

AN ANALYSIS OF PUBLIC DEBT IN EURO AREA MEMBER STATES: DYNAMICS AND DETERMINANTS

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Abstract

The objective of this paper is to analyze the dynamics and the determinants of public debt in Euro Area Member States. Taking into consideration the two main causes of public debt growth, current account balance and private sector debt, we aim to determine the differences between Northern³ and Southern Euro Area Member States. We tested the influence of current account and private sector debt on the general government debt, using panel data analysis for the period 2000 - 2011, and the result showed that current account and private sector debt influence the dynamics of public debt in both Northern and Southern countries, but to a higher degree in the latest.

Keywords: Euro Area, current account, general government debt, private debt, panel data
JEL Classification: C23, F32, H63

1. INTRODUCTION

The recent economic crisis, followed by the European sovereign debt crisis, resulted in rapidly deteriorated public finances, especially in Southern Euro Area countries. Analyzing the causes that led to such unfavorable dynamics determined an important perspective shift: the spotlight was changed from the deficit and public debt criteria of the Stability and Growth Pact, that resulted to be insufficient, to the economic imbalance indicators. This is due to the fact that current account imbalances were proved to be one of the main causes of the Euro Area sovereign debt crisis, along with the competitiveness gaps between some Euro Area member states and the need to cover private sector debt.

The major imbalance is related to the dynamics of the current account: the gap between North and South has increased since the creation of the EMU, proving to be a persistent problem (Holinski et. al, 2012). External imbalances proved to be the main Euro Area problem (Croitoru, 2012). Also the sovereign debt crisis is deeply connected to the banking crisis and macroeconomic imbalances that affected the euro area (Lane, 2012). This is especially the case of Ireland (but this is not the only European case), that had to capitalize banks and take over liabilities, increasing therefore the level of general government debt.

Looking back, the gap between the North and the South can be explained by the fact that North has been able to translate higher competitiveness into increasing trade surpluses and higher net factor income from abroad while South has been borrowing from abroad to maintain its negative trade balance and pay the interest on its net debt (Holinski, 2012). In

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³ Regarding the composition of Northern and Southern Euro Area groups of countries, we follow Gros (2012) and therefore, the North includes Austria, Germany, Belgium, Luxembourg, Netherlands and Finland, while the South includes Greece, Italy, Spain, Ireland and Portugal

Southern Euro Area current account imbalances seemed to have been even larger than can be explained by fundamentals, though the situation varies substantially across countries, and is mostly driven by a decline in private saving rates (Jaumotte, Sodsriwiboon, 2010).

2. DYNAMICS AND INTERDEPENDENCES BETWEEN CURRENT ACCOUNT BALANCE, PRIVATE SECTOR DEBT AND GENERAL GOVERNMENT DEBT DURING 2000 - 2011

Having in view the experience of the most vulnerable countries, as shown by the economic crisis, this being the PIIGS countries (Portugal, Ireland, Italy, Greece and Spain), we take into consideration the two main causes of public debt increase during the latest years: current account deficit (PIGS) and private sector debt (Ireland). Using panel data analysis we tested the dependency between public debt and these two indicators. We also applied the same methodology using EUROSTAT data, between 2000 to 2011, for the Northern Euro Area countries, with the objective of testing whether these two indicators also influenced public debt in this group of countries, and if so, which are the differences between North and South.

2.1. Methodology

The econometric analysis is based on panel data estimation, using the STATA software. In a panel data model the individual effects may be either correlated with the explanatory variables (fixed effects model: FE) or incorporated into the error term (random effects model: RE) and assumed uncorrelated with the explanatory variables (Baum, 2001).

For the FE model the most used estimator is the “within estimator”. A great advantage of panel data is the fact that consistent estimation is possible even with endogenous regressors.

The model is estimated assuming that the default standard errors is independent and identically distributed (Cameron and Trivedi, 2009) and homoskedastic. When heteroskedasticity is present the standard errors of the estimates will be biased and one need to compute robust standard errors. Another problem is the serial correlation of the idiosyncratic error term, but Wooldridge (2002) proposed a very simple test for checking the autocorrelation of the residuals.

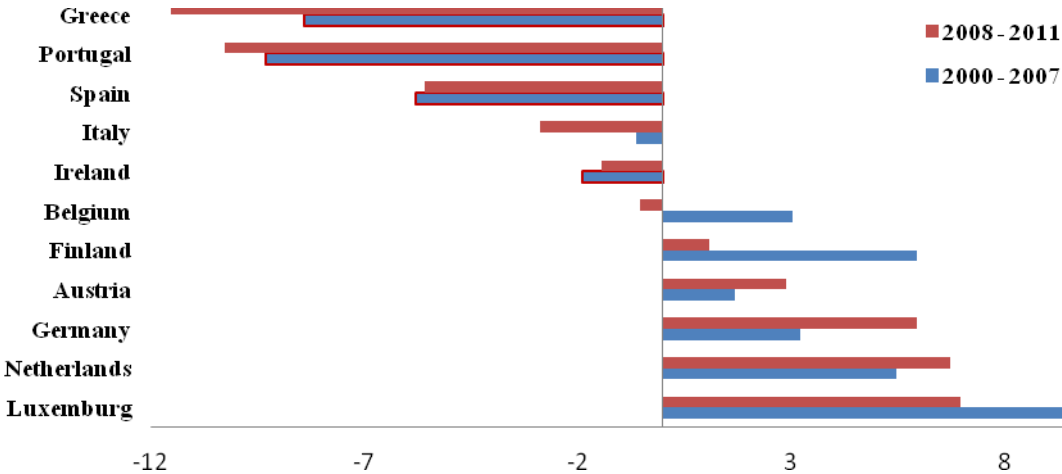
In order to overcome these problems, we should estimate the regression model using robust standard errors (Hoechle, 2007). Some authors have provided a number of tests in order to identify the problems encountered (Drukker, 2003, Baum, 2001). Also, for the Stata program, there are some procedures that correct the error structure, assuming for example that the errors are heteroskedastic, auto-correlated up to some lag and possibly correlated between the groups.

2.2. Dynamics of current account balance, private sector debt and general government debt during 2000 - 2011

One of the main causes of Euro Area crisis seems to have been the current account imbalances between Northern and Southern countries. During 2000 - 2011, Luxembourg, Netherlands, Germany and Austria have registered current account surpluses. Finland and Belgium have also registered mostly current account surplus, with few exceptions: Finland registered current account deficit in 2011 of 1.6% GDP; Belgium registered current account deficit of 1.3% GDP in 2008 and 1.4% GDP in 2009.

During 2000 - 2011 the countries with the highest deficits of competitiveness were Portugal, Spain and Greece. This downward trend was also registered in Cyprus, Malta, and Slovenia, but later than in Greece, Italy, Portugal and Spain, perhaps due to their later entry in the Euro Area. Within this context, understanding the dimension of the implications of the

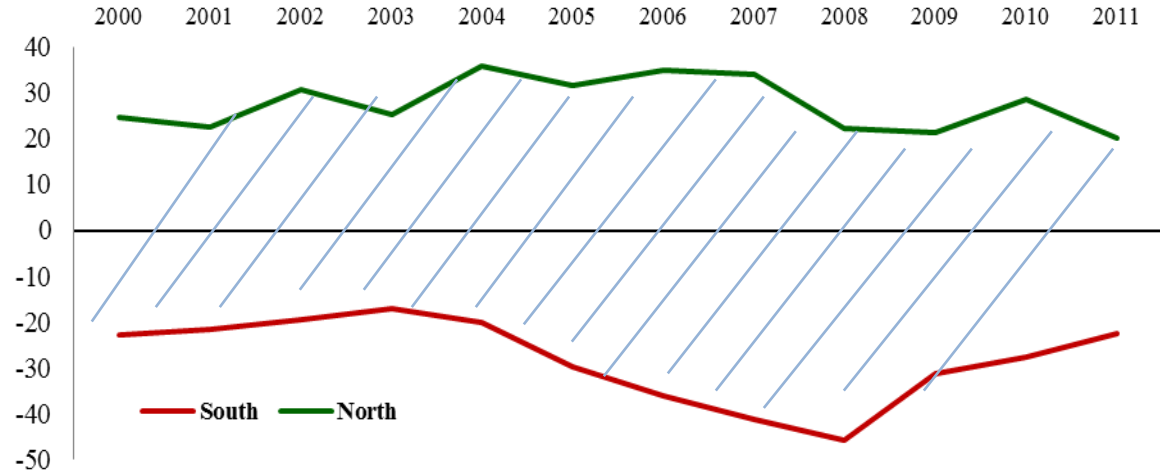
current crisis in a region with common monetary policy is moreover enhanced as there is an issue of concern regarding the possibility of a similar unfavorable evolution of these states, that might have been corrected by the crisis. Italy also registered downward trend in the period 2000 - 2011, but the pace was slow. One explanation for such negative dynamics is that during the pre-crisis period, high current account deficits were covered through foreign direct investments (Pislaru, 2008). The situation changed under the crisis as, from 2003 to 2007, the economies were characterized by a continuous expansion and increase of flows until 2008, when the global economic crisis had an impact on the entire world economy (Petrescu et al., 2011): limited access to financial resources affected the ability of firms to invest and therefore to reduce current account deficits.



Source: EUROSTAT, own calculation

Chart 1. The dynamics of the current account deficit in some Euro Area Member States during 2000 - 2011 (average, %GDP)

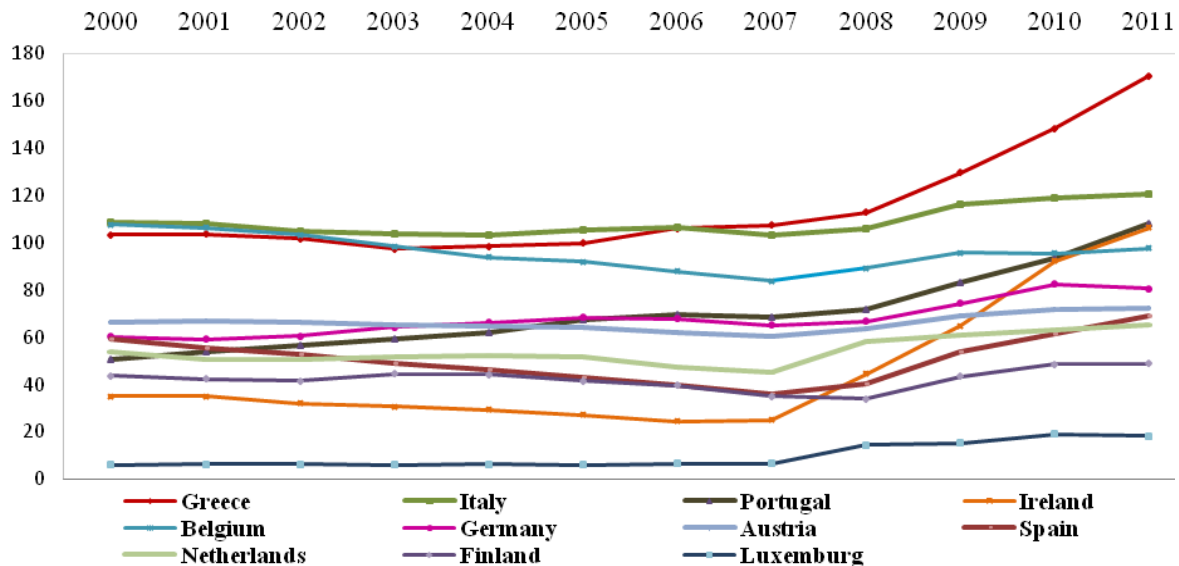
The average current dynamics shows a clear picture of the difference between Northern and Southern countries and also the deterioration of current account balance in both groups of countries, during 2000 - 2011, under the crisis' conditions.



Source: EUROSTAT, own calculation

Chart 2. The dynamics of the current account balance in Northern and Southern Euro Area Member States during 2000 - 2011 (%GDP)

The dynamics of current account balances in the period 2000 - 2011 showed a competitive transfer between north and south; Baltic countries reveal an increased vulnerability to macroeconomic global imbalances during the period analyzed and especially during the economic crisis.



Source: EUROSTAT, own calculation

Chart 3. General government debt dynamics in some Euro Area Member States during 2000 - 2011 (%GDP)

During 2000 and 2011 Luxembourg and Finland are the two Euro Area countries that managed to maintain the level of public debt below 60% of GDP, regardless of the economic crisis. The lowest share of debt in relation to GDP in all Euro Area is registered by Luxembourg.

Euro Area member states in which, during 2000 - 2011, public debt exceeded the 60% of GDP threshold imposed by the Stability and Growth Pact are: Germany, Austria, Malta, France and Belgium. Member states that, at the onset of the economic crisis showed low levels of public debt relative to GDP, but subsequently had negative developments are: Spain, Netherlands and Cyprus. The rapid deterioration of this indicator in the 60% - 100% GDP segment was registered by Spain, where the ratio of general government debt to GDP had doubled during the recent economic crisis.

During 2000 - 2011 Greece and Italy registered high total public debt, of over 100% of GDP. Portugal, in 2004, exceeded the target of 60% GDP, but under the economic crisis, the general government debt increased at almost 100% GDP. A significant increase, influenced by the recent global imbalances was recorded by Ireland: in 2007 public debt was of 24.6% of GDP and under the dynamics of the economic crisis, this debt grew to 106% of GDP in 2011. A considerable deterioration of public finances was recorded in Greece, where general government debt increased from 107.4% to 170.6% GDP in 2011. Greece, Italy, Portugal and Ireland registered the highest ratio of public debt to GDP. While Greece and Italy have had problems regarding this aspect even from the beginning of the Euro Area, Ireland proved to be, under the crisis, the most vulnerable country, showing the highest public debt growth rate

in Euro Area. This is mainly due to the fact that in Ireland, private debt increased to unsustainable rates, of almost 280% GDP, and was partly covered through government debt.

Geo\Time	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Ireland	154.5	154.5	151.6	154.5	163.8	187.1	214.2	219.7	258.5	282.5	284.9	280.7

Source: EUROSTAT, own calculation

Table 1. Private sector debt dynamics in Ireland during 2000 - 2011 (%GDP)

While in PIGS countries, current account deficits played an important role in rising public debts, in Ireland the situation was slightly different; public debt level increased mainly due to the fact that its banking system was heavily dependent to the international short term funding; when cross border financial flows slowed due to the onset of the crisis, the government had to cover losses and sustain the banking system.

2.3. Econometric results

When considering the first group of countries (the Southern countries) we estimated a fixed effects panel data model using the STATA software, in order to explain the public debt variations. After applying the t-Student test, all the coefficients were statistically significant (p-value <0.05) and the results were consistent with the economic theory.

When running the Hausman test in order to decide whether a RE model is more appropriate than a FE model, the probability was less than 5%. Concluding that we are dealing with fixed-effects, we estimated the model using the within estimator.

When performing both the modified Wald test for group wise heteroskedasticity in the FE model, implemented in Stata by Baum (2001) and the serial correlation test proposed by Drukker (2003), it resulted that the errors were both auto correlated and heteroskedastic. That is why, in order to ensure the validity of the statistical results, we had to estimate a robust fixed-effects (within) regression with Driscoll and Kraay standard errors.

The output of the robust fixed-effects regression model that describes the general government debt variation for the Southern countries is presented in Figure 1.

Regression with Driscoll-Kraay standard errors		Number of obs	=	60	
Method: Fixed-effects regression		Number of groups	=	5	
Group variable (i): Coll		F(2, 4)	=	12.57	
maximum lag: 2		Prob > F	=	0.0189	
		within R-squared	=	0.5324	
dat_public	Coef.	Drisc/Kraay Std. Err.	t	P> t	[95% Conf. Interval]
deficit_cc	3.520382	.9697642	3.63	0.022	.8278854 6.21288
dat_priv	.400117	.0836219	4.78	0.009	.1679454 .6322886
_cons	35.68632	10.56111	3.38	0.028	6.363967 65.00867

Figure 1. Robust fixed-effects regression model for South

Therefore, the following final valid econometric model resulted:

$$\text{Dat_public}_{it} = 3.521 * \text{deficit_CC}_{it} + 0.4 * \text{dat_priv}_{it} + 35.686$$

As expected, the current account deficit has a strong and positive influence upon the

general government debt (the coefficient indicates an increase of the public debt of about 3.521 percentages in case the current account deficit increases with one percentage, keeping all the other explanatory variables constant). Besides, the influence of the private sector debt seems normal, since its growth with one percentage stimulates an increase of 0.4 percentage of the public debt, keeping all other variables constant. In Southern Euro Area Countries, the dynamics of general government debt can be explained through the dynamics of current account balance and private sector debt, both having a positive influence.

Secondly, we estimated a fixed effects panel data model when considering the second group of the Northern countries in order to explain the public debt variations.

Since both the modified Wald test for group wise heteroskedasticity and the serial correlation test confirmed the presence of both autocorrelation and heteroskedasticity we had to estimate a robust fixed-effects (within) regression with Driscoll and Kraay standard errors.

The output of the robust fixed-effects regression model that describes the public debt variation for the Northern country group is presented in Figure 2.

Regression with Driscoll-Kraay standard errors		Number of obs	=	72		
Method: Fixed-effects regression		Number of groups	=	6		
Group variable (i): coll		F(2, 5)	=	13.27		
maximum lag: 2		Prob > F	=	0.0100		
		within R-squared	=	0.1738		
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dat_public	Coef.	Drisc/Kraay Std. Err.	t	P> t	[95% Conf. Interval]	
deficit_cc	.6621312	.299178	2.21	0.078	-.1069304	1.431193
dat_priv	.0842562	.0163575	5.15	0.004	.0422079	.1263046
_cons	40.61993	2.119325	19.17	0.000	35.17203	46.06783

Figure 2. Robust fixed-effects regression model for North

As we can notice, the coefficients are statistically significant (the p-value <0.10) and the results are consistent with the economic theory. The final valid econometric model for the Northern countries is presented below:

$$\text{Dat_public}_{it} = 0.662 * \text{deficit_CC}_{it} + 0.0843 * \text{dat_priv}_{it} + 40.62$$

In Northern Euro Area countries, the dynamics of general government debt can be explained through the dynamics of current account balance and private sector debt, both having a positive influence.

3. CONCLUSIONS

During the economic crisis, public finances were significantly deteriorated. General government debt (%GDP) registered record and unsustainable records. The general macroeconomic conditions affected all Euro Area Member States, but in some to a lesser extent. This is the case of Northern Euro Area countries that proved to be more stable and less vulnerable to economic turbulences. On the opposite side, there are PIIGS countries, in which general government debt growth was very high. In these countries, current account deficit and private role played a very important role in rising public debt.

Our results show that those two indicators, private debt and current account balance also influenced public debt in Northern Euro Area, where current account surplus was registered in most of the 2000 - 2011 period. In both Northern and Southern Euro Area countries public

