone. Finopen is the Chinn ITO (2008) index taken in levels. For the EU subgroup (14 countries) the interaction effects terms obviously refer only to Core and Periphery.

OECD countries. The estimate results for 22 OECD countries obtained with the fixed effects model (column 1) show that the REEX, output gap, income per capita and oil price are significant and enter with the expected signs.[30] The EMU dummy is also significant and contributes to lower the CA in the period considered.

Looking at the interaction terms, the most interesting finding is that the financial openness indicator seems to have had a positive impact on the CA imbalance for the OECD countries excluding the Eurozone on average (2.39), whereas disentangling the impact for EMU core and periphery countries it emerges that financial integration had a negative impact on the periphery (-1.22) but for the core countries the coefficient is positive though not statistically significant. Our evidence of a positive impact of financial openness (measured with the Chinn and Ito index) for the OECD group excluding the Eurozone is not fully comparable with the results of Chinn and Ito (2008). They find a negative and significant relationship with the CA for developed countries and a positive relation for less developed and emerging economies. When comparing the results we have to consider that our subsample associated with the interaction term OECD_nonEZ is very small (11 countries) and is a mix that includes both industrialized economies such as the US, Canada, Japan, the UK and Switzerland and emerging countries such as Korea and Mexico.

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[29]Following the literature (Caporale and Girardi, 2011; Caporale et al., 2014) we define Austria, Belgium, Finland, France, Germany and the Netherlands as "core" and Greece, Ireland, Italy, Portugal and Spain as peripheral EMU countries.

[30] In this form it is not possible to make a cross comparison of the magnitude of the coefficients that are not elasticities as the regressors are not in logarithmic form. This is due to the fact that many indicators take negative values and sp cannot be transformed into logarithms.

Another interesting result concerns the relation between the CA and the fiscal balance for the three interaction terms. According to our estimates the fiscal balance has a positive and significant sign for the Eurozone core countries (0.26) and for the OECD group excluding the Eurozone (0.21), confirming the twin deficit hypothesis for these groups of countries, in line with the findings of Chinn and Ito (2008).[31] Interestingly, the panel estimates show no significant relation between the government and the external balance for the peripheral countries. However, it is worth noting that this outcome is the average of very different individual country results and structural changes could somehow have had an influence. To further investigate this apparently counter-intuitive result for the periphery, we considered additional regressions in which we included budget balance as only regressor, as aggregate and again interacted with the three dummy groups. In this case we found that the budget balance is positive and significant as aggregate, but regressing the budget balance on the CA considering interaction terms, we find even in this case a negative and not statistically significant coefficient in the periphery. As a further check we also considered specifications including the cyclically adjusted budget balance. The results of a not significant effect for the periphery group are confirmed.

Comparing the results with respect to other panel techniques we find that for the HT estimator (column 2) the previous findings are confirmed, whereas the variables internal area and distance, introduced to account for possible geographical country (time invariant) effects, are not statistically significant. The estimation results from the dynamic panel model are reported in column 3. For income per capita and oil price the sign and the size of the estimated coefficients are similar to those obtained with the FE model. For business cycle and REEX the magnitude of the coefficients slightly decreases to -0.21 and -0.04 respectively. The effects on the CA coming from core and periphery groups concerning the interaction terms both for fiscal balance and financial openness are also confirmed, showing similarity and robustness with respect to the static panel estimates.

European Union countries. The fixed effects estimates for the EU sample (column 4) show robust and similar results with respect to the OECD sample although with a different magnitude of the impact coefficients. Specifically, the output gap coefficient is significant

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[31] We also tested the cyclically adjusted budget balance indicators and the results were substantially unchanged.

(-0.28) and seems to indicate that the business cycle contributed to explain CA trends even with a lower impact with respect to the OECD sample (-0.36). By contrast, the real effective exchange rate (-0.16) seems to have had a greater role in explaining CA dynamics within the subset of EU countries. The financial openness coefficient for the core countries is positive but not statistically significant, whereas for the periphery it is negative and significant. Looking at the interaction terms for budget balance we find a positive and significant coefficient for the core countries (0.23). On the contrary the panel estimates show no significant relation between the government and the external balance for the peripheral countries (in this case the coefficient is negative but insignificant).

[Table 3]

Overall, financial openness seems to have had a negative and significant impact only on the peripheral countries (financial openness for the core countries is not significant) both in the OECD and EU subsets. In the OECD group the EMU dummy coefficient, in line with the findings of Schmitz and von Hagen (2012), is negative and significant indicating a negative effect of the EMU. The results also hold for the EU group. The negative sign of the EMU dummy therefore seems to be consistent with the negative impact of financial integration for peripheral countries in both the OECD and EU samples and suggests, similarly to Jaumotte and Sodsriwiboon (2010), a role of capital flows in determining CA imbalances in the periphery. The disentangled impact of the fiscal balance for core and peripheral countries on the CA shows in this case too that the twin deficit hypothesis is confirmed only for the core countries, while for the peripheral countries the regressor is negative but not statistically significant.[32]

4.2 Robustness with respect to time horizon, EU groups and financial openness measures

In order to check the robustness of the results of EU countries in the full sample (1986-2012), in Table 4 we replicate the same fixed effects regression procedure in a

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[32] Belke and Dreger (2013) a find a negative coefficient of fiscal deficit in three periphery countries in a similar time sample, although their fiscal indicator is the level of government debt and not the deficit.

shorter sample (1999-2012) corresponding to the post-EMU period. As a further check, given the peculiar behaviour of CA balance dynamics in Germany and Italy with respect to other core and peripheral countries, we also consider an EU subset sample that excludes Italy and Germany from the estimates (column 3). It is worth noting that when considering the post-EMU period the capital account openness measures can lose significance in interpretation depending on the way in which they are constructed. For example, the financial openness index of Chinn and Ito appears to have lower variability in this shorter sample because since the creation of the EMU the index has been nearly constant at the level of highest capital openness within the Eurozone countries. To deal with this shortcoming, in the following set of regressions we use a *De_Facto* financial integration indicator (finopen1) built as the sum of net assets and net liabilities divided by GDP in place of the Chinn and Ito index. As for REEX, the indicator is included with a lag in the estimates in order to avoid possible endogeneity (here due to the fact that the numerator of the ratio comes from the balance of payments financial account component). As we show in this paragraph, the use of this second financial integration indicator does not weaken the previous findings because it performs very well also in the full sample (i.e. from 1986), providing similar results and conclusions.

[Table 4]

Looking at Table 4 all the previous results are confirmed especially for what concerns the impact of financial integration on core and peripheral Eurozone countries. The sensitivity analysis in column 3 also shows that the exclusion of Germany and Italy from the sample keeps the empirical results substantially unchanged.

To check the reliability and the stability of our findings for the EU subset after the introduction of EMU in what follows we concentrate on the group of EU countries and we assess the estimate results with respect to different time samples. These also allow us to make some considerations on the role played by the European integration process in determining CA disequilibria. To this end, Table 5 compares the coefficients of the regressions over three samples corresponding to various European integration deepening steps: i) the full sample 1986-2012 with 1986 corresponding to the ratification of the European Single Act; ii) the economic integration sample 1993-2012 with 1993 as starting

date, being the year of both the completion of the Single Market Programme and the ratification of the Maastricht Treaty; and iii) the post-EMU sample 1999-2012.

[Table 5]

Looking at the changes in the coefficients' magnitude over the three periods there are some interesting findings: i) the REEX coefficient decreases substantially in the post-euro period[33] showing, similarly to Sanchez and Varoudakis (2013), a minor role for competitiveness in explaining CA trends in the last decade; ii) the business cycle has a greater role in explaining the CA balance in the post-euro period than in the other two previous samples; and iii) the magnitude of the financial openness coefficient for the periphery countries almost doubled in the post-euro period in line with the stylized facts (paragraph 2, Figure 2). Interestingly, the financial deepening indicator coefficient for the core countries is positive and significant starting from 1999. This result corroborates the view of Schmitz and von Hagen (2012) that the dispersion of CA balances in the Eurozone widened after the introduction of the euro and thus that somehow during the process of financial integration it partly failed to fulfil the predictions of the OCA theories.[34] Income per capita, which in the literature is used as a proxy of convergence and catching up, is positive and statistically significant and its magnitude increases over time. This finding could suggest a convergence between the EU groups. However, as a robustness check we redid the same regressions disentangling the overall effect of income per capita for core and periphery using interaction dummies (as we had done for financial openness and budget balance). The results, which we do not report for reasons of brevity, suggest a completely opposite interpretation: in this case income per capita is in fact positive and significant only for the core, whereas for the periphery group the coefficient is negative. This result is in line with the findings of Belke and Draeger (2013).

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[33]The REEX is not statistically significant in the post-EMU period at aggregate level while it is statistically significant for the periphery group.
34 These results are also in line with Caporale et al. (2014).

In order to give an idea of the absolute magnitude of the impact of the coefficients on the CA, in Table 6 the average elasticity of the estimated coefficients over the 3 periods is reported.[35]

[Table 6]

Looking at the results we note that the business cycle elasticity significantly increases in the EMU period from -0.05 to -0.72. By contrast, the elasticity of the real effective exchange rate seems to decrease over the subsamples analysed, suggesting a decreasing role for price competitiveness. The elasticity of the fiscal balance for the core countries increases in the post-EMU sample. Interestingly, the average elasticity of the financial openness coefficient for the peripheral countries shows a progressive increase from about -0.4% before the EMU to -1.5% in the post-EMU period for the peripheral countries. For the core countries the elasticity of financial openness in the post-EMU period is about 1.8%. These results support our hypothesis of a role played by European integration process in determining the core-periphery dualism in the EMU. The absence of an endogenously determined process of current account and business cycle convergence within the Eurozone, as seems to emerge in the empirical analysis, suggests that to guarantee financial stability within the Eurozone more coordinated policies and a stricter European surveillance procedure might be needed.[36]

Impact analysis. To further analyse the impact of financial openness on the CA in what follows we assess the contribution of core and periphery countries' explanatory variables to the model prediction. More specifically, we evaluate the contribution of the various regressors to overall CA variation between 1999 and 2007 (2008 is the year of the crisis). The sum of the contribution is equal to the model's predicted value. We also report the actual and predicted values of CA growth rates over the period for each country. To perform the impact exercise we consider the regression coefficients reported in column 3 (post-EMU sample) of Table 5.

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[35] Elasticity is the percentage variation of the CA as a ratio to GDP due to a unitary percentage variation in the explicative variables included in the estimates. The elasticity reported in the table is given by the estimated coefficient times the average regressor value for the period under examination, divided by the average value of the dependent variable.

[36] It should be underlined, however, that in the aftermath of the crisis some reforms have already been implemented. For example, a new surveillance and enforcement mechanism was set up in December 2011 as part of the so-called "Six-Pack" legislation, which reinforced economic governance in the EU and the euro area.

Figure 7

The results of the impact analysis suggest that the main contribution to the CA growth rate between 2007 and 1999 came from income per capita, which contributed to increase the CA for all countries. In interpreting this result we have to keep in mind that income per capita is averaged over the full set of countries. As we saw before, a disentangled estimate of income per capita in the periphery produces a negative coefficient and thus would produce a negative contribution in the period. Figure 7 also shows that the budget balance contributes to an increase in the CA in the core countries (especially Germany and Austria).

The main contribution of financial openness to reducing the CA among the peripheral countries is in Ireland, a result that highlights the Irish financial system's heavy exposure even before the 2007 housing bubble burst (the large capital flows in this country are also linked to the advantageous fiscal system that attracts foreign direct investment). Competitiveness contributes to lower the CA in all the countries except Germany. As expected, the business cycle contributes to the deterioration in the CA in almost countries (except Portugal). The oil price also plays, as expected, an important contribution in lowering the CA for all countries. Income per capita makes an important contribution in explaining the CA in all countries, although, as explained when describing the estimation results of Table 5, the coefficient comes from an average of core and periphery effects. Disentangling the effect for core and periphery (introducing the interaction term in the estimates), we would find an opposite contribution to the CA in the periphery.

4.3 Robustness to control variables: the role of institutions

The dispersion of the CA balances in various Eurozone members, especially after 1999, reported in the literature has also been considered in relation to qualitative indicators approximating governance and policy coordination (Giavazzi and Spaventa 2010; Eichengreen 2010). To make some further robustness checks, in Table 7 we include some governance indicators in the previous estimates. Although the governance concept is

widely discussed among policy makers and difficult to quantify in empirical analyses, especially if the aim is to assess the effects of European governance, we try to approximate it through institutional quality indicators at country level. In interpreting the latter analysis, however, we need to take into account all the caveats due to the use of signals coming from qualitative survey indicators. As these indicators are only available without discontinuities starting from 1999, the estimation sample is 1999-2012.

[Table 7]

The estimation results reported in Table 7 column 1 show that the corruption indicator which accounts, by construction, for an increased reduction of corruption, is statistically significant and indicates, as expected and in line with Eichengreen (2010), that the decrease in corruption improves the CA balance within the EU countries. The results (Table 7 column 2) also show that the effectiveness of governance (which reflects perceptions of the quality of public and civil services and the degree of governance independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies) is statistically significant and contributed to the improvement in the CA balance during the EMU. The voice and accountability indicator is also statistically significant during the EMU and enters with the expected positive sign.

By contrast, capital control (limits on financial flows), regulatory quality and credit market regulation are not statistically significant in the period considered. This could be due to the fact that the phenomenon is captured by the quantitative financial openness indicator included in the estimates. Overall, the governance indicators seem to have played a role in explaining CA dynamics.

5. Conclusions

In this paper we analysed the role of financial integration in determining the dispersion in CA balances within Eurozone members. More specifically, we quantified this impact through the introduction of two financial integration indicators in the estimates, namely the Chinn and Ito (2008) index and a *de facto* measure of capital openness. According to our estimates, and mostly in line with the prevailing theoretical

and empirical literature, financial integration seems to have played a role in explaining CA dynamics in both the main OECD and the EU countries. In particular, looking at the Eurozone and differentiating the impact of financial integration for core and peripheral countries, we find evidence of a negative impact of financial integration on the CA in the Eurozone periphery. Moreover, this negative relationship seems to have increased in the post-euro period. The business cycle has also had a growing role over time, whereas competiveness appears to have reduced its impact on CA balances over time.

The increase in foreign capital inflows in the peripheral countries indicates that the EMU was effective in integrating the European capital market. However, the home bias reduction in the financial market contributed, according to our estimates, in creating a "CA core-periphery dualism", especially in the post-EMU period. This finding suggests that the recent reforms of European governance designed to create stricter European surveillance procedures, by reducing asymmetric CA imbalances in the Eurozone, could also improve the effectiveness of centralized policies.

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Appendix

Figure 1. CA balance in industrialized economies

Current account
(% of GDP)

Source: OECD   — • EZ   •••••• USA   — — Japan
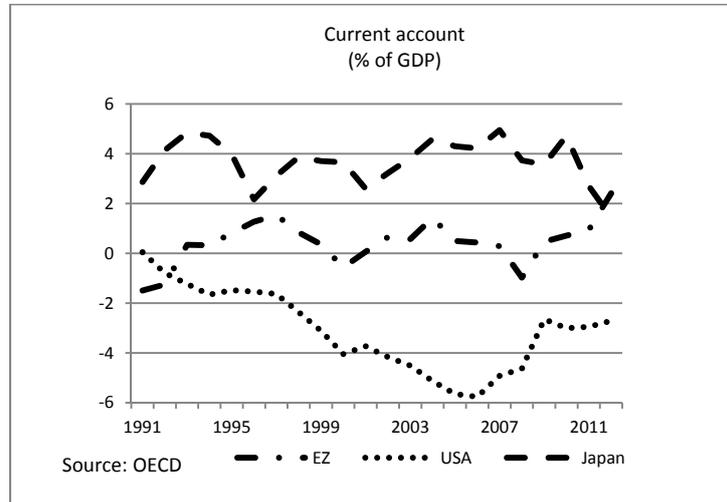
Figure 2. CA balance in the EMU core and periphery countries

Current account
(%GDP)

—— "core" av.   – – – "periphery" av.

Source:OECD
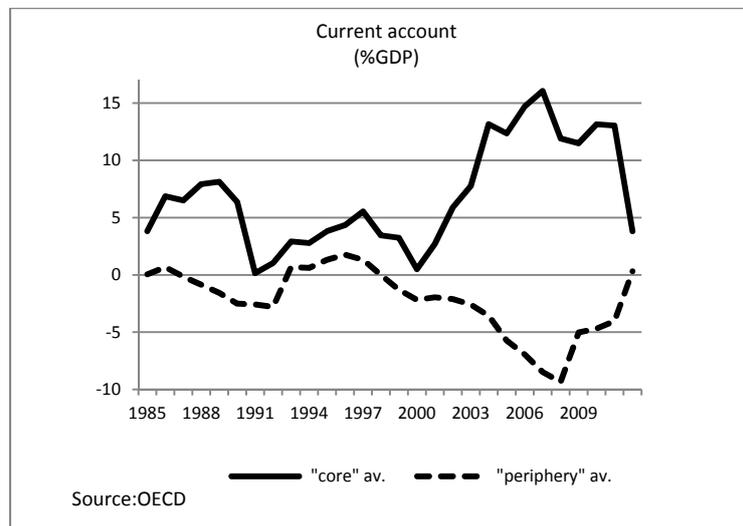
Figure 3. CA balance in Italy, Germany and the other core and periphery countries

Current account*
(%GDP)

     - - - "core" av.   —— "periphery" av.   —— • Italy   • • • • • Germany

Source:OECD
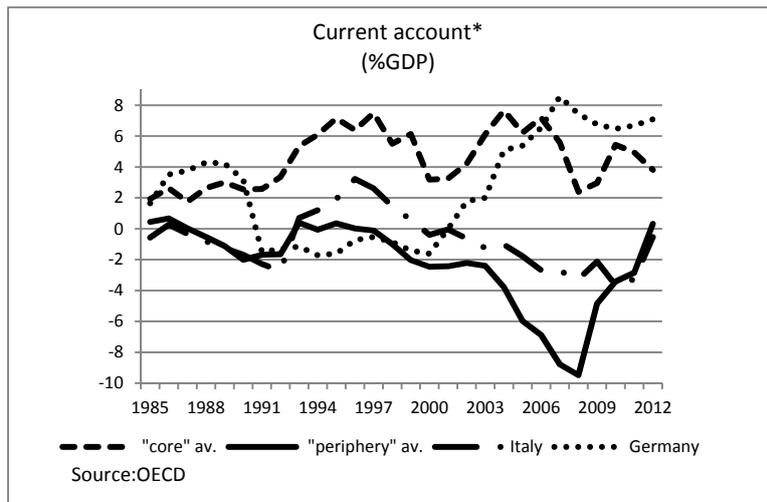
* The core average excludes Germany and the core-periphery excludes Italy.

Figure 4. CA balance (average) in the EMU countries

     ▪ 1985-1999   ▪ 2000-2012

Source: OECD
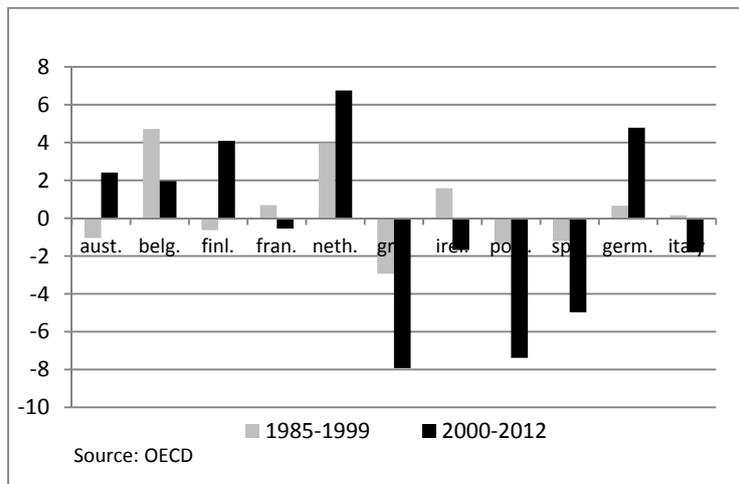
Table 1. Data description

Current account	Sum of net exports of goods, services, net income and net current transfers as a percentage of GDP. All in nominal terms (US $).	*Source:* OECD (1986-2012)
Output gap	% deviation of GDP from its trend.	*Source:* OECD
Fiscal balance/GDP	Tax revenue minus any government spending.	*Source:* WDI World Bank
Income per capita	Income per capita in US dollars.	*Source*: OECD
Real effective exchange rate	Percentage changes in the index are calculated by comparing the change in the consumer price index for a given country converted into US dollars at market exchange rates to a weighted average of changes in its competitors' indices, Chain-linked index takes as base period 2005.	*Source:* OECD
Real oil price in US$	Price of oil in US dollars.	*Source:* Thomson Reuters
Corruption	Is the abuse of public power for private gain.	*Source:*Fraser Institute
Capital controls	Restrictions on the citizens' ability to own foreign currency, bank accounts domestically and overseas.	*Source:*Fraser Institute
Regulatory quality	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	*Source:*WGI World Bank
Voice and accountability	Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	*Source:*WGI World Bank
Government effectiveness	Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	*Source:*WGI World Bank
Private sector credit	Measures the extent to which government borrowing displaces private borrowing.	*Source:*Fraser Institute
Credit market regulation	Measures the restriction under which banks operate.	*Source:*Fraser Institute
Chinn-Ito index	Capital openness measure.	*Source:* Chinn-Ito (2008)
Finopen 1	Net foreign assets+ liabilities (NFA+NFL)/GDP.	*Source:*EWNII Lane and Milesi Ferretti (2012)
Internal distance	The internal distance taken of a country is approximated by the area of the country or its square root, multiplied by a suitably defined proportionality factor.	*Source:* Cepii
Area	The area is the geographical area of the country in Km^2.	*Source:* Cepii

Table 2. Summary statistics. Sample 1986-2012

Variable	Obs	Mean	Std. Dev.	Min	Max
cagdp	579	1.066625	5.528006	-15.3773	25.10396
bcycl	567	0.035219	2.799673	-12.6077	10.73026
reex	594	99.81061	12.17988	63.7	146.2
finopen	562	1.81517	1.022902	-1.86397	2.439009
oil price	594	67.15765	45.84463	24.8901	168.745
finopen1	572	3.656724	4.642344	0.25269	37.56802
incomepc	594	21.58691	8.874802	4.467985	58.25797
fiscalbal	542	-2.21286	4.746157	-30.62	18.79

Table 3 CA determinants in OECD and EU countries. Full sample 1986-2012.

	OECD			EU		
	F-E	H-T	GMM-SYS	F-E	H-T	GMM-SYS
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Ca_{it-1}			0.72***			0.87***
constant	6.90***	11.40**	0.97	-13.82 ***	19.25**	-0.023 ***
$fisbal_{i*OECD\_EZ}$	0.21***	0.22 ***				
$fisbal_{*core}$	0.26**	0.26***	0.09	0.23**	0.23**	0.04
$fisbal_{*periphery}$	0.07	0.07	-0.11**	0.01	0.03	-0.15***
$bcy_{cle.it}$	-0.36***	-0.37***	-0.21***	-0.28***	-0.28 ***	-0.13***
$REEXit_{-1}$	-0.12 ***	-0.12***	-0.04***	-0.17***	-0.16***	-0.02
$fin_{openi*OECD\_EZ}$	2.39***	2.24***	0.27			
$fin_{open*core}$	0.16	0.27	0.08	-0.23	0.04	-0.12
$fin_{openi*periphery}$	-1.22***	-1.23***	-0.60***	-1.03 ***	-1.12***	-0.40**
EMU	-1.36 ***	-1.38 ***	-0.40	-1.93***	-1.97***	-0.33
Oil price	-0.03***	-0.03***	-0.03***	-0.03 ***	-0.03***	-0.03***
income per capita	0.34***	0.30 ***	0.27 ***	0.35***	0.32 ***	0.20 ***
distance		-0.02	0.00		-0.1	-0.1
area		0.00	0.00		0.00	000
Number of countries	21	21	21	14	14	14
Observations	513	513	513	317	317	317
R^2	0.27			0.45		
Sargan over-identifying restriction test			254.27 (0.000)			212.05 (0.000)
Test for interaction terms (F or χ2)	1.09 33.20***	1.03 32.3***	0.37 6.43**	3.11* 19.43***	4.8** 8.3**	2.73*
Over-identification test (S-H χ2)		4.04 (0.85)			7.66 9.44* (0.26)	

*** significant at 1% , ** significant at 5%, * significant at 10%. P-value in parenthesis

Table 4. CA determinants in OECD and EU countries. FE model. Sample 1999-2012

	OECD	EU	EU ex Italy and Germany
constant	-0.33	-0.82	-0.83
fisbal$_{i*OECD\_EZ}$	0.23***		
fisbal$_{*core}$	0.88***	0.89***	0.91***
fisbal$_{*periphery}$	0.01	0.02	0.03
bcy$_{cle.it}$	-0.50***	-0.53***	-0.56***
REEXit$_{-1}$	-0.06**	-0.06	-0.04
fin$_{open1OECD\ EZ1i}$	-0.04		
fin$_{open1*core}$	0.3*	0.33*	0.30
fin$_{open1*periphery}$	-0.27**	-0.27**	-0.28**
EMU	-1.76		
income per capita	0.49***	0.45***	0.39***
Oil price	-0.04***	-0.04***	-0.04***
Number of countries	21	14	12
Observations	273	168	156
R^2	0.48	0.49	0.45
Hausman test $\chi2$	5.58	27.01***	104.9***
Wald test for interaction terms (F or $\chi2$)	14.91***	28.00***	25.48***
	0.95	13.78***	13.51***

*** significant at 1% , ** significant at 5%, * significant at 10%.

Table 5. CA determinants in the EU countries over time. Fixed effects model

	Full sample (1986-2012)	Economic integration sample (1993-2012)	Post-EMU sample (1999-2012)
Constant	14.34***	9.09**	-0.82
fisbal$_{it *core}$	0.20**	0.3**	0.89***
fisbal$_{it *periphery}$	-0.15**	-0.08	0.02
bcy.it	-0.30**	-0.41***	-0.53***
REEXit-$_1$	-0.16***	-0.12***	-0.06
fin$_{open1*core}$	0.07	0.02	0.33*
fin$_{open1*periphery}$	-0.13**	-0.16**	-0.27**
income per capita	0.21***	0.30***	0.45***
Oil price	-0.03***	-0.03***	-0.04***
Number of countries	14	14	14
Observations	317	272	196
R^2	0.31	0.44	0.49
Hausman test χ2	50.08***	33.49***	104.9***
Wald test for interaction terms (F or χ2)	6.58* 6.14*	5.87** 5.70**	25.48*** 13.51***

*** significant at 1% , ** significant at 5%, * significant at 10%. *With respect to Table 1 we dropped the EMU dummy to compare the coefficients' magnitude over time.

Table 6. CA elasticity to main explanatory variables in the EU countries*

	Full sample (1986-2012)	*Economic integration sample (1993-2012)*	*Post-EMU sample (1999-2012)*
bcy.it	-0.04	-0.05	-0.72
REEXt-1	-25.3	-17.0	-13.8
fisbal$_{it}$ *core	0.4	0.4	1.2
fisbal$_{it}$ *periphery	-0.4	0.2	-0.1
fin$_{openi1}$*core	0.3	0.1	1.8
fin$_{openi1}$*periphery	-0.3	-0.4	-1.5

*The grey area indicates that the elasticity is referred to not statistically significant coefficients.

Table 7. CA imbalances and "governance" in the EU countries. Sample 2000-2012

	Model 1	Model 2	Model 3*	Model 4	Model 5	Model 6	Model 7
Constant	-14.86**	-9.33**	-3.55	-5.46*	-4.81	-0.05	-2.11
fiscalbal$_{it\ *core}$	0.71***	0.95***	1.1***	0.74***	1.00***	0.93***	0.73***
fiscalbal$_{it\ *periphery}$	-0.14*	-0.03	-0.05	-0.08	-0.02	0.00	-0.11*
REEXi$_{t-1}$	0.07*	0.01	-0.10**	-0.02	-0.04	-0.01	-0.08**
bcycle.it	-0.46***	-0.49***	-0.43***	-0.42***	-0.60***	-0.47***	-0.44***
fin$_{openi1*core}$	0.17	0.14	0.40**	0.42*	0.02	0.12	0.36
fin$_{openi1*periphery}$	-0.46***	0.31**	-0.29***	-0.28***	-0.32**	-0.25**	-0.27**
Income per capita	0.46***	0.24**	0.49***	0.49***	0.21**	0.28**	0.49***
Oil price	-0.03**	-0.02	-0.04***	-0.04***	-0.03**	-0.03*	-0.04***
corruption	1.72***						
gov. effectiveness**		3.52**					
capital mkt reg			0.40				
capital control				0.32			
voice and accountability**					4.71**		
reg. quality indicators**						-1.35	
priv. sect credit							0.23*
Number of countries	14	14	14	14	14	14	14
Observations	168	154	168	168	131	154	168
R^2 overall	0.61	0.49	0.54	0.52	0.42	0.22	0.56
Wald test for interaction (a)	32.94*** 10.85***	38.5*** 3.96*	27.06*** 11.22***	27.74*** 13.00***	48.25*** 5.05**	32.4*** 2.64	38.17** 11.85***

**Voice and accountability, government effectiveness and regulatory quality indicators are only available from 2002, Portugal is not included in the governance indicators.

*** significant at 1% , ** significant at 5%, * significant at 10%. (a) The first row refers to financial openness, the second one to fiscal balance.

Figure 5 Chinn Ito index of capital openness in the EMU countries. Period 1986-2012.
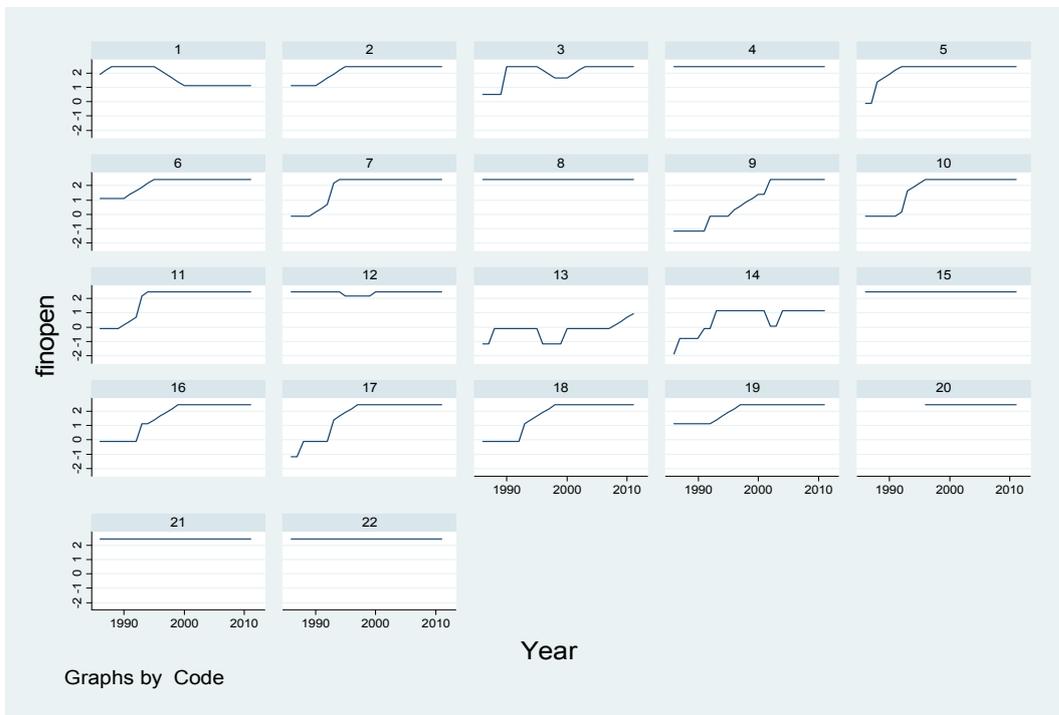

*Figure 6 De facto capital openness index in the EMU countries. Period 1986-2012.*
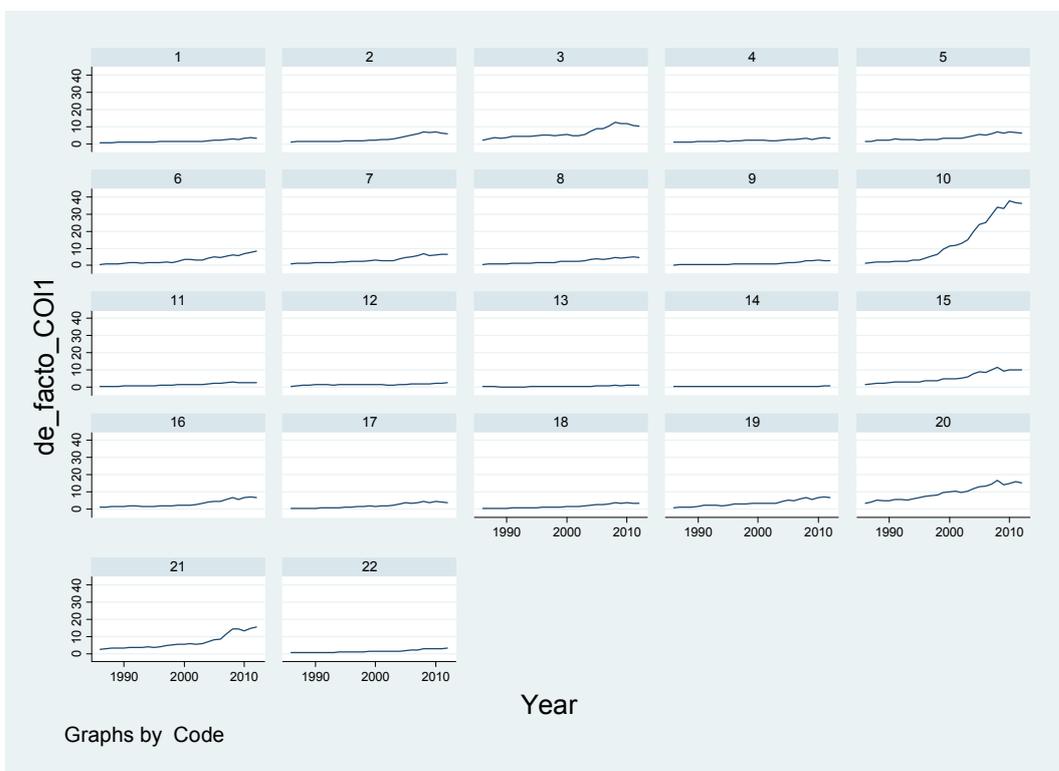
Figure 7 Contributions to CA balances (1999-2007).*
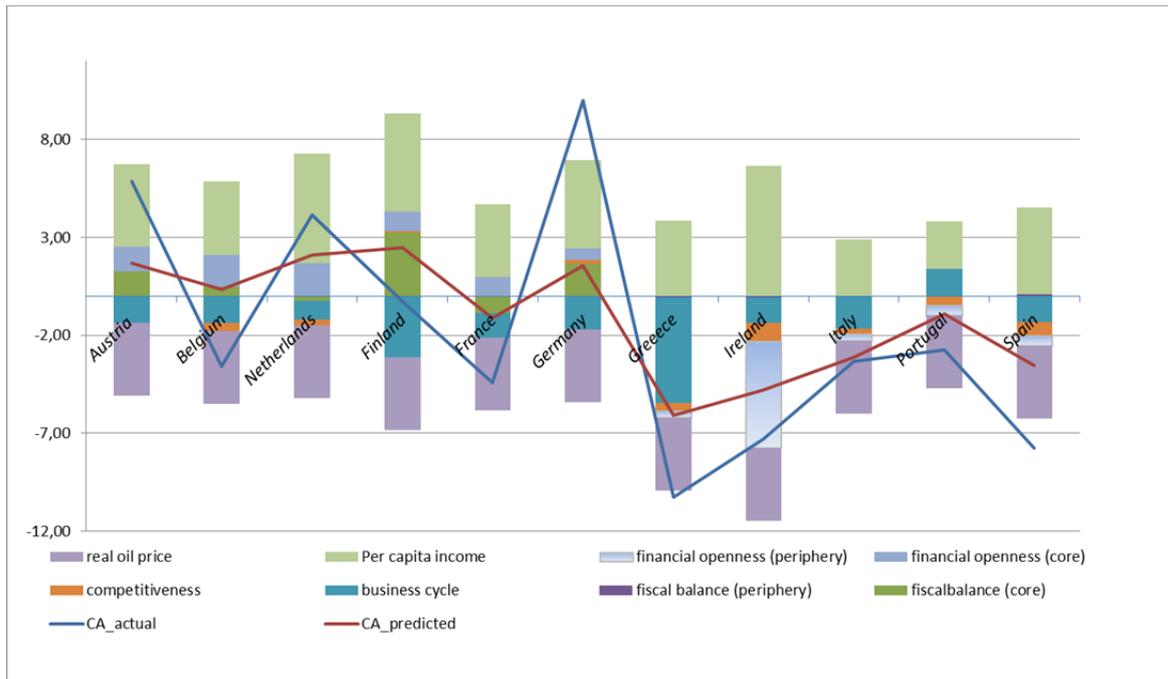
*Fixed effects set to zero.

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