

EUROPEAN UNIVERSITY INSTITUTE, FLORENCE

DEPARTMENT OF ECONOMICS



WORKING PAPER No. 88/344

INTERVENTION MECHANISMS  
AND SYMMETRY IN THE EMS

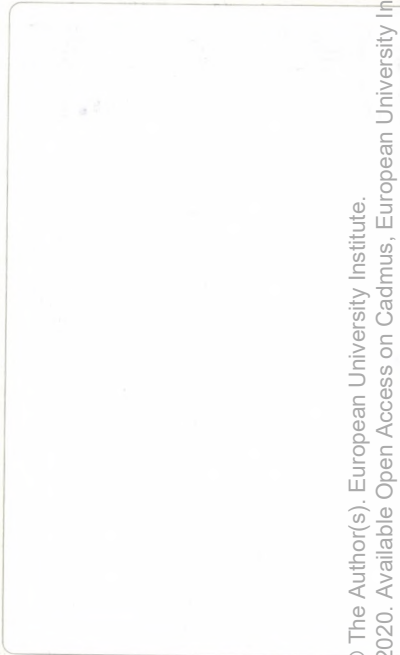
by

Joerg MAYER

I should like to acknowledge helpful comments by Emil Claassen, Marcello de Cecco, Francesco Giavazzi, Christoph Kutscher, Stefano Micossi, and Wolfgang Rieke on a previous draft of this paper. Any errors or misinterpretations are solely those of the author.

BADIA FIESOLANA, SAN DOMENICO (FI)

All rights reserved.  
No part of this paper may be  
reproduced in any form without  
permission of the author.



(C) Joerg Mayer  
Printed in Italy in June 1988  
European University Institute  
Badia Fiesolana  
- 50016 San Domenico (Fi) -  
Italy

## Intervention Mechanisms and Symmetry in the EMS

### 1. Introduction

This paper discusses the degree of symmetry of the European Monetary System (EMS). A symmetrical monetary regime would mean a system in which no country's monetary base is insulated from external disturbances and in which all countries share the burden of adjustment. The EMS was actually founded with the presumption of symmetry. However, evolution seems to have transformed the system into a Deutsche-mark area with Germany, as the most efficient member country in terms of anti-inflationary policy, at the center. Recent changes in the institutional setup of the EMS suggest the existence of a strong movement which aims at returning to greater symmetry. The paper concentrates on the analysis of existing intervention mechanisms in order to assess their impact on the symmetry issue of the system; this assessment is complemented by evaluating the efficiency and the inflationary impact of the different intervention mechanisms. In addition, the paper tries to identify the new circumstances which are pushing the system towards greater symmetry. As the paper points out, such a system could possibly lead to an enhanced role of the ECU.

The paper is organized as follows: Section two briefly reviews the basic institutional set-up of the EMS. The third section recalls the  $n-1$  problem in terms of which the symmetry issue was discussed in the 1960s and illustrates its possible solutions for the EMS. The fourth section starts with the presentation of a two-country portfolio model which shows the impact of symmetrical and asymmetrical intervention on the monetary bases of the two countries. It then analyses the intervention mechanisms of the EMS, focusing on the changes of national quantities of money and of the total EMS quantity of money. It concludes with the analysis of data on EMS intervention in order to assess which kind of intervention actually prevails. The fifth section looks at the extent of exchange-rate realignments in the EMS in order to analyse the interests of Germany and the other members

in staying in the system. The sixth section casts some light on the influence on the symmetry issue of the low inflation rates reached in the EMS, the program for capital liberalization and the intended full membership of the United Kingdom in the EMS. The last section considers the role of the ECU in a possibly emerging EMS as a more symmetrical system which, however, would maintain monetary discipline.

## 2. Main Features of the European Monetary System

The European Monetary System is a system of fixed but adjustable exchange rates in which all member countries of the European Communities with the exception of the United Kingdom, Spain, Portugal and Greece participate. The Pound Sterling and the Greek drachma are, nonetheless, included in the ECU basket. Central rates in the EMS are expressed in terms of the European Currency Unit (ECU). These central rates are taken to form a grid of bilateral parities so that intervention margins are also expressed bilaterally in terms of participating currencies. The fluctuation margins of these bilateral parities are 2.25 percent (6 percent for the Italian lira) around central parities. Interventions are compulsory at these margins and unlimited in amount.

In addition to these rules, a 'divergence indicator' was established. This indicator shows the divergence of the daily rate of any EMS currency, expressed in ECU, from its ECU central rate. If a currency diverges more than 75 percent of its maximum divergence spread (threshold of divergence) it is 'presumed' that the authorities concerned will take adequate measures. Those measures are, for example, diversified intervention or a change of domestic monetary policy.

Intervention in EMS currencies at the margins is financed by the 'very short-term financing facility' (VSTF) which consists of mutual credit lines between member central banks. For the settlement of claims and debts arising from these interventions, specific rules were created (see below for further detail). Those rules have been

necessary because ECUs have to be accepted only up to a certain amount and because EMS currencies can be held with other member central banks only for working balances, except in cases of particular allowance.

The other two financial mechanisms, the 'short-term monetary support' and the 'medium-term financial assistance' were intended to be used for mutual assistance in cases of balance-of-payment difficulties but have never been used.<sup>1</sup>

The ECU was created to fulfill four functions, numeraire for the exchange-rate mechanism, denominator for operations in the intervention and credit mechanisms, reference point for the divergence indicator, and means of settlement and reserve asset for EMS central banks. In order to have a sufficient amount of ECUs available for the financial mechanisms, a supply of ECUs is created against the deposit of 20 percent of both the gold holdings and gross US dollar reserves of EMS central banks at the European Monetary Cooperation Fund (EMCF). These deposits take the form of three-month revolving swaps. Every three months when a new swap transaction takes place, any changes of the price of gold or the dollar rate are taken into account.

Adjustments of central rates are "subject to mutual agreement by a common procedure which will comprise all countries participating in the exchange rate mechanism and the Commission." (European Council Resolution of December 5, 1978, paragraph A.3.2. See *European Economy*, No. 3 (July 1979), p. 95). See Table 1 for the eleven realignments until now.

---

<sup>1</sup> UNGERER et al. (1986) p. 6 note that France in 1983 and Greece in 1985 requested loans under the Community loan mechanism which, however, does not take part in the institutional setup of the EMS.

### 3. The Solution of the (n-1) Problem

#### 3.1. Theoretical Foundation

The n-1 problem is a critical feature of any operational monetary system because with n currencies we only have n-1 independent exchange rates. Hence, one degree of freedom exists "and its disposal must be explicitly specified." [FRENKEL (1987) p. 209] The resolution of the n-1 problem is closely related to the problem of determining the distribution of the burden of adjustment between countries. In a world of n countries only n-1 countries need achieve balance-of-payments equilibrium. Therefore, the question of which country should be spared a balance-of-payments constraint arises, or in other words, which country should exert benign neglect with respect to its balance of payments and hence to its exchange rate. The Bretton Woods system gave this degree of freedom to the United States which in turn pegged the price of the dollar to gold, at 35 dollar an ounce. With this provision it was hoped to assure a stable and low-inflation-rate monetary policy of the United States. The other n-1 countries, in contrast, committed themselves to peg their currencies to the dollar and thus to bear the burden of adjustment in the case of balance-of-payments imbalances. In addition, exchange-rate realignments and intervention were a matter of the n-1 countries without any commitment of the USA. This means that in principle a stable international monetary system with a low inflation path was established. However, this was only true as long as all countries acted in fact according to the duties and obligations which were allocated to them. As a matter of fact, this fundamental commitment of all countries to the system's stability was less and less strong during the course of the 1960s. This was ultimately responsible for the breakdown of the system.

#### 3.2. Possible Solutions in the EMS

The solution of the n-1 problem in the Bretton Woods system can not easily be transformed to the EMS for various reasons. Firstly, the EMS is only a regional monetary system and thus a sub-system of the

international monetary system in which the US dollar - being an outer currency - is still the main international currency. Secondly, the German mark is the only EMS currency which has a sizable importance in the international monetary system, namely as a close substitute to the US dollar in international portfolios. Thirdly, the EMS rules of the game concerning the procedure of realignments and the original stipulations on intervention explicitly attribute equal rights and duties to all participants. Fourthly, the ECU was created with the presumption of its becoming future common European currency. Consequently, the actual functioning of the EMS combines on the one hand an originally intended - and at the outset in the rules fixed - equality of all participants and on the other an actually existing hierarchy among EMS currencies and between EMS currencies and the dollar. The studies on the EMS reflect this dual feature, partly emphasizing monetary discipline [e.g. GIAVAZZI and PAGANO (1986) or GIAVAZZI and GIOVANNINI (1987)] and partly underlining the gains of exchange-rate cooperation. [e.g. MELITZ (1985)] However, as MELITZ [(1987) p. 1] points out, it is necessary "to combine the two approaches in order to benefit from the respective merits of each. The monetary discipline hypothesis is especially helpful in understanding the interest of the inflation-prone members in the system, while the issue of strategic cooperation is essential in explaining the German presence." Thus, how the (n-1) problem has been solved in the EMS is crucial. If the n-th currency was the ECU or a non-participating currency like the US-dollar the position between the individual member currencies would in fact be symmetrical, the system tending toward strategic cooperation. In contrast, if a participating currency played the role of the n-th currency, this would mean the imposition of the policy of the monetary authorities of that currency on the remaining participants, the system tending toward monetary discipline.

The question is what are the particular attributes of a currency which make it the key currency of a monetary system. Characteristics of an n-th currency can be threefold:

- 1) the currency which serves as numeraire
- 2) the intervention and reserve currency

- 3) the currency of the economically most important country which exerts benign neglect towards its balance of payments.

(1) and (2) are in general identical "because to fix the price of the other currencies in terms of the numeraire requires using the numeraire currency as an intervention currency, and also promotes its use as medium of international exchange and a store of international value". [JOHNSON (1972) p. 417] However, this does not hold true if the numeraire is a currency basket which is not convertible, such as the SDR or the ECU.

The three possible characteristics mentioned lead to the following hypothesis about the solution of the (n-1) problem in the EMS:

- (1) The ECU is the numeraire because central rates are expressed in terms of the ECU. Thus, it would be a symmetrical system with n+1 currencies: the n member currencies plus the ECU.
- (2) There is no independent currency because intervention margins have been fixed bilaterally and intervention at the margins have always to be executed bilaterally in terms of participating currencies. Thus, this would be in principle a symmetric system, determined, however, by the different monetary and fiscal policy pursuits of member countries.
- (3) The US-dollar is the n-th currency because a significant amount of intramarginal interventions were in terms of dollar. Moreover, the ECU is rather a "non-negotiable instrument of credit than a reserve asset" and holdings of Community currencies are confined to working balances, so that "the system has no common freely available, liquid, fully convertible asset but the US dollar." [MICOSSSI (1985) p. 331] Thus, the system would be symmetric in principle, however determined by differences in the closeness of relation of participating currencies to the US dollar manifested by different responses to dollar rate movements.
- (4) The D-mark is the n-th currency because Germany as the economically strongest member is the pivot in economic policies within the EMS and because intramarginal intervention has increasingly been executed in German mark. However, in addition it



would require that German monetary authorities would not care about the intra-EMS D-mark exchange rate. With these characteristics the system would be asymmetric, the EMS would be a D-mark area.

During the discussions about how to build the EMS a proposal was made in which the ECU would have served as the reference currency. Not only would central rates have been expressed in terms of ECU, but also fluctuation margins would have been defined against ECU. This means that the ECU would have reflected mean behavior and identified the divergent country. Thus, central banks would have been forced to intervene whenever their currency's exchange rate diverged from its ECU central rate. This proposal was not realized, mainly for two reasons. Firstly, one currency only would always touch intervention margins, so that the problem of how to determine the 'partner' currency for intervention would arise. This 'involuntary' intervention partner would then have had to accept a liquidity increase in its own currency being a creditor or it would have lost reserves in the case of being a debtor. [UNGERER et al. (1985) p. 15] Secondly, since the ECU represents a kind of average of the Community, monetary policies and inflation rates would have tended to converge towards this average and not towards the more stable member currencies as is the case in a bilateral system such as the snake or the finally realized EMS. [RIEKE (1979) p. 346]

The hypotheses 2) - 4) are examined in more detail in the remainder of the paper. Foreign-exchange market intervention will be at the center of attention.

#### 4. Intervention and Coordination of Monetary Policy in the EMS

This section focuses on the coordination of foreign-exchange intervention in the EMS. This question is particularly important because it analyses the monetary quantity of which country changes due to the different intervention mechanisms. On this basis, the allocation of the burden of adjustment concerning intra-EMS

disturbances and external disturbances can be evaluated. Before the effects and the effectiveness of the different intervention mechanisms of the EMS are discussed, a theoretical model is presented to tackle the issue in general terms. An interpretation of EMS intervention data will conclude this section.

#### 4.1. Theoretical Model

The model is a simple two-country portfolio model developed by DE GRAUWE (1983). We shall mainly follow DE GRAUWE in concentrating analysis on, first, the effectiveness of symmetric and asymmetric intervention, and second, the importance of who intervenes. As a third aspect, the impact of capital controls on the intervention issue will be considered. Throughout the whole analysis non-sterilization of intervention is assumed.

DE GRAUWE's model considers two countries (A and B) and four assets: money issued by country A, money issued by country B, bonds issued by country A denominated in currency A, and bonds issued by country B denominated in currency B. The degree of substitutability between the two bonds is very important because existing capital controls are a major determinant of substitutability and because substitutability influences the effectiveness of intervention. Monetary equilibrium is obtained in the two countries when

$$(1) \quad M_{sa} = P_a L_a(y_a, r_a)$$

and

$$(2) \quad M_{sb} = P_b L_b(y_b, r_b)$$

where

$M_{sa}$  and  $M_{sb}$  = money supply in countries A and B, respectively

$P_a$  and  $P_b$  = price level in countries A and B, respectively

$L_a$  and  $L_b$  = demand for real money balances in countries A and B, respectively

$y_a$  and  $y_b$  = level of real income in countries A and B, respectively

$r_a$  and  $r_b$  = nominal interest rate on bonds of countries A and B, respectively

The bonds of countries A and B are imperfect substitutes, so that

$$(3) \quad r_a = r_b + u + z$$

where

$u$  = the expected rate of depreciation of currency A; that is,  
 $u = [E(S) - S]/S$ , where  $E(S)$  denotes the expectation held today about tomorrow's exchange rate,  $S$  ( $S$  denotes the price of currency B in units of currency A). Exchange-rate expectations are assumed as static.

$z$  = risk premium paid to the holders of A-bonds in order to induce them to hold these bonds willingly

Following DE GRAUWE, the risk premium is assumed to be a positive function of the supply of A-bonds and a negative function of the supply of B-bonds. Hence,

$$(4) \quad z = z(B_a/B_b)$$

where  $B_a$  and  $B_b$  represent the supplies of A-bonds and B-bonds, respectively. Both supplies are expressed in terms of currency A. It is further assumed that

$$(5) \quad \frac{dz}{d(B_a/B_b)} = z_B > 0$$



an open economy with free capital movements domestic interest rates are determined by domestic supply and demand and by international portfolio disturbances, the raising interest rate could come about by an increase in liquidity preference in Germany or by a reallocation in the dollar-mark portfolio of international investors. This latter point is due to the characteristic of the D-mark as a close substitute to the dollar in international markets. It is further assumed that this shock does not affect  $E(S)$ , i.e. that it is expected to be temporary. The money market in country B now reaches equilibrium in point G. Hence, another variable has to adjust for maintaining full asset-market equilibrium. Supposing that monetary authorities peg the exchange rate at its initial level, exchange market intervention has to be carried out in a way to keep  $u=0$ .<sup>1</sup>

Figure 1 shows the case of symmetric intervention. Symmetric intervention means that money stocks in both countries are influenced by exchange market intervention. Following the external shock in country B, country A intervenes by selling currency B with the aim of not letting the exchange rate increase. This aim is realized by a decrease in country A's money stock (from OA to OA') and an increase in country B's money stock (from OB to OB'). The change of both countries' national quantity of money causes the interest rate differential to disappear, so that  $u=0$ . With both money multipliers constant and equal to 1, country A needs an amount of intervention which equals the distance A'A. The two countries reach equilibrium in point H and point K, respectively. With active cooperation in intervention, that is country A intervening in currency B and country B intervening in currency A, the same results are obtained. However, the needed amount of intervention would be equally allocated to both the countries. If we assume that instead of country A it is country B which intervenes by selling currency B, exactly the same results for

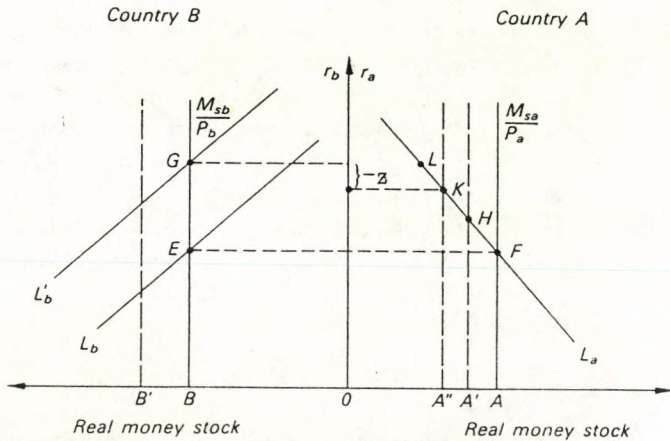
---

<sup>1</sup> DE GRAUWE notes that this must not always be the case. Intervention might aim at stabilizing  $u$  at a level different from zero. However, this would unnecessarily complicate the model without changing its essence.

the changing money stocks are obtained. The only difference is that it is now country B which needs foreign exchange reserves. Therefore, in the case of symmetric intervention it is unimportant who intervenes.

Next, we consider the effects of capital controls existing in country A. Capital controls decrease the degree of bond substitutability in two ways [CLAASSEN and WYPLOSZ (1982)]: On the one hand, they tend to decrease the interest-rate sensitivity of the demand for foreign assets. On the other hand, the degree of bond substitutability decreases due to the uncertainty regarding the imposition of capital controls in the future. In the model, a lower substitutability of A- and B-bonds is reflected in a higher  $z_B$ . Hence, going back to equation (3), a lower change of  $u$  is necessary in order to adjust  $r_a$  to an increase in  $r_b$ . The new equilibrium points will be closer to the original ones E and F than in the case without capital controls. Therefore, a lesser extent of intervention is necessary. As a result, we can conclude that capital controls can partly reconcile a fixed parity with independent monetary policies. This is due to the fact that short-run autonomy of monetary policy under fixed exchange rates is more limited the more capital is internationally mobile.

Figure 2:



In the case of asymmetric intervention results are different. Asymmetric intervention means that the national quantity of money of only one of the two countries changes. The case in which country B pegs its domestic money stock at the initial level OB is illustrated in Figure 2. In this case, country A intervenes by selling currency B which country B buys immediately back through sales of domestic bonds in the open market. As DE GRAUWE shows, two opposing effects occur. On the one hand, with country B's money stock remaining fixed, country A has to adjust its money stock to a larger extent and therefore to intervene more extensively in order to decrease the difference between  $r_a$  and  $r_b$ . The new equilibrium points would be G and L, respectively. On the other hand, the supply of B-bonds has increased in country B, causing the risk premium to become negative. Thus, country A has to reduce its domestic money stock to a lower extent, which in turn reduces the need to intervene. Figure 2 represents the case of high bond substitutability. In this case, the change in the relative bond supplies affects the risk premium only slightly; it equals  $-z$ . The amount needed for intervention is A''A. The net equilibrium points are G and K, respectively.

We can conclude that asymmetrical intervention - only one country's monetary base changes - is less effective than symmetrical intervention - both countries' monetary bases change - because a larger amount is needed for intervention in order to adjust the money markets to the same external shock.

A common feature of both cases is the impact of capital controls on the amount of intervention. Since capital controls decrease the substitutability between A- and B-bonds the risk premium will be more affected by the change in the relative bond supplies than is portrayed in Figure 2 for the case without capital controls. Hence, the amount of  $-z$  will be larger, so that again the new equilibrium points will be closer to the original ones than in the case without capital controls.

An interesting feature of asymmetric interventions is their different impact on the common quantity of money depending on who intervenes. As Figure 2 shows, intervention by country A with the

depreciating currency reduces the net money stock so that this kind of intervention has an inherent deflationary bias. The reverse would hold true for intervention of the country with the appreciating currency. In this case the country with the depreciating currency (country A in the model) would peg its money stock, so that the burden of adjustment would be allocated to country B. This can only be done by an increase in the money stock of country B, with the amount of this increase again depending on the degree of substitutability of the two bonds. Hence, the total money stock would increase. Thus, this kind of intervention bears an inflationary bias. This example demonstrates the welfare case of allocating the nth currency role to the country with the lowest inflation rate and the burden of adjustment for balance-of-payments imbalances to the remaining n-1 countries while exchange rates are fixed. This is known as the 'discipline argument' for fixed exchange rates.

To sum up the conclusions: Firstly, symmetric intervention is more effective than asymmetric intervention because a lower amount of intervention is needed. Secondly, in the asymmetric case it is important which country intervenes. If the country with the depreciating currency intervenes the system has a deflationary bias. Thirdly, capital controls in the depreciating currency allow for a certain degree of monetary independence under fixed exchange rates as well.

Until now it has been assumed that the two countries and their respective quantities of money are equal in size. If instead analysis is extended to unequal size, another case can be made for overall welfare from an asymmetric exchange-rate system. Welfare has to be understood in this context at the system's least inflationary path. The relative size criterion was made by MUNDELL [(1968) Ch. 13]. MUNDELL demonstrates "that, in theory, adjustment should be divided in inverse proportion to the sizes of the countries". [MUNDELL (1968) p. 192. Emphasis in original.] Whenever an exogenous shock requires an adjustment by changing relative prices, the ratio of the price changes is inversely proportionate to the size of the country. This holds true under the assumption that the money stocks reflect the size of the



respective countries. Thus, the effect on the whole system's price level will be lesser the less the price level of the large country is affected. The system's welfare from a low inflation point of view is, hence, minimized when the burden of adjustment is mainly taken by the small countries.

If we look at the different sizes of GDP among EMS countries it turns out that Germany is the relatively largest country (80% larger than Italy and 22% larger than France, in 1986). Thus, from the relative size criterion one must conclude for the EMS that it would be optimal if Germany had the freedom to leave its money base unchanged and if, in turn, the remaining countries took the burden of adjustment.

#### 4.2. The Various Intervention Mechanisms of the EMS

Before examining to which kind of the discussed types of intervention the intervention mechanisms of the EMS can be allocated, some general remarks about intervention in the EMS will be made.

The EMS was founded to pursue two objectives<sup>1</sup>: first, the creation of a 'zone of monetary stability in Europe', that is a general reduction of inflation rates and in the differentials between inflation rates of participants. This should be accompanied by more stable and less volatile exchange rates. The second objective was 'to coordinate members' policies vis-à-vis third countries', that is in particular with respect to the United States. Intervention has explicitly been considered as a means to reach this objective. However, intervention has quite different outcomes depending on why they are executed, the way in which central banks intervene and, most important for the EMS, how interventions are financed. We shall start with the question of the reasons for intervention.

---

<sup>1</sup> As defined in the Bremen Annex to the conclusions of the European Council of December 1978; compare also PADOA-SCHIOPPA (1985) p.337

In principle, the objectives of creating a zone of monetary stability in Europe and of coordinating members' policies vis-à-vis third countries contains two different points of view which reflect the comparative advantages of a fixed and a flexible exchange rate system. An adjustable peg system like the EMS can be regarded as an attempt to reconcile the 'goods', but naturally also the 'bads', of both the systems. These two points of view imply different evaluations of the relative merits of exchange rate flexibility and stability within the margins in relation to other EMS currencies. On the one hand, "the flexibility provided by the fluctuation margins .. (would be) regarded as a cushion to absorb or dampen some external shocks without the need for immediate changes in basic policies or central rates." [UNGERER et al. (1985) p. 5] On the other hand, stability, and in particular keeping the exchange rate stable against a strong currency in the system, would positively influence market expectations. In so doing, monetary authorities would demonstrate their determination to block destabilizing speculation against their currency, and by pegging to a low-inflation currency they would gain credibility in terms of pursuing domestic monetary stability. As will be argued below, intervention data suggest that the first point of view prevailed in the EMS during the first years after the system's inception, but that over the course of time the latter point of view has gained favor.

Intervention data can give insight into this question because the different points of view on the relative merits of flexibility and stability imply different ways of using interventions for exchange rate management. Favoring flexibility would mean a full use of fluctuation margins. Thus, in the case of the EMS we would observe symmetrical intervention at the margins. That is to say, both the strong and the weak currency country would intervene in the respective currencies financed by recourse to the very-short term financial facility (VSTF). Favoring stability would mean intramarginal intervention so that only one country would intervene, by using its foreign-exchange reserves.

From these considerations one can see the importance of an intervention rule in a fixed exchange-rate system. MELITZ (1985), indeed, focuses on intervention rules to determine whether an exchange-rate system yields higher or lower welfare. Welfare in this context is larger the higher the degree of symmetry in an exchange-rate system. MELITZ claims that the EMS is a high welfare case of a fixed exchange-rate system because the existence of intervention rules which are reflected, "for example, in the automatic short-term facilities, the indicator of divergence, and the operating rules of thumb of the member central banks" [MELITZ (1985) p. 503] makes it a symmetric system. Symmetry means that no country can fully determine its monetary base. According to MELITZ, the highest welfare position is reached in a situation in which both countries try to optimize their quantity of domestic credit in an output-inflation optimizing set and, concomitantly, both allow their total money supply ( $M = \text{domestic credit} + \text{foreign reserves}$ ) to be influenced by intervention. Thereby, the degree of the intervention's impact on the money supplies depends on the specific intervention rule agreed upon previously. However, MELITZ assumes that "the countries fail to do any sterilization whatever". [MELITZ (1985) p. 497] Thus, his claim for the EMS to be a symmetric system depends on two aspects: One, the actual share of intervention which by itself affects both countries' money supply, and two, no sterilization at all thereafter.

Let us now consider the various intervention mechanisms of the EMS and their respective way of financing. In so doing, attention will be focused on three categories:<sup>1</sup> first, whose national quantity of money changes, second, the relative efficiency of intervention, and third, the intervention's influence on the total EMS-quantity of money. Four groups of interventions are distinguished: first, intervention at the margins financed by the VSTF, second, intramarginal intervention with various possibilities of financing, third, dollar intervention, and fourth intervention in private ECU. At

---

1 See CLAASSEN (1983) for using these categories.

this stage of the analysis, it is assumed that intervention is not sterilized.

a) Intervention at the Margins

Intervention at the margins has to be executed in EMS currencies and is financed by the 'very-short term financing facility' (VSTF) which consists of mutual credit lines between member central banks. For the settlement of claims and debts arising from these interventions, specific rules were created. These rules have been changed various times since 1979. Originally, central banks had to accept ECUs for debt settlement only up to 50% of the total amount. This payment ratio was extended from July 1, 1985 on to the extent to which the recipient central bank has an overall net debt position in the ECU reserve accounts (amended article 16.1). Recently, in September 1987, the reimbursement limit of the VSTF was enlarged to 100%, the time limit for settlement was extended from 2 1/2 to 3 1/2 months and the credit facility was increased with its automatic renewal from 100% to 200% of the debtor's quota at the European Monetary Cooperation Fund (EMCF).

This kind of intervention is the most effective because the national quantities of money of both the intervening countries change. This is the case represented above in Figure 1. Thereby, a relatively small amount of reserves has to be used, and the total EMS-quantity of money remains unchanged, i.e. the position of the EMS as a system does not change with regard to the rest of the world. There is neither an inflationary nor a deflationary bias. In addition, the burden of adjustment is shared equally between the intervening countries because the respective money stocks change symmetrically. However, to the extent to which the swaps which have financed the intervention are paid back in national currency the monetary base effect is reversed. In contrast, settlement in official ECU does not bear any monetary base effect at all because it has a money circuit of its own.

b) Intramarginal Intervention in Participating Currencies

At the inception of the EMS, intramarginal intervention was regarded as being the exception rather than the rule. One reason for this was that intramarginal intervention would have undermined the ability of the divergence indicator to identify the divergent country. [MICOSS I (1985) p. 328] An additional reason may have been to avoid the asymmetrical effect on the national quantities of money of the EMS countries, which is a common feature of all intramarginal interventions in the EMS effectuated under the institutional setup effective until September 1987. The extent of this asymmetrical effect, and who has to bear the burden of adjustment, depends on the kind of the financing of the intervention. There are three possibilities of financing intramarginal intervention: First, cutting down the foreign-exchange holdings denominated in the intervention currency and placed in the Euro-market; second, exchanging of dollars for participating currency via the EMCF; and third, as a new possibility introduced in September 1987, having recourse to the VSTF.

The cutting down of foreign-exchange holdings in the Euro-market denominated in the intervention currency, in particular Deutsche mark holdings, is the most frequent way of financing because it does not, like the other two possibilities, need the preceding approval of the creditor central bank. This is due to the fact that these intramarginal interventions do not change foreign holdings of the intervention currency's central bank. They, therefore, do not influence its national quantity of money and thus do not have any impact on this country's monetary policy. [DEUTSCHE BUNDESBANK (1987) p. 73] This is the case represented above in Figure 2 in which country A holds its foreign-exchange reserves in B-bonds. Only the national quantity of money of the intervening country changes, so that intervention policy is less efficient because it alters only the domestic asset-market equilibrium in one country. This means that a relatively large amount of reserves is necessary. However, the total EMS-quantity of money declines, which means that this kind of intervention has a deflationary bias.

Through a new financial mechanism which became effective on July 1, 1985, EMS currency can be obtained for the provision of dollars. "Central banks with a need for intervention currencies may mobilize through the European Monetary Cooperation Fund their net creditor positions in ECUs together with part of those ECUs allocated to them by the EMCF ... EMS central banks have committed themselves to cover such mobilization operations by providing US dollars within specified limits. The dollars thus provided may be exchanged for participating EMS currencies with the approval of the issuing central banks. Mobilization operations will run for three months, with the possibility of renewal for a further three-month period". [UNGERER et al. (1986) p. 8] During the three-month (or if renewed six-month) period when the swaps are active intervention has a symmetrical effect on the two countries' monetary base. This effect is brought about because this case is identical to the intervening country's holding of its foreign-exchange reserves in bonds denominated in the other country's currency. This particular way of financing is a change in the debit part of the balance sheet of the central bank which accepts dollars for domestic currency. Hence, the effects of intramarginal intervention financed by this new mobilization mechanism is identical to the one of intervention at the margins, as described above and represented by Figure 1. The reason for introducing this mechanism was that previously it was not possible to obtain EMS currencies for intramarginal intervention. However, the symmetric effect is only temporary and limited to the duration of the mobilization swaps' operation. Hence, the central bank which provides its currency for intervention does not increase its domestic monetary base permanently. This might be the reason why the mechanism could be introduced at all. An extreme feature arises by this kind of financing of intramarginal intervention. For the period in which the swaps are active intervention is very efficient requiring only a small amount of reserves; but as soon as the swaps are settled, no effect at all occurs with respect to the situation before the intervention. However, the intervening central bank can buy time which can be necessary for example for the adaptation of market expectations after a shift in the conduct of macroeconomic policies.

In order to make these symmetrical intervention effects permanent the recent technical innovations in the institutional setup of the EMS introduced the possibility of making recourse to the VSTF for intramarginal interventions as well. However, approval of the creditor central bank is needed in every individual case. If this innovation is used symmetrical effects occur, as described above.<sup>1</sup>

To sum up, intramarginal intervention has permanent symmetrical effects exclusively in the only recently introduced case of the financing by the VSTF. The mechanism through which ECUs can be mobilized against EMS currencies temporarily allows for symmetrical effects. In all other cases intramarginal intervention has asymmetrical effects and thus is less efficient. However, it introduces a deflationary bias in the EMS.

#### c) Dollar Intervention

Dollar intervention in the EMS can be compared to the asymmetrical effects of intervention during the Bretton Woods system. Only the monetary base of the intervening country changes. The effect between the intervening EMS country and the United States is identical to the case described above where the intervening country cuts down its foreign-exchange reserves denominated in the intervention currency. That is, it is another example of the case in which a country holds its reserves in bonds denominated in the other country's currency. This case was represented in Figure 2. This kind of intervention affects intra-EMS exchange rates via the cross effects of dollar intervention. Dollar intervention and thus the change of the dollar exchange rate of the intervening country has to be so considerable that by the change of its monetary base interest rates in

---

<sup>1</sup> This new financial mechanism was significantly used for the first time by the French central bank's borrowing about 10 billion DM from the Bundesbank channeled through the EMCF in the first half of November 1987. See FINANCIAL TIMES of November 18, 1987.

the two respective EMS countries change enough so as to reestablish asset market equilibrium between the two EMS countries. This kind of intervention is less efficient, because it consumes a relatively large amount of reserves. In addition, the total EMS quantity of money changes. With dollar purchases (sales) the EMS quantity of money increases (decreases), so that an inflationary (deflationary) effect results. Hence, particularly in this case it is very important which of the EMS countries intervenes.

d) Intervention in private ECU

Intervention of central banks in private ECUs, that is purchases or sales of private ECUs against domestic currencies, are of minor importance for the issue of influencing intra-EMS exchange rates. Prior to 1985, they were executed in order to maintain 'orderly conditions' in the ECU market. Thereafter, however, some interventions were undertaken with the desire to stabilize the domestic currency. [MASERA (1986) p. 15] Those interventions have asymmetrical effects on the national quantities of money depending on the weight of each currency in the ECU basket. In addition, their efficiency is relatively low because each purchase (sale) of private ECU against domestic currency is also a purchase (sale) of domestic currency in the proportion of its weight in the ECU basket. Hence, the less the weight of the intervening country's currency in the ECU basket the more efficient is intervention in private ECU. However, in any case a relatively large amount of reserves is needed. The EMS quantity of money is asymmetrically redistributed due to the different weights of the various currencies in the ECU basket, but as a whole it remains constant.

For a general summary of this section see Table 2. Thereby, symmetry refers to the way in which intervention policy is carried out. If no country's monetary base is insulated from the effects of exchange-market intervention, the system is called symmetrical. Contrary, if one country's monetary base is not affected, the system is called asymmetrical. Efficiency refers to the amount of foreign



exchange which has to be sold or purchased by monetary authorities in order to obtain a given effect on the exchange rate. The question of symmetry is closely related to the direction of change of the countries' total quantity of money. If the country with the appreciating currency is committed with intervening, the total quantity of money increases, whereas in the case of the depreciating country's committance the total quantity of money decreases. Hence, if the burden of monetary adjustment is shared the total quantity of money tends to remain unchanged.<sup>1</sup>

#### 4.3. Empirical Evidence

In this section, three kinds of data on intervention in the EMS will be considered: first, total intervention in dollar and in EMS currency (table 3), second, total intervention in dollar and EMS currency differentiated per intervening country (table 4), and third, Deutsche-mark intervention at the margins and between the margins and their respective impact on the German monetary base (table 5).

The examination of total intervention data for the period since the inception of the EMS highlights three aspects:<sup>2</sup> Firstly, the US dollar was used as the main intervention currency until 1985. In particular during the early years of the EMS until 1983, dollar intervention was substantial (over 70 per cent of the gross total). In the following years until 1985, dollar intervention accounted for about 50-55 per cent. However, since the dollar was appreciating against EMS currencies through almost the whole period this way of intervention was appropriate. All of the EMS currencies were weak vis-à-vis the dollar as a currency of outside the system. Given the

---

1 Actually, the total quantity of money remains unchanged only if the money multipliers in both countries are identical. This case is assumed in Table 2.

2 See the interpretation of UNGERER et al. (1983) pp. 14-15, MICOSSI (1985) pp. 331-333, MASERA (1986) p. 7, and MASTROPASQUA/ MICOSSI/ RINALDI (1987) pp. 6-9

restrictions on the use of EMS currencies for intervention, it was impossible to obtain them. Therefore, dollar intervention was chosen as an alternative to support weak currencies in their national markets.<sup>1</sup> This feature is supported by the fact that dollar sales prevailed over dollar purchases during the whole period. As was shown above, this kind of intervention decreases the total EMS quantity of money, so that a deflationary bias can be attributed to it. With the rapid depreciation of the dollar from 1985 on, this feature changed considerably. Now, a much larger part of dollar intervention has been purchases, and the dollar share of gross total intervention has dropped further to about 25 per cent.

Secondly, intervention at the margins only amounted to about 10 per cent of total intervention, i.e. 75-80 per cent of all interventions were intramarginal. The main objective for this feature might be that intramarginal intervention is a way of changing expectations, as described above. Thus, it aims at avoiding growing pressure which would foster expectations for realignments in the near future. Another reason might be related to reserve positions of central banks. On the one hand, the avoidance of large fluctuations within the EMS margins limits the changes in reserve positions. On the other hand, intramarginal intervention allows central banks to rebuild their reserve positions which declined during previous periods of pressure.<sup>2</sup>

Thirdly, the share of EMS currency in intramarginal intervention has been steadily growing during the whole period, with particular growth since 1983. Until 1985, this development was largely due to an

---

1 Note that with a strong dollar the DM is, generally, a weak currency in the EMS.

2 A recent example for this motive is the action of the Banca d'Italia on September 14, 1987: The Banca d'Italia purchased about half a billion German marks (about 0.362 billion lire) after previous interventions (which amounted to 2.600 billion lire only in the week before) during the period of pressure on the lira preceding the Nyborg meeting of EMS central bank governors. See "La Repubblica" of September 15, 1987.

increase in purchases. The growing share of EMS currencies in the foreign exchange reserves of EMS countries give further evidence for this development.<sup>1</sup> Purchases of EMS currency, in turn, generally reflect the intervention of strong currency countries in the market of a weak currency country. It is interesting to note, that this feature was particularly virulent in the period between 1983 and the end of the first quarter of 1985.<sup>2</sup> In this period, the dollar was very strong and the EMS was relatively stable in the sense that exchange rates did not undergo a realignment. However, this is also a sign for a somewhat strange constellation whereby the Deutsche mark is a weak currency in the EMS although Germany has both, the lowest inflation rate and the strongest external position. This is an example of the effects which are brought about by the characteristic of the Deutsche mark as the only EMS currency which can be regarded a real substitute for the dollar in international portfolios. The Deutsche mark remained at the lower limit of the band for some months after the 1983-realignment, so that at least the 1983 data may mainly reflect DM intervention when they indicate purchases of EMS currency. From 1986 on, the growing share of EMS currency in intramarginal intervention (now accounting for about 57 per cent of gross total intervention) has been characterized by an outstanding increase in sales. The concomitant harsh drop of dollar sales and the enormous increase of DM sales (see Table 5) during this period suggest that the dollar has no longer been an adequate means of supporting weak currencies in the EMS. Considering the persistent dollar weakness and the parallel DM appreciation, dollar intervention seems to have been replaced by DM intervention.

As a general result, total intervention data suggest that intramarginal intervention has increasingly gained importance in the EMS and that obligatory intervention at the limits has almost

---

1 See Table 2 of MICOSSI (1985) p. 334.

2 MICOSSI (1985) p. 332 indicates 5.6 and 1.5 as the data for purchases and sales, respectively, at the end of the first quarter of 1985.

disappeared.<sup>1</sup> By the restrictions on obtaining EMS currency for intramarginal intervention these interventions have to be financed in a way that causes only one national quantity of money to change (compare analysis above). This, in turn, tends to make EMS intervention as a whole less effective, as was shown in the model. Against this background one may interpret the two revisions in the system's institutional set-up in 1985 and 1987 as an attempt to reinforce the effectiveness of EMS intervention by facilitating the obtaining of EMS currency. Opposite, asymmetric intervention brings a deflationary tendency into the system as long as these interventions are confined, on the one hand, to purchases of the momentarily weak currency, and on the other, to sales of the strong currency - the intervention being financed by reducing holdings in the Euro-market denominated in the intervention currency. As a matter of fact, this has been the dominant feature in the EMS, in particular since intramarginal intervention in EMS currency has become very important. Thus, we must conclude that an easier availability of EMS currency for intramarginal intervention would strengthen the intervention's effectiveness but that at the same time it would tend to remove the deflationary bias of the system. However, if intramarginal intervention in EMS currency has to be seen only as an alternative to dollar intervention, the former replacing the latter as the dollar (DM) changes from a strong (weak in the EMS) to a weak (strong in the EMS) currency, the inflationary / deflationary issue would not be affected at all. This is because in both cases the country with the weak currency in the EMS intervenes due to the turn around of the dollar exchange rate in 1985 - about the same time at which the change in intervention currency took place. Nevertheless, one must not forget

---

1 Exceptions to this feature are the two French franc crises in March 1986 and January 1987. Both events necessitated a considerable amount of intervention at the margin. (For the 1987 crisis compare Deutsche Bundesbank Geschäftsbericht für 1986 p. 73) However, this recourse to intervention at the margin had mainly political motivations because authorities wanted to avoid realignments until parliamentary elections in France (March 1986) and Germany (January 1987) had taken place. The realignment followed one week later in both cases.

the different objectives of dollar intervention and intramarginal intervention in EMS currency in so far as the former is adequate to deal with EMS-external shocks whereas the latter is adequate to tackle intra-EMS periods of pressure. In this sense, dollar intervention can be regarded as a cushion to absorb or dampen external shocks. It is, thus, similar to obligatory intervention at the margin. Hence, given the decreasing importance of intervention at the margin and the development of dollar intervention and intramarginal intervention in EMS currency, one may conclude that actions which favour the keeping of exchange rates stable against other participating currencies (in particular, strong currencies like the Deutsche mark) have become prevalent with respect to actions directed towards absorbing or dampening external shocks. The tendency of institutional changes towards facilitating the financing of intramarginal intervention with EMS currency may support this conclusion.

Table 4 shows data on total intervention differentiated per intervening country. The first panel reports that France executes the bulk of marginal intervention. It is interesting to note that Italy never intervened at the margins during the reported period. This might be due to its enjoying a larger fluctuation band. The second panel highlights that Germany never intervened between the margins. This suggests that Germany does not care very much about intra-EMS exchange rates unless it is compelled to by the rules of the system. In contrast, the first column in the third panel shows that Germany was very committed to the dollar exchange rate in the period of relative stability in the EMS. The bottom panel documents the increasing role of intramarginal intervention and the concomitant decline of dollar intervention. The high share of marginal intervention seems to contradict the conclusions of the previous section. However, the kind of distribution of marginal intervention among Germany, Netherland and France in this period suggests that these marginal interventions were mainly caused by the somewhat

belated realignment of April 1986 due to political motivations.<sup>1</sup> To sum up, Germany does not seem to be committed to stabilizing intra-EMS exchange rates whereas it is very committed to the dollar exchange rate.

The data of table 5 give additional evidence on the commitment of Germany to intra-EMS exchange-rate stability. If Germany realized this commitment a large influence of DM interventions on German liquidity would result. The data show that this was in fact the case in the first years. However, from 1982 on one can observe a decreasing level of liquidity effects. This must be seen as the corollary of the shift from marginal to intramarginal intervention. The unusual amount of DM intervention at the margins in 1983 and 1986 is due to the early periods after the realignments in March 1983 and April 1986, respectively. [DEUTSCHE BUNDESBANK (1987) p. 74] These events necessarily increase the share of liquidity effects of intervention temporarily. MASTROPASQUA/ MICOSSI/ RINALDI (1987) give further empirical evidence on the low impact of intervention on the German monetary base. Calculating the correlation coefficients between interventions, monetary base foreign component and total monetary base for Belgium, France, Germany, and Italy, they conclude that "Germany appears to stand out for its systematically weaker correlations both of interventions and of the foreign component with changes in the total base." [MASTROPASQUA/ MICOSSI/ RINALDI (1987) p. 25] The data show, however, that the level of liquidity effects on the German monetary base has been increasing since the Nyborg meeting. This means that intervention effects have become more symmetrically again.

We can sum up that the two main conclusions referring to table 3 and table 4 are supported. There is a shift from intervention at the margin to intramarginal intervention with a concomitant lesser commitment of Germany to intra-EMS exchange rates. In contrast,

---

<sup>1</sup> See footnote 1 on page 26.

Germany seems to be responsible for the whole system of dealing with dollar rate stability.

##### 5. The Extent of Exchange-Rate Realignments

Analysis of the nth country problem in the EMS has brought strong evidence that this role has to be attributed to Germany. This means that the other EMS countries have to follow German monetary policy more or less closely, depending on whether or not they have set-up capital controls. However, the question, on the one hand, is why these countries accept the monetary discipline which the asymmetric structure of the system imposes upon them, and on the other, what interest has Germany in staying in the system considering that the low-inflationary path of Germany's monetary policy could be maintained at least as well without the EMS. This part analyses the extent of realignments in the EMS in order to evaluate these questions.

Realignments play an outstanding role in fixed exchange-rate systems due to their impact on real exchange rate shifts between the systems' members. Following COLLINS (1987), two approaches can be distinguished to explain the size of real exchange rate shifts caused by the extent of realignments. Firstly, the competitiveness approach regards realignments as a means of maintaining purchasing power parity (PPP). The approach is based upon two assumptions; one, that every exchange-rate adjustment is connected with a fixed cost resulting in infrequent realignments, and two, that government tries to adjust nominal exchange rates in such a way as to minimize a loss function depending on deviations of the real exchange rate from an optimal level. Hence, there are critical levels of overvaluation ( $R_O$ ) and undervaluation ( $R_U$ ). Therefore, realignments take place to avoid the exchange rate to pass  $R_O$  and they will have an extent large enough to establish a real exchange rate of  $R_U$ . This implies that devaluations are greater than required to offset the cumulated inflation differentials. The competitiveness approach is mainly directed towards the foreign-trade sector of the economy in so far as it concentrates

on the point of view that real exchange-rate changes are costly because they lead to output fluctuations. Secondly, the discipline approach tries to explain why realignments only partially offset cumulated inflation differentials, with the result that high inflation countries appreciate over the course of time. This appreciation reflects the cost to high inflation countries when they join or remain in the system. This cost, however, increases the credibility of monetary authorities as being committed to a slowdown of the inflationary path of their country. Thereby, credibility is defined "as the extent to which the public believes that a shift in policy has taken place when, indeed, such a shift has actually occurred. More important, to be credible, a policy must be consistent, at each stage, with the public's information about the objectives and constraints facing the central bank. The public will not believe an announced policy if it knows the policy is incompatible with the current objectives of policymakers." [CUKIERMAN (1986) p. 6]

In order to test the two approaches exchange-rate realignments should be analysed whether they have been greater or lesser than cumulated inflation differentials. However, a formal test of the two approaches for the EMS is not possible because there are not enough realignments in the data. Hence, actual exchange-rate adjustments will be compared with the exchange-rate adjustments which would have been necessary to maintain a constant real exchange rate.<sup>1</sup> For this purpose bilateral real exchange rates for the high inflation EMS countries (France, Italy, Denmark) are considered vis-à-vis the Deutsche mark. The base periods for France and Denmark are March 1979 and for Italy March 1983. Figures 3, 4 and 5 represent the behavior of the franc, the lira and the kroner in relation to the Deutsche mark. The figures show the upper and lower limit of the bilateral exchange-rate band, the actual spot exchange rate (dotted line) and the PPP exchange rate (dashed line) which would have maintained a constant real exchange rate vis-à-vis Germany. As COLLINS notes, neither of the

---

1 See COLLINS (1987) for this testing of the two approaches.



two approaches holds true for any country for the whole period. The discipline approach can be supported by the early years (1979-81) in France and Italy and by the most recent years (after 1983) for all three countries. The competitiveness approach, in contrast, is more adequate for the description of the intermediate period (1981-83) in France and Italy and for the period before 1983 in Denmark. More interesting for our purposes, however, is that all realignments after 1983 are better explained by the discipline approach. Thus, these data support the above conclusion that at that time there was a shift in government objectives towards discipline, with the concomitant change of the EMS from a symmetric system to an asymmetric system with the least inflationary country, Germany, as the leading participant. This shift towards discipline gains further support by the greater convergence of inflation rates with the convergence to a lower level after 1983. [UNGERER et al. (1986) p. 19] This is shown in Table 6. In addition, the data show that the German mark has been undervalued with respect to PPP in the last few years. Hence, Germany has gained in competitiveness with respect to the remaining EMS countries. This feature could explain the interest of Germany - being a structurally current-account surplus country - in staying in the EMS.

The leadership of Germany as a low inflationary country in the EMS and the consequent imposition of its monetary policy on the other members increase the credibility of these other members' central banks being seriously committed to an anti-inflationary policy. ROGOFF (1985) shows that the credibility issue is very important for a system of monetary cooperation like the EMS. Without credibility, cooperative arrangements could lead to adverse reactions by private agents who aim at counteracting an inflationary bias of such an agreement. The reasoning behind this argument runs as follows: EMS realignments have been less extensive than inflation differentials between strong and weak currencies accumulated up to the time of the realignment. Hence, weak currencies obtain a continuous slight real appreciation against strong currencies in the EMS. On the other hand, above-average inflationary countries can be assumed to have an objective function in which output and employment are superior to price stability. Consequently, they are assumed to use monetary policy not only to

offset disturbances but also to try systematically to increase employment. This attempt is carried out by inflationary surprises by which (in the short run) a large response of output and employment is obtained. However, in order to be successful this policy pursuit requires two conditions: first, inflationary monetary policies have to be unexpected by private agents. If this is not the case, private wage-setters will anticipate the real wage discount by an additional nominal wage increase. Consequently, the equilibrium inflation rate will be high. Second, in a non-cooperative setting monetary authorities have to face a depreciation of the real exchange rate in foreign-exchange markets to the extent of the inflationary result of their monetary policy. If there is inter-central bank monetary cooperation this depreciation 'penalty' does not exist, provided monetary authorities agree to use inflationary policies in all countries. Thus, monetary cooperation by itself does not increase the credibility of central banks vis-à-vis the private sector as being committed to low-inflation monetary policy. However, the structure of the EMS has a built-in credibility increase for weak-currency central banks concerning inflation discipline for two reasons. Firstly, the path of EMS-monetary policy is set by a low-inflation country, Germany. Secondly, due to the way in which realignments are carried out, above-average inflation results in a real appreciation and not in depreciation, so that there are no gains for output and employment. Consequently, the policy-makers' incentive to inflate is reduced, their lack of credibility is (partly) eliminated.

From all that has been said until now, one may conclude that from a low-inflationary-path point of view the EMS should in fact be constituted as a kind of 'mini Bretton Woods system' with Germany as the  $n$ th country leaving its monetary base unaffected from intra-EMS disturbances and with the remaining  $n-1$  countries taking the burden of adjustment. In addition, Germany should manage the dollar exchange

rate for the system as a whole.<sup>1 2</sup> This would be optimal from the relative size criterion, the deflationary bias introduced by a respective intervention rule, and from the credibility issue. The real conduct of the EMS suggests that the evolution of the system, after an initial period of relative symmetry, has, indeed, gone towards this asymmetric scheme. Accordingly, the interest of the non-German countries in remaining in the EMS has been to increase the credibility of their central banks in conducting a low inflationary policy because they "would like to have German monetary policy for themselves but are unable to get it" [MELITZ (1987) p. 3] while Germany's interest in the EMS is the undervaluation of the DM, i.e. the increased competitiveness of Germany with respect to the other members.

In a somewhat stylized differentiation one may put the EMS countries into three groups (see Figure 5). First, Germany as the center country taking care of the relationship to outside of the system, namely the dollar exchange rate; second, an inner Deutsche-mark zone with the Netherlands and with Switzerland and Austria as non

---

1 This latter point may also be concluded from a statement by the BANK FOR INTERNATIONAL SETTLEMENTS: "In view of Germany's strong international trade position and its large current-account surpluses, there tends to be a market perception that Germany will be in a better position than other member countries to weather a strong depreciation of the dollar. Moreover, when, because of exchange rate expectations, foreign financial investment tends to shy away from the United States, it is likely that, partly for the same reasons, Germany will attract a disproportionately larger share of this capital."

BIS (1987): 57th Annual Report p. 168.

2 It is interesting to note that recently, international agreements have taken into account this distribution of responsibilities: In the Louvre accord of February 22, 1987 15 billion dollars were constituted into an intervention fund to stabilize the dollar exchange rate. Of these 15 billion, 5 billion were allocated to Europe; 75% out of this European share alone to the Bundesbank. [See 'La Repubblica' of January 15, 1988] Considering that a significant part of the remaining 25% for Europe were most probably allocated to the Swiss central bank and to the Bank of England, the final allocated amount to the remaining EMS countries was certainly rather modest. One may suggest that the intervention fund created in December 1987 contains a similar distribution of the intervention means.

EMS countries, all three countries following close DM exchange-rate targets; and third, an outer Deutsche-mark zone with the other EMS countries differentiated among themselves by the existence of capital controls or their absence.

#### 6. The Recent Development towards more Symmetry

Analysis of the intervention policy in the EMS in the last section suggested that the EMS underwent a change from a symmetrical to an asymmetrical system in 1983 and evaluated the interests of the different members in participating in such a system. This section refers the circumstances which made such a change possible and, in particular, focuses on whether or not these circumstances and the specific interests of the members still exist.

The specific circumstances which made the change of 1983 possible were twofold. Firstly, the ongoing appreciation of the US dollar from 1981 on after the change of economic policy of the Reagan administration considerably lessened the external constraint on the EMS. It has been shown<sup>1</sup> that a depreciating dollar and concomitant appreciating DM has always led to tensions in the EMS. Secondly, the extensive realignment of March 1983 paved the way inside the EMS to pursue a convincing anti-inflationary policy. The extent of the March-1983 realignment was due to two factors. On the one hand, authorities wanted to reconstitute credibility to the system by avoiding further realignments in the near future. This was considered to be necessary because of very frequent realignments in the preceding years (it was the fifth realignment in only two years).<sup>2</sup> On the other hand, the realignment exceeded the cumulated inflation differentials so that PPP among the member countries was reestablished (compare Figures 1-3). Accordingly, through the significant increase of their

---

1 See MICOSSI and PADOA-SCHIOPPA (1984), GIAVAZZI and GIOVANNINI (1986), and FRANKEL (1984).

2 See DEUTSCHE BUNDESBANK Geschäftsbericht für das Jahr 1982 p. 75.

competitiveness,<sup>1</sup> the non-German countries could concentrate their domestic policies on reducing the inflation differential with respect to Germany.

However, it is rather doubtful whether these circumstances still exist, and so a change in the structure of the EMS seems to be imminent. Firstly, the depreciating dollar restored the external tension on the EMS even though the emerged exchange rate management seems to cope rather well with this situation, avoiding spectacular events.

Secondly, and much more important, the inflation prone members seem to be neither capable nor willing to further reduce their inflation differential with respect to Germany. It has been argued that now European inflation rates have been lowered enough, having reached their lowest level since the late 1960s, and one may suggest that after such enormous exogenous anti-inflationary stimuli like the dollar depreciation and the decline in oil prices, inflation rates can hardly be reduced any more. Moreover, as DORNBUSCH (1987) pointed out, a relatively high level of inflation is crucial for countries with public debt problems. These countries can not renounce the revenue from seignorage in order to prevent their debt problems from exploding.<sup>2</sup>

Thirdly, the progressive liberalisation of capital movements within the Community and the complete abolition of capital controls until 1992 will remove the partial independence of the members' monetary policy, as was shown above. It has been argued that given

---

1 See for these aspects DEUTSCHE BUNDESBANK Geschäftsbericht für das Jahr 1983 p. 72 and MASTROPASQUA/ MICOSSI/ RINALDI (1987) p. 8.

2 See GIAVAZZI (1988) for a detailed discussion of this aspect. A good example of this is Italy's policy during the dollar depreciation and the oil price decrease in 1985/86. The Italian government only slightly reduced the controlled prices for gasoline. They thus renounced a possible sizable reduction of the inflation rate rather than the considerable seignorage revenue accruing to the Treasury.

different values attributed to anti-inflationary policies among EMS countries capital controls have been necessary to maintain stability under the overwhelming impact of German monetary policy on the other countries. [GIAVAZZI and GIOVANNINI (1986)] Therefore, it would be adequate to equip the EMS with more symmetrical instruments for the case of exchange-rate pressure stemming from inside the system.

Fourthly, this tendency towards greater equality and symmetry in the EMS seems to be a pre-condition for the full membership of the UK in the EMS. The reluctance of the UK to join the exchange-rate mechanism of the EMS can be attributed to two motives. Firstly, the UK does not want to be subject to stop-and-go policies as in the 1960s and 1970s. This would be due to an obligation to maintain a stable exchange rate during periods of balance-of-payments pressure. These pressures could have been brought about in the EMS by sterling being an oil currency. [LOMAX (1987)] Secondly, identifying the EMS as a Deutsche-mark area the UK has remained outside because it considers it to be politically impossible to become a mere satellite of Germany.<sup>1</sup> The importance of the first aspect has lessened during the last few years. Even if there is still a potential uncertainty in relation to the development of the oil price the British economy has become quite similar to that of Germany, in particular as far as monetary policy is concerned. And, indeed, since February 1987 there has been a successful attempt going on to keep the pound-DM exchange rate within relatively tight margins - between DM 2.90 and 3.00 up to the second week of March 1988, and around DM 3.10 - 3.15 thereafter. However, as Prime Minister Thatcher pointed out<sup>2</sup>, there is a big difference between being formally obliged to defend a certain exchange-rate level or to voluntarily choose such a commitment with the option of giving up the de facto pegging when the connected costs seem too high. This attempt to keep the pound-DM exchange rate stable can be seen as a concession of the government to the British industry, the latter being

---

1 See the FINANCIAL TIMES of September 9, 1987.

2 See the FINANCIAL TIMES of November 23, 1987.

increasingly orientated towards markets in continental Europe. However, as long as Prime Minister Thatcher is in charge, a full membership of the UK in the EMS cannot be expected. As DE CECCO (1988) points out, the full membership of the UK could be very troublesome for the EMS. This is because the German financial market has not performed the financial role usually attributed to the center country of a monetary system, i.e. it has not carried out maturity transformation - borrowing short and lending long. Looking at the dimension and the aspiration of London's financial market, it has to be expected that this crucial financial role would be taken by the City. However, it is rather doubtful whether the EMS could maintain its present extent of monetary unification with Germany at the heart of the system and the UK performing the system's vital financial role.

In particular the re-emergence of external pressure to the EMS by the weak dollar and the reached low level of inflation in EMS countries have pushed EMS-authorities towards a revision of the distribution of responsibilities. The dollar depreciation since February 1985 could initially be instrumentalized for reducing inflation rates. However, with only slight changes of the dollar exchange rate since Spring 1987 and the even sometimes expressed expectation of an imminent dollar appreciation, the monetary discipline argument seems to have completely lost its strength for inflation-prone EMS countries. Hence, the policy objectives of these countries could no longer be easily reconciled with the German interests. The decisions of Nyborg in September 1987 can be regarded as a response to these changes and as the starting point of a third stage of the actual development of the EMS. This third stage would be characterized by a return to more symmetry and thus by a less determinant position of Germany with respect to the other members. Consequently, the interests of the different member countries in staying in the system in such a third stage would be the other way round compared to the second stage. Germany would accept more symmetry only if and to the extent that its low-inflationary monetary policy were not in danger, i.e. it would certainly not accept a system leading to a community-average inflation rate. The other countries, in contrast, would be opposed to an ongoing loss of competitiveness with

respect to Germany so that the extent of realignments would have to be as large as the cumulated inflation differentials. Germany would, accordingly, have to allow intra-EMS intervention to affect its monetary base, at least to a somewhat greater extent than now. The new possibility of financing intramarginal intervention agreed upon at Nyborg goes precisely in this direction. It foresees the financing of intramarginal intervention via the VSTF causing symmetrical monetary base effects. However, Germany can refuse to place German marks at the other members' disposal so that the influence of intra-EMS tension on its monetary policy can be limited if necessary. A further coordination of monetary policies would be triggered via this channel. The emerged distribution of responsibilities among the members would be maintained, Germany would deal with the dollar exchange rate while the other members would deal with their respective DM exchange rates. The intervention currency inside the EMS would be almost exclusively the DM.

#### 7. The Role of ECU

Until now very little has been said about the ECU and, as a matter of fact, the official ECU has played a very modest role in the last few years even though according to the initial agreement on the EMS 'a European currency unit, the ECU, shall be at the center of the EMS'. However, the enormous success of the private ECU<sup>1</sup> would most probably not have been possible without the existence of EC institutions and the EMS.<sup>2</sup> Hence, an interesting question might be how the role of the official ECU could be enhanced in a system that considers the changed circumstances and interests of the EMS members.

As PADOA-SCHIOPPA points out, "... Improving the use that can be made of the official ECU depends primarily on its wider acceptance as

---

1 For data on this issue see: DEUTSCHE BUNDESBANK: Monthly Report for August 1987.

2 Compare for example ALLEN (1986) pp. 18-20.



a reserve asset among central banks external to the area." [PADOA-SCHIOPPA (1987) p. 16; emphasis added] The attractiveness of an international reserve asset, in turn, depends in particular on the use of a currency as transaction currency and on the stability and predictability of its value.<sup>1</sup> Consequently, such a system would be characterized by a wide use of the ECU for transaction purposes by both authorities and the private market<sup>2</sup>, namely by its use as a (non-competitive) parallel currency in all EMS member countries and by its gradual replacing of the German mark as 'the' international (reserve) asset of the EMS.

The relation between the ECU, the German mark, and the other member currencies is of crucial importance in any proposal for the ECU's future. The only perceived possibility for this relation has been to put the ECU on top of the EMS with the importance of all other currencies depending on their shares in the ECU basket.<sup>3</sup> However, this kind of distribution does not seem to be adequate for two reasons. Firstly, as a mere average of all EMS currencies the ECU, outside of weak currency countries, would not be very attractive as an international asset compared to national currencies like the dollar, the yen, or the mark. Secondly, it seems to be very improbable that Germany would have an interest in participating in such a system because it would have to renounce its low inflationary monetary policy that has been of crucial importance for German monetary authorities. Hence, a possible system which considers these two aspects could put on top of the system the ECU, on a second level the DM having a fixed exchange rate to the ECU with Germany responsible for the exchange

---

1 For a detailed analysis of this point, see the author's PhD dissertation in preparation on the multiple reserve-currency system.

2 See the recent initiative of leading companies from different EMS countries to increase the use of the ECU in their transaction ['La Repubblica' of December 2, 1987] and their founding of an association to promote the ECU's use in this respect ['La Repubblica' of December 6, 1987].

3 See for example the initially intended 'second, institutional stage of the EMS' or the proposal by STEINHERR (1987).

rate between the ECU and non-EMS currencies, and on a third level the remaining EMS currencies with a crawling peg to the DM and their authorities responsible for their DM exchange rates.<sup>1</sup> See Figures 4-7 for a graphical representation of this possibility compared to the other realized or proposed arrangements.

The basic advantage of such a system would be that the ECU would be as attractive as an international asset as the DM. Moreover, in order to promote the ECU's use for transaction purposes it could be used in all member countries as a non-competitive parallel currency. Even though there might be a danger that a parallel currency drive out the national currency, this is not necessarily the case if the authorities transform the competitive pressure of a parallel currency into monetary convergence: "... if the ECU were encouraged as a parallel currency, in conjunction with a gradual convergence of EC monetary policies, its use alongside the national currencies might well increase, without indicting the national currency for failing to serve its function." [ALLEN (1986) p. 28] In addition, the ECU's use as a parallel currency would make it legal tender in all EMS countries. Hence, the ECU would really make the step to becoming a currency in its own right.<sup>2</sup>

According to ALLEN [1986, p. 49], the basic decision for a promotion of the ECU has to be between the maintenance of the ECU as a basket to determine its value and the determination of its supply. Therefore, a crucial question is how the ECUs would be created and how and who would determine its value or its supplied quantity. Concerning the ECU's creation, it seems to be obvious that the original way of exchanging 20% per cent of the members' gold and dollar reserves at the EMCF has to be abolished. A more reasonable way of issuing

---

1 I am grateful to Professor E. CLAASSEN who made me aware of this possibility.

2 For a detailed discussion of this question see ALLEN (1986) pp. 26-44 and PADOA-SCHIOPPA (1987) who focuses on the lender-of-last-resort aspect.

official ECU would be the exchange of ECU deposits for deposits of national currencies between the EMCF and the national central banks. The weights in the basket could be determined both by the amounts of domestic-currency deposits and the distribution of the ECUs. [ALLEN (1986) p. 52] The link between private and official ECUs could be matched by ECU intervention of the different central banks. At the same time, they would influence the value of ECUs, leaving the determination of their quantity to the market.

**TABLE 1:** Realignments of the EMS

	Mark	F.franc	Guilder	B.franc	Lira	Krone	st.irl
1) 24-09-79	+2.0	-	-	-	-	-2.9	-
2) 30-11-79	-	-	-	-	-	-4.8	-
3) 23-03-81	-	-	-	-	-6.0	-	-
4) 05-10-81	+5.5	-3.0	+5.5	-	-3.0	-	-
5) 22-02-82	-	-	-	-8.5	-	-3.0	-
6) 14-06-82	+4.25	-5.75	+4.25	-	-2.75	-	-
7) 21-03-83	+5.5	-2.5	+3.5	+1.5	-2.5	+2.5	-3.5
8) 20-07-85	+2.0	+2.0	+2.0	+2.0	-6.0	+2.0	+2.0
9) 06-04-86	+3.0	-3.0	+3.0	+1.0	-	+1.0	-
10) 02-08-86	-	-	-	-	-	-	-8.0
11) 11-01-87	+3.0	-	+3.0	+2.0	-	-	-

Source: UNGERER et al. (1986) p. 35, and "La Repubblica" January 13, 1987

Table 2: Symmetry and Monetary-Base Effects of EMS Intervention (1)

Kind of Intervention	Intramarginal Intervention				Dollar Intervention		Private-ECU Intervention
	Marginal Intervention	Reducing DM holdings in Euro-market	ECU mobilization against DM	VSTF	Changing Dollar Holdings	Private-ECU Intervention	
Financing of Intervention	VSTF	Reducing DM holdings in Euro-market	ECU mobilization against DM	VSTF	Changing Dollar Holdings	Private-ECU Intervention	Reducing Private-ECU Holdings in Euro-market
Who intervenes	Both countries intervene	Italy intervenes	Italy intervenes	Italy intervenes	Germany intervenes	Italy intervenes	Italy intervenes
whose quantity of money changes	Both national quantities of money change	Italy's quantity of money changes	Both national quantities of money change temporarily	Both national quantities of money change	Germany's quantity of money changes	Italy's quantity of money changes	Both national quantities of money change asymmetrically
Efficiency of intervention	Intervention is efficient	Intervention is less efficient	Intervention is temporarily efficient	Intervention is efficient	Intervention is less efficient	Intervention is less efficient	Intervention is least efficient
Effect on EMS quantity of money	EMS quantity of money remains unchanged	EMS quantity of money decreases	EMS quantity of money remains unchanged	EMS quantity of money remains unchanged	EMS quantity of money decreases	EMS quantity of money increases	EMS quantity of money remains unchanged

(1) Table 2 represents a two-country case with Germany as the appreciating country and Italy as the depreciating country, except for dollar interventions where an appreciating dollar is assumed, which typically leads to a situation in the EMS characterized by a depreciating DM and an appreciating Lira.

TABLE 3: Foreign Exchange Intervention by Currencies in the EMS Exchange Rate Arrangements (1)

	1979(2)	1980	1981	1982	1983	1984	1985	1986	1987(3)
US dollars	P 10.3 S 12.2	6.4 20.9	8.2 34.1	6.5 32.1	10.6 21.7	6.1 17.1	5.5 18.0	13.2 6.8	17.6 1.2
EMS currencies (4)									
- at the limits (5)	P 2.5 S 0.7	3.9 2.2	11.1 3.6	3.0 4.1	13.3 7.7	1.9 10.8	0.2 10.3	14.0 15.6	6.4 17.2
- intramarginal	S 4.7	2.3	5.8	5.8	5.4	2.8	11.4	33.7	14.9
others (6)	P - S 1.1	- 0.2	0.1 0.2	- 0.7	- 0.2	- -	3.2 0.7	0.4 0.3	0.9 1.4
TOTAL	gross 31.5 net(7) -7.0	35.3 -14.8	63.1 -28.2	52.2 -28.0	58.9 -9.0	38.8 -4.4	49.3 -11.0	86.0 -10.0	61.6 17.0
memorandum items									
- recourse to VSTF (8)	3.3	2.5	9.0	2.3	5.4	1.8	-	9.5	8.4
- ECU spot settlements of intervention	0.9	3.1	2.3	0.1	0.5	0.7	0.1	0.7	-

(1) In billions of US dollar. P=purchases, S=sales

(2) March to December

(3) First semester

(4) Currencies participating in the exchange arrangements

(5) Purchases or sales

(6) From 1985 onwards the figures include intervention in the private ECU market

(7) A minus sign indicates net sales

(8) Very short-term financing facility

Source: MICOSSI (1985) p. 332, MASERA (1986) p. 41, MASTROPASQUA/MICOSSI/RINALDI (1987) p. 7, and MICOSSI

**Table 4: Central bank Intervention in the EMS**

	Jan 83 - Mar 85	Apr 85 - Apr 86
<b>Marginal Intervention (in EMS currencies)</b>		
Germany	(-) 0.093	(-) 0.031
Netherlands	(-) 0.039	(-) 0.108
France	0.313	0.861
Italy	-	-
Belgium	(-) 0.554	-
<b>Intra-marginal Intervention (in EMS currencies)</b>		
Germany	0.0	0.0
Netherlands	0.006	0.051
France	0.637	(-) 0.647
Italy	0.073	(-) 0.079
Belgium	0.283	(-) 0.224
<b>Intervention in US Dollars</b>		
Germany	(-) 0.645	(-) 0.076
Netherlands	(-) 0.009	0.092
France	(-) 0.303	0.142
Italy	0.012	0.592 (1)
Belgium	(-) 0.030	(-) 0.097
<b>Summary</b>		
Intervention at margin	0.196	0.429
Intra-marginal Intervention	0.196	0.250
Dollar Intervention	0.608	0.321

The data used to construct this table are cumulative intervention figures expressed in US dollars. Negative signs indicate foreign exchange purchases by the central bank of the corresponding country. Each entry represents the share of intervention of that country in the total volume of intervention during the given interval, i.e. in the sum of the absolute values of the entries of that column.

(1) This figure is indicated with a minus sign in the paper of Giavazzi and Giovannini. However, it must be a mistake because the time between April 85 and November 1985 was a relatively quiet period. Then, between November 85 and March 1986 the French franc and the lira came under downward pressure. "The ..(Italian).. authorities responded with heavy intra-marginal intervention involving mainly sales of DM and US dollars." BIS 56th Annual Report p. 155 (Emphasis added)

Source: GIAVAZZI/GIOVANNINI (1987) p. 239.

TABLE 5: Deutsche Mark Interventions in the EMS (in billions of DM) (1)

+ = DM-sales and expansive liquidity effect in Germany

- = DM-purchases and restrictive liquidity effect in Germany

Year	Obligatory	Intra-marginal	Total	Liquidity effect in Germany (2)	Share of interventions with liquidity effect
<b>A. Years</b>					
1979 (3)	Purchases	-	- 2.7	- 2.4	0.88
	Sales	+ 3.6	+ 8.1	+11.7	1
	Net	+ 3.6	+ 5.4	+ 9.0	+ 9.2
1980	Purchases	- 5.9	- 5.9	-11.8	0.94
	Sales	-	+ 1.0	+ 1.0	0.6
	Net	- 5.9	- 4.9	-10.8	-10.5
1981	Purchases	- 2.3	- 8.1	-10.4	0.99
	Sales	+17.3	+12.8	+30.1	0.84
	Net	+15.0	+ 4.7	+19.7	+15.0
1982	Purchases	-	- 9.4	- 9.4	0.26
	Sales	+ 3.0	+12.8	+15.8	0.38
	Net	+ 3.0	+ 3.4	+ 6.4	+ 3.7
1983	Purchases	-16.7	-19.1	-35.8	0.56
	Sales	+ 8.3	+12.9	+21.2	0.59
	Net	- 8.4	- 6.2	-14.5	- 7.8
1984	Purchases	-	-30.2	-30.2	0.02
	Sales	+ 4.7	+ 7.6	+12.3	0.35
	Net	+ 4.7	-22.7	-17.9	+ 3.6
1985	Purchases	-	-29.6	-29.6	0.006
	Sales	+ 0.4	+30.8	+31.1	0.0
	Net	+ 0.4	+ 1.2	+ 1.5	- 0.2
1986	Purchases	-19.0	-33.6	-52.6	0.23
	Sales	+ 4.1	+76.0	+80.1	0.04
	Net	-14.8	+42.4	+27.6	- 8.4
1987	Purchases	-	-48.1	-48.1	0.15
	Sales	+15.0	+62.7	+77.7	0.33
	Net	+15.0	+14.6	+29.7	+18.1
<b>B. Selected Periods after the Nyborg Meeting on September 13, 1987</b>					
Sept. 14, 1987 - Oct. 14, 1987 (Period of relaxation of tension in the EMS)					
	Net	-	-14.5	-14.5	0.0
Oct. 15, 1987 - Jan. 14, 1988 (Period of dollar depreciation and DM appreciation)					
	Net	-	+21.5	+21.5	+10.0
Jan. 15, 1988 - End of March, 1988 (Period of relaxation of tension in the EMS)					
	Net	-	-8.2	-8.2	-6.1

(1) DM interventions of other in the exchange-rate mechanism participating central banks and EMS-interventions of the Bundesbank

(2) Indicates the extent to which DM-interventions in the EMS and settlements of creditor and debtor positions with the EMCF has influenced the net foreign position of the Bundesbank and thereby the supply of central-bank money for banks; without transactions which are connected to the 'snake', the predecessor of the EMS

(3) Since the inception of the EMS on March 13, 1979

Differences in totals due to rounding

Source: Deutsche Bundesbank: Geschäftsbericht für 1986 p. 74, Deutsche Bundesbank, and own calculations



Table 6: Consumer Price Indices 1974-86 (annual change in percent)

	Average 1974-78	1979	1980	1981	1982	1983	1984	1985	1986	Average 1979-86	Average 1979-83	Average 1983-86
Belgium	9.2	4.5	6.6	7.6	8.7	7.7	6.3	4.9	1.3	5.9	7.0	5.1
Denmark	11.0	9.6	12.3	11.7	10.1	6.9	6.3	4.7	3.7	8.2	10.1	5.4
France	10.7	10.7	13.8	13.4	11.8	9.6	7.4	5.8	2.5	9.4	11.9	6.3
Germany	4.7	4.1	5.4	6.3	5.3	3.3	2.4	2.2	-0.2	3.6	4.9	1.9
Ireland	15.3	13.2	18.2	20.4	17.1	10.5	8.6	5.4	3.8	12.2	15.9	7.1
Italy	16.4	14.8	21.2	17.8	16.5	14.7	10.8	9.2	5.9	13.9	17.0	10.2
Netherlands	7.9	4.2	6.5	6.7	5.9	2.8	3.3	2.2	0.2	4.0	5.2	2.1
Arithmetic average	10.7	8.7	12.0	12.0	10.8	7.9	6.4	4.9	2.5	8.2	9.3	5.4
Standard deviation	3.8	4.2	5.7	5.2	4.3	3.9	2.7	2.2	1.7	3.7	4.7	2.6
Difference between highest and lowest value	11.7	10.7	15.8	14.1	11.8	11.9	8.4	7.0	6.1	9.9	12.1	8.3

Source: International Financial Statistics (various issues) and own calculations.

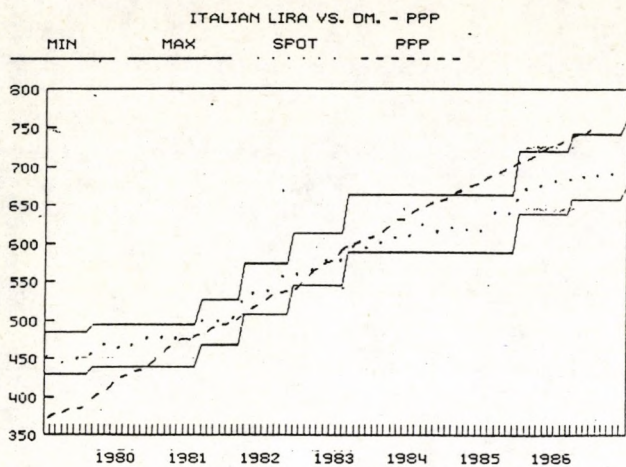


Figure 1

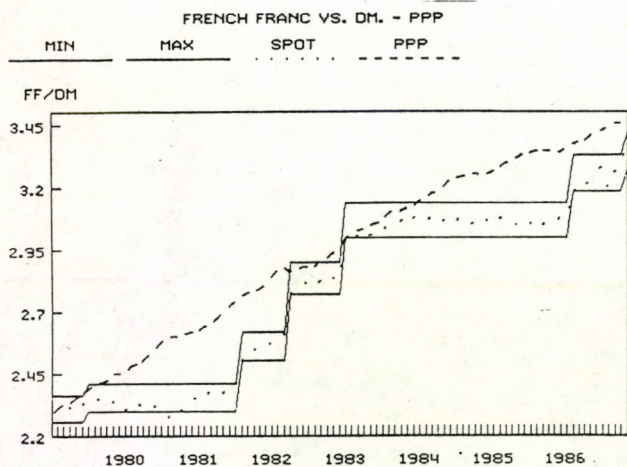


Figure 2

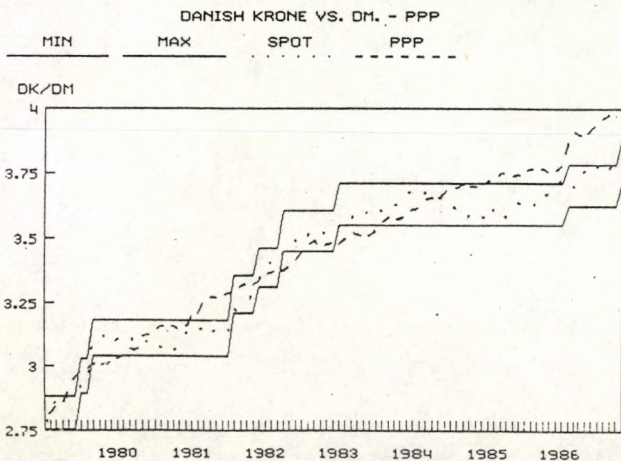


Figure 3

Figure 4: The EMS 1979-83

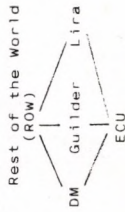


Figure 5: The EMS 1983-87

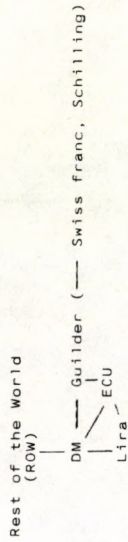


Figure 6: Proposal 1

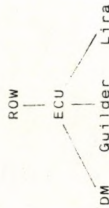
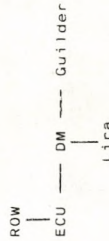


Figure 7: Proposal 2





References

- ALLEN, P.R. (1986): The ECU: Birth of a New Currency, Group of Thirty Occasional Paper No 20, New York
- BANK FOR INTERNATIONAL SETTLEMENT (1987): Fifty-seventh Annual Report, Basle
- CLAASSEN, E.M. (1983): Comment on de Grauwe (1983)
- \_\_\_\_\_/ WYPLOSZ, C. (1982): Capital Controls: Some Principles and the French Experience, in: Annales de l'INSEE, 47-48.1982 pp. 237-267
- COLLINS, S. (1987): PPP and the Peso Problem: Exchange Rates in the EMS, Paper presented at the EUI Conference on the EMS, EMS, ECU and Plans for World Monetary Reform, mimeo, April 1987
- CUKIERMAN, A. (1986): Central Bank Behavior and Credibility: Some Recent Theoretical Developments, in: Federal Reserve Bank of St. Louis Review, 68.1986,5 pp. 5-17
- DE CECCO, M. (1988): The European Monetary System and National Interests, mimeo
- DEUTSCHE BUNDESBANK (1987): Geschäftsbericht für 1986, Frankfurt
- DORNBUSCH, R. (1987): The EMS, the Dollar and the Yen, Paper prepared for the Conference on the EMS, Perugia October 1987, processed
- FRANKEL, J. (1984): Comment on Giavazzi/ Giovannini and Williamson, in: ISTITUTO BANCARIO SAN PAOLO DI TORINO (ed) (1984): Europe and the Dollar, Torino
- FRENKEL, J. (1987): The International Monetary System: Should it be Reformed?, in: American Economic Review, 77.1987,2 PaP pp. 205-210
- GIAVAZZI, F. (1988): The Exchange-Rate Question in Europe, mimeo
- \_\_\_\_\_/ GIOVANNINI, A. (1986): The EMS and the Dollar, in: Economic Policy 1986,2 pp. 456-485
- \_\_\_\_\_/ \_\_\_\_\_ (1987): Models of the EMS: Is Europe a greater Deutsche-Mark Area?, in: BRYANT, R./ PORTES, R. (eds) (1987): Global Macroeconomics, MacMillan: London
- \_\_\_\_\_/ PAGANO, M. (1986): The advantage of tying one's hands: EMS discipline and central bank credibility, processed
- GRAUWE, P. de (1983): What are the Scope and the Limits of Fruitful International Monetary Policy Cooperation in the 1980s?, in: FURSTENBERG, G. von (ed) (1983): International Money and Credit: The Policy Rules, Washington DC
- JOHNSON, H.G. (1972): Political Economy Aspects of International Monetary Reform, in: Journal of International Economics 2.1972 pp. 401-423

- LOMAX D.F. (1987): The United Kingdom case: in: VAN DEN BEMPT, P. (ed) (1987): The European Monetary System: Towards More Convergence and Closer Integration, Leuven
- MASERA, R. (1986): An increasing Role for the ECU, Banca d'Italia Temi di Discussione No. 65, Roma
- MASTROPASQUA, C./ MICOSSI, S./ RINALDI, R. (1987): Intervention, Sterilization and Monetary Policy in EMS Countries (1979-1987), Paper prepared for the Conference on the EMS, Perugia October 1987, processed
- MAYER, H. (1986): Private ECUs Potential Macroeconomic Policy Dimensions, BIS Economic Paper No 16, Basle
- MELITZ, J. (1985): The Welfare Case for the European Monetary System, in: Journal of International Money and Finance, 4.1985 pp. 485-506
- \_\_\_\_\_ (1987): Germany, Discipline and Cooperation in the European Monetary System, Paper prepared for the Conference on the EMS, Perugia October 1987, processed
- MICOSSI, S. (1985): The Intervention and Financing Mechanisms in the EMS and the Role of the ECU, in: Banca Nazionale del Lavoro Quarterly Review 1985, December pp. 327-345
- MUNDELL, R. (1968): International Economics, London
- PADOA-SCHIOPPA, T. (1985): Policy Cooperation and the EMS Experience, in: BUITER, W.H./ MARSTON, R.C. (eds) (1985): International Policy Coordination, Cambridge
- \_\_\_\_\_ (1987): The ECU's Coming of Age, Paper prepared for the Conference on the EMS, Perugia October 1987, processed
- RIEKE, W. (1979): Die ECU als Bezugsgroesse und Reserveinstrument im EWS, in: Kredit und Kapital 12.1979 pp. 341-353
- ROGOFF, K. (1985): Can International Monetary Policy Cooperation be Counterproductive?, in: Journal of International Economics 8.1985 pp. 199-217
- STEINHERR, A. (1987): The Macroeconomics of the ECU: The ECU and the Working of the EMS, Louvain University Working Paper No 8705
- UNGERER, H./ EVANS, O./ YOUNG, P. (1983): The European Monetary System: The Experience, 1979-82, IMS Occasional Paper No. 19, Washington DC
- \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_/ MAYER, H. (1986): The European Monetary System: Recent Developments, IMF Occasional Paper No. 48, Washington DC

WORKING PAPERS ECONOMICS DEPARTMENT

- 85/155: François DUCHENE                      Beyond the First C.A.P.
- 85/156: Domenico Mario NUTI                      Political and Economic Fluctuations in  
the Socialist System
- 85/157: Christophe DEISSENBURG                      On the Determination of Macroeconomic  
Policies with Robust Outcome
- 85/161: Domenico Mario NUTI                      A Critique of Orwell's Oligarchic  
Collectivism as an Economic System
- 85/162: Will BARTLETT                      Optimal Employment and Investment  
Policies in Self-Financed Producer  
Cooperatives
- 85/169: Jean JASKOLD GABSZEWICZ                      Asymmetric International Trade  
Paolo GARELLA
- 85/170: Jean JASKOLD GABSZEWICZ                      Subjective Price Search and Price  
Paolo GARELLA                      Competition
- 85/173: Berc RUSTEM                      On Rationalizing Expectations  
Kumaraswamy VELUPILLAI
- 85/178: Dwight M. JAFFEE                      Term Structure Intermediation by  
Depository Institutions
- 85/179: Gerd WEINRICH                      Price and Wage Dynamics in a Simple  
Macroeconomic Model with Stochastic  
Rationing
- 85/180: Domenico Mario NUTI                      Economic Planning in Market Economies:  
Scope, Instruments, Institutions
- 85/181: Will BARTLETT                      Enterprise Investment and Public  
Consumption in a Self-Managed Economy
- 85/186: Will BARTLETT                      Instability and Indexation in a Labour-  
Gerd WEINRICH                      Managed Economy - A General Equilibrium  
Quantity Rationing Approach
- 85/187: Jesper JESPERSEN                      Some Reflexions on the Longer Term Con-  
sequences of a Mounting Public Debt
- 85/188: Jean JASKOLD GABSZEWICZ                      Scattered Sellers and Ill-Informed Buyers:  
Paolo GARELLA                      A Model of Price Dispersion
- 85/194: Domenico Mario NUTI                      The Share Economy: Plausibility and  
Viability of Weitzman's Model
- 85/195: Pierre DEHEZ                      Wage Indexation and Macroeconomic  
Jean-Paul FITOUSSI                      Fluctuations

- 85/196: Werner HILDENBRAND      A Problem in Demand Aggregation: Per Capita Demand as a Function of Per Capita Expenditure
- 85/198: Will BARTLETT  
Milica UVALIC      Bibliography on Labour-Managed Firms and Employee Participation
- 85/200: Domenico Mario NUTI      Hidden and Repressed Inflation in Soviet-Type Economies: Definitions, Measurements and Stabilisation
- 85/201: Ernesto SCREPANTI      A Model of the Political-Economic Cycle in Centrally Planned Economies
- 86/206: Volker DEVILLE      Bibliography on The European Monetary System and the European Currency Unit.
- 86/212: Emil CLAASSEN  
Melvyn KRAUSS      Budget Deficits and the Exchange Rate
- 86/214: Alberto CHILOSI      The Right to Employment Principle and Self-Managed Market Socialism: A Historical Account and an Analytical Appraisal of some Old Ideas
- 86/218: Emil CLAASSEN      The Optimum Monetary Constitution: Monetary Integration and Monetary Stability
- 86/222: Edmund S. PHELPS      Economic Equilibrium and Other Economic Concepts: A "New Palgrave" Quartet
- 86/223: Giuliano FERRARI BRAVO      Economic Diplomacy. The Keynes-Cuno Affair
- 86/224: Jean-Michel GRANDMONT      Stabilizing Competitive Business Cycles
- 86/225: Donald A.R. GEORGE      Wage-earners' Investment Funds: theory, simulation and policy
- 86/227: Domenico Mario NUTI      Michal Kalecki's Contributions to the Theory and Practice of Socialist Planning
- 86/228: Domenico Mario NUTI      Codetermination, Profit-Sharing and Full Employment
- 86/229: Marcello DE CECCO      Currency, Coinage and the Gold Standard
- 86/230: Rosemarie FEITHEN      Determinants of Labour Migration in an Enlarged European Community
- 86/232: Saul ESTRIN  
Derek C. JONES      Are There Life Cycles in Labor-Managed Firms? Evidence for France





- 87/277: Felix FITZROY Efficiency Wage Contracts, Unemployment, and Worksharing
- 87/279: Darrell DUFFIE  
Wayne SHAFER Equilibrium and the Role of the Firm in Incomplete Markets
- 87/280: Martin SHUBIK A Game Theoretic Approach to the Theory of Money and Financial Institutions
- 87/283: Leslie T. OXLEY  
Donald A.R. GEORGE Perfect Foresight, Non-Linearity and Hyperinflation
- 87/284: Saul ESTRIN  
Derek C. JONES The Determinants of Workers' Participation and Productivity in Producer Cooperatives
- 87/285: Domenico Mario NUTI Financial Innovation under Market Socialism
- 87/286: Felix FITZROY Unemployment and the Share Economy: A Sceptical Note
- 87/287: Paul HARE Supply Multipliers in a Centrally Planned Economy with a Private Sector
- 87/288: Roberto TAMBORINI The Stock Approach to the Exchange Rate: An Exposition and a Critical Appraisal
- 87/289: Corrado BENASSI Asymmetric Information and Financial Markets: from Financial Intermediation to Credit Rationing
- 87/296: Gianna GIANNELLI On Labour Market Theories
- 87/297: Domenica TROPEANO The Riddle of Foreign Exchanges: A Swedish-German Debate (1917-1919)
- 87/305: G. VAN DER LAAN  
A.J.J. TALMAN Computing Economic Equilibria by Variable Dimension Algorithms: State of the Art
- 87/306: Paolo GARELLA Adverse Selection and Intermediation
- 87/307: Jean-Michel GRANDMONT Local Bifurcations and Stationary Sunspots
- 87/308: Birgit GRODAL  
Werner HILDENBRAND Income Distributions and the Axiom of Revealed Preference
- 87/309: Eric PEREE  
Alfred STEINHERR Exchange Rate Uncertainty and Foreign Trade
- 87/312: Pietro REICHLIN Output-Inflation Cycles in an Economy with Staggered Wage Setting

- 87/319: Peter RAPPOPORT  
Lucrezia REICHLIN                      Segmented Trends and Nonstationary  
Time Series
- 87/320: Douglas GALE                      A Strategic Model of Labor Markets  
with Incomplete Information
- 87/321: Gianna GIANNELLI                      A Monopoly Union Model of the Italian  
Labour Market: 1970-1984
- 87/322: Keith PILBEAM                      Sterilization and the Profitability  
of UK Intervention 1973-86
- 87/323: Alan KIRMAN                      The Intrinsic Limits of Modern Economic  
Theory
- 87/324: Andreu MAS-COLELL                      An Equivalence Theorem for a Bargaining  
Set
- 88/329: Dalia MARIN                      Assessing Structural Change: the Case  
of Austria
- 88/330: Milica UVALIC                      "Shareholding" in Yugoslav Theory and  
Practice
- 88/331: David CANNING                      Convergence to Equilibrium in a Sequence  
of Games with Learning
- 88/332: Dalia MARIN                      Trade and Scale Economies. A causality  
test for the US, Japan, Germany and the  
UK.
- 88/333: Keith PILBEAM                      Fixed versus Floating Exchange Rates  
Revisited.
- 88/335: Felix FITZROY  
Kornelius KRAFT                      Piece Rates with Endogenous Monitoring:  
Some theory and evidence
- 88/337: Domenico Mario NUTI                      On Traditional Cooperatives and James  
Meade's Labour-Capital Discriminating  
Partnerships
- 88/338: Pietro REICHLIN  
Paolo SICONOLFI                      Government Debt and Equity Capital in  
an Economy with Credit Rationing
- 88/339: Alfred STEINHERR                      The EMS with the ECU at Centerstage:  
a proposal for reform of the European  
rate system

- |                                 |   |
|---------------------------------|---|
| 88/340: Frederick VAN DER PLOEG | Monetary and Fiscal Policy in Interdependent Economies with Capital Accumulation, Death and Population Growth |
| 88/341: David CANNING           | Optimal Monetary Policy in an Economy without a Forward Market for Labour                                     |
| 88/344: Joerg MAYER             | Intervention Mechanisms and Symmetry in the EMS   |
| 88/345: Keith PILBEAM           | Exchange Rate Management and the Risk Premium   |

Spare copies of these working papers and/or a complete list of all working papers that have appeared in the Economics Department series can be obtained from the Secretariat of the Economics Department.

- 87/300: A. ELZINGA, P. NABER,  
R. CIPPOLLINI,  
F. FACCIOLI, T. PITCH      Decision-Making About Girls by  
the Criminal Justice System in  
Holland and Italy
- 87/301: S. LEES, J. SHAW,  
K. REISBY      Aspects of School Culture and the  
Social Control of Girls
- 87/302: Eleanor MILLER, Rosa  
ANDRIEU-SANZ and  
Carmen VAZQUEZ ANTON      Becoming a Teenage Prostitute in Spain  
and the U.S.A.
- 87/303: Mary EATON and  
Lode WALGRAVE      A comparison of crime and its  
treatment amongst girls in Britain and  
Belgium
- 87/304: Annie HUDSON  
Edna OPPENHEIMER      Towards an effective policy for  
delinquent girls
- 87/305: G. VAN DER LAAN and  
A.J.J. TALMAN      Computing, Economic Equilibria  
by Variable Dimension Algorithms:  
State of the Art
- 87/306: Paolo C. GARELLA      Adverse Selection and Intermediation
- 87/307: Jean-Michel GRANDMONT      Local Bifurcations and Stationary  
Sunspots
- 87/308: Birgit GRODAL/Werner  
HILDENBRAND      Income Distributions and the Axiom of  
Revealed Preference
- 87/309: Eric PEREE/Alfred  
STEINHERR      Exchange Rate Uncertainty and Foreign  
Trade
- 87/310: Giampaolo VALDEVIT      American Policy in the Mediterranean:  
The Operational Codes, 1945-1952
- 87/311: Federico ROMERO      United States Policy for Postwar  
European Reconstruction: The Role of  
American Trade Unions
- 87/312: Pietro REICHLIN      Output-Inflation Cycles in an Economy  
with staggered wage setting
- 87/313: Neil KAY,  
Jean-Philippe ROBE and  
Patrizia ZAGNOLI      An Approach to the Analysis of Joint  
Ventures
- 87/314: Jane LEWIS      Models of Equality for Women: The Case  
of State Support for Children in  
20th Century Britain

- 87/315: Serge NOIRET                    Nuovi motivi per studiare i meccanismi delle leggi elettorali. Una riflessione metodologica a proposito della legge del 1919 in Italia
- 87/316: Alain GOUSSOT                Les sources internationales de la culture socialiste italienne à la fin du 19e siècle et au début du 20e siècle. Problèmes de la composition de l'idéologie du PSI et ses rapports avec la circulation des idées en Europe
- 87/317: Eamonn NOONAN                Württemberg's exporters and German protection, 1931-36
- 87/318: Jean-Pierre CAVAILLE        Theatrum Mundi. Notes sur la théâtralité du Monde Baroque.
- 87/319: Peter RAPPOPORT and        Segmented Trends and Nonstationary Time Series  
          Lucrezia REICHLIN
- 87/320: Douglas GALE                A Strategic Model of Labor Markets with Incomplete Information
- 87/321: Gianna GIANNELLI            A Monopoly Union Model of the Italian Labour Market
- 87/322: Keith PILBEAM                Sterilization and the Profitability of UK Intervention 1973-86
- 87/323: Alan KIRMAN                The Intrinsic Limits of Modern Economic Theory
- 87/324: Andreu MAS-COLELL          An Equivalence Theorem for a Bargaining Set
- 88/325: A. GROPPi                    "La classe la plus nombreuse, la plus utile et la plus précieuse". Organizzazione del lavoro e conflitti nella Parigi rivoluzionaria.
- 88/326: Bernd MARIN                Qu'est-ce que c'est "Le Patronat"? Quelques enjeux théoriques et observations empiriques
- 88/327: Jean BLONDEL                Decision-Making Processes, Conflicts, and Cabinet Government
- 88/328: Ida KOPPEN                The European Community's Environment Policy.  
          From the Summit in Paris, 1972, to the Single European Act, 1987
- 88/329: Dalia MARIN                Assessing Structural Change: The Case

- of Austria
- 88/330: Milica UVALIC "Shareholding" in Yugoslav Theory and Practice
- 88/331: David CANNING Convergence to Equilibrium in a Sequence of Games with Learning
- 88/332: Dalia MARIN Trade and Scale Economies. A causality test for the U.S., Japan, Germany and the UK
- 88/333: Keith PILBEAM Fixed versus Floating Exchange Rates Revisited
- 88/334: Hans Ulrich Jessurun d'OLIVEIRA Die EWG und die Versalzung des Rheins
- 88/335: Felix Fitzroy and Kornelius Kraft Piece Rates with Endogenous Monitoring Some Theory and Evidence
- 88/336: Norbert LORENZ Die Übertragung von Hoheitsrechten auf die Europäischen Gemeinschaften - verfassungsrechtliche Chancen und Grenzen einer europäischen Integration erläutert am Beispiel der Bundesrepublik Deutschland, Frankreichs und Italiens -
- 88/337: Domenico Mario NUTI On Traditional Cooperatives and James Meade's Labour-Capital Discriminating Partnerships
- 88/338: Pietro REICHLIN and Paolo SICONOLFI Government Debt and Equity Capital in an Economy with Credit Rationing
- 88/339: Alfred STEINHERR The EMS with the ECU at Centerstage: A proposal for reform of the European Exchange rate system
- 88/340: Frederick VAN DER PLOEG Monetary and Fiscal Policy in Interdependent Economies with Capital Accumulation, Death and Population Growth
- 88/341: David CANNING Optimal Monetary Policy in an Economy without a Forward Market for Labour
- 88/342: Gunther TEUBNER "And God Laughed..." Indeterminacy, Self-Reference and Paradox in Law
- 88/343: Jean BLONDEL Ministerial Careers in Western European Governments

- |   |  |
|---|--|
| 88/344: Joerg MAYER                         | Intervention Mechanisms and Symmetry   |
| 88/345: Keith PILBEAM                       | Exchange Rate Management and the Risk Premium  |
| 88/346: Efisio ESPA                         | The Structure and Methodology of International Debt Statistics                                     |
| 88/347: Francesc MORATA and<br>Jaume VERNET | Las Asambleas Regionales en Italia y España: Organizacion Institucional y Reglas de Funcionamiento |









