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An analysis of the determinants of the impact of  
the Great Recession on the Eurozone countries

Carlos A. Carrasco and Jesus Ferreiro

# Title: An analysis of the determinants of the impact of the Great Recession on the Eurozone countries

**Authors:** Carlos A. Carrasco and Jesus Ferreiro

**Affiliation of authors:** Department of Applied Economics V, University of the Basque Country UPV/EHU

**Abstract:**

Although the financial and economic crisis that erupted in 2008 in the European countries can be considered as a common shock, however its impact on the European economies, in general, and the euro countries, in particular, has been very different. The objective of the paper is to analyze whether these differences are due to the existence and size of the macroeconomic imbalances registered before the crisis or, on the contrary, these differences are explained by intrinsic elements of each country. The paper shows that the impacts of the crisis are closely related with intrinsic features of each country or group of countries, and not only with the expected effects of a common shock to the European Union or the Eurozone member states.

**Key words:** Great Recession, economic and financial crisis, Eurozone, macroeconomic imbalances

**Journal of Economic Literature classification:** C22, O52, O57, P52

**Contact details:**

Carlos A. Carrasco: [carlosalberto.carrasco@ehu.es](mailto:carlosalberto.carrasco@ehu.es)

Jesus Ferreiro: [jesus.ferreiro@ehu.eus](mailto:jesus.ferreiro@ehu.eus)



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## 1. Introduction

Although the Great Recession is a global phenomenon, with roots outside the European Union (EU), its impact has been deeper and longer lasting in the EU than elsewhere. However, the impact of the Great Recession has not been the same in all the European countries. The analysis of the impact of the economic and financial crisis on European Union countries shows that the negative impact has been larger in the Eurozone than in non-euro countries. But even within the Eurozone there are significant differences, mainly between those countries that joined the euro in the year 1999 and those that joined after this year, and also in the case of the countries that formed the Eurozone in 1999 between the peripheral countries (Ireland, Italy, Portugal and Spain) and the central countries (see Arestis and Sawyer, 2012; Bitzenis et al., 2015; Carrasco et al., 2016; and Ferreiro, Galvez, Gomez and Gonzalez, 2016).

The existence of significant differences in the economic performance of euro countries since the onset of the crisis leads us to study the determinants in these differences of the impact of the economic and financial crisis on the euro economies. Namely, our objective is to analyze whether these differences are related to the differences in the economic performances of euro countries in the years preceding the burst of the crisis. As far as it is commonly argued that the countries with the worst performance during the crisis have been those countries that registered before the crisis the largest macroeconomic performance, then the main (and only) determinant of the impact of the crisis would be the size of the previous imbalance. This implies, therefore, that the belonging to a certain group, like the Eurozone, the southern euro countries, the Baltic states, etc., would not exert a significant effect on the economic performance during the crisis. If this hypothesis is not confirmed, therefore, there would be specific characteristics of some countries that would have been exacerbated the negative consequences of the burst of the financial crisis. On the other hand, it would also

imply that we could not talk of the existence of a crisis in the Eurozone, but of the crisis of some countries, or groups of countries, within the Eurozone.

The paper is structured as follows. In the first section, we will analyze whether the impact of the crisis, in terms on the impact on total economic activity, is related to the existence and size of previous imbalances before the crisis and whether the belonging of countries to a certain group exerts a significant impact that contributes to explain the impact of the crisis in these countries. The second section focuses on the determinants of the impact of the crisis on certain economic variables. Final section concludes.

## 2. Pre-crisis disparities and post-crisis output change

Our aim in this section is to analyse the effects of pre-crisis disparities in post-crisis output change. The hypothesis we want to test is whether the accumulated change in GDP during the crisis (2008-2013) is explained by the values of some variables before the crisis (average 2003-2007). In other words, whether the impact of the crisis is related to the macroeconomic imbalances registered in the Euro countries before the crisis.

Therefore, we analyse the pre-crisis (2000-2007) values of some key variables, both structural and cyclical, and their effects on the GDP change in the post-crisis period (2008-2013). We start from a baseline model as expressed in equation 1:

$$(1) \quad GDP_{i,post} = \beta_1 + \beta_2 GDPpc_{i,pre} + \beta_3 Trade_{i,pre} + \beta_4 Gov_{i,pre} + \beta_5 Ind_{i,pre} + \beta_6 HighExp_{i,pre} + \beta_7 Inf_{i,pre} + \beta_8 PubBal_{i,pre} + \beta_9 CA_{i,pre} + \omega_i$$

The meaning and the expected sign of the variables included in equation 1 are the following ones:

- $GDP_{i,post}$  refers to the accumulated change in the GDP of the country  $i$  during the period 2008-2013.
- $GDP_{pc_i,pre}$  is the pre-crisis average of the GDP per capita. We expect a negative sign given that the epicentre of the crisis is placed in developed countries.
- $Trade_{i,pre}$  is the pre-crisis average of trade openness (exports plus imports as a percentage of GDP). We expect a negative sign since a more open economy is more exposed to the international transmission of the crisis via commercial interrelations.
- $Gov_{i,pre}$  refers to the size of the general government measured as the total expenditure-to-GDP ratio. We could expect that a bigger government could serve as a shock absorber. However, since developed countries are those with the bigger government size and the origin of the crisis could be found in these countries, then, government size could have a negative sign.
- $Ind_{i,pre}$  refers to the industry added value as a percentage of the GDP. In this case, we expect a positive sign since we suppose a country with a higher share of industry to be more resilient when facing a crisis.
- $HighExp_{i,pre}$  refers to the high-added value exports as a share of manufactured exports. In this case, we introduce this variable to account for the non-price competitiveness structure of the country.
- $Inf_{i,pre}$  refers to pre-crisis annual inflation average. We expect a negative sign because (relative) higher inflation could be interpreted as a symptom of sectoral imbalances with negative effects in the country responses to a crisis.
- $PubBal_{i,pre}$  refers to the pre-crisis annual average of the general government net lending/borrowing as share of GDP. In this case, we could expect the interaction of two opposite forces. On the one hand, we could expect a positive sign since the constant presence of a negative balance could damage the government ability to respond when facing a crisis. On

the other hand, since pre- and post-crisis values of public balances could be related to the flexibility of the fiscal rules, this could be translated in a stronger fiscal response after the burst of the crisis in those countries with a more flexible fiscal rule smoothing the effects of the crises and, therefore, we could expect a negative sign.

- $CA_{i,pre}$  refers to the pre-crisis annual average of the current account balance as share of GDP. We expect a positive sign since the presence of persistent pre-crisis negative external imbalances (e.g., a current account deficit) could deplete the capacity of response of a country when facing a crisis.

Table 1. Countries and variables analysed in equation 1

List of countries	Algeria, Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, Russian Federation, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States, Uruguay
Source of variables	World Economic Indicators database: GDP growth, trade openness, high-tech exports, GDP per capita (in 2005 US dollars), industry added value World Economic Outlook database: General government total expenditure, current account balance, inflation, general government net lending/borrowing
Observations	No data of high-tech exports for Serbia; no data of industry added value for Canada, Israel and Peru

We have used a set of 55 developed and developing countries (see table 1 for details). In addition to our baseline model, we have estimated eight different specifications by including some dummy variables accounting for different groups of countries:

- EA-12 for the countries that formed the Eurozone in 1999 plus Greece (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain).
- EA-19 for all the euro countries (EA-12 plus Cyprus, Estonia, Latvia, Lithuania, Malta, Slovak Republic and Slovenia).

- EU-28 for all the European Union member states (EA-19 plus Bulgaria, Croatia, Czech Republic, Denmark, Hungary, Poland, Romania, Sweden and United Kingdom).
- EU-28 but EA-19 (the non-euro EU countries).
- GIIPS (Greece, Ireland, Italy, Portugal and Spain).
- Central and Eastern European countries (Bulgaria, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, Slovenia, Estonia, Latvia and Lithuania).
- Baltic States (Estonia, Latvia and Lithuania).
- Individual dummies for each GIIPS countries.

In the table 2 we present the results of the baseline model and other eight specifications. As the table 2 shows, the government size and the current account are statistically significant at 5% with the exception of government size in models 4 and 5 and current account in model 7. The sign of the government size is negative in contrast with the expected sign if the size of government would have worked as a shocker absorber. However, the origin of both crises is found in developed countries which are characterised by having bigger public sector. In this case, this variable is catching the effect of the origin of the crisis. For the case of the current account, the sign are as expected: a surplus in the annual average current account balance in pre-crisis period is associated with an increase in the output in the post-crisis period. In other words, the countries with the largest current account deficits before the crisis would have suffered the largest decline in the economic activity during the crisis. When dummies have been introduced, the significance of GIIPS countries is evident. However, when disaggregating, other dummy variables are not significant (different than GIIPS as in models 7 and 8). In other words, our model shows that the crisis in the Euro area is specific of the GIIPS countries



Table 2. Determinants of the accumulated change in GDP in post-crisis period.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Constant	31.4200 (0.0043)	30.6123 (0.0040)	28.9548 (0.0086)	20.1808 (0.0179)	20.9495 (0.0199)	30.4297 (0.0033)	24.5724 (0.0062)	30.5737 (0.0048)	31.8747 (0.0055)
GDP per capita	0.0000 (0.7034)	0.0000 (0.9250)	0.0000 (0.7846)	-0.0001 (0.4575)	-0.0001 (0.5512)	0.0000 (0.9600)	0.0000 (0.9551)	0.0000 (0.9661)	0.0000 (0.9710)
Trade openness	-0.0209 (0.2201)	-0.0174 (0.3311)	-0.0037 (0.8518)	0.0187 (0.3635)	0.0203 (0.3314)	-0.0211 (0.2302)	0.0054 (0.8216)	-0.0112 (0.5788)	-0.0218 (0.2395)
Government size	-0.7595 (0.0002)	-0.7094 (0.0005)	-0.6735 (0.0011)	-0.3854 (0.1090)	-0.4090 (0.0998)	-0.7657 (0.0001)	-0.7032 (0.0004)	-0.7313 (0.0005)	-0.7671 (0.0005)
Industry share	0.1247 (0.6854)	0.1073 (0.7244)	0.1388 (0.6516)	0.1844 (0.5196)	0.1808 (0.5337)	0.1776 (0.5464)	0.3322 (0.2533)	0.1619 (0.5977)	0.1354 (0.6837)
High Tech Exports	0.0239 (0.8041)	0.0037 (0.9699)	-0.0124 (0.9067)	-0.0233 (0.7963)	-0.0333 (0.7291)	-0.0026 (0.9769)	-0.0966 (0.3101)	-0.0229 (0.8120)	0.0100 (0.9173)
Inflation	0.2078 (0.4983)	0.1765 (0.5622)	0.1141 (0.7196)	0.0699 (0.7824)	0.0471 (0.8625)	0.1566 (0.6094)	0.1287 (0.6352)	0.0920 (0.7789)	0.1541 (0.6333)
Public balance	-0.6421 (0.2321)	-0.7587 (0.1833)	-0.7273 (0.1856)	-0.7410 (0.1821)	-0.7665 (0.1762)	-0.7313 (0.1730)	-0.7611 (0.1284)	-0.6863 (0.2527)	-0.7456 (0.1914)
Current account	0.8004 (0.0019)	0.8380 (0.0008)	0.7058 (0.0035)	0.5534 (0.0095)	0.5497 (0.0104)	0.6695 (0.0040)	0.3880 (0.1826)	0.5917 (0.0226)	0.6770 (0.0087)
EA-12		-4.9119 (0.1403)							
EA-19			-5.4848 (0.0613)		-11.5039 (0.0012)				
EU-28				-10.6292 (0.0018)					
EU-28 (other than EA-19)					-8.7180 (0.0411)				
GIIPS						-10.3494 (0.0078)	-13.1726 (0.0033)	-11.7674 (0.0064)	
CEE							-7.5852 (0.1679)		
Baltic states								-5.2416 (0.2424)	
EA-19 (no GIIPS no Baltics)								-2.2263 (0.5124)	
Greece									-23.1591 (0.0000)
Ireland									-10.6239 (0.0234)
Italy									-4.7752 (0.0722)
Portugal									-4.7219 (0.0488)
Spain									-8.5668 (0.0001)
R-squared	0.6058	0.6232	0.6309	0.6483	0.6533	0.6552	0.6746	0.6629	0.6813
Wald F-stat	8.6667 (0.0000)	8.8875 (0.0000)	10.9314 (0.0000)	11.7692 (0.0000)	11.3579 (0.0000)	8.2070 (0.0000)	8.0786 (0.0000)	7.9460 (0.0000)	6.0846* (0.0000)

White heteroskedasticity-consistent standard errors & covariance; *p-values* in parentheses; \*F-stat

Based on this previous information, we have analyzed a new model as expressed in equation 2. This new model includes 5 variables:  $Trade_{i,pre}$ ,  $Gov_{i,pre}$  and the three variables accounting for pre-crisis imbalances ( $Inf_{i,pre}$ ,  $PubBal_{i,pre}$  and  $CA_{i,pre}$ ).

$$(2) \quad GDP_{i,post} = \pi_1 + \pi_2 Trade_{i,pre} + \pi_3 Gov_{i,pre} + \pi_4 Inf_{i,pre} + \pi_5 PubBal_{i,pre} + \pi_6 CA_{i,pre} + \epsilon_i$$

Table 3 presents results from estimating equation 2 and other related specifications. For the new baseline model, trade openness is significant at 10% with the expected negative sign. Government size is significant in the baseline model and in the other specifications with negative sign. As mentioned above, this relates with the countries where the origin of the crises is found. In the case of the pre-crisis disparities variables, public balance is significant in all specification at 10% of significance. Public balance presents a negative sign which is related to the flexibility of fiscal rules. For instance, a country with a flexible fiscal rule will implement an expansionary fiscal policy to address the crisis no matter the previous stance of fiscal policy. This expansionary fiscal policy will boost demand and avoid having major effects from the crisis. However, when fiscal rules are more rigid, these rules will prevent to smooth the effects of the crisis. Finally in the case of current account, as in the previous model, it is significant with a positive sign. In this new model, the dummy for the group of GIIPS countries is significant with negative sign (as in the earlier model) and it shows the worse performance of those countries once the crisis started. Again, the model confirms the idea that the crisis in the Eurozone is specific of the GIIPs countries.

Table 3. Determinants of the accumulated change in GDP in post-crisis period.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Constant	38.9143 (0.0000)	36.0812 (0.0000)	35.8016 (0.0000)	31.6727 (0.0002)	31.7104 (0.0002)	38.9269 (0.0000)	38.4311 (0.0000)	37.3761 (0.0000)	38.9544 (0.0000)
Trade openness	-0.0281 (0.0713)	-0.0231 (0.1220)	-0.0099 (0.5369)	0.0025 (0.8839)	0.0052 (0.7626)	-0.0289 (0.0684)	-0.0212 (0.2337)	-0.0174 (0.2733)	-0.0290 (0.0957)
Government size	-0.8369 (0.0000)	-0.7251 (0.0000)	-0.7205 (0.0000)	-0.5663 (0.0025)	-0.5677 (0.0026)	-0.7983 (0.0000)	-0.7827 (0.0000)	-0.7438 (0.0000)	-0.7992 (0.0000)
Inflation	0.1535 (0.4495)	0.0940 (0.6539)	0.0448 (0.8360)	0.0177 (0.9270)	-0.0098 (0.9614)	0.0736 (0.7235)	0.0711 (0.7183)	0.0166 (0.9404)	0.0704 (0.7443)
Public balance	-0.8511 (0.0526)	-0.9136 (0.0330)	-0.8783 (0.0373)	-0.9136 (0.0306)	-0.9134 (0.0311)	-0.8338 (0.0430)	-0.8135 (0.0480)	-0.8202 (0.0690)	-0.8974 (0.0442)
Current account	0.8881 (0.0002)	0.9350 (0.0002)	0.7602 (0.0010)	0.6288 (0.0054)	0.6209 (0.0059)	0.7757 (0.0007)	0.6424 (0.0187)	0.6876 (0.0106)	0.7757 (0.0016)
EA-12		-6.5700 (0.0298)							
EA-19			-6.6937 (0.0136)		-11.0076 (0.0006)				
EU-28				-9.6224 (0.0020)					
EU-28 (other than EA-19)					-7.2513 (0.0626)				
GIIPS						-11.2299 (0.0028)	-12.6228 (0.0020)	-13.1120 (0.0017)	
CEE							-3.7291 (0.3164)		
Baltic states								-5.4465 (0.1303)	
EA-19 (no GIIPS no Baltics)								-3.6949 (0.2596)	
Greece									-25.2607 (0.0000)
Ireland									-9.9570 (0.0000)
Italy									-6.5534 (0.0114)
Portugal									-5.8646 (0.0068)
Spain									-9.0407 (0.0000)
R-squared	0.5827	0.6154	0.6204	0.6327	0.6416	0.6381	0.6455	0.6505	0.6646
Wald F-stat	11.6450 (0.0000)	11.2027 (0.0000)	12.6519 (0.0000)	13.6876 (0.0000)	12.6866 (0.0000)	11.3822 (0.0000)	10.4367 (0.0000)	10.8412 (0.0000)	8.7189* (0.0000)

White heteroskedasticity-consistent standard errors & covariance; *p-values* in parentheses; \*F-stat

### 3. Determinants of the impact of the crisis on certain variables

In this section we want to assess the impact of the global financial crisis and the European sovereign debt crisis on key variables paying special attention to the EA-12 countries within an econometric univariate framework. In this regard, we use two control groups to compare the differences and similarities in the behaviour of key variables after the onset of the crisis. The first group of control is composed of the other EU-27 countries (Cyprus, Estonia, Latvia, Malta, Slovakia, Slovenia, Bulgaria, Czech Republic, Denmark, Hungary, Lithuania, Poland, Romania, Sweden and United Kingdom). In this case, EU enlargement has been characterised by the heterogeneity of the new member states (see, for instance, Epstein, 2014). For this reason, we have included a dummy variable accounting for the Central and Eastern European countries ( $D_{CEE}$ ). The second group of control is composed of the OECD high income countries, limited to those members which joined the OECD before 2007 (Australia, Canada, Czech Republic, Denmark, Iceland, Japan, Korea, New Zealand, Norway, Poland, Slovakia, Sweden, Switzerland, United Kingdom and United States). This second group is intended to account for a more homogeneous set of countries to compare with.

We have applied a modified version of the approach implemented by Ball and Sheridan (2005) for the analysis of key macroeconomic variables before and after the global financial crisis. We start by assuming a two way fixed-effects panel model for the relevant variable ( $x_{i,t}$ ) of country  $i$  in time  $t$  which is given by:

(equation 3) 
$$x_{i,t} = \gamma_1 + \gamma_2 E_{i,t} + \theta_i + \tau_t + \varepsilon_{i,t}$$

Where  $\theta_i$  is the individual effect,  $\tau_t$  is the time effect,  $\varepsilon_{i,t}$  is an error term for country  $i$  in time  $t$  and  $E_{i,t}$  is a dummy variable taking the value of 1 if the country  $i$  belong to the group  $j$  after the burst of the crisis and 0 otherwise. There are only

two period, pre-crisis ( $x_{i,pre}$ ) and post-crisis ( $x_{i,post}$ ). Pre-crisis period ( $x_{i,pre}$ ) is the 5-years annual average before the crisis (2003-2007) for the relevant variable, and post-crisis period ( $x_{i,post}$ ) is the 5-years annual average after the burst of the financial crisis (2008-2012). Differentiating equation 3, we have:

$$(4) \quad x_{i,post} - x_{i,pre} = \rho_1(\tau_{post} - \tau_{pre}) + \rho_2(E_{i,post} - E_{i,pre}) + \rho_3(\theta_i - \theta_i) + (\varepsilon_{i,post} - \varepsilon_{i,pre})$$

Where  $D_i = E_{i,post} - E_{i,pre}$ . Summing up, we have:

$$(5) \quad x_{i,post} - x_{i,pre} = \rho_1(\tau_{post} - \tau_{pre}) + \rho_2 D_i + (\varepsilon_{i,post} - \varepsilon_{i,pre})$$

Equation 6 can be expressed as a cross-country estimation as in Equation 5 plus the added  $x_{i,pre}$  regressor to avoid a regression to the mean problem. Our dependent variable is the change in the period average of the relevant variables ( $x_{i,post} - x_{i,pre}$ ).

$$(6) \quad x_{i,post} - x_{i,pre} = \alpha_1 + \alpha_2 x_{i,pre} + \alpha_3 D_i + \mu_i$$

In addition, we have included some dummy variables to account for different groups of countries:  $D_{EA-12}$  represents the EA-12 countries;  $D_{GIIPS}$  is a dummy for the GIIPS countries;  $D_{CORE}$  is a dummy for the core EA-12 countries (Austria, Belgium, Finland, France, Germany, Luxembourg and Netherlands); and  $D_{CEE}$  is a dummy for the Central and Eastern European countries according to the OECD criteria (Bulgaria, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, Slovenia, and the three Baltic States: Estonia, Latvia and Lithuania). Unfortunately, there are data availability restrictions.

Table 4. Variables used in the estimation of equation 8

Variable	Source	Period	Definition	Observations
Inflation	WDI-World Bank	2003-2012	Inflation measured by the annual growth rate of the GDP implicit deflator	
GDP growth	WDI-World Bank	2003-2012	GDP rate of growth	
GDP per capita	WDI-World Bank	2003-2012	GDP per capita in constant 2005 USD	
Long-term unemployment	WDI-World Bank	2003-2012	The number of people with continuous periods of unemployment extending for a year or longer as a percentage of the total unemployed.	
Unemployment	WDI-World Bank	2003-2012	The share of the labour force without work but available for and seeking employment.	
Employment	WDI-World Bank	2003-2012	The proportion of a country's population that is employed	
Current account	Eurostat for EU-27 countries and OECD otherwise	2003-2012	Current account as share of GDP	
Government consolidated gross debt	Eurostat for EU-27 countries and OECD otherwise	2003-2012	General Government consolidated gross debt	Not including Estonia, Poland, Iceland and Korea; data for Greece and New Zealand starts in 2006
Cash surplus/deficit	WDI-World Bank	2003-2012	Cash surplus (% of GDP) or deficits revenue including grants minus expense, minus net acquisition of non financial assets.	Not including Cyprus and Japan; data for Korea and Switzerland up to 2011
Gini index	OECD Stats	2004-2011	Gini index at disposable income, post taxes and transfers	Not including Australia, Cyprus, Denmark, France, Germany, Italy, Japan, Korea, Latvia, Lithuania, Malta, Netherlands, New Zealand, Norway, Sweden, Switzerland, Bulgaria, Romania and Hungary; data for Denmark from 2005 and for Belgium up to 2010
Palma ratio	OECD Stats	2004-2011	The share of all income received by the 10% people with highest disposable income divided by the share of all income received by the 40% people with the lowest disposable income.	Not including Australia, Belgium, Cyprus, Denmark, France, Germany, Italy, Japan, Korea, Latvia, Lithuania, Malta, Netherlands, New Zealand, Norway, Sweden, Switzerland, USA, Bulgaria, Romania and Hungary; data for Denmark from 2005 and for Belgium up to 2010

In the table 4 we present detailed information about data sources, analysed periods and countries included in each variable.

Following the methodology above described, we have analysed a set of key variables with special emphasis in the EA-12 countries. The variables analysed are clustered into 5 topics: a) inflation and growth, b) labour market, c) external sector, d) public sector and e) income distribution.

### 3.1. Inflation and economic growth

In this sub-section, we focus on the analysis of inflation (measured by the GDP deflator), GDP per capita and GDP growth rate (see Table 5). In the case of inflation, when we use EU-27 as control group the constant and the pre-crisis average are statistically significant. The pre-crisis average has a negative relation with the change in the period average. In this case, the GIIPS dummy is significant. When controlling by OECD high-income countries, the results change. GIIPS dummy is significant with a coefficient of -1.8 and  $R^2$  is 0.38. Before the burst of the crisis, peripheral European countries presented high levels of inflation in relation with those observed in core countries and other developed countries.

What caused those inflation disparities within the EA-12? Capital flows from core to GIIPS countries increased since the introduction of the single currency. The euro adoption eliminated the exchange rate risk thus encouraging capital flows looking for higher marginal returns due to the baseline differences in capital-to-labour ratio and the expected catching-up process. Those capital flows put upward demand-side pressure in wages and prices of southern countries. In addition, common ECB monetary policy was relatively expansionary aiming to encourage growth in core countries causing an overheating of southern economies. Once the crisis burst and with the restriction of a common currency,

this is, without the possibility of an external devaluation, the internal devaluation policies have been reflected in a significant fall in prices and wages in peripheral countries and in the overall Eurozone.

In the case of the GDP growth rate, the pre-crisis average is negatively related to the change in the average in both of the control groups. GIIPS dummy is significant and shows that GIIPS countries have suffered a larger negative impact after the crisis. However, when controlling by the OECD high-income countries, core dummy is significant, this is, for both, core and peripheral countries, the crisis has had higher impact than for the other OECD high-income countries. In regard of the GDP per capita, the previous average is significantly related to the change in the average. In this case, GIIPS dummy is significant and show the larger negative effect of the crisis in the peripheral European countries.



Table 5. Determinants of inflation, GDP growth and GDP per capita

Control group: EU-27												
	Inflation (GDP deflator)				GDP growth				GDP per capita			
Constant	0.734 (0.012)	1.273 (0.001)	1.177 (0.002)	1.153 (0.000)	-0.122 (0.808)	1.158 (0.176)	1.080 (0.192)	0.956 (0.154)	-1.221 (0.006)	-0.318 (0.661)	-0.276 (0.704)	13.614 (0.000)
Pre-crisis	-0.617 (0.000)	-0.669 (0.000)	-0.648 (0.000)	-0.613 (0.000)	-1.015 (0.000)	-1.175 (0.000)	-1.160 (0.000)	-1.271 (0.000)	-0.798 (0.000)	-0.906 (0.000)	-0.914 (0.000)	-0.240 (0.000)
EA-12dummy		-0.782 (0.087)				-1.356 (0.059)				-1.070 (0.161)		
GIIPS dummy			-1.596 (0.015)	-1.677 (0.009)			-2.460 (0.007)	-2.003 (0.003)			-2.093 (0.024)	-3.984 (0.000)
Core dummy			-0.120 (0.716)				-0.504 (0.349)				-0.382 (0.585)	
CEE dummy				-0.333 (0.462)				1.017 (0.361)				-1.098 (0.086)
R-squared	0.754	0.784	0.838	0.841	0.719	0.762	0.818	0.825	0.708	0.735	0.779	0.624
Wald F-statistic	218.439	84.329	81.591	100.487	72.817	42.742	34.784	37.669	79.379	44.078	30.239	15.792
Prob (Wald F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Control group: OECD High-income countries												
	Inflation (GDP deflator)				GDP growth				GDP per capita			
Constant	0.110 (0.756)	0.488 (0.266)	0.230 (0.480)		-0.367 (0.496)	0.947 (0.214)	0.840 (0.215)		-1.236 (0.007)	-0.290 (0.622)	-0.225 (0.685)	
Pre-crisis	-0.339 (0.054)	-0.357 (0.053)	-0.258 (0.104)		-0.817 (0.000)	-0.987 (0.000)	-0.958 (0.000)		-0.677 (0.003)	-0.819 (0.001)	-0.841 (0.000)	
EA-12 dummy		-0.749 (0.138)				-1.685 (0.009)				-1.281 (0.045)		
GIIPS dummy			-1.802 (0.016)				-2.832 (0.001)				-2.290 (0.007)	
Core dummy			0.034 (0.924)				-0.824 (0.058)				-0.595 (0.290)	
R-squared	0.118	0.195	0.388		0.364	0.531	0.644		0.312	0.429	0.528	
Wald F-statistic	4.085	4.052	5.537		16.520	12.398	11.059		10.731	7.578	6.445	
Prob (Wald F-statistic)	0.054	0.030	0.005		0.000	0.000	0.000		0.003	0.003	0.003	

White heteroskedasticity-consistent standard errors & covariance  
*p-values* in parentheses

Table 6. Determinants of long-term unemployment, unemployment and employment

Control group: EU-27												
	Long-term unemployment				Unemployment				Employment			
Constant	8.794 (0.014)	6.259 (0.061)	7.162 (0.037)	6.241 (0.055)	4.926 (0.008)	4.554 (0.020)	5.130 (0.001)	4.276 (0.003)	9.097 (0.042)	9.304 (0.042)	11.116 (0.003)	13.614 (0.000)
Pre-crisis	-0.287 (0.001)	-0.267 (0.001)	-0.288 (0.001)	-0.225 (0.016)	-0.457 (0.064)	-0.442 (0.078)	-0.513 (0.007)	-0.632 (0.003)	-0.176 (0.032)	-0.176 (0.031)	-0.210 (0.001)	-0.240 (0.000)
EA-12dummy		3.850 (0.087)				0.571 (0.681)				-0.455 (0.585)		
GIIPS dummy			7.974 (0.004)	6.316 (0.022)			4.239 (0.021)	6.005 (0.001)			-3.010 (0.000)	-3.984 (0.000)
Core dummy			0.760 (0.716)				-2.158 (0.010)				1.369 (0.037)	
CEE dummy				-2.999 (0.342)				2.378 (0.050)				-1.098 (0.086)
R-squared	0.304	0.376	0.487	0.505	0.148	0.154	0.530	0.537	0.184	0.195	0.651	0.624
Wald F-statistic	13.504	7.506	8.003	7.947	3.749	1.973	11.179	9.358	5.156	2.681	16.470	15.792
Prob (Wald F-statistic)	0.001	0.003	0.001	0.001	0.064	0.161	0.000	0.000	0.032	0.089	0.000	0.000
Control group: OECD High-income countries												
	Long-term unemployment				Unemployment				Employment			
Constant	5.387 (0.012)	5.031 (0.021)	5.397 (0.017)		3.334 (0.017)	2.700 (0.027)	3.053 (0.001)		6.699 (0.093)	10.393 (0.027)	12.099 (0.001)	
Pre-crisis	-0.194 (0.004)	-0.243 (0.004)	-0.258 (0.003)		-0.351 (0.124)	-0.395 (0.045)	-0.451 (0.003)		-0.125 (0.064)	-0.179 (0.021)	-0.208 (0.001)	
EA-12 dummy		4.173 (0.142)				2.086 (0.101)				-1.398 (0.191)		
GIIPS dummy			8.513 (0.012)				5.837 (0.001)				-4.138 (0.000)	
Core dummy			1.446 (0.552)				-0.509 (0.392)				0.235 (0.743)	
R-squared	0.258	0.340	0.463		0.128	0.233	0.665		0.144	0.221	0.660	
Wald F-statistic	10.362	5.445	6.101		2.533	3.642	10.456		3.744	3.108	17.516	
Prob (Wald F-statistic)	0.004	0.011	0.003		0.124	0.042	0.000		0.064	0.063	0.000	

White heteroskedasticity-consistent standard errors & covariance. *p-values* in parentheses

#### 4.2.2 Labour market

In the case of the labour market we have focused on three variables: unemployment, employment and long-term unemployment (see Table 6).

In the case of unemployment, the pre-crisis average is significant with a negative sign for both groups of countries. When controlling by the EU-27, GIIPS dummy, core dummy and CEE dummy are significant, although the sign is different: thus, whilst in GIIPS and CEE countries the crisis has led to higher unemployment, in the core countries the unemployment would have performed better, showing that the largest impact of the crisis on unemployment has been generated in peripheral countries. However, when controlling by OECD high-income countries, a more homogeneous set of countries, core dummy is not significant, implying that the unemployment performance in these countries would not differ significantly from the unemployment performance in other OECD high-income economies. In both cases, the significant coefficient of GIIPS dummy is close to 6 points.

In the case of the employment rate, GIIPS dummy is significant in both cases, controlling by EU-27 or by OECD high-income countries. After the burst of the crisis, the employment growth rate fell significantly. In the case of the GIIPS countries, the fell in employment growth rate was deeper. This drop in employment growth could be associated with the high levels of unemployment and long-term unemployment since people could decide to leave labour market due to the impossibility of find a job. In the case of long-term unemployment, the crisis translate in a significant increase of this variable with the higher impact also reflected in the figures of GIIPS countries with a coefficient close to 8. The hysteresis of long-term unemployment makes profoundly difficult to go back to the levels prevailing before the burst of the crisis with negative effects in present and future economic growth.

#### 4.2.3 External sector

There is abundant literature on the external European imbalances, their origin and their connection with the crisis in European countries (see Carrasco and Peinado, 2015 and the references therein). In the case of the current account imbalances within the Eurozone, Luxembourg, the Netherlands and Germany have been characterised by significant and persistent surpluses while the opposite case is that of Portugal, Spain and Greece, which are particular examples of persistent deficit countries.

Table 7. Determinants of the current account balance

<b>Control group: EU-27</b>				
	<b>Current account</b>			
Constant	0.366 (0.489)	1.438 (0.079)	0.900 (0.319)	0.101 (0.914)
Pre-crisis	-0.462 (0.000)	-0.397 (0.001)	-0.487 (0.001)	-0.384 (0.018)
EA-12 dummy		-1.937 (0.081)		
GIIPS dummy			-3.054 (0.033)	-1.661 (0.375)
Core dummy			-0.177 (0.913)	
CEE dummy				2.226 (0.276)
R-squared	0.522	0.561	0.593	0.618
Wald F-statistic	18.816	10.662	8.190	9.040
Prob (Wald F-statistic)	0.000	0.000	0.001	0.000
<b>Control group: OECD High-income countries</b>				
	<b>Current account</b>			
Constant	-0.063 (0.860)	0.331 (0.455)	0.332 (0.465)	
Pre-crisis	-0.193 (0.000)	-0.191 (0.000)	-0.185 (0.001)	
EA-12 dummy		-0.885 (0.223)		
GIIPS dummy			-0.742 (0.420)	
Core dummy			-0.992 (0.316)	
R-squared	0.361	0.401	0.402	
Wald F-statistic	16.525	10.273	6.827	
Prob (Wald F-statistic)	0.000	0.001	0.002	

White heteroskedasticity-consistent standard errors & covariance  
p-values in parentheses

The origin of current account imbalances has been linked to the catching-up process in the context of European financial and economic integration process, the diverging trends in price and non-price competitiveness, the economic policy design of the European Union, the public finance balance of member states and the aging process and its effects on investment-saving decisions.

Regarding the external sector, we have focused on the figures of current account balances as share of GDP (see Table 7). When controlling by the EU-27, pre-crisis

average is significant with negative sign. GIIPS dummy is only significant when we introduce a core dummy while controlling by EU-27. In all other specifications, GIIPS dummy is not significant. What are the driving forces behind these results? The crisis has had such an impact in the output that imports have decrease significantly even when the structural origin of the current account deficit in southern European economies has not been addressed. If this is true, and the origin of the current account imbalances is structural, then it can be well expected than once the economy start to grow the deficit will reappear.

#### 4.2.4 Public finances

Regarding the situation of public finances, we focus on two variables: government consolidated gross debt and cash surplus/deficit (see Table 8).

In the case of government consolidated gross debt, pre-crisis period average is not significant. GIIPS dummy is significant when controlling by both groups of countries, EU-27 and OECD high-income countries. However, in all cases  $R^2$  is relatively low and Wald test hypothesis is only rejected when introducing GIIPS dummy at 10% significance. GIIPS countries have faced a significant increase in public debt after the burst of the global financial crisis. The pre-crisis debt levels for GIIPS were not homogeneously high, for instance, countries like Spain presented a level of debt well below the threshold imposed by the Stability and Growth Pact (SGP) before the burst of the global financial crisis so that Spanish debt was among the lowest within Eurozone countries (35.5 % of GDP in 2007). However, other countries such as Italy and Greece have presented before the crisis debt levels well above the limits of the SGP, for instance, 99.7% and 103.1% of GDP in 2007, respectively. In the case of Spain and Ireland the source of the pressure was mainly in private debt linked to the evolution of the residential investment sector. However, when the crisis burst, the private sector went into an adjustment process in order to deleverage, thus, public sector increase its

participation in the economy in order to smooth the effects of the private sector debt consolidation.

Table 8. Determinants of public finance imbalances

Control group: EU-27								
	Government consolidated gross debt				Cash surplus/deficit (% GDP)			
Constant	12.441 (0.081)	11.517 (0.089)	13.939 (0.015)	15.782 (0.046)	-3.602 (0.000)	-2.872 (0.000)	-3.034 (0.000)	-2.280 (0.002)
Pre-crisis	0.025 (0.836)	-0.091 (0.548)	-0.156 (0.162)	-0.143 (0.249)	-0.697 (0.005)	-0.674 (0.002)	-0.766 (0.000)	-0.754 (0.000)
EA-12 dummy		13.427 (0.085)				-1.506 (0.261)		
GIIPS dummy			28.973 (0.005)	26.209 (0.004)			-4.763 (0.032)	-5.496 (0.018)
Core dummy			4.953 (0.294)				0.920 (0.296)	
CEE dummy				-1.743 (0.780)				-0.909 (0.310)
R-squared	0.002	0.167	0.464	0.448	0.335	0.372	0.606	0.607
Wald F-statistic	0.044	1.906	3.498	3.425	9.716	5.913	8.249	9.074
Prob (Wald F-statistic)	0.836	0.172	0.034	0.036	0.005	0.008	0.001	0.000
Control group: OECD High-income countries								
	Government consolidated gross debt				Cash surplus/deficit (% GDP)			
Constant	9.052 (0.201)	4.951 (0.484)	6.633 (0.359)		-3.204 (0.000)	-2.768 (0.003)	-2.717 (0.004)	
Pre-crisis	0.107 (0.203)	0.108 (0.235)	0.081 (0.405)		-0.060 (0.752)	-0.092 (0.655)	-0.148 (0.537)	
EA-12 dummy		8.040 (0.238)				-0.948 (0.561)		
GIIPS dummy			20.265 (0.054)				-3.847 (0.165)	
Core dummy			-0.729 (0.886)				0.927 (0.365)	
R-squared	0.052	0.113	0.315		0.004	0.020	0.213	
Wald F-statistic	1.720	1.916	2.911		0.103	0.213	1.415	
Prob (Wald F-statistic)	0.203	0.172	0.060		0.752	0.810	0.265	

White heteroskedasticity-consistent standard errors & covariance  
p-values in parentheses

In the case of the cash surplus/deficit, a proxy for overall budget balance, pre-crisis period average is significant and it has a negative sign. When controlling by EU-27 countries, GIIPS dummy is significant with a coefficient close to -5. Summing up, there is a negative relation between the pre-crisis period and the change in average cash deficit/surplus with the GIIPS countries presenting a significant deterioration of their fiscal position after the burst of the crisis. The

deterioration of the overall budget balance has been reflected in a sharp increase in the debt ratio.

#### 4.2.5. Income distribution

Table 9. Determinants of income distribution

<b>Control group: EU-27</b>								
	Gini index				Palma ratio			
Constant	0.040 (0.055)	0.039 (0.071)	0.053 (0.130)	0.058 (0.060)	0.206 (0.021)	0.202 (0.031)	0.233 (0.119)	0.295 (0.021)
Pre-crisis	-0.153 (0.048)	-0.158 (0.067)	-0.204 (0.128)	-0.203 (0.080)	-0.220 (0.018)	-0.231 (0.034)	-0.259 (0.116)	-0.268 (0.046)
EA-12dummy		0.004 (0.536)				0.031 (0.504)		
GIIPS dummy			0.008 (0.511)	0.003 (0.814)			0.046 (0.582)	-0.005 (0.946)
Core dummy			0.001 (0.843)				0.017 (0.551)	
CEE dummy				-0.010 (0.136)				-0.086 (0.074)
R-squared	0.253	0.283	0.314	0.438	0.360	0.395	0.404	0.580
Wald F-statistic	4.840	2.170	1.382	3.473	7.731	3.383	2.042	5.817
Prob (Wald F-statistic)	0.048	0.161	0.304	0.059	0.018	0.075	0.178	0.017
<b>Control group: OECD High-income countries</b>								
	Gini index				Palma ratio			
Constant	0.015 (0.557)	0.016 (0.552)	0.010 (0.777)		0.203 (0.061)	0.200 (0.076)	0.227 (0.241)	
Pre-crisis	-0.065 (0.482)	-0.066 (0.488)	-0.046 (0.710)		-0.210 (0.051)	-0.214 (0.075)	-0.238 (0.228)	
EA-12 dummy		-0.001 (0.922)				0.013 (0.778)		
GIIPS dummy			-0.002 (0.840)				0.023 (0.787)	
Core dummy			0.001 (0.842)				0.003 (0.933)	
R-squared	0.048	0.049	0.056		0.299	0.306	0.310	
Wald F-statistic	0.523	0.270	0.227		4.814	2.170	1.453	
Prob (Wald F-statistic)	0.482	0.768	0.875		0.051	0.165	0.291	

White heteroskedasticity-consistent standard errors & covariance  
p-values in parentheses

Finally, in the case of income distribution we focus in two variables (see table 9): Gini index at disposable income and Palma ratio, which is the ratio of the share of all income received by the 10% people with highest disposable income divided





by the share of all income received by the 40% people with the lowest disposable income. The case of income distribution variables is special since it is difficult to find source of homogeneous data for all the countries in our sample for the full period. In the case of the Gini index at disposable income, all different estimation, based on the methodology described above, are not statistically significant. In this case, the analysis is complex due to data limitation. Something similar happens in the case of Palma ratio. Pre-crisis average is significant in most of the specifications with negative sign. However, neither GIIPS nor core dummies are significant in any case. When controlling by EU-27, CEE dummy is significant at 10%. The crisis has worsened income distribution in both groups of countries.

## 5. Conclusions

The study of the determinants of the impact of the crisis on the analyzed economic variables show that the membership to the European Monetary Union has implied a significant differential effect, and, thus, the impact of the crisis has been larger inside the Eurozone than in the non-euro EU countries or in the other developed economies.

However, when we analyze in a separate way the performance of the peripheral euro countries (the GIIPS), we see very clear that the impact of the Great Recession has been significantly larger in the latter countries, and that the impact of the crisis on the other euro countries (the core countries) has not been significantly different than that registered in the non-euro EU countries or in the other developed economies.

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## **THE ABSTRACT OF THE PROJECT IS:**

The research programme will integrate diverse levels, methods and disciplinary traditions with the aim of developing a comprehensive policy agenda for changing the role of the financial system to help achieve a future which is sustainable in environmental, social and economic terms. The programme involves an integrated and balanced consortium involving partners from 14 countries that has unsurpassed experience of deploying diverse perspectives both within economics and across disciplines inclusive of economics. The programme is distinctively pluralistic, and aims to forge alliances across the social sciences, so as to understand how finance can better serve economic, social and environmental needs. The central issues addressed are the ways in which the growth and performance of economies in the last 30 years have been dependent on the characteristics of the processes of financialisation; how has financialisation impacted on the achievement of specific economic, social, and environmental objectives?; the nature of the relationship between financialisation and the sustainability of the financial system, economic development and the environment?; the lessons to be drawn from the crisis about the nature and impacts of financialisation? ; what are the requisites of a financial system able to support a process of sustainable development, broadly conceived?'

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