

**THE ROOTS OF THE  
EUROZONE SOVEREIGN  
DEBT CRISIS: PIGS vs NON-  
PIGS**

**ABEL L. COSTA FERNANDES  
PAULO R. MOTA**

FACULDADE DE ECONOMIA, UNIVERSIDADE DO PORTO  
AND NIFIP

# The Roots of the Eurozone Sovereign Debt Crisis: PIGS *vs* Non-PIGS

Abel L. Costa Fernandes\*

Faculdade de Economia do Porto and NIFIP

Paulo R. Mota

Faculdade de Economia do Porto and NIFIP

## Abstract

The main purposes of this paper are twofold: on the one hand, to determine if there are significant differences of regime on public expenditures, total revenues and tax revenues between the so-called PIGS and the remaining Eurozone member states and, on the other hand, to uncover possible explanations for the quite different situations in which these countries find themselves nowadays. This work focus on the effect of the cyclical state of the economy, captured by the unemployment rate, and on the two fiscal rules imposed by the Maastricht Treaty on the Eurozone member states. Based on the estimated results, which distinguish between PIGS and non-PIGS countries, we come to the conclusion that the anti-cyclical reaction with respect to the unemployment rate is much stronger among non-PIGS. We also find that fiscal rules have, in general, not been obeyed by the two groups of countries. Moreover PIGS, in spite of their economic frailties, have, instead, tried to emulate the fiscal behavior of their more prosperous Eurozone partners instead of implementing more rigorous policies.

*Keywords:* european public finance; fiscal policy; fiscal rules

*JEL classification:* H2, H5, H6

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\*Corresponding author: Abel L. Costa Fernandes, Faculdade de Economia, Universidade do Porto, Rua Dr Roberto Frias, 4200-464 Porto, Portugal. E-mail: abelf@fep.up.pt. Phone: 351-225571100

# 1 Introduction

After the debacle of the financial markets occurred mostly in the USA and Western Europe during the years of 2007 and 2008, since 2009, and especially since 2010, financial markets have been highly affected by deeply felt concerns on the solvency of some European States. At the heart of this crisis of confidence on sovereign debt is the European Union (EU) and, in particular, the Eurozone due to the unsatisfactory performance of some of its member states, the so-called PIGS: Portugal, Ireland, Greece and Spain, even though with varying degrees of severity and in different stages of its development. These concerns are strong barriers to the full normalization of the workings of the financial markets worldwide, in addition to being a serious obstacle to a faster and stronger economic recovery. Besides, they have generated a good deal of stress in the cohesion of the Eurozone itself, openly revealing disparate approaches to the solution of the problem by the member states while, at the same time, leading the European Central Bank (ECB) to adopt highly controversial measures in support of the Eurosystem. One such measure is the programme to purchase public debt issued by the member states experiencing the most severe difficulties in that respect which, in fact, amounts to indirect monetization of public deficits. In short, what is being put into question is the configuration and workings of the Eurozone itself and even the survival of the common currency in the near future.

There is an abundant and diversified theoretical and empirical economic literature that attempts at explaining governments' positive fiscal behavior, dating back to the well-known Wagner's law of increasing expenditures to the

present day. In the whole, that literature emphasizes economic, institutional, demographic and political variables as the driving forces behind not only the secular growth of the public sector in modern market economies, but also of the asymmetric nature of discretionary fiscal policies over the business cycle, as well as between revenues and expenditures expected behavior throughout the cycle. Another interesting aspect analyzed by this literature, initially in the case of Latin American countries in the sixties and, more recently, among industrialized countries, is the procyclicality of those policies. However, at least to the best of our knowledge, the impact of fiscal rules, such as restraints on the public deficit, on the stock of sovereign debt and on the power to borrow as a proportion to GDP, on the dependent fiscal variables has received much less attention from the empirical literature.

This apparently widespread abstraction from the role played by fiscal policy reaction functions and their effects on key economic variables is somewhat difficult to comprehend given the familiar rules imposed by the Maastricht Treaty and by the Stability and Growth Pact on the Eurozone member states.

Given that the center of the public debt crisis is the Eurozone, the main goal of this paper is to identify significant differences of regime on public expenditures, total revenues and tax revenues between the so-called PIGS and the remaining Eurozone member states, which might offer some clues on why the former are confronted with so serious problems from which the latter are apparently exempted. The comprehensive model we rely on, besides testing for the effective implementation of fiscal rules, also incorporates variables for the economic, political, demographic, and institutional dimensions taken into account by the most significant theoretical contributions on positive public

finances.

The paper is organized as follows. Section 2 briefly reviews the underlying literature. In section 3 we refer to the model and the data set. In section 4 we discuss the estimated results, and in section 5 we draw some final conclusions.

## 2 The Determinants of Fiscal Policy

We consider the unemployment rate and trade openness in the period as the economic determinants of fiscal policy. The output gap is an alternative to the unemployment rate; however, our hypothesis is that the latter variable is not just an automatic stabilizer, like the output gap, but has the potential to enforce discretionary fiscal policies due to its greater public awareness and social and political significance to which politicians feel obliged to respond. According to the Keynesian perspective of macroeconomic stabilization, we should observe a negative relationship between the unemployment rate and tax revenues, and the inverse relationship with public expenditures. Likewise, that relationship follows from the neoclassical tax-smoothing hypothesis, provided budget imbalances are temporary, in order to minimize inter-temporal social welfare losses from taxation for a given path of government spending (Barro, 1979; Lucas and Stokey, 1983; Roubini and Sachs, 1989, among others). However, numerous empirical papers have detected procyclical fiscal policies instead; Gavin *et al.* (1996), Aizenman *et al.* (1996) and others have uncovered empirical evidence of procyclicality in Latin American countries, which they explain by access restrictions to capital markets by those countries during recessions. Talvi and Végh (2005) find that procyclicality is the

rule rather than the exception and applies to industrialized countries as well, with the possible exception of the G-7 nations. But now the explanatory hypothesis put forward is the higher tax base volatility in developing countries and the ensuing management of public revenues and expenditures to minimize welfare losses on the face of pressures from interest groups to increase spending during booms and otherwise during recessions. Close to this hypothesis is the so-called voracity effect proposed by Tornell and Lane (1999) which states that during upturns the various constituencies compete for a share in the growing tax revenues such that expenditures increase more than proportionally to income. This last line of thought introduces asymmetric behavior of discretionary fiscal policies throughout the cycle, that is, countercyclical during recessions but procyclical during growth periods; Hercowitz and Strawczynski (2004) refer to it as the cyclical ratcheting in government spending. Finally, Manasse (2006) concludes that fiscal policy is acyclical over downturns but strongly procyclical in good times.

Trade openness is a variable very often present in these models since early times. Cameron (1978) includes it as part of the international explanation of the expansion of the public sector. A first line of reasoning considers that open economies are exposed to world markets fluctuations out of their control and, therefore, are subject to increased volatility of the business cycle. A way to manage this higher risk is through increased government intervention in the economy with particular emphasis on the social sector, as pointed out by Myrdal (1960), Lindbeck (1975), Rodrik (1998) and others. Accordingly, it should be expected state expenditures to increase through subsidies to unemployed workers and to enterprises to retrain and retain workers in

bad times, and through larger public employment. However, this analysis abstracts from the implications of increased international economic integration, competition, and the progressive dismantling of tariff barriers, which tear down the effectiveness of those attempts to insulate national economies from unfavorable outside events. Therefore, these latter circumstances could reduce both revenues and public expenditures and, accordingly, change the expected signs of the coefficients. Interestingly enough, Cameron (1978) sets the transmission mechanisms of that variable in such a manner that puts into play institutional and political forces, *i.e.*, open economies possess highly concentrated industrial sectors favoring the development of strong labor unions and confederations that, in turn, provide labor and social-democratic parties their electoral bases to whose demands they must respond.

Budgetary procedures and fiscal rules aimed at constraining government behavior have been the focus of both theoretical and some empirical contributions by authors such as Hallerberg and von Hagen (1999), and Hallerberg *et al.* (2001, 2007) within the context of EMU and the Stability and Growth Pact. In what concerns procedures, they distinguish between the delegation and contract approaches implying concepts similar to the hierarchical and collegial institutions referred to by Alesina and Perotti (1996). Fiscal rules are quantitative targets for main fiscal variables. A balanced budget law is a typical example, but it is not an optimum rule. Other likely rules are the ones adopted by the Eurozone countries in relation to the general government sector and in proportion to GDP: annual budget deficit limited to 3% of GDP and debt not exceeding 60%. Indeed, if left unregulated, the common good nature of independent national fiscal policies is enhanced by

economic and monetary unions as profligate deficit spending risks to lead to monetization by the Union Central Bank, hence forcing significant and diverse costs on every other member country. However, von Hagen and Wolff (2006) provide empirical confirmation of creative account practices in the EU to circumvent that type of rules and ease fiscal deficits, namely stock-flow adjustments, whereas Milesi-Ferretti and Moriyama (2006) prove that optimal fiscal rules should incorporate creative account. Hallerberg *et al.* (2007) test a model where the dependent variable, the change in gross debt as a share of GDP, is regressed against several explanatory variables, among which we find examples of fiscal rules, such as an indicator for borrowing limits for sub-national governments and the 3% deficit to GDP. In our paper we analyze the two fiscal rules imposed by the Maastricht Treaty on the Eurozone member states, lagged one period on the grounds that information costs do not allow for within period government fiscal reactions to deviations of actual values from the targets. In so being, deviations of the stock of debt, as a proportion of GDP, from the 60% rule should have a positive association with revenues and negative with government expenditures in case this rule is effectively pursued, and the opposite otherwise. On the other hand, deviations of the fiscal surplus, again as a proportion of GDP, from -3% of the GDP, should evidence a positive relationship with expenditures and negative with revenues for us to conclude that the rule is being pursued; otherwise, if the signs are reversed, then it is because countercyclical policies are being conducted instead.

Following the tradition of the public choice literature on the median voter and interest groups (Olson, 1965; Becker, 1976; Meltzer and Richard, 1981,



and many others) we analyze the effect the following demographic and institutional variables: the fraction of elderly population, and union density. In average, members of both groups have incomes equal or lower than median income which, following Meltzer and Richard (1984), is lower than average income. These groups favor income redistribution to their benefit and vote on political parties that respond positively to them. Besides, the bias towards deficit spending is supposed to increase with the aging of the population, leading to future tax increases that affect future generations (Sussmuth and Weizsacker, 2006) as present ones lack altruism. And, as a matter of fact, in the last forty years or so the composition of government spending has evolved away from the purchase of goods and services towards unilateral transfers. The associated impact on tax revenues is much less well studied in the literature but it seems reasonable to assume that, if at all, they should increase less than proportionally to welfare state expenditures.

We consider political fragmentation as a potential driving force behind government spending. In this sense the budget is a product of the competition among different political constituencies for budgetary benefits. Kontopoulos and Perotti (1999) distinguish between political fragmentation, either the number of parties in the coalition (the legislative interpretation) or the number of spending ministers (the executive interpretation), and institutional fragmentation dealing with different budgetary procedures<sup>1</sup> and fiscal discipline rules (Alesina and Perotti, 1996; Hallerberg *et al.*, 2007). Political fragmentation transforms the budgetary process into a common good since

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<sup>1</sup>All rules dictating how budgets are prepared, approved and executed by politicians and the bureaucracy.

benefits are highly concentrated on the beneficiary interest groups whereas costs are spread all over. Higher fragmentation tends to be synonymous with government weakness and produce higher expenditure and higher deficits, as shown in the seminal paper by Roubini and Sachs (1989), Hallerberg and Strauch (2002), and others. The expected impact on tax revenues is less well established by the literature; for example, in the models developed by Weingast *et al.* (1981) the budget remains in balance implying that fragmentation acts on revenues in the same manner as it does on expenditures. However, following Poterba (1994) we might think that the ability of governments to raise taxes and cut spending decreases with fragmentation but, in the presence of various approaches to this point we come to the conclusion that, indeed, the literature does not offer unequivocal indications on the effects of fragmentation on taxation. In addition, Lane (2003) finds a positive procyclical relationship between spending and fragmentation. Alesina and Tabellini (1990) emphasize a closely related feature: whenever the winning party is randomly determined, or the party in power expects to lose the next elections, the government in office tends to increase expenditures and debt, accordingly reducing the ability of its successor to implement its own programme.

The effect of elections and the new ideological composition of the cabinet are considered to capture the possible influence of political business cycles (PBC) generated through fiscal policy. This literature dates back to Nordhaus (1975), MacRae (1977) and Hibbs (1977) who argued that governments and political parties manipulate the economy to win elections. Their arguments have given rise to the opportunistic and partisan hypothesis. Ac-

According to the former, incumbent governments inflate the economy prior to elections in order to maximize their probabilities of being re-elected, and contract them once having attained their goals, that is, during the first half of their terms in office. The second hypothesis states that macroeconomic management depends on the specific interests of their constituencies, namely the ideological tenets pursued by the government in office; in particular, left wing governments tend to pursue more inflationary policies than right wing ones because unemployment is their priority. Their hypothesis lies on the assumptions that there is a trade-off between the unemployment rate and expected inflation along the lines of a downward sloping Phillips curve, with expectations being formed adaptatively. However, in more recent times, the independence of central banks in the conduct of monetary policy has been reinforced as a key policy goal, in addition to the establishment of the ECB with responsibilities all over the Eurozone. As a result, national governments no longer control monetary policy, unless the board of the central bank is ready to accommodate the objectives of the administration. A second difficulty arises in case rational expectations prevail; if that is the case there is no way governments can exploit such a trade-off since now voters have full information and adjust instantaneously to expansionary policies. Later on, Rogoff (1990), Person and Tabellini (1990), and Lohmann (1998) redefined the assumptions of the theory assuming rational voters with imperfect information. Now, the underlying rationale is that some important characteristics of politicians, like competence, are not directly observable by voters who can only infer about them through their retrospective valuation of economic outcomes. For example, if increased public spending is evaluated as

a positive event because it generates output growth above a threshold value (Lohman, 1998), or if they succeed to raise expenditures in public goods financed by the same tax revenue (Rogoff and Sibert, 1988), or if government spending increases in immediately discernible consumption goods, though in detriment of investment (Rogoff, 1990), then incumbents are perceived as more capable than their competitors, and are re-elected. In what concerns taxes, these approaches agree that lower taxes are preferred to higher taxes. As stated by Lohmann (1998), "... an incumbent of above-average quality is more likely to survive voter scrutiny...". In these models politicians have an incentive to promote inflationary policies before elections, even though future economic effects are different.

On the other hand, enforcing transparent fiscal rules restricting fiscal deficits, public debt or both to maximum values constraints the ability of incumbents to run explicit political budget cycles (Alt and Lassen, 2006). In this case voters punish candidates who violate those rules. Instead, politicians can resort to changes in the composition of public expenditure, favoring special items such as those identified with the welfare state; in fact, higher social expenditures during electoral periods find strong support in the literature (Drazen and Eslava, 2005) and, in this sense, we would now have cycles in the budget composition of expenditures to signal competence (Schneider, 2010).

Considering the enormous diversity of the literature on this topic, plus the fact that we use aggregate data on fiscal variables and all the empirical evidence on PBC is quite mixed (Schneider, 2010, p. 128), we do not have a priori expectations on the significance and signs of the coefficients to be

estimated.

### 3 Model and Data Set

A panel data approach, controlling for countries' and time fixed effects<sup>2</sup>, is used to estimate the effects of the cyclical state of the economy and of the two fiscal rules imposed by the Maastricht Treaty on fiscal variables:

$$F_{i,t} = \alpha_i + \omega_t + \beta_1 U_{i,t} + \beta_2 (DEBT - 60\%)_{i,t-1} + \beta_3 [GGS - (-3\%)]_{i,t-1} + \gamma \mathbf{X}_{i,t} + \epsilon_{i,t} \quad (1)$$

where the fiscal dependent variable for country  $i$  at time  $t$ ,  $F_{i,t}$ , is either general government outlays, total government revenues or total tax receipts, all of them evaluated as a proportion to GDP. In fact, total tax revenues evaluated in this manner turn out to be the effective average tax rate. The paper focus on the reaction of these variables to the unemployment rate,  $U_{i,t}$ , as a proxy of the cyclical state of the economy, and on the deviation from the fiscal targets defined by the Maastricht Treaty: the deviation of government debt as a percentage of GDP,  $DEBT_{i,t}$ , to the fiscal target, 60%, and the deviation of government surplus as a percentage of GDP,  $GSS_{i,t}$ , from the fiscal target, -3%. To account for possible reverse causality running from fiscal policy to deviations from the fiscal targets we instrument the fiscal target variables with their own first lags.  $\mathbf{X}_{i,t}$  is a vector of other

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<sup>2</sup>Hausman test indicates that fixed effects specification is preferable to a random effects model.

economic, demographic, institutional and political variables viewed as control variables. It includes: the degree of openness of the economy, measured as total trade (sum of imports and exports) at current prices as a percentage of GDP,  $OPENC_{i,t}$ ; the fraction of total population whose age is at least 65 years old,  $ELDERLY_{i,t}$ ; net union membership as a proportion of wage and salary earners (trade union density),  $UDENSITY_{i,t}$ ; a dummy variable,  $ELECTIONS_{i,t}$ , that is (1) if there are elections in year  $t$ , and (0) otherwise; a variable that captures the ideological composition of the cabinet,  $GOV\_PARTY_{i,t}$ , and which assumes the values (1) hegemony of right-wing parties, (2) dominance of right-wing parties, (3) balance of power between right and left, (4) dominance of social-democratic and other left parties, (5) hegemony of social-democratic and other parties; a variable that captures the level of political fragmentation,  $GOV\_TYPE$ , and which assumes the values (1) single party majority government, (2) minimal winning coalition, (3) surplus coalition, (4) single party minority government, (5) multi party minority government, (6) caretaker government; a dummy variable that captures the new ideological composition of the cabinet,  $GOV\_NEW_{i,t}$ , and which assumes (1) for change, (0) for no change.

All the variables, except tax revenues and general government surplus, are from Comparative Political Data Set I (Armigeon *et al.*, 2010), which is a collection of political, institutional, demographic, and socio and economic annual data for 23 democratic countries for the period of 1960 to 2008. Data for tax revenues and general government surplus are from OECD Economic Outlook Statistics and Projections.

The model is estimated for the period 1970-2008 (38 years of observa-

tions), and just taking into account the 12 initial Eurozone countries<sup>3</sup> (summary statistics are in Table 1). In so being, the sample covers both prior and subsequent time periods to the actual adoption of the Euro. Indeed, considering the requisites imposed by the Treaty of Maastricht, those countries took measures to adjust their economies in preparation for the new currency with a special emphasis on those intended for nominal convergence.

To account for a different reaction of the fiscal variables to the unemployment rate and to the deviation from the fiscal targets after the adoption of the Euro a multiplicative dummy variable,  $EURO99_{i,t}$ , for each the main explanatory variables were introduced in the model. The dummy variable takes the values (0) for years before the adoption of the Euro, and (1) for years after the adoption of the Euro.

Finally, by means of a multiplicative form dummy,  $PIGS_{i,t}$ , the country sample is divided between the so-called PIGS and the remaining member states with respect to both fiscal rules under consideration, plus the unemployment rate. As stated earlier, given that PIGS have experienced seriously unbalanced public finances and face actual or market perceived insolvency crisis, this paper compares the fiscal behavior of these two groups of countries in search for an explanation for the actual diverse situations in which they find themselves in the present Eurozone predicament.

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<sup>3</sup>Finland, France, The Netherlands, Belgium, Luxembourg, Germany, Portugal, Spain, Ireland, Italy, Austria and Greece. Also, the panel is unbalanced due to missing observations.

## 4 The Estimated Results

### 4.1 *Base Model Results*

The results of the estimation for the baseline model are displayed in Tables 2, 3 and 4 - Equation (1). All the regressions are overall significant and have high explanatory power.

The first striking results to be noticed are: *a)* in general, the estimated coefficients on the government revenues and tax receipts equations are, in absolute value, smaller than those on outlays, showing that fiscal policy is more ‘potent’ on the expenditure side than on the revenue side; *b)* the asymmetry of fiscal policy is exposed by the positive signs of the highly significant estimated coefficients for the unemployment rate on expenditures and on both revenue measures, as well as for the estimated coefficients for deviations of debt stock and government surplus from their targets.

In both instances the estimated coefficients on the rate of unemployment are positive. Therefore, expenditures intended for macro-stabilization purposes, either through automatic stabilizers or discretionary policies, are anti-cyclical whereas revenues, mainly through the contribution of tax revenues, are pro-cyclical, even though with a substantially lower estimated coefficient. This result can also be inferred from Figures 1 to 3. Government expenditures are more correlated with the unemployment rate than government receipts and tax revenues. Our tentative explanation for this result, which is different from all others mentioned in the literature we know of, rests on the possible association between a progressive tax system and concentration of unemployment among lower income taxpayers. If this is the case, then higher income



groups are the ones that gain the most and lose the least, respectively during booms and recessions. This is a very significant outcome because even though budgetary policy is anti-cyclical as a whole, as conveyed by the whole set of the reported regression coefficient estimates on the unemployment rate, the anti-cyclical effectiveness of expenditures is significantly weakened by the behavior of effective tax rates and revenues. In case this tentative hypothesis is confirmed by further empirical research, we would have an additional good reason to suggest the reform of the present day tax system in order to improve its ability to pursue macroeconomic stabilization goals.

Regarding fiscal rules, deviations of the debt stock from the 60% target induce feeble expenditure adjustments, but there is no significant reaction from total and tax revenues. Let's now turn to the other fiscal rule. Deviations of the lagged one period budget surplus from the -3% target are negatively related to expenditures and positively related to total and tax revenues. These results mean that the fiscal rule was not followed; instead, anti-cyclical policies persist over time with diminishing strength, moreover supporting the estimated net effects mentioned above regarding unemployment.

Contrary to past predictions, but more in line with contemporary economic structural developments as envisaged by Vernon (1974) and others, there is an inverse and significant relationship between outlays and revenues, on one hand, and the degree of trade openness of the economies, on the other hand. Both unionization and elderly impact positively on all the dependent fiscal variables under analysis, as expected, exposing their redistributive influences. As population gets older, it becomes unsustainable to keep the

same level of social transfers and services because they require higher taxes on a shrinking working fraction of a country's population with undesirable effects on working incentives.

On the government expenditures equation political variables do not play any meaningful influence with the exception of the government type variable. Furthermore, the statistical significance of this variable persists on the total revenues equation, and with a negative sign as well. The detected negative relationship between government type and government expenditures is the reverse of what we would expect on the assumption that coalition governments are weaker than single party majority governments and, as consequence, lacking political muscle to cut on expenditures and raise taxes. However, as already noticed in the literature, it is not necessarily true that coalition governments are weaker than single party majority governments; in difficult times it is quite common the formation of coalition governments that join all major political parties to achieve unquestionable national interest outcomes (national unity governments), whereas it might happen that the authority of single party majority governments is eroded by disputes within the sustaining party, with the ensuing lack of internal cohesion. The most up to date example of what has just been said is the present day conservative-liberal coalition in the UK which is currently pursuing substantial and decisive expenditure cuts, and the previous labor government led by Mr. Gordon Brown. Moreover, the same negative relationship uncovered between government type and general government total revenues is in line with Weingast *et al.* (1981) mentioned above, according to which fragmentation acts on revenues in the same manner as it does on expenditures.

Interestingly enough, in years of elections we observe a strong negative relationship with total revenues and tax revenues, and none whatsoever with expenditures, which we interpret as evidence of the opportunistic view. As far as one can understand, this indicates that in years of elections the best strategy for governments to win re-elections is to lower taxes favoring voters in general, and conceivably tax discriminate in favor of special interest groups disguised under the mantle of a general tax reduction, rather than raising expenditures. The perception by electors with respect to tax reductions is swifter because their personnel potential gains need a shorter time lag to become effective, are more internalized and less diffused than they would be under an expenditure approach.

Ideology plays no role on the behavior of any of the dependent fiscal variables, as shown by the statistical non-significance of both government party and government new variables. We could therefore conclude that ideology has lost its appeal in the real politics of the Eurozone due to the repositioning towards the political centre by some influential European political parties, mainly the labor party in the UK under the leadership of Tony Blair, the socialist party in France under Miterrand and the German social-democrats since Willy Brandt, explained by the constraints put in place by the EU construction. Or, in alternative, along the lines proposed by Schneider (2010), their influence happened on the composition of the variables in question rather than on their amounts.

## 4.2 *The Effect of the Euro*

Since the Maastricht Treaty until the start of the recent financial crisis fiscal policy in the Eurozone has become more homogeneous. The standard deviation of government outlays, total receipts and tax revenues have shown a tendency to fall (see Figure 1 to 3). This has led to an approximation of the average level of government surplus in PIGS and non-PIGS countries especially in the years prior to this financial crisis. The standard deviation of general government surplus has indeed fallen since 1992. On the revenue side this tendency was, however, reversed since 2007. The consequence was an increase in the PIGS's average general government deficit relative to non-PIGS (see Figure 4). Part of the explanation lies on the different behavior of the unemployment rate in the two groups of countries. After a prolonged period of decrease in the standard deviation of the unemployment rate in the Eurozone, which is an indicator of more homogeneous economies, recently it has increased much more among PIGS than with non-PIGS (see Figure 4).

In a second step, and to account for a possible policy regime shift after the adoption of the Euro, we re-estimated our model differentiating between the effects of the main three variables on fiscal policy before and after 1999. The results are reported in Tables 2, 3, and 4 - Equation (2). The reaction of fiscal variables to the unemployment rate increases after 1999. That is, expenditures are more anti-cyclical, while revenues have become more pro-cyclical.

Concerning the reaction of fiscal variables to the deviations of the lagged debt stock from the 60% target, we do not find any regime shift on the

expenditure side, but there is a significant, although weak, increase on the tax revenues side.

Deviations of the lagged budget surplus from the -3% target are still negatively related to expenditures (although the coefficient is lower after 1999) and positively related to total and tax revenues, meaning that the fiscal rule is not being followed after the adoption of the EURO.

### **4.3 *PIGS vs Non-PIGS***

Figures 5 to 7 show the positions of the individual Eurozone countries concerning their relationships between GDP growth rates and the general government surplus as a proportion of GDP. Three different periods are considering for these scatter plots: *a*) the whole period of the sample; *b*) the period before the Euro, and *c*) the period after the actual adoption of the Euro.

Concerning the general government surplus variable and the whole period under consideration some facts stand-out: *i*) Greece and Portugal are very close to each other, but significantly apart from Spain and Ireland; *ii*) with the exception of Italy and Belgium, all the remaining non-PIGS are in a relatively better position than PIGS. In fact, for the whole period, Spain and Ireland are quite apart from Greece and Portugal; for roughly the same average GDP growth rate, Spain evidences a much better performance with respect to the budget balance, positioning itself in the same group as Germany, Austria, France and others. Ireland, on the other hand shows a much higher GDP growth rate than the other 3 countries of the group, but a worse performance when compared with all other countries with the exception of

Belgium, Italy, Portugal and Greece. Indeed, with GDP growth rates lower than the ones observed for PIGS, most of the non-PIGS expose a better performance concerning the budget, with special emphasis for Finland and the Luxembourg. For Portugal the Euro had a strong negative impact which is unique among PIGS: the GDP growth rate decreased dramatically in comparison to the years before the Euro, with only a slight improvement of the budget. On the contrary, there are relative improvements in the positions of Ireland and Spain. These last results show that: *a)* PIGS are not a homogeneous group of countries because Spain and Ireland clearly stand out from the rest; *b)* indeed, the present day problems of Ireland have quite different roots (the failure of the bank system) than those afflicting Portugal and Greece (government mismanagement of public finances and of the economy in general). For obvious reasons these insights tend to be confirmed on the stock of debt side.

In spite of knowing that this group of countries is not entirely homogeneous, to shed some light on present day state of affairs, we check for possible differences of regime on public expenditures, total revenues and tax revenues between PIGS and the remaining Eurozone member states. The results are in Tables 2, 3, and 4 - Equation (3).

Even though expenditures on both groups of countries respond positively to unemployment, the anti-cyclical reaction with respect to that variable is much stronger among non-PIGS, which we might interpret as an outcome from comparatively weaker public finances as well as a symptom of the PIGS related inability to collect the necessary financial resources. As a matter of fact the standard deviation of the real GDP growth rate among PIGS exceeds

that among non-PIGS in about 40%, which is an indicator of more volatility of the tax base. Figure 1 also shows that, not only the level of government expenditures is greater among non-PIGS countries as a proportion of GDP, but also more correlated with the unemployment rate.

As mentioned before, whereas the tax rate responds positively to unemployment among non-PIGS, the situation is just the opposite when it comes to PIGS. However, this response is quite small, about -0.05 pp only. Our hypothesis to explain this finding is again the association of a progressive tax system with the concentration of unemployment in lower income groups, but this time bearing in mind we are dealing with countries with lower per-capita real and nominal incomes where poorer income groups make up a larger share of total population. A final critical difference we might extract from the net-value of the estimated coefficients for the unemployment rate on expenditures and revenues is that, as a whole, stabilization policies are much more effective with non-PIGS than with PIGS. Therefore, the ability of this latter set of countries to control their economic cycles by themselves is rather weak and they mostly depend on the policies undertaken by partner countries.

Regarding fiscal rules, when we distinguish between the two sets of countries, deviations of the debt stock from the 60% target do not induce expenditure adjustments, but there is a positive reaction from tax revenues which, however, is so small that has no meaningful impact on total revenues whatsoever (see Equation (3) in Tables 1 and 3). That is, this fiscal rule is slightly obeyed on the taxation side but no effort is made by governments on the expenditure side, which is very much what one feels from empirical

observation for the period under consideration. Nonetheless, the significance of the variables (but not their signs) are reversed when we look at the whole sample, since then the adjustment is through expenditures and not through revenues. But then the estimated coefficients are so close to each other and so small on both instances, around something between -0.05 and 0.03 pp, that we would better judge them as inconclusive, *i.e.*, reasonable doubts remain about the existence of any type of adjustment whatsoever to this fiscal rule, as well as to its possible channel; the only conclusion possible is that if any adjustment takes place at all, it is extremely feeble. We find no statistically significant differences of regime among both groups of nations concerning the deviations of the debt stock from the 60% target.

In relation to the deviations of the lagged one period budget surplus from the -3% target, we find no difference of regime between PIGS and non-PIGS.

We come to the conclusion that PIGS, rather than showing more urgency than their more developed and structural stronger partner countries, have chosen instead to mimic the behavior of these rather than reinforcing their efforts.

## 5 Conclusions

The tests we have performed on the Eurozone countries, duly distinguishing between those that nowadays face seriously unbalanced public accounts and have already received official aid from the Eurozone and the IMF, and those, like Germany, that enjoy a healthy record, reveal the following main results: *a)* the asymmetry of fiscal policies due mainly to the procyclicality of total



and tax revenues and the anticyclical of government expenditures; *b*) the stronger anti-cyclical reaction of public expenditures among non-PIGS; *c*) the neglect by PIGS and non-PIGS alike of both fiscal rules inscribed in the treaty of Maastricht.

Indeed, in spite of their weaker economies, plagued by structural imbalances making them increasingly uncompetitive and, as a consequence, enjoying comparatively lower and more volatile growth rates of their real GDPs, PIGS chose to replicate the fiscal policies of their more prosperous member partners rather than adjusting in real terms. Faced with the negative external shocks arising from the financial crisis starting in 2007 and from its economic shockwaves, suddenly these countries were forced to confront themselves with the burst of their public debt burden. Before the adoption of the common currency, one of the most widely mentioned threats associated with it was the likely predisposition of individuals and families in the least developed countries of the Eurozone to emulate the economic behavioral patterns of their more affluent counterparts in the most progressive countries of the Union. It seems now that such danger also existed at the government level, openly illustrating the latent conflict between normative and positive public finance.

It is now overtly recognized some important facts about the construction of the Eurozone, mainly: *a*) its intrinsic fragility since it never satisfied the requisites of an optimum currency area; *b*) the overvaluation of some national currencies with respect to the Euro, as is the case of the Portuguese Escudo. Moreover, we could add the emphasis put on nominal convergence, as it is well exposed by the consistent abatement of the unemployment rate

volatility after the common currency was introduced, instead of real convergence, among the partner countries based on the underlying assumption of asymmetric shocks instead of government similar behavior patterns. Finally, another conclusion which is potentially important is the fiscal system now in place, considering its ability to function as an effective instrument in pursuance of macroeconomic stabilization purposes and the eventual need for its overhaul accordingly.

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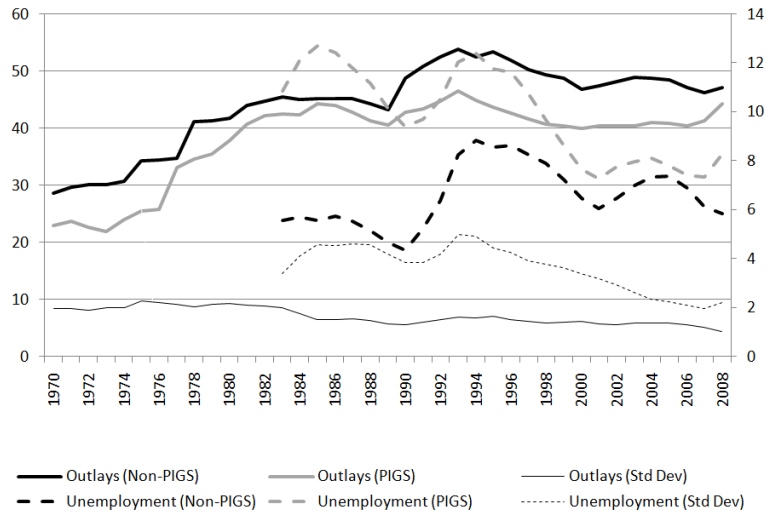


Figure 1: Cyclical Behaviour of Outlays

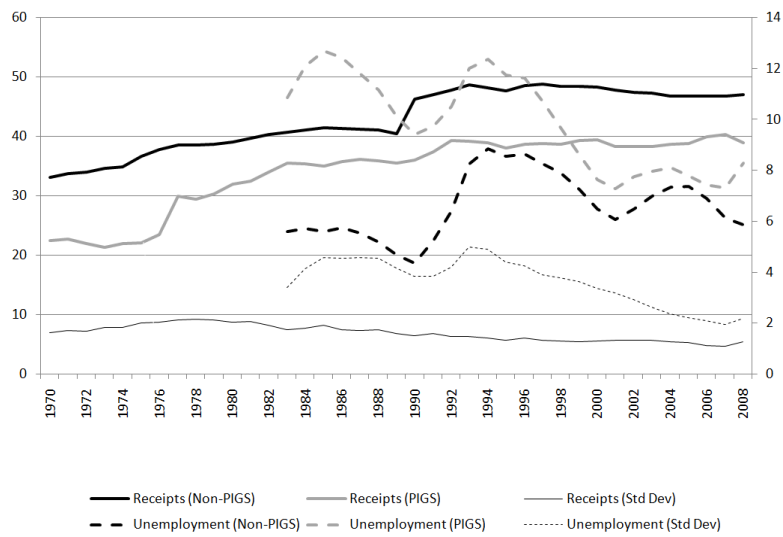


Figure 2: Cyclical Behaviour of Receipts

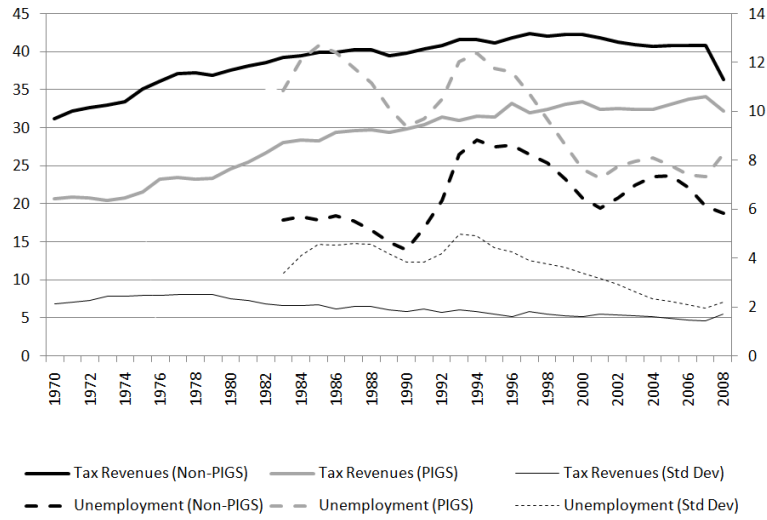


Figure 3: Cyclical Behaviour of Tax Revenues

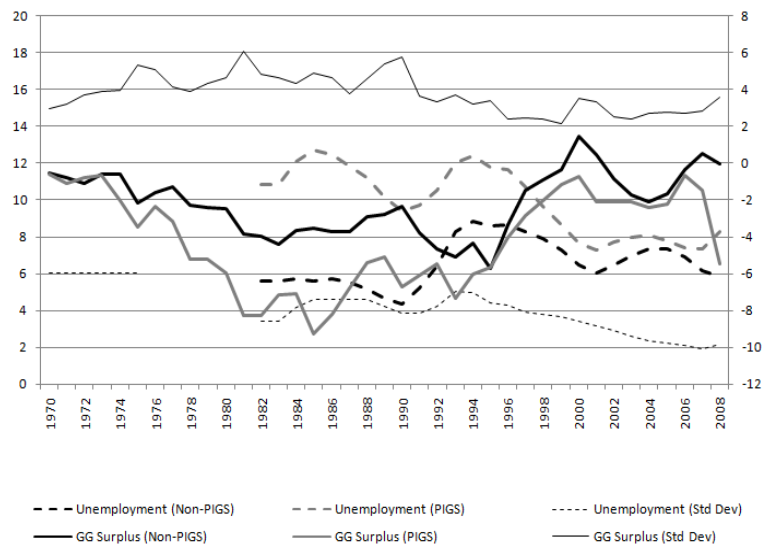


Figure 4: Cyclical Behaviour of General Government Surplus



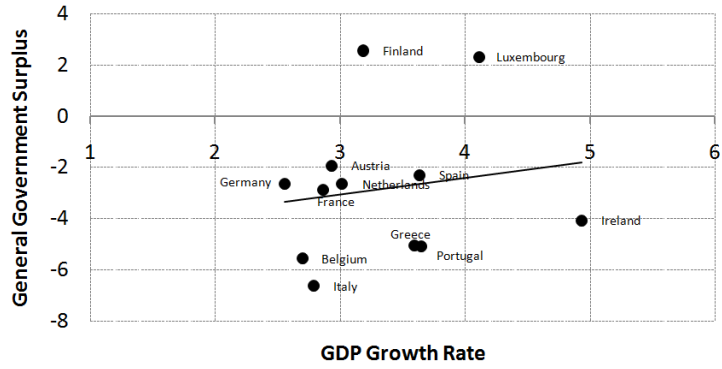


Figure 5: General Government Surplus vs GDP Growth Rates (Whole Sample Period)

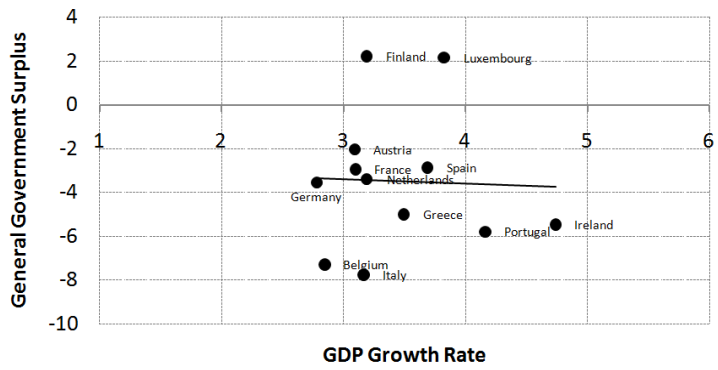


Figure 6: General Government Surplus vs GDP Growth Rates (Before the Euro)

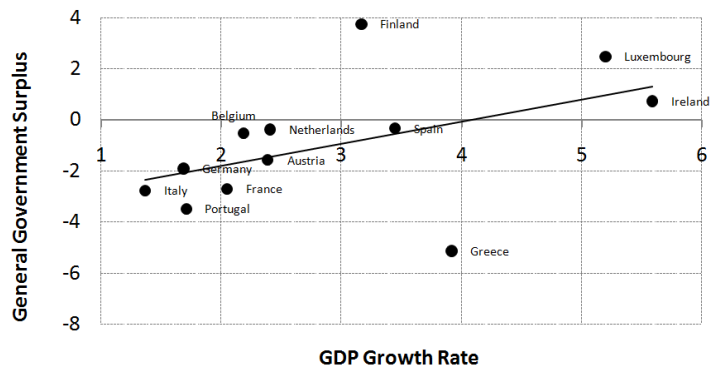


Figure 7: General Government Surplus vs GDP Growth Rates (After the Euro)

Table 1: Summary Statistics

	A	B	Fi	Fr	G	Gr	Ir	It	L	N	P	S	
<i>OUTLAYS<sub>i,t</sub></i>	Mean	50.4	52.1	46.7	51.3	46.1	38.3	43.6	46.4	39.6	51.2	41.1	37.2
	Std Dev	4.5	4.7	8.8	2.7	2.9	8.0	7.5	6.3	1.7	5.2	4.7	7.0
<i>RECEIPTS<sub>i,t</sub></i>	Mean	48.1	46.5	49.3	46.8	43.9	32.6	39.3	39.3	41.9	48.6	36.0	34.6
	Std Dev	3.2	3.1	6.2	3.6	1.6	6.2	3.2	6.5	1.6	3.6	5.7	5.7
<i>TAX_REVENUES<sub>i,t</sub></i>	Mean	39.6	41.3	39.9	40.2	35.3	25.7	31.1	34.4	34.7	40.3	26.3	26.8
	Std Dev	3.4	4.1	5.2	4.0	1.6	5.2	2.8	7.0	4.7	3.3	6.7	7.6
<i>U<sub>i,t</sub></i>	Mean	4.2	7.7	6.9	9.0	8.3	8.7	10.5	9.1	3.0	5.4	6.4	13.2
	Std Dev	0.5	2.3	4.0	1.7	1.5	1.7	5.1	1.5	1.0	2.0	1.6	3.7
<i>DEBT<sub>i,t</sub></i>	Mean	50.8	100.0	34.5	48.3	43.5	60.9	69.2	92.9	8.8	70.5	68.3	57.6
	Std Dev	19.4	28.1	20.1	17.1	17.3	40.3	25.9	28.0	2.7	13.7	4.2	11.0
<i>GGS<sub>i,t</sub></i>	Mean	-1.9	-5.6	2.6	-2.9	-2.6	-5.0	-4.1	-6.6	2.3	-2.6	-5.1	-2.3
	Std Dev	2.0	4.2	3.6	1.4	2.3	4.1	4.7	3.6	2.0	2.3	2.0	2.7
<i>OPENC<sub>i,t</sub></i>	Mean	71.7	128.3	57.9	42.6	51.0	44.4	114.0	41.7	201.9	107.3	58.2	38.7
	Std Dev	15.5	25.0	10.4	8.5	13.7	10.0	33.0	8.0	43.6	16.0	9.39	12.3
<i>UDENSITY<sub>i,t</sub></i>	Mean	49.9	50.9	67.4	14.3	30.7	32.9	53.8	39.1	45.8	29.5	34.0	16.1
	Std Dev	10.6	4.6	11.4	5.6	4.8	6.0	9.0	6.8	3.2	6.4	16.9	8.3
<i>ELDERLY<sub>i,t</sub></i>	Mean	15.0	14.9	12.6	14.3	15.6	13.9	11.1	14.7	13.4	12.2	13.7	13
	Std Dev	0.8	1.5	2.5	1.4	2.1	2.6	0.2	3.1	0.7	1.5	2.9	2.8

A-Austria; B-Belgium; Fi-Finland; Fr-France; G-Germany; Gr-Greece; Ir-Ireland; It-Italy;

L-Luxembourg; N-Netherlands; P-Portugal; S-Spain

Table 2: Fiscal Dependent Variable: General Government Outlays

Variables	(1)		(2)		(3)	
	Coefficient	t-statistic <sup>+</sup>	Coefficient	t-statistic <sup>+</sup>	Coefficient	t-statistic <sup>+</sup>
<i>Coms</i>	33.17***	4.35	33.98***	4.16	30.10***	5.41
$U_{i,t}$	0.85***	6.79	0.88***	6.14	1.22***	10.47
$U_{i,t} \times EURO99_{i,t}$	-	-	0.30***	2.95	-	-
$U_{i,t} \times PIGS_{i,t}$	-	-	-	-	-0.68***	-3.41
$(DEBT - 60\%)_{i,t-1}$	-0.05**	-2.26	-0.05**	-2.25	-0.03	-1.33
$(DEBT - 60\%)_{i,t-1} \times EURO99_{i,t}$	-	-	0.00	-0.08	-	-
$(DEBT - 60\%)_{i,t-1} \times PIGS_{i,t}$	-	-	-	-	-0.03	-1.03
$(GGS - (-3\%))_{i,t-1}$	-0.53***	-7.51	-0.55***	-6.51	-0.40***	-5.31
$(GGS - (-3\%))_{i,t-1} \times EURO99_{i,t}$	-	-	0.32**	2.09	-	-
$(GGS - (-3\%))_{i,t-1} \times PIGS_{i,t}$	-	-	-	-	-0.07	-0.52
$OPENC_{i,t}$	-0.07**	-2.17	-0.07**	-2.35	-0.09***	-3.09
$UDENSITY_{i,t}$	0.09**	2.04	0.05	1.25	0.15***	3.51
$ELDERLY_{i,t}$	0.85**	2.30	0.85*	2.00	0.95***	3.28
$ELECTIONS_{i,t}$	-0.08	-0.21	-0.15	-0.40	-0.11	-0.32
$GOV\_NEW_{i,t}$	0.41	0.96	0.60	1.37	0.37	1.06
$GOV\_PARTY_{i,t}$	-0.11	-1.01	-0.13	-1.28	0.01	0.10
$GOV\_TYPE_{i,t}$	-0.51**	-2.37	-0.55**	-2.74	-0.43**	-2.24
No. Obs. /No. Countries	233/12		233/12		233/12	
Time Fixed Effects	yes	yes	yes	yes	yes	yes
Country Fixed Effects	yes	yes	yes	yes	yes	yes
Adjusted R_squared	0.88	0.88	0.89	0.89	0.90	0.90
DW	0.78	0.78	0.80	0.80	0.87	0.87
F_statistic	31.74	31.74	31.51	31.51	36.16	36.16

\*\*\*, \*\*, and \* indicate significance at 1, 5 and 10 percent respectively  
<sup>+</sup>t-statistics based on White cross-section consistent standard errors

Table 3: Fiscal Dependent Variable: General Government Receipts

Variables	(1)		(2)		(3)	
	Coefficient	t-statistic <sup>+</sup>	Coefficient	t-statistic <sup>+</sup>	Coefficient	t-statistic <sup>+</sup>
<i>Coms</i>	29.86***	5.26	33.53***	5.86	26.41***	5.40
$U_{i,t}$	0.53***	5.59	0.51***	4.73	0.80***	7.84
$U_{i,t} \times EURO99_{i,t}$	-	-	0.25***	4.47	-	-
$U_{i,t} \times PIGS_{i,t}$	-	-	-	-	-0.44**	-2.52
$(DEBT - 60\%)_{i,t-1}$	-0.01	-0.38	-0.01	-0.41	0.01	0.80
$(DEBT - 60\%)_{i,t-1} \times EURO99_{i,t}$	-	-	0.02	1.60	-	-
$(DEBT - 60\%)_{i,t-1} \times PIGS_{i,t}$	-	-	-	-	-0.04	-1.48
$(GGS - (-3\%))_{i,t-1}$	0.17**	2.81	0.11	1.51	0.26***	3.76
$(GGS - (-3\%))_{i,t-1} \times EURO99_{i,t}$	-	-	0.28**	2.03	-	-
$(GGS - (-3\%))_{i,t-1} \times PIGS_{i,t}$	-	-	-	-	0.03	0.28
<i>OPENC</i> <sub><i>i,t</i></sub>	-0.05**	-2.45	-0.05**	-2.53	-0.08***	3.60
<i>UDENSITY</i> <sub><i>i,t</i></sub>	0.08**	2.16	0.05	1.46	0.14***	3.07
<i>ELDERLY</i> <sub><i>i,t</i></sub>	0.95***	3.10	0.73**	2.15	1.07***	3.73
<i>ELECTIONS</i> <sub><i>i,t</i></sub>	-0.65*	-1.87	-0.66**	-1.95	-0.67**	-2.50
<i>GOV_NEW</i> <sub><i>i,t</i></sub>	0.25	0.69	0.38	1.08	0.21	0.76
<i>GOV_PARTY</i> <sub><i>i,t</i></sub>	-0.03	-0.37	-0.03	-0.34	0.06	0.75
<i>GOV_TYPE</i> <sub><i>i,t</i></sub>	-0.27*	-1.83	-0.30**	-2.14	-0.22	-1.46
No. Obs. /No. Countries	233/12		233/12		233/12	
Time Fixed Effects	yes		yes		yes	
Country Fixed Effects	yes		yes		yes	
Adjusted R_squared	0.88		0.88		0.90	
DW	0.46		0.52		0.64	
F_statistic	30.93		30.49		34.62	

\*\*\*, \*\*, and \* indicate significance at 1, 5 and 10 percent respectively

+t-statistics based on White cross-section consistent standard errors

Table 4: Fiscal Dependent Variable: Tax Revenues

Variables	(1)		(2)		(3)	
	Coefficient	t-statistic <sup>+</sup>	Coefficient	t-statistic <sup>+</sup>	Coefficient	t-statistic <sup>+</sup>
<i>Cons</i>	28.19***	6.99	31.97***	7.82	26.44***	8.10
$U_{i,t}$	0.27***	3.08	0.25**	2.75	0.61***	7.36
$U_{i,t} \times EURO99_{i,t}$	-	-	0.26***	4.13	-	-
$U_{i,t} \times PIGS_{i,t}$	-	-	-	-	-0.66***	-4.23
$(DEBT - 60\%)_{i,t-1}$	0.02	1.36	0.02	1.30	0.03**	2.31
$(DEBT - 60\%)_{i,t-1} \times EURO99_{i,t}$	-	-	0.02**	1.99	-	-
$(DEBT - 60\%)_{i,t-1} \times PIGS_{i,t}$	-	-	-	-	-0.01	-0.46
$(GGS - (-3\%))_{i,t-1}$	0.093*	1.77	0.02	0.44	0.20***	3.21
$(GGS - (-3\%))_{i,t-1} \times EURO99_{i,t}$	-	-	0.34**	2.79	-	-
$(GGS - (-3\%))_{i,t-1} \times PIGS_{i,t}$	-	-	-	-	-0.03	-0.34
$OPENC_{i,t}$	-0.04**	-2.10	-0.04**	-2.31	-0.06***	-3.73
$UDENSITY_{i,t}$	0.07**	2.16	0.03	1.01	0.11***	3.20
$ELDERLY_{i,t}$	0.69***	3.01	0.48*	1.79	0.73***	3.17
$ELECTIONS_{i,t}$	-0.66**	1.77	-0.68**	-2.19	-0.68**	-2.83
$GOV\_NEW_{i,t}$	0.27	0.76	0.43	1.29	0.23	0.85
$GOV\_PARTY_{i,t}$	-0.08	-0.87	-0.08	-0.91	0.03	0.46
$GOV\_TYPE_{i,t}$	-0.2	-1.6	-0.24	-2.15	-0.16	-1.54
No. Obs. /No. Countries	233/12		233		233/12	
Time Fixed Effects	yes		yes		yes	
Country Fixed Effects	yes		yes		yes	
Adjusted R_squared	0.88		0.88		0.90	
DW	0.45		0.54		0.65	
F_statistic	29.94		30.45		36.25	

\*\*\*, \*\*, and \* indicate significance at 1, 5 and 10 percent respectively

+t-statistics based on White cross-section consistent standard errors

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Rua Dr. Roberto Frias, 4200-464 Porto | Tel. 225 571 100

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