Macroeconomic stabilisation in the EMU: rules versus institutions *

Lilia Cavallari
University of Rome III

Debora Di Gioacchino
University of Rome "La Sapienza"

Abstract

This paper investigates the macroeconomic implications of different policy regimes in a monetary union with independent fiscal authorities that act strategically vis à vis a common central bank. In the presence of other policy goals than cyclical stabilisation, such as interest rate smoothing and fiscal stability, we show that coordination among national fiscal authorities can reduce output and inflation volatility relative to the non-cooperative setting in specific circumstances only, as in case of demand disturbances and positive fiscal spillovers, while turning potentially counterproductive otherwise. The adverse effects of union-wide coordinated fiscal measures can be attenuated in a regime of global coordination, namely when a centralised fiscal stabilisation is coordinated with the common monetary policy as well.

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1 Introduction

The advent of the European Monetary Union has revived the interest in monetary and fiscal policy interactions. The strategic environment faced by national fiscal authorities changes as a result of monetary unification, potentially affecting the optimal design of fiscal policy in several ways. This paper focuses on cyclical stabilisation in a monetary union, by analysing the monetary and fiscal reaction to global and country-specific disturbances in a regime of non-coordinated policies as well as under different setups of monetary and fiscal coordination.

While there is wide consensus in the literature on the possibility of coordination failures arising from the strategic interplay between national fiscal authorities and a supra-national central bank, it is highly debatable whether the desired policy mix can be conveniently implemented through appropriate fiscal rules, such as the Stability and Growth Pact, or via institutional design, as for example the creation of a supra-national fiscal entity. The upshot of rules is rigidity and lack of economic foundations (arbitrary debt and deficit limits, falsifiable accounts), while institutions act on the proper incentives so as to deliver the desired outcome (Wiplosz, 2002). In this paper, we aim to shed some light on these issues by providing a simple model of a monetary union with independent fiscal authorities that act strategically vis à vis a common central bank.

In the presence of other policy goals than macroeconomic stabilisation, such as interest rate smoothing and fiscal stability, this paper shows that macroeconomic outcomes may deteriorate in a monetary union as a consequence of fiscal policy-makers failing to internalise the union-wide consequences of their moves: a fiscal expansion in one country of the union may directly spillover onto other members' output as well as affect union-wide prices and interest rates. Depending on the relative magnitude of these effects and the source of cyclical instability, excess volatility in union-wide output or inflation or both may occur.

Comparing macroeconomic outcomes across policy regimes, the paper further shows that non-cooperative fiscal and monetary policies lead to higher output volatility but not necessarily to more stable inflation. Coordination among national fiscal authorities proves advantageous when monetary and fiscal instruments are strategic complements, as for example in the wake of demand shocks. When facing supply shocks, instead, fiscal coordination may turn counter-productive by inducing excessive fiscal activism.

The case for counterproductive fiscal coordination is weakened when fiscal authorities behave cooperatively towards the central bank, i.e. under global coordination. Global coordination unambiguously helps solving the free-riding problems that may originate in a monetary union as a consequence of the attempts on the part of each policy-maker to shift the burden of cyclical adjustment onto other authorities. It may also reduce policy conflicts by favouring a more appropriate split of tasks between monetary and fiscal policy.

Differently from Dixit and Lambertini (2003), the macroeconomic performance under global coordination can be reproduced in a non-cooperative setting provided there is agreement on policy targets as well as on their relative weights. Monetary-fiscal symbiosis vanishes when there are other policy goals than cyclical stabilisation.

The paper is organised as follows: section 2 models the monetary union and describes the rules of the game. Section 3 compares the union-wide macroeconomic performance in a regime of non-coordinated monetary and fiscal policies and under fiscal and global coordination. Section 4 discusses the policy implications of these regimes and section 5 concludes.

2 A simple analytical framework

Recent advances in macroeconomic modelling as sinthesized by Clarida, Galì and Gertler (1999), show that expectations-augmented versions of traditional aggregate demand and supply equations provide a first-order approximation to a dynamic, general equilibrium model with monopoly distortions and nominal rigidities, capturing in a reduced-form context the main transmission mechanisms in the economy. This proves particularly useful in policy games, where a simplified analytical framework allows to compare different solution concepts without resorting to otherwise inevitable numerical simulations.[1]

Drawing on the Clarida-Galì-Gertler approach, we consider an aggregate demand cum Phillips curve model of a monetary union that comprises n identical countries indexed by $i = (1, ...n)$. As we focus on cyclical stabilisation, structural asymmetry among member countries can be conveniently disregarded without altering qualitative results.

[1] Numerical methods for assessing the performance of alternative regimes of fiscal and monetary interaction are provided, among others, by: Beetsma and Jensen (2002), Van Aarle et al. (2000) and Beetsma et al. (2001).

In each country, the aggregate demand equation relates the output gap, y_{it}, to the real interest rate - defined as the difference between the union-wide nominal interest rate, i_t, and expected national inflation, π^e_{it+1} - to a measure of the fiscal stance, such as the public deficit, in the own and other member countries, g_{it} and g_{jt} respectively, and to an error term, v_{it},:

$$y_{it} = ag_{it} - b(i_t - \pi^e_{it+1}) + \frac{c}{(n-1)} \sum_{j=1, j\neq i}^{n} g_{jt} + v_{it} \tag{1}$$

where the exogenous stochastic process has zero mean [2]. All parameters in the IS equation (1) are positive, with the possible exception of c, which captures direct fiscal spillovers in the monetary union. A fiscal expansion in a member country is likely to boost demand in the monetary union, although non-Keynesian fiscal effects may not be excluded a priori.

The Phillips curve in each country directly links inflation to the output gap, expected inflation and to a zero mean cost-push shock, u_{it}:

$$\pi_{it} = \lambda y_{it} + \mu \pi^e_{i,t+1} + u_{it} \tag{2}$$

2.1 Policy preferences

The common central bank is assumed to aim at stabilising union-wide inflation and smoothing short-run interest rate movements. This is motivated by the need to represent as closely as possible the way monetary policy is set in practice, with particular reference to the European Central Bank and its primary concern for inflation. [3] Interest rate smoothing, while potentially capturing the central bank's care about output stabilisation, accords to a widespread practice in central banking, as documented by Blinder (1999).[4]

[2] Clarida et al. (1999) consider an AR(1) stochastic process for both aggregate demand and supply shocks. For our purposes, the hypothesis of no persistency in the exogenous driving forces has no practical consequences: it would affect forward-looking expectations while playing no role in policy strategies.

[3] Similarly, Beetsma et al. (2001) argue that output does not enter as an autonomous target in the preferences of the European Central Bank, which stabilises output as long as this does not interfere with price stability.

[4] Central bankers may be reluctant to change short-run interest rates by much as this would imply large variations in the prices of outstanding debts.

In each period, the central bank sets the nominal interest rate so as to minimise the quadratic loss:

$$L_t^M = \alpha \pi_t^2 + i_t^2 \tag{3}$$

where the ideal targets for inflation and nominal interest rates are normalised to zero. In our notation, variables without subscript refer to union-wide averages.

Each national fiscal authority is assumed to combine output and public deficit stabilisation, in the attempt to dampen cyclical fluctuations yet preserving long-run sustainability of fiscal policy. The strongest argument in favour of fiscal stabilisation in a monetary union is the risk of asymmetric cyclical developments across member countries which cannot be accounted for by the common monetary policy. As regards the deficit target, this accords with institutional countraints on fiscal variables, as those currently adopted in Europe with the Stability and Growth Pact. [5] The amount of public deficit in each period is chosen so as to minimise the following loss function:

$$L_{it}^{FA} = \tau y_{it}^2 + g_{it}^2 \tag{4}$$

where the ideal levels of the output gap and public deficit are normalised to zero. It is worth stressing that having a natural output target as in (4) implies that there is no inflationary bias in the economy.

2.2 Rules of the game

The timing of events is as follows: first, the private sector formulates inflation expectations in a rational way, then shocks realise and finally policies are set. Monetary and fiscal authorities move simultaneously.

Leadership equilibria may be considered as an alternative institutional arrangement. [6] Some authors argue that fiscal leadership is the most appropriate description of policy interactions in a monetary union on the ground

[5] The EU fiscal rules mainly reflect a desire to enhance long-run fiscal discipline and interrupt the rapid accumulation of government debt that occurred in many member countries in the 80's and early 90's.

[6] A partial list of recent contributions focusing on the macroeconomic implications of different institutional arrangements in a monetary union includes: Dixit and Lambertini (2001, 2003), Gambacorta (2001) and Beetsma and Jensen (2002).

that fiscal policy cannot be adjusted as quickly as monetary policy (Beetsma and Bovenberg (1998) and Beetsma et al. (2001)). Leadership, however, may also be conceived as the result of the leader's pre-commitment capacity, which would imply that monetary rather than fiscal leadership characterises the strategic policy framework in the EMU (Cooper and Kempf (2000)). [7]

The order of moves does not affect the qualitative features of our results. It is easy to show that leadership, as compared to simultaneous moves, reduces the leader's activism yet increasing the volatility of her target. Since the follower will not accommodate the leader's strategies in our framework of different goals for monetary and fiscal policies, there is no first-mover advantage.

3 Monetary-fiscal interactions in a monetary union

This section compares the macroeconomic outcomes of three alternative policy regimes. In the non-cooperative regime, NC, the monetary and each national fiscal authority move independently from each other. Under fiscal coordination, FC, national fiscal authorities choose domestic deficit levels in a cooperative way while playing Nash towards the common central bank. Global cordination, GC, is characterised by cooperation between a supranational fiscal authority and the central bank.

3.1 Non-cooperative policies

The central bank sets the nominal interest rate so as to minimise her losses (3) subject to the IS (1) and Phillips curves (2) and taking private sector's expectations as given. This yields a "lean against the wind" optimal policy:

$$i_t = \alpha\lambda b\pi_t \tag{5}$$

where a monetary restriction, namely an increase in the interest rate, is realised whenever inflation is above the ideal target.

Each national fiscal authority independently sets the own country level of public deficit so as to minimise her losses (4) subject to the economy's

[7] See discussion in Debrun (2000) and Dixit and Lambertini (2001).

constraints (1) and (2) and taking as given the behaviour of private agents and the central bank, obtaining the optimal policy (best response):

$$g_{it} = -a\tau y_{it} \tag{6}$$

After substituting optimal monetary and fiscal policies, (5) and (6) respectively, into the IS and Phillips curves, aggregating across countries and applying the rational expectations operator to the resulting expressions, we obtain the (Nash) equilibrium levels of union-wide output and inflation:

$$\begin{aligned} y_t^N &= \frac{1}{\gamma^N} v_t - \frac{\alpha\lambda b^2}{\gamma^N} u_t \\ \pi_t^N &= \frac{\lambda}{\gamma^N} v_t + \frac{1+\tau a(a+c)}{\gamma^N} u_t \end{aligned} \tag{7}$$

where $\gamma^N \equiv 1+\tau a(a+c)+\alpha\lambda^2 b^2$. As apparent in the above expressions, output and inflation can be stabilised only partially unless shocks are perfectly and negatively correlated across union members, i. e. union-wide shocks are zero.[8] Partial stabilisation is the result of a coordination failure between monetary and national fiscal policies that does not arise in case of perfectly asymmetric cycles, when monetary policy is passive and fiscal policy bears the whole burden of idiosyncratic adjustment.

Coordination failures stem from a conflict in policy orientation when facing cost-push shocks, namely when monetary and fiscal measures are strategic substitutes. Consider for instance an exceptionally high realisation of the cost-push shock in a member country. Output stabilisation calls for a domestic fiscal expansion, which in turn boosts the union-wide inflation rate. In the attempt to control inflation, the central bank then raises the nominal interest rate, partly vanishing the fiscal stimulus (and possibly inducing other members to loosen their own fiscal stance). The monetary response to supply-side disturbances is more effective on curbing inflation the higher the weight the central bank attaches to its inflation target, namely the higher α. By the same token, the central bank's ability to counteract the inflationary consequences of a cost-push shock is inversely related to the weight of the output target in fiscal policy preferences, τ.

[8] This result accords with the findings of Beetsma et al. (2001) showing that macroeconomic stabilisation in a monetary union is favoured the more asymmetric the cyclical developments among member countries.

Free-riding on cyclical adjustment emerges, instead, in case of demand disturbances when monetary and fiscal policies are strategic complements. In, say, an overheated scenario, the orientation of discretionary monetary and fiscal measures is restrictive. Each policy-maker, however, has an incentive to shift the burden of cyclical adjustment onto other policy-makers so as to economise on the use of its policy instrument. This in turn results in too low a degree of macroeconomic stabilisation.

Equations (7) evidence that under-stabilisation of demand shocks is inversely related to the weight of output and inflation in policy preferences. Full stabilisation is achieved when at least one policy instrument is not constrained, i.e. when either α or τ are infinite. In such cases, the non-constrained policy bears the whole burden of adjustment, while the constrained one is completely passive, independently on whether the shocks are asymmetric across member countries.

Using the solution (7) into optimal policies (6) and (5), it is easy to derive the feedback monetary and fiscal rules:

$$\begin{aligned} g_{it}^N &= \frac{a\tau}{\left(1+\tau a\left(a-\frac{c}{n-1}\right)\right)} \\ &\quad \left[-v_{it}+\frac{\alpha\lambda b^2\left(1+\tau a\left(a-\frac{c}{n-1}\right)\right)}{\gamma^N}u_t+\frac{\left(\tau ac\frac{n}{n-1}+\alpha\lambda^2 b^2\right)}{\gamma^N}v_t\right] \\ i_t^N &= \frac{\alpha\lambda^2 b}{\gamma^N}v_t+\frac{\left(1+\tau a(a+c)\right)\alpha\lambda b}{\gamma^N}u_t \end{aligned} \tag{8}$$

The optimal fiscal rule in (8) is outward-looking: fiscal policy reacts to both country-specific and union-wide cyclical disturbances. Moreover, it is counter-cyclical in facing asymmetric, country-specific demand shocks while turning pro-cyclical in case of symmetric, union-wide disturbances. [9] Equation (8) reveals, in fact, that a positive aggregate demand shock in the own country, namely a positive realisation of v_{it}, triggers a fiscal restriction, while fiscal policy is relaxed in union-wide upswings, i.e. when v_t is positive. Such a pro-cyclical activism is due to the attempt of national fiscal authorities

[9] The European Commission (2001) claims that fiscal policies in Europe have been characterised by "pro-cyclical activism"in the last decades. Mélitz (2000) and Wyplosz (2002), find evidence in favour of weak counter-cyclical effects in the European fiscal policies.

to contrast the domestic deflationary consequences of monetary and fiscal restrictions in the monetary union.

In the wake of a negative supply shock, namely a positive realisation of u_t, national public deficits rise unless the cost-push shock is perfectly and negatively correlated across union members. Fiscal profligacy is due to the attempt on the part of national fiscal authorities to offset the domestic output consequences of a tightening in the common monetary policy. In the absence of a monetary restriction, adjustment to asymmetric supply shocks is more efficiently achieved through the divergent behaviour of domestic inflation rates and fiscal discipline.

In order to gain some intuition on the likely effects of alternative policy rules on macroeconomic stabilisation, consider a first best environment as the one that arises in the absence of policy coordination failures and disregarding constraints on policy instruments. In such circumstances, it is generally argued that monetary policy should remove the distortions caused by nominal rigidities, favouring price adjustment, while fiscal policy should be set as if prices were flexible (Correia, Nicolini and Teles, 2003). In our framework, this amounts to set fiscal policy independently on the supply shock: there is no reason for reacting to a fluctuation in union-wide costs that can be fully compensated for by monetary policy.

In a monetary union, however, fiscal authorities have an incentive to "inefficiently" respond to union-wide supply shocks as a result of coordination failures of the type we have discussed above, as well as due to the inability of the central bank to fully offset country-specific, asymmetric cost-push-shocks in the absence of exchange rate movements. Consistently with a second best argument, we will show below that getting closer to the ideal first-best rule, for exampe through fiscal coordination, does not necessarily reduce macroeconomic fluctuations.

3.2 Fiscal cooperation

Each fiscal authority sets its goverment deficit so as to minimise the average loss in the monetary union:

$$\frac{1}{n}\sum_{i=1}^{n} L_{it}^{FA} \tag{9}$$

taking private sector' expectations as well as the behaviour of the central bank as given, which yields the optimal policies:

$$g_{it} = -a\tau y_{it} - \frac{c}{(n-1)}\tau \sum_{j=1, j\neq i}^{n} y_{jt} \tag{10}$$

It is worth noticing that in our framework of identical countries and policy preferences, cooperation among n fiscal authorities delivers the same outcome as a supra-national fiscal entity that sets the union-wide public deficit.

Following the same steps as before, we obtain the equilibrium levels of output and inflation under fiscal cooperation:

$$\begin{aligned} y_t^{FC} &= \frac{1}{\gamma^{FC}} v_t - \frac{\alpha\lambda b^2}{\gamma^{FC}} u_t \\ \pi_t^{FC} &= \frac{\lambda}{\gamma^{FC}} v_t + \frac{1+\tau(a+c)^2}{\gamma^{FC}} u_t \end{aligned} \tag{11}$$

where $\gamma^{FC} \equiv 1 + \tau(a+c)^2 + \alpha\lambda^2 b^2$.

Comparing the above expressions with (7) reveals that output volatility under fiscal coordination is lower than in the non-cooperative regime, provided fiscal spillovers are positive, i.e. $c > 0$. Moreover, in the absence of conflicting policy targets, as it is the case when facing demand disturbances, fiscal coordination reduces inflation volatility as well.

Inflation volatility increases, instead, in the wake of a cost-push shock. By strengthening the strategic position of fiscal authorities towards the central bank and exacerbating the conflict on policy orientation, fiscal cooperation may turn counter-productive, as originally stressed by Beetsma and Bovenberg (1998). A casual inspection of equations (7) and (11) reveals that this is more likely to happen the higher the weight attached to macroeconomic stabilisation as opposed to instruments' smoothing (high values of α and τ). In such circumstances, in fact, national fiscal expansions are unleashed so as to counteract the output consequences of a union-wide monetary restriction. In such a "struggle for dominance" coordinated fiscal policies end up destabilising the economy.

In case of negative fiscal spillovers ($c < 0$), the above results are reversed: output volatility is increased by fiscal coordination while effects on inflation depend on the source of cyclical movements. Intuitively, the internalisation of negative fiscal spillovers reduces fiscal activism, which in turn may

lead to a more efficient macroeconomic stabilisation in case of supply-side disturbances.

3.3 Global cooperation

Consider a supra-national entity that is interested in union-wide output, inflation and policy variables:

$$L^{GC} = \alpha\pi_t^2 + i_t^2 + \tau y_t^2 + g_t^2 \tag{12}$$

Mimimisation of (12) subject to the usual constraints gives the following optimal monetary and fiscal policies:

$$i_t = b\left(\alpha\lambda\pi_t + \tau y_t\right) \tag{13}$$

$$g_t = -\left(a+c\right)\left(\alpha\lambda\pi_t + \tau y_t\right) \tag{14}$$

The equilibrium allocation under global coordination is given by:

$$\begin{aligned} y_t^{GC} &= \frac{1}{\gamma^{GC}}v_t - \frac{\alpha\lambda\left(b^2+(a+c)^2\right)}{\gamma^{GC}}u_t \\ \pi_t^{GC} &= \frac{\lambda}{\gamma^{GC}}v_t + \frac{1+\tau\left(b^2+(a+c)^2\right)}{\gamma^{GC}}u_t \end{aligned} \tag{15}$$

where $\gamma^{GC} \equiv 1+\tau(a+c)^2 + \alpha\lambda^2\left(b^2+(a+c)^2\right) + b^2\tau$.

Comparing the above equations with the ones under fiscal coordination (11) and non-cooperative behaviour (7) reveals that global coordination improves macroeconomic outcomes when facing demand shocks. By coordinating their policies, monetary and fiscal authorities can engineer adjustment in prices and output yet saving on their (costly) instruments. This amounts to an unambiguous gain for all players.

When a trade-off between inflation and output stabilisation materialises, the efficacy of macroeconomic stabilisation across policy regimes depends on the relative impact of policy variables on output. [10] When the output effect of fiscal policy is higher than that of monetary policy, namely when $b < a+c$, global coordination reduces inflation volatility at the cost of higher

[10] In the US, Blanchard and Perotti (2002) find that the output effect of fiscal policy is rather small. A discussion on the relative efficacy of monetary and fiscal policies as stabilisation tools in Europe is provided by Wyplosz (2002).

output volatility relative to fiscal coordination, yet potentially improving macroeconomic stabilisation relative to the non-cooperative setting. In such circumstances, fiscal authorities have a comparative advantage in stabilising output and cooperation with the central bank allows them to specialise on that task. By recognising that the central bank is more effective in facing supply shocks, fiscal authorities are induced to behave in a more disciplined way.

The opposite occurs when monetary policy is relatively more efficient in output stabilisation ($b > a+c$). Global coordination leads to lower output and higher inflation volatility in this case, unless fiscal authorities are sufficiently interested in fiscal stability, i.e. $\tau < (a+c)^2 / \left(b^4 - (a+c)^4\right)$. They will refrain from dampening the inflationary consequences of a cost-push shock only in the event of a binding constraint on the public deficit.

After substituting the equilibrium outcome (15) into the policy reaction functions (13) and (14), the following feedback rules are obtained:

$$\begin{aligned} g_t^{GC} &= -(a+c)\left[\frac{\tau+\alpha\lambda^2}{\gamma^{GC}}v_t + \frac{\alpha\lambda}{\gamma^{GC}}u_t\right] \\ i_t^{GC} &= b\left(\frac{\alpha\lambda^2+\tau}{\gamma^{GC}}v_t + \frac{\alpha\lambda}{\gamma^{GC}}u_t\right) \end{aligned} \tag{16}$$

As apparent in the above expressions, global coordination helps solving the conflict on policy orientation by leading to counter-cyclical measures: both the interest rate and public deficit are raised whenever output or inflation are above their target levels. Differently from the non-coordinated setting, where fiscal policy may turn pro-cyclical, fiscal authorities need not offset the output consequences of monetary measures when behaving cooperatively.

4 Policy arrangements in a monetary union

In a monetary union, the possibility of coordination failures as the ones discussed above raises the question of the desirability of cooperative policy regimes.

The literature on policy interactions in a monetary union has mainly focused on the need for coordination among national fiscal authorities that

bargain independently vis à vis a common central bank. [11] By internalising international spillovers, coordinated fiscal policies are generally found to deliver better outcomes than in the non-cooperative regime, as recently argued by Uhlig (2002). Counterproductive fiscal coordination may, however, arise whenever output-oriented fiscal authorities gain too much power towards a highly conservative common central bank. In a fiscal leadership scenario, for example, fiscal coordination exacerbates the time-inconsistency problem of monetary policy, by inducing the central bank to accommodate fiscal profligacy ex post (Beetsma and Bovenberg (1998)). The optimal degree of fiscal policy centralisation may therefore be less than complete, as stressed by Alesina and Wacziarg (1999).

Consistently with this argument, we have previously shown that coordinated fiscal policies can effectively attenuate the free-riding problems of cyclical adjustment, while turning potentially harmful in case of conflict with the common central bank over the orientation of discretionary measures. We have further argued in favour of a global cooperative regime as a means for dealing with policy conflicts. [12]

In our view, the conflict between monetary and fiscal authorities arises from differences in policy objectives rather than disagreement on the ideal levels of these targets. One of the traditional arguments why discretionary fiscal policy may be less effective as a stabilisation tool than monetary policy rests on other central goals for fiscal policy than cyclical adjustment, as income redistribution and resource allocation. In the absence of such other goals for fiscal policy, Dixit and Lambertini (2003) show that coordination, as well as commitment and leadership are redundant whenever fiscal and monetary policy-makers agree on the ideal targets for inflation and output, independently on the relative weight attached to these targets. In the authors' view, this suggests that committing to an ultra-conservative objective, as the European Central Bank, or to fiscal rules, such as the Stability and Growth Pact, places additional, unnecessary constraints on member countries and may even prove counterproductive. But, if agreement on the ideal targets is not achievable, namely if policy preferences are fixed, then the outcomes can only be affected by constitutional constraints that shift the policy reaction functions.

[11] By focusing on fiscal-monetary policy coordination, Buti et al. (2001) provide a notable exception.

[12] Von Hagen and Mundschenk (2002) also argue in favour of coordinated monetary and fiscal policies when the common central bank pursues both output and inflation targets.

In our framework, global coordination can be reproduced in a non-cooperative setting whenever monetary and fiscal authorities share the same objectives. By adding output among the monetary targets and inflation among those of the fiscal authorities, it is easy to see that optimal non-coordinated and global policies coincide if policy-makers agree on the ideal levels of output and inflation and attach the same weight to these targets. [13] Differently from Dixit and Lambertini (2003), no fiscal-monetary "symbiosis" arises when there are other policy goals than output and inflation. This suggests that, except in the unlikely event of identical preferences, monetary and fiscal policy coordination should be favoured through an appropriate institutional design, such as a constitutional mandate for output and inflation stabilisation.

An inflation target for fiscal authorities can be assigned within the existing policy arrangements in the EMU. [14] An explicit mandate for output and inflation is consistent with delegation of fiscal stabilisation to an independent fiscal entity along the lines of delegation of monetary policy to an independent central bank [15], although for such purposes an appropriate federal budget might be needed [16]. More controversial is the assignment of an explicit output target to the European Central Bank, which would require a change in the European treaties.

Finally, a further argument in favour of institutions rather than policy rules rests on the instability of the cooperative solution. Even if global coordination delivers better outcomes for both policymakers, this may not be a (Nash) equilibrium in the game for the choice of the institutional regime as there could be a unilateral incentive to deviate.[17] Unless binding agreements

[13] In a non-cooperative setting where the central bank and the fiscal authority minimise, respectively, the losses: $L^M = \alpha_1 \pi_t^2 + \alpha_2 y_t^2 + i_t^2$ and $L^{FA} = \tau_1 y_t^2 + \tau_2 \pi_t^2 + g_t^2$, the optimal policies, $i_t = b(\alpha_1 \lambda \pi_t + \alpha_2 y_t)$ and $g_t = -(a+c)(\tau_2 \lambda \pi_t + \tau_1 y_t)$, coincide with those under global coordination if, and only if, $\alpha_1 = \tau_2 = \alpha$ and $\alpha_2 = \tau_1 = \tau$.

[14] Article 4(3) of the Treaty requires that the Member States define common objectives in accordance with "*stable prices, [*as well as] *sound public finances and monetary conditions and a sustainable balance of payments*".

[15] Delegation of fiscal policy to an independent agency with macroeconomic stabilisation purposes is advocated, among others, by Seidman (2001), EEAG Report (2003), and Calmfors (2002). Wyplosz (2002) argues in favour of the inclusion of debt management among the goals of such an institution.

[16] The European budget, which is currently around 1 percent of joint EU gross domestic product and mostly devoted to redistributive tasks may not be appropriate for stabilisation purposes.

[17] Van Arle et al. (2002) analyse the endogenous establishment of coalitions among

are in place, a typical prisoner-dilemma applies: the central bank has an incentive to further deflate once fiscal discipline is achieved in a coordinated way, so as to reach her bliss point. By the same token, fiscal profligacy may be induced once the common monetary policy is set.

5 Conclusions

Drawing on a simplified aggregate demand-cum-Phillips curve model, this paper has investigated the macroeconomic implications of different policy regimes in a monetary union.

In the presence of other policy goals than cyclical stabilisation, such as interest rate smoothing and fiscal stability, we show that output is generally more volatile in non-coordinated than in cooperative settings and this may not necessarily balance with lower inflation. Centralised fiscal policy proves to be an effective stabilisation tool in specific circumstances, as in case of demand disturbances and positive fiscal spillovers, while turning potentially counterproductive otherwise. The adverse effects of union-wide coordinated fiscal measures can be attenuated in a regime of global coordination, namely when a centralised fiscal stabilisation is coordinated with the common monetary policy as well.

policymakers in a monetary union and argue that, unless policymakers can communicate, global cooperation cannot be reached.

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