Current Account Imbalances in the Eurozone: a GVAR assessment of the 'Competitiveness Narrative'

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Abstract

A popular explanation of how the pre-crisis current account imbalances between European core and periphery countries were accumulated identifies the loss of cost-competitiveness on the part of Italy, Spain and Portugal as the real culprit. By letting their wages grow faster than productivity, these countries lost export market share and simply became too expensive with respect to the core. A different version of this narrative would instead shift the blame to Germany, who unfairly let its wages stagnate for years, earning a competitive advantage at the expense of its southern neighbors. This work tests both these views using a Global VAR estimated for 8 EMU countries between 1996 and 2007. Different shock simulations to the level of real wages are performed and little support is found for both these narratives, as the current accounts do not strongly react to increased labor cost. Different explanations are proposed and the evidence presented suggests that non-price factors such as specialization and export structure weaken the effect of labor cost on the current account and determine to a greater extent the success and failure of European countries' trade. Finally, it is argued that the financial flows in the pre-crisis period should be analyzed more thoroughly in order to fully explain the current account dynamics.

I. Introduction

Six years after the Eurozone crisis took the old continent by storm, the situation is still not promising. Euro area GDP is 15 percent lower than its pre-crisis period, unemployment is stuck at a worrying 9 percent and public debt increased by 10 percent since 2008. Looking more closely at the development of these indicators for individual countries shows how the worst recession of the last 60 years has had very heterogeneous impacts. Two blocks of countries can be identified in terms of the social cost borne: Nordic countries like Germany, France, the Netherlands, Finland and Belgium on the one side and the so-called PIIGS (i.e. Portugal, Italy, Ireland, Greece and Spain) on the other. The former group saw a 2 percent average reduction in GDP and a 3 percent change in unemployment.
This was less true for the periphery countries. Greece's unemployment rate increased by 19 percent between 2008 and 2014, Spain did little better with a 15 percent change, while Portugal experienced a 9 percent increase (OECD data). The average change in GDP for these countries from 2009 to 2014 was a shocking minus 12 percent against the 2 percent of the Euro area.

What has really distinguished core from periphery and characterized the EU crisis -at least in the public discussion and media reports- was the public debt dynamic. The American-born financial fiasco took the form in Europe of a sovereign debt crisis, where periphery countries with unsustainable debt levels had to be bailed out by Nordic creditors in exchange for harsh austerity measures.

This, however, is only one part of the diagnosis, argued a group of economists from CEPR (Baldwin *et al.* 2015). If it remains true that the crisis developed into a sovereign debt one, its causes are to be found in the huge capital flows from core to periphery countries in the years before the crisis and after the introduction of the euro, which can be seen in the divergent trajectory of current accounts (Figure 1). These flows fueled unsustainable asset bubbles in the periphery, which eventually busted and gave rise to the complex Eurozone crisis.

A popular explanation of how these imbalances have been accumulated pivots around the increase in unit labor cost (ULC) and price level in periphery countries. Spain, Italy, Portugal and Greece let their wages grow more than their neighbors before the crisis, implying a severe loss of competitiveness. This caused a worsening of the balance of payments and ultimately the outflow of capital, once the crisis hit and investors lost confidence in these countries' growth potential (Juncker *et al.* 2015). A variant to this narrative identifies Germany as the real wrongdoer: by

deliberately undercutting wages through the Hartz labor reform in 2000, Germany earned an unfair competitive advantage which boosted its export at the expense of other Eurozone member states.
The common denominator of these different, but not mutually exclusive views, is that the level of wages significantly affects the net financial position of Eurozone countries, which intensely compete with one another for higher export market shares.

This work attempts to evaluate two propositions that have been singled out of this narrative using a Global Vector Autoregression (GVAR) estimated for the years before the crisis for 11 countries of which 8 belong to the EMU. Given that the links between the individual countries VARs, of which the GVAR is composed, are constructed using data on bilateral trade flows, the model can capture the trade and competitiveness dynamics, which –according to this narrative– have led to the divergence in current accounts.
The results are then integrated with other circumstantial evidence and literature, in the attempt to delineate a different narrative of the crisis and highlight what I believe to be the structural problem of the EU.

The over-arching research question can be summarized as: can the divergent trajectories of European countries' current accounts be explained by price-competitiveness factors?

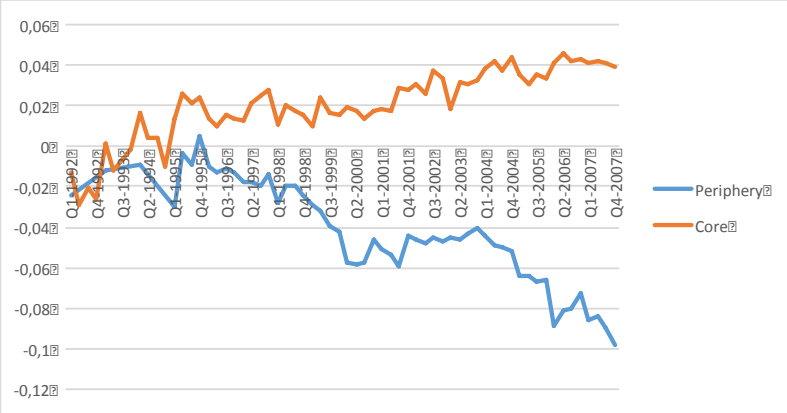
The work is organized as follows. Section 2 introduces the problem of divergent current accounts, Section 3 describes the 'competitiveness narrative' and a variant to it, from whom a series of testable propositions are identified. Section 4 describes the Global VAR model and tests these propositions by analyzing the impacts of different shocks on the current accounts of EZ member states. Finally, Section 5 tries to explain the results obtained by developing a different narrative to the one outlined in Section 3. Section 6 summarizes the work.

II. Stylized Facts On the Current Account Dynamics.

The first signs of divergence in current accounts emerged in the mid-nineties, as stage two of the EMU paved the way for the future of the single currency. By the end of 1994 Portugal, Spain and Greece had all started the accumulation of deficits, while Italy was still running a surplus. Some heterogeneity was present also among Northern European countries, with Austria and

Germany running deficits until the introduction of the euro. By 2001, however, the picture was clear: periphery countries were running deficits of on average 5 percent of their GDP, while core countries remained on a 2 percent surplus, which was destined to increase. The peak of the dispersion in current account was reached in 2007-2008 when the periphery had an average deficit of nearly 10 percent (Figure 1).

Figure 1: Current account in percentage of GDP for core (Germany, Austria, France, Netherlands, Finland) and periphery (Italy, Spain, Portugal, Greece).



Source: IMF International Financial Statistics

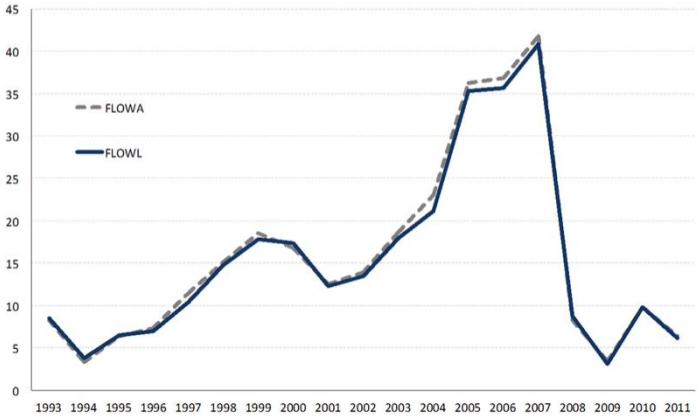
These statistics are easy to gather and describe; the real issue is of course establishing which centrifugal forces are responsible for this dynamic. This can be a difficult endeavor in the case of current accounts, because the variable is by definition influenced by both domestic and foreign factors.

To add further complexity, the period under consideration has been characterized by the fast period of financial integration and the adoption of the single currency, which led many commentators believe that those imbalances were the sign of a healthy convergence process between capital-abundant core economies and capital-scarce periphery (Blanchard *et al.* 2002).

What is certain is that these flows financed the accumulation of unsustainable levels of debt in periphery countries. In Spain funds were channeled toward a housing bubble, while they took the form of public debt and higher government spending in Greece.

All this came to a sad end when the financial crisis hit and these flows abruptly terminated in what has been defined as a 'sudden stop' crisis (Baldwin *et al.* 2015) and is best captured by Lane's (2013) figure.

Figure 2: Euro Area Capital Flows in percentage of GDP (Flowa = outward flows ; Flowl = inward flows)



Source: Lane (2013)

3. The Competitiveness Narrative

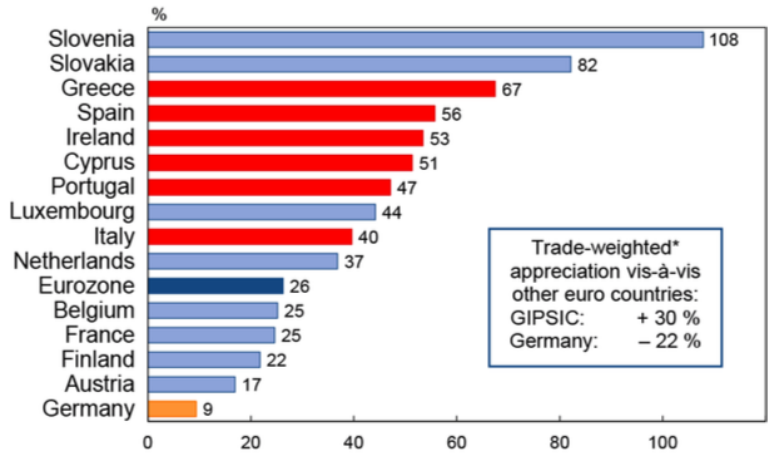
A popular explanation of what caused these imbalances, which I will call 'competitiveness narrative', is perhaps best reflected in the work of Sinn (2013). Professor Sinn attributes the slow recovery and the build-up of imbalances to an internal competitiveness problem of periphery countries, fueled by cheap credit and excessively loose monetary policy.

The adoption of the single currency in 1999 brought about convergence and reduction of interest rates for all EZ countries, some of which saw a 10 percent reduction in their cost of borrowing. Risk premiums reached the lowest level in years as German bonds were exchanged in the market at more or less the same rate as Greek and Spanish ones.

Low rates coupled with the expectation of fast income growth for the periphery, created a demand boom that was channeled to higher wages (due to rigid labor markets) and thus lower competitiveness (Dadush 2010).

To corroborate this view commentators focus on the change in price level from before the introduction of the euro until the crisis, highlighting the above average increase of the latter for periphery countries, which became too expensive and thus unattractive compared to the core (Figure 4).

Figure 3: Evolution of the GDP deflator 1995-2008,



*Including exchange rate adjustment before the introduction of the euro

Source: Sinn (2013). Eurostat Database, Economy and Finance.

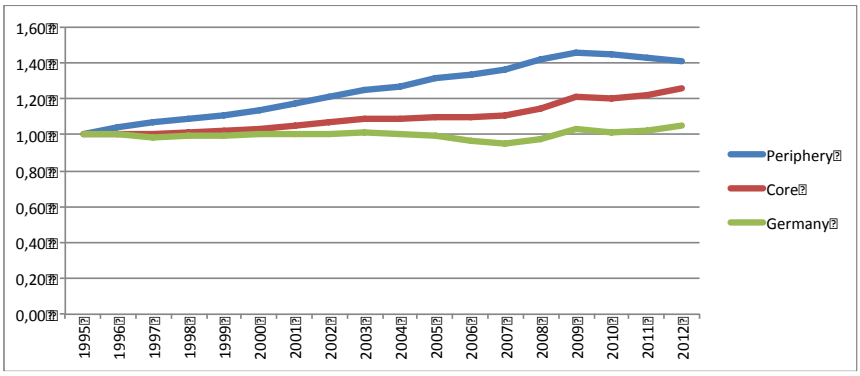
Unit labor cost developments can only validate this diagnosis. Their increase in periphery countries is due to overregulated labor markets that allowed wages to grow faster than productivity, thus increasing ULC both in absolute terms and relative to other core Eurozone countries (Figure 4). Between 1997 and 2007 compensation of employees rose by 5.9 percent on average in the so-called GIIPS. This translated to an appreciation of the real exchange rate and a severe loss of competitiveness, which ultimately eroded the trade balance.

ULC movements are indeed mirrored by the divergence in current accounts and confirm the core-periphery differences: Germany, Austria and the Netherlands had stable ULC and ran account surpluses, while Portugal, Italy and Spain ran deficit and their labor cost increased.

The policy recommendation to tackle the problem is, therefore, a real depreciation in the order of 20 to 30 percent with respect to the Eurozone average for Portugal, Greece and Spain (Sinn 2013). This is because sustained growth can "result if a country is truly competitive in the sense of being inexpensive enough, given the nature and quality of its products, to enjoy high demand for its products from abroad" (Sinn 2013). Deregulation of the labor market and tight fiscal policy are offered as the only way to rebalance the current account and bring growth back through exports.

As highlighted by Draghi's speech (Draghi 2012) and other influential figures (e.g. Trichet 2011, Junker *et al.* 2015) this narrative has been accepted by policymakers and ULC have been introduced in the 'Scoreboard' of the Macroeconomic Imbalance Procedure, the European Commission's surveillance mechanism aimed at correcting adverse economic trends inside the EU.

Figure 4: ULC in Core, Periphery and Germany. (1995 = 100)



Source: OECD Statistics

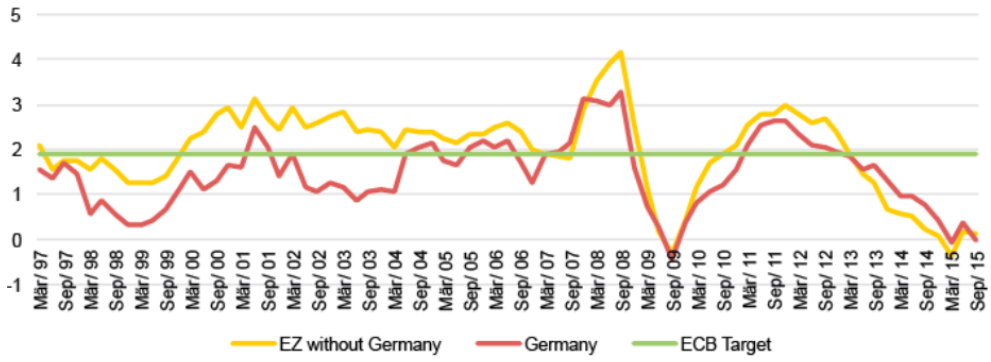
3.1 A Narrative's Variant: The Mercantilist Germany

Drawing from the same competitiveness narrative, Flassbeck and Lapavitas (2013) and Wren Lewis (2014) shift the blame of fueling the current account imbalances to Germany. In their view Europe's export superpower has reduced unions' bargaining power through the 2003 Hartz' labor reform, as confirmed by the steady decrease in the percentage of unionized workers from 1995 to 2001 (OECD, 2013). This policy reduced the unemployment benefits and

increased the efficiency of the job matching through a re-organization of training schemes (Kollman *et al.* 2014). This resulted in a stagnation of real wages, which were essentially allowed to increase to make up for inflation but not for productivity. Consequently, weak domestic demand in Germany meant lower export for other EZ countries (Bofinger 2015). By deliberately cutting wages, Germany increased its competitiveness and enlarged its market share at the expense of neighboring countries and 'exported' its unemployment.

At the same time, below- average inflation in Germany pushed down the Eurozone average, forcing the ECB to lower interest rates, thus imposing an excessively accommodating monetary policy in the periphery, which would further reduce the incentive to save and worsen their external position (Figure 5).

Figure 5: German inflation and Eurozone average Inflation (without Germany)



Source: Eurostat, Bofinger (2015)

The theoretical framework, around which both the competitiveness narrative and its variant pivot, can be regarded as neoclassical with a mercantilist flavor. Nations compete for the same good and the market rewards the one, which produces it with lowest cost, so that a trade surplus for one country means a trade deficit for another.

3.2 Some Testable Propositions

Having outlined the contours of the competitiveness narrative, I can now isolate two propositions, which I will then try to test empirically using the GVAR model.

Proposition 1: *Periphery countries' net financial position worsened, as a consequence of the relative increase in cost-competitiveness represented by the German wage moderation.*

Proposition 2: *The divergence in current accounts is due to a lack of cost-competitiveness in the periphery countries, since the level of wages significantly influences their external liabilities.*

Both propositions will be tested by feeding the model with positive (for proposition 2) and negative (for proposition 1) one standard deviation shocks (from here on, simply referred to as "shock") to the level of real wages in Germany and periphery countries. The reactions of the current accounts to these shocks will offer some evidence on the validity of this narrative.

In order to enlarge the scope of the analysis, I will further analyze the effects of productivity increases (as opposed to wages) and of shocks from non-EU countries on the current accounts of both core and periphery.

The analysis will be performed using a Global VAR, which I shall now describe more specifically. Sections 4.1 till 4.7 describe the methodology, the model construction and the data, while the results are reported in section 4.7. The basic idea behind the use of a GVAR in this setting is summarized at the beginning of the section.

4. The GVAR Model

The Global VAR model developed by Dees, di Mauro, Pesaran and Smith (DdPS[1]) can be thought of as a VAR containing many country-specific models. The aim of such econometric tool is to account for the interdependencies and co-movement of macroeconomic variables between different countries. Contrary to estimated structural models, large-scale VARs like the

[1] The estimation of the GVAR was performed with the GVAR Toolbox 2.0 by Smith and Galesi (2014)

GVAR do not impose many theoretical constraints on the data, which can be a desirable property, when –as in this case– many factors concur in the determination of current accounts. However, this comes at a cost. As will be further exemplified, the GVAR cannot offer much insight as to why shocks propagate the way they do, nor can it offer much explanation when results are not significant.

Nevertheless, it is useful for our investigation of the possible causes of current account imbalances and of the validity of the 'competitiveness narrative', as the former are obviously determined by both domestic and foreign factors, while the latter hinges upon trade dynamics. If cost competitiveness losses on the part of periphery countries have caused the divergence in current accounts through worsening trade balance, or if Germany engaged in unfair competition vis-à-vis other countries, then the model should be able to reproduce these dynamics, since the links between different countries' VARs are constructed using data on bilateral trade flows.

The way these links are constructed is also the defining feature of the GVAR methodology. Indeed, the model reduces the dimensionality problem common to all large-scale VARs by augmenting each country model with a vector of country-specific cross sectional averages of foreign variables, which is constructed using trade weights (more below) (Chudik and Pesaran 2014). This imposes the restriction that the dynamics produced by variables of different country models on the variables of a specific country are proportional to the weights chosen (Canova and Ciccarelli 2013).

Moreover, the model is useful in this setting, as it allows for the simulation of both country-specific and regional shocks, which fits the need to analyze the different and perhaps asynchronous movement of core and periphery countries' macroeconomic variables.

The first stage for the construction of the GVAR is the specification of individual countries model with the addition of foreign "star" variables (distinguished graphically by "*"). These variables are treated as weakly exogenous or "long-run forcing" in the sense that there is no long run feedback from the domestic to the foreign variables, but lagged short run feedback is allowed. For example, an individual model may have inflation as domestic endogenous variable and foreign inflation as "star" variable computed as a weighted average of other countries' inflation in the GVAR.

The second and third steps comprise the estimation of individual countries' models and their subsequent collection under a comprehensive VAR (further details below).

4.1 Countries and Data

The model covers 8 EMU countries plus China, the UK and USA with quarterly frequency between 1996 and 2007. A first estimation was performed without the inclusion of non-EMU countries, but the model displayed above normal residuals in most individual-country models. This was especially true for core countries. The inclusion of China, the UK and the US allowed for a better explanation of cross-countries interdependencies and resulted in a sizeable reduction of residual terms. The choice of time span was partly dictated by data constraints, as for some countries quarterly data on current accounts are available only from 1996. I decided not to include the years after 2007 (i.e. the years of the financial crisis) to avoid structural breaks in the model.

Germany, France, Finland, Austria and the Netherlands are among the creditor countries and are aggregated as one region using GDP–PPP weights when conducting the dynamic analysis. The same holds for Italy, Spain and Portugal which form the periphery group. This division and corresponding aggregation are used for the simulation of regional shocks as will be further explained.

Data entering the country-specific VARs are real GDP (*y*), inflation rate (*Dp*), real wage (*rw*), real effective exchange rate based on CPI (*reer*), labour productivity (*prod*), current account (*ca*) and the price of oil (*poil*). Table 1 shows the transformations made to each variable.

Table1: Variables and Transformations

Variable	Transformation
Real GDP	$ln(\text{RGDP}_t)$
Inflation Rate	$\Delta ln(\text{CPI}_t)$
Real Wage	$ln(\text{Compensation per employee}/\text{CPI}_t)$

Real Effective Exchange Rate	$ln(REER_t)$
Labor Productivity	Δln(Labor Productivity)
Current Account	CA_t/Nominal GDP_t
Oil Price	ln(Oil Price Index)

4.2 The Weight Matrix

In order to construct the matrix that will weigh the foreign variables it is necessary to first collect data on the trade relationship of each country with the rest of the group. The total trade of country *i* with the rest of the group is then divided by the total trade with country *j,* which results in the relative share of *j* in *i*'s total trade. This way of constructing the weight matrix makes the columns for each country sum to one, while the rows do not.

Table 2: Trade Matrix (weights reported as average between 1996 and 2007)

	au	chi	fin	fra	ger	ita	ned	por	spa	uk	usa
au	0.000	0.007	0.022	0.016	0.088	0.043	0.019	0.010	0.015	0.013	0.014
chi	0.020	0.000	0.063	0.035	0.057	0.042	0.050	0.010	0.033	0.045	0.333
fin	0.010	0.017	0.000	0.009	0.019	0.010	0.017	0.008	0.009	0.018	0.012
fra	0.063	0.056	0.091	0.000	0.187	0.210	0.137	0.152	0.266	0.162	0.102
ger	0.588	0.159	0.291	0.285	0.000	0.289	0.378	0.207	0.216	0.230	0.194
ita	0.122	0.053	0.075	0.151	0.129	0.000	0.075	0.078	0.135	0.083	0.076
ned	0.048	0.065	0.108	0.090	0.144	0.075	0.000	0.060	0.063	0.128	0.068
por	0.006	0.003	0.011	0.023	0.018	0.015	0.011	0.000	0.086	0.015	0.006
spa	0.030	0.024	0.044	0.134	0.071	0.097	0.049	0.332	0.000	0.068	0.027
uk	0.050	0.067	0.159	0.141	0.136	0.105	0.154	0.096	0.114	0.000	0.169
usa	0.063	0.550	0.135	0.116	0.152	0.113	0.111	0.049	0.064	0.237	0.000

Source: IMF Direction of Trade Statistics

The trade matrix so computed can already show a couple of interesting facts. Firstly, it is possible to have a better sense of the dominant role of Germany in the Euro area. This export juggernaut is the most important trading partner for six of the eight European countries considered and competes on a tight margin with France for Spain's biggest trade share. Secondly, Germany is China's biggest trading partner in the EU with double the share of other European Member States. This point is particularly important for any discussion of the determinants of competitiveness among EU countries, as it already shows some important differences in their respective trade relations.

With these trade weights it is then possible to construct the foreign variables as:

$$y_{it}^{*} = \sum_{j=1}^{N} w_{ij} y_{jt} \qquad Dp_{it}^{*} = \sum_{j=1}^{N} w_{ij} Dp_{jt}$$

$$rw_{it}^{*} = \sum_{j=1}^{N} w_{ij} y_{jt}$$

where w_{ij} corresponds to the average total trade between two countries.

Not all these 'star' variables enter each country model. The UK, China and the US do not have real wage in their model and thus affect European countries only through output and inflation. This is primarily because the weak exogeneity test (more below) for real wage showed it is not long-run forcing with respect to the variables of other countries. In addition, I wanted to construct a GVAR, which is as parsimonious as possible in terms of both countries and variables, in order to focus on few specific dynamics.

4.3 Specification and Estimation of Individual Models

Each country model features GDP and Inflation as endogenous and foreign variables. European countries have in addition labor productivity, the real effective exchange rate, current account and real wage; the latter variable being also a foreign "star" variable for these models. The price

of oil is considered weakly exogenous in all models but for the US one, in which it is considered endogenous following Dees *et al.* (2005).

The models' estimation starts with the single country VARX* structure:

$$(1)\ \boldsymbol{x}_{it} = \boldsymbol{a}_{i0} + \boldsymbol{a}_{i1}t + \boldsymbol{\Phi}_{in}\boldsymbol{x}_{i,t-n} + \boldsymbol{\Lambda}_{i0}\boldsymbol{x}^{*}_{it} + \boldsymbol{\Lambda}_{in}\boldsymbol{x}^{*}_{i,t-n} + \boldsymbol{u}_{it}$$

Where $\boldsymbol{x}_{it}$ is the vector of endogenous variables and $\boldsymbol{x}^{*}_{it}$ is the vector of foreign weakly exogenous ones, which is treated as 'long-run forcing' with respect to the parameters of the model; $\boldsymbol{a}_{i0}$ and $\boldsymbol{a}_{i1}$ are column vectors for constants and time trends respectively. Each VARX* is estimated separately conditional on $\boldsymbol{x}^{*}_{it}$ using reduced rank regression (Dees et. al 2005).
The number of lags of both domestic and foreign variables are selected using AIC and need not be the same for each model. The maximum of this lag order across all countries will be used to describe the whole GVAR.

Once each VARX* has been estimated, all models are stacked together and the GVAR is solved as follows. First, define $\boldsymbol{z}_{it} = (\boldsymbol{x}_{it}, \boldsymbol{x}^{*}_{it})'$, $\boldsymbol{A}_{i0} = (\boldsymbol{I}_{ki}, \boldsymbol{\Lambda}_{i0})$ and $\boldsymbol{A}_{i1} = (\boldsymbol{\Phi}_{i1}, \boldsymbol{\Lambda}_{i1})$, so that (1) can be expressed as

$$(2)\ \boldsymbol{A}_{i0}\boldsymbol{z}_{it} = \boldsymbol{a}_{i0} + \boldsymbol{a}_{i1}t + \mathbf{A}_{i0}\boldsymbol{z}_{i,t-1} + \mathbf{u}_{it}$$

Next, define the vector $\boldsymbol{z}_{it} = \boldsymbol{W}_i \boldsymbol{x}_t$, where $\boldsymbol{x}_t = (\boldsymbol{x}'_{0t}, \boldsymbol{x}'_{1t}, \boldsymbol{x}'_{2t}, \ldots, \boldsymbol{x}'_{11t})$. $\boldsymbol{x}_t$ is therefore the global vector which contains at time t all the endogenous variables of the system and $\boldsymbol{W}_i$ is the link matrix of size $(k_i + k_i^{*}) \times k$. Using this identity we can express (2) as

$$(3)\ \boldsymbol{A}_{i0}\boldsymbol{W}_i\boldsymbol{x}_t = \boldsymbol{a}_{i0} + \boldsymbol{a}_{i1}t + \mathbf{A}_{i0}\mathbf{W}_i\boldsymbol{x}_{t-1} + \mathbf{u}_{it}$$

Finally we can collect all the country models in one Global VAR, which takes the following form:

$$(4)\quad \boldsymbol{G}_0\boldsymbol{x}_t = \boldsymbol{b}_0 + \boldsymbol{b}_1 t + \mathbf{G}_i\boldsymbol{x}_{t-1} + \mathbf{c}_{it}$$

Where $\boldsymbol{b}_0 = \begin{pmatrix} a_{00} \\ a_{10} \\ \cdots \\ a_{N0} \end{pmatrix}$ $\boldsymbol{b}_1 = \begin{pmatrix} a_{01} \\ a_{11} \\ \cdots \\ a_{N1} \end{pmatrix}$ $\boldsymbol{c}_t = \begin{pmatrix} u_{0t} \\ u_{1t} \\ \cdots \\ u_{Nt} \end{pmatrix}$

And $\boldsymbol{G}_0 = \begin{pmatrix} A_{00}W_0 \\ A_{10}W_0 \\ \cdots \\ A_{N0}W_N \end{pmatrix}$ $\boldsymbol{G}_1 = \begin{pmatrix} A_{01}W_0 \\ A_{11}W_1 \\ \cdots \\ A_{N1}W_N \end{pmatrix}$

Multiplying both sides by $\boldsymbol{G}_0^{-1}$ yields

$$(5) \quad \boldsymbol{x}_t = \boldsymbol{f}_0 + \boldsymbol{f}_1 + \mathbf{F}_1\boldsymbol{x}_{t-1} + \mathbf{v}_{it}$$

which is the final representation of the model.

4.4 Weak Exogeneity Test

A fundamental assumption is the weak exogeneity of the foreign variables with respect to the endogenous ones. This means that $\boldsymbol{x}_{it}$ does not affect $\boldsymbol{x}_{it}^*$ at long horizons and that $\boldsymbol{x}_{it}^*$ is considered 'long-run forcing' with respect to $\boldsymbol{x}_{it}$ (Chudik *et al.* 2014). This is generally the case when each economy in the model is small relative to the others. A formal test of this assumption can be performed following Johansen (1992) approach. Table 3 presents the result of this test with the corresponding F statistics. It appears that the foreign variable chosen, namely output, inflation and real wages can all be considered weakly exogenous, with the exception of inflation for the Italian model. The price of oil can also be considered exogenous in most countries' models.

Table 3: Test for Weak Exogeneity at the 5% Significance Level

Country	F test	Fcrit_0.05	ys	Dps	rws	poil
AUSTRIA	F(4,29)	2.70	3.10	0.50	0.46	0.97
CHINA	F(2,36)	3.26	2.57	2.22		1.43
FINLAND	F(3,30)	2.92	0.82		2.81	3.59
FRANCE	F(2,31)	3.30	2.79	2.88	1.35	0.58
GERMANY	F(4,29)	2.70	0.26	0.68	0.63	1.15
ITALY	F(3,30)	2.92	0.74	4.53	1.13	4.08
NETHERLANDS	F(1,32)	4.15	1.32	0.04	0.44	0.22
PORTUGAL	F(4,29)	2.70	0.40	2.74	1.47	2.33
SPAIN	F(2,31)	3.30	0.57		0.17	3.29
UNITED KINGDOM	F(1,37)	4.11	2.07	0.07		0.01
USA	F(3,35)	2.87	1.15	0.27		

4.6 Average Pairwise Cross-Section Correlation

In order to assess to which extent this model specification and the foreign variables have been effective at reducing cross-section correlation, Table 4 is reported, which specifies the average pairwise correlation of the endogenous variable and the estimated residuals from the individual VARX* models. A low residual term implies a good performance of the model at controlling for the idiosyncratic shocks between countries and thus at explaining the interdependencies among them. This will be important for the analysis of regional and country-specific shocks, which will be carried out later.

Looking at Table 4 it is clear that correlation varies substantially across variables but less so between countries. Output displays the highest correlation with all countries being close to a one-to-one synchronized movement. The real effective exchange rate also shows high correlation both for the levels and for the first difference. Instead, output growth -identified by the first difference of output- appears to be in the range of a 20 to 30 percent correlation among countries. Inflation and real wage both have an average correlation of c.a. 28 percent, which is line with the results of Sun *et al.* (2013) and of DdPS.

Turning to the analysis of residual terms, it is possible to conclude that the model performed well for most of the variables and countries, with an average correlation of all residuals of 5%. However, the main weakness lies in the correlations of residuals for the exchange rate, which are not in line with the rest of the variables and display high correlations. This suggests that the model's results concerning exchange rate should be handled with caution and that future specifications should consider this problem.

Table 4: Average Pairwise Cross-section Correlation and VARX* Residuals

Country	Real GDP			Country	Inflation		
	Levels	First Diff	VARX* Residual		Levels	First Diff	VARX* Residual
AUSTRIA	0,98	0,22	0,003	AUSTRIA	0,36	0,30	0,03
CHINA	0,96	0,039	0,028	CHINA	0,21	0,14	-0,01
FINLAND	0,98	0,23	0,041	FINLAND	0,30	0,25	-0,02
FRANCE	0,98	0,29	0,043	FRANCE	0,36	0,39	0,02
GERMANY	0,96	0,29	-0,096	GERMANY	0,35	0,35	-0,07
ITALY	0,98	0,28	0,056	ITALY	0,32	0,26	-0,07
NETHERLANDS	0,97	0,31	0,013	NETHERLANDS	0,18	0,28	-0,06
PORTUGAL	0,95	0,147	0,026	PORTUGAL	0,17	0,16	0,02
SPAIN	0,98	0,287	0,011	SPAIN	0,34	0,26	-0,03
UK	0,98	0,245	0,015	UK	0,17	0,29	-0,02
USA	0,98	0,163	-0,058	USA	0,36	0,40	-0,05

Country	Labor Productivity		
	Levels	First Diff	VARX* Residual
AUSTRIA	0,18	0,14	-0,02
FINLAND	0,11	0,18	-0,06
FRANCE	0,07	0,03	-0,03
GERMANY	0,01	0,01	0,06
ITALY	0,04	0,01	-0,04
NETHERLANS	0,09	0,08	-0,04
PORTUGAL	0,08	0,11	-0,08
SPAIN	0,14	0,17	-0,02

Country	Real Wage		
	Levels	First Diff	VARX* Residual
AUSTRIA	0,35	0,23	-0,01
FINLAND	0,39	0,06	-0,06
FRANCE	0,40	0,27	-0,03
GERMANY	0,53	0,00	0,11
ITALY	0,09	0,06	-0,07
NETHERLANS	0,40	0,16	-0,01
PORTUGAL	0,36	0,08	-0,02
SPAIN	0,25	0,22	-0,01

Country	Current Account		
	Levels	First Diff	VARX* Residual
AUSTRIA	-0,23	0,09	0,05
FINLAND	-0,08	-0,02	-0,04
FRANCE	0,03	0,11	0,15
GERMANY	-0,22	0,25	0,13
ITALY	0,08	0,16	0,04
NETHERLANDS	-0,13	0,10	0,03
PORTUGAL	0,14	0,08	0,02
SPAIN	0,10	0,13	0,14

Country	Real Effective Exchange Rate		
	Levels	First Diff	VARX* Residual
AUSTRIA	0,79	0,93	0,48
FINLAND	0,70	0,91	0,33
FRANCE	0,78	0,94	0,44
GERMANY	0,63	0,94	0,36
ITALY	0,83	0,92	0,49
NETHERLANDS	0,78	0,94	0,49
PORTUGAL	0,67	0,89	0,31
SPAIN	0,65	0,89	0,40

4.7 Shock Analysis Using Structural and Generalized Impulse Response Functions

Having analyzed the model's structure, I can now investigate how different shocks propagate through the system and -consequently- through different European countries. As previously highlighted, the transmission is influenced by the foreign variables' construction, which represents the trade relationship between each country.

I will consider two types of shocks: to a specific variable in one country and to one variable in many countries forming a region. The first type of shock will be used to test the hypothesis that German wage moderation could have had meaningful repercussions on the current account of periphery countries. The second type of shock will be employed to investigate the second proposition and the role of productivity. The identification strategies for these two types of shocks differ substantially and is therefore worth explaining them in turn.

4.7.1 Identification of Wage shock in Germany

The structural identification of shocks in large system like the GVAR faces many complications, due to the large number of variables and countries present, which requires the imposition of many restrictions for correct identification. This is the reason why most literature employs generalized impulse response functions (GIRF) for the analysis of global shocks (see for example Sun *et al*. 2013). In this application, though, it is possible to perform a structural analysis by imposing restrictions only on one country, namely Germany. I wish to identify a negative wage shock and look at how it propagates through the system and how it affects the current accounts of other EZ countries as well as the German one.

Following Dees *et al* (2005) I employed a recursive identification scheme *a la* Sims (1980), which entails the ordering of variables in the matrix of contemporaneous effects and the imposition of a diagonal structure on the variance covariance matrix of the structural shocks. These restrictions are applied only to the German VARX* model, which in this particular application contains output, real wage, inflation and the current account. The assumption is therefore that the level of wages is not instantaneously affected by the other variables, which are ordered as: output, inflation and current account. Of course, these a priori restrictions are very strong and can potentially lead to misleading conclusions, so I performed the same shock simulation using generalized impulse response functions to see if the result would change considerably (more below).

In order to apply this identification scheme to the whole GVAR, it is easier to start from the single country VARX* as in (4). First, define the structural shocks $\boldsymbol{\varepsilon}_{it}$ as the product of $\boldsymbol{H}_0\mathbf{c}_{it}$, where $\boldsymbol{H}_0$ is the matrix to be identified and $\mathbf{c}_{it}$ are the residuals for each VARX*. Next, impose

that $\boldsymbol{\Sigma\varepsilon}_0 = Var(\boldsymbol{\varepsilon}_0)$ to be diagonal and $\boldsymbol{H}_0$ to be lower triangular. By applying a Cholesky decomposition to $\boldsymbol{\Sigma}_{c0} = Var(\mathbf{c}_{it}) = \boldsymbol{Q}_0' \boldsymbol{Q}_0$, the variance of the structural shocks is $\Sigma\boldsymbol{\varepsilon}_0 = \boldsymbol{H}_0\Sigma_{c0}\boldsymbol{H}_0'$ and $\boldsymbol{H}_0 = (\boldsymbol{Q}_0')^{-1}$. This implies that $\boldsymbol{\Sigma}\varepsilon_0$ is diagonal. It is now possible to apply these setting to the GVAR by premultiplying (4) by

$$\boldsymbol{H}_{G_0}^0 = \begin{pmatrix} \boldsymbol{H}_0 & 0 & 0 & 0 \\ 0 & I_{k_1} & 0 & 0 \\ 0 & 0 & \ddots & 0 \\ 0 & 0 & 0 & I_{k_N} \end{pmatrix}$$

So that the model becomes:

$$\boldsymbol{H}_{G_0}^0 \boldsymbol{G}_0 \boldsymbol{x}_t = \boldsymbol{H}_{G_0}^0 \mathbf{G}_i \boldsymbol{x}_{t-1} + \boldsymbol{\varepsilon}_{it}$$

Where $\boldsymbol{\varepsilon}_{it} = (\boldsymbol{\varepsilon}'_{0t}, \mathbf{c}'_{1t}, \mathbf{c}'_{2t}, \dots, \mathbf{c}'_{Nt})$

4.7.2 Generalized Impulse Response Functions and Regional Shocks

The analysis of regional shocks, which corresponds to the second proposition and the investigation of the role of productivity, has been performed using a different methodology than the one just described. This is because the restrictions needed to structurally identify the shocks to a variable from a set of countries would have been highly implausible. These would entail the ordering of both variables and countries, which amounts to imposing -for instance- that Italian variables are not affected by other countries' ones, but the opposite is not true. These restrictions can hardly be justified using economic theory and would significantly alter the results; not to mention the fact that imposing them would implicitly assume the insularity of some economies, which is against all empirical evidence.

The methodology followed is instead the one proposed by Koop *et al.* (1996) and adapted to VAR models by Pesaran and Shin (1998). Generalized impulse response functions have the

advantage of being independent of the ordering of the variables in VAR, while taking into account the historical pattern of correlation among shocks. GIRFs cannot be given a causal interpretation, but are rather used to explore the dynamic properties of the system. This is because this methodology "considers shocks to individual errors and integrates out the effects of the other shocks using the observed distribution of all the shocks without any orthogonalization" (Dees *et al.* 2005).

To illustrate how their computation is performed, consider first the GVAR in (4). A GIRF is defined as

$$GIRF\ (\boldsymbol{x}_t ; u_{ilt} , n) = E\ (\boldsymbol{x}_{t+n} \mid u_{ilt} = \sqrt{\sigma_{ii,ll}}\ , \mathcal{I}_{t-1}) - E(\boldsymbol{x}_{t+n} | \mathcal{I}_{t-1})$$

Where $\mathcal{I}_{t-1}$ is the information set at time t-1, $\sigma_{ii,ll}$ is the diagonal element of the covariance matrix $\sum_c$ corresponding to the l^{th} equation in the i^{th} country and n is the horizon.

In case of regional shocks, which affect a single variable in a specific group of countries, GIRFs are computed as

$$GIRF\ (\boldsymbol{x}_t ; u_{ilt} , n) = \frac{e_j' \boldsymbol{A}_n \boldsymbol{G}_0^{-1} \sum_c e_l}{\sqrt{e_j' \sum_c e_l}}, \quad n = 0,1,2, \dots l, \quad j = 1,2, \dots k$$

Where e_j' is a vector with Purchasing Power Parities GDP weights for all the countries that form the region. In the simulation of regional shocks, for instance, e_j' will be a vector with zeros for the countries that are not from that region and weights (based on PPP-GDP) that sum to one for the countries in the region.

4.8 Dynamic Analysis and Results

Having outlined how the two types of IRFs have been computed, I can now turn to the results of the different shocks' simulations and the test of the propositions outlined in section 2. I will feed the model with different shocks and see how they propagate through the system and impact the current account.

Given the short estimation period, it is reasonable to focus on the first few quarters after the shock, even if tables are presented for longer horizons. This section will simply describe the results, while the next one will comment on them and put them in perspective.

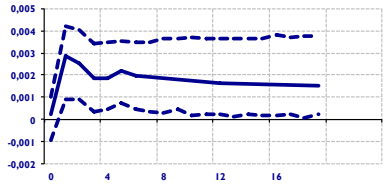
4.8.1 Proposition 1: Negative Shock to German Real Wage

The first shock to be performed is the one to the level of German real wages and it should simulate the impact of the labor market reform outlined in the previous section, which reduced the level of wages and should have boosted German export at the expense of periphery countries' trade balance.

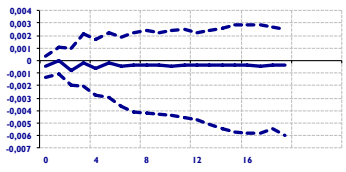
As can be seen from the IRFs below, the current account reacts positively albeit with some lags to a reduction in employees' compensation. IRFs are significant for the first 2 years and then slowly converge to zero. What is remarkable, however, is the fact that there is little variation in the current accounts of other countries, most notably of the periphery ones. IRFs do slope downward for some countries, indicating a worsening of the current account, but for most these movements are not significantly different from zero.

Figure 6: Response of the Current Account to a Negative Shock to German Real Wage

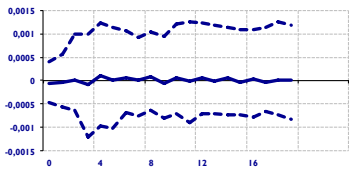
Germany



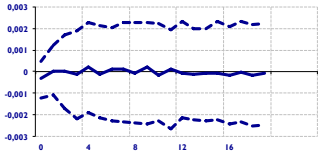
Austria



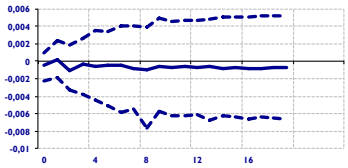
France



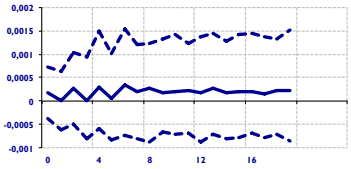
Portugal



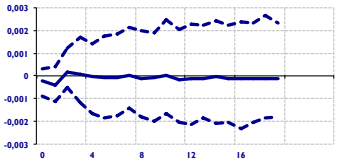
Finland



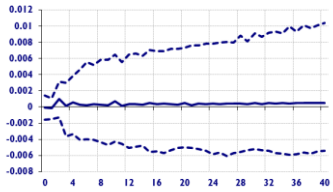
Italy



Spain



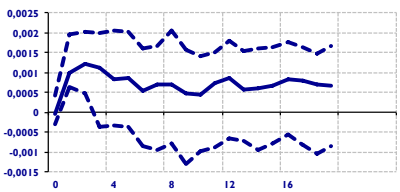
Netherlands



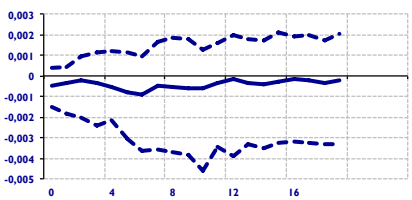
This result can be the due to an improper identification strategy, considering that the ordering of the variables necessary for obtaining orthogonal shocks was somewhat arbitrary. For this reason, I performed the same individual country shock, this time using the generalized impulse response function methodology. Shock profiles are in line with the previous result, even though the reaction of Germany's current account has been mitigated by the correlation with other shocks and is now significant for fewer quarters (Figure 7).

Figure 7: Response of the current account to a negative shock to German real wage (GIRFs methodology)

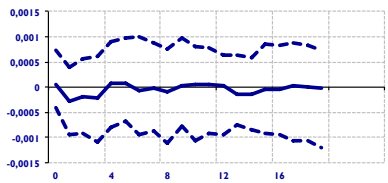
Germany



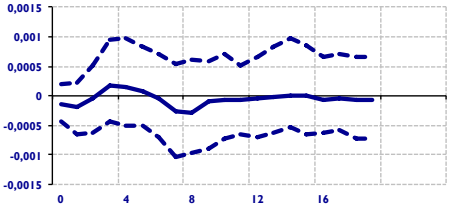
Austria



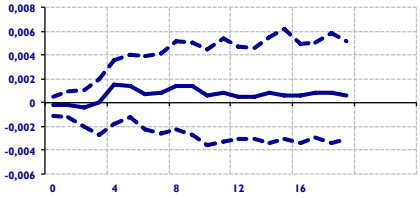
France



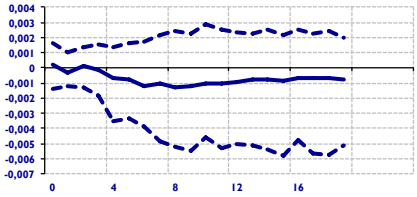
Portugal



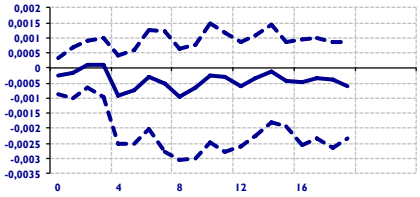
Finland



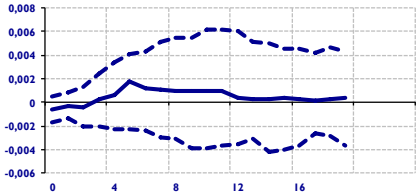
Italy



Spain



Netherlands



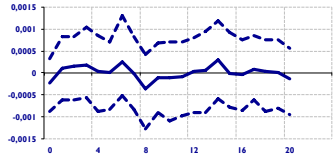
4.8.3 Proposition 2: Wage Shocks in Periphery Countries

A popular policy implication of the competitiveness narrative is that debtor countries should drastically reduce their level of wages in order to increase their cost-competitiveness, boost their export and improve their net foreign position. I tried to test this proposition by simulating a coordinated negative shock to real wages in the periphery countries.

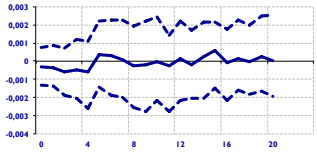
What emerges is that the effect of this shock on the current account is not significantly different from zero for Italy and Portugal, while it is nearly positive for Spain (Figure 8).

Figure 8: Response of the current account to a negative region-specific shock to periphery's real wage.

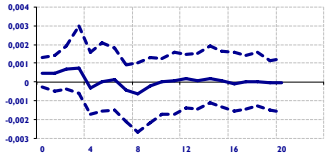
Italy



Portugal



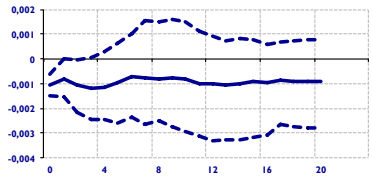
Spain



For sure, output will be temporarily lower (for nearly a year) given the loss in disposable income, which is also what our model confirmed (Figure 9).

Figure 9: Response of Periphery's GDP to a Negative Region-Specific Shock to Periphery's Real Wage.

Periphery



The poor performance of wage shocks in affecting the current account dynamics in the model was confirmed also by the simulation of a positive region-specific wage shock to the periphery countries, following which current accounts have not significantly worsened and resulted in GIRFs that are not significantly different from zero.

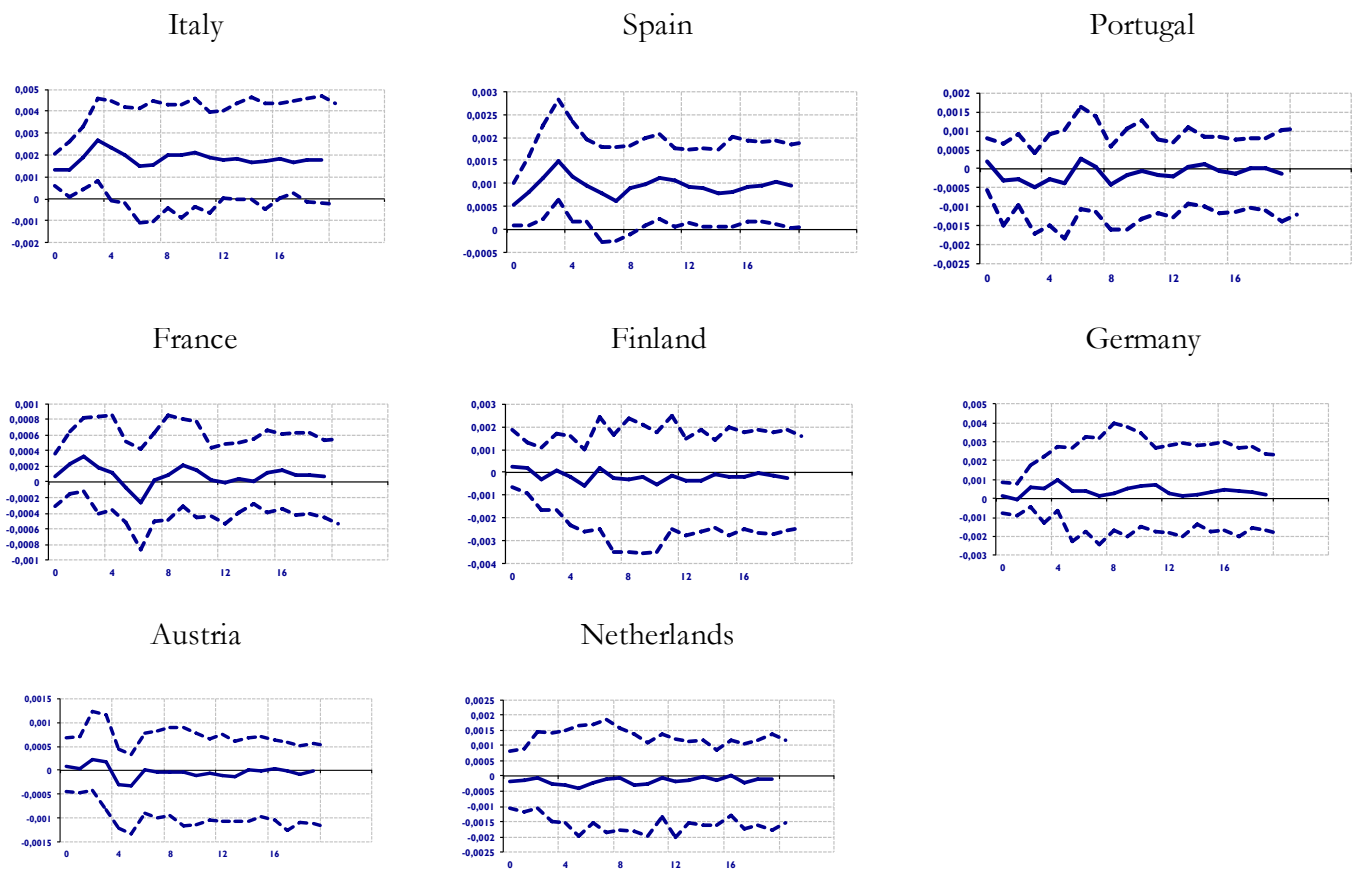
4.8.2. Positive Shocks to Labor Productivity

In order to further investigate the determinants of current accounts' dynamics, I simulated positive shocks to labor productivity. These shocks do not directly imply an increase in cost-competitiveness, as the variable is calculated as output divided by the number of hours worked. Instead, higher labor productivity is generally associated with technological improvements and human capital investments, which

Figure 10 shows the GIRFs for the current account of European countries following a positive productivity shocks. Indeed, Italian and Spanish current accounts significantly increase upon impact, suggesting that higher productivity in those countries could have reduced the accumulated imbalances. Portugal instead does not show the same response: the curve does slope upward, but the bootstrap confidence intervals are on the zero line. This is a puzzling

result given the similar behavior of the other two periphery countries and the unsurprising increase in GDP that is brought about by the shock.

Figure 10: Response of the current account to a positive region-specific shock to periphery's productivity

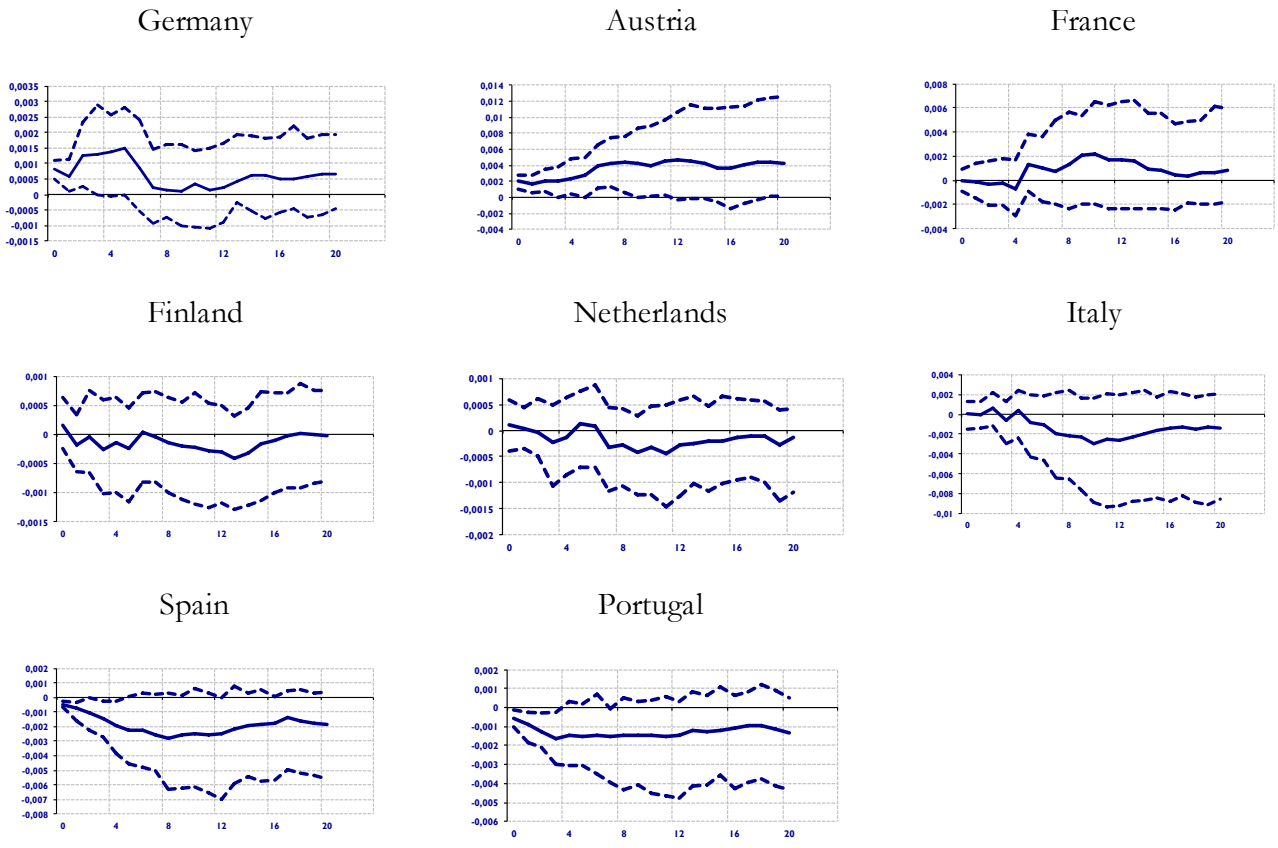


Another possible observation concerns the reaction of core countries to this shock. France and Germany's current accounts react positively, despite the magnitude of the increase being quite small. This dynamic cannot be explained by a simple framework in which the surplus for one European country imply a deficit for another, otherwise we should see impulse response functions sloping downward for the current account of core countries.

Having observed the relative importance of productivity for periphery countries, I decided to feed the model with the same shock, this time to core countries. Figure 11 reports the time

profile of the current account after a hypothetical positive productivity shock hits the core countries. Germany's current account reacts more strongly, followed by Austria, while France and the Netherlands do not display significant changes. What is interesting, though, is that Spain' and Portugal's balances react negatively upon impact. This dynamic, coupled with the previous one seems to suggest that productivity increases weather domestic or foreign affect the account balances of periphery countries more than the core ones, albeit with some heterogeneity.

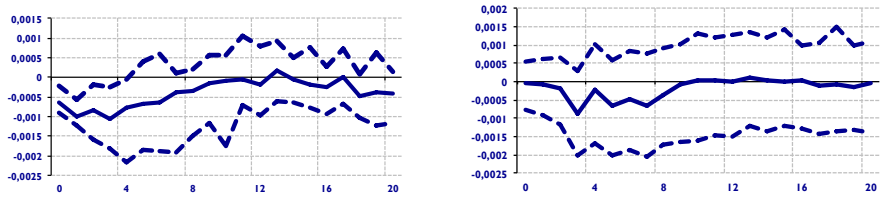
Figure 11: Response of the current account to a positive region-specific shock to core's productivity.



4.8.4 Positive Shock to China's GDP

The inclusion of non-EU countries in the model allows me to enlarge the scope of the analysis and see if and how other global trade partners influence the dynamics of the system. What emerged after different simulations is that China can affect core and periphery in different ways. In particular, a positive shock to China's GDP negatively impacts the EU periphery's current account, while the effect on core countries is not significant (Figure 12).

Figure 12: Peripehry' and Core' Response of GDP to a positive country-specific shock to China's GDP



Before turning to a more detailed analysis of the results obtained, it is important to recognize some of the limitations of this model and more generally of this approach. Firstly, some countries' GIRSs display recursive humps, indicating possible seasonality effects, despite data from the OECD should have controlled for it. Secondly, most time profiles converge to zero after a relatively long time-span, owing to the relatively persistent eigenvalues of the model. Finally, observations are relatively few, which makes estimation less reliable. This is the reason why I will try to focus on general trends, rather than thoroughly analyzing single countries' behavior.

Despite these observations and this methodological restriction, it is still possible to gain some insight on the topic. Indeed, the results obtained are quite consistent with one another and show two general features: (i) foreign level of wages do not seem to influence domestic current accounts, despite the inclusion of real wages as trade-weighted weakly exogenous variable, (ii) domestic productivity significantly impacts domestic current accounts and for some countries also foreign ones.

5. Building a Different Narrative.

The results obtained from the GVAR seem to contradict the propositions that have been singled out from the competitiveness narrative, while the last result enlarges the potential causes of current account imbalances.

In what follows I will try to make sense of the results obtained by building a different narrative to the one proposed earlier and by critically evaluating the latter.

5.1 German Wage Moderation Revisited

The identified shock to German real wages resulted in a significant albeit small increase of the domestic current account balance, while the same variable did not react strongly for the other countries. This dynamic was confirmed also by Bettendorf et al. (2015), whose paper focused entirely on the role of Germany in the creation of current account imbalances. Their identification strategy relied on sign restrictions drawn from a calibrated DSGE model, but their results are quite similar to these and seem to partially dismiss proposition 1: if it is true that the labor reform has had a small but positive impact on the German current account, this does not have to be mirrored by a worsening of the external financial position of other EZ countries.

The problem in proposition 1 might lie in the implicit assumption that Germany competes with other EZ countries for the production of the same goods, which is the *conditio sine qua non* for an increase in German export at the expense of periphery's one. In fact, this may not be the case, as documented by the work of Abdon *et al.* (2010), which ranked products and countries based on complexity and export share respectively; what emerges is that among all the periphery countries only Italy appears among the top five exporters of the ninth most complex product, while Germany is the second most complex economy in the world.

Not only does Germany trade in very different goods compared to the periphery, but its export structure is also hard to compare with the southern European one. German exports toward non-EU countries as a share of net export have boomed between 1995 and 2008 (Figure 13).

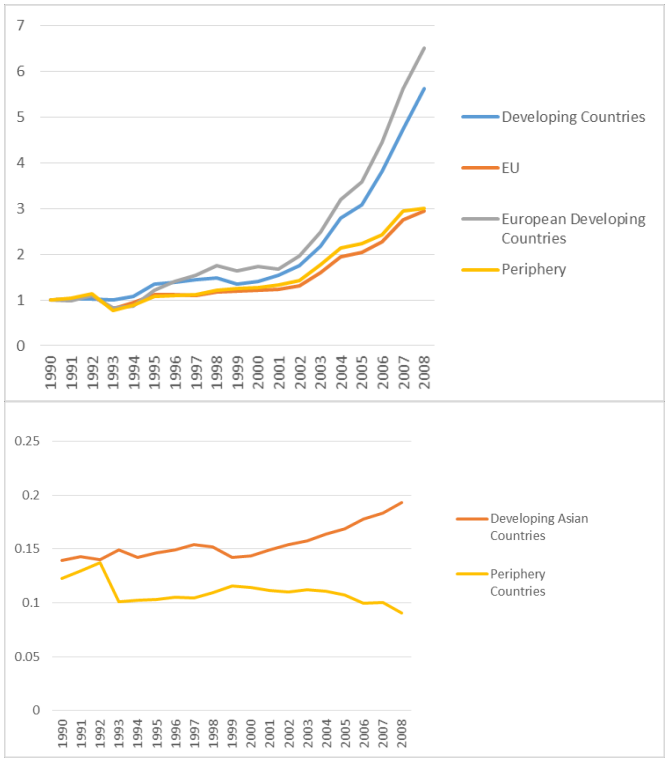
Instead, countries like Greece and Spain have only marginally increased their exports toward emerging economies between 2000 and 2008[2].

As confirmed by Danninger and Joutz (2007) and by the ECB (2005), Germany's export boom, which allowed the country to reach an 8 percent trade surplus in 2007 (Deutsche Bundesbank 2013), hugely depends on the country's favorable placement in the world economy and on its intense trade relationships with developing countries in fast-growing markets. In addition, there is evidence that increased demand for German goods from non-European countries was as a key driving factor for the development of the country's current account (Kollman *et al.* 2014).
Instead, periphery countries' export structures and specialization tend to suffer from China's competitive pressure, as a result of their specialization: China's export demand elasticities for high-tech sectors in Europe are above the average sector elasticity, implying that countries like Spain and Portugal will benefit less from any positive Asian demand shock.

It is thus hard to explain the divergence in current accounts, especially in periphery countries, with Germany's 'unfair' wage moderation reaping export markets shares at the expense of other EZ members.

[2] Exports toward Emerging Asian countries, Eastern Europe and Commodity Exporters increased by 0,2 and 0,8 percent of GDP for Greeece and Spain Respectively (IMF Direction of Trade Statistics)

Figure 13: Germany's Export Volumes by Country (1990 = 1) and Share of Net Exports by country.



Source: IMF Direction of Trade Statistics

5.2 Wages and Competitiveness

Both positive and negative coordinated wage shocks to periphery countries did not have meaningful impacts on the current accounts, despite the explicit inclusion of real wages as foreign variable. To the extent that ULC move with the level of wages, this amounts to stating that cost-competitiveness losses are not among the prime determinant of the imbalances and that cutting wages –as advocated by Sinn (2013) – may not solve the problem.

Support for this view comes also from other studies on the subject. Using a similar methodology to the one I employed (i.e. a Panel VAR) Diaz Sanchez and Varoudakis (2013) reached the same conclusion and were echoed by Gabrisch and Staehr (2013, p.16) and by Cesaroni and De Santis (2015).

The worsening of the trade balance due to an increase in wages implies that relative ULC elasticities of export demand are generally high (in absolute terms) for periphery countries.

Unfortunately there is not much evidence on this topic, because most studies focus on relative price elasticities and not on labor cost ones. However, it is still possible to get a sense of proportions if one considers that labor cost are only a fraction of the total output price, which implies that relative ULC elasticities will be lower than relative price ones. Relative price elasticities of export demand are -0.26 for Portugal (Garcimartin *et al.* 2012), -0.66 for Spain (Bank of Spain 2007) and -0.54 for Italy (Onaran *et al.* 2012).
Comparing these estimates to the world income elasticity of export demand for the same countries[3] shows that an increase of partner countries income has more than twice the effect on exports than a reduction in relative prices. As confirmed by Gaulier and Vicard (2013), periphery countries' exports are mostly determined by foreign countries' growth rather than by price or domestic labor cost developments.

Factors beyond price-competition must also be considered in order to make sense of the shock simulation results and of periphery's current account dynamics. The work of Cafiso (2009) can offer some useful insights in this direction. What emerges is that Portugal and Italy have lost export market share between 1996 and 2007, partly because they specialized on the production of medium- to low-tech goods, for which markets are not growing (Cafiso, 2009 p.6 and p.26).

Moreover and as previously outlined, Europe's periphery suffers more than core from Chinese goods' competition (see Chen et al. 2012 p.17 and Benkovskis *et al.* 2013). Di Mauro *et al.* (2010) found that Italy, Spain and Portugal had the highest degree of export overlap with China, which helps explaining the negative reaction of the current account of these countries to positive Chinese GDP growth I obtained with the GVAR.

Overall, it is clear that the worsening of periphery's current accounts, which can be explained by a loss of cost-competitiveness with respect to the core, is relatively small. The trade factors, which are more likely to have influenced the worsening of the trade balance have less to do with prices and more with products and placement in the world economy.

Too strong a focus on price-dynamics might end up concealing a bigger problem, rightly remarked by Naastepad et al. (2015): namely, that the Euro project has not fostered convergence in production structure between its members. More than 20 percent of Spain', Italy's and

[3] World income elasticities of export demand are 1.88 and 2.53 for Portugal and Spain respectively (Garcimartin and Rivas 2012), while for Italy it is 1.08 (European Commission 2010)

Portugal' export structure is devoted to low technology manufactures against the 10 and 12 percent of Germany and France (EC 2009). Productivity gaps between core and periphery remained at high levels, effectively delineating a two-velocity Europe with a single currency. This makes the Union vulnerable to asymmetric responses to trade and financial shocks. Unfortunately, this is a structural problem that price deflation and wage cuts cannot solve and that demands

5.3 The Danger of Wage Cuts and the Role of Productivity

At this point it is reasonable to ask what could correct the accumulated imbalances, after having ruled out the effectiveness of wage cuts, thanks to both the GVAR analysis and the related literature. The dynamic analysis in the previous section and the results' discussion have offered some clues as to what could influence more the trade balance and the current account of both periphery and core countries. Labor productivity seems to be the best candidate. As a matter of fact, shocks to this variable have all resulted in a positive reaction of the current account.

Higher labor productivity boosts periphery countries' exports through non-price competition and technological improvements. Labor productivity as defined by output divided by number of hours worked, is affected to a lesser extent by ULC than by investment in new technologies and human capital, which are the building blocks of a credible convergence strategy for periphery countries. Therefore, what southern European countries and especially Portugal and Spain should be aiming at is a technological upgrade of their production structure that allows them to penetrate new markets and be shielded from developing countries' competition.

Unfortunately, the focus of policymaker has been mostly on cost-competitiveness and the reduction of ULC (see section 3), a measure which could potentially be counterproductive, to the extent that it is pursued only through a reduction of wages. This is because demand is determined to a significant extent by wages (Stockhammer *et al.* 2012), so their rapid reduction could halt the already slow recovery. Indeed, the significant reduction in GDP following a one standard error negative regional shock to periphery countries' wages found by the model should not come as a surprise.

5.4 So What Caused The Divergence In Current Accounts?

This analysis has found little support for the competitiveness narrative, but has not offered an extensive explanation of how these imbalances were accumulated. The GVAR so constructed cannot account for the significant financial flows, which occurred from 1999 to 2008, because the focus is on trade dynamics, on which the propagation of shocks depends. This means that the developments in financial sector should be scrutinized more thoroughly, considering also that cross-border trade in financial assets increased far quicker than the trade in goods (Lane *et al.* 2008).

The main message of this work is that competitiveness losses on the part of periphery countries are not the prime determinant of the current account imbalances. This does not imply that cost-competitiveness was not affected in the years before the crisis, but rather that this effect was negligible and should be seen as the consequence of a credit-led demand boom (Wyplosz 2013) fueled by the EMU financial integration. Gabrisch *et al.* (2014) show how the external balance of periphery countries worsened *before* the trade balance, implying that the cross-border financial flows financed by core countries' banks (Chen et al. 2012) translated into higher domestic spending and imports. ULC have thus increased only after the accumulation of external liabilities for periphery countries and cannot be deemed to be the structural problem to be solved.

The uncontrolled lending behavior of both core and periphery's banks should then be recognized as having played a more prominent role in the fueling of imbalances. Hale and Obstfeld (2014) note how core banks borrowed from institutions outside the Eurozone in order to finance further lending in the deficit countries. Unfortunately, policies aimed at smoothing the credit cycle were not in place during the pre-crisis years, so the period of financial integration translated to very different levels of credit creation around Europe (Figure 16 Apendix). A thorough analysis of how this credit was used and of its impact on domestic demand is beyond the scope of this paper, but the exclusion of purely competitiveness –and therefore trade– dynamics as the real culprit suggests that more relevant answers, and policy solutions, can be found by analyzing and changing microprudential regulation.

6. Conclusion

Economist still lack a common interpretation of the Eurozone crisis, but most concur in the identification of current account imbalances before 2007 as the main determinant of the longest recession of this century. Between 1995 and 2007 significant capital flows from Germany, France, Austria, the Netherlands and Finland have financed the account deficits of Spain, Portugal, Italy and Greece, delineating a clear diverging trend in between Europe's core and periphery in their net foreign position. These flows were directed toward the non-traded sectors of the economy inflating assent bubbles or financed onerous public expenditures to the detriment of public finances. When the crisis hit in 2010, investors became reluctant to lend to financial institutions and governments of the highly indebted periphery and these flows abruptly ended, while risk premiums skyrocketed. This was the beginning of the Eurozone crisis.

A narrative accepted by policymakers imputes the accumulation of current account imbalances to a competitiveness problem in periphery countries: the so-called PIGS have let their wages grow faster than productivity (due to rigid labor markets) as the period of financial integration promised fast income convergence. ULC increased significantly with respect to core countries and worsened the trade balance, which translated to higher current account deficits.

Others commentators have identified instead Germany's stagnation of real wages as the real culprit of the crisis. By deliberately undercutting wages through a labor reform, Germany increased its competitiveness and exports at the expense of periphery countries.

This work has investigated the validity of these 'competitiveness narratives' by testing two propositions. The first one concerned the effect of German wage moderation on the current accounts of periphery countries, while the second reflected the view that higher wages in Spain, Italy and Portugal have caused the worsening of their net financial positions.

A Global VAR estimated from 1996 to 2007 and consisting of 8 EMU countries plus China, the US and the UK was used to test both propositions and see if other factors could influence the EZ current accounts. The model structure and the propagation of shocks were constrained to be dependent on trade factors, so as to accommodate the dynamics implied by the competitiveness narrative.

The identified negative shock to the level of real wages in Germany resulted in a significant but small increase of the country's current account, while the same variable did not react for other EU member states, implying that German success did not come at the expense of its neighbors. I suggested this might be explained by the fact that Germany and periphery countries trade in different goods and compete for different export market shares. The former specialized in high-tech sectors and benefitted from its placement in fast-growing markets.
Positive and negative coordinated shocks to the level real wages in Italy, Spain and Portugal have not resulted in a significant increase or decrease of the current accounts, despite the specification of real wages as a foreign trade weighted variable. This seemed to dismiss proposition 1, so I looked for further evidence that could corroborate this finding and still be compatible with a worsening of the trade balance for periphery countries. Firstly, exports in these countries are determined to a larger extent by foreign income growth rather than by relative prices or labor costs. Secondly, periphery countries' export decline has been determined to a large extent by their specialization in low-tech goods, which makes them vulnerable to Chinese competition, and by their export structure.

Given the positive response of the current accounts of both core and periphery countries to positive labor productivity shocks, it was argued that policies aimed at fostering human capital accumulation and technological upgrades should be preferred to wage cuts in the periphery, because productivity gains reduce the technological gap between north and south without jeopardizing domestic demand.

In conclusion, cost-competitiveness factors do not seem to have played a central role in the dispersion of current accounts, nor should policymakers excessively focus on them to solve periphery's competitiveness. Instead, the evidence gathered to integrate the model's results has unveiled a more fundamental problem that the EU should face, namely that periphery's and core's production structures are very different from each other. This makes the union prone to heterogeneous responses to global shocks and calls for the establishment of further EU fiscal capacity to mitigate these asymmetric responses.

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Appendix

Data Sources

GDP Series:
IMF International Financial Statistics, GDP at constant prices (1995)

Consumer Price Index:
IMF International Financial Statistics, CPI 64z. For China's data I used Dees *et al.* (2005) dataset

Compensation of Employees:
OECD Statistics, quarterly series

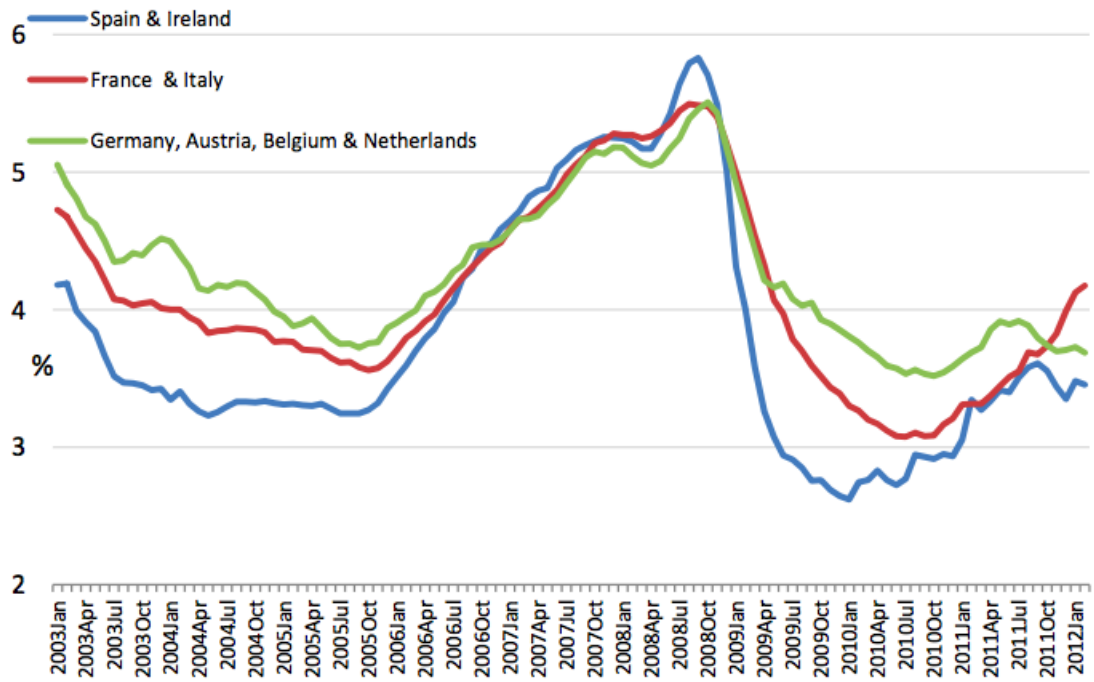
Real Effective Exchange Rate:
IMF, International Financial Statistics, REER based on CPI inflation

Current Account:
OECD Statistics, quarterly series

Labor Productivity:
ECB Statistics, quarterly change in labor productivity

Trade Weights:
IMF Direction of Trade Statistics

Figure 14: Interest rates on lending for house purchase



Source: ECB as in Gros (2010)