# The Euro and Fiscal Policy*

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November 2008

**Abstract:** The paper provides and empirical characterization of fiscal policy in the euro area and in a group of twenty-two OECD economies over the period from 1970 until 2007. Using the cyclically-adjusted fiscal balance we document that policy in the euro area has been mildly pro-cyclical. The adoption of the common currency and the constraints imposed by the Stability and Growth Pact have not had a large impact on the cyclical behavior of the structural balance. In contrast, over the past ten years US fiscal policy has become highly countercyclical, which was due predominantly to discretionary changes in tax policies. However, the component of the budget due to automatic stabilizers reacts stronger in the euro-area countries than in the US. We also document the primary balance in the OECD economies is more sensitive to output growth rather than to the output gap, which calls into question the common practice of adjusting structural balances by using elasticities with respect to the output gap.

*JEL No:* E62, E65
*Keywords:* fiscal policy, automatic stabilizers, euro area

* We are indebted to Alberto Alesina and Francesco Giavazzi for very useful comments on earlier drafts of the paper, as well as to Roberto Perotti (our discussant). We are also grateful to the participants at the NBER Conference on "Europe and the Euro" in Milan, October 17-18, 2008, for their feedback on the paper.

## 1. Introduction

The creation of a single currency in Europe has been accompanied by some major changes in the institutional setting for fiscal policy. In this chapter we ask whether the new institutional framework has led to a change in the conduct of fiscal policy in the members of the euro area. The run up to the launch of the euro was already difficult and driven by the strict criteria defined by the Maastricht Treaty. Because this was a process driven by entry requirements, limited attention was paid to the long-run optimality of these conditions. With the introduction of the euro in January 1999 the issues became broader and moved from a matter of debate in the academic profession to a real-time challenge for policy-makers. Within the first years of the EMU, the framework for fiscal policy embedded in the Stability and Growth Pact has been subjected to many criticisms and has certainly failed to provide a credible framework for the conduct of fiscal policy. Although the Pact was intended to be conducive to an environment of discipline, coordination, and stability, its constraints became binding for several countries and presented challenges to macroeconomic stability and to the credibility of the Pact at the very early years of the EMU.

We review the behavior of fiscal policy after the introduction of the euro in several dimensions: procyclicality, volatility, coordination, and the role of automatic stabilizers. We characterize how the common currency and the constraints associated to the Stability and Growth Pact have shaped fiscal policy among the members of the union. The focus of the paper is not so much in providing yet another discussion on the merits and the faults of the Stability and Growth Pact and how it could be reformed. We are after characterizing the behavior of fiscal policy and understanding whether from the

perspective of the euro and monetary policy there should be any strong concerns about this behavior. Is the ECB being hurt by the behavior of fiscal policy? Does monetary policy have to compensate for the poor behavior of fiscal policy? In that sense, we see our analysis as taking place at the aggregate level more than at the national level. Nevertheless, given that there are no fiscal policy decisions taking place at the level of the monetary union, we also report results related to the behavior of fiscal policy at the national level.

Our results show that despite the significant change in the institutional setting, the cyclical behavior of fiscal policy in the euro area is mildly procyclical and has not changed much since the introduction of the new currency. In contrast, US fiscal policy has become distinctly countercyclical over the period 1999 to 2007. We also document that there has been a broad-based decline in the volatility of discretionary fiscal policy in all major economies. This decline is quite substantial for the euro area and is present in the majority of the member states. Furthermore, the discrepancy of fiscal policy across euro-area countries – measured by the dispersion of cyclically-adjusted balances – has decreased threefold since 1999.

The paper is organized as follows. In the next section we provide an assessment of the debates around fiscal policy as well as an overview of the academic literature. In Section 3 we characterize the behavior of fiscal policy at the euro level and we compare it to policy dynamics in the US and other OECD economies. Section 4 asks the question whether the correct cyclical measure is the output gap or output growth. In Section 5 we discuss coordination of fiscal policies and Section 6 concludes.

## 2. The debates on fiscal policy

The fiscal framework of the Maastricht Treaty and the introduction of the euro generated a renewed interest in fiscal policy and in the design of institutions that promote good policies. The first problem in the analysis of the recent experience in the euro area comes from the observation that it is difficult to reach a consensus on what constitutes good fiscal policy and what should be the appropriate policy stance giving economic conditions. Our approach is to focus on a set of particular behaviors of fiscal policy that have been analyzed previously in the literature and that can be linked potentially to a broad set of theoretical frameworks that study biases in fiscal policy.

We characterize the performance of fiscal policy authorities and the environment in which they operate along three main dimensions: (1) Long-term sustainability of fiscal policy; (2) The behavior of fiscal policy over the business cycle; (3) Volatility (i.e. changes in fiscal policy that are exogenous to the cycle). Implicitly, we assume that good fiscal policy must be sustainable, possibly countercyclical (but also could be acyclical) and it should not be a significant source of volatility.

We start with an overview of the debates on these topics and a brief review of the academic literature. We also offer a short discussion of the rules and institutions designed to constrain fiscal policy discretion. The analysis is framed in the context of EMU. In the next section we empirically characterize each of the fiscal policy behaviors we describe here.

*2.1. Sustainability of fiscal policy*

Long-term sustainability is central to the institutional setting of fiscal policy in EMU and one of the biggest concerns of both policy makers and academics. For emerging markets, confidence in the sustainability of government budgets has direct effects on interest rates and economic performance. Many of the deepest crises in these countries have been characterized by large increases in the risk premium or defaults on government debt.

In developed countries, the concerns started with the increase in government debt levels in the mid-70s and while these levels have stabilized or have even gone down in recent years, the uncertainty of the consequences of future demographic changes has kept the debate alive.

The difficulty of governments to produce sustainable budgetary plans became known in the academic literature as the deficit bias of governments (Persson and Svensson (1989) and Alesina and Tabellini (1990)). This deficit could be due to the common pool problem or the strategic behavior of politicians in power as they tie the hands of the new elected governments or simply a sign of short sightedness of policies (for a survey of the theoretical literature see Persson and Tabellini (2001)).

In the EMU context, the Maastricht Treaty identifies sustainability as the most important bias to deal within the context of a single-currency area. What is the economic rationale for such a concern in a monetary union? Unsustainable fiscal policy may generate excessive macroeconomic volatility, which in turn will complicate the goal of the central bank in maintaining stability within the EMU. The potential tension between fiscal and monetary authorities is present in any economy but these tensions might be

more relevant for a monetary union where fiscal policy is decentralized and coordination might be more difficult or simply not in the interest of national governments.

This view has been articulated explicitly by the ECB in their statements where the "sustainability of public finances" is seen as the main goal of the fiscal framework. And the logic is that "sound fiscal policies and a monetary policy geared to price stability are fundamental for the success of a Monetary Union. They are prerequisites for macroeconomic stability and cohesion in the euro area" (Statement of the Governing Council of the ECB, March 21 2005).

Under extreme circumstances, unsustainable fiscal policy plans can lead to a deterioration of credibility and the expectation that monetary policy will bail out governments by creating unexpected inflation. In the context of a shared currency it can be that this bias becomes stronger as governments do not internalize the consequences of their behavior on the credibility of the common currency. This could create externalities in terms of credibility or simply through interest rate channels. Although this is a possibility, the academic literature does not reach a consensus neither on whether these externalities matter nor on their size.

While sustainability relates to the long-term behavior of fiscal policy, it is connected in many ways to the discussions around business cycle stabilization policies. The lack of discipline in fiscal policy can make the macroeconomic management of the economy difficult. First, from a dynamic point of view, if governments face debt levels which are unsustainable, they will have very little room to use automatic stabilizers in bad times so all the pressure will fall on monetary policy to smooth the business cycle. As such, a combination of high deficits and procyclical fiscal stance amplifies economic

fluctuations because it reduces the effectiveness of automatic stabilizers (as argued by Melitz (2000) and Perry (2002)). Second, unsustainable plans will have to turn into sustainable ones by fiscal consolidations that are likely to have a short-term effect on the economy. Finally, high debt levels lead to higher interest rate and lower investment and growth (Mankiw and Elmendorf (1999) provide a survey of the empirical literature). Of course, a deterioration of macroeconomic performance might not have a direct impact on the conduct of monetary policy but there is, however, the argument that favorable macroeconomic conditions can make the running of monetary policy easier from a political point of view. For example, in the presence of inflationary pressures, fiscal prudence will reduce the need to increase interest rates.

There is yet another connection between sustainability and the cyclical stance of fiscal policy; one that is related to the design and implementation of budgetary plans. When it comes to the discussions on what constitutes a sustainable fiscal policy, there is the need to measure, characterize and monitor annual budgets. Because of the short-term fluctuations in budgets due to automatic stabilizers, there is the need to capture the structural balance in a given year, i.e. the budget balance adjusted for cyclical changes. Without a proper understanding of how fiscal policy behaves over the business cycle, it is impossible to provide long-term guidance to budgetary plans. This has been one of the major difficulties of the implementation of the limits on deficits and debt of the Maastricht Treaty. While they were based on simple principles of sustainability, there were endless discussions on the special circumstances that had led to balances that did not corresponded with the projected levels. The 2005 reform of the Stability and Growth Pact allowed for a more flexible interpretation of the limits that takes into account the

cyclical position of the economy. There is, however, no consensus on how this adjustment needs to be made and some see this flexibility as a relaxation of the constraints.

In summary, although the main concern of the EMU fiscal policy framework was long-term sustainability, the implementation of the rules have led to debates that have focused much more on the cyclical behavior of fiscal policy. We now turn to this debate.

### *2.2. Fiscal policy stance and management of business cycles*

Although there is a large body of theoretical literature on fiscal policy, it is difficult to provide an easy characterization of what the appropriate behavior of fiscal policy over the business cycle should be. A starting framework could be one of tax smoothing as in Barro (1979). Within that framework we can find a pattern of cyclical fluctuations of the budget as distortionary taxes are kept constant and the balance has to absorb changes in other revenues or expenditures or changes in taxes that follow the stochastic properties of the cyclical shocks (as in Chari, Christiano and Kehoe (1994)). Within the context of Keynesian models, and under the assumption that consumers are liquidity-constrained, it is expected that governments run deficits during bad times and surpluses during good times as this policy will help to stabilize the economy.

From the perspective of monetary policy, high deficits can lead to inflationary pressures and might force the ECB to keep interest rates higher than what they otherwise would be. Of course, it has to be that these high deficits take place at a time when they are not needed, which leads to the discussion on what is the appropriate stance of fiscal policy during the cycle. This is relevant for economies where fiscal and monetary

policies are decided at the same level but it might become more acute when we have a scenario of a monetary union. The decentralized nature of national budgets can make the coordination of policies more difficult.

Beyond the theoretical discussions, the issue of the cyclicality of fiscal policy has received much attention in the empirical literature. There is strong evidence that fiscal policy tends to less countercyclical than what normative models suggest. In fact, in many cases, fiscal policy is procyclical, which will exacerbate the business cycle and makes the conduct of monetary policy more difficult. Theories explaining this behavior point to increases in spending in good times that exceed the increase in tax revenues. Most Latin American economies, for example, display procyclical fiscal policy as documented in Gavin and Perotti (1997) and explained in terms of the voracity effect in Tornell and Lane (1999). The evidence for OECD and European economies is somewhat mixed. There is some evidence of procyclical behavior, but in most cases, policy is either acyclical or only slightly countercyclical. Lane (2003) and Wyplosz (2002) present evidence on the cyclical properties of fiscal policy for this group of countries. More recent studies corroborate these results (e.g. Kaminsky, Reinhardt and Vegh (2004)). Alesina, Campante and Tabellini (2007) also discuss similar evidence and present alternative political economy theories of this behavior.

When analyzing the cyclical behavior of fiscal policy it is important to understand that fiscal policy is a combination of automatic stabilizers and discretionary policy. Many of the papers above deal with discretionary changes but we cannot forget that for most countries the majority of cyclical changes in budgets are a result of automatic stabilizers.

The role of automatic stabilizers is one that has received little attention in the literature. In the case of EMU, the assumption is that they are influenced by tax codes and spending rules which have not been affected by the limits on deficits and debt. Many studies about automatic stabilizers take a public finance perspective and attempt to measure the elasticity of different fiscal components to the cycle. For example Auerbach and Feenberg (2000) study the size of the automatic stabilizers in the US to conclude that there have been quite stable despite changes in tax rates.

From a macroeconomic point of view, the effects of automatic stabilizers have been linked to the size of governments. The reason for this link is the empirical regularity presented in Gali (1994) and confirmed in Fatás and Mihov (2001) that large governments display less volatile business cycles. The logic is that the size of the governments is related to the safety network provided by governments. There is some evidence that this robust empirical regularity has gotten weaker in recent years as some governments have reduced their size, which has not resulted in a more volatile economy (see Debrun, Pisany-Ferry and Sapir (2008)). One potential explanation for the weakening of the link between government size and volatility is that recent declines in government size have happened in components that are inconsequential for macroeconomic volatility. The reduced-form nature of the empirical analysis does not provide a deeper insight into the sources of the reduced role of government size for macroeconomic stability.

*2.3. Volatility*

Fiscal policy can be a source of business cycles. When governments implement changes in fiscal policy for political reasons or, more generally, for reasons that are not driven by economic conditions, then these changes will lead to fluctuations in output and consumption. In principle, such policies may have a negative effect on the economy if they simply add volatility, which in some cases may slow down growth. The effects of fiscal policy shocks has received much attention after the work of Blanchard and Perotti (2002), Fatás and Mihov (2001) and Burnside, Eichenbaum and Fisher (2004). The origin of these changes has been associated to the political business cycle. While the evidence is mixed, there is some recent support for the presence of an electoral cycle among some economies (Drazen (2000)). The macroeconomic consequences of volatility in fiscal policy as well as its institutional origin has been documented in Fatás and Mihov (2003) and (2007) where the aggressive use of discretion in fiscal policy has been shown to generate macroeconomic volatility and lower growth.

The issue of volatility has not been a major concern in the EMU context, but we will still study it empirically to see if there is any evidence of changes in the use of discretionary fiscal policy. It is possible that the absence of national currencies has changed the incentives of governments to engage in policies that lead to a political business cycle.

*2.4. Rules, institutions and fiscal policy in the context of EMU*

The 1992 Maastricht Treaty recognized the importance of providing a framework for fiscal policy in EMU and established limits to deficits and debt in order to "avoid

excessive government deficits" (Article 104c). At the same time it defined an Excessive Deficit Procedure in case of violations. The main goal of this fiscal framework was to ensure the sustainability of public finances among members of the European Monetary Union and provide the necessary credibility to the currency. The implementation of this principle was done through a ceiling on deficits and debt as percentage of GDP. These ceilings were defined independently of the business cycle although there could be exceptional circumstances under which a country could go above those limits.

The Stability and Growth Pact (1997) developed the original ideas of the Maastricht Treaty into a set of more detailed rules and processes to ensure budget discipline and enforcement. With the Stability and Growth Pact there is a slight change in the focus and motivation of the framework. From the narrow goal of ensuring sustainability of the Maastricht Treaty, there is a broader need to "strengthen the surveillance of budgetary positions and the surveillance and coordination of economic policies". From a process point of view, the Pact included the creation of an early-warning mechanism through the preventive arm and emphasis on medium-term budgetary plans.

As a condition for entry in the single currency area, the limits on deficits and debt had a large impact on fiscal positions. The run-up to EMU saw a large decline in budget deficits among all candidates. Once EMU started there was a clear sign of fiscal fatigue that combined with the slowdown of 2002, led to several countries being above the agreed ceilings. While growth rates were low in those years, they were not low enough to qualify as a "severe economic downturn". As countries breached the limits on budget deficits it became clear that the enforcement mechanisms of the SGP were not credible.

This opened a broad debate on the merits of the current system among policy makers and academics. It is difficult to provide an exhaustive review of this literature but Buti and Sapir (2003), Gali and Perotti (2003), Fatás, von Hagen, Hughes Hallett, Strauch and Sibert (2003), Blanchard and Giavazzi (2002), Brunila, Buti and Franco (2001), Buiter and Grafe (2002) provide a review of the early years as well as proposals to modify the stability and growth pact. More recent reviews include von Hagen (2005) and Wyplosz (2007).[1] This debate led to a proposal to amend the principles of the Stability and Growth put forward by a report of the ECOFIN council in March 2005, which was later endorsed by the European Council.

The modifications introduced in 2005 allowed for more flexible interpretations of the limits on deficits, including adjustments for cyclical conditions. These changes were criticized by many, including the ECB, as an attempt to relax the constraints that governments faced and a failure to address the real problems with the current fiscal policy framework. The fact that the European economies witnessed healthy growth rates in the years that followed eased the tensions imposed by the limits on deficits. What remains unclear is how the new rules, which provide much more room for the interpretation of what constitutes an excessive deficit, will work in the years to come as the euro economies enter a recessionary environment and deficits are likely to be above the established ceiling. It is likely that we will return to the debate about the trade-off that exists between simple rules that might be seen as inappropriate or short-sighted, and the necessary flexibility to deal with idiosyncratic conditions in each country. The evolution

[1] This debate is also linked to the earlier academic literature on the effects of budget-balance constraints of US states (Alt and Lowry (1994), Poterba (1994), von Hagen (1992) and Alesina and Bayoumi, (1996). There is also a broader literature on the connection between budgetary processes and fiscal outcomes (Poterba and von Hagen, 1999).

of the Stability and Growth Pact has been towards flexibility, which has been welcomed by governments, but there are well-founded concerns that the added flexibility has relaxed the constraints of the system to a point that they have become irrelevant. This is very much linked to the academic debate about rules versus institutions. Even if we accept that there is a need to restrict governments and fiscal policy, are numerical rules the right way to do so or can we design a set of budget processes and institutions that can ensure the proper behavior of fiscal policy by using (good) judgment? Wyplosz (2003) and Fatás, von Hagen, Hughes Hallett, Strauch and Sibert (2003) argue that establishing checks on the budgetary process through independent committees might generate a superior outcome relative to simple numerical rules.

## 3. Fiscal policy in the euro area

To start the empirical assessment of fiscal policy, we first take the perspective of the ECB as it tries to manage the economic conditions of the euro area and it has to deal with the euro area fiscal policy stance. This euro fiscal policy stance is the result of a collection of decentralized national fiscal policies. Each of these policies is decided independently and they react to national economic conditions but this is, in principle, irrelevant to the conduct of monetary policy that is only concerned with the aggregate of the euro countries. For this reason we also look at data at the level of individual countries.

When we look at fiscal policy at the national level, we are interested in the same characterization of fiscal policy but the issues that arise are slightly different. National governments are worried that in the absence of monetary policy they need to be more aggressive in the use of fiscal policy as a way to smooth the business cycle. This is even

more relevant in the European context where mobility of labor, is very limited. Has this happened? Or have the constraints on deficits and debt limited the flexibility available to fiscal policy?

A second source of costs for national economies could be associated to interest rate effects of fiscal policies in other countries. As all countries share a common currency, there could be a spillover from deficits in the other members of EMU via the interest rate (or the premium associated to the euro currency, if it had an effect on the credibility of the ECB). This raises issue of coordination and the extent to which national fiscal policies take into account what is happening in other countries or at the European level.

*3.1 Sustainability of fiscal policy*

Figure 1 shows the evolution of the debt to output ratio for the euro area, the UK and the USA.[2] The evolution of this ratio for the euro countries shows an increasing trend until the mid-90s. There is a clear downward trend that starts at this point. This trend was also followed also by the US and the UK until 2001-2002. The trend in the euro area has been interpreted before as a clear sign of the discipline that the entry conditions imposed on all members.[3]

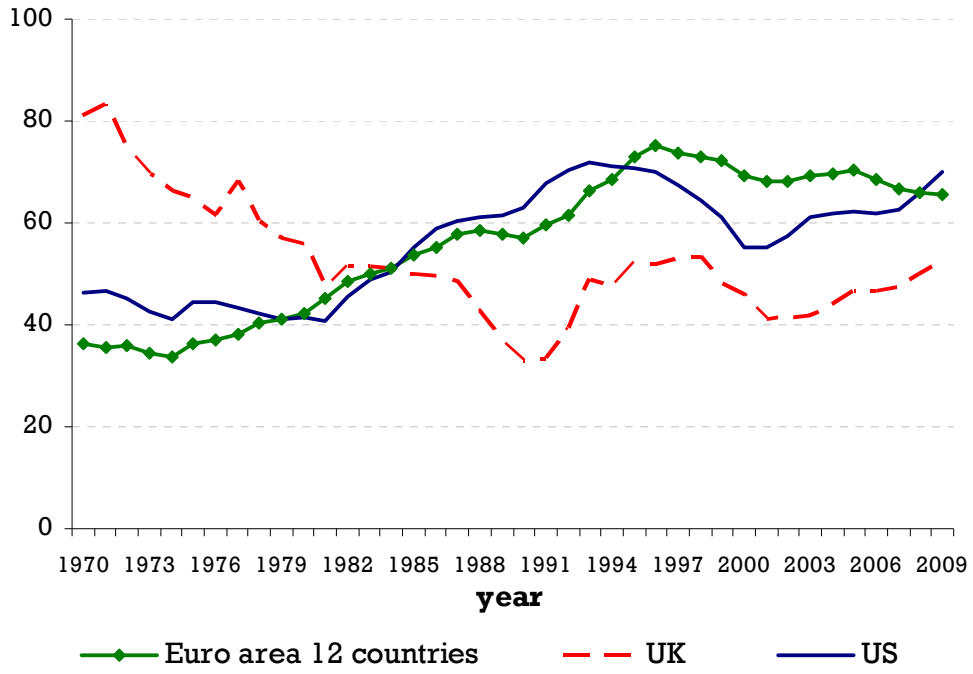
Figure 2 provides more insights on these trends by looking at structural budget balances, which are measured as the cyclically adjusted balance as a % to potential output

[2] Figure 1 reports gross government debt. It might be more appropriate to look at net liabilities, which in the case of the US stand at about 44% of GDP, while in Europe they are closer to 47%. However, although the levels are different, the dynamics of the net and gross liabilities for the three countries in the figure are very similar.

[3] Of course, one can construct explicit measures of sustainability by calculating the required tax rate, which ensures that public debt does not explode (given assumptions on future interest rates and output growth). Blanchard (1993) reviews some of the proposals for such "indicators of sustainability".

(using the OECD methodology). The decade of the 1970s as well as late 1980s and early 1990s showed high deficits for all countries in the sample. By early 1990s there was a growing need to tackle these deficits as levels of government debt increased in several countries. This effort started in the mid 1990s, which coincides with the adoption of the Maastricht Treaty among European countries. Therefore, for EMU countries, the fiscal consolidation efforts that were necessary because of the high debt levels were reinforced by the limits on budget deficits and debt that were being created as a condition for entry into the single-currency area.

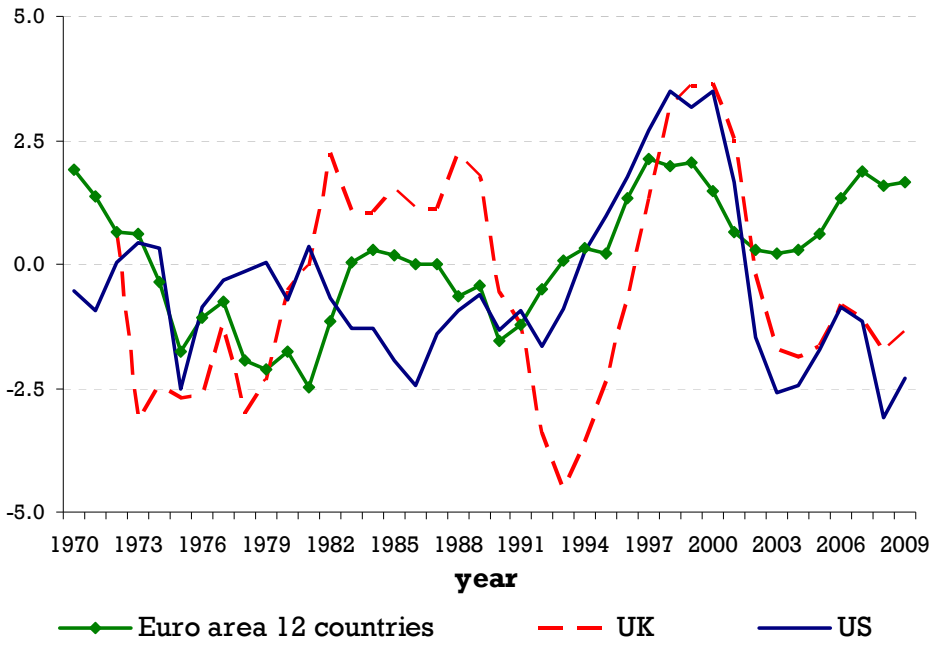
**Figure 1. Gross Government Debt (%of GDP)**




**Notes:** Data are from the OECD Economic Outlook. The series for the UK are gross government financial liabilities as a percentage of GDP. For the euro area the series are gross government financial liabilities (Maastricht definition) as percentage of GDP. Data for 2008 and 2009 are forecasts.

During this period of fiscal consolidation all major economies with the exception of Japan behaved in a very similar way: structural budgets were brought up closer to balance or even to surplus. The improvement in the Euro-area budget balance is not as large as in the case of the UK and the US but it is also true that the worsening of the balances as a result of the economic slowdown of 2001/2003 is much more pronounced in the US and the UK than in the euro area.

**Figure 2. Cyclically-adjusted budget balance as a % of potential output.**




**Notes:** Data are from the OECD Economic Outlook. Data for 2008 and 2009 are forecasts.

For the euro countries, 1997 represents an inflexion point as the adjustment of structural deficits clearly slows down right at the time when entry decisions for EMU are made. The euro structural balances improve again after 2003/2004 that coincides with a period of faster growth rates.

*3.2 The reaction of fiscal policy to macroeconomic conditions*

To be able to interpret the stance of fiscal policy we need to separate the cyclical component from the structural one. Separating the cyclical from the structural component of fiscal policy is not an easy task and it is possibly one of the most controversial issues in the academic literature. Not only there are some practical issues related to estimating the cyclical behavior of fiscal policy, because of endogeneity, but there is also the broader debate on how to characterize the business cycle itself. Before we look at the data it is good to do a simple taxonomy of the different concepts of fiscal policy we want to measure.

From a methodological point of view, we can think of fiscal policy as a combination of three elements:

1. *Automatic stabilizers*: this is the reaction of fiscal policy to business cycles and it is a result of the tax code and spending rules that link budgetary components to changes in GDP.
2. *Endogenous discretionary fiscal policy*: it includes changes in fiscal policy taken in response to changing economic conditions. These changes are discretionary in the sense that they are not coded in tax or spending laws.
3. *Exogenous discretionary fiscal policy*: here we include changes in fiscal policy that are not related to economic conditions. They can be driven by political considerations (e.g. elections) or, in the case of European countries, by the conditions set by the Maastricht Treaty.

From a conceptual point of view, it might be difficult to separate these three components. For example, governments that are trying to implement a reduction in their debt levels (as

if has been the case for most of these countries during recent years) might wait for a favorable economic environment to implement their adjustment policies. This could be seen as an endogenous change in fiscal policy but it is not directly motivated by the economic cycle.

From an econometric point of view, we can summarize the behavior of fiscal policy by using a fiscal policy rule such as

$$Bal_t = \alpha + \beta\, Cycle_t + \lambda\, Debt_{t-1} + \phi\, Bal_{t-1} + \varepsilon_t \qquad (1)$$

Where *Bal* is a measure of fiscal policy, *Cycle* is a variable that captures the state of the economy. *Debt* is gross government debt as percentage of GDP.[4] The logic of this rule is that fiscal policy is a function of the level of debt (the parameter λ can be seen as related to the indicators of sustainability) as well as a function of the current state of the cycle (captured by β). Any change in fiscal policy that is not directly related to the state of the economy or the level of debt will be part of the residual, which we will identify with exogenous discretionary fiscal policy.

There are two alternative approaches to estimating this policy rule: if fiscal policy is measured as the actual budget balance then the parameter β captures both the automatic stabilizers and the endogenous changes in discretionary fiscal policy. If instead we use a cyclically-adjusted measure of the budget balance on the left-hand side, the parameter β is reflecting the endogenous response of fiscal policy to the business cycle.

[4] The inclusion of debt in fiscal policy rules is advocated among others by Favero and Giavazzi (2007).

*3.3 The endogenous response of fiscal policy to the cycle*

We start by looking at the behavior of cyclically-adjusted balances as a measure of the discretionary response of governments to the business cycle. We use the structural balances constructed by the OECD. For details on this methodology see Girouard and Andre (2005). The drawback of this methodology is that it heavily relies on the process to extract the cyclical component out of fiscal policy that requires strong assumptions on potential output, cyclical elasticities of different fiscal variables and could potentially create a bias in the results. Blanchard (1993) and Mohr and Morris (2007) discuss the potential drawbacks of cyclically-adjusted measures of fiscal policy.[5]

From an econometric point of view there could be a problem of endogeneity when it comes to the estimation of the above policy rule. To deal with this problem we use instrumental variables as previously proposed by Gali and Perotti (2003) and Alesina, Campante, Tabellini (2007). There are cases where we discuss how the IV results relate to the OLS estimates because we feel that the OLS estimates might provide a useful perspective. The instruments for the output gap are one lag of the own output gap as well as the current value of the US output gap. For the US we use the lag of own output gap as well as the lag of the output gap of the euro area.[6]

Table 1 presents the results. The top panel shows the estimates for the euro area as well as three large countries that we use as benchmarks of comparison. The reason for

[5] Generally speaking the elasticities used to adjust the budget balance assume that the cyclical adjustment is happening mostly through revenues and not spending (see Girouard and Andre (2005)). There is however evidence that spending also adjusts to the cycle in a countercyclical manner (Melitz (2006)).

[6] Our instrumenting strategy assumes that the US gap does not react contemporaneously to developments in other countries, while output in other countries is influenced by the US output gap. Under this assumption current foreign gaps will be inappropriate instruments for the US gap and therefore we use the lagged euro gap as an additional instrument for the US reaction function.

comparing the euro area to these three countries is that they are the largest three countries with similar level of GDP per capita and therefore the closest benchmark we can find. The bottom panel shows the estimates for each of the individual EMU countries as well as seven additional economies, for the purpose of benchmarking. We present the results of estimating the equation above both by instrumental variables and OLS.

We note first that the coefficient on debt in all cases is positive, as expected. Among the first four countries, the largest coefficient is in the USA followed by the UK and the euro area. The coefficient for Japan is several times lower than the coefficients for other countries. It is hard to reach strong conclusions just from the size of this coefficient but fiscal policy in the US, UK and in the euro area seem to be more responsive to concerns of sustainability.[7] If we look at the results of the individual countries, the coefficient on debt remains positive for all countries with the exception of New Zealand (when estimated by OLS). There are large variations in this coefficient. If we ignore Luxembourg that displays a very large coefficient, we find the largest coefficients in Italy and outside of the euro area.

If we now look at the cyclical behavior of the balance (the coefficient $\beta$), comparing the OLS and IV estimates reveal that, for many of the countries, OLS estimates for the parameter are lower than the instrumental variables ones. In principle, one might have expected the opposite. The OLS estimates are likely to be biased downwards because fiscal policy expansions (decrease in the budget balance) are likely to lead to increases in output. This reverse causality is likely to lower the OLS estimates

[7] Of course, a positive coefficient may also capture that once debt becomes low, fiscal policy becomes expansionary.

of the cyclical elasticity of fiscal policy (the parameter $\beta$ above), but our results point in the opposite direction.

If we focus on the top panel of the table, and regardless of the estimation method, the euro area displays the most procyclical policy out of this group, in contrast with the US that shows acyclicality or mild counter-cyclicality. The UK results are closer to that of the euro area while Japan is closer to the US.

**[Insert Table 1 about here]**

The procyclicality of the euro area is confirmed when looking at the individual euro countries. The majority display negative coefficients, some close to -0.4 (Italy). In contrast, for the non-euro countries and with the exception of Norway, the coefficients are all positive and in some cases large (Sweden and New Zealand).

Another important insight from this table is that many of the coefficients on the output gap are not significant. This was also the case in Gali and Perotti (2003). In some sense, this could be expected given that the cyclically-adjusted balance has been constructed by purging the cyclical component from the budget balance. However, the method used is not simply an econometric one but one that relies on information on elasticities of the different fiscal components. So as long as governments engage often, and in the same direction, in fiscal policy decisions that are discretionary and related to the cycle, we should expect these coefficients to be significant. The fact that the coefficients are not significant could be an indication that this is not a behavior that we observe often. It could also be that the behavior is not consistent: maybe in some years fiscal policy behaved procyclically and in others countercyclically.

One of the questions that academics as well as policy makers are concerned about is whether policy in the euro countries has changed as a result of the introduction of the Euro. Here we need to be very careful as we will be looking at very short time series when we split the sample into two. There are two possible ways of splitting the sample: in 1992 when the Maastricht Treaty was approved and governments started dealing with limits on budget deficits, even if they were just entry conditions, and 1999 when the limits are actually enforced and there is a single monetary policy. We will show in the main text of the paper the results where we split the sample in 1999 but an appendix (available upon request) includes the results when the sample is split in 1992.

Table 2 presents the results of estimating the policy rule in Table 1 by allowing different elasticities before and after 1999.[8]

**[Insert Table 2 about here]**

Overall, there is a clear pattern of policies becoming more countercyclical after 1999. Among the top four large countries, the US shows the largest change towards countercyclical policy.[9] While in the first sample policy looks mildly procyclical, it becomes very countercyclical after 1999. In the euro area there is practically no change in the coefficient between the two periods.

If we look at the individual EMU countries, when comparing the pre- and post-1999 samples we do not see any clear direction of change – in six countries policy has become less procyclical, while in the other six countries policy has become more procyclical. Formal tests as indicated by p-values signal that there is no evidence of a statistically significant shift in the cyclicality of fiscal policy in the euro area. Of all

[8] We only include in this table the IV results. The OLS estimates show a similar pattern.
[9] For the UK the change is even more dramatic in the IV estimates, but the standard errors are very large and the OLS estimates do not confirm this large shift in policy.

countries in the sample, only in the US and in Denmark there is a statistically significant shift towards more countercyclical policy.

To some it might look like a surprise that the euro area fiscal stance is clearly procyclical given that we have seen in recent years an improvement in the budget balance during a period (post 2003) where the economy displayed increasing growth rates. It might also look that these results contradict those in other papers that show acyclical or even countercyclical fiscal policy for euro countries (for example Alesina, Campante and Tabellini (2007)). It is important to emphasize that the results in Tables 1 and 2 are based on the cyclically-adjusted budget balance, so we are ignoring automatic stabilizers.[10] Our methodology is the one used by Gali and Perotti (2003). Their results are closer to ours but, still, there is a difference when it comes to the euro area, where we are showing that fiscal policy is much more procyclical. Their estimates for the cyclicality of fiscal policy at the aggregate level are coming from estimating regression (1) for each of the countries and then aggregating the coefficients across countries. We are looking at the whole euro area without taking into account individual behavior. In addition, our sample is longer and all these factors could explain the differences in results.

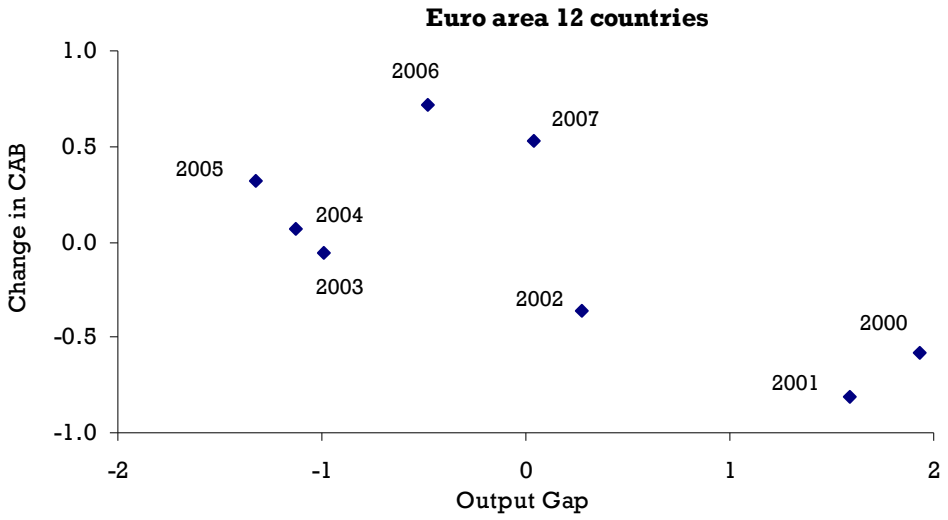
To understand better the strong procyclicality of fiscal policy of the euro area, we have plotted the change in the cyclically adjusted budget balance against the output gap for the years between 2000 and 2007. This is not exactly what is in our regression where we have the level of the balance on the left hand side but the coefficient on the lagged value is high (although lower than one) plus it is quite common in the literature to look at

[10] Table A1 in the appendix shows the results of regressing the primary balance on the output gap. In that case, we observe acyclicality (if we use IV estimates) or even countercyclicality (OLS) for the euro area, consistent with previous results in the literature.

changes in fiscal policy stance (see European Economy 2008 or Alesina, Campante, and Tabellini (2007)).

Figure 3 plots these two variables for the euro area and Figure 4 does the same thing for the USA.

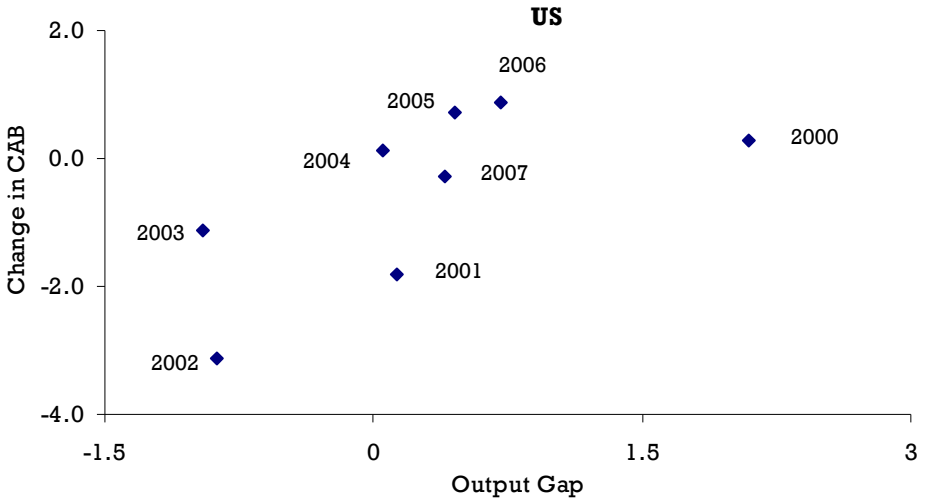
**Figure 3. Fiscal Policy Stance and the Output Gap. Euro.**




The difference between the two plots is shocking. While for the US there is a clear positive correlation signaling strong countercyclical policy, for the euro area we see exactly the opposite, a strong negative correlation. The evolution of the euro fiscal stance is marked by decreasing balances after 2000 which reflect the relaxation of fiscal policy after the launch of the Euro, a sign of fatigue after the strong pre-1998 decrease in deficits to qualify for membership to EMU. After the recession of 2002/2003 and despite the existence of a negative output gap, there is an improvement in the structural balance that represents again procyclical policy. This improvement is due to two reasons: First,

some of the euro countries were caught in levels of deficit that were too close to 3% (or above 3%) and they had little room to adjust their fiscal policies. In addition, and this is especially true in 2005, tax revenues increased faster than what many governments expected. One interpretation is that the tax elasticities were larger than normal. Some of this could be due to composition effects such as an increase in profits as a share of GDP during these years (see European Economy, 2008). These increases in revenues and elasticities were assumed to be permanent by governments and led to increases in spending or decrease in taxes that in the years that followed (2006 and 2007) led to a structural balance that remained too low despite the improvement in the cyclical condition of the economy.

**Figure 4. Fiscal Policy Stance and the Output Gap. USA.**



This reading of the behavior of fiscal policy during these eight years reveals that some of it is due to special circumstances (such as the effects of the launch of the new currency) but it is also difficult to avoid a sense that the fiscal policy framework did not work as expected and it is likely that we will see similar behavior in the future.

*3.4 Digging Deeper: Spending and taxes*

To understand the source of changes in policy elasticities, we now look at the behavior of cyclically-adjusted spending and taxes. Tables 3 and 4 replicate the results of Table 2 but where the dependent variable is either the cyclically-adjusted spending or taxes.

**[Insert Table 3 about here]**

**[Insert Table 4 about here]**

In the euro area, spending has become more procyclical while taxes have become more countercyclical. The same is true for the US and Japan.[11] Consistent with previous claims that procyclicality is driven by spending (Gavin and Perotti, 1997, and Tornell and Lane, 1999), we find that in most countries spending is pro-cyclical. Only Finland and France have changed their policies towards more counter-cyclicality in the past ten years, as evidenced by the p-value of the test for the equality of the coefficients before and after 1999.

Tax revenues in some countries have also become or have remained pro-cyclical. However for the euro area, Japan, UK and US tax revenues signal countercyclical policy stance in recent years. The move is particularly pronounced in the case of the US, where several expansionary tax packages introduced in the beginning of 2000s coincided

[11] For the UK, as in Table 2, we see a large change towards countercyclicality in both taxes and spending. But the large coefficients and standard errors together with the fact that the OLS results produce very different results makes the interpretation of these changes very difficult.

(deliberately or not) with a negative output gap in the US economy. From Tables 3 and 4 we can conclude that the increase in counter-cyclicality in the US over the past ten years is coming from the revenue side rather than from the spending side.

It is also possible that the changes in the reaction of cyclically-adjusted tax receipts over the past ten years in some countries signal that the elasticities used in adjusting budgetary variables have changed. Indeed, recently the European Commission has started paying special attention to time-varying elasticities as documented in European Economy (2008).

*3.5 Automatic stabilizers*

We now look at the automatic stabilizers component of fiscal policy. In Table 5 we rerun the regression above by using as dependent variable the component of fiscal policy that is linked to automatic stabilizers. This is measured as the difference between the actual and the cyclically-adjusted budget deficit. The regressions are estimated by OLS as they recover the log-linear relationship between the gap and automatic stabilizers used by the OECD in the process of adjusting budget to automatic changes in revenues and spending.

**[Insert Table 5 about here]**

This exercise produces very different results. First of all, the coefficient on the cycle now becomes clearly significant, as one would expect. In addition, the coefficients for the euro area now show clearly the countercyclical nature of fiscal policy. When comparing the euro area with the US, we see that the size of the coefficient, in absolute value, is higher for the euro area. One potential reading of this comparison is that European countries have stronger automatic stabilizers built in and they have less need to use countercyclical

discretionary measures. This is consistent with the fact that European governments have larger governments and that the size of governments have been associated to the significance of automatic stabilizers. (Gali (1994) and Fatás and Mihov (2001).

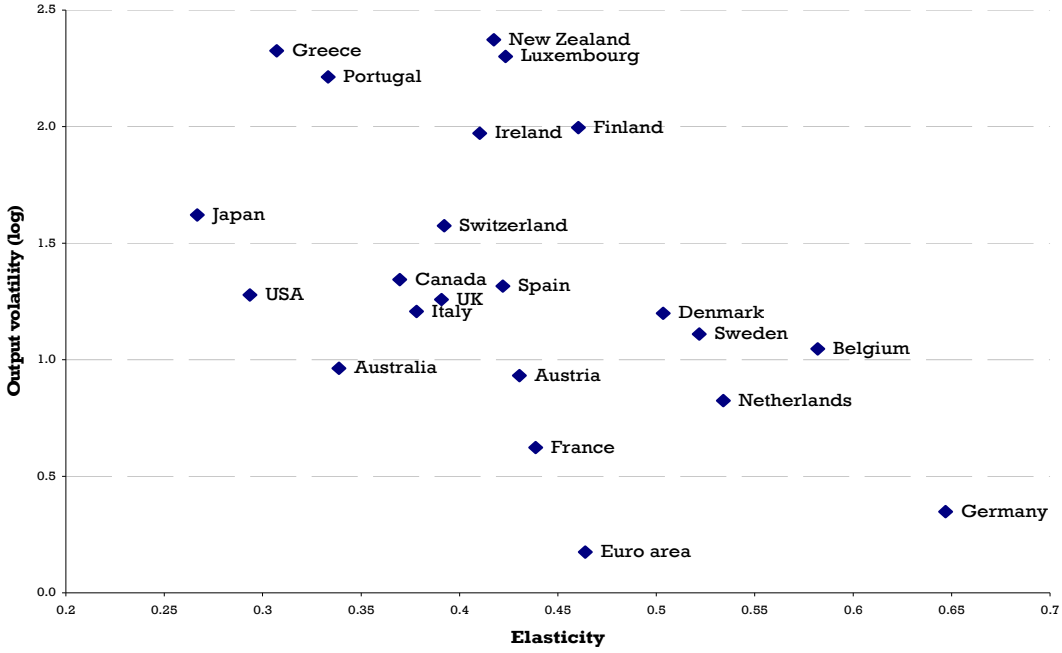
The coefficients on the gap are closely related to the elasticities used by the OECD to derive the cyclically adjusted budget balance. The OLS regression should uncover the weighted average of all elasticities (direct taxes, indirect taxes, social security payments, etc.) with the weights being given by the significance of each category in the overall budget. Since the OECD uses time-invariant elasticities, there is no point in searching for time-variation in these coefficients. The $R^2$ also shows that the errors in this estimation are quite small, which implies that indeed this manipulation uncovers relatively well a weighted-average estimate of the tax and spending elasticities used by the OECD.

The results at the national level confirm the ones for the euro area. Coefficients are positive and highly significant. Coefficients in the euro area vary from a low 0.3 (Greece) to a high of 0.65 (Germany), while in the US and the UK these coefficients are 0.29 and 0.39 respectively. Thus in the euro area the increase of the gap by 1% generates a budget surplus of about 0.46%, while in the US, the surplus goes up only by 0.29%.

One question that emerges from this discussion is whether indeed automatic stabilizers lead to lower output volatility. In Figure 5 we use the elasticities reported in Table 5 and we plot them against output volatility (in logarithm). The correlation is quite clear – countries like Germany, the Netherlands and Belgium with high elasticity of the budget with respect to the output gap exhibit low levels of output volatility. The relationship between elasticities and volatility is statistically significant with a slope

estimate of -3.3. This implies that an increase in elasticity by 0.1 leads to a reduction in output volatility by about 30%.

**Figure 5. Output volatility and automatic stabilizers**




As we mentioned above, there is no time-variation in these elasticities as they assumed to be constant in the construction of the cyclically-adjusted balance. At the same time recent research has shown that the empirical relationship between government size and the volatility of GDP seems to have become weaker (as documented in Debrun, Pisany-Ferry and Sapir, 2008). The fact that the relationship has become weaker is an indication that there have been changes in the effectiveness of automatic stabilizers that have also weakened the link between the size of the government and their smoothing effect. Given the close link between government size and automatic stabilizers, it seems important to

review the assumption of time-invariant elasticities. If one finds that elasticities have changed, then researchers will be able to construct better measures of the structural balance. If on the other hand it turns out that elasticities have not changed, then the link between government size and stabilization has become indeed weaker, which will lead to review of the desirability of having large governments. Larger governments, as much as they might be able to provide a cushion to business cycle fluctuations can be associated with crowding out and lower growth.

*3.6 The use of (exogenous) discretionary fiscal policy*

To establish whether exogenous discretionary policy has become more aggressive since 1999, we calculate the volatility of the residuals from equation 1. Table 7 compares the volatility of discretionary policy before and after EMU as well as with US, UK and Japan. We show volatilities calculated using a fiscal policy rule with a break in 1999.

**[Insert Table 6 about here]**

What is evident from the above numbers is that the euro area has the lowest standard deviation of the residual, so the size and frequency of fiscal policy exogenous "shocks" is much smaller than for the other countries. We also see a decrease in the volatility over time. The fact that the volatility is lower for the euro area should not be a surprise as this is an aggregate of national fiscal policies and it is difficult to think about coordinated changes in fiscal policy. It might be that we observe such changes of policies at the national level but they are not synchronized and therefore vanish when we aggregate all the countries. However, and as we have seen in the previous section, we do observe some significant changes in fiscal policy at the euro level. So one potential reading of these

results is that European countries are less willing to engage in discretionary changes in fiscal policy. It is possible that this decline in aggressiveness is due to the increased monitoring of national fiscal policies by the European Commission. On the margin, changing fiscal stance for reasons unrelated to the state of cycle has become more difficult as any change is carefully scrutinized by the Commission. Potentially this is only a partial explanation, as the volatility in the US has declined even faster than in the euro area.

When we look at individual countries, most euro countries display low volatility of exogenous discretionary policy, which is consistent with what we found for the aggregate of the euro countries. We also see that this volatility has decreased in the second half of the sample for all countries with the exception of Austria, Ireland, and Luxembourg. Outside of the EU-15, only Canada and the US show substantial reduction in policy volatility.

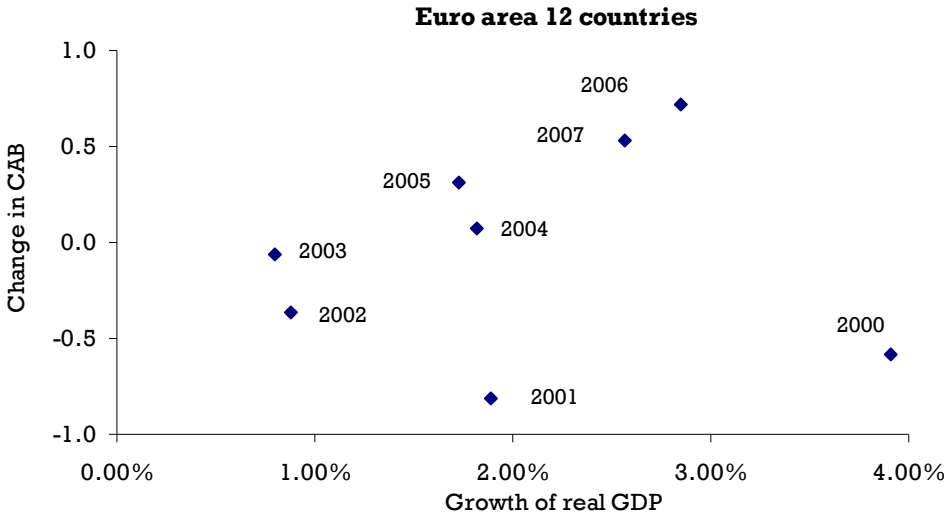
**4. Does fiscal policy react to output growth or to the output gap?**

Both in the construction of the cyclically adjusted balance, as well as in the estimation reported above, there is an assumption that fiscal policy reacts to the output gap. There are two issues: First, the reported gap might be a noisy and biased estimate of the actual gap. Second, fiscal authorities might be more concerned with growth rather than the gap.

We can illustrate the difficulty in interpreting regression results by redoing Figures 3 and 4 (euro area and US correlation between cyclically adjusted balances and the cycle) by using the output growth rate instead of the gap as a measure of the cyclical position of the economy. Figures 6 and 7 plot the change in the structural balance against

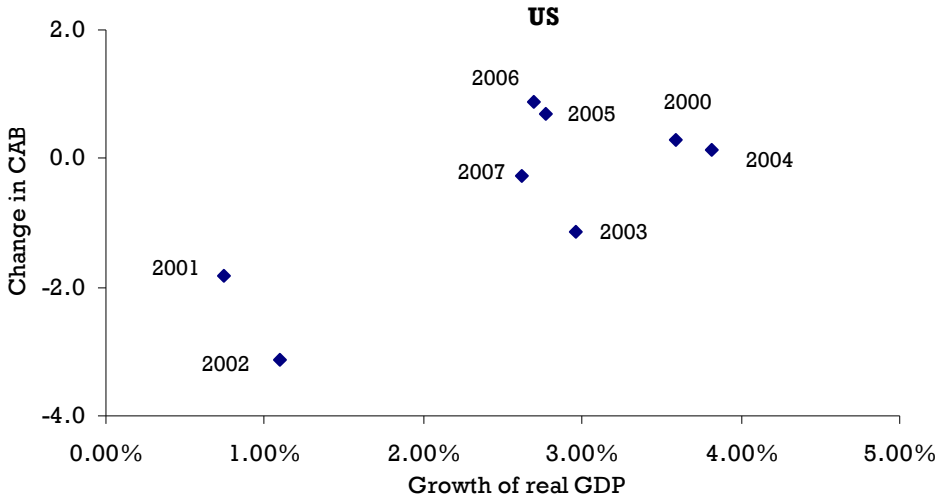
real growth for the euro area and the US. It is interesting that while for the US the picture looks very similar to the previous plot, for the euro area, we now see a much less clear picture. While the years 2000-2001 show procyclical fiscal policy, the years that follow 2002-2007 we see a positive slope, signaling acyclical or countercyclical policy. This is very different from what we saw in Figure 3, using the output gap, where Euro fiscal policy was clearly procyclical.

**Figure 6. Fiscal Policy Stance and Output Growth. Euro Area.**




The comparison between Figure 3 and Figure 6 opens the door for a different interpretation of our results. There is still no doubt that US fiscal policy is more countercyclical (and in a consistent manner) than the euro one. But whether the euro fiscal policy has been countercyclical or procyclical (or has switched from one to the other) remains an open question. The European Commission uses the output gap as the cyclical indicator to assess the stance of fiscal policy, but it might be that politicians care more about growth and react to the output growth rate.

**Figure 7. Fiscal Policy Stance and Output Growth. USA.**




There is even a deeper issue: Current practice in removing the cyclical component of the budget balance uses as a starting point the automatic reaction of fiscal variables to the output gap. That is the case for the measures we have used in this paper and produced by the OECD or the structural balance used by the European Commission. What if in fact tax revenues react more closely to the growth rate of output rather than to the gap? If this is the case, then many of the results in the literature have to be reinterpreted. To evaluate this possibility, we run a "race" between the gap and output growth. In Table 7 our dependent variable is the primary balance as percent of GDP, while the key regressors are the growth rate of real GDP and the output gap.

**[Insert Table 7 about here]**

The results are quite interesting. With the exception of Denmark and Sweden, in all countries where we have significant coefficients the key variable is output growth and not the output gap. Importantly, in the euro area the gap enters with a negative, albeit

insignificant, coefficient (implying procyclicality), while the growth rate enters with a significant positive coefficient (counter-cyclicality). The estimates imply that the primary balance – which includes both automatic stabilizers and structural balances – reacts more readily to output growth rather than to the output gap. At this point, the only thing that we can do is to raise a warning flag. To re-estimate the results in the previous tables we need first to decompose the balance into cyclical and structural components by using elasticities with respect to output growth and not the output gap. Furthermore, it is quite conceivable that certain fiscal variables respond to the gap (e.g. unemployment benefits), while others respond to the growth rate (tax revenues). And although this task lies beyond the scope of the paper, Table 7 is still useful in both raising the issue and in pointing out that the disparity of findings in the literature might be due to the difference in the cyclical indicator used to evaluate the behavior of fiscal policy. It is certainly worth considering in future work an alternative adjustment based on the growth rate. See Blanchard (1993) for an in-depth discussion of the alternative adjustment methods.

**5. Coordination of national fiscal policies. Is there a Euro-wide fiscal policy stance?**

In the previous sections of the paper we looked both at the behavior of fiscal policy for the aggregate of the twelve euro countries as well as for each of the countries. Although there is no government behind the behavior of the euro aggregate, it is simply the collection of twelve individual policies; these individual policies have been designed within the institutional framework of the Maastricht Treaty and the Stability and Growth Pact so the idea of Euro-wide fiscal policy is not entirely meaningless. The framework has possibly introduced some commonalities across national fiscal policies. For example,

the run up to the euro launch led to fiscal consolidation efforts for many of the governments. In addition, the interpretation and implementation of the Stability and Growth Pact has led to increasing emphasis on coordination of national fiscal policies. This coordination of national fiscal policies runs contrary to the intuition that with a common monetary policy, fiscal policy should behave in an even less coordinated fashion as it needs to deal with idiosyncratic national shocks. In this section we look at national fiscal policies and ask the question of whether we have seen any move towards coordination or synchronization.

**Figure 8. Dispersion of cyclically-adjusted budget balances (standard deviation across countries in %)**

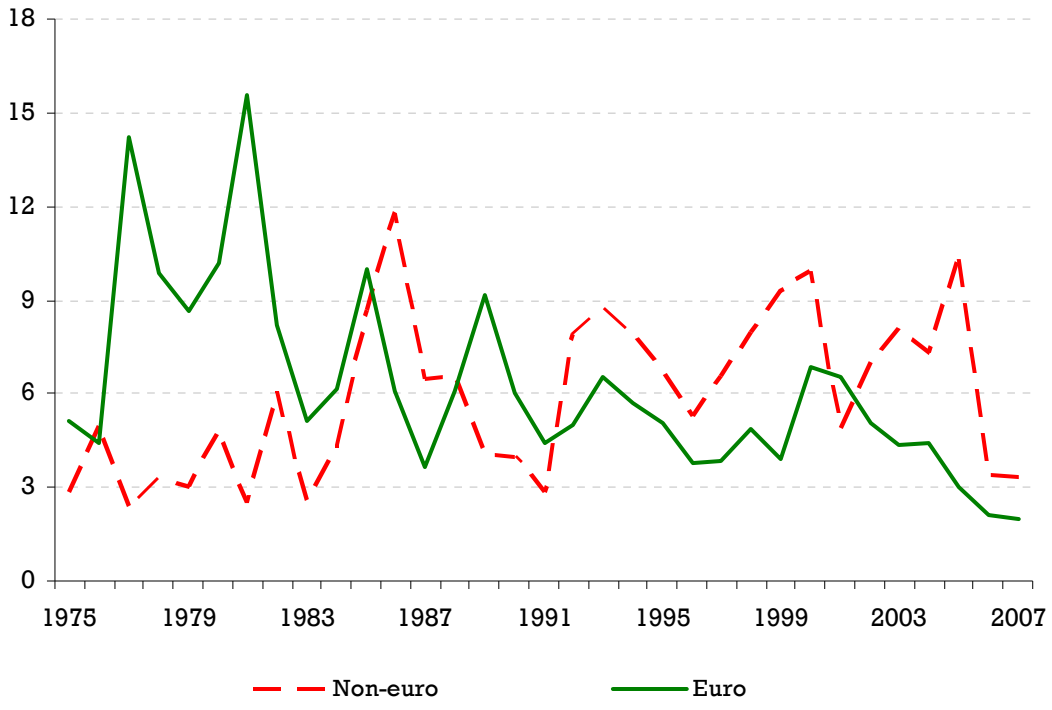


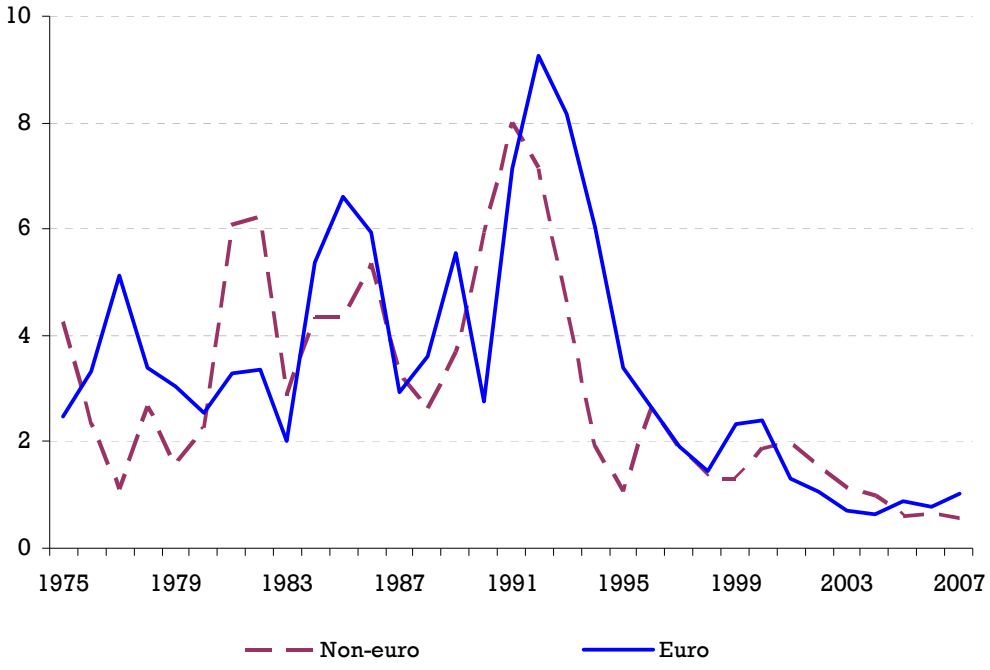

Figure 8 plots the annual standard deviation of the structural budget balance across euro countries and compares it to the same measure for the non-euro countries in the sample.[12]

[12] Norway is excluded from this calculation because of the high volatility of the budget stemming from fluctuations in oil prices.

Since 1999, there is a clear trend towards less dispersion among the euro countries that is not evident for the rest of the countries. This trend can be the result of proactive coordination but it could also be the outcome of some countries being close or above the limits established for budget deficits.

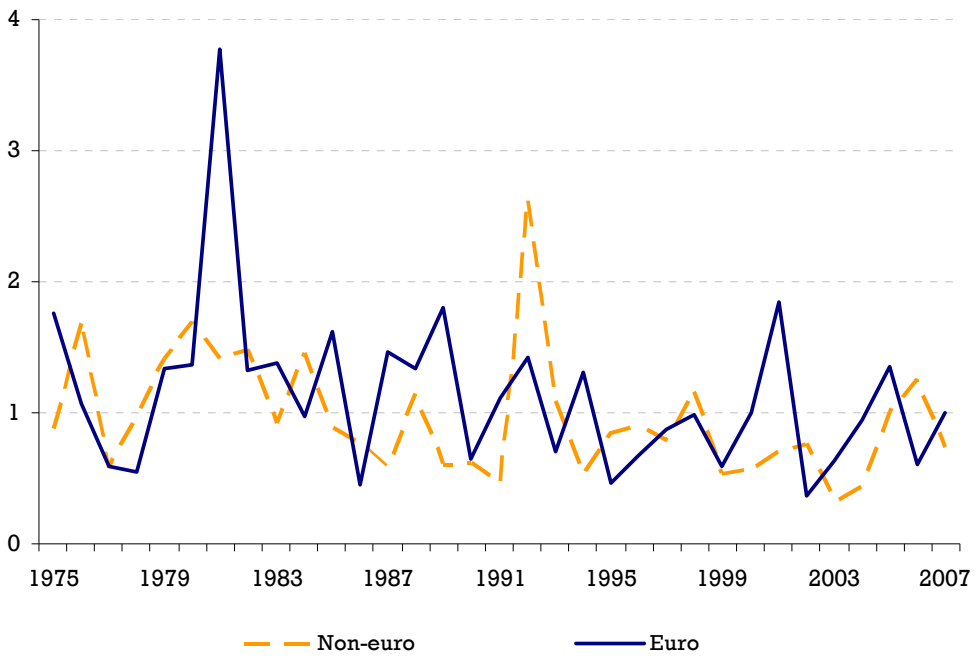
The trend towards more similar structural balances might be a result also of synchronization of business cycles. Indeed, Figure 9 shows that the dispersion of the output gap has been declining steadily since early 1990s. Interestingly, however, this trend is visible both for the euro area and for the group of the non-euro area countries. If we compare now Figures 8 and 9, it seems that there is more to the synchronization of fiscal policy stances across euro countries than just synchronization of business cycles.

**Figure 9. Dispersion of output gaps**
**(standard deviation across countries in %)**



Finally, Figure 10 reports synchronization of fiscal policy by looking at the exogenous component. We measure the dispersion (using standard deviation) of the residuals from equation (1) across both euro and non-euro countries. In this case we see that there is a very small downward trend for both samples. We already know that the typical size of these shocks has decreased over the sample period, so this could simply be due to the fact that we see fewer and smaller changes in discretionary fiscal policy and, therefore, an increase in synchronization for many countries. Of course, this needs not be the case, as it is possible that many large and coordinated changes in fiscal policy lead to a small cross-country standard deviation.

**Figure 10. Dispersion of exogenous discretionary fiscal policy**




## 6. Concluding Remarks

The 1992 Maastricht Treaty recognized the importance of providing a framework for fiscal policy in EMU and established limits to deficits and debt in order to "avoid

excessive government deficits" (Article 104). At the same time it defined an Excessive Deficit Procedure in case of violations. The Stability and Growth Pact (1997) developed the original ideas of the Maastricht Treaty into a set of more detailed rules and processes to ensure budget discipline and enforcement. The principles of the Stability and Growth pact were later amended by a report of the ECOFIN council in March 2005 that was later endorsed by the European Council.

This is the environment under which fiscal policy has been conducted in the euro area, an environment that has been a source of criticisms and debates. Some have been seen these limits as unnecessary constraints on national fiscal policy at a time when it was needed the most, with negative consequences on the macroeconomic performance of these economies. For those who had to implement the constraints and procedures (European Commission) or those who were supposed to care about them (ECB), the rules have not provided an easily-enforceable system and the outcome has been far from what the system was designed for. Fiscal consolidation has not been large enough and national policies have continued to display many of the prior biases (such as procyclicality).

In this paper we have provided a characterization of fiscal policy at the euro and the national levels and used countries outside of the euro area as benchmark. Our goal was not to propose an alternative fiscal policy framework but more to validate or disprove the conventional wisdom about how fiscal policy has behaved and the extent to which the EMU fiscal policy framework has affected that behavior.

Overall, our results have shown that the behavior of fiscal policy in the euro area has not been too different from what we have seen in other countries and that the introduction of the euro has not led to a significant change. The fear that fiscal policy

would become less disciplined because governments would not internalize the cost of "bad" fiscal policy in the absence of national currencies is not validated by our results. There is also very little evidence that the fiscal policy stance at the national level has gotten worsen. Although cyclically-adjusted balances still show some tendency to be procyclical for some countries in the euro zone, it is still true that the automatic stabilizers do most of the countercyclical adjustment in the union. The other positive reading of our results is that governments have not abused their discretion and that the size of frequency of politically-motivated fiscal policy changes has decreased among the European economies.

Coordination of fiscal policies has received much recent attention by the European Commission as a way to justify the strong surveillance mechanisms that they impose on national countries. The notion of coordination is some times linked to that of economic convergence but this link is theoretically not founded as we should expect the opposite: as countries have abandoned monetary policy, there is a stronger need to rely on fiscal policy as an automatic stabilizer. Of course, if business cycles become more synchronized, we will see coordination but there is no need to impose that coordination as one lets automatic stabilizers run their course. This is indeed what our results show. But it also seems that there is something beyond business cycle synchronization since a similar decline in dispersion for the countries outside the euro zone has not be met with a decline in the dispersion of their structural balances. Other measures of fiscal policy, those that also include the discretionary component, do not show any tendency to become less coordinated. If any, there seems to be more coordination and synchronicity at that

level, which supports the view that governments have not taken advantage of the euro fiscal framework to push different political agendas through the use of fiscal policy.

Our analysis of the Euro-wide aggregates provided us with the perspective that the ECB and monetary policy have about fiscal policy. In some sense, it could be argued that this is the relevant dimension in which to discuss fiscal policy in the euro area. As much as national fiscal policies can show biases and behaviors which are not optimal, when it comes to monetary policy and the currency, what matters is the behavior of fiscal policy at the aggregate level (of course, the aggregate is made out of the sum of all the national fiscal policies, so their understanding can still provide very useful insights).

When looking at the euro-wide fiscal policy we see a behavior that is different from what we have seen in the US. Fiscal policy is more procyclical in the euro area than in the US (where it is strongly countercyclical), but it is also true that the automatic stabilizers are larger in the euro zone. In addition, and this should be welcomed by the ECB, fiscal policy is less volatile at the euro level when it comes to exogenous changes, those that are not motivated by the economic environment.

Last but not least, it is important to emphasize that many of the findings in the literature are sensitive to the cyclical indicator used in the regression analysis. In this paper we show that the primary balance reacts more readily to the growth rate of real output rather than to the output gap. Reassessing the construction of cyclically-adjusted variables might lead to significant changes in the way that researchers view fiscal policy stance in the OECD economies.

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**Table 1: Fiscal policy reaction function (IV estimates, No break)**
**Dependent variable: Cyclically-adjusted balance**

| | Gap | | Debt (t-1) | | CAB (t-1) | |
|---|---|---|---|---|---|---|
| | Coefficient | s.e | Coefficient | s.e | Coefficient | s.e |
| EURO area 12 countries | -0.222 | (0.063)** | 0.014 | (0.007)* | 0.732 | (0.078)** |
| Japan | -0.043 | (0.138) | 0.005 | (0.007) | 0.904 | (0.071)** |
| United Kingdom | -0.174 | (0.142) | 0.016 | (0.034) | 0.833 | (0.099)** |
| United States | -0.004 | (0.113) | 0.031 | (0.015)* | 0.778 | (0.106)** |
| | | | | | | |
| Austria | 0.053 | (0.104) | 0.025 | (0.012)* | 0.521 | (0.126)** |
| Belgium | -0.156 | (0.223) | 0.040 | (0.015)* | 0.706 | (0.125)** |
| Finland | 0.151 | (0.115) | 0.032 | (0.015)* | 0.664 | (0.119)** |
| France | -0.193 | (0.108) | 0.009 | (0.006) | 0.674 | (0.165)** |
| Germany | -0.269 | (0.115)* | 0.017 | (0.012) | 0.674 | (0.087)** |
| Greece | -0.331 | (0.457) | 0.030 | (0.011)* | 0.567 | (0.125)** |
| Ireland | -0.234 | (0.206) | 0.005 | (0.012) | 0.832 | (0.056)** |
| Italy | -0.399 | (0.133)** | 0.066 | (0.015)** | 0.472 | (0.104)** |
| Luxembourg | 0.044 | (0.201) | 0.987 | (0.488) | 0.274 | (0.184) |
| Netherlands | -0.308 | (0.163) | 0.004 | (0.018) | 0.766 | (0.163)** |
| Portugal | -0.188 | (0.080)* | 0.043 | (0.040) | 0.337 | (0.121)* |
| Spain | -0.078 | (0.089) | 0.036 | (0.014)* | 0.832 | (0.112)** |
| | | | | | | |
| Denmark | 0.620 | (0.315) | 0.041 | (0.010)** | 0.632 | (0.110)** |
| Sweden | 1.003 | (0.377)* | 0.053 | (0.021)* | 0.407 | (0.218) |
| Australia | 0.021 | (0.197) | 0.052 | (0.017)** | 0.851 | (0.106)** |
| Canada | 0.106 | (0.079) | 0.051 | (0.013)** | 0.725 | (0.077)** |
| New Zealand | 0.901 | (0.640) | 0.004 | (0.031) | 0.032 | (0.462) |
| Norway | -0.110 | (0.151) | 0.056 | (0.042) | 0.959 | (0.068)** |
| Switzerland | 0.095 | (0.141) | 0.077 | (0.029)* | 0.473 | (0.221) |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

**Table 1(cont.): Fiscal policy reaction function (OLS estimates, No break)**
**Dependent variable: Cyclically-adjusted balance**

| | Gap | | Debt (t-1) | | CAB (t-1) | | $R^2$ |
|---|---|---|---|---|---|---|---|
| | Coefficient | s.e | Coefficient | s.e | Coefficient | s.e | |
| EURO area 12 countries | -0.145 | (0.061)* | 0.016 | (0.006)* | 0.721 | (0.076)** | 0.82 |
| Japan | -0.042 | (0.100) | 0.005 | (0.007) | 0.904 | (0.069)** | 0.78 |
| United Kingdom | -0.196 | (0.127) | 0.017 | (0.032) | 0.837 | (0.095)** | 0.67 |
| United States | 0.133 | (0.065)* | 0.028 | (0.014) | 0.770 | (0.103)** | 0.69 |
| | | | | | | | |
| Austria | -0.014 | (0.087) | 0.022 | (0.011) | 0.523 | (0.126)** | 0.49 |
| Belgium | -0.199 | (0.124) | 0.038 | (0.014)* | 0.711 | (0.123)** | 0.91 |
| Finland | 0.232 | (0.084)* | 0.034 | (0.015)* | 0.601 | (0.096)** | 0.71 |
| France | -0.127 | (0.083) | 0.009 | (0.006) | 0.652 | (0.151)** | 0.49 |
| Germany | -0.240 | (0.118) | 0.017 | (0.012) | 0.681 | (0.092)** | 0.80 |
| Greece | -0.388 | (0.228) | 0.029 | (0.012)* | 0.562 | (0.114)** | 0.76 |
| Ireland | -0.219 | (0.121) | 0.006 | (0.012) | 0.832 | (0.057)** | 0.88 |
| Italy | -0.195 | (0.126) | 0.065 | (0.014)** | 0.510 | (0.104)** | 0.92 |
| Luxembourg | -0.033 | (0.168) | 0.968 | (0.478) | 0.311 | (0.186) | 0.62 |
| Netherlands | -0.191 | (0.164) | 0.007 | (0.019) | 0.704 | (0.163)** | 0.51 |
| Portugal | -0.161 | (0.067)* | 0.036 | (0.040) | 0.356 | (0.119)** | 0.42 |
| Spain | -0.079 | (0.072) | 0.036 | (0.014)* | 0.832 | (0.110)** | 0.87 |
| | | | | | | | |
| Denmark | 0.467 | (0.125)** | 0.040 | (0.010)** | 0.669 | (0.105)** | 0.83 |
| Sweden | 0.699 | (0.255)* | 0.050 | (0.018)* | 0.537 | (0.155)** | 0.75 |
| Australia | 0.070 | (0.117) | 0.052 | (0.018)** | 0.833 | (0.092)** | 0.77 |
| Canada | 0.100 | (0.070) | 0.051 | (0.013)** | 0.727 | (0.076)** | 0.91 |
| New Zealand | 0.364 | (0.143)* | -0.009 | (0.019) | 0.394 | (0.238) | 0.65 |
| Norway | -0.013 | (0.127) | 0.048 | (0.040) | 0.997 | (0.064)** | 0.93 |
| Switzerland | 0.014 | (0.106) | 0.068 | (0.027)* | 0.535 | (0.212)* | 0.81 |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

**Table 2: Fiscal policy reaction function (IV estimates, with a break in 1999)**
**Dependent variable: Cyclically-adjusted balance**

| | **Gap before 1999** | | **Gap after 1999** | | p-value: | **Debt (t-1)** | | **CAB (t-1)** | |
|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | s.e | Coefficient | s.e | Equality | Coefficient | s.e | Coefficient | s.e |
| EURO area 12 countries | -0.218 | (0.077)** | -0.206 | (0.120) | 0.94 | 0.016 | (0.008) | 0.736 | (0.089)** |
| Japan | -0.072 | (0.143) | 0.280 | (0.648) | 0.60 | 0.015 | (0.009) | 0.840 | (0.083)** |
| United Kingdom | -0.186 | (0.148) | 5.713 | (7.710) | 0.45 | 0.011 | (0.039) | 0.680 | (0.259)* |
| United States | -0.035 | (0.133) | 1.326 | (0.267)** | 0.00 | 0.033 | (0.016)* | 0.700 | (0.071)** |
| | | | | | | | | | |
| Austria | -0.002 | (0.118) | -0.059 | (0.257) | 0.84 | 0.019 | (0.016) | 0.485 | (0.134)** |
| Belgium | -0.120 | (0.283) | -0.223 | (0.223) | 0.81 | 0.060 | (0.027)* | 0.519 | (0.221)* |
| Finland | 0.128 | (0.105) | 0.829 | (0.517) | 0.19 | 0.028 | (0.018) | 0.658 | (0.150)** |
| France | -0.196 | (0.116) | 0.155 | (0.206) | 0.09 | 0.014 | (0.011) | 0.640 | (0.181)** |
| Germany | -0.212 | (0.142) | -0.305 | (0.217) | 0.74 | 0.038 | (0.019) | 0.637 | (0.113)** |
| Greece | -0.429 | (0.578) | 0.166 | (0.833) | 0.50 | 0.031 | (0.012)* | 0.606 | (0.154)** |
| Ireland | -0.174 | (0.180) | -0.291 | (0.574) | 0.86 | 0.024 | (0.029) | 0.815 | (0.066)** |
| Italy | -0.435 | (0.157)** | -0.153 | (0.257) | 0.41 | 0.069 | (0.017)** | 0.453 | (0.134)** |
| Luxembourg | 0.549 | (0.545) | 0.646 | (0.410) | 0.87 | 0.712 | (0.491) | -0.116 | (0.278) |
| Netherlands | -0.458 | (0.228) | -0.246 | (0.182) | 0.43 | 0.050 | (0.030) | 0.587 | (0.207)* |
| Portugal | -0.119 | (0.088) | -0.211 | (0.159) | 0.65 | 0.065 | (0.059) | 0.158 | (0.177) |
| Spain | -0.088 | (0.085) | -0.951 | (0.451)* | 0.08 | 0.047 | (0.016)** | 0.629 | (0.153)** |
| | | | | | | | | | |
| Denmark | 0.699 | (0.320)* | -0.242 | (0.299) | 0.02 | 0.040 | (0.011)** | 0.630 | (0.114)** |
| Sweden | 1.118 | (0.401)** | 0.662 | (0.401) | 0.30 | 0.057 | (0.024)* | 0.372 | (0.238) |
| Australia | 0.170 | (0.224) | -2.014 | (1.748) | 0.21 | 0.049 | (0.026) | 0.755 | (0.207)** |
| Canada | 0.129 | (0.086) | -0.553 | (0.586) | 0.25 | 0.051 | (0.014)** | 0.784 | (0.107)** |
| New Zealand | 0.629 | (0.420) | 1.122 | (0.641) | 0.53 | 0.002 | (0.068) | -0.022 | (0.414) |
| Norway | 0.091 | (0.141) | -0.280 | (0.487) | 0.48 | 0.063 | (0.050) | 0.894 | (0.082)** |
| Switzerland | -0.105 | (0.156) | -0.023 | (0.143) | 0.69 | 0.044 | (0.028) | 0.470 | (0.246) |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

**Table 3: Dep. Var: Cyclically adjusted spending (IV estimates, with a break in 1999)**

| | **Gap before 1999** | | **Gap after 1999** | | p-value: | **Debt (t-1)** | | **Spending (t-1)** | |
|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | s.e | Coefficient | s.e | Equality | Coefficient | s.e | Coefficient | s.e |
| EURO area 12 countries | 0.037 | (0.090) | 0.138 | (0.061)* | 0.42 | -0.013 | (0.008) | 0.905 | (0.051)** |
| Japan | 0.027 | (0.065) | 0.275 | (0.135) | 0.10 | -0.018 | (0.006)** | 1.012 | (0.040)** |
| United Kingdom | -0.166 | (0.072)* | -2.884 | (3.360) | 0.42 | 0.006 | (0.016) | 0.642 | (0.136)** |
| United States | -0.023 | (0.066) | 0.055 | (0.073) | 0.34 | -0.038 | (0.012)** | 1.108 | (0.064)** |
| | | | | | | | | | |
| Austria | 0.015 | (0.104) | -0.073 | (0.139) | 0.64 | -0.020 | (0.026) | 0.997 | (0.092)** |
| Belgium | 0.262 | (0.120)* | 0.297 | (0.150) | 0.86 | -0.018 | (0.006)** | 0.970 | (0.045)** |
| Finland | -0.026 | (0.073) | -0.713 | (0.060)** | 0.00 | -0.088 | (0.025)** | 1.156 | (0.064)** |
| France | 0.157 | (0.095) | -0.092 | (0.056) | 0.03 | -0.024 | (0.010)* | 0.987 | (0.036)** |
| Germany | -0.449 | (0.939) | 0.303 | (0.211) | 0.47 | -0.050 | (0.046) | 0.774 | (0.256)* |
| Greece | 0.342 | (0.373) | -0.819 | (1.134) | 0.33 | 0.001 | (0.020) | 0.932 | (0.109)** |
| Ireland | 0.264 | (0.236) | 0.049 | (0.209) | 0.59 | -0.042 | (0.041) | 1.145 | (0.071)** |
| Italy | 0.213 | (0.116) | 0.064 | (0.156) | 0.45 | -0.056 | (0.016)** | 1.160 | (0.062)** |
| Luxembourg | 0.286 | (0.506) | 0.085 | (0.258) | 0.74 | -0.247 | (0.513) | 0.549 | (0.406) |
| Netherlands | 0.138 | (0.124) | 0.023 | (0.107) | 0.52 | -0.041 | (0.014)** | 0.955 | (0.048)** |
| Portugal | 0.270 | (0.080)** | 0.105 | (0.087) | 0.20 | 0.039 | (0.048) | 0.678 | (0.093)** |
| Spain | 0.199 | (0.050)** | 0.122 | (0.249) | 0.77 | -0.015 | (0.013) | 0.882 | (0.075)** |
| | | | | | | | | | |
| Denmark | -0.207 | (0.247) | -0.158 | (0.065)* | 0.85 | 0.008 | (0.038) | 0.881 | (0.161)** |
| Sweden | -0.142 | (0.081) | -0.268 | (0.290) | 0.69 | -0.046 | (0.014)** | 0.986 | (0.056)** |
| Australia | -0.322 | (0.151)* | 0.903 | (0.745) | 0.11 | -0.019 | (0.022) | 0.788 | (0.083)** |
| Canada | -0.002 | (0.088) | 0.506 | (0.387) | 0.21 | -0.044 | (0.014)** | 1.048 | (0.051)** |
| New Zealand | -0.483 | (0.926) | 1.774 | (1.268) | 0.32 | 0.026 | (0.111) | 1.809 | (0.807) |
| Norway | -0.153 | (0.117) | -0.097 | (0.151) | 0.77 | -0.024 | (0.022) | 0.836 | (0.073)** |
| Switzerland | -0.070 | (0.155) | 0.011 | (0.121) | 0.69 | 0.003 | (0.050) | 0.737 | (0.373) |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

**Table 4: Dep. Var: Cyclically adjusted tax receipts (IV estimates, with a break in 1999)**

| | **Gap before 1999** | | **Gap after 1999** | | p-value: | **Debt (t-1)** | | **Taxes (t-1)** | |
|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | s.e | Coefficient | s.e | Equality | Coefficient | s.e | Coefficient | s.e |
| EURO area 12 countries | -0.148 | (0.079) | 0.012 | (0.156) | 0.42 | 0.001 | (0.006) | 0.734 | (0.092)** |
| Japan | 0.010 | (0.084) | 0.853 | (0.313)* | 0.01 | 0.002 | (0.008) | 0.877 | (0.066)** |
| United Kingdom | -0.210 | (0.122) | 2.043 | (3.309) | 0.50 | 0.052 | (0.027) | 0.755 | (0.085)** |
| United States | 0.050 | (0.060) | 1.162 | (0.246)** | 0.00 | 0.048 | (0.011)** | 0.578 | (0.076)** |
| | | | | | | | | | |
| Austria | 0.140 | (0.128) | 0.047 | (0.153) | 0.68 | 0.023 | (0.020) | 0.861 | (0.123)** |
| Belgium | 0.125 | (0.170) | 0.111 | (0.152) | 0.96 | 0.000 | (0.009) | 0.928 | (0.125)** |
| Finland | 0.157 | (0.093) | 0.141 | (0.545) | 0.98 | 0.016 | (0.025) | 0.940 | (0.112)** |
| France | -0.166 | (0.164) | -0.044 | (0.196) | 0.67 | 0.014 | (0.013) | 0.833 | (0.086)** |
| Germany | 1.049 | (1.107) | 0.238 | (0.423) | 0.57 | 0.038 | (0.047) | 0.704 | (0.451) |
| Greece | -0.437 | (0.421) | -0.707 | (0.568) | 0.65 | 0.037 | (0.015)* | 0.592 | (0.186)** |
| Ireland | -0.031 | (0.328) | -0.233 | (0.266) | 0.70 | 0.005 | (0.038) | 0.822 | (0.189)** |
| Italy | -0.192 | (0.155) | -0.516 | (0.242)* | 0.29 | 0.026 | (0.025) | 0.859 | (0.123)** |
| Luxembourg | 0.409 | (0.541) | 0.367 | (0.213) | 0.93 | 0.121 | (0.383) | 0.392 | (0.234) |
| Netherlands | -0.031 | (0.181) | -0.103 | (0.144) | 0.78 | -0.034 | (0.018) | 0.902 | (0.050)** |
| Portugal | 0.184 | (0.105) | -0.102 | (0.087) | 0.07 | 0.056 | (0.045) | 0.666 | (0.090)** |
| Spain | 0.115 | (0.090) | -0.308 | (0.362) | 0.29 | -0.010 | (0.015) | 0.847 | (0.088)** |
| | | | | | | | | | |
| Denmark | 0.430 | (0.187)* | -0.282 | (0.288) | 0.03 | 0.057 | (0.018)** | 0.623 | (0.086)** |
| Sweden | 0.305 | (0.134)* | 0.132 | (0.341) | 0.63 | 0.017 | (0.013) | 0.787 | (0.104)** |
| Australia | -0.305 | (0.242) | -1.293 | (1.124) | 0.41 | 0.022 | (0.025) | 0.929 | (0.114)** |
| Canada | 0.075 | (0.063) | -0.008 | (0.419) | 0.85 | 0.019 | (0.012) | 0.843 | (0.088)** |
| New Zealand | 0.711 | (0.390) | 0.371 | (0.463) | 0.68 | -0.072 | (0.068) | 0.801 | (0.188)** |
| Norway | -0.004 | (0.116) | 0.690 | (0.233)** | 0.01 | -0.008 | (0.028) | 0.709 | (0.111)** |
| Switzerland | -0.198 | (0.190) | 0.275 | (0.128) | 0.04 | 0.107 | (0.062) | 0.099 | (0.336) |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

**Table 5: Automatic Stabilizers (OLS estimates)**

| | Gap | | Constant | | $R^2$ |
|---|---|---|---|---|---|
| | Coefficient | s.e. | Coefficient | s.e. | |
| EURO area 12 countries | 0.464 | (0.005)** | 0.021 | (0.009)* | 1.00 |
| Japan | 0.267 | (0.012)** | -0.014 | (0.021) | 0.95 |
| United Kingdom | 0.391 | (0.021)** | -0.011 | (0.033) | 0.94 |
| United States | 0.293 | (0.013)** | 0.000 | (0.020) | 0.95 |
| | | | | | |
| Austria | 0.430 | (0.015)** | 0.011 | (0.034) | 0.95 |
| Belgium | 0.582 | (0.046)** | 0.042 | (0.082) | 0.83 |
| Finland | 0.460 | (0.010)** | -0.194 | (0.046)** | 0.98 |
| France | 0.439 | (0.016)** | 0.001 | (0.028) | 0.94 |
| Germany | 0.647 | (0.062)** | 0.334 | (0.094)** | 0.82 |
| Greece | 0.307 | (0.019)** | 0.012 | (0.020) | 0.94 |
| Ireland | 0.410 | (0.012)** | -0.010 | (0.033) | 0.98 |
| Italy | 0.378 | (0.019)** | -0.071 | (0.032)* | 0.93 |
| Luxembourg | 0.423 | (0.026)** | 0.013 | (0.061) | 0.96 |
| Netherlands | 0.534 | (0.036)** | -0.015 | (0.068) | 0.88 |
| Portugal | 0.333 | (0.010)** | 0.077 | (0.036)* | 0.98 |
| Spain | 0.422 | (0.013)** | -0.023 | (0.044) | 0.97 |
| | | | | | |
| Denmark | 0.503 | (0.034)** | 0.016 | (0.064) | 0.85 |
| Sweden | 0.522 | (0.022)** | -0.108 | (0.044)* | 0.96 |
| Australia | 0.339 | (0.017)** | -0.008 | (0.025) | 0.91 |
| Canada | 0.370 | (0.013)** | -0.055 | (0.021)* | 0.97 |
| New Zealand | 0.417 | (0.007)** | 0.047 | (0.015)** | 0.99 |
| Norway | 1.518 | (0.268)** | 11.656 | (1.194)** | 0.57 |
| Switzerland | 0.392 | (0.014)** | -0.197 | (0.035)** | 0.98 |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

## Table 6: Volatility of the residuals

| Country | Before 1999 | After 1999 |
|---|---|---|
| EURO area 12 countries | 0.304 | 0.146 |
| Japan | 1.096 | 2.543 |
| United Kingdom | 1.845 | 0.899 |
| United States | 0.641 | 0.135 |
| | | |
| Austria | 0.792 | 1.123 |
| Belgium | 1.658 | 0.927 |
| Finland | 1.811 | 1.062 |
| France | 0.517 | 0.171 |
| Germany | 0.713 | 0.492 |
| Greece | 2.729 | 1.461 |
| Ireland | 0.904 | 2.784 |
| Italy | 1.416 | 0.415 |
| Luxembourg | 0.628 | 0.953 |
| Netherlands | 1.189 | 0.798 |
| Portugal | 1.379 | 0.961 |
| Spain | 0.625 | 0.457 |
| | | |
| Denmark | 1.377 | 1.200 |
| Sweden | 3.017 | 1.082 |
| Australia | 0.613 | 0.711 |
| Canada | 1.018 | 0.409 |
| New Zealand | 0.109 | 0.281 |
| Norway | 1.466 | 1.399 |
| Switzerland | 0.219 | 0.308 |

**Table 7: Fiscal policy reaction function: gap vs. growth (OLS estimates, no break)**
**Dependent variable: primary balance**

| | Gap | | Output growth | | Debt (t-1) | | Primary balance (t-1) | | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | s.e | Coefficient | s.e | Coefficient | s.e | Coefficient | s.e | |
| EURO area 12 countries | -0.114 | (0.169) | 0.463 | (0.157)* | 0.016 | (0.034) | 0.657 | (0.193)** | 0.86 |
| Japan | 0.015 | (0.089) | 0.283 | (0.121)* | 0.010 | (0.008) | 0.877 | (0.068)** | 0.81 |
| United Kingdom | 0.029 | (0.128) | 0.179 | (0.135) | -0.006 | (0.025) | 0.728 | (0.084)** | 0.66 |
| United States | 0.153 | (0.084) | 0.375 | (0.085)** | 0.026 | (0.014) | 0.808 | (0.085)** | 0.79 |
| | | | | | | | | | |
| Austria | 0.214 | (0.115) | 0.101 | (0.162) | 0.025 | (0.012)* | 0.526 | (0.126)** | 0.53 |
| Belgium | -0.018 | (0.154) | 0.296 | (0.186) | 0.042 | (0.011)** | 0.729 | (0.114)** | 0.90 |
| Finland | 0.221 | (0.118) | 0.458 | (0.118)** | 0.008 | (0.017) | 0.685 | (0.092)** | 0.84 |
| France | 0.047 | (0.091) | 0.372 | (0.090)** | 0.013 | (0.005)* | 0.495 | (0.113)** | 0.69 |
| Germany | -0.192 | (0.220) | 0.628 | (0.143)** | 0.004 | (0.022) | 0.617 | (0.265)* | 0.76 |
| Greece | -0.228 | (0.229) | 0.101 | (0.149) | 0.025 | (0.012)* | 0.571 | (0.162)** | 0.72 |
| Ireland | -0.239 | (0.131) | 0.329 | (0.131)* | 0.008 | (0.012) | 0.783 | (0.082)** | 0.90 |
| Italy | 0.001 | (0.128) | 0.158 | (0.159) | 0.066 | (0.013)** | 0.532 | (0.103)** | 0.92 |
| Luxembourg | 0.366 | (0.249) | -0.061 | (0.279) | 1.059 | (0.523) | 0.290 | (0.183) | 0.72 |
| Netherlands | 0.065 | (0.266) | 0.417 | (0.191)* | -0.006 | (0.021) | 0.562 | (0.235)* | 0.67 |
| Portugal | 0.018 | (0.084) | 0.141 | (0.129) | 0.082 | (0.029)** | 0.406 | (0.121)** | 0.59 |
| Spain | -0.021 | (0.111) | 0.354 | (0.187) | 0.013 | (0.015) | 0.842 | (0.082)** | 0.91 |
| | | | | | | | | | |
| Australia | 0.084 | (0.152) | 0.364 | (0.144)* | 0.031 | (0.021) | 0.830 | (0.091)** | 0.83 |
| Canada | 0.190 | (0.082)* | 0.334 | (0.066)** | 0.057 | (0.012)** | 0.703 | (0.074)** | 0.93 |
| Denmark | 0.714 | (0.247)** | 0.221 | (0.218) | 0.036 | (0.010)** | 0.691 | (0.112)** | 0.87 |
| New Zealand | 0.828 | (0.409) | -0.091 | (0.379) | -0.003 | (0.023) | 0.285 | (0.262) | 0.83 |
| Norway | 0.138 | (0.203) | 0.691 | (0.245)** | 0.087 | (0.074) | 0.736 | (0.133)** | 0.70 |
| Sweden | 1.058 | (0.306)** | 0.044 | (0.251) | 0.05 | (0.017)** | 0.527 | (0.130)** | 0.86 |
| Switzerland | 0.225 | (0.193) | 0.163 | (0.202) | 0.084 | (0.035)* | 0.441 | (0.180)* | 0.84 |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

**Table A1: Dependent variable: Primary balance (IV estimates, No break)**

| | Gap | | Debt (t-1) | | Primary balance (t-1) | |
|---|---|---|---|---|---|---|
| | Coefficient | s.e | Coefficient | s.e | Coefficient | s.e |
| EURO area 12 countries | -0.006 | (0.103) | 0.020 | (0.011) | 0.657 | (0.143)** |
| Japan | -0.004 | (0.145) | 0.005 | (0.007) | 0.901 | (0.082)** |
| United Kingdom | 0.041 | (0.143) | -0.003 | (0.030) | 0.728 | (0.110)** |
| United States | 0.099 | (0.141) | 0.038 | (0.018)* | 0.695 | (0.118)** |
| | | | | | | |
| Austria | 0.316 | (0.109)** | 0.027 | (0.013)* | 0.481 | (0.133)** |
| Belgium | -0.048 | (0.249) | 0.035 | (0.013)* | 0.756 | (0.126)** |
| Finland | 0.285 | (0.213) | 0.037 | (0.018)* | 0.676 | (0.173)** |
| France | 0.083 | (0.162) | 0.011 | (0.007) | 0.577 | (0.203)** |
| Germany | 0.025 | (0.128) | 0.021 | (0.016) | 0.570 | (0.119)** |
| Greece | -0.436 | (0.466) | 0.022 | (0.012) | 0.604 | (0.148)** |
| Ireland | -0.242 | (0.210) | 0.005 | (0.014) | 0.910 | (0.058)** |
| Italy | -0.123 | (0.117) | 0.065 | (0.014)** | 0.493 | (0.096)** |
| Luxembourg | 0.427 | (0.194) | 1.009 | (0.473) | 0.266 | (0.207) |
| Netherlands | -0.070 | (0.261) | 0.017 | (0.020) | 0.793 | (0.228)** |
| Portugal | -0.010 | (0.090) | 0.068 | (0.036) | 0.442 | (0.151)** |
| Spain | 0.015 | (0.100) | 0.036 | (0.012)** | 0.841 | (0.102)** |
| | | | | | | |
| Denmark | 1.016 | (0.298)** | 0.047 | (0.008)** | 0.579 | (0.086)** |
| Sweden | 1.217 | (0.434)** | 0.051 | (0.016)** | 0.474 | (0.188)* |
| Australia | 0.309 | (0.239) | 0.058 | (0.019)** | 0.745 | (0.105)** |
| Canada | 0.339 | (0.107)** | 0.062 | (0.014)** | 0.653 | (0.078)** |
| New Zealand | 1.022 | (0.390)* | -0.001 | (0.024) | 0.201 | (0.237) |
| Norway | -0.002 | (0.284) | 0.129 | (0.082) | 0.743 | (0.149)** |
| Switzerland | 0.396 | (0.163)* | 0.115 | (0.018)** | 0.318 | (0.160) |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

**Table A1 (cont): Dependent variable: Primary balance (OLS estimates, No break)**

| | Gap | | Debt (t-1) | | Primary balance (t-1) | |
|---|---|---|---|---|---|---|
| | Coefficient | s.e | Coefficient | s.e | Coefficient | s.e |
| EURO area 12 countries | 0.156 | (0.105) | 0.025 | (0.011)* | 0.545 | (0.145)** |
| Japan | 0.086 | (0.104) | 0.005 | (0.007) | 0.883 | (0.079)** |
| United Kingdom | 0.074 | (0.132) | -0.002 | (0.024) | 0.726 | (0.083)** |
| United States | 0.342 | (0.082)** | 0.033 | (0.016) | 0.650 | (0.107)** |
| | | | | | | |
| Austria | 0.265 | (0.094)** | 0.025 | (0.012)* | 0.506 | (0.130)** |
| Belgium | 0.100 | (0.127) | 0.042 | (0.011)** | 0.725 | (0.111)** |
| Finland | 0.498 | (0.141)** | 0.027 | (0.017) | 0.533 | (0.114)** |
| France | 0.177 | (0.105) | 0.011 | (0.007) | 0.532 | (0.144)** |
| Germany | 0.092 | (0.130) | 0.024 | (0.016) | 0.540 | (0.119)** |
| Greece | -0.194 | (0.199) | 0.025 | (0.012)* | 0.612 | (0.124)** |
| Ireland | -0.112 | (0.121) | 0.013 | (0.013) | 0.923 | (0.064)** |
| Italy | 0.084 | (0.114) | 0.069 | (0.014)** | 0.491 | (0.098)** |
| Luxembourg | 0.328 | (0.168) | 0.999 | (0.458) | 0.321 | (0.214) |
| Netherlands | 0.206 | (0.236) | 0.019 | (0.020) | 0.599 | (0.219)* |
| Portugal | 0.042 | (0.072) | 0.085 | (0.028)** | 0.402 | (0.142)** |
| Spain | 0.071 | (0.095) | 0.032 | (0.011)** | 0.815 | (0.103)** |
| | | | | | | |
| Denmark | 0.903 | (0.128)** | 0.041 | (0.009)** | 0.618 | (0.083)** |
| Sweden | 1.096 | (0.260)** | 0.051 | (0.016)** | 0.517 | (0.119)** |
| Australia | 0.383 | (0.139)* | 0.057 | (0.020)** | 0.720 | (0.090)** |
| Canada | 0.360 | (0.094)** | 0.063 | (0.013)** | 0.646 | (0.073)** |
| New Zealand | 0.741 | (0.100)** | -0.005 | (0.021) | 0.339 | (0.181) |
| Norway | 0.162 | (0.202) | 0.100 | (0.073) | 0.704 | (0.128)** |
| Switzerland | 0.304 | (0.132)* | 0.108 | (0.015)** | 0.386 | (0.150)* |

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%