E C O N O M I C S B U L L E T I N

Fiscal federalism, discipline and selection adverse in the EU : Lessons from a theoretical model

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Fiscal federalism, discipline and selection adverse in the EU : Lessons from a theoretical model

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Abstract

What is the optimal way to stabilize shocks and to take care of fiscal discipline in a fiscal union ? Among the various possible ways, this paper focuses on an inter-countries insurance scheme conditioned by the national preference for the fiscal discipline of each government. We will show that the insurance scheme improves significantly the union's social welfare because it enables to cover deviations of the ouptut gap and correct national preferences.

Keywords : inter-countries insurance, stabilization, fiscal discipline, EU, fiscal federalism, selection adverse.

JEL Classification : E 61, E 62, H 62, H 77.

Introduction

The question of introducing an insurance scheme between the member countries of the EMU is particularly acute. Indeed, since the European governments have faced difficulties in stabilizing their economic situation because of the fiscal rules which press on their decisions, we have to wonder about the interest of an alternate mechanism which would substitute for the ongoing mechanism.

In the EMU, national fiscal policies are governed by the Stability Pact, intended to secure fiscal discipline within the union, and by the subsidiarity principle, which leaves a large room for initiative in fiscal policies. Nevertheless, the Stability Pact, prohibiting « excessive » public deficits, seems mainly to have been motivated by the fear of unbearable national debt rather than by the need for flexibility[1]. The main risk is then that it may be an obstacle to the use of national budgets as a stabilizing tool during recessions, making fiscal policies pro-cyclical[2].

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[1]although Villieu (2003) interprets the Stability Pact as an implicit coordination tool of the national fiscal policies which allows to improve the stabilization of important asymmetrical shocks in the union.

[2]See, notably, Eichengreen & Wyplosz (1998) or still Kadareja (2001).

Faced with such a situation, several alternatives are offered. Two main lines of research emerge from these works. A first way of research consists in relaxing the current fiscal rule which presses on EU member countries so as to let play the subsidiarity principle fully[3]. A second way of research proposes to set up a centralized stabilization scheme which would come to complement national fiscal policies or to substitute for them[4]. We have choosen to explore this second way of research.

The literature on the relevance of a centralized stabilization scheme in the EU has had a new development with the birth of the EMU since the end of the nineties[5]. Nevertheless, the idea of establishing a specific stabilization mechanism in the EMU intended to smooth asymmetric shocks is fairly old[6]. More recently, some works have tried to study the interest of a centralized stabilization scheme as regards the double requirement of stabilization and of fiscal discipline within a monetary union[7].

Our approach will take place within the framework of these recent works. We will consider the introduction of a transfers centralized scheme which would come as a substitute for the Stability Pact. The envisaged mechanism will later be considered as a hybrid insurance mechanism as far as it has to fulfil a double mission which distinguishes it from a standard insurance mechanism : it must not only insure countries against random shocks but also take care of fiscal discipline within a union in which member countries differ by their relative preferences for deficit stabilization. Thus, the aim of this article is to determine the shape and properties of the optimal insurance contract for every governmental type and to estimate the implications of it on the stabilization of ouput gap, deficit and on the social loss of the union.

Like Hougaard Jensen & van Aarle (1996), we will study various possible configurations for the fiscal policy in the EU and we will attempt to shed light on the relevance of a centralized transfer mechanism in terms of stabilization and fiscal discipline. Nevertheless, our analysis differs from theirs for several reasons. First of all, we model explicitly the interplay between the various levels of fiscal power. Besides, we make endogeneous the determination of the transfers mechanism which results henceforth from the central agency's game. Finally, we raise the hypothesis that countries have the same structural parameters, assuming that fiscal governments differ by their preference for fiscal discipline. From then on, the insurance contract can be conditioned on national specificities.

The rest of this paper is organized as follows. Section 1 sets out the model. In section 2, we will study the national reaction functions. In section 3, we will characterize the equilibrium with symmetric information. In section 4, we will characterize the selection adverse equilibrium.

[3]See, for example, Barbier & Villieu (2003) or else Barbier-Gauchard & Blot (2003).

[4]As it's generally the case in a big number of fiscal unions such as the United States, Canada or also Switzerland.

[5]See Beine & Docquier (1997) or still Huart & van Aarle (1999).

[6]See notably the report of Mac Dougall (1977), van der Ploeg (1991), Majocchi & Rey (1993), or still Hammond & von Hagen (1995).

[7]See Hougaard Jensen & van Aarle (1996) or still van Aarle (2001).

1 The model

We consider a union of N identical countries. Each country i is characterized by the following reduced form according to which the output gap depends on public deficit (where a represents the output gap sensibility to deficit with $0 < \alpha < 1$), on a positive random shock and on insurance transfers :

$$y_i^M = ad_i^M - x^M + \alpha_i \qquad \text{in the bad state of nature} \tag{1}$$

$$y_i^B = ad_i^B + x^B - \beta_i \qquad \text{in the good state of nature} \tag{2}$$

where the M exponent refers to « bad state of nature » and the B exponent to « good state of nature » with y_i the level of output gap, d_i the level of public deficit, x an i.i.d. random shock (x^M in the bad state of nature and x^B in the good state of the nature), α_i the net of premium compensation received by country i in case of unfavourable shock and β_i the premium paid by country i in case of favourable shock.

The union consists in two levels of fiscal decision : the central stage represented by a central agency and the national stage represented by the national governments of the union. There are two types of national governments which differ by their sensitivity for fiscal discipline noted γ_i : n_H type H governments (H stands for « high») characterized by a strong preference for fiscal discipline noted γ_H and n_L type L governments (L stands for « low ») characterized by a weak preference for fiscal discipline noted γ_L with $\gamma_H > \gamma_L$. Afterwards, type H will correspond to the « virtuous » type as far as it shows a strict budget control and the L type to the « laxists » because it presents a more relaxed fiscal discipline. So, in case of a cyclical shock, H type governments will stabilize their deficit better than L type gouvernments, but not so much their economic situation.

The game between central agency and national governments is a Stackelberg four-stage game in which the central agency plays as leader and national fiscal authorities play in Nash (that is in a non-cooperative way) as followers. First, the central agency plays by determining an optimal menu of insurance contracts. Second, the nature plays by determining the state of nature (favourable or unfavourable shock), observed by all the players. Third, national fiscal authorities play by determining the optimal fiscal deficit. Finally, payments are made between central agency and national governments. To obtain the equilibrium in this Stackelberg game, we must first determine the governments' reaction functions. Indeed, as any game with sequential decisions, the resolution takes place backwards. From then on, we first have to determine the reaction functions of national fiscal authorities to be able to introduce them into the central agency's optimization program.

Every government, playing as follower, is going to minimize its loss with regard to the public deficit by considering central agency behavior as given. The national loss expresses toward a quadratic function noted L_i depending on the deviations of output gap y_i and of public deficit d_i from their target with the deficit target supposed equal to zero :

$$L_i = \frac{1}{2}\left[(1-\gamma_i)\ (y_i - y^*)^2 \ +\ \gamma_i\ (d_i)^2\right] \text{ with } \ 0 < \gamma_i < 1 \tag{3}$$

In this context, countries have to arbitrate between stabilizing their economic situation at the cost of a high deficit or reducing their deficit at the cost of a weaker stabilization. The resolution of this optimization program gives us the following reaction functions which expresses the optimal public deficit according to the insurance contract determined by the central agency in each state of nature :

$$d_i^M = R_i^M(\alpha_i) = \frac{a\ (1-\gamma_i)\ (x^M - \alpha_i + y^*)}{a^2\ (1-\gamma_i) + \gamma_i} \tag{4}$$

$$d_i^B = R_i^B(\beta_i) = \frac{-\ a\ (1-\gamma_i)\ (x^B - \beta_i + y^*)}{a^2\ (1-\gamma_i) + \gamma_i} \tag{5}$$

where R_i^j indicates the reaction function of a type i government in the state of nature j with $i = H$ or L and $j = G$ or B. Thus, optimal public deficit presents three components : a cyclical component which depends on the random shock[8], a structural component which depends on the output gap target[9] and an insurance component that negatively affects public deficit in the bad state of nature and positively in the good state of nature[10]. Thus, the national fiscal intervention allows, whatever the state of nature is, to improve output gap stabilization. Indeed, output gap becomes less sensitive to cyclical shocks because the sensitivity shifts down from 1 to $\frac{\gamma_i}{a^2\ (1-\gamma_i)+\gamma_i}$. Besides, this sensitivity is all the weaker as γ_i is weak. However, whatever the government type considered is, national fiscal stabilization never allows to completely stabilize cyclical shocks. Besides, fiscal behavior is differentiated because of the heterogeneousness of national preferences for deficit stabilization. It seems that the « virtuous » stabilize their public deficit better but their output gap less than the « laxists ». Consequently, the stumbling block of such a system appears. Indeed, it could be accompanied by an explosion of public deficits in some countries and real lack of cyclical stabilization in others. That's why we are interested in the relevance of an insurance scheme intended to improve the output gap stabilization while taking care of fiscal discipline within the union.

The central agency, acting as as a leader central planner, is going to minimize its expected loss with regard to the menu of insurance contracts (α_H, β_H) and (α_L, β_L) under the constraint of nul expected profit and of the national reaction functions. The union's social loss function noted L is also a quadratic loss function depending on the deviation of output gap y_i and of the deficit d_i for every country from their target :

$$L = \frac{1}{2}\Big[(1-\gamma)\ n_H\ (y_H - y^*)^2 + (1-\gamma)\ n_L\ (y_L - y^*)^2 + \gamma\ n_H\ (d_H)^2 + \gamma\ n_L\ (d_L)^2\Big] \tag{6}$$

The central agency's aim is double : offering to member states a coverage against random shocks and correcting national arbitrages with $\gamma_L < \gamma < \gamma_H$. The parameter γ represents the specific central agency sensitivity for fiscal discipline. We suppose that $\gamma > \gamma_L$ i.e. that the central agency cares more for fiscal discipline than the « laxists » and that $\gamma > \gamma_H$

[8]The cyclical deficit is all the more sensitive to shocks as preference for fiscal discipline γ_i is low.

[9]Structural deficit is all the more sensitive to the output gap target as preference for fiscal discipline γ_i is low.

[10]Public deficit is of all the more sensitive to the insurance contract as it presents a low preference for fiscal discipline γ_i.

i.e. that the central agency is less worried by fiscal discipline than the « virtuous ». The constraint of nul expected profit is frequently used in the insurance litterature. In our framework, it represents a long-term budget-balance constraint which can be written like :

$$-p\ n_H\ \alpha_H + (1-p)\ n_H\ \beta_H - p\ n_L\ \alpha_L + (1-p)\ n_L\ \beta_L = 0 \tag{7}$$

where p is the probability to be hit by a random negative shock x^M and, consequently, $(1-p)$ is the probability to be hit by a random positive shock x^B.

2 Insurance and symmetric information

In the symmetric information situation, the central agency knows the number of countries of every type and knows which type every country belongs to. In other words, the central agency perfectly knows how to distinguish between the « virtuous » and the « laxists ». As a consequence, the central agency can determine a contract adapted for every country type and conditional to the observation of cyclical shocks. Then, there are as many contracts as there are types. The resolution of this optimization program allows us to determine the optimal insurance contracts expression :

$$\alpha_H = x^M - \frac{n_L\ (A-B)}{n_H\ A + n_L\ B}\ y^* \quad , \quad \beta_H = x^B + \frac{n_L\ (A-B)}{n_H\ A + n_L\ B}\ y^* \tag{8}$$

$$\alpha_L = x^M + \frac{n_H\ (A-B)}{n_H\ A + n_L\ B}\ y^* \quad , \quad \beta_L = x^B - \frac{n_H\ (A-B)}{n_H\ A + n_L\ B}\ y^* \tag{9}$$

$$\text{with } A = \frac{[a^2\ (1-\gamma_H)+\gamma_H]^2}{{\gamma_H}^2\ (1-\gamma)+a^2\ \gamma\ (1-\gamma_H)^2} \text{ and } B = \frac{[a^2\ (1-\gamma_L)+\gamma_L]^2}{{\gamma_L}^2\ (1-\gamma)+a^2\ \gamma\ (1-\gamma_L)^2}$$

Consequently, the insurance contract proposed to every type of fiscal authority depends on the scope of the observed cyclical shock and on the output gap target but also on the proportion of every type of government n_H and n_L, on the sensitivity for fiscal discipline of national governments γ_H and γ_L and of the central agency's γ. So, the insurance contract answers the two raised problems in this economy since each term of the contract presents two components. An insurantial component, enabling to be covered against random shocks, answers the stabilization problem. It enables to stabilize completly random shocks. This component is identical for each type of government but differs according to the state of nature[11]. A corrective component allows to answer the fiscal heterogeneousness problem. It affects the insurantial component positively or negatively. This component is identical for each state of nature but differs according to government type[12]. We can moreover note that, without the fiscal heterogeneity problem that is if $\gamma = \gamma_H = \gamma_L$, full insurance is the optimal solution.

[11] cThis insurancial omponent rises in x^M in the bad state of nature and in x^B in the good state of nature.

[12] This corrective component rises in $-\frac{n_L\ (A-B)}{n_H\ A+n_L\ B}\ y^*$ or the « virtuous » governments and in $\frac{n_H\ (A-B)}{n_H\ A+n_L\ B}\ y^*$ for the « laxists ».

The differentiation of insurance contracts takes place through the corrective constituent, intended to correct national arbitrages . This component differs according to the government type and its determinants are twofold. First, the proportion of every type of government plays a crucial role. If the virtuous governments are more numerous than the lax governments then the virtuous corrective component is weaker than that of the laxists. Second, the sign of $(A - B)$ plays also a crucial role. If it is positive then the virtuous governments undergo a fine which comes to reduce net compensation and to increase paid premium (compared to the full insurance) whereas the laxists benefit from an additional payment which comes, on the contrary, to increase net compensation and to reduce paid premium. The sign of $(A - B)$ depends on the value of the social preference for deficit stabillization γ. More precisely, it depends on the distance between the social preference for deficit stabilization and national preferences i.e. $\gamma_H - \gamma$ et $\gamma - \gamma_L$[13].

Finally, at the symmetric information equilibrium, the insurance scheme enables to stabilize completly random shocks but the existence of a heterogeneousness of national preferences for fiscal discipline introduces a corrective component in every insurance contract. For every government type, the effect of this component depends on the distance between the central preference and national preferences for deficit stabilization. So, if social preferences are relatively close to the virtuous preferences (the case if $A > B$) then the virtuous support a fine whereas the laxists get an additional payment. Whatever happens, the insurance sheme reduces the social expected loss.

3 Insurance and selection adverse

However, it is unlikely that the central agency perfectly knows national preferences or can use this information to discriminate between governments (for political reasons for example). So, it seems relevant to tackle the situation in which the type of fiscal authorities constitutes a hidden characteristic for the central agency. We are then in a frame of selection adverse. By continuing to propose the contracts obtained above, one of the two types of government is going to be tempted to choose the insurance contract intended for the other type. In this context, the central agency has to introduce incentive-compatibility constraints in its optimization program. These constraints allow to verify that every type of government gets a lower expected loss with their contrat than with the contract intended for the other type and can spelt thus with $EL_i(\alpha_k, \beta_k)$ is the expected loss of a gouvernment i with the insurance contract intended to the type k :

$$EL_H(\alpha_L, \beta_L) \geq EL_H(\alpha_H, \beta_H) \quad (10)$$

$$EL_L(\alpha_H, \beta_H) \geq EL_L(\alpha_L, \beta_L) \quad (11)$$

[13]Let's remember that $[a^2\ (1-\gamma_L)+\gamma_L] < [a^2\ (1-\gamma_H)+\gamma_H]$ because $\gamma_L < \gamma_H$. We then show that $A-B>0 \Leftrightarrow\ \ [a^2\ (1-\gamma_H)+\gamma_H]\ (\gamma-\gamma_L)-[a^2\ (1-\gamma_L)+\gamma_L]\ (\gamma_H-\gamma)>0$. So, if the central agency shows a strong preference for deficit stabilization then virtuous governments undergo a fine whereas the laxists benefit from an additional payment. In that case, social preferences come near the virtuous preferences but remote from those of the laxists. Consequently, the central agency has to correct the arbitrages of the laxists. In other words, the only means for the central agency to correct the laxist preferences, given the balanced budget constraint, is to introduce a fine on the virtuous.

The resolution of this optimization program gives the following contract :

$$\alpha_H = \alpha_L = \alpha = x^M \quad \text{et} \quad \beta_H = \beta_L = \beta = x^B \tag{12}$$

Consequently, we are in the presence of a pooling insurance contract, which means that, in the presence of selection adverse, the central agency can no longer offer dividing contracts to governments. Compared with the equilibrium without insurance, it also seems that the introduction of an insurance contract reduces the expected social loss as well as the expected national losses. In comparison to the equilibrium with insurance and symmetric information, it appears that the expected social losses are higher. To study the effect on national expected losses, it is necessary to distinguish two cases according to the nature of the incentive problem. If $A > B$ that is if the virtuous are tempted to cheat then the selection adverse equilibrium improves their situation. On the contrary, the laxists see their expected loss increase and conversely if $A < B$.

Concluding remarks

In a union of countries, national governments have to arbitrate between stabilizing their economic situation at the cost of a high deficit or reducing their deficit at the cost of a lesser stabilization. in this context, the questions raised is how to insure a better stabilization of the activity while taking care of a certain fiscal discipline. This paper focuses on the relevance of an inter-country insurance scheme in a context where the information can be asymmetric. Even though the modelization remains extremely simplistic, this study enables to find out some significant results as to the relevance of such a mechanism within a union of countries. Furthermore, these results correspond to results highlighted in the traditional insurance literature.

Whatever the informational situation is, the introduction of an hybrid insurance scheme permits to reduce the expected social loss. If the central agency can perfectly discriminate between governments then the stabilization problem is solved by full insurance whereas the problem of the heterogeneousness of national preferences is solved by a payment/fine system. This corrective mechanism depends on the number of governments of every type and on the dimension of the heterogeneousness of national preferences. This corrective component is all the higher as national preferences are heterogeneous. Generally speaking, the correction of the national arbitrages of some can be made only by punishing the others because of the budget balanced constraint of the central agency. On the contrary, if the central agency cannot perfectly discriminate between governments then only the problem of stabilization is solved. Again, shocks are totally stabilized by full insurance. Nevertheless, the problem of the heterogeneousness of national preferences is not solved any more as far as the central agency can no longer distinguish the virtuous from the laxists. In a general way, we can't hope to correct national arbitrages by a hybrid insurance scheme when information is asymmetrical. So, it would be preferable to consider that the transfer centralized scheme might come to complement the Stability Pact rather than to substitute for it.

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