FISCAL ACTIVISM IN EUROPEAN REGIONS: EVIDENCE ON FISCAL RULES BEFORE AND AFTER THE EURO

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Abstract
The introduction of the euro has been followed by noticeable fiscal divergence between the core and the periphery economies. This paper investigates the basic properties of fiscal policy in Europe and asks whether these properties are affected by euro membership. The empirical findings suggest that fiscal policy has been decisively countercyclical and generally sustainable. Adopting the euro raises the average country member's primary deficit by about 0.5% of GDP within a year and the effect accumulates to 1.76% of GDP ten years later, but these dynamic responses are far more pronounced in the periphery economies than in the core.

Keywords: Fiscal Rules, Euro zone, Fiscal Policy
JEL classification: E62, F45

1. Introduction

Fiscal policy has been at the heart of European economic developments since the beginning of the global financial crisis. Early on, and particularly when the limitations of monetary policy were revealed, active fiscal policy was considered to be an integral part of the solution. More recently, however, as the financial crisis gave way to the sovereign debt crisis, fiscal activism has tended to be viewed as part of the problem.

This paper asks whether fiscal policy in Europe has been stabilizing and sustainable and examines whether these properties of fiscal policy have been sensitive to euro membership.[2] Theoretically, euro members, having lost their ability to stabilize their economies with independent monetary policy, may opt to rely on more activist fiscal policy to accomplish this task. However, similar differences may also exist within the euro zone. If the loss of independent monetary policy is more costly for the countries of the "periphery" than for the "core" countries, the incentive to substitute fiscal for monetary policy should be greater for the periphery, suggesting a more activist policy in these countries.

The evidence will suggest that mechanisms like these may well be responsible for the observed *fiscal divergence* between core and periphery economies after the introduction of the euro. In particular, the data show clearly that after adopting the euro, the average primary budget balance swings from a deficit to a surplus for the core countries, but from a surplus to a deficit in the periphery.

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[2] Therefore, the emphasis here is different from that of the vast recent literature that attempts to quantify the output effects of fiscal shocks. Theoretical contributions on the fiscal multiplier include Christiano, Eichenbaum, and Rebelo (2011), Eggertsson (2010), and Woodford (2011). For empirical contributions, see Barro and Redlick (2011), Hall (2009), Mountford and Uhlig (2009), and Cogan, Cwik, Taylor, and Wieland (2010). Ramey (2011) provides an excellent survey and guide.

The two studies that are closest to the present paper are Galí and Perotti (2003) and Fatás and Mihov (2010), both of which estimate standard fiscal rules and investigate whether they have been affected by European monetary integration.[3] Galí and Perotti (2003) ask whether the Maastricht Treaty and the Stability and Growth Pact reduced the ability of EMU countries to pursue stabilizing fiscal policy. Their empirical evidence is not supportive of such an effect. Fatás and Mihov (2010) follow a similar estimation strategy and, enjoying the advantage of a longer data set, try to determine the extent to which the introduction of the euro may have changed the conduct of fiscal policy. Their estimates show no big differences between the behavior of fiscal policy in the euro area compared to that of other countries, as well as no evidence that introducing the euro leads to substantial changes.[4]

The present study adopts a similar methodological framework. It uses annual data from 1989 to 2010 for various panels of thirty European economies and estimates fiscal policy rules that measure the response of government budget (total, structural, or primary) deficits to changes in economic activity (measured by the real GDP growth rate or the output gap) and the government-debt-to-GDP ratio. It then asks how these fiscal policy rules differ between euro members and nonmembers, as well as between core and periphery euro countries, and whether adopting the euro changes an economy's fiscal rule.

The empirical findings show important similarities but also significant differences with those of the earlier literature. In particular, our findings support the following conclusions: (i) fiscal policy has been decisively countercyclical; (ii) fiscal policy has been generally sustainable; (iii) membership in the euro raises the average country member's primary budget deficit by about 0.5% of GDP on impact (within the year of adopting the common currency) but the effect accumulates to 1.76% of GDP ten years later; (iv) these dynamic responses are far more pronounced for the periphery economies than for the core ones.

The rest of the paper is organized as follows. Section 2 discusses the sources of the data and defines the variables to be used in the estimation. Section 3 outlines the estimation methodology, derives the main empirical results, and implements an interesting extension. Section 4 discusses the findings and concludes.

2. The Data

All data are obtained from the IMF's World Economic Outlook database. The full data set consists of a panel of thirty European countries over the time period 1989-2010. Table A1 in the Appendix lists the countries and classifies them in terms of a couple of widely used criteria. The most obvious distinction is between euro members and nonmembers. In addition, of interest here is the split of the twelve original euro members between "core" and "periphery" subsets.[5]

Fiscal variables include the general government's primary balance (s, expressed as a percent of Gross Domestic Product) and the general government's primary deficit (d, also expressed as a percent of GDP). Public debt is measured by the general government's gross debt (b, expressed in percent of GDP). Output growth (Δy) is measured by the growth rate of GDP in constant prices, while the output gap (gap) is expressed in percent of potential GDP.

Table 1, Panel A reports sample means of the main variables of interest over the entire period for the full set and four subsets of countries. Focusing first on the government budget balance, it is clear that euro members have run higher deficits (2.97% of GDP on average) than non-members (average of 0.19% of GDP). Within the euro, as expected, the periphery

[3] The literature on fiscal rules is also large. For a recent overview and critical discussion see Charles Wyplosz (2013).

[4] This strand of the literature is related to, but distinct from, the strand on the cyclical behavior of fiscal policy (see Lane, 2003; Frankel, Vegh and Vuletin, 2013; and Riera-Crichton, Vegh, and Vuletin, 2015). It is much more closely related to the literature on fiscal activism (see Auerbach, 2009).

[5] While this division is somewhat arbitrary, the paper follows the standard practice of assigning Greece, Ireland, Italy, Portugal, and Spain to the "periphery", and the remainder seven countries (Austria, Belgium, Finland, France, Germany, Luxembourg, and the Netherlands) to the "core".

countries have run substantially greater deficits (4.48% of GDP on average) than the core countries (1.78% of GDP).

We note, however, that these differences shrink significantly when one looks at the primary balance: the differences between euro members (0.48%) and nonmembers (0.46%), and between core (0.54%) and periphery (0.42%) are considerably smaller. Part of the reason for this different picture, is made clear by the data on government debt. As Table 1 makes clear, governments of euro members are more heavily indebted (66.99% of GDP on average) than governments of nonmembers (46.88% of GDP). Similarly, the debt of core-country governments (59.61% of GDP on average) is lower than the periphery's (76.39% of GDP). Finally, the average real growth rate of euro members over this period (2.38%) has exceeded the growth rate of nonmembers (2.09%), though not by much; while, within the euro, the periphery (2.55%) has grown a bit faster than the core (2.36%).

Figures A1 – A5 in the Appendix add a time dimension to this picture by presenting the full times series on government budget balance and government debt, both as shares of GDP, for each of the thirty economies over the 1989-2010 period. As the graphs make clear, the fiscal experiences of these countries are far from homogeneous, indeed displaying a lot of diversity that ranges from the chronic budget surpluses of Luxembourg and Norway to the consistent deficits of Greece and Italy. For the euro members, the shaded areas of Figures A1 – A5 highlight each member country's post-euro period. The goal is to make it easier to detect euro membership-related changes in fiscal behavior, in terms of either the government budget balance or government debt – however, relevant patterns do not appear to be obvious to the naked eye.

For a more focused approach to this question, Table 1, Panel B reports average primary balances over the pre- and post-euro periods for the twelve original euro members, the seven core countries, and the five periphery economies. It is interesting to note that the pre-and post-euro primary balances (0.57% and 0.43% of GDP, respectively) are not all that different for the full sample of the twelve euro members.

This, however, masks a very significant difference in fiscal behavior between the core and periphery countries. Specifically, in the core countries, the pre-euro average primary *deficit* of 0.41% swung to an average *surplus* of 1.06% after the euro; while in the periphery, the pre-euro average primary *surplus* of 1.55% changed to an average *deficit* of 0.48%.

It appears that the introduction of the euro resulted in a substantial divergence between the fiscal policies of the core and the periphery countries. This is the subject of the more rigorous econometric scrutiny of the next section.

3. Econometric Methodology and Empirical Evidence

3.1. Organizing Framework

As noted above, the introduction of the euro has been followed by noticeable fiscal divergence between the core and periphery countries. Therefore, the crucial question is not *what* happened to fiscal policy after the euro, but rather *why* it happened. To make progress in answering this question, we will follow a time series framework that distinguishes between the effects of impulses and the propagation mechanism.

To illustrate, we write a general fiscal rule in the form

$$f_{i,t} = h\left(\mathbf{z}_{i,t}\ , f_{i,t-1}\right) + e_{i,t} \qquad (1)$$

where f is the fiscal policy variable and $\mathbf{z}$ is a vector of other economic variables (to be specified below) to which fiscal policy is responding. The policy function h represents the propagation mechanism, while the innovation e represents the fiscal shocks, or impulses. Estimating equation (1) can shed light to the causes of the fiscal divergence after the introduction of the euro. In particular, it can be used to determine how much of the changes in fiscal policy are the result of the euro shock (the impulse) and how much can be attributed to differences in the structure (the propagation mechanism).

3.2. The Benchmark Model

We start with the following specification, standard in the empirical literature on fiscal rules:

$$d_{i,t} = w_i + \alpha_x x_{i,t} + \alpha_b b_{i,t-1} + \alpha_d d_{i,t-1} + e_{i,t} \qquad (2)$$

where d is the government primary deficit (as percent of GDP), x represents cyclical economic activity which is measured by real output growth ($x = \Delta y$) or by the output gap ($x = gap$), b is the gross government debt, i is indexing over countries and t over time, the w's capture country-specific effects, and the α's are parameters to be estimated.[6]

We expect the estimated parameters to have the following signs. First, $\alpha_x < 0$ because of countercyclical fiscal policy: the fiscal stance is expected to be expansionary when the economy is cyclically weaker, and contractionary when the economy appears to be overheating. Second, $\alpha_b < 0$ because of the debt-stabilization motive: holding everything else constant, debt sustainability requires a smaller budget deficit when the level of government debt is high, while on the contrary low levels of debt permit higher deficits. Finally, $\alpha_d > 0$ because of fiscal policy persistence: the effects of a fiscal policy shock will normally last more than one period.

Table 2 estimates model (2) using output growth as the cyclical economic activity proxy ($x = \Delta y$). The first column of estimates reports the results for the full sample. As expected, primary fiscal deficits are shown to be negatively related to both output growth ($\alpha_{\Delta y} = -0.499$) and the government debt ($\alpha_b = -0.023$), and exhibit strong persistence ($\alpha_d = 0.729$). Note that all three estimated coefficients are highly statistically significant, and the model accounts for a sizable 81% of the total variability in the dependent variable ($R^2 = 0.807$).

The remaining four columns ask how the fiscal rule applies to different subsets of countries. First, we distinguish between euro-members (Table 2, 3rd column of results) and nonmembers (2nd column). All estimated coefficients have the expected signs and remain statistically significant, despite the smaller numbers of observations. Comparing the estimates, there is some evidence that deficits in euro members ($\alpha_{\Delta y} = -0.523$) respond more aggressively to cyclical economic conditions than nonmembers ($\alpha_{\Delta y} = -0.485$), though the difference is slight and statistically insignificant. There is stronger evidence that nonmembers ($\alpha_b = -0.033$) have a stronger debt-stabilization motive than euro members ($\alpha_b = -0.018$), but again this difference, though proportionately larger, is not statistically significant.

Finally, Table 2 splits the euro members into Core (4th column of results) and Periphery (5th column) subsamples. Again, all estimates have the expected signs and (with the exception of α_b) remain highly statistically significant. The point estimates suggest that that deficits in core euro members ($\alpha_{\Delta y} = -0.570$) respond more aggressively to cyclical economic conditions than in peripheral members ($\alpha_{\Delta y} = -0.483$), but again the difference is statistically insignificant.

Table 3 repeats the exercise for the version of model (2) that uses the output gap as the proxy for cyclical economic activity ($x = gap$). Starting with the full sample, we note again that the model's coefficients have the expected signs, are statistically significant, and continue to explain a large part of the dependent variable's variance ($R^2 = 0.759$). Turning to the different sets of countries, the *gap* models of Table 3 imply some larger differences between subsamples, and especially between core and periphery euro members. In particular, primary deficits in core members are shown to be more countercyclical ($\alpha_{gap} = -0.831$ versus $\alpha_{gap} \approx 0$ in the periphery), more sensitive to the debt sustainability motive ($\alpha_b = -0.085$ versus $\alpha_b = -0.025$ in the periphery), and much less persistent ($\alpha_b = 0.392$ versus $\alpha_b = 0.893$ in the periphery). Overall, the *gap* regressions are less precisely estimated. This may be partly because they are based on fewer observations than the Δy regressions (the availability of the

[6] In terms of equation (1), equation (2) sets $f = d$, and $\mathbf{z} = (gap, b)'$ or $\mathbf{z} = (\Delta y, b)'$.

gap time series is more limited), but not entirely (the periphery subsamples use the same number of observations).

In general, therefore, the estimates of Tables 2 and 3 suggest that the fiscal policy rule estimated here captures the behavior of EU primary budget deficits rather well, and strongly supports our main priors: primary deficits are generally countercyclical, sensitive to the debt-stability motive, and persistent.

3.3. An Extended Model

To further investigate the possible role of euro membership in fiscal policy, we now turn to an extended specification that treats euro membership as an additional shock to the fiscal rule in the following specific way:

$$d_{i,t} = w_i + \alpha_x x_{i,t} + \alpha_b b_{i,t-1} + \alpha_d d_{i,t-1} + \theta_e euro_{i,t} + e_{i,t} \qquad (3)$$

where $euro_{i,t}$ is a binary variable that equals 1 if country i is a euro member time t, and 0 otherwise.[7]

Table 4 reports the estimated θ_e's for the full sample and various subsamples (except for the subset of euro nonmembers, for which the *euro* binary variable always equals zero), two different fiscal variables (the primary and total budget deficit), and two measures of cyclical economic activity (output growth and the output gap).

Focusing first on the full sample (Table 4, 1st column of results), the effect of euro membership on the primary deficit is seen to be positive, statistically significant, and economically sizeable, with an impact (contemporaneous, i.e. within-the-year) effect that ranges from 0.56% of GDP in the output growth specification to 1.25% of GDP in the output gap specification. The impact effects on the total budget deficit are substantially smaller (and in fact statistically insignificant in the output growth specification). Very similar results are obtained when the sample is constrained to the euro members only (Table 4, 3rd column of results).

Perhaps the most interesting findings of Table 4 are in the last two columns that compare the deficit effects of euro membership between core and periphery countries. We note first, that in terms of the primary deficit, all estimated θ_e's are positive and (with one exception) statistically significant. They are, however, substantially higher for the periphery: the impact deterioration of the primary deficit from adopting the euro for an economy in the periphery (0.9% to 1.3% of GDP) is roughly twice as large as for the core economies (0.3% to 0.7% of GDP).

The evidence becomes more complex for the total budget deficit. As expected, euro membership is causing an impact deterioration in the periphery (thought the effect is not statistically significant when output growth is used); but, somewhat surprisingly, adopting the euro in a core country causes the total deficit to improve (though not statistically significantly).[8]

The various versions of estimated model (3) can then be used to trace the effects of a euro membership shock on the deficit over time. The estimated Impulse Response Functions (IRF) are shown in Figures 3 and 4. What these dynamic responses make clear is that the impact effects are actually rather small compared to the long-run, cumulative effects implied by the estimated propagation mechanisms.

Figure 3 plots the estimated IRFs of the primary deficit to a euro membership shock in the output growth specifications, for three samples: all euro members, the core, and the periphery. Qualitatively the patterns are quite similar across the three country groups, starting with a positive impact that quickly accumulates to a much larger long-run effect. Quantitatively,

[7] For an example of a similar empirical specification (though in a different context), see Acemoglu, Naidu, Restrepo, and Robinson (2014).

[8] All in all, the primary deficit specifications are more precisely estimated, which is one more reason why we focus on those results in the rest of this section.

however, the differences are telling. Most importantly, both impact and long-run effects are substantially larger for the periphery than the core.[9] Specifically, in the core [periphery] countries, the impact (within-the-year) deterioration of the primary budget deficit by 0.3% [0.9%] of GDP rapidly accumulates to 1.3% [2.9%] of GDP ten years later.

Similar conclusions can be drawn from the IRFs implied by the output gap models, reported in Figure 4. Once again, the periphery IRF is uniformly higher than the core IRF. In particular, in the core countries the impact deterioration of the primary budget deficit by 0.7% of GDP accumulates to 1.2% of GDP ten years later, whereas in the periphery the corresponding values are 1.3% of GDP contemporaneously and (an astonishing) 8.1% of GDP ten years later.

4. Discussion and Conclusions

The introduction of the euro has been followed by noticeable fiscal divergence between the core and periphery countries. A clear example is the behavior of the primary government budget balance: in the core countries, the pre-euro average primary *deficit* of 0.41% swung to an average *surplus* of 1.06% after the euro; while in the periphery, the pre-euro average primary *surplus* of 1.55% changed to an average *deficit* of 0.48%.

This paper asks whether fiscal policy in Europe has been stabilizing and sustainable and examines whether these properties of fiscal policy are sensitive to euro membership. Using annual data from 1989 to 2010 for several panels of 30 European economies, the study employs various techniques to estimate fiscal policy rules that measure the response of government budget deficits (total, structural, or primary) to changes in economic activity (measured by the real GDP growth rate or the output gap) and the government-debt-to-GDP ratio.

The empirical findings support the following conclusions:

(i) fiscal policy has been decisively countercyclical: expansionary during economic downturns and contractionary during economic expansions;

(ii) fiscal policy has been generally sustainable: overall, primary budget deficits fall (increase) when government debt is increased (reduced) as a fraction of GDP;

(iii) membership in the euro raises the average country member's primary budget deficit by about 0.5% of GDP on impact (within the year of adopting the common currency) but the effect accumulates to 1.76% of GDP ten years later; and

(iv) these dynamic responses are far more pronounced for the periphery economies (0.9% of GDP on impact, accumulating to 2.9% of GDP ten years later) than for the core (0.3% of GDP on impact to 1.3% of GDP after ten years).

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[9] For the sample of all member economies the numbers are 0.5% of GDP on impact and 1.77% after ten years. Not surprisingly, the IRF for the full members sample is somewhere in between the higher periphery and lower core IRFs.

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Table 1: Sample Means

PANEL A

	Govt Budget Balance	Primary Balance	Govt Debt	Real GDP Growth
Full sample	–2.26%	0.25%	53.42%	2.44%
Euro NonMembers	–0.19	0.46	46.88	2.09
Euro Members	–2.97	0.48	66.99	2.38
Euro Core	–1.78	0.54	59.61	2.26
Euro Periphery	–4.48	0.42	76.39	2.55

PANEL B

Primary Balance

	12 euro members	7 core	5 periphery
Pre-euro	0.57%	–0.41%	1.55%
Post-euro	0.43%	1.06%	–0.48%

Note: Government Budget Balance, Primary Balance, and Government Debt are in percent of GDP; Real Growth Rate is annual percentage rate

Table 2: Benchmark Model (2a)

$$d_{i,t} = w_i + \alpha_{\Delta y}\Delta y_{i,t} + \alpha_b b_{i,t-1} + \alpha_d d_{i,t-1} + e_{i,t}$$

Dependent Variable: Primary budget deficit

	ALL	NonMembers	Members	Core	Periphery
$\alpha_{\Delta y}$	–0.499**	–0.485**	–0.523**	–0.570**	–0.483**
	(0.038)	(0.072)	(0.044)	(0.055)	(0.080)
α_b	–0.023**	–0.033*	–0.018*	–0.022	–0.017
	(0.008)	(0.017)	(0.009)	(0.014)	(0.012)
α_d	0.729**	0.763**	0.690**	0.726**	0.676**
	(0.029)	(0.047)	(0.039)	(0.047)	(0.072)
R^2	0.807	0.828	0.785	0.806	0.771
N	347	127	220	122	98

Note: All models estimated with country-specific fixed effects (not reported). Estimated standard errors in parentheses. **:significant at 1%, *:significant at 5%.

Table 3: Benchmark Model (2b)

$$d_{i,t} = w_i + \alpha_{gap} gap_{i,t} + \alpha_b b_{i,t-1} + \alpha_d d_{i,t-1} + e_{i,t}$$

Dependent Variable: Primary budget deficit

	ALL	NonMembers	Members	Core	Periphery
α_{gap}	–0.325**	–0.581**	–0.260**	–0.831**	–0.007
	(0.060)	(0.143)	(0.066)	(0.074)	(0.095)
α_b	–0.056**	–0.046	–0.054**	–0.085**	–0.025
	(0.010)	(0.026)	(0.011)	(0.013)	(0.015)
α_d	0.735**	0.674**	0.748**	0.392**	0.893**
	(0.038)	(0.065)	(0.050)	(0.054)	(0.075)
R^2	0.759	0.854	0.675	0.841	0.677
N	277	71	206	108	98

Note: All models estimated with country-specific fixed effects (not reported). Estimated standard errors in parentheses. **:significant at 1%, *:significant at 5%.

Table 4: Extended Model

$$d_{i,t} = w_i + \theta_e euro_{i,t} + \alpha_x x_{i,t} + \alpha_b b_{i,t-1} + \alpha_d d_{i,t-1} + u_{i,t}$$

	ALL	NonMembers	Members	Core	Periphery
A. Dependent Variable: Primary budget deficit; x = output growth					
θ_e	0.558*	0.0	0.540*	0.340	0.941**
	(0.256)		(0.234)	(0.301)	(0.385)
B. Dependent Variable: Primary budget deficit; x = output gap					
θ_e	1.247**	0.0	1.206**	0.683*	1.324**
	(0.304)		(0.297)	(0.287)	(0.467)
C. Dependent Variable: Budget deficit; x = output growth					
θ_e	0.110	0.0	0.211	–0.340	0.886
	(0.288)		(0.304)	(0.334)	(0.571)
D. Dependent Variable: Budget deficit; x = output gap					
θ_e	0.728*	0.0	0.957**	–0.507	1.956**
	(0.343)		(0.362)	(0.361)	(0.587)

Note: All models estimated with country-specific fixed effects (not reported). Estimated standard errors in parentheses. **:significant at 1%, *:significant at 5%.

Figure 1 Deficits around the year of Euro adoption

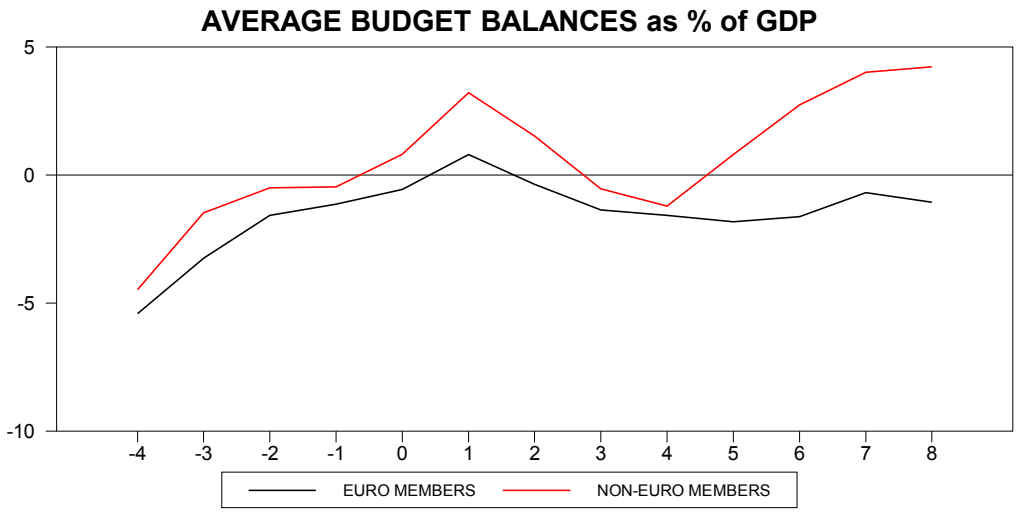


Figure 2 Deficits around the year of Euro adoption

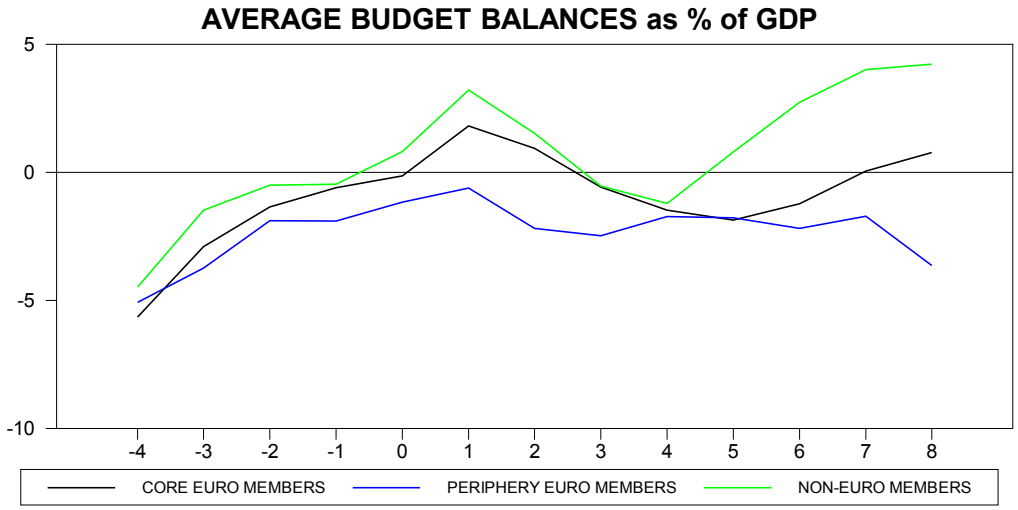


Figure 3

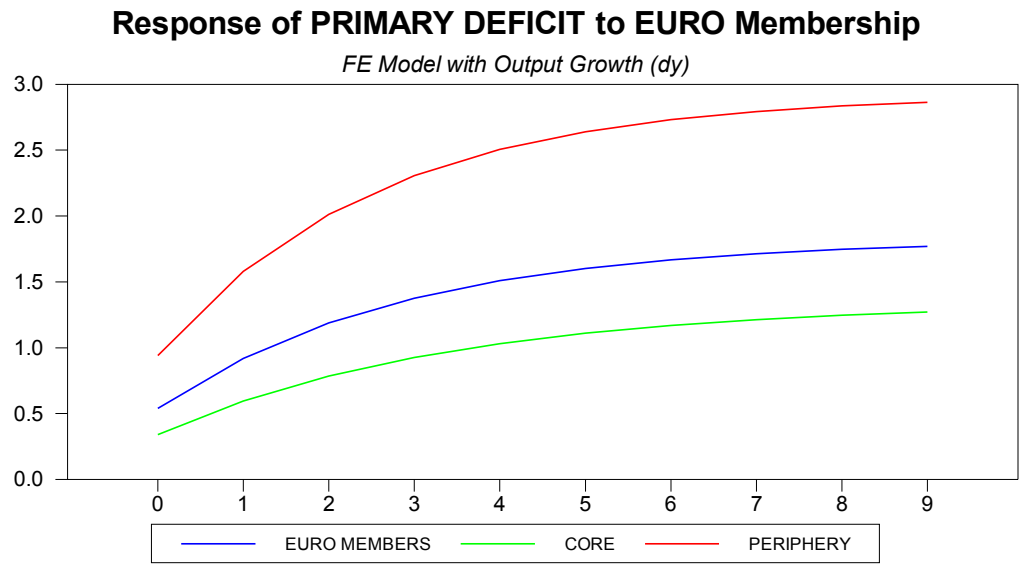
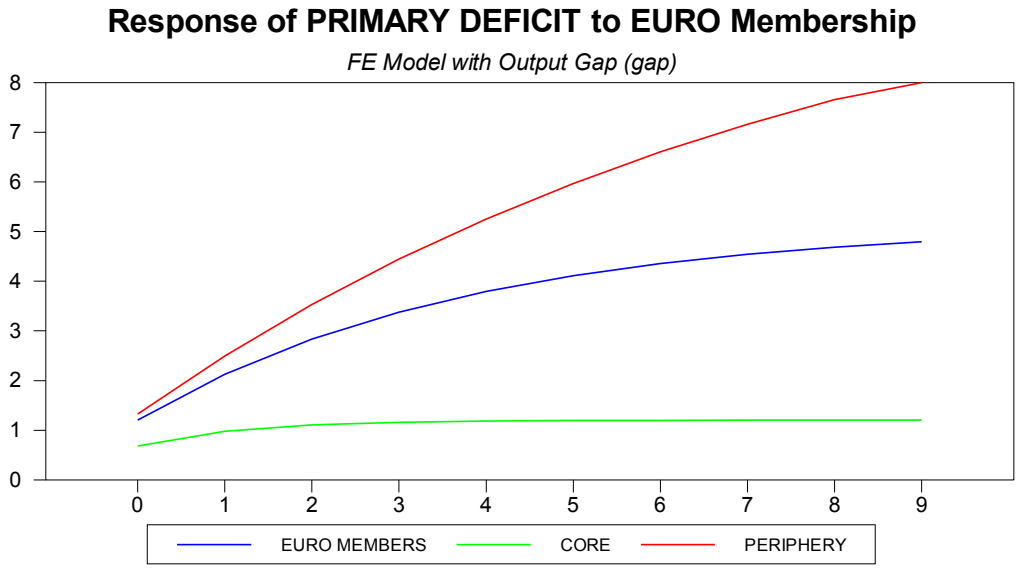


Figure 4



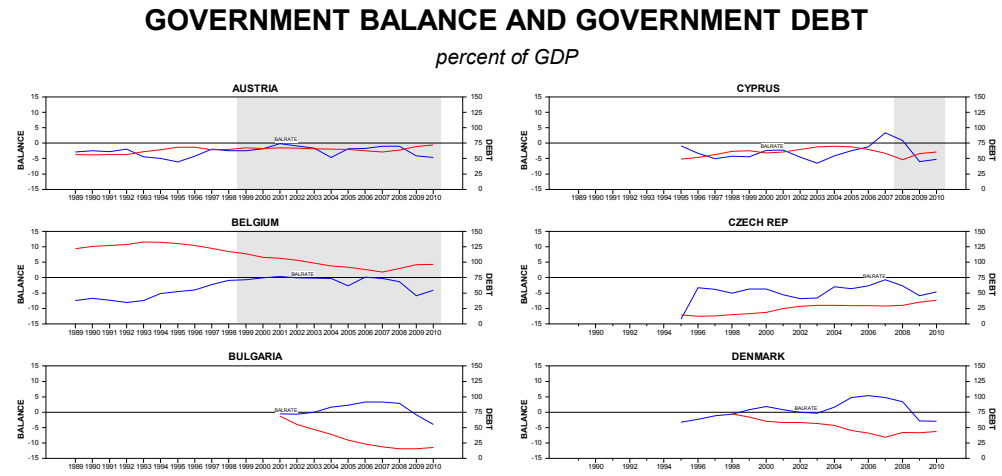
APPENDIX

Table A1: Country Classification

Original Euro Members [12]		**Newer Members**	**Non-Members** [7]
Austria ('99)		Slovenia ('07)	Czech Republic
Belgium ('99)		Cyprus ('08)	Denmark
Finland ('99)		Malta ('08)	Iceland
France ('99)	core [7]	Slovakia ('09)	Norway
Germany ('99)		Estonia ('11)	Sweden
Luxembourg ('99)		Latvia ('14)	Switzerland
Netherlands ('99)		Lithuania ('15)	UK
Greece ('01)			
Ireland ('99)		**Non-Members** (incomplete data)	
Italy ('99)	periphery [5]	Bulgaria	Poland
Portugal ('99)		Hungary	Romania
Spain ('99)			

Note: Year of euro membership in parentheses, number of countries in each subset in square brackets.

Figure A1

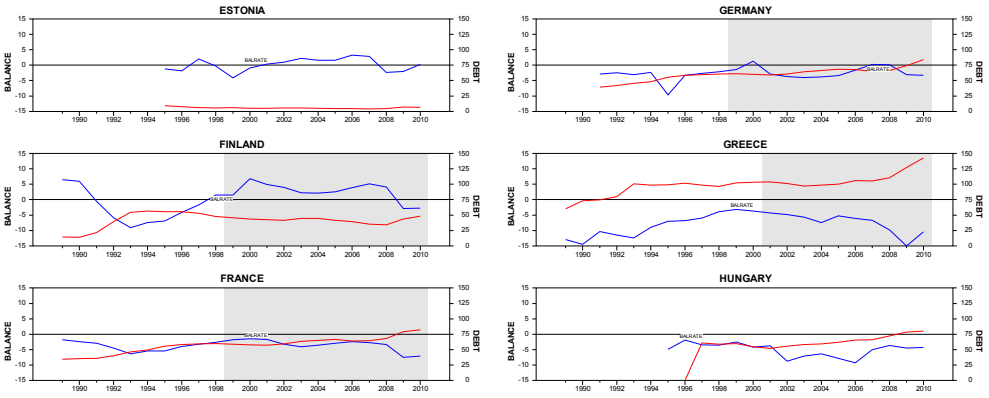


Blue line: Govt Balance (left axis); Red line: Govt Debt (right axis); Shaded area: Euro member

Figure A2

GOVERNMENT BALANCE AND GOVERNMENT DEBT

percent of GDP

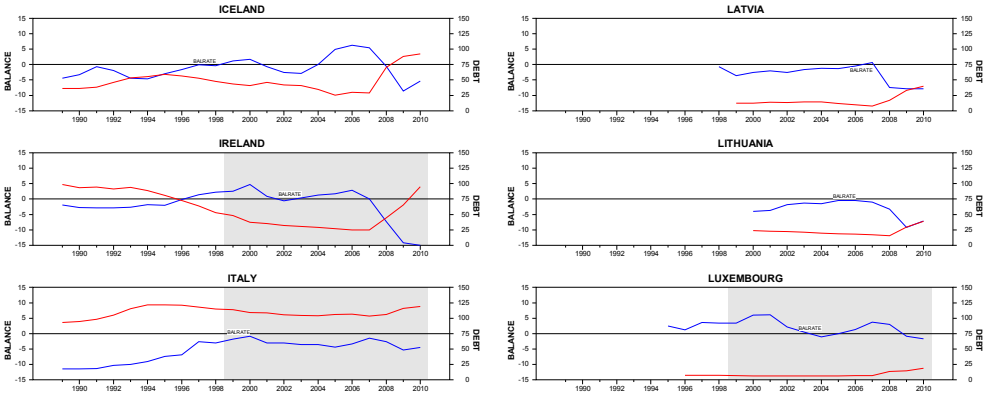


Blue line: Govt Balance (left axis); Red line: Govt Debt (right axis); Shaded area: Euro member

Figure A3

GOVERNMENT BALANCE AND GOVERNMENT DEBT

percent of GDP

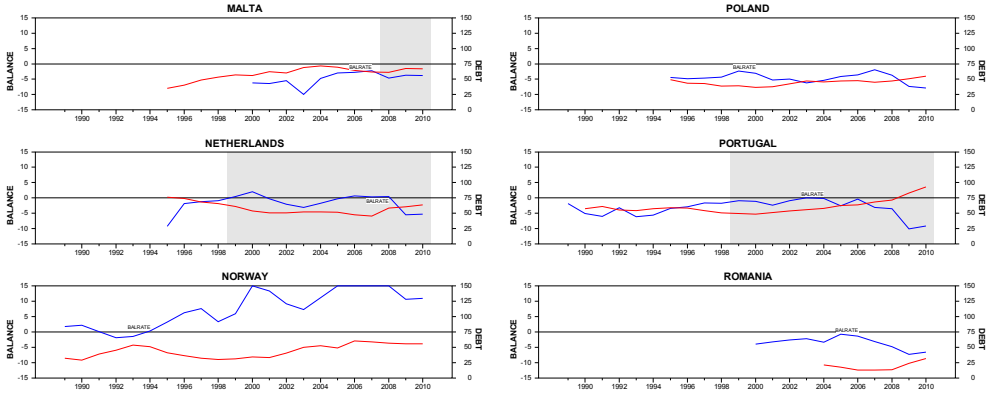


Blue line: Govt Balance (left axis); Red line: Govt Debt (right axis); Shaded area: Euro member

Figure A4

GOVERNMENT BALANCE AND GOVERNMENT DEBT

percent of GDP

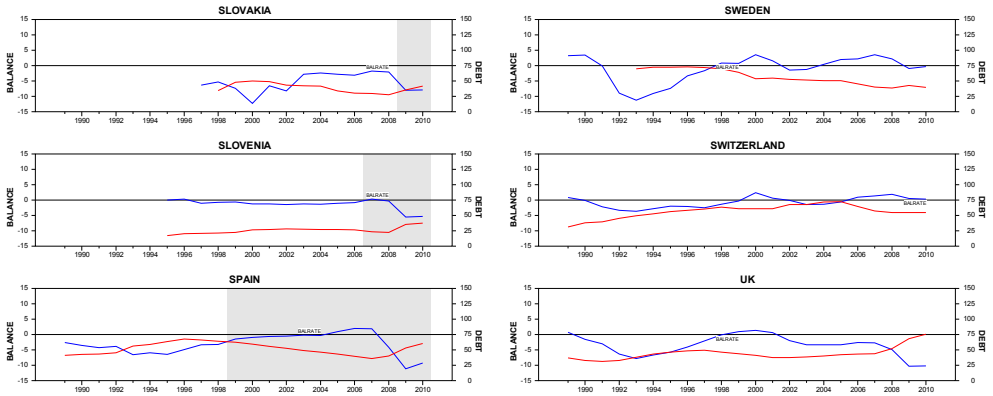


Blue line: Govt Balance (left axis); Red line: Govt Debt (right axis); Shaded area: Euro member

Figure A5

GOVERNMENT BALANCE AND GOVERNMENT DEBT

percent of GDP



Blue line: Govt Balance (left axis); Red line: Govt Debt (right axis); Shaded area: Euro member