INSURANCE MECHANISMS AGAINST ASYMMETRIC SHOCKS IN A MONETARY UNION: AN APPLICATION TO THE EUROPEAN MONETARY UNION[*]

Oscar Bajo-Rubio

Carmen Díaz-Roldán

(Universidad Pública de Navarra)

Abstract

In this paper we offer a proposal of an automatic insurance mechanism designed to cope with asymmetric shocks in a monetary union. The mechanism would take as indicator the changes in the unemployment rate of the countries belonging to the union, and would be financed through a fund built from contributions of those countries as a percentage of their tax receipts. The fund would be later distributed among the countries affected by a negative asymmetric shock according to the proportion in which every one of them would have been affected by the shock. The mechanism proposed is illustrated by means of an empirical application to the case of the European monetary union.

Key words: Monetary union, asymmetric shocks, insurance function.

JEL classification: E62, E63.

1. INTRODUCTION

Traditionally, it has been identified as the main functions of fiscal policy, together with that of allocation (that is, supplying an adequate provision of public goods), those of redistribution and stabilization. The redistribution or equalization function is addressed to correct either structural disequilibria or those provoked by a shock (i. e., any unexpected event having a direct or indirect impact on the economy), where the concept of redistribution is related to those of interpersonal comparisons, equity, and economic and social cohesion. In its turn, the stabilization function would be addressed to smooth the business cycle and so counteracting the economy's undesired fluctuations.

However, within the stabilization function it is possible to differentiate what corresponds to the stabilization function in itself, from what Eichengreen (1993) terms insurance function of federal fiscal policy. So, whereas the stabilization function would try to compensate the effects that several regions might suffer following a common (symmetrical) shock, the insurance function would be relevant in the presence of specific (asymmetrical) shocks. Hence, we can see how the main difference between the stabilization and insurance functions lies in the kind of shock to which it has to provide an answer.

Within a federation (i. e., a territory made up of several federal states, each one formed by a certain number of local governments), the central budget plays a key role in the redistribution among territories (von Hagen, 1993). Starting from a certain structure of revenues and expenditures, redistribution translates into an equalization function, since establishing progressive taxes, which impinge on the levels of economic activity,

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and uniformly distributed regional transfers, means that the regions (which can extend to more than one state) with a lower income will receive transfers from the rest. But the central budget may also provide a stabilizing effect in an automatic way, through direct transfers to the agents and progressive taxes. So, in the case of several regions simultaneously experiencing a recession, tax revenues would decrease, and transfers would increase, which would be the stabilization function. However, when a region experiences a recession not affecting to the others, net transfers to the central government to that region would increase, which would be the insurance function.

On the other hand, in the context of the Economic and Monetary Union (EMU) currently in force within the European Union (EU), the management of fiscal policy becomes an issue of special relevance. Given the increasing role acquired by fiscal policy as an instrument of macroeconomic stabilization, the question is raised about its use at the EU level. In this sense, it has been widely discussed the possibility of introducing a centralized fiscal policy instrument at the EU level, serving as an automatic mechanism of compensation of the asymmetric shocks that might eventually affect to those economies participating in EMU (Bajo and Vegara, 1999).

The analysis of a mechanism of this kind will be the objective of this paper. In section 2, we will revise the available evidence on the degree of insurance provided by the budget in the already existing federations. In section 3, we will discuss the main questions that have been posed when debating which degree of insurance might provide a particular mechanism. In section 4, we will offer a specific proposal of an automatic insurance mechanism designed to cope with asymmetric shocks in a monetary union. Finally, the main conclusions are presented in section 5.

2.   THE INSURANCE FUNCTION OF FISCAL POLICY

Before raising the proposal contained in this paper, we will briefly discuss the available studies on this issue. The proposal of establishing some mechanism providing an insurance, of an automatic kind, to the regions experiencing asymmetric shocks in a monetary union, has a certain tradition within the classical literature on optimum currency areas (Kenen, 1969), even though it has come back to the foreground with the publication of the paper of Sala-i-Martin and Sachs (1992). Several empirical studies have tried to quantify, from the experience of the existing federations, the degree of insurance that the federal budget can provide; although not all of them make clear the difference between stabilization and insurance, and most of them confuse the insurance and the stabilization functions. All these papers start from the same hypothesis: federal systems provide an insurance against shocks. To this end, they take as indicator of the occurrence of a shock the worsening of a certain economic variable, and, when verifying the hypothesis that the federal budget means an insurance mechanism, study which are the stabilizing properties of fiscal variables. The insurance effect is quantified by means of two alternative methods: regression analysis, distinguishing between income before and after taxes, and simulations from macroeconomic models, making some assumptions on the properties of the fiscal system and the degree of economic integration.

In general, those studies using regression analysis compute the contribution of fiscal variables (taxes and transfers) to a variable that represents the current state of the economy (state income or product). The pioneering paper is that of Sala-i-Martin and Sachs (1992), who regress federal government's tax revenues and transfers on the final disposable income of 9 US regions, where the variables are measured in levels. From

the estimated elasticities in both regressions, they obtain that the federal budget would absorb, through taxes and transfers, around 40 per cent of the initial effect of a shock. However, these results were criticized on the grounds that, since variables are measured in levels, they were incapable to distinguish between the equalization and insurance functions. So, when the variables are introduced in first differences into the regression, von Hagen (1992) obtains, also for the US case, an insurance effect of 10 per cent; whereas Goodhart and Smith (1993) obtain an effect of 14 per cent. Finally, Bayoumi and Masson (1995) use variables in levels and in first differences (which allows them to quantify the effect of the equalization and insurance functions, respectively) for the US and Canada, obtaining a degree of insurance of 30 per cent in the US case and 17 per cent in the Canadian case. Indeed, as noticed by these authors, federal flows depend on the institutional structure; so that, since there exist several types of federalism, it is not surprising to find differences in results.

Another way of address this issue is that of Pisani-Ferry, Italianer and Lescure (1993) by means of a simulation exercise, where they try to measure the scope of the automatic stabilization (insurance) provided by the fiscal system, when a shock occurs. They obtain that the effect would be 17 per cent in the US, 37 per cent in France, and between 34 and 42 per cent in Germany, depending on whether transfers among regions are included; from here, they conclude that EMU member estates would not need a specific insurance mechanism. Goodhart and Smith (1993) also perform a simulation analysis, obtaining an effect of 34 per cent for the case of Britain, concluding that an adequate fiscal policy coordination would be enough in order to insurance the different economies against the occurrence of shocks.

As can be seen, there are strong discrepancies in the results obtained from the studies previously quoted, which relates to two aspects: the components of the stabilizing mechanism, and the magnitude of the effects obtained from it.

Regarding the composition of the mechanism, according to Sala-i-Martin and Sachs, von Hagen, and Goodhart and Smith, the tax system provides the main part of the stabilization; whereas Pisani-Ferry *et al*. stress the role of social security payments (neglected by von Hagen) and unemployment benefit at the federal level, which does not exist in the US economy. In its turn, Bayoumi and Masson go a step beyond when state that the Sala-i-Martin and Sachs and von Hagen approaches overestimate the stabilizing effect of the tax system, since the component with a higher weight in stabilization are actually transfers.

Turning to differences in the quantitative results, in regression analyses these could be explained for two reasons: the sample period (the longer the period, the better the results) and the variables chosen. Sala-i-Martin and Sachs, and Bayoumi and Masson, use *per capita* income before taxes, whereas von Hagen, and Goodhart and Smith, use the gross state product, a wider measure of economic activity. Regarding the fiscal variable, all these studies consider basically taxes and transfers, excluding the unemployment benefit, which is not established at the federal level; indeed, von Hagen also excludes social security, since he argues that it can redistribute income among regions along time. It is maybe for this reason, as well as using a different functional form than Sala-i-Martin and Sachs, that von Hagen's results were the more pessimist of all.

Until now, it could be said that, even though federal systems can certainly provide an insurance, the needed degree of fiscal federalism can be lower than thought. Sala-i-Martin and Sachs' results show an upwards bias, since they overlap the redistribution and stabilization functions, which would be confirmed by von Hagen's weaker results, even though deriving from them the conclusion that a monetary union can work without any insurance seems to be somewhat extreme. The reconsideration of Sala-i-Martin and Sachs' and von Hagen's results by Goodhart and Smith suggests that fiscal federalism can provide a remarkable degree of insurance; but, since this would be obtained thanks to several budget items not transferable to the EU budget in the medium run, it might be inferred that, faced to EMU, the implementation of other mechanisms would be more advisable. On the other hand, Pisani-Ferry *et al*. show how the degree of stabilization provided by the US federal budget is lower than in the case of several European countries such as Germany and France, due to the fact that in the US there does not exist a unemployment benefit system at the federal level. This would endorse the hypothesis that keeping relatively independent fiscal policies in the EU might face the occurrence of shocks, not being necessary either any budget reform or the implementation of automatic mechanisms warranting the insurance function.

3. THE INSURANCE FUNCTION OF FISCAL POLICY IN EMU: SOME UNSETTLED QUESTIONS

In theory, with a federal fiscal authority the most part of an exogenous shock that might affect to a monetary union would be automatically absorbed. The magnitude of such an absorption would depend on the size of the overall budget, of the taxes varying procyclically, and of the expenditures varying countercyclically. In practice, as we have seen, the empirical studies show that the degree of needed fiscal federalism could be lower than *a priori* assumed. However, faced to EMU, the EU budget should not be expected in principle to play the same role than, for instance, the US federal budget. In fact, proposing structural reforms of the budget would require several institutional changes, such as reinforcing the role of the European Parliament, creating either a supranational authority on taxes or funds guaranteed by different budget rules, or establishing a joint decision mechanism for the coordination of fiscal policies.

Incorporating the insurance function to the EU budget would mean to reinforce fiscal competencies at the EU level, since the size of its budget is still relatively small. However, the implementation of a European fiscal policy through this way would face a difficulty, since the EU does not obtain revenues from federal taxes, but also there does not seem to be plans of transferring taxes to the EU level. Since the current structure of revenues and expenditures is not able to provide an automatic stabilization, the necessity of designing a specific mechanism can be posed. This question, already noticed by Goodhart and Smith (1993), has been raised by several studies trying to answer the question of how a stabilization policy at the European level might be designed and how the insurance function might be guaranteed. The more relevant features that have been

stressed in the literature, when analyzing the desirability of a mechanism of this kind, are its degree of automaticity, the proper level of government, the equilibrium between redistribution and stabilization, and the origin and destination of the funds. In this section, we will briefly review how these features have been dealt with in some recent studies.

Automaticity vs. discretionality

Italianer and Vanheukelen (1993) defend the existence of an insurance mechanism at the federal level, although they warn about the limited value of the US experience. Majocchi and Rey (1993) coincide with these authors in that resorting to transfers among governments would require a reform of the European fiscal system. Since this solution seems to be hardly feasible, they insist in that the alternative mechanism should operate in a discretional way, in order to be able to verify that the shock was exogenous and so avoiding problems of moral hazard. Italianer and Vanheukelen solve this question by proposing a limited stabilization mechanism which could be activated either automatically or discretionally, in the latter case if it is deemed as necessary that the government of the affected country proved that the shock escapes to its control; this possibility exploits fiscal autonomy, avoids moral hazard and allows the insurance's automaticity.

National insurance vs. federal insurance

The basic question is not whether the federal budget is able to provide insurance, but rather if it is necessary to implement the insurance function at the federal level; how to do it can be relegated to a later moment. The answer depends on what is to be expected from the insurance function. According to Mélitz and Vori (1993), the main

objective of such a function should be to overcome the loss of national independence regarding the management of macroeconomic policy, from what they defend that it should be instrumented at the national level. Indeed, according to these authors, common shocks with asymmetric effects would not be a problem in Europe, so that the EU would be close to be an optimum currency area that would not require an insurance mechanism; however, the insurance function of fiscal policy at the federal level would be assigned to face specific shocks affecting the domestic economy (Eichengreen, 1993). On the other hand, the objective of insurance is to cover oneself against a risk, and not necessarily to compensate the loss of independence regarding fiscal policy.

Redistribution vs. stabilization

Determining the equilibrium between redistribution and stabilization means a problem of political decision that also affect the features of the stabilization mechanism; indeed, not all the available studies clarify the basic difference between both functions. Italianer and Vanheukelen (1993) design a mechanism intended to fulfil a exclusively stabilization function, whereas von Hagen and Hammond (1998) propose a series of redistributive or stabilizing mechanisms according to the properties included in their design, concluding that, the higher the econometric complexity, the higher the degree of stabilization provided.

Financing and destination of the funds

Both the financing of the mechanism and the destination of the funds are posed as open questions, since the available studies limit themselves to point to certain general aspects on the design of the mechanism (what to insure?, whom?, desirable properties, indicators to use), as well as to simulate how some examples could work. Only

Majocchi and Rey (1993) propose that their discretional mechanism was financed in an *ad hoc* manner by the countries concerned and that the amounts to be paid were conditioned in order to assure its consistency with the Community's objectives. The other studies do not go into this subject, although they recognize that the degree of stabilization attained will depend, in part, on how the funds were used.

4. AN INSURANCE MECHANISM AGAINST ASYMMETRIC SHOCKS IN EMU

In the previous section we have reviewed some studies that make different proposals on stabilization policy at the European level and the possibility of relying on a mechanism that guarantees the insurance function. The degree of coverage provided by the mechanism is an empirical question which would depend, in principle, on the characteristics with which it were designed; so, a coverage wide enough could justify a system of fiscal federalism able to assure the working of the mechanism. But, to the technical problems (of design and implementation), we should add the political problem of its general acceptance.

4.1. THE CHARACTERISTICS OF THE MECHANISM

As well as the legal bases that should be taken into account for the correct working of the mechanism, the more relevant questions facing its design would be the following.

Why an automatic mechanism?

According to Fatás (1998), the only additional benefit of a system of fiscal federalism would be to provide insurance among regions, although he estimates that the benefits would be reduced and decreasing along time. However, it should not be expected in EMU, at least in the short run, the high flexibility of prices and wages, as well as the labour mobility, which would be needed to be adjustment mechanisms, alternative to the loss of the exchange rate and monetary policy. On the other hand, if we assume that it would be desirable to rely on a mechanism that would provide automatic

insurance against shocks, the relevant concept of shock should be defined: asymmetric shocks, i. e., those requiring an optimal answer which is different in every country. In its turn, two kinds of asymmetric shocks should be distinguished: specific, which affect just one country (i. e., asymmetric both in origin and in impact), and common that affect simultaneously several countries but with a different impact among them (i. e., symmetric in origin but asymmetric in impact).

When should it work?

When the indicator of the occurrence of a shock is activated. Before defining such an indicator, its desirable properties should be stressed: it must be a measure both sure and quick, and its fluctuations must provide some information on the cyclical changes in real output. In principle, we can choose the worsening of a cyclical indicator (output or employment level, rate of growth of the economy) as compared to the EU average. In our case we will make use, like Italianer and Vanheukelen (1993), of the change in the unemployment rate, under the assumption that changes in that variable correspond with changes in the opposite sense in the economy's rate of growth. The choice of the unemployment rate as an indicator of asymmetric shocks can be justified on the grounds that, both at the national and regional level, it becomes available relatively easily and with a small time lag.

How should it work?

Compensating relatively, at least, to those regions affected by a shock. Following von Hagen and Hammond (1998), the desirable properties of an insurance mechanism are that *it must operate with simplicity*, both for financing and transferring funds; *in an automatic way*, avoiding bureaucratic intervention to assure its working and with

expenditures having a specific purpose; *it must not mean redistribution in the long run*, so that the mechanism must be designed to face asymmetric shocks; *it must avoid moral hazard*, which would occur using observable data (i. e., guarantee of the indicators) and establishing that transfers were among governments (i. e., in order to not creating personal incentives); *it must have a wide coverage and guarantee budget neutrality*, so that those regions not affected by the unfavourable shock must contribute relatively more, and only the regions affected must receive transfers; indeed, *the whole amount collected must be always distributed*, avoiding deficits or superavits in the mechanism.

How to finance it?

This is a fundamental question for the general acceptance of the mechanism, since the concerned countries will be reluctant to give up any competencies, which means a loss of political sovereignty or national autonomy. Given that establishing a federal budget does not seem to be viable in the short or medium run, we will propose giving up a percentage of tax collections. In this way, those countries not suffering the unfavourable shock will contribute relatively more than those affected, because in the latter, when the level of activity decreases, so will do the level of tax collections.

Who should be the beneficiaries?

If these were the governments, it should be guaranteed that they would use the funds adequately. But if they were the individuals, transfers should be among governments in order to not creating personal incentives. With the proposed mechanism, each country affected would receive a proportion over the total amount collected that should be assigned to the unemployed, so that automaticity would be guaranteed since revenues would have the specific purpose of subsidizing unemployment. Indeed, on

insuring individuals and not governments, the problems arising when an asymmetric shock affected to a region extended to more than one country would be minimized (von Hagen, 1993).

How payments should be distributed?

The federal government would distribute the total amount collected among the countries affected by the shock in a proportional way, according to the change in the unemployment rate. In its turn, the governments of these countries (or, alternatively, other lower levels of government) would make the distribution among individuals, exploiting in this way the advantages of their fiscal autonomy.

Which will be the degree of insurance attained?

This is an empirical question that would depend basically on the concept of shock considered and on how its effects were measured; on the relative change in the indicator and its relation with the effects of the shock; on the amount of the received transfers and the way in which the governments concerned implement the distribution among individuals.

4.2. A PROPOSAL OF AN INSURANCE MECHANISM FOR EMU

Next, we will present a proposal of an insurance mechanism against asymmetric shocks, and then we will present a numerical example applied to the 11 countries participating in EMU.

As the indicator of the occurrence of a shock we will take the change in the unemployment rate with respect to the period before:

$$du_i(t) = u_i(t) - u_i(t-12)$$

where $u_i(t)$ is the unemployment rate of the country i (i = 1,....,11) in period t. Since in the numerical application we will use monthly data, the indicator will refer to the change in the unemployment rate with respect to the same month of the year before, in order to eliminate the effect of cyclical fluctuations.

The condition for a country i to receive payments will be:

$$du_i(t) > 0, \; du_i(t) > du_{EMU}(t)$$

i. e., that in such a country a positive change in the unemployment rate with respect to the same month of the year before occurs in month t, and this change must be also higher than the change in the unemployment rate in the whole EMU area during the same period.

Regarding the financing of the mechanism, it will be assumed that each country will give up a percentage of its tax collections. Since these are procyclical, those countries not suffering the unfavourable shock will contribute proportionally more than those affected. Denoting α that percentage (which will be assumed to be the same for all the countries) and T_i the total amount collected in country i in a certain year, αT_i will be the amount with which country i annually contributes to the mechanism. If the amount collected every year is assigned monthly in equal parts, the total amount of the fund to be distributed every month t will be given by:

$$F(t) = \alpha \left(\frac{\sum_{i=1}^{11} T_i}{12} \right)$$

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Finally, the total fund F(t) will be distributed among the countries concerned according to the proportion in which every country was affected by the unfavourable shock. Denoting $\beta_i(t)$ to that proportion, we will have:

$$\beta_i(t) = \frac{\omega_i du_i(t)}{\sum\limits_{i=1}^{n} \omega_i du_i(t)}$$

subject to $du_i(t) > 0$, $du_i(t) > du_{EMU}(t)$; and where ω_i represents the weight of the unemployment rate of country i in the unemployment rate in the whole EMU area (in the numerical application the weighting factor will be GDP), being n the number of countries affected by the unfavourable shock ($0<n<11$). We will also impose the constraint $\sum\limits_{i=1}^{n} \beta_i(t) = 1$, which guarantees that the fund is fully distributed, so that we will eliminate the possibility of redistributive actions in the long run.

Therefore, each country i affected by a unfavourable shock (i=1,...,n) would receive every month t a total amount $B_i(t)$:

$$B_i(t) = \beta_i(t) F(t) = \frac{\omega_i du_i(t)}{\sum\limits_{i=1}^{n} \omega_i du_i(t)} \alpha \left(\frac{\sum\limits_{i=1}^{11} T_i}{12} \right)$$

subject to $du_i(t) > 0$, $du_i(t) > du_{EMU}(t)$.

As can be seen in the previous expression, each country affected by a unfavourable shock will receive a higher amount the higher was $\beta_i(t)$, which will occur, on the one hand, the higher was the relative increase in its unemployment rate as compared to the other countries affected; and, on the other hand, the lower was the number of countries suffering that unfavourable shock. In other words, the proposed

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mechanism "stabilizes more" the more asymmetric was the shock; therefore, we could say that it exclusively fulfils the insurance function.

4.3. THE INSURANCE MECHANISM IN PRACTICE: AN APPLICATION TO THE COUNTRIES PARTICIPATING IN EMU

Next, we will present an empirical application of the insurance mechanism proposed in the previous subsection. To this end, we will use monthly data for the 11 countries participating in EMU, and the reference year will be 1997.

The changes in the unemployment rate occurred in every month of 1997 with respect to the same month of 1996, for each one of the 11 countries and the whole EMU area, are shown in Table 1. As can be seen, the only countries fulfilling the requirements to benefit from the proposed mechanism (i. e., a positive change in the unemployment rate should have occurred, and this must be higher than the change occurred in the whole EMU area) would be Germany and Luxembourg, both during all the year; France, between January and July; Italy, between January and May, in July, and between September and November; and Austria, in January and February, and between April and December.

The total amount of the fund to distribute during 1997, computed from a percentage α given up by each country on its tax collections, is shown, for different values of α, in Table 2. When computing the fund, value added tax (VAT) collections for 1996 have been used. The choice of VAT might be justified on the grounds that this tax is subject to some harmonization principles within the EU; in fact, the most important revenue source, in quantitative terms, of the EU budget comes from the

transfer of a percentage of VAT collections in each member state. On the other hand, since every year's tax collections would not be available until the next year, it will be assumed that the insurance provided by the mechanism during 1997 would be financed with 1996 collections.

Next, in Table 3 we show the proportions in which those countries fulfilling the requirements would receive payments from the insurance mechanism. As can be seen, the resulting proportions would be higher, *cæteris paribus*, the higher the relative increase in the unemployment rate and the lower the number of countries concerned (or, in other words, the more asymmetrical the shock). Also, given a same increase in the unemployment rate, the country with a greater size would receive a higher amount; in our case, the country with a higher GDP, since this has been the weighting factor used when computing the proportions.

Once we know the total amount of the fund and the proportions according to which this is distributed, in Table 4 we present the amounts to receive monthly by each of the countries benefiting from the fund, for different values of α.

To conclude, we have tried to measure the degree of coverage that the proposed insurance mechanism would provide. Notice that we do not intend here to offer an exact measurement of the effects associated with the mechanism, but rather a rough approximation through a very simple procedure. To this end, we have estimated, with annual data for the whole EMU area during the period 1960-1996, the following equation representative of the so-called "Okun's Law":

$$du_t = \gamma - \sigma\, g_t$$

where du_t and g_t denote, respectively, the change in the unemployment rate and the rate of growth of real GDP.

From the estimation of the previous equation, the rate of growth in the presence of a shock (i. e., when $du_t \neq 0$) would be given by:

$$\hat{g}_t^p = \frac{\gamma}{\sigma} - \frac{1}{\sigma} du_t$$

and the associated GDP level by:

$$\hat{Y}_t^p = (1 + \hat{g}_t^p) Y_{t-1}$$

where Y denotes GDP. On the other hand, in the absence of a shock (i. e., when $du_t = 0$), the estimated rate of growth would be given by:

$$\hat{g}_t^s = \frac{\gamma}{\sigma}$$

and the associated GDP level by:

$$\hat{Y}_t^s = (1 + \hat{g}_t^s) Y_{t-1}$$

Therefore, the size of the shock could be proxied by:

$$\hat{Y}_t^s - \hat{Y}_t^p = (\hat{g}_t^s - \hat{g}_t^p) Y_{t-1}$$

or, in other terms, by:

$$\left(\frac{1}{\sigma} du_t \right) Y_{t-1}$$

In this way, the degree of coverage of the insurance would be given by the ratio of the sum of the payments received throughout the year to the size of the shock, the latter measured by the above expression.

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The estimation of the Okun's Law equation gave us a value of the coefficient σ of 0.296, significant at the 1 per cent level; the estimated equation included a trend, with a negative coefficient that was also significant. The results from applying the procedure sketched above appear in Table 5, and lead to values for the degree of coverage of our insurance mechanism that would not be very far from those found in the literature for the federal fiscal systems already existing (see the references quoted in section 2). As can be seen, and for a given change in the unemployment rate, those countries enjoying a higher degree of coverage would be France and Italy, which would have received payments from the mechanism for a lower number of months; in other words, those countries where the shock would have been more asymmetric.

5. CONCLUSIONS

In a monetary union, fiscal policy acquires a special role as an instrument facing the occurrence of shocks. In principle, it is difficult to distinguish between the insurance function (i. e., correcting deviations in the equilibrium path of the economy, provoked by a negative asymmetric shock) and the redistribution or equalization function (i. e., correcting disequilibria, structural or provoked by a shock). When designing a fiscal policy that incorporates the insurance function, it could be useful to rely on some mechanisms of automatic adjustment against asymmetric shocks. Some ideas proposed in order to implement a mechanism of this kind include to exploit keeping independent fiscal policies, considering the possibility of establishing a unemployment benefit at the European level or designing an automatic mechanism based on unemployment as an indicator.

The latter possibility is that we have tried to explore in this paper. In particular, we have proposed a simple insurance mechanism against asymmetric shocks, of an automatic nature, from a fund made up by contributions of the countries participating in a monetary union as a percentage of their tax collections; the fund would be later distributed among those countries affected by a negative asymmetric shock according to the proportion in which every one of them was affected by the unfavourable shock, which was defined in terms of an increase in the unemployment rate higher than in the whole area of the union.

Next, an empirical application for the case of EMU was offered, where the tax figure from which the fund to distribute was made up was VAT. This example allowed us to verify the main characteristics of the proposed mechanism: it provided a higher

stabilizing effect the more asymmetric was the shock (i. e., the higher had been the relative increase in the unemployment rate and the lower the number of countries affected), the total amount of the fund was distributed (which eliminated the possibility of redistributive effects in the long run) and, since a percentage of VAT collections in the whole EMU area was distributed, all the participating countries (whether affected or not by the unfavourable shock) would contribute to the mechanism. Finally, a rough estimation of the possible degree of coverage offered by the insurance mechanism was provided, which would not be very far from the values found in the literature for the federal fiscal systems already existing. In sum, a mechanism of this kind might be useful when facing asymmetric shocks in a monetary union.

Notice that with this purpose we are not asserting that in EMU asymmetric shocks will necessarily prevail, an entirely empirical issue on which there is not concluding evidence in the literature; and even some authors have noticed that the greater integration associated with EMU would reinforce the symmetry of shocks affecting member countries (Frankel and Rose, 1997). We only wish to stress that, on disappearing monetary policy and the exchange rate as policy instruments available to the authorities of the countries participating in EMU, these find themselves with a lower number of instruments at hand faced to the eventual appearance of asymmetric shocks; and, in this sense, an insurance mechanism of an automatic nature such as that proposed in this paper might be helpful. Besides, recalling the argument that, once EMU is under way, "politicians and commentators will, rightly or wrongly, blame the severity of cyclical downturns on monetary union" [Goodhart (1995), p. 470], the availability of a compensating mechanism like the one proposed here could help to sustain political support for EMU in temporarily disadvantaged countries [see Goodhart (1995)].

To conclude, it is important to notice that, faced to the political acceptance of a mechanism such as the one proposed in this paper, it would be desirable to have a harmonized definition of the unemployment rates of the countries participating in the monetary union, as well as a certain degree of fiscal harmonization that leads to an homogeneous structure of the tax figure from which the fund to be distributed is made up. In the current situation, however, the latter problem could be reduced if the tax figure chosen was VAT, given its higher degree of harmonization among the member states of the EU. Also, it could be more appropriate taking as reference, both for the definition of the unfavourable shock and for the distribution of the funds, other government levels below that of national states, such as regional governments.

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TABLE 1: Changes in the unemployment rate
(1997 to 1996)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Belgium	-0.8	-0.7	-0.7	-0.7	-0.5	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5
Germany	0.7	0.5	0.5	0.6	0.7	0.8	0.8	1.0	1.0	0.9	0.7	0.7
Spain	-1.4	-1.4	-1.6	-1.3	-1.2	-1.3	-1.4	-1.5	-1.5	-1.5	-1.5	-1.2
France	0.4	0.2	0.3	0.2	0.2	0.2	0.1	0.0	0.0	0.0	-0.1	-0.2
Ireland	-1.7	-1.9	-1.8	-2.2	-2.2	-2.3	-2.3	-2.4	-2.4	-2.2	-2.1	-2.0
Italy	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.2	0.2	0.1	-0.1
Luxembourg	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.5	0.4	0.3	0.1
Netherlands	-1.0	-1.1	-1.3	-1.4	-1.2	-1.0	-1.3	-1.5	-1.8	-1.7	-1.9	-1.8
Austria	0.3	0.2	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.3
Portugal	-0.1	-0.1	-0.4	-0.7	-0.8	-0.6	-0.3	-0.5	-0.4	-0.4	-0.6	-0.6
Finland	-0.9	-0.4	-1.2	-0.6	-0.5	-1.8	-3.0	-3.1	-2.0	-2.0	-2.6	-2.4
EMU	0.1	0.0	-0.1	0.0	0.0	0.1	-0.1	0.0	0.0	-0.1	-0.2	-0.1

Source: Eurostat: *Eurostatistics* 05/1997 and 05/1998; and *European Economy* 66/1998.

TABLE 2: Total fund to distribute, for different values of α
(in million Euro)

	Total	α = 1%	α = 0.9%	α = 0.75%
January	48210.5094	482.105094	433.894584	361.578820
February	49405.1324	494.051324	444.646191	370.538493
March	49099.6312	490.996312	441.896681	368.247234
April	48092.7682	480.927682	432.834914	360.695762
May	48082.9890	480.829890	432.746901	360.622418
June	48793.3477	487.933477	439.140129	365.950108
July	49775.9584	497.759584	447.983625	373.319688
August	49847.5419	498.475419	448.627877	373.856564
September	48854.3697	488.543697	439.689327	366.407773
October	49419.2144	494.192144	444.772929	370.644108
November	49084.3757	490.843757	441.759381	368.132818
December	49178.6469	491.786469	442.607822	368.839852

Source: Own elaboration from OECD: *Main Economic Indicators*.

TABLE 3: Proportions for the distribution of payments

	$\beta_{GERMANY}$	β_{FRANCE}	β_{ITALY}	$\beta_{LUXEMBOURG}$	$\beta_{AUSTRIA}$	$\sum_{i=1}^{5}\beta_i$
January	0.62597181	0.25616005	0.08696196	0.00416890	0.02673728	1
February	0.69789050	0.19991342	0.06786719	0.00650701	0.02782188	1
March	0.61218356	0.26304351	0.11906503	0.00570790	-	1
April	0.70167113	0.16749700	0.11372473	0.00545189	0.01165525	1
May	0.76382126	0.15628539	0.05305622	0.00508696	0.02175018	1
June	0.81817318	0.14648054	-	0.00476782	0.03057847	1
July	0.83719251	0.07494282	0.05088361	0.00569176	0.03128930	1
August	0.96659339	-	-	0.00450618	0.02890043	1
September	0.88414955	-	0.08598017	0.00343486	0.02643542	1
October	0.87357150	-	0.09439055	0.00301668	0.02902127	1
November	0.88515748	-	0.06148442	0.00294752	0.05041058	1
December	0.95801663	-	-	0.00106338	0.04091999	1

Source: Own elaboration from Table 1 and OECD: *National Accounts. Main Aggregates 1960-1997*, vol. 1, 1999.

TABLE 4: Amounts received monthly, for different values of α
(in million Euro)

Table 4.A: GERMANY

	α = 1%	α = 0.9%	α = 0.75%
January	301.784199	271.605779	226.338150
February	344.793723	310.314351	258.595292
March	300.579872	270.521884	225.434904
April	337.453071	303.707764	253.089803
May	367.268091	330.541282	275.451068
June	399.214083	359.292675	299.410562
July	416.720596	375.048537	312.540447
August	481.823046	433.640742	361.367285
September	431.945691	388.751122	323.959268
October	431.712173	388.540955	323.784129
November	434.474022	391.026620	325.855516
December	471.139617	424.025656	353.354713
TOTAL	4718.90818	4247.01737	3539.18114

Table 4.B: FRANCE

	α = 1%	α = 0.9%	α = 0.75%
January	123.496067	111.146460	92.6220501
February	98.7674906	88.8907416	74.0756180
March	129.153394	116.238054	96.8650452
April	80.5539437	72.4985494	60.4154578
May	75.1466856	67.6320170	56.3600142
June	71.4727577	64.3254819	53.6045683
July	37.3035064	33.5731558	27.9776298
August	-	-	-
September	-	-	-
October	-	-	-
November	-	-	-
December	-	-	-
TOTAL	615.893845	554.30446	461.920383

Table 4.C: ITALY

	α = 1%	α = 0.9%	α = 0.75%
January	41.9248024	37.7323221	31.4436018
February	33.5298737	30.1768863	25.1474053
March	58.4604907	52.6144416	43.8453680
April	54.6933721	49.2240349	41.0200291
May	25.5110144	22.9599130	19.1332608
June	-	-	-
July	25.3278048	22.7950243	18.9958536
August	-	-	-
September	42.0050699	37.8045629	31.5038024
October	46.6470680	41.9823612	34.9853010
November	30.1792432	27.1613189	22.6344324
December	-	-	-
TOTAL	358.278739	322.450865	268.709054

Table 4.D: LUXEMBOURG

	α = 1%	α = 0.9%	α = 0.75%
January	2.00984653	1.80886188	1.50738490
February	3.21479871	2.89331884	2.41109904
March	2.80255619	2.52230057	2.10191714
April	2.62196309	2.35976678	1.96647232
May	2.44596139	2.20136525	1.83447104
June	2.32637812	2.09374031	1.74478359
July	2.83312807	2.54981527	2.12484606
August	2.24621854	2.02159669	1.68466391
September	1.67807875	1.51027088	1.25855907
October	1.49081916	1.34173724	1.11811437
November	1.44677241	1.30209517	1.08507931
December	0.52295555	0.47065999	0.39221666
TOTAL	25.6394765	23.0755289	19.2296074

Table 4.E: AUSTRIA

	α = 1%	α = 0.9%	α = 0.75%
January	12.8901786	11.6011607	9.66763394
February	13.7454374	12.3708937	10.3090781
March	-	-	-
April	5.6053322	5.04479898	4.20399915
May	10.4581382	9.41232434	7.84360362
June	14.9202583	13.4282325	11.1901938
July	15.5745481	14.0170933	11.6809111
August	14.4061538	12.9655384	10.8046153
September	12.9148576	11.6233718	9.68614321
October	14.3420840	12.9078756	10.7565630
November	24.7437197	22.2693477	18.5577898
December	20.1238959	18.1115063	15.0929219
TOTAL	159.724604	143.752143	119.793453

Source: Own elaboration from tables 2 and 3.

TABLE 5: Annual coverage provided by the insurance mechanism, for different values of α
(in percentage of the size of the shock)

	Germany	France	Italy	Luxembourg	Austria
$\alpha = 1\%$	13.48	17.19	14.73	10.99	10.68
$\alpha = 0.9\%$	12.13	15.47	13.26	9.90	9.61
$\alpha = 0.75\%$	10.11	12.89	11.05	8.25	8.01

Source: Own elaboration from Eurostat: *European Economy* 66/1998.