

MACROECONOMIC HETEROGENEITIES AND COORDINATION OF FISCAL POLICIES IN EMU

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Abstract

This article studies the impact of differences in economic mechanisms on stabilization and fiscal coordination. We use a static model of monetary union in which macroeconomic heterogeneities are introduced. This model shows that fiscal coordination can improve welfare and stabilization but this improvement is altered by the existence of heterogeneities. We then identify thresholds of parameter values which beyond stabilization and welfare in coordination are less than in non-cooperative equilibrium.

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1 Introduction

Since EMU members have abandoned national monetary policy and their exchange rate as adjustment mechanisms, they search a solution to protect them from shocks and especially from country-specific shocks. Indeed, as monetary policy is common, this implies a limited role to asymmetric shocks regulation. This role is so assigned to fiscal policy. As the European budget is constraint¹, a solution usually advanced is the coordination of fiscal policies. According to Thygesen [1992], this coordination may be seen in two different ways: either as providing international public goods (public-good coordination), or as a response to economic interdependencies between countries (strategic coordination). It seems that European construction has chosen the first way, through a multilateral monitoring, although it is the strategic coordination who would allowed a regulation in the Euro area because it can take the spillover effects into account and can improve the collective welfare (Kletzer [1997]).

It is usually assumed that countries within the monetary union are similar. The literature has so far paid little attention to differences between countries. However, beyond the size differences, economic mechanisms in the EMU members are different: especially the transmission channels of monetary policy and the preferences of agents. Would these differences prevent the coordination of fiscal policies from achieving an efficient stabilization?

This paper analyses the impact of heterogeneities between EMU members on fiscal coordination. It is organized as follows: Section 2 develops the analytical framework, Section 3 analyses non-cooperative and cooperative fiscal policies, Section 4 presents a numerical simulation of the model to illustrate its main characteristics, and the final section concludes.

2 The Model

The model of coordination includes the theoretical framework and a presentation of public authorities behaviours.

2.1 The theoretical framework

We use a static model of closed monetary union with n countries in which we introduce an asymmetric demand shock². Insofar as we analyse short-run

¹The European budget has reached 1,27% of european GDP at the maximum and is mainly devoted to allowance and reallocated spendings.

²As we internalize the ECB behaviour, conflicts between policy authorities are limited. In addition, efficiency of fiscal policy to counter supply shocks is widely argued (Brunila et alii [2001]).

regulation, we prefer a model where demand prevails. Hence, demand will determinate output.

Demand is given by classical terms of literature: government spending, real interest rate, and trade balance (Buti et alii [2002]). Government expenditure increase aggregate demand but in a proportion lower to one because we assume that the eviction of transaction effect exists. This proportion is rendered by paramater γ . That shows behaviours of private agents faced with public spending and that explains why it is nationalized. Demand decreases with the common interest rate with a domestic sensibility ρ . Finally, trade exchanges include intra-EU competitiveness (defined as the inflation differential) and the economic situation differences. Demand can be written as follows:

$$y_i^d = \gamma_i g_i - \rho_i r + \eta(\bar{y} - y_i) + \eta\varepsilon(\bar{\pi} - \pi_i) + x_i \quad (1)$$

where

y : is GDP

γ : is the impact of government spending on demand

g : is the level of government spending

ρ : is the sensibility of demand to interest rate

r : is the real interest rate

η : is the measure relative openness of countries

\bar{y} : is the average GDP in monetary union

π : is the inflation rate

$\bar{\pi}$: is the average inflation rate in monetary union

x : is the asymmetric demand shock

Variables are in logarithms, except for the interest rate and the inflation rate, and all the parameters are positive.

The model is based on demand, so we prefer to use a Phillips curve as supply fonction (Leith et Wren-Lewis [2002], Creel [2002], Buti et Giudice [2002]). This representation is a writing of the supply function NK in a static monetary union framework without supply shock³. Hence, aggregate supply can be written as follows:

$$\pi_i = \theta y_i + \eta(\bar{\pi} - \pi_i) \quad \theta \in [0; 1] \quad (2)$$

Combining these two equations, it enables to write income and inflation in the monetary union and in each country.

Average income and average inflation in the monetary union:

$$\bar{y} = \bar{\gamma} \bar{g} - \bar{\rho} r \quad (3)$$

$$\bar{\pi} = \theta(\bar{\gamma} \bar{g} - \bar{\rho} r) \quad (4)$$

³The "New Keynesian" supply curve is presented as its traditional form:

$$y_t = \alpha(\pi_t - \beta E_t \pi_{t+1}) + \varepsilon_t$$

where α captures the degree of nominal rigidity, β is the actualisation factor, E is the anticipation operator, and ε is a supply shock.

Income and Inflation in each country:

$$y_i = \mu (\gamma_i g_i - [\rho_i - P(\rho_i - \bar{\rho})] r + (1 - P)x_i + A\bar{y} - P(\gamma_i g_i - \bar{\gamma}g)) \quad (5)$$

$$\pi_i = \frac{\theta}{1 + \eta} y_i + \frac{\theta\eta}{1 + \eta} (\bar{\gamma}g - \bar{\rho}r) \quad (6)$$

$$\text{where} \quad P = \eta\varepsilon\theta \quad A = \eta \left(1 + P \left(\frac{1 + \varepsilon\theta}{1 - \eta} \right) \right) \quad \mu = \frac{1}{1 + A}$$

The parameters P and A can be interpreted respectively as the influence of union activity on prices and as the influence of union activity on exchanges. An increase of the spread between national and average government spending reduces income. An increase in the spread between their incidences has a similar effect. On the contrary, a sensibility to interest rate stronger than the average raise income because overall sensitivity is reduced.

2.2 The behaviours of public authorities

The demand and supply equations are complemented with a representation of public authorities i.e. the ECB and the twelve governments.

The Central Bank. We assume that ECB uses the interest rate as a tool for conducting its monetary policy. The aim of monetary policy is to minimize a linear-quadratic loss function (LM) which depends on average values. The Maastricht Treaty has assigned the maintenance of price stability as the main objective of the single monetary policy. This implies that its weight is more important than others. The monetary loss function can be written as follows:

$$LM = \frac{1}{2} [\bar{\pi}^2 + \beta_1 \bar{y}^2 + \beta_2 r^2] \quad (7)$$

where β_1 and β_2 captures respectively the relative preferences for output stabilization and the interest rate smoothing.

By replacing expressions of average income (3) and average inflation (4) in the monetary loss function, the interest rate can be written as follows:

$$r = \psi \bar{\gamma}g \quad (8)$$

$$\text{where} \quad \psi = \frac{\bar{\rho}(\theta^2 + \beta_1)}{\bar{\rho}(\theta^2 + \beta_1) + \beta_2}$$

The interest rate rises with the average level of government spending. Thus, monetary policy depends on fiscal policy meaning that the financial eviction effect exists. With this expression we can write the expressions of income and inflation for the monetary union. Note that these expressions rise with the average level of government spending:

$$\bar{y} = \bar{\gamma}(1 - \bar{\rho}\psi)\bar{g} \quad (9)$$

$$\bar{\pi} = \theta\bar{\gamma}(1 - \bar{\rho}\psi)\bar{g} \quad (10)$$

National Governments. The behaviour of each government in the monetary union is described by a linear-quadratic loss function (LG) which depends on its income deviation of the baseline, its rate of inflation, and its government spending. Each government has a target level of public expenditure h that comes from a trade-off between the constraints of the Stability Pact and the optimal social level.

$$LG_i = \left[(Y_i - y_i)^2 + \phi_1 \pi_i^2 + \phi_2 (h_i - g_i)^2 \right] \quad (11)$$

Y captures potential output, ϕ_1 is the weight of inflation rate in the fiscal loss function, and ϕ_2 is the weight of spread between the target level of government spending and the effective level.

The level of government spending in non-cooperative case is given by minimization of the fiscal loss function. By doing this, we have internalized Central Bank's behaviour i.e. we have replaced the interest rate by its developed expression (8). Note that we take the impact of the weight of a country in Euro area into account (λ_i)⁴. So, the average level of government spending breaks up between national government spending and the others government spending:

$$\bar{g} = \lambda_i g_i + (1 - \lambda_i) g_i^*$$

The expressions of income and inflation in each country then become:

$$y_i = a_{1i} g_i + \mu(1 - \lambda_i) B_i g_i^* + \mu(1 - P) x_i \quad (12)$$

$$\pi_i = z_1 y_i + z_2 [\lambda_i g_i + (1 - \lambda_i) g_i^*] \quad (13)$$

$$\begin{aligned} \text{where } a_{1i} &= \mu [\gamma_i(1 - P) + \lambda_i B_i] \\ z_1 &= \frac{\theta}{1 + \eta} & z_2 &= \frac{\eta \theta (1 - \bar{p} \psi) \bar{\gamma}}{1 + \eta} \\ B_i &= [-(\rho_i - P(\rho_i - \bar{p})) \psi + A(1 - \bar{p} \psi) + P] \end{aligned}$$

Parameter a_{1i} captures the overall impact of government spending on income in country i . This impact results from the incidence of government spending on demand (γ_i) and from fiscal externalities (B_i). These externalities are all the more significant as price and activity channels are high, and as interest rate channel is weak. A domestic sensibility to interest rate lower than that of union reduces this channel: an increase of government expenditure is less costly. Like income, it is possible to highlight the overall impact of government spending on inflation. Thus, the impact is captured by parameter a_{2i} which includes the effect through income (z_1) and through the inflation differential (z_2):

$$a_{2i} = z_1 a_{1i} + z_2 \lambda_i$$

We identify the different macroeconomic equilibrium by using the previous tools: non-cooperative equilibrium and coordination of fiscal policies.

⁴The weight of country i (λ_i) is its part of monetary union GDP.

3 Macroeconomic Equilibria

The comparison between non-cooperative and coordination cases is necessary because a spontaneous interpretation is not so easy in this framework.

3.1 Non-cooperative case

Macroeconomic equilibrium in non-cooperative case derives from the minimization of fiscal function in relation to government spending. We deduce the equilibrium level of government spending:

$$g_i = \omega_{0i}Y_i - \omega_{1i}(1 - \lambda_i)g_i^* + \omega_{2i}h_i - \mu\omega_{3i}(1 - P)x_i \quad (14)$$

$$\begin{aligned} \omega_{0i} &= \frac{a_{1i}}{a_{1i}^2 + \phi_1 a_{2i}^2 + \phi_2} \\ \omega_{1i} &= \frac{(a_{1i} + \phi_1 z_1 a_{2i})B_i + \phi_1 z_2 a_{2i}}{a_{1i}^2 + \phi_1 a_{2i}^2 + \phi_2} \\ \omega_{2i} &= \frac{\phi_2}{a_{1i}^2 + \phi_1 a_{2i}^2 + \phi_2} \\ \omega_{3i} &= \frac{a_{1i} + \phi_1 z_1 a_{2i}}{a_{1i}^2 + \phi_1 a_{2i}^2 + \phi_2} \end{aligned}$$

The equilibrium level of government spending shows the influence of fiscal policy to achieve potential output (ω_{0i}). The level depends on the others fiscal policies too. This implies that a spillover effect exists. Higher are fiscal externalities, more significant is the effect, but its impact depends on country weight. A big country would feel less spillover effect and would have smaller reaction to behavioural differences. The equilibrium level also depends on government's capacity to modify its fiscal policy (h_i) and on counter-cyclical reaction to asymmetric shock (x_i). This reaction seems to be more significant when government expenditure has a stronger impact on income (a_{1i}) and when the country is big.

Under these conditions, we can write the expressions of income and inflation to achieve a non-cooperative equilibrium:

$$y_i = n_{0i}Y_i + (\mu B_i - n_{1i})(1 - \lambda_i)g_i^* + n_{2i}h_i + \mu(1 - n_{3i})(1 - P)x_i \quad (15)$$

$$\begin{aligned} \pi_i &= m_{0i}Y_i + (z_1 \mu B_i - m_{1i} + z_2)(1 - \lambda_i)g_i^* + m_{2i}h_i + \\ &\quad \mu(1 - m_{3i})(1 - P)x_i \end{aligned} \quad (16)$$

$$\text{where} \quad n_{ji} = a_{1i}\omega_{ji} \quad m_{ji} = a_{2i}\omega_{ji} \quad j = [1, 4]$$

Therefore, these expressions depend on fiscal externalities and macroeconomic heterogeneities. The spillover effect of government spending is determined by fiscal externalities and differences of sensibility to interest rate. The impact of shocks is all weaker as government spending has a stronger impact on income (a_{1i}) and it is counter-cyclical (ω_{3i}).

We deduce the expression of expected fiscal loss for country i in the cooperative case:

$$E(LG_i) = \delta_{3i}(1-P)^2\sigma_x^2 + \delta_{0i}Y_i^2 + \delta_{1i}(1-\lambda_i)g_i^* + \delta_2h_i^2 \quad (17)$$

$$\begin{aligned} \text{where } \delta_{0i} &= (1-n_{0i})^2 + \phi_1m_{0i}^2 - \phi_2\omega_{0i}^2 \\ \delta_{1i} &= (\mu B_i - n_{1i})^2 + \phi_1(\mu z_1 B_i - m_{1i}^2 + z_2) + \phi_2\omega_{1i}^2 \\ \delta_{2i} &= \phi_1m_{2i}^2 + \phi_2(1-\omega_{2i})^2 - n_{2i}^2 \\ \delta_{3i} &= \mu[(1-n_{3i})^2 + \phi_1(z_1 - m_{3i})^2 + \phi_2\omega_{3i}^2 \end{aligned}$$

The government's capacity to stabilize activity comes down to reducing the impact of shocks' variance on expected loss i.e. reduce $\delta_{3i}(1-P)^2$. This impact comes from influence of shocks on income, inflation, and government spending. Fiscal loss gathers stabilization's capacity by also cost related to spillover effects ($\delta_{1i}(1-\lambda_i)$) and cost related to fiscal margin (δ_{2i}). This situation will be used as reference that will be compared to cases of fiscal policy coordinate.

3.2 Cooperative Equilibrium

In cooperative case, fiscal policies are defined at the same time to maximize collective welfare. In other words, cooperation fiscal policies are conducting at minimizing a joined loss function (JLG) rather than at minimizing the individual national loss functions:

$$JLG_i = \frac{1}{2}LG_i + \frac{1}{2}LG_i^* \quad (18)$$

Governments know that their policies have repercussions on neighbours' situations through spillover effects. Indeed, government spending in country i affects income in other countries through fiscal externalities (parameter b_{1i}) but affects also their inflation rates (parameters b_{2i}). Government of i takes effectiveness of fiscal policies in other countries too into account ($c_i^*(1-\lambda_i)$).

$$\begin{aligned} b_{1i} &= \mu\lambda_i B_i \\ b_{2i} &= (\mu z_1 B_i + z_2)\lambda_i \\ c_i^* &= \mu\bar{\gamma}(1-P) + \mu B_i \end{aligned}$$

Hence, the equilibrium level of government spending for country i in cooperative case, that we have found by minimization of the joined loss function, takes these effects into account:

$$g_i^c = v_{0i}Y_i - v_{1i}(1-\lambda_i)g_i^* + v_{2i}h_i - \mu v_{3i}(1-P)x_i + v_{4i}Y_i^* \quad (19)$$

$$\begin{aligned}
v_{0i} &= \frac{a_{1i}}{2[(a_{1i}^2 + b_{1i}^2) + \phi_1(a_{2i}^2 + b_{2i}^2) + \phi_2]} \\
v_{1i} &= \frac{\mu B_i(a_{1i} + \phi_1 z_1 a_{2i}) + \phi_1 z_2(a_{2i} + b_{2i}) + (b_{1i} + \phi_1 z_1 b_{2i})c_i^*}{2[(a_{1i}^2 + b_{1i}^2) + \phi_1(a_{2i}^2 + b_{2i}^2) + \phi_2]} \\
v_{2i} &= \frac{\phi_2}{2[(a_{1i}^2 + b_{1i}^2) + \phi_1(a_{2i}^2 + b_{2i}^2) + \phi_2]} \\
v_{3i} &= \frac{a_{1i} + \phi_1 z_1 a_{2i} - (b_{1i} + \phi_1 z_1 b_{2i})\lambda_i}{2[(a_{1i}^2 + b_{1i}^2) + \phi_1(a_{2i}^2 + b_{2i}^2) + \phi_2]} \\
v_{4i} &= \frac{b_{1i}}{2[(a_{1i}^2 + b_{1i}^2) + \phi_1(a_{2i}^2 + b_{2i}^2) + \phi_2]}
\end{aligned}$$

The expression of this equilibrium level is rather similar of the one in non-cooperative case. However, we see that potential output in other countries comes in equilibrium determination, and coefficients take spillover effects into account. These coefficients are more sensible on size and behavioural differences (through a_{ji} and b_{ji}). We also note that the coefficient associated with asymmetric shocks depends on the influence of national fiscal policy on the other countries and also on its size. Yet, it is not obvious that the classical issue of coordination that is government spending level in coordination is less than in non-cooperative case. This issue is determined by values of a_{ji} and b_{ji} .

Using the expression of the cooperative government spending we obtain the equilibrium expressions of income and inflation in each member states. These expressions can be written as follows:

$$\begin{aligned}
y_i^c &= q_{0i} + (\mu B_i - q_{1i})(1 - \lambda_i)g_i^* + q_{2i}h_i + \mu(1 - q_{3i})(1 - P)x_i + q_{4i}Y_i^* \\
\pi_i^c &= p_{0i} + (\mu z_1 B_i - p_{1i} + z_2)(1 - \lambda_i)g_i^* + p_{2i}h_i + \mu(z_1 - p_{3i})(1 - P)x_i \\
&\quad + p_{4i}Y_i^* \tag{21}
\end{aligned}$$

$$\text{where} \quad q_{ji} = a_{1i}v_{ji} \quad p_{ji} = a_{2i}v_{ji} \quad j = [1, 4]$$

The main difference of these expressions in comparison with these without cooperation is in coefficient writing. In order to illustrate this, we study the possible benefits for coordination through loss function. Thus, we express the expected loss function for i when fiscal policies are coordinated:

$$\begin{aligned}
E(JLG_i) &= \kappa_{3i}(1 - P)^2 \sigma_x^2 + \kappa_{0i}Y_i^2 + \kappa_{1i}(1 - \lambda_i)g_i^* + \kappa_{2i}h_i^* + \kappa_{4i}Y_i^{*2} \\
&\quad + \frac{\phi_2}{2}(h_i^* - g_i^*)^2 \tag{22}
\end{aligned}$$

$$\begin{aligned}
2\kappa_{0i} &= (1 - q_{0i})^2 + \phi_1 p_{0i}^2 - \phi_2 v_{0i}^2 - \chi_{0i}^2 \\
2\kappa_{1i} &= (\mu B_i - q_{1i})^2 + \phi_1(\mu z_1 B_i - p_{1i}^2 + 2z_2)^2 + \phi_2 v_{1i}^2 - (1 - \phi_1 z_1)c_i^{*2} + \chi_{1i}^2 \\
2\kappa_{2i} &= \phi_1 p_{2i}^2 + \phi_2(1 - v_{2i}^2) - q_{2i}^2 - \chi_{2i}^2 \\
2\kappa_{3i} &= \mu[(1 - q_{3i})^2 + \phi_1(z_1 - p_{3i})^2 + \phi_2 v_{3i}^2 + (1 - \phi_1 z_1)^2 \lambda_i^2 + \chi_{3i}^2] \\
2\kappa_{4i} &= (1 - q_{4i})^2 + \phi_1 p_{4i}^2 - \phi_2 v_{4i}^2 - \chi_{4i}^2 \\
\chi_{ji} &= (\mu B_i - \phi_1(\mu z_1 B_i + z_2))\lambda_i v_{ji} \quad j = [1, 4]
\end{aligned}$$

The influence of other members states is described in term κ_{4i} and in the average spread between target and effective level of government spending. The interaction between countries is also taken in loss coefficients into account (existence of χ_{ji}). The expected loss related to potential output and fiscal margin for i is weaker than in the non-cooperative case, but this decrease is partially offsetted by taking economic situations of others countries into account. The loss related to spillover effects is obviously less ($2\kappa_{1i} < \delta_{1i}$). This gain is all the more significant as fiscal policy has a greater impact of economy (higher c_i^*) and as the country is small. Finally, it is not easy to decide clearly about stabilization gains. These gains depend strongly on v_{3i} values compared to ω_{3i} values, and so depends on macroeconomic heterogeneities. We note that the gain would be more important for smaller countries.

To summarize, the gains of fiscal policies coordination, in terms of stabilization as well as welfare, are not obvious. They are related to macroeconomic heterogeneities and fiscal externalities. We will analyse this relation more precisely.

4 Sensibility of gains to heterogeneities

4.1 Calibration

We assign quantitative values to parameters that allow us to study heterogeneities influence coordination gains. We see the impact on stabilization and welfare when a negative asymmetric shock occurs (1% of GDP). Parameters values are in tables 1 and 2.

The rate of openness η and the coefficient of the Phillips curve θ are chosen according to Creel [2002]. The trade balance elasticity to inflation differential ε is estimated by using OECD data from 1985 to 2001. So we can calculate values to parameters P and A.

Table 1: Common Parameters

η	0,2
ε	0,83
θ	0,25
P	0,05
A	0,21

The average government spending level is the one in 2001. Its influence on demand $\bar{\gamma}$ is suggested by Bouthevillain et alii [2001] who estimated government spending elasticity to PIB. The sensibility to interest rate $\bar{\rho}$ is chosen according to Mojon and Peersman [2001] who studied monetary policy's transmission through a VAR model. We fixed 0,7 and 0,5 respectively to inflation and to spread between target and effective level of government spending as objective weights in fiscal loss function. Finally, we fixed 0,5 and 0,25 respectively to income and to interest rate as weights in monetary loss function ⁵.

⁵As interest rate is the adjustment mechanism, its weight is more weaker.

Table 2: Union parameters

$\bar{\gamma}$	0,12
$\bar{\rho}$	0,19
ϕ_1	0,7
ϕ_2	0,5
β_1	0,5
β_2	0,25

Once we have calibrated our model we can analyze heterogeneities' influence on coordination gains.

4.2 Impacts of heterogeneities

Size impact. Country size is an essential tool in the coordination of fiscal policies. Indeed reactions are different when shock affects a small or a big country. As is it would have been expected, coordination gains are especially significant in small countries (see graphics in annex). Bigger is the country, less are its gains. Thus, beyond a certain size, a EMU member takes not interest in coordination. Gains resulting from fiscal externalities ($\kappa_1 < \delta_1$) are not large enough to offset the cost of this situation (existence of κ_4 and raise of κ_2 compared to δ_2). According to our calibration, this threshold value is $\lambda = 0,47$. It is the same for stabilization's capacity: that of a big country is weaker than in coordination case. This is true for a country who has a size over at 57% of the union. Insofar as none EMU country have this size, coordination of fiscal policy seems to benefit all⁶.

Incidence of government spending. Insofar as coordination takes spillover effects into account, it would improve the impact of fiscal policies. Countries where this incidence is weak take an interest in coordination because this weakness is partly offsetted whereas countries where this incidence is strong are disadvantaged because their policies are diluted in euro area. Therefore, coordination gains are decrease in relation to national government spending impact. This fall especially significant for stabilization. Moreover, gains in terms of welfare are more significant since they reach 8,5% whereas gains in terms of stabilization reach a maximum at 3,5%. In our analysis threshold values are $\gamma = 0,38$ for stabilization and $\gamma = 0,58$ for welfare.

Sensibility to interest rate. The sensibility to interest rate is a fundamental determinant of the sign and the extent of fiscal externalities (synthetized in B_i). Broadly, if the sensibility in lower than the sum of foreign influences, externality is positive; in the contrary case externality is negative reducing welfare. In our calibration, this threshold is $\rho = 0,24$. Coordination of fiscal policies does not change this phenomenon but lessen it. Thus, if a country has a high sensibility, coordination is the best way since this country takes advantage of weaker sensibilities of the others. Its welfare is so improved (if $\rho > 0,05$). But the situation is less favourable in terms of stabilization. Gains are weaker than

⁶Germany is the biggest country in EMU with a size of 33% of union

for welfare (maximum of 6,3% compared to 9,85%) and exist from a sensitivity of $\rho = 0,25$.

We showed that threshold values exist for national parameters to obtain coordination gains. It is useful to see EMU members situation compared to these values.

4.3 EMU case

We will parametre the model by attributing reasonable values to the coefficients. Sizes are parts of union GDP in 2001 (OECD data), national incidences of government spending comes from to Bouthevillain et alii [2001], and sensibilities to interest rate are chosen according to Mojon and Peersman [2001].

Table 3: EMU members parameters

	λ	γ	ρ	B
Aus	0,03	0,09	0,29	-0,05
Bel	0,04	0,16	0,28	-0,04
Ger	0,31	0,10	0,16	0,09
Fin	0,02	0,20	0,36	-0,12
Fra	0,22	0,09	0,15	0,10
Gre	0,02	0,00	0,02	0,23
Ire	0,02	0,31	0,06	0,19
Ita	0,18	0,02	0,17	0,07
Lux	0,00	0,12	0,07	0,18
Net	0,06	0,57	0,28	-0,04
Por	0,02	0,17	0,13	0,12
Spa	0,09	0,12	0,26	-0,02

We note that only the Netherlands have an incidence value of government spending lower than threshold value (in terms of stabilization) and five countries (France, Greece; Ireland, Italy, and Luxembourg) have sensibility to interest rate within the critical bracket (in terms of welfare). Greece case is special case because its sensibility implies coordination losses in terms of welfare and stabilization. Fiscal externalities values are relatively weak and various which is consistent with issues of Gros and Hobza [2001]. Their simulations show that fiscal externalities are uncertain. Thus, fiscal externalities are negative for five countries (Austria, Belgium, Finland, the Netherlands, and Spain). Indeed, the diferent transmission channels of fiscal policy may have an opposite impact on fiscal exernalities. Under these conditions, coordination gains in terms of stabilization and welfare are synthetized in table 4.

Table 4: Coordination Gains (in %)

	Stab	Welf
Aus	9,94	11,03
Bel	9,89	10,48
Ger	6,49	8,98
Fin	9,96	10,58
Fra	8,10	10,09
Gre	9,97	11,35
Ire	8,96	9,97
Ita	9,03	10,56
Lux	9,07	10,94
Net	2,21	6,09
Por	9,97	10,94
Spa	9,48	10,30

In our analysis, welfare of all EMU members would improve with coordination of fiscal policies (6% to 11,5%). Although we expected that stabilization's capacity of some countries would be reduced, numerical simulation shows that coordination would increase national stabilization (2% to 10%). We can distinguish three countries' groups:

- the first group is EMU members within critical bracket but have negative fiscal externalities (Austria, Belgium, Finland, Spain). Coordination gains should be high but they are reduced by fiscal externalities values. Coordination gains (stabilization and welfare) are around of 10%.
- the second group is small countries that have a critical sensibility to interest rate ($\rho < 0,25$) but have high fiscal externalities values (Greece, Ireland, Luxembourg, Portugal). Coordination losses related to sensibility values are clearly offsetted by the size effect and externalities values on the other channels. Thus, coordination gains are nearly the same as those of the first group. Only Ireland has gains weaker than others because the impact of government spending on its economy is too strong ($\gamma = 0,31$).
- the last group is composed of big countries (Germany, France, Italy) where size effect has expanded impacts of the other channels in terms of stabilization. So as expected, big countries have less interest in coordination of fiscal policies. Nevertheless, coordination gains exist because externalities are positive.

The case of the Netherlands is specific since it is the only country where government spending incidence is lower than threshold values. This situation and negative fiscal externalities clearly reduce coordination gains: 2% in terms of stabilization and 6% in terms of welfare. This shows differences are significant in coordination.

5 Conclusion

With a common monetary policy, a proposed solution is to assign the regulation of asymmetric shocks to fiscal policies. We studied the impact of differences in economic mechanisms on fiscal coordination. We used a static model of monetary union in order to show threshold values to national parameters. Indeed, even if coordination gains exist, they are determined by national differences. Thus, country size, government spending impact and sensitivity to interest rate are important variables to obtain coordination gains especially in terms of stabilization.

Numerical simulation highlights a surprising result: all countries take an interest in coordination of fiscal policies, even if differences exist. However, this result could be altered if values of big countries tend towards critical brackets. In this case, the ECB should take of asymmetric effects on its policy into account in order to reduce cost of sensitivity differences. Cost related to differences in government spending impact could be corrected by improving economic cohesion. Thereby, redistributive European spending could play an important role in stabilization of Euro area.

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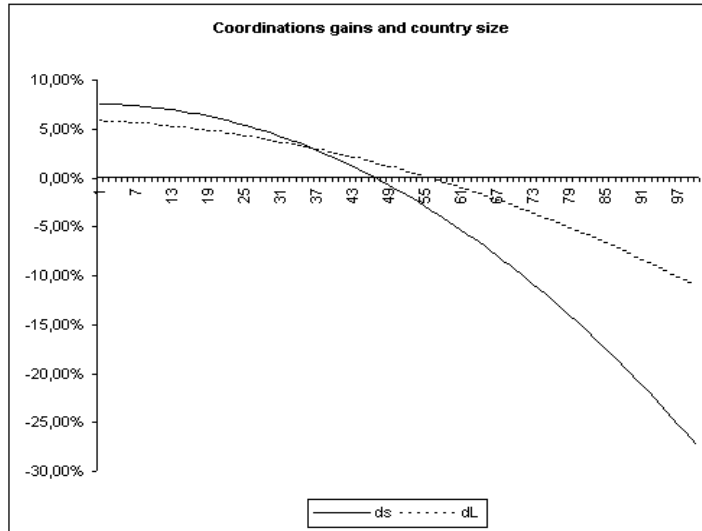


Figure 1:

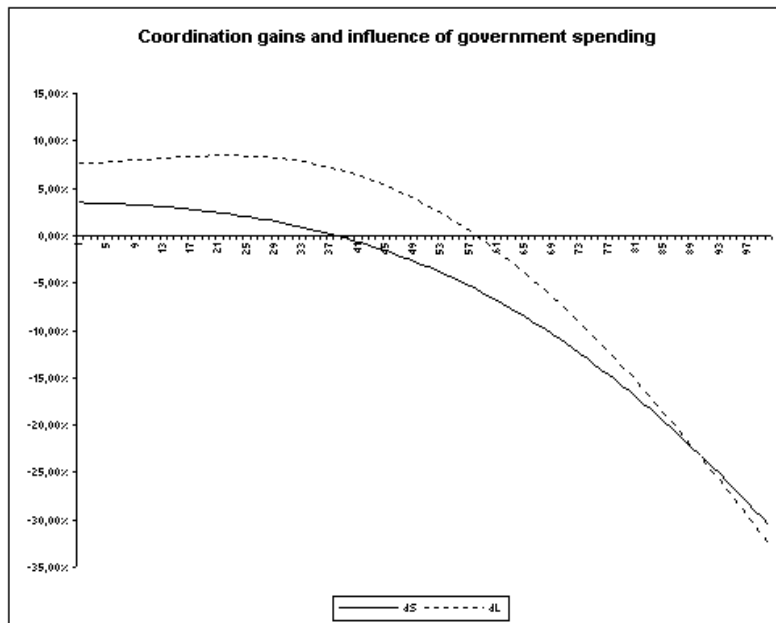


Figure 2:

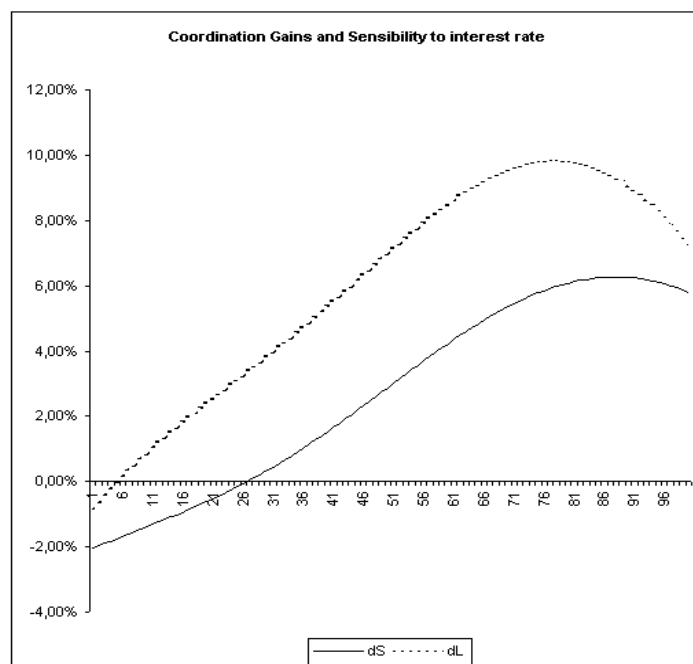


Figure 3: