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The five little PIIGS and the big bad Troika

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Abstract

The purpose of this paper is to investigate whether efforts to eliminate the budget deficits in Portugal, Ireland, Italy, Greece and Spain, as it has been suggested by Troika (European Commission, International Monetary Fund, and European Central Bank), will delay the economic growth of these countries than enhance it. For this purpose a state-space equation for each country is estimated using maximum likelihood and Kalman filter. The results indicated that policies aiming at increasing labor productivity positively influence economic growth in all countries, whilst policies aiming at reducing public deficits positively influence economic growth in Portugal and Ireland, and negatively influence economic growth in Italy, Greece and Spain.

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1. Introduction

Following the financial crisis of 2007-2008, Portugal, Ireland, Italy, Greece and Spain are considered to be the weaker economically countries in Euro-zone. PIIGS is an acronym that refers to these countries. Although this acronym has been criticized that is producing offensive connotations, still is used by economic organizations, analysts and academics. Since these five countries joined the Euro-zone in 1999-2002, their common currency is the euro. This means that these countries abolished their individual monetary policies in battling their economic decline and they had to follow a common monetary policy established for the entire Euro-zone, although economic and monetary conditions were substantially different among the Euro-zone member-states.

As a result, each of these five countries lost cost competitiveness in the last decade, due to the fact that their prices and wages rose more quickly than the Euro-zone member-states average. As the speed of the loss of competitiveness varied, the consequences varied in each country also. Specifically, the recession rate reached in 2009 the level of -2.5 percent in Portugal, -7.6 percent in Ireland, -5.2 percent in Italy, -2.0 percent in Greece, and -3.7 percent in Spain. Accordingly, the unemployment rate reached in 2009 the level of 9.6 percent in Portugal, 11.9 percent in Ireland, 7.8 percent in Italy, 9.5 percent in Greece, and 18.0 percent in Spain. Furthermore, the general government deficit and debt, as a percentage of GDP, reached in 2009 respectively the levels of -10.1 and 83.0 percents in Portugal, -14.3 and 65.6 percents in Ireland, -5.4 and 116.1 percents in Italy, -15.4 and 127.1 percents in Greece, and -11.1 and 53.3 percents in Spain (European Economy 2011).

On May 10, 2010, the European finance ministers produced a three-year €750 billion stabilization package to support the Euro-zone weaker member-states. However, this package did not resolve the underlying structural difficulties that Portugal, Ireland, Italy, Greece and Spain were facing (Economist 2010). Additionally, Memorandums of Economic and Financial Policies between Portugal, Ireland, and Greece, and the European Commission, the International Monetary Fund, and the European Central Bank, the so-called "Troika", was agreed, that outline the economic and financial policies that the governments of these three Euro-zone member-states will implement in the immediate coming period to strengthen market confidence and their fiscal and financial position during a difficult transition period toward a more open and competitive economy.

The core of these three Memorandums was based on austerity policies. Portugal, Ireland, and Greece should first try to reduce their budget deficits. For achieving this, it was advised that the three countries should increase direct and indirect taxation and cut spending by decreasing the wages and pensions budget. However, it is criticized that these actions may lead to social inequalities and unrest without reducing deficits. This is because in trying to eliminate or reduce a budget deficit when an economy is experiencing recession may delay the economy's return to growth (Lipsey *et al.* 1992).

Considering the above, the purpose of this paper is to investigate whether efforts to eliminate the budget deficits in Portugal, Ireland, Italy, Greece and Spain, as it has been suggested by the Troika, will delay or speed the economic growth of these countries. This purpose (i.e., whether the policy of reducing the budget deficit or any other alternative policies will have an impact on economic growth), is not purely academic. This is because this purpose underlies the recent debate on the European Stability and Growth Pact as well as the criticisms against the European Central Bank and the International Monetary Fund for pursuing austerity policies that may bring social unrest without even reaching the set targets (Acemoglou *et al.* 2003).

2. Model and Methodology

The empirical specification used in this paper is a revised version of the Aghion and Marinescou (2007) specification. Particularly, our model supports the view that in a country the GDP growth rate is influenced by its history, the labor productivity growth rate, and the budget deficit, as follows:

$$g_{it} = \sum_{j=1}^{k} \alpha_{jit} g_{i,t-j} + \sum_{j=0}^{m} \beta_{jit} q_{i,t-j} + \sum_{j=0}^{n} \gamma_{jit} b_{i,t-j} + \delta_i + \varepsilon_{it} \quad (1)$$

The identification of the variables included in model (1), and the units of measurement used in estimation, is as follows:

g_{it} = GDP growth rate in country i at year t (annual percentage change of Gross Domestic Product at 2000 market prices).
q_{it} = labor productivity growth rate in country i at year t (annual percentage change of Gross Domestic Product at 2000 market prices per person employed).
b_{it} = budget deficit in country i at year t (percentage of GDP at market prices of net lending (+) or net borrowing (-) of general government).
α_{jit} = time-varying coefficient of the variable $g_{i,t-j}$ in country i at year t.
β_{jit} = time-varying coefficient of the variable $q_{i,t-j}$ in country i at year t.
γ_{jit} = time-varying coefficient of the variable $b_{i,t-j}$ in country i at year t.
δ_i = country i fixed effect.
ε_{it} = error term in country i at year t.

Hamilton (1994a, 1994b) reveals that the parameter time-variability is an important issue in the literature with respect to growth rate modeling. Consequently, conclusions drawn from time-invariant models might be misleading.

In order to estimate the coefficients in model (1), the estimation issues followed may be summarized as follows. Considering that the data is annual, at most two lags in the independent variables of equation (1) were employed. Equations (2) – (5) describe a simple state-space specification of model (1) used in estimation.

Measurement equation:
$$g_{it} = \alpha_{1it} g_{i,t-1} + \beta_{0it} q_{it} + \gamma_{0it} b_{it} + \varepsilon_{it} \quad (2)$$

Transition equations:
$$\alpha_{1it} = \phi_{1i} \alpha_{1i,t-1} + \varepsilon_{1it} \quad (3)$$
$$\beta_{0it} = \phi_{2i} \beta_{0i,t-1} + \varepsilon_{2it} \quad (4)$$
$$\gamma_{0it} = \phi_{3i} \gamma_{0i,t-1} + \varepsilon_{3it} \quad (5)$$

where α_{1it}, β_{0it} and γ_{0it} are the state variables, φ_{1i}, φ_{2i} and φ_{3i} are parameters, and the disturbance terms ε_{it}, ε_{1it}, ε_{2it} and ε_{3it} are assumed to be independent and white noise.

The parameters of the equations (2)-(5) can be estimated by maximum likelihood using the Kalman filter. The Kalman filter is a recursive algorithm for sequentially updating the state variables given past information. More technically, it is an algorithm for calculating linear least squares forecasts of the state variables given data observed up to date t (Cuthbertson *et al.* 1992, EViews 2007). The state variables are either random walk (assuming $\varphi_{1i} = 1$, $\varphi_{2i} = 1$ and $\varphi_{3i} = 1$; shocks to the random coefficient persist indefinitely) or

AR(1) and constant mean (assuming $\varphi_{1i} \neq 1$, $\varphi_{2i} \neq 1$ and $\varphi_{3i} \neq 1$; shocks to the random coefficient have some persistence, but that the coefficient eventually returns to its mean value).

Having estimated the time-varying coefficients α_{1it}, β_{0it}, and γ_{0it}, we used the Hodrick and Prescott (1997) filter to make these coefficients to move continuously. However, the main limitation of this filter is that the user's choice of the smoothness parameter may yield an arbitrary smoothed series ranging from a straight line to a series that is so variable that it precisely mimics the series being de-smoothed (Gordon 2004).

3. The Empirical Results

Table 1 presents the results of the estimated equation using maximum likelihood and the Kalman filter, via Eviews 6. The data used were annual, covering the period 1981-2010 for the five countries, and were taken from European Economy (2011). The estimates refer to the state variables following a random walk process. Experiments assuming that the state variables follow an AR(1) and constant mean process were also performed but the results were inferior because in most cases the autoregression coefficients were not significant. The results in Table 1 are acceptable, considering also the rather flexible significant levels for the estimates for Italy and Greece. From the results in Table 1 it is seen that the structure of all equations is rather the same. Specifically, for all countries the GDP growth rate is influenced by its lagged value. This lagged value term captures any inertia effects in the determination of the GDP growth rate. The labor productivity growth rate and the GDP growth rate are related in the same year for all countries, except for Spain where this relationship refers to one lag. Additionally, the budget deficit and the GDP growth rate are related in the same year for all countries, except for Italy and Greece where this relationship refers to one lag.

Table 1: Estimates of the GDP growth rate equations

Coefficients / Statistics	Portugal	Ireland	Italy	Greece	Spain
Final State					
GDP	0.465_{t-1}	0.439_{t-1}	0.160_{t-1}	0.321_{t-1}	0.870_{t-1}
	[5.45]*	[4.76]	[1.48]	[3.69]	[10.06]
Productivity	0.886_{t}	1.050_{t}	0.393_{t}	0.897_{t}	0.704_{t-1}
	[6.81]	[6.21]	[2.85]	[8.31]	[2.86]
Deficit	0.141_{t}	0.160_{t}	0.293_{t-1}	0.154_{t-1}	0.218_{t}
	[2.28]	[2.80]	[1.27]	[1.34]	[2.15]
Mean State					
GDP	0.330	0.368	0.159	0.190	0.645
Productivity	0.749	0.832	0.398	0.759	0.132
Deficit	0.109	0.152	-0.778	-0.227	-0.161
Error Variance Parameter	0.364	1.474	0.848	0.351	0.663
	[2.03]	[6.40]	[4.46]	[1.39]	[2.80]
Diagnostics					
Log Likelihood	-75.518	-93.048	-81.452	-72.927	-79.138
Akaike information criterion	5.277	6.486	5.686	5.280	5.527
Schwarz criterion	5.324	6.533	5.733	5.328	5.574
Hannan-Quinn criterion	5.292	6.501	5.701	5.295	5.541

t Sub-indexes indicate time lags of explanatory variables

* Figures in brackets indicate z-statistics

Attached to Table 1 are the estimated time-varying coefficients α_{1it}, (Gi) β_{0it} or β_{1it} (Qi), and γ_{0it} or γ_{1it} (Bi), for i = Portugal (PT), Ireland (IE), Italy (IT), Greece (GR), and Spain (ES) that have been smoothed using the Hodrick and Prescott (1997) filter. These coefficients are presented graphically in Figures 1 to 5 for the five countries respectively. The shaded areas refer to the recession periods for each country. Furthermore, the averages of the estimated time-varying coefficients are reported in Table 1.

From the averages of the time-varying coefficients it is seen that for all countries the lagged values of the GDP growth rates (inertia effects) and the labor productivity growth rates positively influence the growth rates of the economies. In terms of the budget deficit (considering the negative sign in front of the budget deficit figures) we see that on average, budget deficits in Ireland and Portugal have a negative effect on the GDP growth rate, whilst they have a positive effect on the economic growth of Spain, Greece and Italy (Aghion and Marinescu 2007).

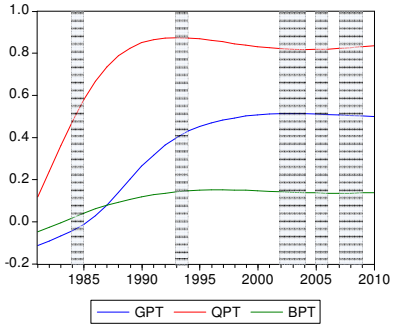

Figure 1: Portugal

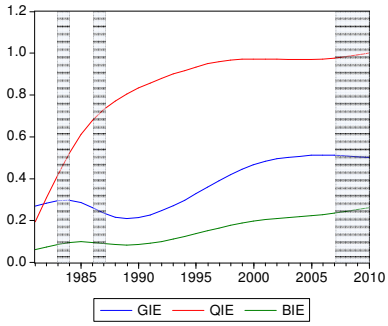

Figure 2: Ireland

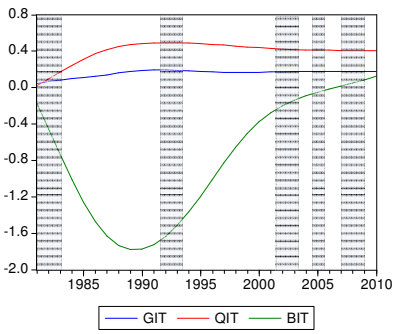

Figure 3: Italy

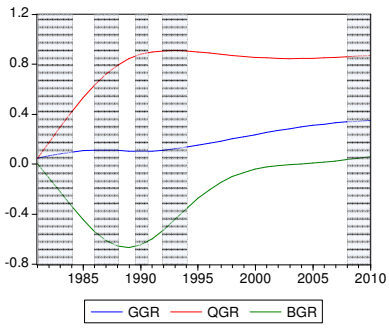

Figure 4: Greece

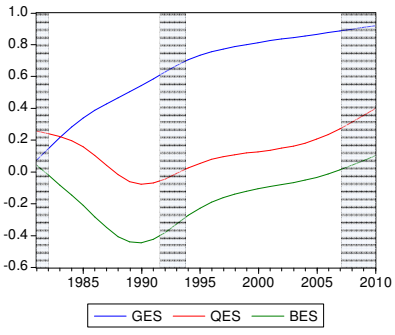

Figure 5: Spain

For comparison purposes, using the mean state coefficients reported in Table 1, and the mean values of the labor productivity growth rates and the budget deficits we estimated for each country the mean elasticities of GDP growth rates with respect to the labor productivity growth rates ($e_{gq,i}$), and with respect to the budget deficits ($e_{gb,i}$). We found $e_{gq,PT}$ = 0.664 and $e_{gb,PT}$ = -0.232 for Portugal, $e_{gq,IE}$ = 0.545 and $e_{gb,IE}$ = -0.143 for Ireland, $e_{gq,IT}$ = 0.313 and $e_{gb,IT}$ = 3.807 for Italy, $e_{gq,GR}$ = 0.404 and $e_{gb,GR}$ = 0.966 for Greece, and $e_{gq,PT}$ = 0.068 and $e_{gb,PT}$ = 0.197 for Spain. From these results it is seen that the influence of labor productivity on economic growth is in descending order as follows: Portugal > Ireland > Greece > Italy > Spain. With respect to the influence and sign of the budget deficits it is seen that the influence is in descending order as follows: (+) Italy > (+) Greece > (+) Spain > (-) Ireland > (-) Portugal.

Considering the time-varying budget deficit coefficients throughout the time period investigated, it is seen in Figures 1 to 5 that in most cases these effects look stronger in periods of economic recessions. However, given that the estimated time-varying coefficients refer to marginal rates (partial derivatives) efforts to eliminate the budget deficits in Ireland and Portugal will have a positive effect on the GDP growth rate, whilst these efforts will have a negative effect on the economic growth of Spain, Greece and Italy. On the contrary, efforts to increase labor productivity will have a positive effect on the economic growth of all five economies. This means that for enhancing economic growth, policies aiming at increasing labor productivity would be more secure than policies that are trying to decrease or eliminate budget deficits.

4. Conclusion and Summary

Considering that Troika suggested to Portugal, Ireland, Italy, Greece and Spain, i.e., five member-states of the Euro-zone, to make efforts to eliminate their budget deficits, the purpose of this paper was to investigate whether these efforts will delay the economic growth of these countries or enhance it. For this purpose a state-space equation for each country was estimated using maximum likelihood and Kalman filter. “While we argue that our results likely reflect the causality from budgetary policy to growth, at the very least they document statistical relationships between macroeconomic variables that are consistent with the theory.” (Aghion and Marinescu 2007). Our main findings can be summarized as follows:

(i) Labor productivity positively influences economic growth. Therefore, policies aiming at increasing labor productivity, such as structural reforms in the public sector, liberalization of all sectors of the economy (e.g., transport sector, energy sector), more flexible rules in the labor market (e.g., licensing procedures, regulated professions), and more innovative investments, may be applied to all five member-states under investigation. These changes will sustain or even increase the competitive position of the five member-states, as has been suggested by Troika.

(ii) Budget deficits negatively influence economic growth in Portugal and Ireland, whilst they positively influence economic growth in Italy, Greece, and Spain. Thus, economic policies aiming at decreasing or even eliminating budget deficits in Ireland and Portugal will have a positive effect on economic growth, whilst these efforts will have a negative effect on the economic growth of Spain, Greece and Italy. Consequently, the application of common budged deficit policies, such as austerity programs across the five Euro-zone member-states, may be questionable because of the different effects of these policies on the various economies.

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