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Long-Run Drivers of Current Account Imbalances in the EU: the Role of Trade Openness

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Long-Run Drivers of Current Account Imbalances in the EU: the role of trade openness[+]

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Abstract

This paper investigates, using panel cointegration methods, the long-run drivers of current account imbalances in 15 EU member States during the period 1974-2011. We argue that the degree of trade openness greatly affects the relative strength of the different long-term drivers of current account imbalances. Our empirical results indicate that competitiveness factors strongly affect imbalances in countries with a low trade openness, while the effects weakens as trade openness increases. Similarly, we find evidence of a positive effects of government debt on current account deficits for high openness countries and a negative impact for medium and low openness countries. Our results suggest that the structural heterogeneity in the degree of openness across EU countries might be an important contributor to the diverging patterns in current account balances experienced in the last decades.

Keywords: current account imbalances; panel cointegration; trade openness

JEL Code: F32, F41

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1. Introduction

With the outbreak of the Great Recession of 2008-09 and the subsequent debt crisis of 2011 that hit many Euro member States, the debate over the current account imbalances within the EU has widened. Since mid-2000s, most of the academic debate was focused on the United States - where current account deficits continuously deepened, reaching almost the 6 percent of GDP in 2006 - and, on China which kept running substantial current account surpluses.

The European Union as a whole has kept for a rather long period a substantial equilibrium in its current account balance. However, in the recent years and with the outbreak of the crisis, many member States are experiencing growing imbalances: countries such as Greece, Spain and Portugal (i.e. the most affected by the sovereign debt crisis of 2011) increased their current account deficits, while Germany, Sweden and the Netherlands experienced large surpluses.

Commercial imbalances softened after the outbreak of the global crisis of 2008-09 but still remained considerably high: current account deficits in 2011 were around 11 percent of GDP for Greece, while 5 and 6 percent of GDP respectively for Spain and Portugal. As regards countries in surplus, after the contraction due to the collapse of international trade in 2008-09, current account surpluses remained high, close to 6 percent of GDP for Germany and Sweden and to 7 percent for the Netherlands.

FIGURE 1 - HERE

Another pattern of divergence within the EU is associated with the recent sovereign debt crisis that is affecting EU member States in a highly heterogeneous way. The fiscal positions of the EU *periphery* (the so called PIIGS: Portugal, Ireland, Italy, Greece and Spain) has worsened considerably more than in the rest of EU countries (see Figure 2)[1].

[1] In many countries the worsening of banking sector conditions led to bailouts which in turn contributed to deepen fiscal deficits. Ireland and Spain, in particular, accumulated growing deficits. The contraction of the Spanish housing market caused tax revenues in the construction sector to fall more than GDP, worsening the fiscal position of the country (Lane and Pels, 2012). Greece is the most extreme case, in fact public debt increased to 170 percent of GDP due to the sovereign debt crisis that hit the country. Within the PIIGS group the Italian debt/GDP ratio, instead, was the least affected by the global crisis. The relative solidity of its

FIGURE 2 - HERE

The goal of the paper is to investigate, employing panel cointegration technique, the long-run drivers of current account imbalances in 15 European Union member States (henceforth EU15).[2] Our main goal is to investigate the role of a country's degree of trade openness in explaining the heterogeneous pattern of current account imbalances in Europe. To our knowledge, previous studies have not considered how the long-term drivers of current account imbalances might differ for countries with highly heterogeneous sizes of the tradable sector. Recent theoretical and empirical studies have highlighted how firms engaged in international trade differ from firms serving exclusively the domestic market as these are typically larger, more productive, more skilled-intensive and have higher mark-up (see Melitz and Ottaviano 2008, Bernard et al 2007 and subsequent studies). The heterogeneity found at the micro level suggests possible heterogeneity also at the macro level. For instance, current account balances of countries with a relatively large number of importers/exporters - or with more firms embedded in highly fragmented global value chains - might react differently to similar changes in the real exchange rate compared to more closed and less integrated economies.

Our results highlight the fundamental role played by trade openness in shaping the effects of alternative channels on current account imbalances. We find evidence that the real exchange rate channel strongly influences current account dynamics in countries with a relatively low trade openness while its impact is less pronounced as trade openness increases. Changes in the real exchange rate are likely to have larger effects on trade margins - in particular on the extensive margin of trade - in countries with a smaller tradable sector. On the contrary, countries that are already highly open to international trade might be less sensitive to exchange rate shocks for three main reasons. Firstly, changes in competitiveness might translate in relatively less resources moving in and out of the non-tradable sector. Second, as exporters are relatively more productive they are also relatively more 'insensitive' to exchange rate fluctuations as they can absorb shocks by

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banking system, together with the absence of housing bubbles, allowed to keep the deficits relatively low. Government debt grew slower as well, compared with other countries of the *periphery*.

[2]We employ panel cointegration techniques in order to explicitly consider the stochastic trends that characterize macroeconomic variables of interest and in order to overcome the issue of spurious regression. Several studies have focused on single countries (Batdelger and Kandil, 2012 for the US, Insel and Kayikci, 2012 for Turkey); in our study the panel analysis enriches the time series dimension by considering also a cross-sectional one and allows us to exploit the properties of a bigger sample size and increase the power of the statistical tests performed. Panel cointegration methods are generally used in the literature for studying current account imbalances in a long time span in more than one country (see also Belke and Dreger, 2013; Gossè and Ferranito ,2014).

changing their mark-ups. More productive firms have low exchange-rate pass-through compared to less productive ones. Third, as exporters are often simultaneously importers (see Amiti et al 20014) variations of the exchange rate are likely to be associated to incomplete pass-through also as the consequence of the offsetting effect of exchange rate variations on import prices ('marginal cost' channel).

In the EU context our results suggest that the different degree of openness across member states represents an important structural element of heterogeneity in the long-run current account balance dynamics.

In addition, we find that the per capita income channel acts differently in countries with heterogeneous degree of openness as it is negative for high openness countries, while insignificant and positive for medium and low openness countries respectively. Interestingly, the impact of the different current account determinants changed over time in the EU15 area. While before the introduction of the euro the competitiveness channel appears to be the main determinant of current account dynamics, in more recent decades the income channel and the depth of financial markets became more important. The introduction of the common currency and the increasing financial integration within the EU allowed low-income countries to borrow more and finance their current account deficits (see Blanchard and Giavazzi 2002, Herrman and Winkler 2009 and Fagan and Gaspar 2008).

This work follows the empirical studies of Belke and Dreger (2013) and Gossè and Ferranito (2014). Belke and Dreger (2013), focus their analysis on the Euro area and shed lights on different adjustment channels in 'core' versus 'periphery' countries. This paper introduces a new dimension of cross-country heterogeneity which is rooted in recent contributions in the international trade literature (Amiti et al 2014; Bernini and Tomasi 2015). We also extends the analysis to *western* European countries that are not part of the Euro area and takes into account a broader time period. This allows us to analyze the potential differences in current account imbalances between the euro area member states and those outside it. Also the work of Gossè and Ferranito (2014) study the long-run determinants of current accounts in a dataset of 21 OECD countries that includes United States and Japan as well. Our work is instead focused on European countries. Moreover, we enrich the picture by including most recent data that allow us to capture the recent developments following the EU sovereign debt crisis.[3]

[3] For the purposes of this paper, we do not include a short-run analysis in our regressions, given that the focus is here more towards the long run determinants of the imbalances.

The rest of the article is organized as follows. *Section 2* reviews the most relevant literature related to the determinants of current account imbalances. *Section 3* explains the methodology employed and describes the dataset. The results of the empirical estimation are reported in *Section 4* and *Section 5* concludes.

2. Potential Drivers of Current Account Imbalances and the role of trade openness

Current account balances: the key determinants

The long run dynamics of current accounts balances have historically attracted a great deal of attention in policy and academic circles and have spurred a large theoretical and empirical literature (Clarida, 2007; Obstfeld and Rogoff, 1996). The potential determinants of current account imbalances highlighted in the existing economic literature can be grouped into the following main channels:

- ***The income (or convergence) channel and the role of financial flows***. International financial integration allows to separate the strict connection between internal investment and domestic savings (Feldstein and Horioka, 1980). In fact, in presence of efficient and integrated financial markets countries can access to foreign capital in order to finance possible excess investments over domestic savings and run current account deficits. The Feldstein-Horioka hypothesis was not verified until most recent decades. Blanchard and Giavazzi (2002) showed that thanks to international capital markets countries with a lower GDP per capita (such as countries in the EU *periphery*) can borrow more in order to support a convergence process towards higher income countries. The convergence-driven capital account deficits can be seen as part of an intertemporal maximization pattern: lower income countries are willing to increase domestic spending and decrease saving, hence incurring into temporary external imbalances, in order to anticipate future growth. The expected higher growth rate attracts foreign investments and increases external liabilities, together with current account deficits. Lane and Pels (2012) extend the work of Blanchard and Giavazzi (2002), finding that the convergence effects is mostly driven by smaller saving rates in lower-income countries. Moreover, they highlight the role of expectations, stating that better growth forecasts are associated with countries running current account deficits. The desirability (and, more specifically, the sustainability) of current account imbalances

associated with the *convergence hypothesis* is debated in the literature. While Blanchard and Giavazzi (2002), Ahearne, Schmitz and von Hagen (2007) and Schmitz and von Hagen (2011) argue that a persistence in the current account deficits should not be matter for concerns, other authors (Arghyrou and Chortareas, 2008, Jaumotte and Sodsriwiboon, 2010) are more cautious about their sustainability and highlight the risks of running persistent deficits. Moreover, these authors stress the importance of the real exchange rate in influencing current account dynamics, as discussed in the following point.

- ***The competitiveness channel.*** A higher real exchange rate makes domestic tradable goods more expensive with respect to foreign goods. As a result, real exchange rate appreciation can damage exports and be harmful for manufacturing. In a study on Portugal, Blanchard (2007a) shows the negative impact on current account deficits of the real exchange rate appreciation starting in the 2000s – and induced by the decline in productivity and rising unit labor costs. The patterns documented by these authors is clearly not in line with the *convergence hypothesis*. In the study by Belke and Dreger (2013) on Eurozone members, the real exchange rate appears to be one of the most important drivers of current account fluctuations and Gossé and Ferranito (2014) confirm this result for 21 OECD countries.

- ***The fiscal policy and government debt channel.*** A higher government fiscal deficit would generally translate into lower domestic savings and, in turn into a higher current account deficit (or a lower current account balance). Feldstein (1987) highlighted the presence of a direct link between current account imbalances and fiscal ones for the United States; a stylized fact known as "twin deficit hypothesis". The tax cut decided by the Reagan administration in 1980s together with the low interest rates kept by the Federal Reserve strongly decreased national saving and contributed to expand trade deficits. Against this hypothesis, the Ricardian Equivalence argues that fiscal policy is generally neutral with respect to saving/investment decisions and, therefore, with the current account balance. If households observe an increase in government debt, they will save more in order to offset a future tax increase. The increased saving would reduce also consumption of imported goods and, hence, improve current account balance. Empirical studies have not provided a clear answer on whether the twin deficit hypothesis is valid or not.[4] In particular, in the EU

[4] In support of the hypothesis, Abell (1990), Frankel (2006) and Abbas et al. (2010) confirmed the presence of a linkage between changes of fiscal policy and current account dynamics while other studies, as Roubini (2006) and Kim and Roubini (2008) stated that as fiscal deficits grow, the current account balance improves. Finally, part of the literature

context the literature on the twin deficit hypothesis is rather scarce. Belke and Dreger (2013) found a negative correlation in the long run between government debt/GDP ratio and current account balance, in particular for southern European countries (Greece, Spain and Portugal) in the period after 1980s. In a related study, Gossé and Ferranito (2014) found a similar result with respect to a broader country sample. Other studies, as Aristovnik and Djuric (2010), suggest a weak correlation between fiscal and current account balances as a consequence of the high level of substitutability between private and public saving, therefore rejecting the twin deficit hypothesis for EU member states. According to Holinski et al. (2010) the low level of private savings, rather than fiscal policy, is the main channel through which the imbalances are generated in countries in deficit.

- ***The demographic channel.*** Countries with different old-age dependency ratios can have different saving and consumption dynamics, hence the demographic structure (or trends) of a country can significantly influence its current account dynamics. Chinn et al. (2003) found a significant negative effect of dependency ratios on current account balance for developing countries. However, an expected change in the old age dependency ratio can affect positively current account balances because of the increased saving associated with the aging process (Ivanova, 2012).

Trade openness and current account imbalances: what are the mechanisms?

The discussion above suggests that an analysis on the determinants of current account imbalances needs to consider multiple economic characteristics of the countries under analysis. In this paper, we are particularly interested in investigating the role played by trade openness in affecting – through the above channels – the dynamics of current account imbalances.

In a related study, Cox (2007) stress the importance of a higher trade openness for productivity gains. The author highlights, using a simple two-country trade model, how a high degree of openness improves the "*overall economy's ability to reorganize aggregate production in response to underlying shifts in unit labour productivity and relative prices*". In more open economies, positive shocks to industry-specific factors' productivities translates into higher aggregate gains in

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argues the fiscal channel to be unsignificant or, at best, secondary in explaining current account behavior (Blanchard, 2007b; Edwards, 2005).

productivity, larger output and lower inflation. An adverse shock to unit labour costs – i.e. the competitiveness channel highlighted above - is more likely to hit stronger those countries that have a smaller tradable sector, while the contrary is true for high-openness countries.

Another important consideration is related to the fact that that greater openness leads to increased competition, therefore firms are pushed to improve their costs structure and be more productive in order to stay in the market (Chen et al., 2009; Neary 2009; Navas and Licandro 2010).

Eckolm et al. (2012), using Norwegian firm-level data, find that the exposure to trade strongly affects the extent to which changes in real exchange rate influence the productivity of firms in the tradable sector. Real appreciations can induce industrial restructuring that in turn causes productivity gains. An exchange rate shock can therefore generate productivity gains at firm level especially for those firms that are more exposed to trade and that face tougher competition. More generally, it is sensible to expect that higher competition induces firms to shift their exports sales towards more productive products. Therefore, firms that operate in international markets will generally be more productive than purely domestic ones (Bernard et al 2007, Mayer et al. 2014, Melitz and Ottaviano 2008). One important corollary of this strand of the literature is that more open economies are expected to be more able to adjust to exogenous shocks – for instance by adjusting their markups – in order to preserve their international market shares.

More open economies are generally more integrated into global value chains and exporters are often simultaneously importers. Recent studies on imperfect exchange rate pass-through have emphasized the role of the 'intermediate input channel' (see Amiti et al 2014 and Bernini and Tomasi 2015). As the exchange rate affects symmetrically import and export prices, exporting firms that are import-intensive are more likely to absorb changes in competitiveness compared to less globally-integrated firms.

In conclusion, we expect that real exchange rate movements would impact relatively less the more open the economy.

The convergence/income channel suggests that a lower income, measured by per capita GDP, should be typically associated with a higher current account deficits. It is important to notice that this effect materialize when financial and final goods markets are well-functioning and fully integrated. The effect of this channel is also likely to be heterogeneous according to the level of openness. In particular, more open economies are likely to have, ceteris paribus, a better access to

international capital markets. A higher openness induces exporters to be more profitable, which finally allows them to borrow cheaply. Russ and Valderrama (2009) demonstrate how an increased trade openness can induce a better access to financial markets so that for countries more open to trade a bigger credit sector is likely to be associated with higher current account surpluses.

A similar argument can be advanced for the effect of public debt on the ability to finance a current account deficit. Also in this case it is reasonable to expect an heterogeneous behavior of the fiscal component in driving current account balances. The impact of a high debt to GDP ratio is expected to be more stringent for low-openness economies, given that they have a lower access to financial markets, while the contrary is true for more open countries.

3. Data and estimation technique

Our main hypothesis, based on the above discussion, is that we should expect that countries with a different level of openness to international trade will be affected differently by similar-sized changes in the long-run determinants of current account imbalances. This difference should be particularly strong for the competitiveness channel given the higher expected insensitiveness of firms engaged in international trade to exchange rate variations.

In order to test this hypotesis, we use panel cointegration methods in order to identify and measure the long run determinants of current account imbalances in EU15 countries according to their relative trade openness. This method allows to fully exploit both the cross-section and time-series dimensions of the data and use a bigger information set.

In the first step of our analysis we explore the presence of unit roots. To this purpose, the Pesaran (2007) cross-sectionally augmented Dickey-Fuller (CADF) test is employed.[5] This test includes the cross-section averages of the dependent and independent variables of the standard ADF equation into the regression. Panel and group mean statistics are applied (Westerlund, 2007) for analyzing the presence of a cointegration relationship. These statistics test the null hypothesis by constructing an error correction model and inferring whether the error correction term is equal to zero. In particular, group mean and panel statistics are computed as follows:

[5] Note that the so called first generation of unit root tests - Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Maddala and Whu (1999) –- cannot deal with the presence of cross-section dependences among panel members and lead to inconsistent estimates and incorrect inferences.

$$G_\tau = \frac{1}{N}\sum_{i=1}^{N}\frac{\widehat{\alpha_i}}{SE(\widehat{\alpha})_i}; \qquad G_\alpha = \frac{1}{N}\sum_{i=1}^{N}\frac{T\widehat{\alpha_i}}{\widehat{\alpha_i}(1)};$$

$$P_\tau = \frac{\widehat{\alpha}}{SE(\widehat{\alpha})}; \qquad P_\alpha = T\widehat{\alpha}$$

where $\widehat{\alpha_i}$ is the error correction parameter.[6]

If the null hypothesis is rejected, cointegration exists. In the case of group mean statistics (G), rejecting the null means that at least for one individual country the variables are cointegrated, while for the panel statistics (P) the rejection of the null tells us that the entire panel is cointegrated. In order to avoid the issue of cross-section dependencies, critical values are obtained by bootstrapping. Finally, we estimate the cointegration vector by using the Pesaran et al. (1999) Pooled Mean Group (PMG) estimator. This estimator allows us to constrain the long-run coefficients to be the same across group while it relax this restriction for the short-run, where intercept and slope are allowed to vary. The hypothesis of long-run homogeneity increases the efficiency of the estimates. Moreover, PMG estimator can be used independently of the integration order of each single variables. As a robustness check, a comparison with the more general Mean Group (MG) estimator is done by running a Hausmann test, in order to investigate if this assumption of long-run homogeneity is true.

The data employed in the analysis are taken mostly from the European Commission Annual Macro-economic database, AMECO (see *Appendix 1* for a detailed description of the variables). The series are annual and consider the time period 1974-2011. The following European countries are considered in the analysis (the former EU-15 group): Austria, Belgium and Luxembourg, Spain, Italy, France, Ireland, Greece, Portugal, United Kingdom, Sweden, Finland, Denmark, Germany and the Netherlands.

Trade imbalances, *ca*, are measured as the ratio of current account over GDP. Our variable for the income (or competitiveness) channel is the (log of) GDP per capita[7], *y*. This variable is expected to have a positive impact on current account balance if *the convergence hypothesis* is true:

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[6] The α_i parameter represents the speed of the error-correction towards the long-run value. If $\alpha_i < 0$, the variables are cointegrated. The null hypothesis of no cointegration is therefore H_0: $\alpha_i = 0$ for all individuals *i*. The G_α and G_τ test H_0 versus H_1^G : $\alpha_i < 0$ for at least one individual *i*. The panel statistics P_α and P_τ assume instead that α_i is the same for all *i*, therefore the H_0 is tested against H_1^P $\alpha_i < 0$ for all *i*. The normalization of G_α and P_α by T may cause to overreject the null in small sample. See Westerlund (2007) for a more detailed description of the statistics.

[7] Nominal GDP is divided by the GDP deflator and by the population in order to have the GDP per capita. For Germany, an interpolation with the growth rate of West Germany is done in order to derive the GDP of Germany before the unification of 1990.

relative low income countries are more likely to borrow from abroad in order to boost a catch-up process toward the high income countries; vice versa, rich countries are more likely to accumulate surpluses. As more developed and integrated financial markets give easier access to the credit market and therefore better allow countries' to borrow in order to finance their trade deficits, we use as a proxy of the size and depth of financial market the share of domestic credit given by banks in percentage of GDP (in logs), *cred*. We expect, as in the literature highlighted above, that this variable should have a negative impact on current account balances.

In order to investigate the importance of the competitiveness channel described above, we employ Unit labor costs (in logs) are used as proxy for the effective real exchange rate, *rer*. As the measure is expressed in unit labor costs, is it reasonable to think this variable to be exogenous with respect to current account fluctuations (see also Belke and Dreger, 2013 and Gossé and Ferranito, 2014 for a discussion of this point). The variable is expected to have a negative effect on the trade imbalances: higher unit labor costs make tradable goods more expensive and therefore are likely to damage exports and, in turn reduce current account balance (or increase deficits).

As regards the other determinants of current account imbalances, the fiscal channel is proxied by the stock of government debt over GDP ratio (in logs), *debt*. This variable is expected to have a negative effect on trade balance, although existing studies found mixed evidences on the importance of this channel as discussed in the previous section. Finally, in order to test for the importance of demographic factors, we employ old-age dependency ratio, *dep*, measured as the (log of the) share of over-65 population to the working age and we expect this variable to be negatively correlated with current account balance.

A closer look to the data gives us interesting insights about the degree of heterogeneity within the panel, both across time and across countries. Real unit labour costs for the entire EU15 decrease between 1982 and 2000 while they start to increase thereinafter. In 2011, in fact, unit labour costs are about 7 percent higher on average compared to their level in 2000. This pattern highlights the loss of competitiveness of western European countries with respect to the rest of the world, during the last decade. Portugal, Greece and Germany present the lowest level of unit labour costs over the time period considered in this study. However, while real exchange rate for Germany have constantly decreased over time, the contrary happened for Portugal and Greece. On the other side, Ireland, Finland and Italy have the highest level of unit labour costs. Also in this case, there is a generalized loss of competitiveness levels in the last decade for all the three countries considered. Similar considerations can be made if we look at per capita income level. EU15 group is characterized by relatively large income disparities. The per capita income of rich countries -

Scandinavian countries, Germany, Belgium, the Netherlands and Luxembourg – is almost double compared to countries like Greece or Portugal. If we look at the trend, in the recent decades - and especially after the crisis - divergences between poor and rich countries have increased. With these considerations in hand, we now proceed to discuss the empirical estimates.

4. Estimation results and analysis

4.1 Analyzing the long-run determinants of EU15 current account (im)balances

We employ the following (long-run) empirical equation on the determinants of current account (im)balances:

$$ca_{it} = \theta_i^0 + \theta^1 y_{it} + \theta^2 rer_{it} + \theta^3 debt_{it} + \theta^4 dep_{it} + \theta^5 cred_{it} + \mu_{it} \quad (1)$$

where θ_i^0 is a country-specific effect, i is the country index and t is the time period[8]. Note that given the high correlation between the dependency ratio and the government debt-to-GDP ratio and the credit sector variable, our preferred model specification of the model is the following:

$$ca_{it} = \theta_i^0 + \theta^1 y_{it} + \theta^2 rer_{it} + \theta^3 debt_{it} + \theta^4 cred_{it} + \mu_{it} \quad (2)$$

As a first step, we analyze the order of integration of all the variables. Results are reported in *Table 1*. Two alternative specification of the CADF equation are used by adding in the specification either a constant or a constant and a trend. As regards the variables in levels, the CADF test does not reject the null of non stationariety for all the variables at 5 percent level except the case of the per capita GDP, y , for one of the two alternative specifications. The first differences of the variables

[8] The dynamic panel specification of the equation has the form of an Autoregressive Distributed Lag (ARDL) model. Using the AIC information criteria, we included 1 lag for each variable (hence, the dynamic equation is an ARDL (1,1,1,1,1,1)).

are all stationary at 5 percent level even if in one of the specifications regarding the dependency ratio the null hypothesis cannot be rejected.

In *Table 2* we report the results of the cointegration tests. Cointegration is present in all the system of variables considered, even if the significance of the results diminishes in two of them.

TABLE 1 and 2 – HERE

The analysis of the cointegration vectors for the preferred specification using the entire sample at our disposal (*Table 3*) shows that real exchange rate appears to be the most important determinant of current account imbalances in the long-run. Its sign, as expected, is negative, confirming that higher unit labour costs play an important role in determining current account deficits. The magnitude of the effect of the competitiveness channel in our study (-0.29) is bigger if compared to other empirical studies such as Belke and Dreger (2013) for Euro area countries - with a coefficient equal to -0.16 or José and Serranito (2014) for OECD countries - with an estimated coefficient of -0.106. This results confirms, therefore, that an appreciation of the real exchange rate component is associated with a worsening of current account balance in the long-run. The income channel appears to be absent, as the estimated long-run coefficient on the income variable, y , is insignificant. As regards consolidated debt effect, we find evidence, in contrast with the twin deficit hypothesis, of a small but positive effect on current account. The impact of the size of the credit sector as a long run determinant of the current account balance appears to be very small and significant only at 10 percent level.[9]

TABLE 3 – HERE

4.2 Does trade openness matter?

As discussed in *Section 2*, trade openness can have a non-negligible influence on how current account dynamics is determined in the long run. Theoretical models predict that a higher trade openness is likely to be associated with a better ability of economic agents to strategically react to changes in relative competitiveness (for instance to adverse changes to unit labour costs). Hence,

[9] Note that the Haussman test does not allow us to reject the null when we compare the estimates of PMG versus MG estimator, we therefore use the PMG estimator given that it is consistent and more efficient than MG one.

we should expect, as argued above, that current account balances of more open economies will be relatively less affected by variations in relative international competitiveness.

To our knowledge, an analysis on the role played by trade openness has not been performed in previous studies. Belke and Dreger (2013) consider a different type of country heterogeneity; these authors cluster the EU countries included in their sample according to the sign of their trade balance considering separately trade surplus and trade deficits countries. The main reason behind this clustering is related to the expected asymmetric policy intervention in these different groups of countries requested in order to reduce the imbalances. Here, we are interested in understanding how the impact of the potential drivers of current account imbalances changes in countries where the tradable sector is more or less large compared to the non-tradable one. We split our sample in three groups,[10] **low-openness** (composed by France, Greece, Italy, Spain, United Kingdom and Portugal), a **medium-openness** (Denmark, Finland, Germany and Sweden) and a **high-openness clusters** (Austria, Belgium and Luxembourg, Ireland and the Netherlands).[11]

The results, presented in *Table 4*, highlight an heterogeneous effect of the competitiveness channel for different levels of trade openness. We find that for high-openness countries, the competitiveness channel is present but its magnitude is rather small (-0.07) and significant only at 10 percent level. On the contrary, for medium openness countries the magnitude of the effect of a real exchange rate appreciation is larger, with a long-run coefficient of about -0.19. For low-openness countries, the effect is strong and highly significant, -0.44. Countries with a smaller tradable sector are more sensitive to changes in relative competitiveness. One possible explanation is related to the possibility for the tradable sector to draw higher resources from the non-tradable sector in order to react to favorable changes in competitiveness. A similar argument has been advanced by recent studies on the effects of real exchange rate changes on growth which argue that "*Countries where underevaluation induces resources to move toward tradables (mainly industry) grow more rapidly*" (Rodrik, 2008). On the other hand, an increase in unit labour cost might be more easily neutralized in more open economies. One potential channel for this dampened effect of

[10] The results are robust to alternative specifications of the country groups. For instance, we consider an alternative grouping based on trade openness conditional on country size in order to explicitly take into account the fact that small countries are relatively more open to trade than larger one. Our main results do not change. As an additional robustness check, we divided the sample in 2 clusters (low and high openness countries). Also in this case, the estimates do not significantly differ from those presented in the paper. Additional estimates are shown in Appendix 2.

[11] The low-openness group is composed by countries with a value of international trade lower than 70 percent of GDP; countries within the range from 80 to 110 percent are in the medium openness group and countries with a trade openness higher than 130 are in the high openness cluster. The grouping clusters are composed on the basis of trade openness indicator computed using WTO trade statistics (see Appendix 1b for openness data by country at the end of the period considered)

real exchange rate appreciation on current account balance in more open economies is working through domestic inflation. Mody and Ohnsorge (2007) find that an increase in unit labour costs translates into a smaller increase in prices in European economies that are more open to international trade. The impact on final prices - and consequently on trade balance - of a drop in competitiveness can be lower in more open economies. Another channel might be related to the prevailing market structure in the tradable sector; in the low-openness countries export might be more proportionally concentrated in relatively more competitive and less horizontally and vertically differentiated goods where price-setting is more constrained and firms are not able to strategically adjust their mark-ups in order to mantain international market shares. Therefore a higher unit labor costs translates into higher final prices, loss of market shares and, in turn, a sharper decline of current account balance.

TABLE 4 – HERE

The income channel appears to be present only for low openness countries, but the coefficient is significant only at 10 percent level. Interestingly, we find evidence of a small negative effect of GDP per capita on current account balance in the high openness countries. This means that relatively rich countries are associated with a worse current account position, compared to the relatively low-income countries. The effect of income channel disappears again in the medium openness group.

We also find evidence of an asymmetric effect of the fiscal channel in the three groups of countries. In relatively closed economies, a higher debt/GDP ratio is more likely to be associated with current account deficits. This is also true for medium openness countries but not for high openness one. In the latter case, in fact, a higher consolidated debt has a small but positive effect (0.02) on current account balance in the long run. This result indicate that in the high-openness cluster the higher public savings are offset by a fall in private savings. On aggregate, the effect is negative for the current account balance. Again this result might be related to the different ability of countries to access international capital markets for financing their trade deficits. Interestingly, the different results between high versus low openness countries found on the fiscal channel seems to be confirmed when looking at the size of the credit sector. For the low-openness cluster, the negative correlation between the size of credit sector and current account balance can be traced back to the wealth effect: easier credit conditions and, in some cases (Spain and UK) housing

booms, together with more efficient financial markets lowered the need for precautionary savings and increased households borrowing. This, in turn, contributed to increase current account deficits.

Another important reason behind the heterogeneous effects of the channels emphasized above in countries with different level of openness might relate to the asymmetric impacts of the rise of emerging economies into the global economy. For instance, capital inflows in the EU from China and other emerging economies experiencing excessive domestic savings (coupled with underdeveloped domestic financial markets) have been rather concentrated into a few countries (the *core* EU member states) perceived as less risky. These countries, in turn, have financed the trade imbalances of countries in deficits (i.e. the EU periphery). There is evidence, therefore, that the financing of EU trade deficits towards the rest of the World acted through an indirect channel, with the core countries experiencing financial inflows from the rest of the world and the periphery countries financing their imbalances through capital inflows from the core EU countries (Chen et al. 2013). These effects, that are not explicitly captured in our regressions, could explain why in the medium openness cluster (that include countries of the core EU that mostly played this intermediate financing role) the coefficient of income and credit variable are found to be not statistically significant.

Similar considerations can be made on the increased competitive pressures in the last decades associated to the rise of emerging economies (China, but also eastern European states) that have mostly affected the EU periphery which present a relatively low degree of openness. In the last decades, exports from emerging Asian countries (especially China) have partially displaced goods exported by the EU countries like Portugal, Spain and Italy (Di Mauro et al. 2000, Chen et al. 2013) The increased demand for machinery coming from the emerging countries had a positive effect on Germany's exports, but limited impact on the exports of the low-openness countries. Chen et al. (2013) find that in the last decade exports from Greece, Spain, Italy and Portugal to external markets are negatively correlated with the Chinese exports to the same markets; Chinese goods have eroded market share of the EU periphery in third countries. Similar considerations can be made observing the growing importance of exports from Eastern European countries. The integration of these States with the European Union has been mostly beneficial for Germany and Austria trade balances, while it may have diverted exports of both final and intermediate goods from southern European countries (Marin, 2010).[12]

[12] Given the important changes occurred outside and inside the EU in the last decades, we run additional estimates by splitting the analysis for different time periods. The results, available upon request, confirm the main finding of the paper; the degree of openness affects the sensitivity of the current account balances to changes in the different drivers.

TABLE 5 – HERE

5. Conclusions

In the present work, we investigate the determinants of current account imbalances in the European Union (EU15) using panel cointegration techniques. The main contribution of our work is that of emphasizing the important role played by trade openness in determining the response of current account balances to changes in its long-run drivers. Our results demonstrate that relatively closed economy are more exposed to external shocks, in particular to real exchange rate movements.

From a policy perspective, our finding highlight an important source of heterogeneity in the context of the EU which might, at least in part, explain the divergent pattern of current account dynamics in the last decades. A bigger tradable sector allows to better react to changes in competitiveness by moving more resources in and out of the non-tradable sector.

Our results are in line with the recent theoretical models that relate trade openness to firms productivity (Melitz and Ottaviano 2008).

Interestingly we find evidence of a different role played by the 'income channel' as a long-term driver of current account imbalances for countries at different degree of trade openness. A growing income per capita translates into current account surpluses in low-openness countries but not in high openness one. Hence, the *convergence hypothesis*, – which predicts that countries with (relatively) low-income per capita are associated with current account deficits, while the contrary is true for the high-income ones – it is not verified in the relatively more open EU economies.

A highly integrated credit market helped to finance current account deficits especially in low-openness countries. Finally, we find that also the effect of consolidated government debt is heterogeneous across countries.

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Appendix 1a – Variables descriptions and sources

Variable name	Description	Source
ca	Current account balance (% GDP)	European Commission – AMECO database
rer	Real effective exchange rate (unit labor costs, in log)	Bank of International Settlements
y	Real GDP per capita (in log)	AMECO
dep	Old-age dependency ratio (% of working age population, in log)	AMECO
cred	Total domestic credit provided by the banking sector (% of GDP, in log)	IMF – International Financial Statistics Database

Countries covered in the sample: Austria, Denmark, Belgium and Luxembourg, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, United Kingdom.

Appendix 1b – Summary statistics of the variables employed

Variable	Obs	Mean	Std. Dev.	Min	Max
rer	532	4.588	0.133	4.236	5.098
ca	532	-0.012	0.066	-.499	.155
debt	532	3.930	0.560	1.816	5.138
dep	532	3.095	0.155	2.728	3.476
y	532	5.325	0.359	4.172	6.016
cred	532	4.251	0.542	2.899	5.447

We use Annual data from 1974 to 2011. Trade openness is intended as total exports and imports to GDP ratio. Openness data by country: Austria (107.2), Belgium (172.0), Denmark (98.6), Finland (84.2), France (54.7), Germany (83.6), Greece (44.3), Ireland (148.4), Italy (55.8), Luxembourg (285.2), Netherlands (133.5), Portugal (70.7), United Kingdom (57.7), Spain (59.1), Sweden (94.6)

Appendix 2 – Robustness estimates

Estimation of the cointegration vector with alternative grouping. (dependent variable: current account balance, *ca*; Pooled Mean Group estimator, Pesaran et al. 1999)

Panel (a)

Dependent variable: *ca*	**High openness**	**Medium openness**	**Low openness**
rer	**-.0609***	.0292	**-.4956*****
	(.0333)	(.0396)	**(.1166)**
y	**-.0511*****	.0272	.0799
	(.0192)	(.0296)	(.0673)
debt	**.0243*****	-.0022	**-.0560*****
	(.0067)	(.0146)	**(.0186)**
cred	**.0331*****	**-.0257****	**-.0871*****
	(.0075)	**(.0130)**	**(.0237)**

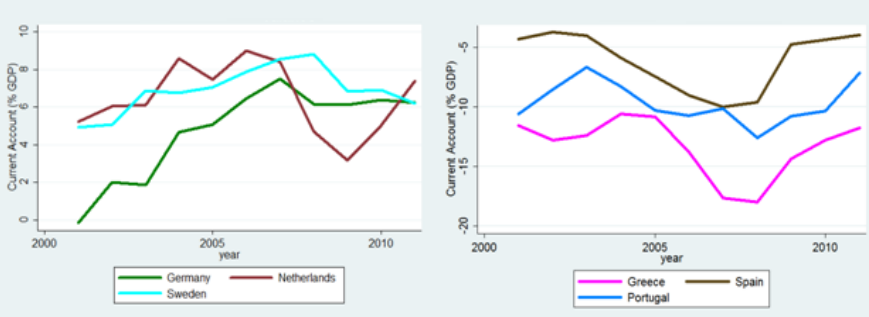
All regressions include a country-specific constant. Standard errors in parenthesis. ***, ** and * are intended as 1%, 5% and 10% confidence level. In this specification: Low Openness group is composed by France, Greece, Italy, Spain and Portugal; Medium Openness group is composed by Germany, Finland, Sweden and UK; High Openness group is composed by Austria, Belgium, Denmark, Ireland and Netherlands.

Panel (b)

Dependent variable: *ca*	**High openness**	**Low openness**
rer	**-.0895*****	**-.2794*****
	(.0308)	**(.0653)**
y	**-.0621*****	-.0792
	(.0194)	(.0495)
debt	**.0218*****	**.0615*****
	(.0065)	**(.0182)**
cred	**.0375*****	**-.0360****
	(.0074)	**(.0171)**

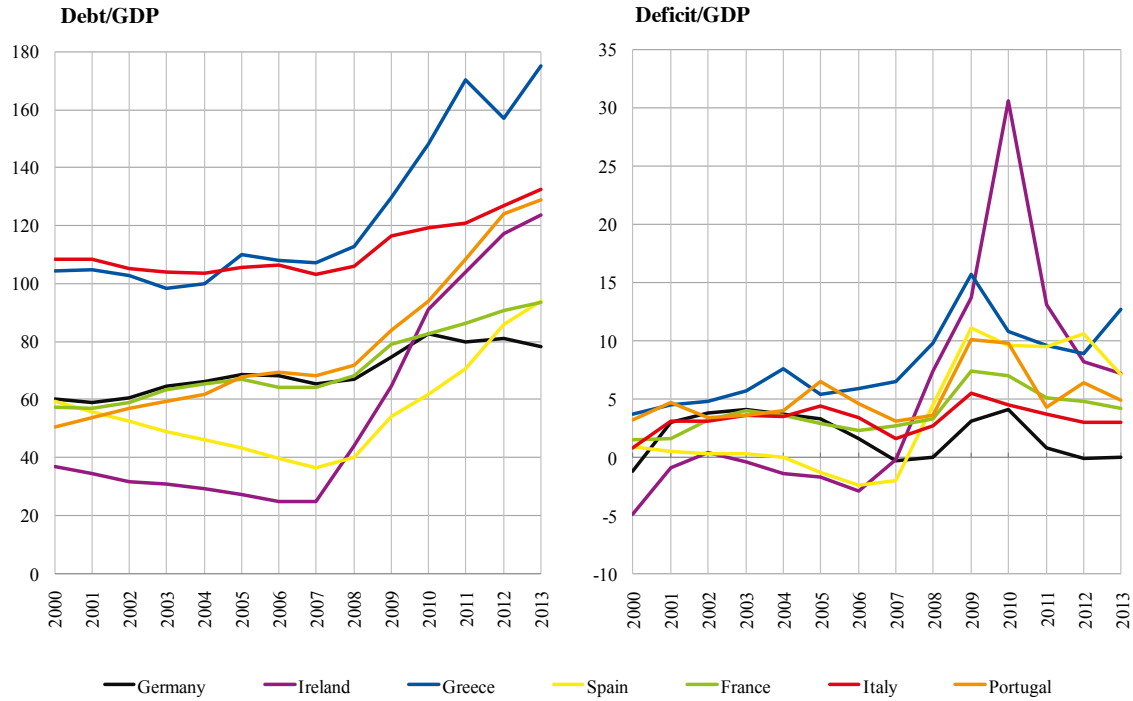
All regressions include a country-specific constant. Standard errors in parenthesis. ***, ** and * are intended as 1%, 5% and 10% confidence level. In this specification: Low Openness group is composed by France, Greece, Italy, Spain, Portugal, UK and Finland; High Openness group is composed by Germany, Sweden, Austria, Belgium, Denmark, Ireland and Netherlands.

Figure 1. Current account balance in selected European countries



Source: authors' elaboration on Eurostat data

Figure 2. The heterogeneous worsening of fiscal conditions in selected European countries



Source: authors' elaboration on Eurostat data

Table 1. Integration tests for the variables employed in the analysis (levels and first differences. Pesaran (2007)' methodology)

Variable	***Model specification includes:***	***Levels***	***First Differences***
ca	constant	-0.256 (0.399)	-5.795 (0.000)***
	constant and trend	0.175 (0.569)	-4.342 (0.000)***
y	constant	-2.557 (0.005)***	-7.592 (0.000)***
	constant and trend	-0.303 (0.381)	-8.780 (0.000)***
rer	constant	-1.583 (0.057)*	-10.443 (0.000)***
	constant and trend	-3.069 (0.001)***	-8.818 (0.000)***
debt	constant	-1.018 (0.154)	-3.021 (0.001)***
	constant and trend	-1.081 (0.140)	-2.343 (0.010)***
dep	constant	1.160 (0.877)	-1.858 (0.032)**
	constant and trend	4.171 (1.000)	1.071 (0.858)
cred	constant	-0.877 (0.190)	-5.885 (0.000)***
	constant and trend	0.358 (0.640)	-5.002 (0.000)***

*P-values in parenthesis. ***, ** and * are intended as 1%, 5% and 10% confidence level.*

Table 2. Group mean and panel cointegration tests (Westerlund, 2007)

Variables	G_τ	G_α	P_τ	P_α
ca, y, rer, dep, debt	**-4.616*** (0.000)**	1.057 (0.204)	**-4.697*** (0.008)**	**-1.807* (0.048)**
ca, y, rer, cred, debt	**-4.099*** (0.000)**	1.608 (0.396)	**-5.974*** (0.000)**	**-1.438* (0.083)**
ca, y, rer, cred, dep	**-4.236*** (0.000)**	1.015 (0.189)	**-6.036*** (0.004)**	-1.050 (0.136)
ca, y, rer, cred, dep, debt	**-4.133*** (0.001)**	2.140 (0.408)	**-5.216*** (0.010)**	0.054 (0.231)

*Critical values obtained using bootstrap with 800 replications. P-values in parenthesis. ***, ** and * are intended as 1%, 5% and 10% confidence level. Lag and lead length chosen with AIC selection criterion. Cointegration is assumed to hold if the null is rejected for all units in the case of the panel statistics, and at least for one member in the case of the group mean statistics. The tests are asymptotically normal distributed, and can account for individual short-run dynamics, trend and slope parameters.*

Table 3. Estimation of the cointegration vector (dependent variable: current account balance, *ca*; Pooled Mean Group estimator, Pesaran et al. 1999)

Dependent variable: ca	***Coefficients***
rer	**-.2972*** **
	(.0426)
y	-.0217
	(.0343)
debt	**.0558*** **
	(.0138)
cred	**-.0193***
	(.0115)
Hausmann test	0.8353
Prob > Wald chi^2	

Sample period: 1974-2011. Standard errors in parenthesis. ***, ** and * are intended as 1%, 5% and 10% confidence level.

Table 4. Estimation of the cointegration vector: the role of trade openness.

(dependent variable: current account balance, *ca*; Pooled Mean Group estimator, Pesaran et al. 1999)

Dependent variable: *ca*	**High openness**	**Medium openness**	**Low openness**
rer	**-.0691***	**-.18667***	**-.4368*** **
	(.0361)	**(.1063)**	**(.1082)**
y	**-.0546*** **	-.25981	.10709*
	(.0207)	(.1790)	(.05764)
debt	**.0229*** **	-.0845	**-.0560*** **
	(.0075)	(.0606)	**(.0186)**
cred	**.0343*** **	.08716*	**-.0865*** **
	(.0083)	(.0500)	**(.0209)**

All regressions include a country-specific constant. Standard errors in parenthesis. ***, ** and * are intended as 1%, 5% and 10% confidence level.

Table 4. Estimation of the cointegration vector: different time periods.
(dependent variable: current account balance, *ca*; Pooled Mean Group estimator, Pesaran et al. 1999)

Dependent variable: ca	**1974-1998**	**1991-2011**	**1999-2011**
rer	**-.3410*** **	**-.0652*** **	.0091
	(.0583)	**(.0247)**	(.0162)
y	-.0421	**.1633*** **	**.0737*** **
	(.0489)	**(.0323)**	**(.0135)**
debt	**.0689*** **	**.1069*** **	**.0278*** **
	(.0185)	**(.0150)**	**(.0070)**
cred	.0153	**-.0814*** **	**-.0757*** **
	(.0175)	**(.0075)**	**(.0043)**

All regressions include a country-specific constant. Standard errors in parenthesis. ***, ** and * are intended as 1%, 5% and 10% confidence level.