



**FIRSTRUN – Fiscal Rules and Strategies under Externalities and Uncertainties**  
Funded by the Horizon 2020 Framework Programme of the European Union  
Project ID 649261.

FIRSTRUN Deliverable 4.2

---

## **The interaction between fiscal and monetary policy – before and after the financial crisis**

### ***Abstract:***

This paper presents an overview of developments in the economic literature, looking into the combination of fiscal and monetary policy accompanied by a narrative of the actual policy mix in the US, the euro area and the UK between 2000 and 2015. The paper starts from the changes that occurred in the medium-term approach during the 1980s and 1990s, and the emergence of the separation between fiscal and monetary policy, and then the dominance of rules over fine-tuning. This approach became part of the mainstream macroeconomic literature until late 2000s. We show that the global financial crisis represents a watershed in the policy mix debate in many respects and that after several years of a synchronised expansionary mix, monetary policy has been the most aggressive tool across countries. This has also been the effect of financial stability becoming a new objective in the mix. In a historical perspective, a key lesson is that the balance between policies in the mix cannot be set independently of the state of the economy.

### **Authors:**

Cinzia Alcidi, CEPS  
Gilles Thirion, CEPS

**Keywords:** fiscal stabilization, monetary policy, fiscal rules  
**JEL Classification:**

**Delivery date: 2016-07-07**

## **Table of contents**

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>Introduction .....</b>  | <b>2</b>  |
| <b>2</b> | <b>Selective literature review .....</b>   | <b>4</b>  |
| 2.1      | The traditional macroeconomic models and the DSGE models .....                   | 4         |
| 2.2      | Policy Coordination and the debt constraint .....                                | 6         |
| <b>3</b> | <b>The fiscal and monetary policy mix: evidence over the period 2000-15.....</b> | <b>8</b>  |
| <b>4</b> | <b>Fiscal policy during and after the crisis .....</b>                           | <b>11</b> |
| 4.1      | Fiscal impulse: expansion (2008-09) and contraction (2010-15).....               | 12        |
| <b>5</b> | <b>Monetary policy: a comparative approach .....</b>                             | <b>16</b> |
| <b>6</b> | <b>Concluding remarks .....</b>  | <b>18</b> |
|          | <b>References .....</b>  | <b>19</b> |

## 1 Introduction

Since the mid-1990s, economists and policy-makers in most advanced economies have generally endorsed the separation of powers between monetary and fiscal policies as a way of optimising non-inflationary growth.

This separation of monetary and fiscal policies was largely the result of countries suffering from fiscal deficits and real interest rates that were too high to promote adequate long-term growth of potential output. This unfavourable monetary-fiscal mix was a feature of the macroeconomic landscape in the 1980s. In reaction to growing inflationary pressures induced by the oil shocks, monetary conditions were generally tightened and became more restrictive. Soon afterwards, budget stances also became more restrictive, as inflation-induced fiscal drag reduced government deficits. Fiscal and monetary policies therefore remained synchronised in favour of restraint in the immediate aftermath of the oil shock. Budgetary policies gradually became more expansionary, however, as the fiscal authorities started to accept the need to finance the oil-related external deficits through public money. Monetary tightening also eased and demand management policies became mutually accommodating. As output continued to stagnate, unemployment rose and inflation expectations persisted, the combined fiscal and monetary expansion soon came to be seen as not working – indeed as having adverse results. The attempt to ‘fine-tune’ the economy in response to high employment seemed to have had too high a cost (ex post, at least) in terms of inflation. There are two main dimensions to this failure. On the one hand, short-term discretionary action might have been ineffective because of errors in timing or understanding of the cycle. On the other hand, the limited gains to output that followed monetary expansion suggested that governments should not allow too high rates of monetary growth and inflation. Those who promoted the idea of achieving a high level of employment and rapid growth by means of ‘easy money’ and currency depreciation had to concede failure.

These developments, combined with important findings in the macroeconomic literature during the 1970s, pointed to the finding that short-term discretionary fiscal policy is not an effective tool to stabilise aggregate demand. Four arguments underpin this position in the literature: fiscal policy tends to impact the economy only with a time-lag (see, Gordon & Jorgenson, 1976); the design of optimal policies may be more difficult than usually assumed due to changes in the structural parameters of the models when policies are put in place (see Lucas, 1976); because economic agents are rational, discretion policy never leads to a maximisation of the social welfare function (see Kydland & Prescott, 1977); and last but not least, the existence of ‘Ricardian agents’ (see Barro, 1974) reduces the effects of expansionary fiscal measures by anticipating future tax hikes.

As a consequence, the focus of the debate about fiscal policy started to shift from fine-tuning to the role of automatic stabilisers, which are less subject to some of the critiques of activist fiscal initiatives.

In addition to economic arguments, there are explanations of a political and institutional nature that suggest that the discretionary fiscal-monetary mix tends to be skewed, in particular, towards expansionary fiscal policy. Nordhaus (1994) argues that fiscal authorities are elected and near election time they are unwilling to set in motion policies that lead to deteriorating economic conditions and offer only modest long-run payoffs. By contrast, monetary authorities typically have a longer time horizon, but they also tend to be cautious and often sluggish. This implies that for an economy locked in a high deficit or debt equilibrium, a debt reduction strategy, which cannot count on monetary reactions, either because inactive or ineffective, may result in a short-run politically lethal recession.

For this reason, politicians may consider the high-debt status quo to be the acceptable. This reasoning may help in understanding the situation in the 1980s to which the paper refers, but to some extent it also applies to nowadays in several advanced economies. The key difference is that in recent years monetary policy was not slow or inactive, rather it seems to have had limited effects on debt.

Against this background, during the 1980s, a broad consensus gradually emerged among most mainstream economists in favour of a rules-based policy and away from discretion. On the one hand, monetary policy insulated from political pressure and set independently was considered to be better able to prevent excessive inflation; on the other hand, discretion in setting fiscal policy had to be reduced as conducive of high deficits and debt.

Developments in policy circles, and especially close to the OECD, led to a search for a strategic approach to the policy mix.<sup>1</sup> The idea was that by defining monetary and fiscal policies in a more stable, medium-term framework, demand management would become steadier and more predictable. In practice the emphasis was on the reduction of governmental discretion in setting policies and regaining control over public spending. More specifically, the objectives of the policy mix were:

- to reduce/remove the trade-off between the monetary and fiscal stance in order better to control monetary growth and inflation expectations;
- control any too-rapid growth of public spending relative to nominal income;
- avoid the ‘crowding out’ of private investors induced by high budget deficits; this indirectly requires the reduction of government borrowing in order to lower interest rates;
- address problems of servicing growing public sector debt in the context of high real interest rates.

This framework resulted in the creation of politically independent central banks that would be charged with the maintenance of price stability. This has taken the form of different more or less flexible institutional arrangements, often formalised as inflation targeting. Interest in central bank independence grew even more during the debate ahead of the creation of monetary union for Europe, and was supported by broad consensus for more than a decade.

By 2008-09, this wisdom became challenged as policy-makers across the world were confronted with exceptional economic conditions. The global financial crisis led to a dramatic fall in output and employment rates, and conventional monetary policy rapidly ran out of ammunition, constrained at the zero lower bound in major developed economies. As monetary policy became less effective, and in this context of sinking aggregate demand, the alternative to monetary policy was to turn back to fiscal policy. At the November 2008 summit G20 country leaders agreed to implement unprecedented fiscal stimulus measures in a coordinated effort to prop up global economic activity. This episode of joint fiscal expansion marked the return of fiscal policy activism as a complement to automatic fiscal stabilisers, at least for a while and in some countries.

This shift has been associated with regained interest in the literature about the Keynesian fiscal multiplier. A key new finding was that there is not a single fiscal multiplier, and that the effect of fiscal policy actions is highly state-dependent. In this respect, a number of papers, among others Auerbach and Gorodnichenko, 2012; Baum et al., 2012; Blanchard and Leigh, 2013, showed that the fiscal multiplier is large when monetary policy and agents are constrained.

Against this brief overview of developments over the last 40 years, this paper asks whether policy independence led to a bias in the mix of monetary and fiscal policies and how this changed after the global financial crisis, in particular in the European monetary union.

---

<sup>1</sup> See Chouraqui and Price (1983).

The rest of the paper is organised as follows. In section 2 we present a survey of selected literature on fiscal and monetary policy issues. Section 3 looks at the evolution of the fiscal monetary policy mix and compares the US, the UK and the EMU. It then assesses the economic performance across countries, also considering individual EMU member states, relative to indicators of the monetary and fiscal stance. Section 4 illustrates in a comparative way fiscal policy in the EMU, the US and the UK after the outbreak of the global financial crisis. In a similar vein, sections 5 focuses on monetary policy. Section 6 concludes.

## **2 Selective literature review**

The economic literature looking at the policy mix mostly dates back to the early 1980s and grew during the 1990s. It was then characterised by a broad consensus that lasted more than a decade. The debate and the controversy resumed when the crisis started and questions about the policy response to the financial shocks and the role of central banks in assuring financial stability arose. Overall, the literature on the topic is vast and difficult to review in an exhaustive fashion in a short note.

In a broad sense such literature can be classified along three main lines of research. First, the macroeconomic literature looking at policy instruments and economic performance in optimisation setups. Second, the literature focusing on coordination among policies and the interaction between decision-makers. Finally, the political science and the political economic research focusing on the political reality and the institutional constraints in the definition of policies.

In what follows, the main issues and findings of the first two strands will be summarised and emphasis placed on how the financial crisis that started in 2008 represents a watershed in this area of research.

### **2.1 The traditional macroeconomic models and the DSGE models**

As mentioned in the introduction, after years of accommodative policies in response to oil shocks and the persistence of high employment combined with high inflation, high nominal interest rates and high deficits and debt, economic theory focused on the role of policies in keeping control of inflation as a necessary starting point.

Since then the literature on optimal fiscal and monetary policies is well established. One key milestone in this literature is Sargent and Wallace's (1983) theoretical work that proves that for monetary policy to permanently control inflation, monetary dominance over fiscal policy must be assumed. This work has been very influential for many years. In this framework monetary policy must be set independently (e.g. money growth rate) and fiscal policy is constrained by the demand for bonds.

Blanchard and Fisher (1988), while acknowledging that incentives, political reality and institutional constraints are key to explaining the characteristics of actual policies, address the question of fiscal and monetary policy-making from a theoretical point of view, using a traditional approach according to which macroeconomic policies should be set in order to maximise the social welfare function. One important message is that the likelihood of dynamic inconsistency (as in Kyedeland & Prescott, 1977) provides argument for policies based on rules, but not for interactive rules.

A decade later, Chari and Kehoe (1999) define a theoretical framework in which traditional theoretical tools of public finance – in particular optimal taxation under the Ramsey optimal allocation - are embedded in a general equilibrium model in order to understand how fiscal and monetary policy should be set in the long run and over the business cycle. They come up with specific findings about the features of taxation of the factors of production, state-contingent taxes and monetary policy. The main message of the analysis is that optimal policies should be driven by

efficiency considerations and in the end depend on the model's specifications, market imperfections and missing markets. Where these exist, policy should cure such imperfections.

A common feature of these works is that the policy analysis is largely developed in isolation or, when interactions among policies are examined, the focus is on the consequences of uncoordinated policies. In other words, the interaction between monetary and fiscal policy is modelled as a non-cooperative game between a central bank and its government, each having its own priorities over inflation and output.

As will be illustrated below, the literature looking at policy coordination starts from the assumption that coordination can lead to a Pareto improvement and hence should be modelled, not excluded by, assumption.

In the traditional macroeconomic approach, one argument for assuming such separation was that, if there is agreement that monetary policy is committed to price stability, there should be no need to coordinate with fiscal policy. A fairly broad consensus about monetary policy and its role in controlling inflation began to emerge in the late 1990s.<sup>2</sup> Consistently, most of the dynamic stochastic general equilibrium (DSGE) models developed in late-1990s and the early 2000s, which fed into a large stream of the literature, implicitly assumed that there is no need for coordination. In the models, monetary policy is defined by a Taylor-type rule (with alternative specifications about the measurement of inflation and inflation expectations, and possibly different weights applied to inflation and output gap but with higher weight on inflation) and fiscal policy is usually derived in an optimisation framework that reduces fluctuations in the economy.

Numerous authors, for instance Schmitt-Grohe and Uribe, (2001) and Benigno and Woodford (2003), examined the interaction between monetary and fiscal policy using new Keynesian DSGE models. These models can have different features that can broadly be ascribed to three different classes: the Solow model, the Ramsey model and the overlapping generations' model. One important conclusion is that automatic stabilisers combined more effectively with monetary policy based on rules than fiscal rules (Muscatelli et. al. 2004).

Interestingly, until the crisis DSGE models had a very poor description of the financial sector. The hypothesis of efficient markets and rational expectations permeates the structure of all models. Since 2007, market frictions and better specification of the financial sector have been added to the model framework.

In recent years the DSGE literature, including dynamic-macro prudential policies, has been growing substantially (see Angelini et al., 2014, Kannan et al., 2012, and Quint and Rabanal, 2014, among others). In this context the common objective is to monitor the systemic risk that threatens financial stability. The focus is on regulation that aims to increase resilience (e.g. stress tests, liquidity coverage ratio and issue warnings) using bank capital requirements, loan-to-value ratios and others. Like other policies, the macro-prudential authority sets a rule in order to attain an objective, which usually entails a maximisation of consumers' welfare. In reality, welfare in macroeconomic models is too ambiguous to become an operational, transparent target of macro prudential policy.

As mentioned in the introduction, the crisis led attention back to fiscal activism. Yet there is little evidence in the literature about the effectiveness of fiscal policy during times of crisis, and in the current economic environment it is even scarcer. The impaired functioning of financial markets, strongly accommodative monetary policy and heightened uncertainty are likely to have increased the impact of the fiscal policy impulse on economic activity by increasing the fiscal multipliers (see

---

<sup>2</sup> Clarida et al. (1999) is the reference paper on this topic, but many other papers reach consistent conclusions.

Blanchard & Leigh, 2013). At the same time, high public deficits may push up sovereign bond yields, crowd out private demand and even trigger financial instability. These factors are hard to quantify, and make it difficult to assess the effectiveness of fiscal policy.

To address the question of policy choice during a crisis, Dosi et al., (2015) explore the effects of alternative combinations of fiscal and monetary policies under different economic regimes. In particular, by using an agent-based model and hence moving away from the DSGE framework, they evaluate fiscal rules in economies subject to banking crises and deep recessions. They find that to stabilise the economy the most appropriate policy mix requires unconstrained counter-cyclical fiscal policies and a monetary policy that also targets employment. They argue that in the euro area fiscal rules, like the Stability and Growth Pact or the Fiscal Compact, tend to depress the economy, without improving public finances, even when escape clauses are considered in the case of recession. The model also shows that the negative effects of fiscal rules are magnified by conservative monetary policies focused on inflation stabilisation only. Overall, they argue against fiscal rules and the need for a monetary policy target that goes beyond inflation.

The issue of the role of central banks in the policy mix was also addressed by Orphanides (2013) who, highlighting different risks around monetary policy, questions whether central banks are overburdened by too many public policy objectives: full employment, fiscal sustainability and financial stability. He made the point that following the experience of the global financial crisis, central banks have been asked to undertake unprecedented responsibilities and to adopt solutions to problems that do not necessarily fit within the realm of traditional monetary policy. He argues that the appropriate policy mix should involve other institutions than central banks, and highlights the risk that overreliance on monetary policy to achieve these goals is bound to disappoint. Moreover, central bank policies that facilitate the postponement of necessary policy actions by governments may also have longer-term adverse consequences. These consequences could eventually diminish and compromise the independence and credibility of the central bank. This would reduce its effectiveness in maintaining price stability and contributing to crisis management.

## **2.2 Policy Coordination and the debt constraint**

A number of theoretical works have argued in favour of coordinated effort between monetary and fiscal authorities to manage the policy instruments that are available to them. Seeking an answer to the hypothesis that asks why there is a need for coordination of monetary and fiscal policy when monetary policy is committed to achieving price stability, Lambertini and Rovelli (2005) look at a large set of theoretical studies to identify their features. They find that most studies assume the existence of separate fiscal authorities while the main differences among them come down to assumptions on the specific goals of monetary and fiscal authorities. For example, if the goal of monetary authorities is to prevent deviation from the natural level of output and of actual inflation from its target, and that of the fiscal authorities is primarily focused on output, Uhlig (2002) shows that pressures on aggregate demand and hence on inflation may emerge if fiscal authorities want to stabilise output. This may induce the central bank to raise interest rates. In this context, coordination between monetary and fiscal policy would be useful. In the context of the EMU, Anderson (2002) put emphasis on the nature of the shocks rather than on the objectives of policies. He shows that the costs of uncoordinated policies tend to be more pronounced in the case of major common shocks, while they are significantly lower in the case of other smaller shocks. In a similar vein, Buti et al. (2001), in analysing the interaction between the fiscal and monetary policies, point to the fact that policies should be studied not only in terms of conflict or cooperation between them, but choices should be driven by the type of shock with which the economy is faced. They conclude that coordination is

desirable when the economy is faced with shocks on the supply side, while the opposite is true for shocks occurring in aggregate demand.

The literature mentioned so far does not consider any debt issue. Despite the large number of articles analysing different aspects of the policy mix, only a limited number of them studied the impact of debt budget constraints on the behaviour of the governments and the central bank. Beetsma and Bovenberg (1997) and Debrun (2000) analyse the interaction in the policy mix introducing an explicit government budget constraint. Beetsma and Bovenberg (2001) focused on the case of labour market distortions and nominal wage rigidity. In this set up, they show that inflation targeting eliminates the inflation bias but to avoid excessive debt accumulation fiscal authorities should be constrained with a debt targets.

In a similar vein, Hughes Hallett (2000) assumes that fiscal authorities can also be directly concerned about the national level of debt by inserting it into the government's loss function. The author highlights that the inflation bias and debt/deficit ratios are both reduced under fiscal leadership without any loss in output volatility. This outcome occurs thanks to the effects of the government's budget restraint.

This issue of the policy mix in the EMU is tackled by Bofinger and Mayer (2007), where the analysis of the interaction between monetary and fiscal authorities is conducted adopting a static version of the New Keynesian Model. In this set up that the central bank can reach the targets only on average. This implies that in the presence of strong economic asymmetries among member countries, great dispersion can be experienced. When shocks are strongly correlated the central bank can easily deal with them. At the same time, the central bank is likely to take into account idiosyncratic shocks in small member states only if their shocks are correlated with the rest of the union. Hence, in these countries stabilisation policies are the only possible reaction to shocks. In this setup the authors show that when the central bank performs a restrictive monetary policy (an increase in the interest rate), national governments increase their deficit in order to stabilise output.

On the wave of the recent crisis, Foresti (2013) takes the arguments of Bofinger and Mayer (2007) further and analyses the interaction between monetary and fiscal policies in a monetary union when fiscal authorities need to satisfy a debt constraint and conduct their policies from a national perspective, while the common central bank performs monetary policies on the basis of union-wide average data. He finds that fiscal authorities react to a restrictive monetary policy with restrictive fiscal policies, if debt stabilisation is binding. Conversely, they react with expansionary fiscal policies under the output stabilisation regime. In addition, the fiscal stance reacts to demand shocks even if they are perfectly symmetrical. Lastly, in the equilibrium the interest rate decreases when the average accumulated debt increases.

In theory, policy coordination means some form of decision-making process that determines a consistent policy mix that citizens want their elected government to implement. Governments would therefore need to determine the policy mix through the policy coordination that most effectively achieves a certain outcome. In order to determine the desired economic outcome, a ranking of preferences must be made. This exercise invariably involves trade-offs because with limited resources, society cannot have all its wants and needs satisfied.

In a historical perspective, it can be said that the ranking of preferences can vary and the constraints (on resources) can be more or less binding, according to the state of the economy and political circumstances. Both aspects do not only affect the coordination but, eventually, also the policy mix, even if policies are non-cooperative.



### 3 The fiscal and monetary policy mix: evidence over the period 2000-15

This section aims to offer some insight into the nature of the budgetary-monetary policy mix, compares interest rates with indicators of budget stance, over the period 2000-15 in the US, UK and the euro area.

Given the different economic conditions in different countries/regions, at the start of this century and with the creation of monetary union in Europe and the dot-com bubble in the US, the policy mix was somehow different across the Atlantic. In the US the response to the burst of the bubble required an expansionary stance which, as illustrated in Figure 1 materialised as a fall in the policy rate and increasing budget deficits. After two years of realignment in 2004 both policies became restrictive with an interest rate hike. But in 2007 both fiscal and monetary policies loosened, and the mix became aggressively expansionary in late 2008. In reality, the monetary policy was even looser than what emerges from Figure 1, because of the recourse to unconventional monetary policy measures, i.e. the different rounds of quantitative easing. The main change in the mix, happens after 2011 when the fiscal stance becomes restrictive.

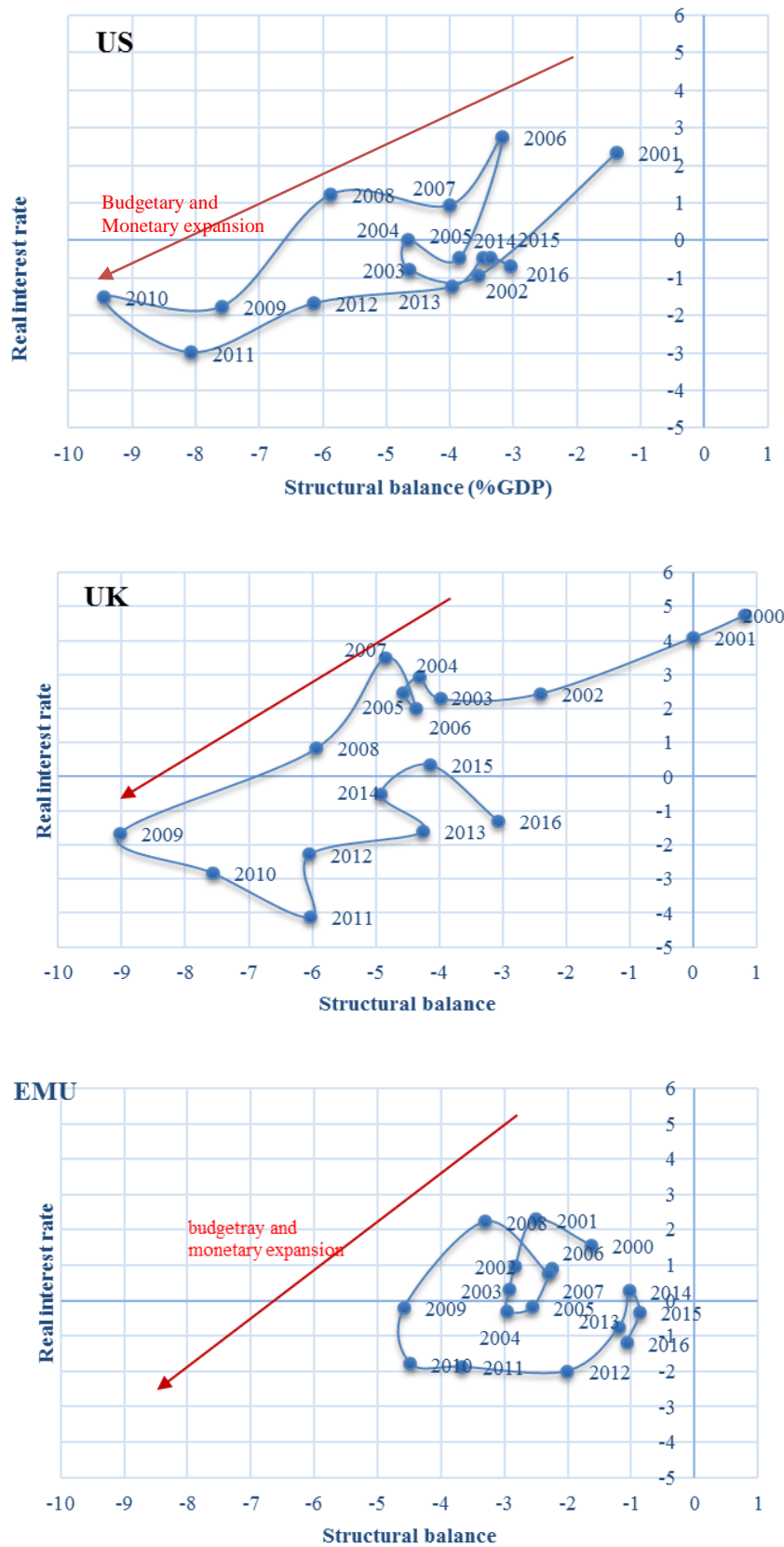
The description of the policy mix in the UK is quite similar; if anything the expansionary stance of the mix, both budgetary and monetary, is a feature for almost a decade. Like the US since the beginning of the crisis, monetary policy becomes more aggressive through several rounds of unconventional monetary policy while fiscal policy becomes restrictive (at least in structural terms) after 2009.

The EMU is to some extent different. Being the average of many countries, some of which experienced a debt crisis, but with a single monetary policy, the policy mix suggests a lesser magnitude, especially when it comes to fiscal policy. After 2011 monetary policy also became very aggressive, with recourse to unconventional measures.

Overall, in response to the crisis, the emphasis ex-post appears to have been on monetary rather than budgetary expansion, but the cyclically adjusted budget indicators show that the fiscal stance had been expansionary for a long time before the crisis. Furthermore, demand management policies were mutually supporting in the US and in the UK in the early stage of the crisis, much more than in the EMU.

Sections 4 and 5 conduct a more in-depth investigation into the fiscal and monetary policy reaction since the global financial crisis, respectively.

**Figure 1. Fiscal monetary policy mix in selected OECD countries: (policy) real interest rate (vertical axis) and structural balance as % of potential GDP (horizontal)**

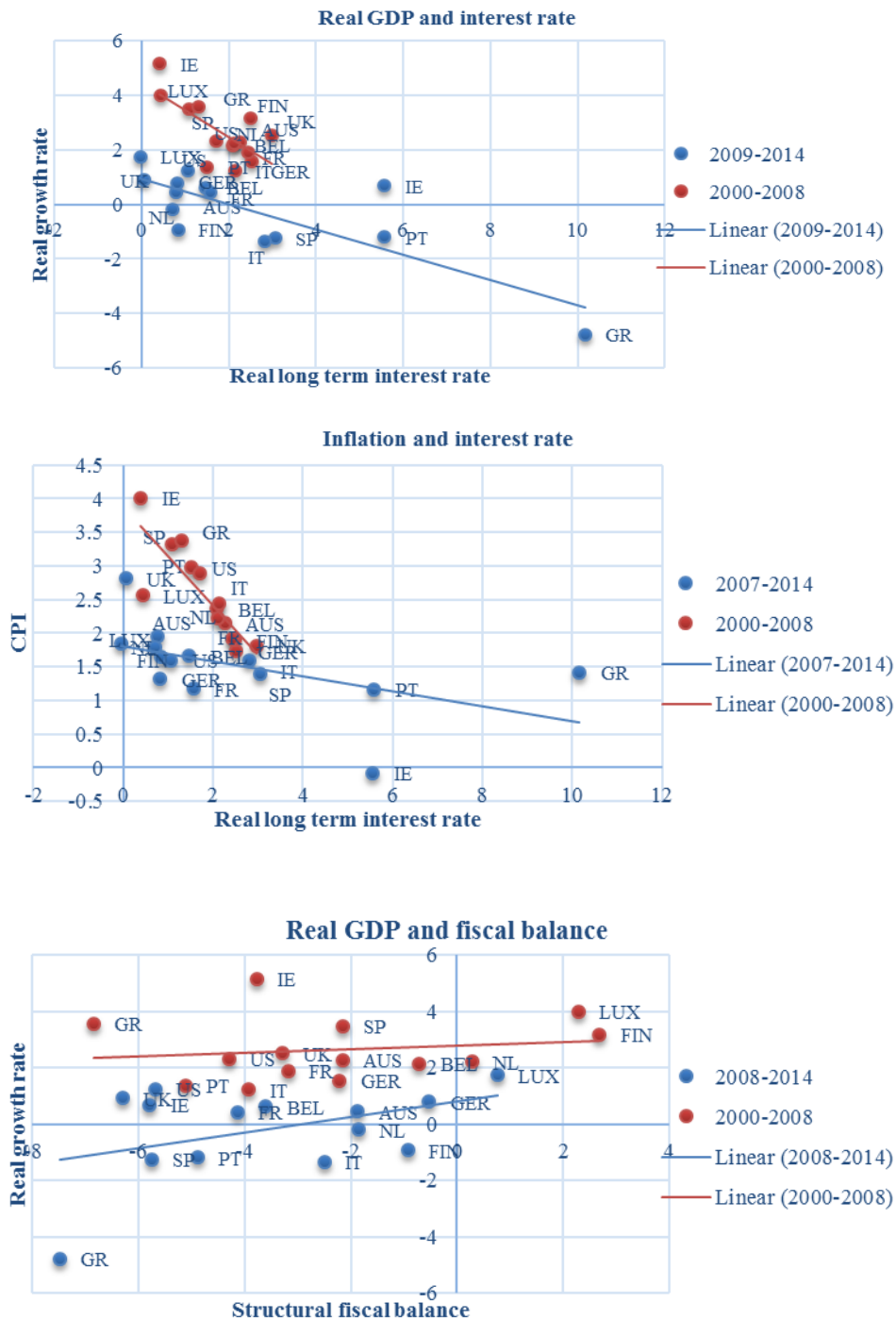


**Sources:** National central banks for the policy rate and inflation and IMF for the structural balance  
**Note:** data for the year 2000 is missing for the US.

Besides the quality of the mix, a key question relates to the performance of the economy: did the policy delivered? This is a very difficult exercise, even more so in a complex environment characterised by a financial/banking crisis but also by deep recession and the use of unconventional tools.

Figure 2 represent a rough qualitative assessment focusing on standard objectives and standard tools. For this reason, results should be taken with a pinch of salt.

**Figure 2. Economic performance and indicators of policy, before and after 2008, (EMU-12 countries, US and UK)**



*Sources:* authors' elaboration based on IMF (GDP growth and structural balance) and OECD (inflation and long term interest rates).

Overall, the comparison of long-term real interest rates, as a proxy for the monetary policy stance, and GDP growth and inflation, as proxies for economic performance, shows a negative relationship in both cases. In line with what economic theory would predict, lower interest rates were associated with higher growth and higher inflation. This correlation is much stronger over the period until the crisis (lines are steeper) and then it becomes weaker (lines are flatter), but also less reliable since the interest rates is not anymore of good proxy of policy.

The last panel, which displays the relationship between the fiscal policy stance and GDP growth, seems to suggest a lack of correlation between them and high dispersion. In order to account for the possibility that the crisis entailed a fall in potential output, we also look at the same charts and replace GDP growth with the output gap. The result is exactly the same.

## 4 Fiscal policy during and after the crisis

This section focuses on the evolution of the role of fiscal policy since the beginning of global financial crisis in the US, the UK and the EMU. As stressed by Alcidi et al., (2014), careful attention should be paid to the difference between the deficit and fiscal impulse in order to assess fiscal policy: while the latter refers to a change in the primary balance and affects growth directly, stable deficits, even if large, would not affect growth.

The fiscal impulse is broadly captured by the year-on-year change in the primary balance-to-GDP ratio, reflecting the magnitude and direction of the changes in the size of the primary budget surplus or deficit as a percentage of GDP. The fiscal impulse can be decomposed in two main components: 1) the operation of automatic stabilisers related to the business cycle – the cycle component of the budget; and 2) the fiscal stance, which consists of discretionary fiscal policy measures and a number of non-policy elements - the cyclically adjusted primary balance.<sup>3</sup> The latter appears to be the most comprehensive measure of the fiscal impulse (De Castro et al., 2010, Van Riet, 2011) and is preferred to the cyclically adjusted primary balance (CAPB). Indeed, while the magnitude of the fiscal policy measures was at the centre of the debate on fiscal policy when the crisis erupted, discretionary stimuli come in addition to the role played by automatic stabilisers, which already provide some direct degree of counter-cyclicality through built-in features of the government budget. A number of studies (Dolls et al., 2012, and Jan in't Veld, 2012) indicate that the role of automatic fiscal stabilisers is significantly larger in euro area countries compared to the US and UK, even though significant heterogeneity persists among member states.<sup>4</sup>

Against this background, in Figure 3, in addition to the overall fiscal impulse, we also report the primary balance to GDP, the output gap and the debt level in the US, UK, and the euro area.

In theory, the first step to understanding the fiscal reaction to the crisis is to examine whether the conduct of fiscal policy in the run-up to the crisis had created solid fiscal buffers (for this reason we show data from 2000 onwards). In this regard, the first observation is that the fiscal space available in the euro area as a whole was certainly no worse than the others. In fact, as mentioned in sections 3, the euro area stance had been more prudent than that of the UK and US prior to the crisis. Unlike them, the budget registered a (mild) primary surplus in 2006-07. In this respect, it is likely that the

---

<sup>3</sup> Note that the distinction between the cyclical and non-cyclical component of the deficit remain based on estimates which suffer from imprecise measurements. Morris et. al, (2009) point out that cyclically adjusted movements in tax revenues and government expenditure are not fully explained by discretionary measures but rather by non-policy factors associated with booms or busts.

<sup>4</sup> The Council of Economic Advisors (2009) suggests that the size of automatic stabilisers appeared to be negatively associated with the size of discretionary stimulus provided in 2009-10.

Stability and Growth Pact provided some degree of discipline to EMU member states. By contrast, and despite positive output gaps in the years prior the eruption of the crisis, the primary fiscal balance in the US and the UK recorded persistent deficits over the sample under consideration.

Considering the level of debt does not detract from the observation made above: the debt ratio of 64% for the EMU in 2007 was admittedly larger than the 40% registered in the UK, but it was on a par with the US.

The important point that does not emerge from the charts is that the euro area data hide a huge heterogeneity among member states, some of which experienced profound crisis while others were close to full employment.

#### **4.1 Fiscal impulse: expansion (2008-09) and contraction (2010-15)**

In order to gauge the extent of fiscal policy reaction (both in its discretionary and automatic component), it is particularly relevant to look at the fiscal impulse (as measured by the decline in the government primary balance) in 2008-09, and from 2010 onwards.

Notwithstanding the effect of the recession on GDP (thus on the denominator on which changes in the primary are measured), the magnitude of the fiscal impulse in 2008-09 among the four economies is remarkable. The fiscal impulse was positive (negative on the chart) in all countries in 2008, mostly as a result of cyclical stabilisers, oscillating between 1.5% in the EMU and 4% in the US. The impulse gathered further strength in 2009 as the crisis deepened and stimulus packages were adopted across the globe, attaining 4.5% of GDP in the euro area and above 6% in the UK and the US. The fiscal impulse has subsequently turned negative, marking the beginning of a process of fiscal consolidation after 2010, against a backdrop of political resistance to pursue further fiscal expansion also induced by growing market pressures, especially in some regions.

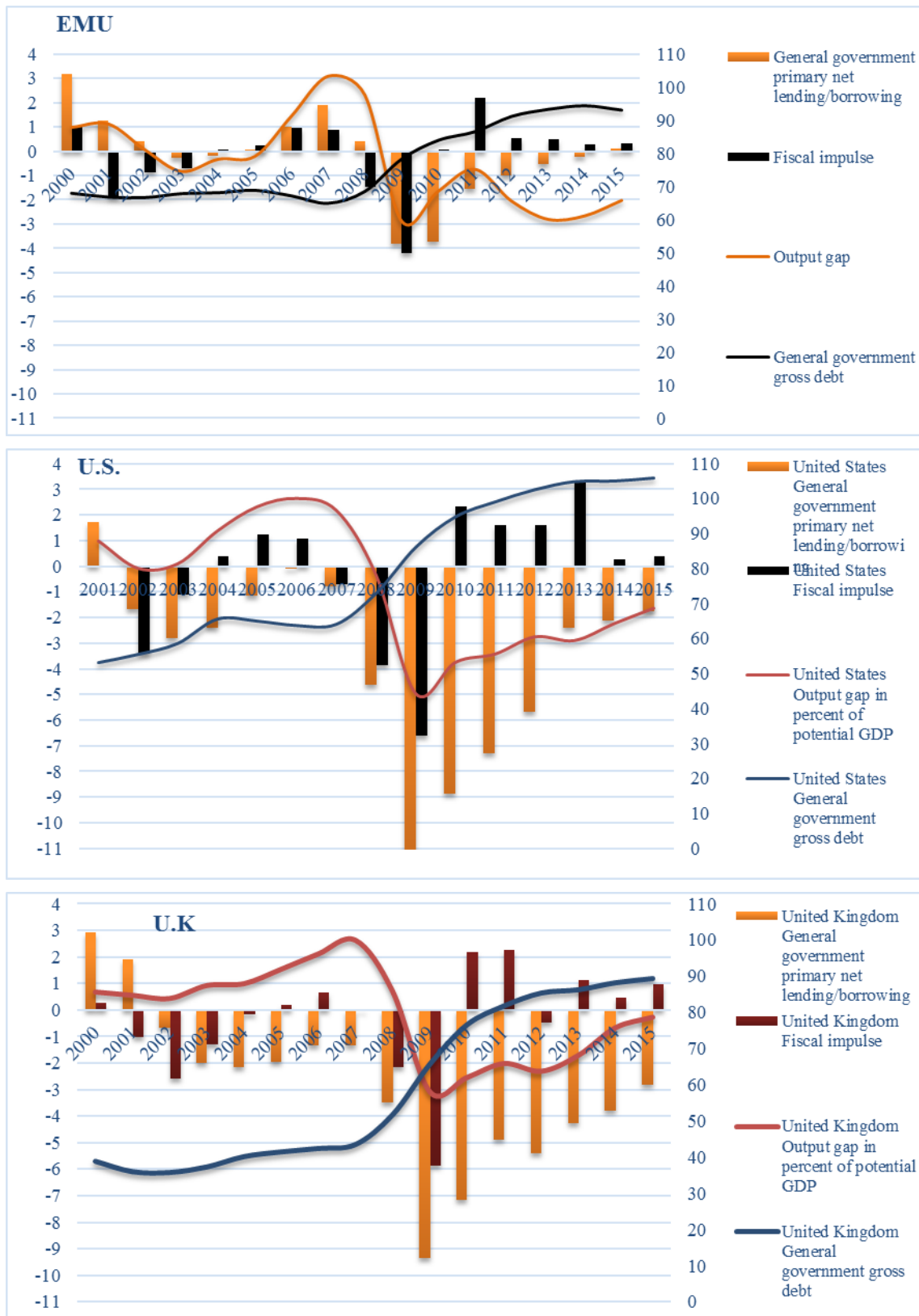
When comparing across the regions, the EMU appears to be subject to smoother movements in the primary fiscal stance:<sup>5</sup> the fiscal impulse coming from fiscal policy was smaller both during the expansionary (2008-09) and tightening (2010-14) phases<sup>6</sup> (see Box 1 for details about the 2008-09 fiscal stimuli).

---

<sup>5</sup> It should be noted that the fiscal impulse adopted in individual member states in 2009 appears to have broadly reflected the amount of fiscal space available and the magnitude of the economic shock as the crisis took hold.

<sup>6</sup>The cumulative fiscal stimulus over the period 2008-09 was about 5.5% of GDP in the euro area compared to 10.5% in the U.S and around 8% in the UK and Japan. Conversely, the adjustment appears to have been of a smaller magnitude in the euro area: cumulated consolidation amounted to 4% of GDP in the euro area as opposed to 5% in Japan, 6.5% in the UK, and 9.5% in the US.

**Figure 3. Fiscal deficit, fiscal impulse and debt over the cycle: euro area, US and UK**



Source: Authors' elaboration based on IMF (WEO) data.

**Milder fiscal policy reaction in EMU: explanatory factors**

The conclusion that seems to emerge from the analysis is the following: the euro area has reacted in a significantly more conservative way to the crisis despite the relatively better fiscal space available and the presumably large size of its automatic stabilisers, providing less fiscal expansion than its counterparts, and consolidating less abruptly than its peers. In particular, three sets of factors specific to the euro area help reconcile the two views set out above.

- *Fiscal rules*

First, the euro area ‘policy mix’ includes strong fiscal rules that constrain national fiscal authorities. This, in principle, leads to lower fiscal activism, particularly during large crises when rules become binding and may even create recessionary bias (De Grauwe, 2013). Therefore, when the deficit or debt criteria are hit during a large crisis, fiscal policy enjoys less room for manoeuvre compared to federations where the central fiscal authority can in principle run virtually unlimited deficits.

- *Sovereign crisis*

Secondly, the constraint imposed by the rules was compounded in some countries by extreme market discipline, which resulted in a loss of access to the credit market, and forced a faster adjustment in some countries. Episodes of fiscal consolidation in 2010-13 were motivated, especially in the European Union, by the bond market reaction to a large increase in debts and deficits, which were actually not larger compared to what was seen in Japan, the US and the UK. While deviance from the markets in Greece was largely justified by the irresponsible behaviour of its public financial bodies, other fiscally sound countries such as Spain and Ireland saw domestic banking crisis spilling over into a sovereign debt crisis as a result of the large fiscal cost implied by banks bailouts, and the self-fulfilling expectations of financial markets.

The financial-fiscal nexus exhibited by the crisis has taken a particularly dramatic turn in the EMU, notably due to the absence of a banking union and lender-of-last-resort guarantees. Being able to borrow in a currency they can control, the UK and the US have been less concerned about the size of the fiscal deficit and were able to support the financial system with less turmoil. By contrast, measures by European governments to save banks and bolster up aggregate demand have been perceived by financial markets as jeopardising fiscal sustainability in certain countries. It eventually imposed sharp fiscal consolidation in the most distressed countries, essentially the euro area periphery. Thus, aggregate numbers of the euro area fiscal reaction to the crisis masks important divergences across member states: the adjustment was indeed essentially borne out by the periphery.

- *Correcting for the fiscal cost of support to financial institutions*

Thirdly, the financial crisis had considerable direct and indirect effects on government fiscal balances. In terms of direct effect, the UK, US and certain EMU member states had to bail out financial institutions and provide guarantees, which directly affected their deficit. Taking into account the portion of fiscal deficit owing to intervention in financial institutions, and other one-off fiscal operations<sup>7</sup> provides interesting nuances to the intended impulse of fiscal policy during the crisis. In 2009, the cost of the Troubled Asset Relief Program (TARP) in the US accounted for about 2% of fiscal impulse alone (CBO, 2016). Thus, abstracting from this element of the deficit, the difference in the magnitude of the fiscal impulse between the two sides of the Atlantic appears narrower, in the order of 1% in 2009 rather than 3%.

---

<sup>7</sup> It should be noted that estimating the budgetary effects of such one-off operations is difficult as it requires relying on different data sources, with possibly different accounting norms. Thus, these figures need to be taken with necessary caution. According to the most recent estimates (2016) issued by CBO, the cost of TARP amounted to 1.93% of GDP in 2009, and subsequently yielded a positive contribution to the budget of 0.82% of GDP in 2010, 0.37 % of GDP in 2011, +0.2 % of GDP in 2012. According to AMECO, one-off and other temporary measures in the euro area have respectively amounted to -0.8 in 2010, -0.4 in 2012, +0.6 in 2013, +0.3 in 2013, and +0.4 in 2015 as ratio to GDP. Note that they have been negligible in the UK according to AMECO. However, according to the U.K government, excluding public sector banks (e.g. Northern Rock, Royal Bank of Scotland) from the net borrowings shows that the deficit is 0.8% smaller in 2008-2009, 1.2% in 2009-2010, 1.1% in 2010-2011, 1.2% in 2011-2012, 0.5% in 2013-2014, 0.4% in 2014-2015 and 2015-16.

Including the cost of rescuing financial institutions provides a different picture of policy-makers' behaviour in 2010 for the euro area and the US. Indeed, if one combines the 'overestimation' of the US fiscal deficit in 2009 due to TARP cost (2% of GDP) with the positive contribution of about 1% of GDP to the federal fiscal balance that TARP made in 2010, fiscal policy has remained mildly supportive of aggregate demand, with a positive fiscal impulse of about 1% of GDP in the US in 2010. In EMU, according to AMECO the cost of one-off and other temporary measures was zero in 2009, whereas it amounted to 0.8% of GDP in 2010, suggesting that the fiscal consolidation already took place in 2010 in the EMU if one abstracts from one-off operations in 2010. While the exact fiscal cost of one-off operations such as rescues of financial institutions remains difficult to quantify precisely, and is only known exactly after a significant period of time, the message it seems to convey is that fiscal expansion was comparatively larger when taking into account this effect during 2008-09, while consolidation was in fact sharper than suggested by figures including one-off operations.

**Box: The 2008-2009 discretionary fiscal stimulus**

If one assumes that automatic stabilisers are indeed automatically implemented regardless of what the government does, an additional interesting question concerns the extent to which government adopted *discretionary* fiscal stimuli.

As a response to the demand slump, the European Commission launched the European Economic Recovery Plan (EERP) in 2008 with the objective of providing a coordinated short-term fiscal policy boost to aggregate demand with a total package amounting to €200 billion (1.5% of EU GDP) in 2009-10.<sup>8</sup> Although this effort was a remarkable episode of policy coordination among EU countries, the aggregate number masks a large degree of dispersion across member states in terms of the size of the stimulus.

The dispersion of the fiscal stimulus size by country within the EMU is illustrated in the table below which reports estimates of the discretionary fiscal stimulus in 2009 (CEA, 2009) in the main industrialised economies. Germany provided the bulk of the stimulus in the euro area with discretionary expansion amounting to 1.5% of GDP in 2009 only, whereas Italy's stimulus was close to 0, and France's amounted to 0.6% of GDP. Overall, the fiscal boost in the euro area was relatively modest compared to the stimulus adopted outside the EMU, reflecting the constraints to the conduct of fiscal policy in the EMU. Indeed, on the other side of the Atlantic, the US adopted a fiscal stimulus of about \$800 billion (about 5% of GDP) including both extra spending and tax cuts in 2009-10. In terms of discretionary fiscal boost in 2009 in the US, the stimulus amounted to 2.0%. At the same time, estimates of the fiscal boost in 2009 amounted to 1.5% in the UK, and 2.4% in Japan.

| Country                     | Share of GDP | Country                     | Share of GDP |
|-----------------------------|--------------|-----------------------------|--------------|
| Australia <sup>a</sup>      | 2.2%         | Korea <sup>a</sup>          | 3.0%         |
| Canada <sup>a</sup>         | 1.7%         | Mexico <sup>a</sup>         | 1.4%         |
| China                       | 2.6%         | Norway <sup>a</sup>         | 1.2%         |
| Czech Republic <sup>a</sup> | 1.6%         | Poland <sup>a</sup>         | 0.8%         |
| France <sup>a</sup>         | 0.6%         | Russia                      | 2.9%         |
| Germany <sup>a</sup>        | 1.5%         | South Africa                | 2.2%         |
| India                       | 0.6%         | Sweden <sup>a</sup>         | 1.4%         |
| Indonesia                   | 1.4%         | Switzerland <sup>a</sup>    | 0.6%         |
| Italy <sup>a</sup>          | 0.1%         | United Kingdom <sup>a</sup> | 1.5%         |
| Japan <sup>a</sup>          | 2.4%         | United States <sup>a</sup>  | 2.0%         |

Source: CEA estimates based on IMF, OECD, and Brookings data.  
 Note: a. Country is an OECD member.

CEA, First Quarterly Report, September 2009

<sup>8</sup> The ECB (2011) points out that the measurement of the fiscal stimulus packages is subject to considerable definition problems, because there is no clear distinction between the fiscal stimulus measures in response to the crisis as part of the EERP, and those measures that would have been taken without the crisis.



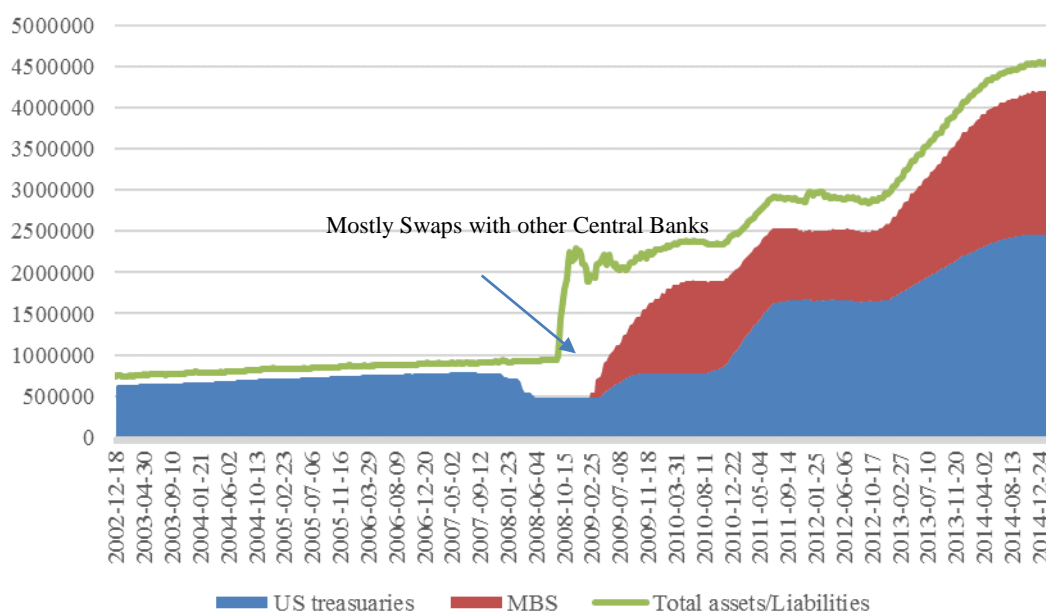
## 5 Monetary policy: a comparative approach

After the crisis, monetary policy responded forcefully everywhere, particularly in the US and the UK with the early implementation of quantitative easing (QE) and credit-easing measures, which as shown in figure in Figure 4 and 5 resulted in a large increase in the size of the central banks' balance sheet. In the euro area, QE started much later, in early 2015 (see Figure 6), but unconventional measures had been in place since mid-2010. The first round of non-standard policy intervention took the form of limited purchases of sovereign bonds in distressed countries and support to the banking sector. Only when the ECB was confronted disinflationary risks, QE was implemented. Since mid-2014, a range of monetary policy tools including targeted measures to revitalise specific market segments and strengthen bank lending, a broad-based easing of overall financial conditions and cuts in the main ECB interest rates, including by setting negative rates on the deposit facility. Indeed, the ECB was the only central bank to go beyond the zero lower bound of the interest rate. While the interest rate is a traditional tool for monetary policy, setting negative rates has never been used.

The assessment of QE is still an open issue. U.S. recovery has been stronger than in the euro area and for 2016 growth is expected to continue, along with a gradual normalisation of interest rates. This could be interpreted as proof that, even with a restrictive fiscal policy, monetary policy can play a decisive role in generating a meaningful recovery and getting firmly away from the lower bound.

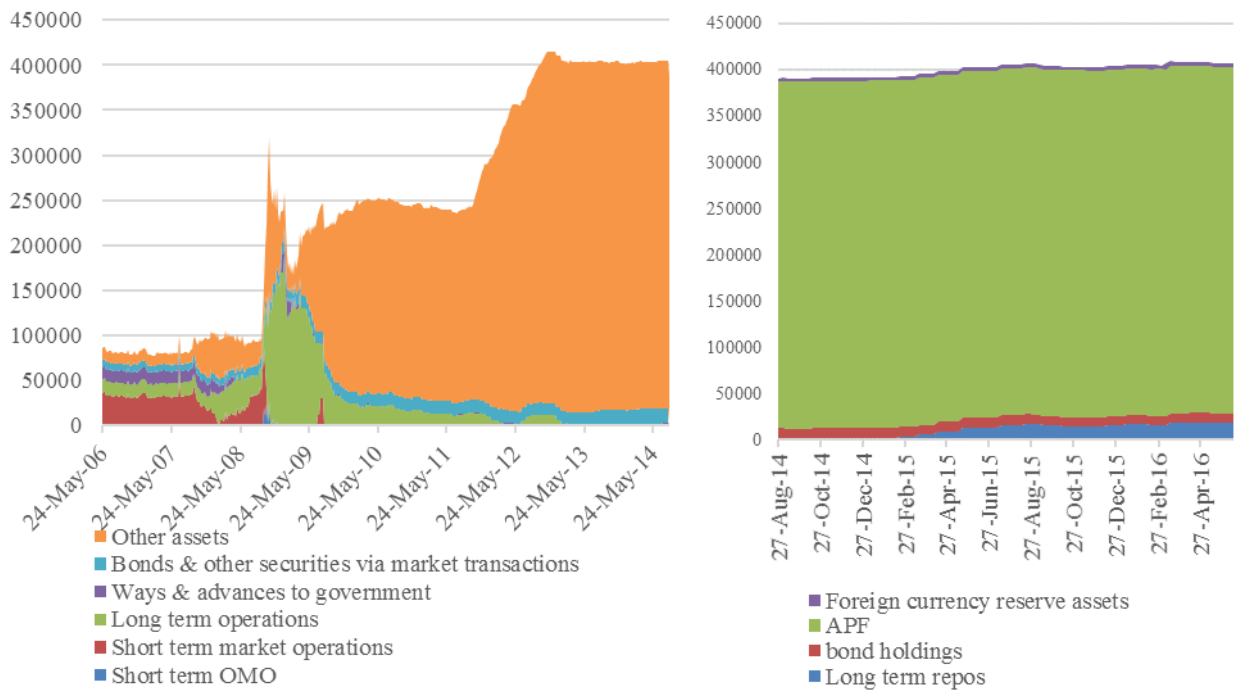
In the UK, QE has been considered as broadly successful. Now the shock of Brexit vote is likely to push back in time any possibility of policy normalisation. The euro area is where the success of QE is less clear cut. Recovery is weak, is uneven across countries and inflation has remained below target.

**Figure 4. Federal Reserve balance sheet. Selected assets (billions of dollars)**



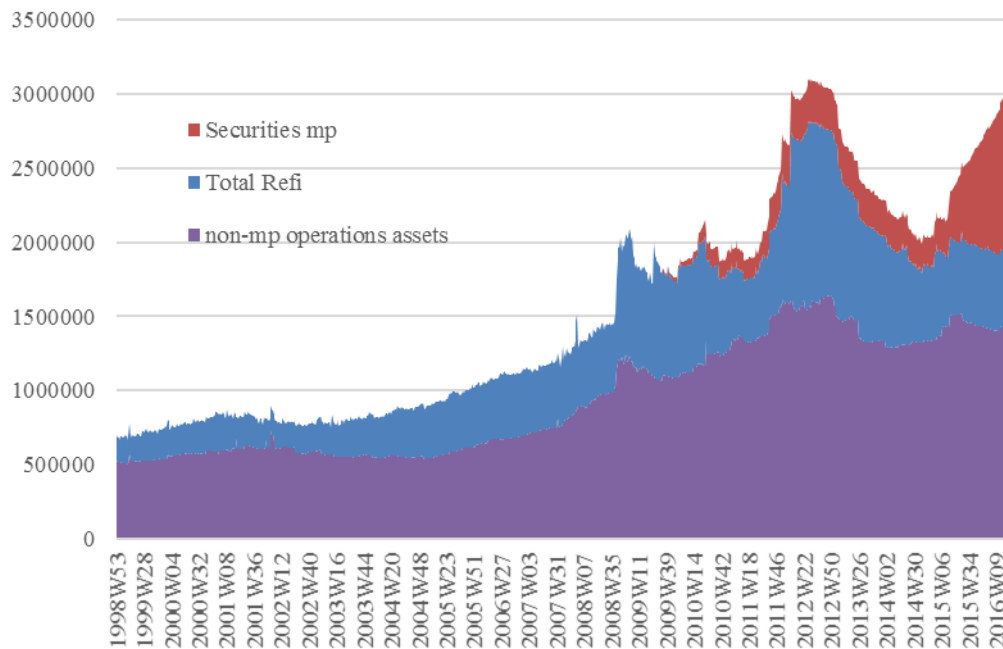
**Source:** Federal Reserve, Flows of funds.

**Figure 5. Bank of England balance sheet (millions of sterling)**



Source: Bank of England.

**Figure 6. ECB balance sheet, selected items, assets (billions of euro)**



Source: ECB.

When trying to consider the role of monetary policy in the policy mix, however, it should be acknowledged that the financial crisis completely changed the landscape. An apparently stable

macroeconomic environment, like those of the early 2000s, was fertile soil for imbalances and resulted in a huge financial crisis. This resulted in major challenges for policy-makers:

- Financial stability cannot be ignored in the definition of the policy mix
- Financial stability has become part of the mandate of central banks
- Public debt is high and is a source of instability
- The economy is weak and fiscal policy is constrained
- The financial system is weak
- Unconventional monetary policy measures jeopardise central banks' independence.

## 6 Concluding remarks

For almost 30 years before the financial crisis erupted, a consensus gradually formed that, in the medium term, the policy mix was driven by the separation of monetary and fiscal policy. Monetary policy, set by independent central banks, had to achieve the objective of controlling inflation and fiscal authority, democratically elected, had only very limited discretionary power in setting fiscal policy. This was clearly the case in reality as far as central banks are concerned. For Fiscal policy, it is less clear. The evidence suggests that in the US and in the UK, and for some years also in the EMU, the structural fiscal balance was systematically in deficit, which may indicate (although not necessarily correctly) discretionary fiscal action.

Economic conditions changed dramatically in 2008 with the onset of the global financial crisis. Budgetary and monetary policies reacted drastically with the resurgence of fiscal activism, at first coordinated at international level, but above all, the reaction consisted of extremely loose measures adopted by central banks to reduce financial instability.

The general objective of non-inflationary growth, which for long time was the driver of the medium-term policy mix, was abruptly replaced by the need to respond to a balance sheet crisis, which led to a large fall in aggregate demand, and financial instability. Ultra-loose monetary policy and expansionary fiscal policy, combined with the bailout of financial institutions, have inevitably resulted in problematic longer-run implications: traditional monetary policy instruments are locked at the zero bound and an exit strategy from unconventional measures must be identified; and public debt levels are excessive and must be kept under control in an environment of low growth.

If one compares the current post-financial crisis environment, shaped by the effects of the crisis itself and the policy responses to it (very low interest and inflation rates and very high debt) to the 1980s when high inflation and high nominal interest rates were combined with high deficits and debt, the balance of the mix between monetary and fiscal policy that can deliver adequate long-term growth would be different. While in the 1980s there was consensus that monetary policy had to take the lead in achieving lower inflation, this truly happened only when fiscal policy also accommodated the shift.

The challenges posed by understanding and responding to the budgetary-monetary policy mix may be even more complicated than back then. This is likely to be especially true within the euro zone, where member states with the highest level of debt overhang have the greatest difficulty in formulating the policy mix, caught between the need to ensure economic stabilisation and reduce public debt. Restrictive budgetary policies alone are unlikely to succeed, but debt cannot be ignored when defining the policy mix.

## References

- Afonso, A., C. Checherita, M. Trabandt and T. Warmedinger (2010) “Euro Area Fiscal Policies: Responses to the economic crisis”, in *Fiscal Policies after the crisis*, Editor Ad van Riet, Occasional Paper Series 109
- Alcidi C., Gros, D. and Giovannini (2013) “A. ‘Revisiting the fiscal consolidation debate in Europe’” *Intereconomics*, Forum on “Crisis Induced Fiscal Restructuring in Europe”, Vol. 49/6, pp. 311-318.
- Andersen, T. (2005), “Fiscal Stabilization Policy in a Monetary Union with Inflation Targeting”. *Journal of Macroeconomics* Volume 27, Issue 1: 1–29
- Angelini, P., S. Neri and F. Panetta (2014), “Monetary and Macroprudential Policies,” Working Paper Series No. 1449, European Central Bank.
- Auerbach, A., and Y. Gorodnichenko, (2012), “Fiscal Multipliers in Recession and Expansion,” in *Fiscal Policy after the Financial Crisis*, edited by Alberto Alesina and Francesco Giavazzi (Chicago: University of Chicago Press).
- Blanchard, O.J. and Fischer, S. (1989) *Lectures on Macroeconomics*. Cambridge: MIT Press.
- Blanchard O. and D. Leigh (2013) “Growth Forecast Errors and Fiscal Multipliers”, IMF Working document WP/13/1
- Barro, R. J., (1974), ‘Are Government Bonds Net Wealth?’ *Journal of Political Economy* 82(6), November-December, pp. 1095-1117.
- Baum, A., M. Poplawski-Ribeiro, and A. Weber (2012) “Fiscal Multipliers and the State of the Economy,” IMF Working Paper No. 12/286 (Washington: International Monetary Fund).
- Beetsma, R. M. W. J. and A. L. Bovenberg, (1997) “Central Bank Independence and Public Debt Policy”, *Journal of Economic Dynamics and Control*. Elsevier, vol. 21(4-5), pp. 873-894.
- Benigno, P., and M. Woodford. (2003) *Optimal Monetary and Fiscal Policy: a Linear-Quadratic Approach*, NBER Working Paper No. 9905
- Bofinger, P. and E. Mayer, (2007) “Monetary and Fiscal Policy Interaction in the Euro Area with Different Assumptions on the Phillips Curve”, *Open Economies Review*. Springer, Vol.18(3), pp. 291-305.
- Buti M, Roeger W, and Jan In’t Veld. 2001. *Stabilizing output and inflation: policy conflicts and coordination under a stability pact*. JCMS: *Journal of Common Market Studies*.
- Clarida, R., J. Gali and M. Gertler (1999). "The Science of Monetary Policy: A New Keynesian Perspective." *Journal of Economic Literature*, 37(4): 1661-1707.
- Chari, V.V. and Kehoe, Patrick J. (1999). “Optimal Fiscal and Monetary Policy”, Federal Reserve Bank of Minneapolis Research Department Staff Report 251.
- Chouraqui, J. and R.W. Price (1983), "Medium-Term Financial Strategy: The Co-ordination of Fiscal and Monetary Policies", OECD Economics Department Working Papers, No. 9, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/034626486843>
- Congressional Budget Office, 2016. ‘Report on the Troubled Asset Relief Program— March 2016’ available at: <https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/51378-TARP.pdf>

- Council of Economic Advisors, (2009), ‘The impact of the American Recovery and Investment Act of 2009’. First quarterly report. September 2009
- Debrun, X., “Fiscal Rules in a Monetary Union: A Short Run Analysis”, *Open Economies Review*, Springer, vol. 11(4), pp. 323-358, October 2000.
- De Castro, F., J. Kremer and T. Warmedinger (2010), “How to Measure a Fiscal Stimulus?”, *Presupuesto y Gasto Público*, No. 59, pp. 103-16.
- De Grauwe P. (2013) Design failure in the Eurozone - can they be fixed? *European Economy. Economic Papers* 491, Brussels, European Commission.
- Dolls, M., C. Fuest and A. Peichl, A. (2012) Automatic stabilisers and economic crisis: US vs. Europe, *Journal of Public Economics*, Vol. 96, 279-294.
- Dosi G., M. Fagiolo, A. Napoletano, A. Roventini and T. Treibich (2015) “Fiscal and monetary policies in complex evolving economies” *Journal of Economic Dynamics and Control*, Volume 52, March 2015, Pages 166–189
- Foresti P. (2013) “How do Debt Constraints Affect Fiscal and Monetary Policies Interaction in a Strategic Monetary Union?” *Journal of Game theory*, Vol. 2(2): 13-17
- Gordon, Roger H., and Dale W. Jorgenson, 1976, ‘The Investment Tax Credit and Counter-Cyclical Policy’, in O. Eckstein, ed., *Parameters and Policies in the U.S. Economy* (Amsterdam: North-Holland), pp. 275-314.
- Hughes Hallett, A. J., (2008), “Debt Targets and Fiscal Sustainability in an era of Monetary Independence”, *International Economics and Economic Policy*, Springer, vol. 5(1), pp. 165-187.
- In’t Veld, J., Larch M., and M. Vandeweyer (2012), “Automatic Fiscal Stabilisers: What They Are and What They Do,” *Open Economies Review*, 1–17.
- Kydland, F. E., and E. C. Prescott, (1977), “Rules Rather than Discretion: The Inconsistency of Optimal Plans”, *Journal of Political Economy* 85(3), June, pp. 473-491.
- Kannan P., P. Rabanal and A. Scott (2012), *Monetary and Macroeconomic Policy Rules in a Model with House Price Booms*, IMF Working document WP/09/251
- Lambertini, L., and R. Rovelli. (2005), *Monetary and fiscal policy coordination and macroeconomic stabilization. A theoretical analysis*. Dipartimento di Scienze Economiche Università di Bologna
- Lucas, R. E., (1976), ‘Econometric Policy Evaluation: A Critique’ in K. Brunner and A. H. Meltzer, eds., *The Phillips Curve and Labour Markets* (Amsterdam: North-Holland), pp. 19- 46.
- Morris, R., C. R. Bras, F. de Castro, S. Jonk, J. Kremer, S. Linehan, M. R. Marino, C. Schalck and O. Tkacevs (2009), “Explaining government revenue windfalls and shortfalls: an analysis for selected EU countries”, ECB Working Paper No. 1114.
- Muscattelli, V. A., T. Ropele, and P. Tirelli. (2004), “Fiscal and Monetary Policy Interactions in a New Keynesian Model with Liquidity Constraints”, University of Glasgow and CESifo, Munich
- Nordhaus W, (1994), “Policy Games: Coordination and Independence in Monetary and Fiscal Policies”, *Brookings Papers on Economic Activity*, 2:1994
- Office for National Statistics, ‘Public sector finances – May 2016’. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/530312/Public\\_Sector\\_Finance\\_-\\_May\\_2016.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/530312/Public_Sector_Finance_-_May_2016.pdf)

- Orphanides A. (2013) "Is monetary policy overburdened?" *BIS Working Papers* No. 435
- Quint D. and P. Rabanal (2014), "Monetary and Macprudential Policy in an Estimated DSGE Model of the Euro Area", IMF Working document WP/13/209
- Sargent, T.J., and N. Wallace (1981), "Some unpleasant monetarist arithmetic". Federal Reserve Bank of Minneapolis Quarterly Review 5: 1-17.
- Sehovic D. (2013) "General Aspects of Monetary and Fiscal Policy Coordination", *Journal of Central Banking Theory and Practice*, Vol.3, pp. 5-27
- Schmitt-Grohe, S., and M. Uribe. (2001), "Optimal Fiscal and Monetary Policy Under Sticky Prices", NBER Working Paper No. 9220.
- Togo, E. (2007) *Coordinating Public Debt Management with Fiscal and Monetary Policies: An Analytical Framework*, Policy Research Working Paper 4369.
- Uhlig, H. (2002) One Money, But Many Fiscal Policies in Europe: What Are the Consequences? CEPR Discussion Paper no. 3296.
- van Riet, A., ed. (2010), "Euro Area Fiscal Policies and the Crisis", Occasional Paper Series no 109, European Central Bank, April.