

CURRENT ACCOUNT BALANCE, PRIVATE DEBT AND EURO AREA SOVEREIGN DEBT CRISIS: A COMPARISON OF NORTH AND SOUTH

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A*bstract:* The objective of this paper is to determine the difference, if any, between North and South in the Euro Area, by testing the influence of current account and private sector debt on the general government debt. We used panel data analysis for the period 2000 - 2011 and the results showed that current account and private sector debt influenced the dynamics of public debt both in Northern and Southern countries, but the dependence proved to be higher in the latter. Monte Carlo simulations were subsequently used in order to predict the variation in public debt for both Northern and Southern country groups.

Keywords: general government debt, current account, private debt, Euro Area, Monte Carlo simulation

JEL Classification: C23, F32, H63

1. Introduction

In this paper we distinctly studied both the Northern and the Southern Euro Area groups of countries, following Gros's (2012) approach, where the North includes

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Austria, Germany, Belgium, Luxembourg, the Netherlands and Finland, while the South includes Greece, Italy, Spain, Ireland and Portugal.

The analysis started with a descriptive statistics of the dynamics of current account balance, private sector debt and general government debt during 2000 – 2011, followed by panel data estimations in order to quantify the impact of current account deficit and private sector debt upon the general government debt for both North and South country groups. Monte Carlo simulations were then used to predict the variation in public debt for both the North and the South cases.

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

The recent economic crisis, followed by the European sovereign debt crisis, resulted in rapidly deteriorated public finances, especially in Southern Euro Area countries. Analysing the causes that led to such unfavourable dynamics, an important perspective swift stood out: the spotlight has 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 Economic and Monetary Union, being 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 to the macroeconomic imbalances that affected the Euro Area (Lane, 2012). This is especially the case of Ireland that had to capitalize banks and take over liabilities, increasing therefore the level of general government debt. However, this is not the only European case, as the situation was similar in many Euro Area member states.

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 Southern Euro Area current account imbalances seemed to have been even larger than it can be explained by fundamentals,

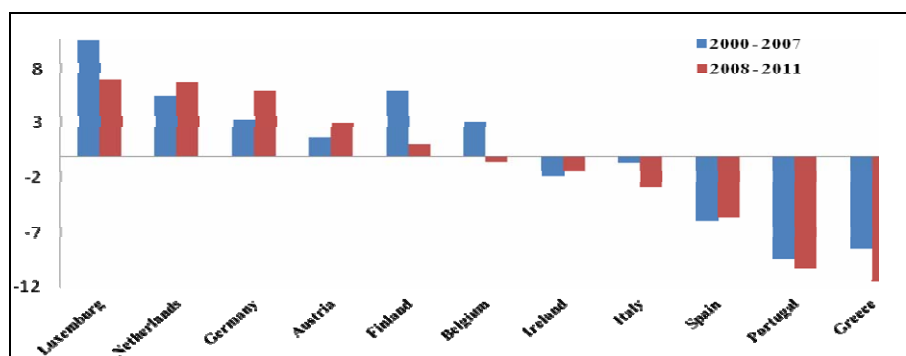
though the situation varies substantially across countries and is mostly driven by a decline in private saving rates (Jaumotte, Sodsriwiboon, 2010).

Taking into consideration the experience of the most vulnerable countries, as shown by the economic crisis, i.e. the PIIGS countries (Portugal, Ireland, Italy, Greece and Spain), we take into account the two main causes of public debt increase during the latest years: current account deficit (PIGS) and private sector debt (Ireland).

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

During 2000 - 2011 the countries with the highest deficits in 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 into the Euro Area. Italy also registered a downward trend, but at a slower pace. Within this context, the necessity of 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 unfavourable evolution of these states that might have been corrected by the crisis.

Figure 1. The current account balance dynamics in some Euro Area member states during 2000 - 2011 (average, %GDP)

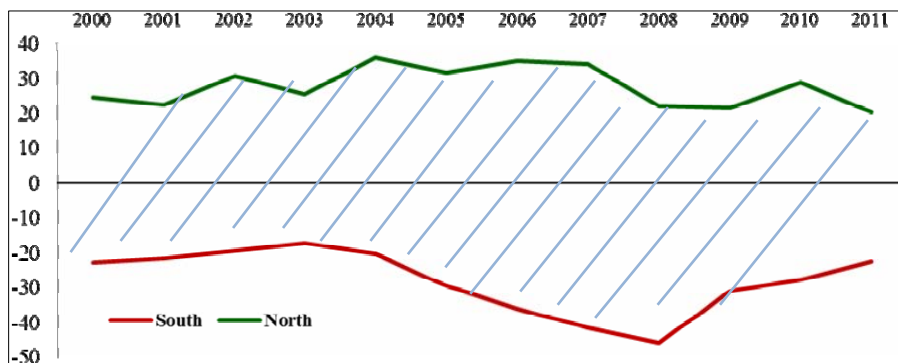


Source: EUROSTAT, own calculation.

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 conditions 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. In many of the cases, increased current account balances led to a loss in competitiveness. One of the determinants of such dynamics is the structure of the foreign direct investments, as in many countries (e.g. Portugal) the flows were directed to the real estate sector. However, this is not a general rule, as, for example, in Ireland, due to the fact that foreign direct investments were directed mainly to tradable goods, the flows contributed to increased performance and enhanced results (Dumitru, 2008).

The average current account dynamics show a clear picture of the difference between Northern and Southern countries and draw attention on the deterioration of current account balance in both groups of countries, during 2000 - 2011, especially in the last period of economic turmoil.

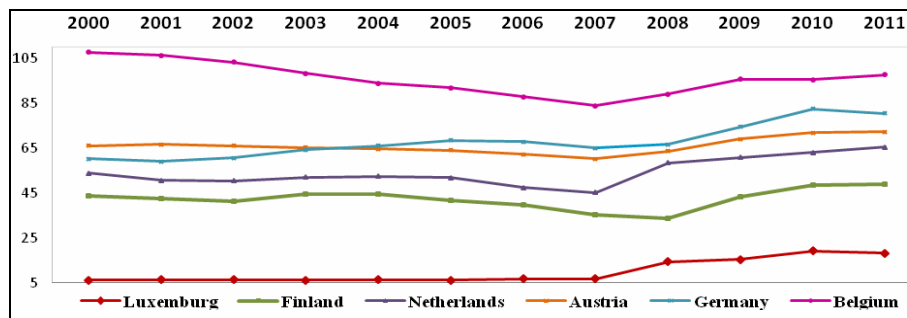
Figure 2. The current account balance dynamics in North and South during 2000 - 2011 (%GDP)



Source: EUROSTAT, own calculation.

The dynamics of current account balances during 2000 - 2011 showed a competitive transfer between North and South. Baltic countries show an increased vulnerability to macroeconomic global imbalances during the period analysed and especially during the economic crisis.

Figure 3. General government debt dynamics in Northern Euro Area member states during 2000 - 2011 (%GDP)

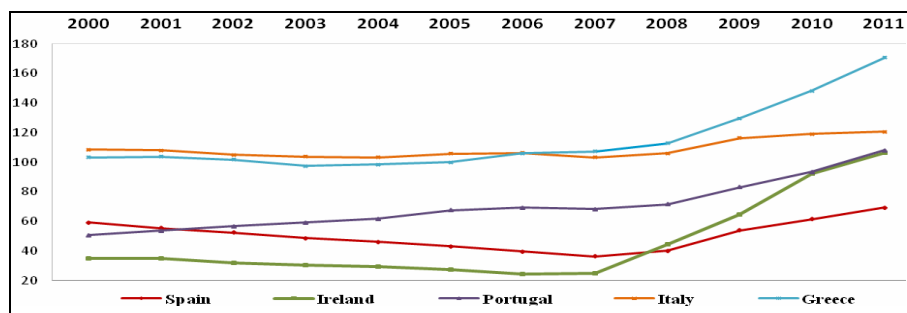


Source: EUROSTAT, own calculation.

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 the 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 60% of the 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, the Netherlands and Cyprus. The rapid deterioration of this indicator in the 60% - 100% of the GDP segment was registered by Spain, where the ratio of general government debt to GDP had doubled during the recent economic crisis.

Figure 4. General government debt dynamics in Southern Euro Area member states during 2000 - 2011 (%GDP)



Source: EUROSTAT, own calculation.

During 2000 - 2011 Greece and Italy registered high total public debt, of over 100% of the GDP. Portugal, in 2004, exceeded the target of 60% of the GDP, but under the economic crisis, the general government debt increased to almost 100% of the GDP. A significant increase, influenced by the recent global imbalances was recorded by Ireland: in 2007 public debt was 24.6% of the GDP and under the influence of latest global economic dynamics, this debt grew to 106% of the GDP in 2011. A considerable deterioration of public finance was recorded in Greece, where the general government debt increased from 107.4% to 170.6% of the GDP in 2011. Greece, Italy, Portugal and Ireland registered the highest ratio of public debt to GDP.

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

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.

While Greece and Italy had problems regarding this aspect even from the beginning of the Euro Area, Ireland proved to be, during the crisis, the most vulnerable country, showing the highest public debt growth rate in the Euro Area. This was mainly due to the fact that in Ireland, the private debt increased to unsustainable rates, of almost 280% GDP, and was partly covered through government debt.

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.

3. Econometric analysis

Using panel data analysis we tested the dependency between general government debt and both the current account deficit and the private sector debt for both the Northern and the Southern Euro Area countries. We estimated two panel data models using EUROSTAT data for the period 2000-2011, with the objective of testing whether these two indicators influence public debt and to identify the main differences between North and South.

The econometric analysis was based on panel data estimation, using the STATA software, where two fixed-effects models (FE) were estimated, by assuming that the individual effects are correlated with the explanatory variables (Baum, 2001). We also tested whether a FE model is more appropriate than a random-effects model (RE), where the individual effects are assumed to be uncorrelated with the explanatory variables.

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.

Moreover, the models were estimated assuming that the default standard errors are 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.

3.1. The econometric results for the South

When considering the Southern group of countries we estimated a fixed-effects panel data model using the STATA software, in order to explain the general government 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 5.

Figure 5. Robust fixed-effects regression model for South

Regression with Driscoll-Kraay standard errors		Number of obs	=	60	
Method: Fixed-effects regression		Number of groups	=	5	
Group variable (i): Col 1		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

Therefore, the following final valid econometric model resulted:

$$Dat_public_{it} = 3.521*deficit_CC_{it} + 0.4*dat_priv_{it} + 35.686 \quad (1)$$

where

Dat_public_{it} - the general government debt for each South country and year from 2000-2011

$deficit_CC_{it}$ - the current account deficit for each South country and year from 2000-2011

dat_priv_{it} - the private sector debt for each South country and year from 2000-2011

As expected, the current account deficit has a strong and positive influence upon the general government debt (the coefficient indicates an increase in the public debt of about 3.521 percent in case the current account deficit increases by one percent, keeping all the other explanatory variables constant). Besides, the

influence of the private sector debt seems normal, since its growth by one percent stimulates an increase of 0.4 percent 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 deficit and private sector debt, both having a positive influence.

3.2. The econometric results for the North

Further, we estimated a second fixed-effects panel data model when considering the Northern group of countries in order to explain the general government 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 once again 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 5.

Figure 6. Robust fixed-effects regression model for North

Regression with Driscoll-Kraay standard errors		Number of obs	=	72		
Method: Fixed-effects regression		Number of groups	=	6		
Group variable (i): Col 1		F(2, 5)	=	13.27		
maximum lag: 2		Prob > F	=	0.0100		
		within R-squared	=	0.1738		
dat_public	Coef.	Disc/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

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 in equation (2).

$$Dat_public_{it} = 0.662 * deficit_CC_{it} + 0.0843 * dat_priv_{it} + 40.62 \quad (2)$$

where

$Dat_{public_{it}}$ - the general government debt for each North country and year from 2000-2011

$deficit_{CC_{it}}$ - the current account deficit for each North country and year from 2000-2011

$dat_{priv_{it}}$ - the private sector debt for each North country and year from 2000-2011

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

4. Monte Carlo Simulations

Based on the econometric relations highlighted by the two estimated panel data models the study continued with a simulation of the evolution of both the current account balance and the private sector debt in order to predict the general government debt for the 2012 – 2014 horizon for both the South and the North.

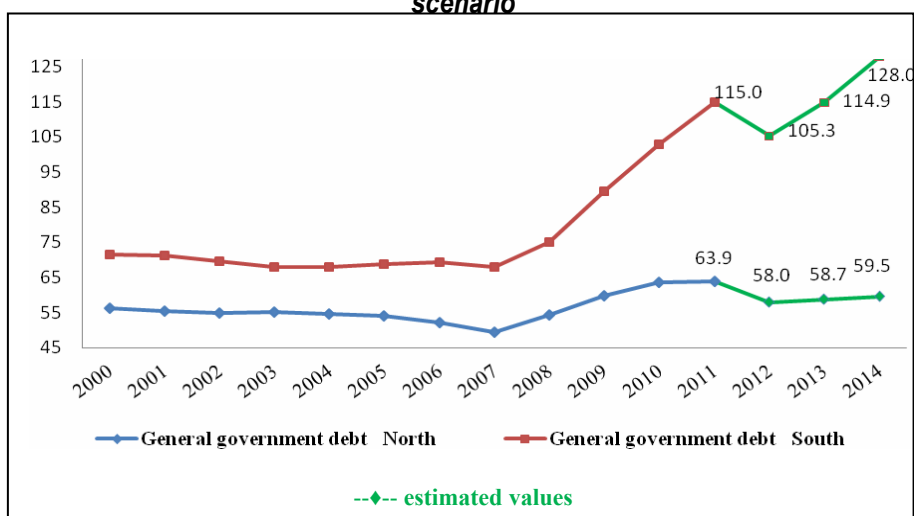
A stochastic simulation relies on repeated random sampling to compute the results and it is generally known as a Monte Carlo simulation. In contrast to the deterministic simulation, where the inputs to the model are fixed at known values and a single path is calculated for the output variables, in the stochastic environment uncertainty is incorporated into the model by adding a random element to the coefficients (Albulescu, 2010; Dobre, 2000).

Therefore, the first step when building the numerical simulation consists in formulating several hypotheses regarding the random variation of the explanatory variables of the panel data models presented in the previous section. The following assumptions were made, when considering the main features of the two country groups, their variations in previous years and their expected trends. The variations of the two explanatory variables compared to the previous year, were considered to be described by uniform distributions inside the following intervals, as presented in Table 2.

Table 2. Simulation hypothesis

	The South		The North	
Year	The current account balance variation (percentage points)	The private sector debt variation (percentage points)	The current account balance variation (percentage points)	The private sector debt variation (percentage points)
2012	[-0,2; 4,3]	[-0,2; 3,5]	[-3,3; 3,3]	[-3,2; 14,2]
2013	[0; 4,8]	[0; 4,5]	[-2; 3]	[-2; 12]
2014	[1; 5,7]	[1; 5,7]	[-1,2; 2,4]	[-1,4; 10,7]

The results of the numerical simulation computed after 1000 iterations suggests that, based on this scenario, the general government debt for the North is more likely to encounter only a slight increase during the simulation horizon 2012 - 2014, in comparison to the previous years.

Figure 7. General government debt prediction based on simulation scenario

Source: EUROSTAT, own calculation.

For the South country group, during the simulation horizon 2012 - 2014, the increase of general government debt seems to be more noticeable. Moreover, it

can be concluded that in the following years, government debt and its determinants will put further pressure on national policies both in Northern and Southern countries and will continue to be an issue of concern for all Euro Area.

5. Conclusions

During the economic crisis, public finances was significantly deteriorated. General government debt (% of the 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 sector debt played a very important role in rising public debt.

Our results show that the 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 years of the period 2000 - 2011. In both Northern and Southern Euro Area countries general government debt dynamics can be explained by the variations in current account balance and private debt, but the dependence degree is higher in the last group of countries.

The Monte Carlo simulations indicated that during the period 2012 - 2014 we are expecting to meet an increase in differences between the general government debts of the North as compared to the South country group.

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