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FRAME ECONOMIC

EC MONETARY COOPERATION

1. THIS TELEGRAM PROVIDES GUIDANCE ON RECENT PROPOSALS FOR THE FURTHER DEVELOPMENT OF EUROPEAN MONETARY COOPERATION, INCLUDING GENSCHER'S STUDY OF THE FEASIBILITY OF ESTABLISHING A EUROPEAN CENTRAL BANK.

UK OBJECTIVES

2. OUR MAIN IMMEDIATE OBJECTIVE IS TO ENSURE THAT THESE IDEAS ARE DISCUSSED TOGETHER IN THE PROPER FORA: IE BY ECOFIN, THE COMMITTEE OF EC CENTRAL BANK GOVERNORS, AND THE MONETARY COMMITTEE: AND TO INDICATE THAT (WHILE SCEPTICAL ABOUT THE IDEA OF THE EARLY ESTABLISHMENT OF A EUROPEAN CENTRAL BANK) OUR APPROACH TO THE DISCUSSIONS WILL BE POSITIVE.

PROPOSALS

3 (I) THE FRENCH FINANCE MINISTER, M BALLADUR, WROTE TO HIS EC FINANCE MINISTER COLLEAGUES IN JANUARY, WITH A PAPER ON EUROPEAN MONETARY CONSTRUCTION, PROPOSING VARIOUS STEPS INCLUDING: EARLY LIBERALISATION OF CAPITAL MOVEMENTS, LESSENING THE CURRENT (QUOTE) ASYMMETRY (UNQUOTE) WITHIN THE ERM, ADOPTING A COMMON STANCE TOWARDS NON-COMMUNITY CURRENCIES, AND FINALLY THE LONG-TERM DEVELOPMENT OF A SINGLE CURRENCY AREA WITH A COMMON CENTRAL INSTITUTION. HE ACKNOWLEDGED THAT THIS LAST IDEA RAISED A NUMBER OF PROBLEMS AND, AT THE FEBRUARY ECOFIN LUNCH, WAS AT PAINS TO EMPHASISE ITS LONG TIMESCALE COMPARED WITH THE OTHER POINTS OF MORE IMMEDIATE OPERATIONAL INTEREST.

(II) THE ITALIAN FINANCE MINISTER, AMATO, WROTE TO COLLEAGUES, WITH SIMILAR PROPOSALS AT THE END OF FEBRUARY, AGAIN ACKNOWLEDGING THAT THE CREATION OF A EUROPEAN CENTRAL BANK HAD TO BE A GRADUAL PROCESS, THOUGH HE SUGGESTED WORK SHOULD BE SET IN HAND TO IDENTIFY WHAT PRACTICAL STEPS COULD BE TAKEN TOWARDS IT.

(III) THE GERMAN FOREIGN MINISTER, GENSCHER, SET OUT MORE AMBITIOUS PROPOSALS, INITIALLY DEVELOPED IN A PARTY, NOT

GOVERNMENT, CONTEXT, IN A PAPER THAT WAS HANDED AROUND AT THE INFORMAL MEETING OF FOREIGN MINISTERS AT LAKE CONSTANCE ON 5 MARCH. HE SUGGESTED THAT THE EUROPEAN COUNCIL AT HANOVER IN JUNE SHOULD ASK FIVE TO SEVEN WISE MEN TO FORMULATE THE FOUNDATIONS FOR A EUROPEAN CURRENCY AREAS, DRAFT A STATUTE FOR A EUROPEAN CENTRAL BANK, AND WORK OUT TRANSITIONAL ARRANGEMENTS. HIS PROPOSALS ALSO ADVOCATED INCREASED USE OF THE ECU, LEADING TO ITS ADOPTION AS A COMMUNITY CURRENCY.

(IV) THE GERMAN FINANCE MINISTER, STOLTENBERG, CIRCULATED PROPOSALS OF HIS OWN TO FELLOW FINANCE MINISTERS ON 17 MARCH. THESE CONCENTRATE ON THE IMMEDIATE GOAL OF SECURING FREEDOM OF CAPITAL MOVEMENTS THROUGHOUT THE COMMUNITY, AND BUILDING ON THE IMPROVEMENTS IN THE EXCHANGE RATE SYSTEM AGREED LAST YEAR AT BASLE AND NYBORG. THE PAPER STRESSES THE IMPORTANCE OF ALL MEMBER STATES GIVING PRIORITY TO CONVERGENCE AND PRICE STABILITY. HE SEES A EUROPEAN CENTRAL BANK AS BEING NEEDED AFTER FULL ECONOMIC AND MONETARY UNION, A LONG WAY IN THE FUTURE. ANY SUCH INSTITUTION SHOULD BE INDEPENDENT OF INSTRUCTIONS FROM MEMBER GOVERNMENTS OR OTHER COMMUNITY BODIES. HE SUGGESTS CONSIDERATION SHOULD BE GIVEN TO THE QUESTION OF WHETHER INTERMEDIATE STEPS TOWARDS A EUROPEAN CENTRAL BANK ARE POSSIBLE AND USEFUL, AND IF SO WHAT SUCH STEPS SHOULD BE.

LINE TO TAKE

4. IF ASKED ABOUT THE UK ATTITUDE TO THESE PROPOSALS YOU SHOULD DRAW ON THE FOLLOWING:

(I) WE ATTACH GREAT IMPORTANCE TO MAKING RAPID PROGRESS TOWARDS DISMANTLING CAPITAL CONTROLS IN EUROPE. (ALL SUCH UK CONTROLS WERE OF COURSE ABOLISHED IN 1979). THIS IS THE IMMEDIATE TASK, AND WE ARE VERY MUCH HOPING THAT THE COMMISSION'S DRAFT DIRECTIVE ON CAPITAL LIBERALISATION CAN BE ADOPTED BEFORE THE END OF THE GERMAN PRESIDNCY - EVEN THOUGH IT MAY TAKE SOME TIME TO COME INTO EFFECT IN ALL COUNTRIES.

(II) WE SUPPORT THE GROWING USE OF THE PRIVATE ECU, BOTH AS A FINANCIAL ASSET AND A CURRENCY FOR DENOMINATION OF TRANSACTIONS, INCLUDING ITS USE AS AN INTERVENTION CURRENCY. THERE IS A LARGE MARKET IN ECU ASSETS IN LONDON.

(III) WE ALSO THINK IT IMPORTANT TO STRENGTHEN THE DEGREE OF COOPERATION ON INTEREST RATE AND MONETARY POLICY THAT IS NOW BEING BUILT UP BETWEEN EC COUNTRIES AND THEIR CENTRAL BANKS.

(IV) THESE DEVELOPMENTS WILL ALL TEND TO BRING ABOUT GREATER CONVERGENCE IN FINANCIAL POLICIES BETWEEN COMMUNITY COUNTRIES.

(V) NOTE THAT MOST OF THOSE WHO HAVE DISCUSSED THE CONCEPT OF A EUROPEAN CENTRAL BANK HAVE SEEN IT VERY MUCH AS A LONG-TERM GOAL. SHOULD NOT LET DISCUSSION OF THAT DISTRACT ATTENTION FROM

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THE IMMEDIATE TASKS: NOTABLY THE AIM OF ACHIEVING FULL LIBERALISATION OF CAPITAL MOVEMENTS.
(VI) NOTE THAT ALL THESE IDEAS ARE LIKELY TO BE DISCUSSED BY FINANCE MINISTERS AND CENTRAL BANK GOVERNORS AT THE INFORMAL ECOFIN IN MAY. SHOULD CONSIDER AFTER THEN WHAT IF ANYTHING IN THIS AREA SHOULD BE DISCUSSED AT HANOVER.
5. IF ASKED ABOUT THE UK LINE ON ERM ENTRY, YOU SHOULD CONFIRM THAT IT HAS NOT CHANGED.

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EMS file

THE EUROPEAN MONETARY SYSTEM: HOW WELL HAS IT WORKED?

by

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Paper to be presented at the Cato Institute's Sixth Annual Conference "Dollars, Deficits, and Trade: The Changing World Economy," Washington, D.C., February 25-26, 1988.

I. INTRODUCTION

The Treaty of Rome makes no reference to monetary union or specific exchange-rate arrangements. In 1968 Raymond Barre, then EC Commissioner, wrote a proposal advocating tighter consultations of member governments concerning macroeconomic policy, and in particular monetary policy. The celebrated Werner Report of 1970 was an outgrowth of Barre's ideas. Although this report set monetary union as the ultimate Community objective, it was careful to emphasize preconditions in the form of coordinated policies and the establishment of narrower margins of fluctuations around exchange rate par values. The so-called snake arrangement, instituted in 1972, was believed to be the Werner Report in action. In fact, from the Werner Report the "snake" system borrows only the idea of reducing currency fluctuations without setting a machinery to coordinate policies. The "snake" failed.

The decision taken in 1978 by Chancellor Schmidt and President Giscard d'Estaing to create a "zone of monetary stability" came as a surprise, not only to the general public, but also to central banks. Samuel Brittan (1979) speculated that the birth of the EMS had less to do with a desire for monetary stability than a Franco-German reaction to the weakness of the dollar and the unreliability of the Carter Administration. Whatever the reasons, the European Monetary System became a reality on March 13, 1979.

Several authors predicted failure, or at leat modest success. Cohen (1981, p. 21) stated that "the potential for an inflationary bias is there and, unlike the hypothethical reverse danger of a deflationary bias, could well become serious in practical terms... Any disciplinary effect of the joint float on a deficit member would probably be more than offset by the 'safety valve' of access to the credit facilities." Fratianni (1980, p. 165) predicted that "the EMS is destined to become an adjustable-peg system. How well this system will fare depends on the disparity of inflation rates and timeliness of parity adjustments. The current disparity of inflation rates and underlying policies among EEC countries suggests frequent realignments. Yet history teaches us that decision makers perceive parity changes as costly political decisions and, therefore, postpone taking action." Vaubel (1980) identified in the EMS the emergence of "egalitarianism, collectivism, and etatism" and worried about the built-in moral hazard incentives and inflation bias.

The EMS has not failed. Many economists and policymakers consider it a success, partly on the strength of the evidence I review in this paper. Yet, the relevant question is not whether the EMS has survived or done well according to some absolute criterion, but whether it has performed better or worse than an alternative exchange-rate regime. Needless to say, this is a demanding task because of

the difficulty of holding ceteris paribus. In Part II of the paper I compare the performance of the EMS countries both with its own pre-EMS history and with non-EMS countries. Methodologically, this exercise can be likened to a comparison of unconditional expectations; hence its limitations. In Part III of the paper I consider the workings and merit of the EMS relative to the free floating alternative. While there is a considerable amount of theoretical work on the relative desirability between an EMS-type arrangement and free floating--with and without credible monetary authorities--the empirical work bearing on this proposition is still in its infancy. I have relegated to Part IV concluding comments and speculations concerning the motives of each EMS country in being part of this arrangement.

II. THE RECORD

Exchange rates

There have been eleven parity changes or realignments during the life of the EMS, seven of which occurring during the first four years and four in the subsequent four years (cf. Table 1). In the approximately eight-year period going from March, 1979 to January 12, 1987 --date of the last parity change--the Italian lira experienced the largest parity depreciation, 45 percent, vis-à-vis the Deutsche mark; the Dutch guilder the smallest depreciation, 4 percent (cf. Table 2).[1]

[1] The parity realignment of 2.6 percent between the Irish pound and the French franc was the smallest parity change in absolute.

--insert Tables 1-5 here--

Did these parity changes evolve to take into consideration inflation differentials within the EMS countries? In Tables 3 and 4 I have shown cumulative bilateral inflation rate differences--over the period 1979-1986--measured by percentage changes of the wholesale price index and the consumer price index, respectively. Italy, again, has had the highest inflation differential in relation to Germany (64 and 84 percentage points, respectively); the Netherlands the smallest (1 and 3 percentage points, respectively). A comparison of Table 2 with Tables 3 and 4 reveals that bilateral depreciations were positively associated with a higher domestic inflation rate.[2] This positive association, however, was far from being complete, leaving room for real exchange rate changes (cf. Table 5). In particular, the French franc, the Italian lira and the Irish pound have had sizeable real appreciations vis-a-vis the other EMS currencies. With respect to the DM, the FF has appreciated 8 percentage points, the Lit 38

[2] The co-movement between nominal exchange rate realignments and inflation rate differentials were tested by regressing the cross-section data of Table 2 (Exr) on the cross-section data of Tables 3 and 4 (wpi and cpi, respectively):

$$Exr = -5.59 + .65*wpi \qquad SEE = 10.3$$

$$\text{t values} \quad (2.45)\ (9.86)$$

$$Exr = -6.8 + .50*cpi \qquad SEE = 9.6$$

$$(3.17)\ (10.7)$$

percentage points, the Lit 38 percentage points, and the Irish pound 35 percentage points.[3]

One interpretation of the EMS is that monetary authorities of the participating countries do not understand the EMS to be a fixed-exchange rate arrangement, but rather as one aimed at preventing high variability of exchange rates. High variability implies that exchange rate movements have a large unexpected component. Risk-averse individuals will move resources away from the riskier trade sector to the less risky non-traded sector. Hence high variability of exchange rates--despite the existence of future or forward markets--hampers the growth of trade.

Ungerer et al.(1986) give detailed evidence about exchange-rate variability within the EMS countries, within the non-EMS countries, and between them. Here are the salient results of this study. First, intra-EMS exchange rate variability--both nominal and real--declined after the creation of the EMS. This is particularly so for bilateral exchange rates, evidence that corroborates the earlier study by Rogoff (1985) who had instead concentrated on predictability, showing that the variance of the forecast error of the risk-neutral rational expectations model was lower during the first five years of the EMS than during the preceding five years. In contrast, non-EMS exchange-rate variability went up after the creation of the EMS.

[3] These were the real exchange rate changes based on the consumer price index.

Much more subtle is the evidence concerning the interaction between EMS and non-EMS countries. On the basis of the IMF's multilateral exchange rate model there is little evidence in Ungerer el al. to suggest that the pre-EMS period behaves differently than the post-EMS period.[4] As an alternative, I computed the standard deviation and the coefficient of variations of the annual percentage change of the effective exchange rate as defined by the OECD (see below for a description of the data) for the seven EMS countries, three European non-EMs countries--Austria, the United Kingdom and Switzerland-- and three non-European countries--Canada, Japan and the United States. The results, presented in Table 6, indicate a sizeable increase in variability for two of the EMS countries--Belgium and the Netherlands-in contrast to the rather stable pattern in non-EMS countries. This fact suggests that part of the gain in reduced exchange-rate variability within the EMS countries was eroded through a higher variability of exchange rates between EMS and non-EMS countries.[5]

--insert Table 6 here--

Why has there been a significant decline in the growth rate of intra-EMS trade after 1979, in relation to

[4] Cf. Tables 28 and 29 in Ungerer et al. (1986).

[5] In support of this point Ungerer et al. (1986, table 22) show that the coefficient of variation of bilateral exchange rates, measured with respect to non-EMS countries' currencies, rises from 36.3 in the period 1974-78 to 46.7 in the period 1979-85 for the average EMS countries, and from 39.6 to 42.8 for the average non-EMS countries.

both its own past and to non-EMS trade growth, despite the achieved lower (within the EMS) exchange rate variability?[6] De Grauwe and Verfaille (1987) tackle this issue by testing a cross-sectional model of bilateral export flows, the determinants of which being the growth of demand of the importing country, the growth of output supply of the exporting country, exchange-rate variability, the nature of the trade arrangement between the pairs of countries and an indicator of protectionism, the latter quantified by cumulative percentage overvaluation of the currency of the importing country. Overvaluation is defined in terms of productivity-adjusted real exchange rate. The main findings are that the slowdown in the growth of output in the EMS and the slowdown in the integration process had a larger impact

[6] Vaubel(1987) reports the following trade statistics

	Average yearly growth of exports and imports, 1979-1984	
Old EEC members	with EMS countries	with non-EMS countries
Belgium	0.3	4.9
France	1.3	5.3
Germany	1.4	4.4
Netherlands	0.4	3.9
Italy	0.4	2.2
New EEC members		
Denmark	2.8	2.5
Ireland	5.9	3.8
United Kingdom	4.1	4.9

Source: IMF, Direction of Trade.

Denmark, Ireland and the United Kingdom, the new members of the EEC, have experienced larger trade growth rates with the EEC countries than the old members. The late entry into customs union may explain in part the difference in performance; there is, however, the possibility, only applicable to the United Kingdom, that the EMS arrangement has in fact retarded trade growth within the EEC.

on intra-EMS trade growth than the beneficial effect of lower exchange-rate variability. What remains to be explained, according to the authors, is "whether the EMS arrangement might have induced both low exchange rate variability and low growth of output."

Inflation rates and money growth

Proponents of the EMS have pointed to the reduction in inflation rates in the EMS countries as a sign of the system's success. Statements of this kind need to be carefully scrutinized in two ways. First, is the inflation rate during the EMS period significantly lower than in the pre-EMS period? Meaningful statistical inferences cannot be made by simply comparing two periods. Naturally, these periods will differ by the number, size and nature of the shocks, as well as by the exchange-rate regime under consideration. Only under the heroic assumption of equivalent shocks can we attribute to the exchange-rate regime the decline in the inflation rate. To relax in part the assumption of homogeneous shocks--and this is the second point--one can compare the performance of the EMS economies with economies which are "similar" to the EMS economies, except for the exchange-rate regime.

In Table 7 I have reported the average inflation rates--measured in terms of the consumption deflator--of the eight EMS countries, the EMS average, and the averages of the

non-EMS countries for the pre-EMS period 1974-1978 and the post-EMS period 1979-1986. The data are annual and come from the diskettes of the OECD, Economic Outlook N. 41 (June 1987). The aggregation over countries was made by multiplying the country's growth rate by the country's weight based on GNP share calculated in 1982 prices and exchange rates.[7] In addition to the two sample averages, Table 7 shows the difference between the two periods and indicates whether this difference is significantly different from zero.[8]

--Insert Table 7 here--

The essential point emerging from the table is that the small two percentage point decline in the inflation rate in the EMS is not statistically significant, whereas the large declines in the other six countries are. These results may not do justice to the drastic disinflation that has taken place in the EMS countries in the last three years, and indeed the outcome would drastically change if we ignored the first four years of the EMS. Belgium had an

[7] These weights are: Belgium = 1.1, Denmark = 0.7, France = 7.0, Geramny = 8.5, Ireland = 0.2, Italy = 4.5, Netherlands = 1.8, Austria = 0.9, United Kingdom = 6.3, Switzerland = 1.2, Canada = 3.9, Japan = 14.0, United States = 40.9.

[8] The following t statistic was employed:

$$t = (x_1 - x_2)/[std(1/n_1 + 1/n_2)^{1/2}]$$

where $std = [(n_1 * var_1 + n_2 * var_2)/(n_1 + n_2 - 2)]^{1/2}$, x_1 = sample average of the pre-EMS period, x_2 = sample average of the EMS period, var_1 = variance of the pre-EMS period, var_2 = variance of the EMS period, n_1 = number of observations in the pre-EMS period, and n_2 = number of observations in the EMS period.

inflation rate of 1.4 per cent in 1986 compared to to an inflation rate of 7.1 per cent in 1982; Denmark 3.6 per cent compared to 9.8 per cent; France 2.2 per cent compared to 10.6 per cent; Germany -0.4 per cent compared to 4.7 per cent; Ireland 3.7 per cent compared to 14.7 per cent; Italy 6.0 per cent compared to 15.7 per cent; and the Netherlands 0 per cent compared to 5.1 per cent.

Different considerations can be made with respect to the growth rate of the money stock which slows down significantly in Belgium, Germany, Italy and the Netherlands, whereas it rises in the other three European non-EMS countries (again Table 7). The incompleteness of money data for Denmark and France, however, prevents us from making statistically relevant comparisons between EMS and non-EMS aggregates. As an alternative to the money stock I considered the growth rate of the monetary base, which has the advantage of closely reflecting the policy actions of the central banks.[9] In Table 8 I report the sample averages of the annualized growth rate of the monetary base of each EMS country and their relative growth rates, defined by the difference of the country's growth rate and the growth rate of the EMS aggregate excluding the country in question.

--insert Table 8 here--

[9] These are quarterly data obtained from the International Financial Statistics (line 14) of the IMF.

Italy and Ireland experienced significant (but at the relatively high 20 per cent confidence level) declines in the growth of the monetary base; France, in contrast, had an increase in the relative growth. The interplay of these forces within the EMS was such to leave the EMS monetary base growth in the 79-86 period virtually unchanged with respect to the pre-EMS period.[10]

--insert Table 9 here--

Interest rates

Integration of the finacial markets implies that, in the absence of expected real exchange rate changes, real rates of interest cannot differ among countries. Rogoff (1985) shows that the difference between German and French and German and Italian short-term real interest rates increased during the EMS period. Furthermore, the conditional variance of these interest rates--based on two alternative ways to proxy the expected rate of inflation--rose as well in the post-EMS period.[11] Giavazzi and Pagano (1985) present evidence that the spread between offshore and onshore interest rates widens and becomes more variable when an expectation of a parity realignment sets in. Tying the

[10] There is a slowdown in the growth rate of the monetary base of the "rest of the world" but it is not statistically significant. It should be noted that the growth rate of the monetary base has large variances in all countries, a fact that explains why apparently large drops in the sample means do not result statistically significant.

[11] Cf. Table 5.

evidence produced by Giavazzi and Pagano with that of Rogoff one arrives at the conclusion that the reduced variability of the exchange rates cannot be credited to coordinated monetary policy, but rather to the existence of capital controls that have effectievly put a wedge between German interest rates, on the one hand, and French and Italian interest rates, on the other hand. Goodhart (1986), on the strenth of this evidence, argues implicitly against the entry of the United Kingom in the EMS, because the crucial role of London as a major financial center requires freedom of capital movement. Put it differently, if the cost of joining the EMS is the application of exchange controls, the EMS is not worth it.

The evidence on interest rates cited above was based on data going up to 1984. What has happened more recently? The most important development is the exchange liberalization process that has taken place both in Italy and France, forcing the real interest rates in these countries to rise relative to those abroad. I have calculated in Table 9 the short-term real rate of interest using two alternative data sets: the annual data of the OECD and the monthly three-month Treasury rates published by the Harris Bank's Weekly Review. In both instances I have assumed that individuals were blessed with perfect foresight as to the next period's rate of inflation. While the two data sets yield different quantitative results, qualitatively they concur in pointing to a narrowing of the differentials.

The narrowing of the interest-rate differential is consistent with the hypothesis that countries like France and Italy have used the exchange rate as an exogenous variable and have adopted a policy of letting their domestic currencies appreciate in real terms vis-à-vis the Deutsche mark.

--insert Table 9 here--

Economic growth and unemployment

How have the EMS countries performed on the real side of the economy? The evidence is very clear concerning unemployment, less so about output growth. Unemployment rates have increased substantially in the post-EMS period: in each of the EMS countries the increase is statistically significant at the five percent level (cf. Table 10). But this is also true for the other three European countries, which are not part of the EMS, in contrast with the experience of the Canada-Japan-US group. The unemployment story does not carry over, however, to the growth of real gnp where the slowdown is statistically significant for France, Ireland and the Netherlands. It should be noted that the growth rates of output in the 74-78 period were low to begin with, making the economic slowdown even more pronounced.

--insert Table 10 here--

The nature and size of the real slowdown in Europe is very controversial and the subject of ongoing research. One critical issue is whether the higher unemployment results from high real wage rates (Classical explanation) or from inadequate spending (Keynesian explanation). It should be noted that unemployment in Europe is largely concentrated among the young and the unskilled, particularly in well-defined geographical areas. In a recent paper Drèze et. al. (1987) argue that European unemployment exhibits both Classical and Keynesian characteristics. These economists propose a series of supply-side measures aimed at reducing the high wedge between the private cost of labor, inclusive of taxes, and the social cost, i.e., net of tax. But they also propose Germany, France and the United Kingdom to generate additional government spending to expand productive capacity--which is currently almost fully used--in the future.[12]

From the perspective of our paper the above discussion highlights that the EMS is a monetary arrangement, not a fiscal one. Indeed there is evidence that fiscal policies among the EMS countries were more divergent after 1979 than before.

[12] The proposal entails higher public debt today and more taxes in the future. The higher public debt today serves to induce an intertemporal substitution of labor away from the future (when the economy will be at full employment) and towards the present (when resources are unemployed).

III. AN INTERPRETATION OF THE EMS

The EMS was created to achieve "a zone of monetary stability in Europe" that would eventually culminate into the establishment of a European Monetary Fund. Central banks have interpreted "a zone of monetary stability" to mean: (1) lower variability of exchange rates, and (2) lower and converging inflation rates among EMS countries.

The evidence presented in Section II of the paper can be summarized as follows. The EMS has been successful in reducing nominal and real exchange rate variability. Yet, intra-EMS trade growth has fallen. It is conceivable that trade growth would have fallen even more with more exchange rate variability. As to inflation, the facts are more ambiguous. The achieved reduction in the inflation rates turns out to be not as significant as the reduction in inflation rates among non-EMS countries, when the entire post-EMS period is considered. If, instead, one isolates the 1982-86 period the story becomes much more favorable for the EMS. Finally, there is some evidence that France and Italy have used the EMS as a disinflationary mechanism, by letting their currencies appreciate in real terms vis-à-vis the Deutsche mark and their real rates of interest rise relative to the real rates of interest prevailing in Germany.

Two questions immediately come to mind. Why would France and Italy accept the discipline of the EMS in preference to appropriate domestic disinflationary policies? Why would Germany be part of a scheme that makes it a potential importer of inflation? The rest of the paper is devoted to answer these two questions.

Credibility hypothesis

The key issue underlying the first of the two questions is whether or not membership in the EMS facilitates disinflation relative to an independent policy of disinflation. High-inflation countries may find it worthwhile to join an EMS-type arrangement because of the benefit derived by linking their currencies to that of a low-inflation country. These benefits stem from the reputation the low-inflation country's central bank has earned in the market place.

A central bank with little or no reputation faces an inflation rate higher than would prevail if the central bank had committed itself to a credible strategy of disinflation.[13] This central bank can borrow reputation by

[13] There is one branch of the literature on reputation that considers conditions under which policy shifts are credible (e.g., Barro and Gordon 1983), while another branch emphasizes that the central bank is free to follow discretionary policies and determine its level of credibility (e.g., Cukierman and Meltzer 1986). According to the latter view it is not clear that the EMS enjoys a comparative advantage in generating reputation over an independent monetary policy of disinflation.

commiting its country's currency to a policy of real exchange rate appreciation with respect to the currency of a low-inflation, credible, central bank. The EMS can be intepreted as an arrangement of this type, with relatively high-inflation France and Italy borrowing reputation from low-inflation Germany.

Giavazzi and Pagano (1986) explore theoretically the advantage of high-inflation countries of tying their hands, as far as monetary policy is concerned. The critical point for these economists is not whether the EMS is an effective disciplinary force, but whether the high-inflation countries gain from the arrangement. The gain of reputation is only one aspect of joining the EMS; high-inflation countries have also to consider the losses in competitiveness implied by real exchange rate appreciations. The Giavazzi-Pagano model postulates that monetary authorities prefer more output to less output, value a positive rate of inflation because it creates revenues, but dislike inflation variability because of its adverse effects on output. The latter responds positively to real exchange rate depreciation and inflation "surprises". Finally, the real exchange rate of the high-inflation countries appreciates between realignments, but returns to its initial value at the time of a realignment (i.e., changes in parities are set equal to cumulative inflation differentials). Under these conditions, the EMS is worth joining if the authorities do not seek to extract

revenues from inflation, an intuitive outcome. Equally intuitive is the result that the payoff of joining the EMS is ambiguous if the authorities value the inflation tax; the final outcome depending on the relative strength of the seigniorage, the present value of output loss due to inflation variability, and the tightness of the EMS regime.

Unfortunately, there are no empirical measures of the three forces that are critical in the determination of EMS membership. It is only through revealed reference that we can deduce that the seigniorage incentives are small enough, relative to the gain in reputation, to have made it worthwhile for France and Italy to remain in the EMS so far.

Benefits to the supplier of reputation

Let us turn to the second question raised earlier: What does Germany gain by being in the EMS? As a supplier of monetary credibility Germany provides an externality for which it appears there is no quid pro quo. Furthermore, the policy of high-inflation countries to export inflation makes the maintenance of low inflation at home more difficult. Once in the EMS, there is the additional problem of whether or not Germany would be able to dictate her terms; and if so, under what conditions.

The recent theoretical analysis by Begg and Wypsloz (1987) provides us with a useful vehicle to discuss these issues. In this paper there are two interacting economies--

one with high-inflation and the other with low-inflation--contemplating several alternative exchange-rate regimes. In these economies authorities want to minimize deviations of output from potential output and price inflation from desired inflation, subject to the following macroeconomic structure. To begin with, financial markets are integrated in the sense that differences in real rates of interest are equal to the expected real depreciation of the currency with the higher real interest rate. Aggregate demand responds positively to real exchange rate depreciation, and negatively to real rates of interest at home and abroad. Core or expected inflation adjusts slowly to changes in the actual inflation rate. The latter is a weighted average of changes in domestic prices and real exchange-rate depreciation: the depreciating country importing inflation from the appreciating country. Changes in domestic prices are determined by the expected inflation rate and output deviation from potential output. Finally, and importantly, one economy starts with a higher inherited inflation rate than the other.

The two countries can interact either with each monetary authority pursuing an independent policy or through an EMS-type arrangement. Two types of EMS are considered. There is a soft version, EMS(S), where exchange rates are fixed just before the economies have to adjust to steady state values of zero inflation and zero output

deviation; and a hard version, EMS(H), where the economies have to commit themselves to fixed exchange rates in the early going. The relative merits of the independent strategy, EMS(S), and EMS(H) are best appreciated with reference to Figures 1 and 2, which are adaptations of equivalent figures in Begg and Wypslosz.

The horizontal axis of Figure 1 measures the difference between the inflation rates of high-inflation France and low-inflation Germany; the vertical axis the world (i.e., the two countries') average inflation rate. The indicated ellipses represent the preference mappings of the two countries. Points F1 and G1 indicate the best positions for France and Germmany, respectively. In words, Germany prefers to have a lower world inflation than France; France's "best" is achieved, not only with a higher world inflation rate, but also with Germany inflating relative to France. The vertical lines EMS(H) and EMS(S) refer to the two types of EMS arrangements.

The independent strategy, free floating, is denoted by N as in Nash. Relative to N, France would like Germany to inflate more and, consequently, would prefer a higher world inflation. Germany, instead, would wish to distance herself more sharply from the French inflation rate, and would prefer a higher world inflation than it is implied by free floating (this result is ambiguous in the analysis). The shaded area represents the gain from cooperation. In

Figure 1 the vertical line EMS(S) runs through the shaded area. The critical assumptions there are that German aversion to inflation is low, initial inflation differences are high and the Phillips Curves are relatively flat in the sense that inflation is moderately sensitive to changes in output. Clearly EMS(S) is preferred to free floating and EMS(H). This is the case that is most consistent with casual observations of today's EMS.

Suppose Germany's aversion to inflation is very high, inherited inflation differences are small and the Phillips Curves are steep in the sense that inflation is very sensitive to changes in output. This outcome is depicted in Figure 2. EMS(H) is preferred to free floating: the high German aversion to inflation raises the desire to reduce disparities rapidly. But there is an intermediate case-- not shown in Figure 1-- where the shaded area would be to the right of EMS(S). Germany would prefer free floating to either EMS arrangement.

One of the key messages of the Begg-Wyplosz analysis is that free floating cannot be dismissed as an inferior solution to the EMS. The incentives of the low-inflation country to participate in the EMS depends on the weight authorities assign to inflation as well as on the initial conditions. As the authors put it (p.38) "an EMS formed to fight inflation might disintegrate once unemployment, not inflation, was the main concern, especially if both the

success on inflation and the extent of the unemplyment problem were unanticipated at the date the bargain took place to hammer out the operating rules of the EMS."

There are other payoffs for Germany for being in the EMS. The models we have considered give monetary authority the exclusivity to set priorities for the economy as a whole. In reality there are conflicts within branches of the executive. Germany, as represented by the Ministry of Finance, is more favorable to a DM real depreciation than Germany represented by the Bundesbank (see Tsoukalis (1987)). Indeed, as I have already mentioned in the introduction, Chancellor Schmidt's original decision to join the EMS--against the opposition of the Bundesbank--might have had less to do with monetary unification than searching for an expedient way to diffuse the brunt of heavy speculative flows into Germany (Brittan 1979). It is not surprising that German authorities have consistently pushed for the integration of financial markets, with France and Italy relaxing exchange controls. The unfolding of tighter financial integration ought to raise the substitutability between DM-denominated assets and assets denominated in French francs and liras. The benefit for Germany will be less vulnerability to changes in U.S. economic policies.[14]

[14] The asymmetries noted by Giavazzi and Pagano (1985) will have then disappeared.

Evidence on Reputation

Giavazzi and Giovannini (1987) address the issue of how important reputation has been in the EMS. These two authors test for the empirical size of reputation by employing the famous Lucas (1979) critique to econometric practice in a positive manner. Since the institution of the EMS represents a new policy regime, it follows that any well specified model of inflation estimated before the EMS will tend to overpredict inflation during the EMS period for counrtries borrowing reputation, and underpredict for reputation-supplying Germany. Giavazzi and Giovannini estimate vector-autoregressive models which act as "idealized" reduced-form equations for changes in the price level, nominal wages, and output. These variables are postulated to depend on their lagged values, money growth, changes in the relative price of imported raw materials and changes in the relative price of imported finished goods, as well as on a smattering of country-specific dummy variables.

The authors find only one significant change in the over-all values of the estimated coefficients before and after the establishment of the EMS; and that occurs for the French price inflation. As Giavazzi and Giovannini admit it (p.16), "this result might suggest that the EMS has not brought about any of the changes in expectations that we describe in the sections above, except for the price equation in France." Since the authors do not provide

statistics about the relative forecast accuracy of the models before and after the EMS, the issue of the effectiveness of the regime change cannot be explored more deeply.

What we are left with are graphs of the actual and predicted values of the models in the post-EMS period. These graphs, in the absence of formal statistics, become the evidence upon which the reputation hypothesis is evaluated. The graphs for Danish and German inflation "appear" to be consistent with the hypothesis. Germany, besides importing inflation from the other EMS countries, seems to be a loser on the real side of the economy as well: the systematic negative error of forecast in the output equation is consistent with the EMS having exerted a deflationary force on Germany.[15] This conclusion runs counter to the popular notion that Germany is a deflationary force on the system.

[15] The following table facilitates the interpretation of the empirical results of Giavazzi and Giovannini. The signs represent the systematic differences betweens actual and predicted values in the post-EMS period. Systematic is defined in a visual sense, that is, when it is obvious that the actual values are consistently above or below the predicted values. The question mark indicates inconclusiveness, again from an optical perspective.

	Denmark	Germany	UK	France	Italy
price change	-	+	-	- (after 82.II)	?
wage change	-	+	-	-	?
output change	+	- (after 82.IV)	+	- (after 83.II)	+

Curiously enough, the United Kingdom appears to have been able to have the cake and eat it too, with systematic negative forecast errors in the inflation rate and positive forecast errors in output. This result, at face value, vindicates Mrs. Thatcher's insistence in not being part of the EMS.

Bundesbank leadership

There is virtual unanimity in the literature that, despite the intentions of the founding fathers to create a democratic institution, the EMS behaves as if Germany were a price leader (cf., for example, Sarcinelli 1986). The theoretical justification for this outcome emerges from Figure 1, where Germany can set her preferred inflation rate (point G2) that is consistent with both countries being better off relative to the N solution. The alternative of France setting her preferred inflation rate (point F2) is not consistent with an improvement over the N solution. The implication is that France would accept the German inflation rate.

Having accepted the German inflation rate, however, does not prevent the high-inflation France and Italy from complaining and setting up strategies to alter the institutional mechanism of the EMS. This is no more evident than on the issue of intra-marginal interventions. Official interventions in the exchange markets of participating

countries are automatic and unlimited at the compulsory intervention rates, but are subject to prior authorization within the margins. Central banks extend to one another credit lines to finance the interventions (Very Short-term Financing Facility). Rules governing the use of these credit lines reflect the competing interests of debtor countries, who want adequate financing, and creditor countries, who worry about the money-creation consequences of interventions. Micossi (1985) points out that only a minor fraction of total interventions has occurred at the compulsory intervention limits. Since Germany seldom intervenes intra-marginally, some authors have concluded that that the burden of adjustment within the EMS has fallen on weaker-currency countries (e.g., Tsoukalis (1987).

France has been more than vociferous in denouncing the dominant role of Germany. In January 1987, before the latest realignment, France refused to intervene as the franc fell to the compulsory intervention floor; the Bundesbank had to intervene. Inspired by France, the Finance Ministers of the EC in September of 1987 modified the rules governing interventions and their financing.[16] The key change concerns

[16] Masera (1987) outlines the principal institutional changes of the September 12-13, 1987 decision by the EC Council of Finance Ministers: in addition to the change discussed in the text, there is a time extension of the Very Short-term Financing Facility, a larger role given to the "official" ECU, and an engagement to monitor exchange rates, external imbalances and monetary conditions in each of the EMS countries. The decision was written with unusually guarded language.

the access of weak-currency countries to automatic credit through the Very Short-term Financing Facility. Mr. Balladur, the French Finance Minister, has interpreted the change as meaning "a presumption of automaticity" (an oxymoron?), whereas Mr. Poehl has interpreted the September decision as giving the Bundesbank the discretion to decide case by case on its merit, the criterion being that "the main pre-condition will be that it does not threaten price stability in Germany" (The Economist 1987). It is too early to judge whether the institutional innovations pushed by France, and backed by other countries, will nudge the Bundesbank to alter its monetary policy. Much will depend on the Bundesbank's ability to sterilize interventions in the exchange markets.

IV. CONCLUDING COMMENTS

The European Monetary System has not failed. The potential for an inflationary bias predicted by many economists has not materialized. So much is clear. Less clear is the matter of whether the EMS has been a success. The evidence marshalled in this paper indicates that the EMS has achieved lower exchange rate variability. Yet, intra-EMS trade growth has declined. The reduction in inflation rates, greatly praised by proponents of the EMS, turns out to be modest when compared to the reduction achieved by other countries. The stronger evidence pertains to the willingness

of high-inflation France and Italy to have used the EMS as a disinflationary mechanism. The real value of the franc and the lira has appreciated in relation to the mark, while the wedge between German real interest rates, on the one hand, and French and Italian real interest rates, on the other hand, has shrunk. The early reliance of France and Italy on exchange controls has given way to later efforts to open up their financial markets.

The preference of France and Italy to join the EMS, over a domestically driven disinflation, suggests that the Banque de France and Banca d'Italia are relatively weak institutions, lacking the reputation of the Bundesbank. By committing themselves to a policy of real exchange rate appreciations, France and Italy use the reputation of the Bundesbank in lowering the inflation rate at a lesser cost than would be possible through an independent monetary policy.

EMS participation poses a complex problem to Germany. As a supplier of credibility the Bundesbank receives no reward from the EMS. In fact, the workings of the EMS make it "natural" for Germany to import inflation from high-inflation countries. On the other hand, the EMS makes it possible for the Deutsche mark to have smaller real appreciations than would be true under free floating. This competitive advantage may justify why the German government has been more favorable towards the EMS than the Bundesbank.

The EMS may generate another benefit for Germany: the integration of financial markets in Europe and, hence, smaller German vulnerability to changes in foreign economic policy, especially U.S. policy.

Belgium, Luxembourg, the Netherlands and Denmark are small countries that have embraced, to different degrees, a Deutsche mark standard. The United Kingdom has refused to join the EMS for fear of losing independence of monetary policy. The evidence reviewed in this paper does not indicate that the United Kingdom has lost by staying out. Ireland, a small country not linked to the Deutsche mark area, remains a puzzle as to its gain from EMS participation.

The EMS so far has run as a German-dominated system. There are pressures to make the arrangement more democratic. It is too early to predict any fundamental changes. However, should democratization come about without an adequate amount of shared reputation, a great deal of the raison d'être of the EMS would have disappeared.

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TABLE 1
Exchange Rate Realignments
Within the EMS

			DM	HFL	FF	BFR	LIT	DKR	IRL
24	Sept.	1979	+2.0	---	---	---	---	-2.9	---
30	Nov.	1979	---	---	---	---	---	-4.8	---
23	Mar.	1981	---	---	---	---	-6.0	---	---
5	Oct.	1981	+5.5	+5.5	-3.0	---	-3.0	---	---
22	Feb.	1982	---	---	---	-8.5	---	-3.0	---
14	Jun.	1982	+4.25	+4.25	-5.75	---	-2.75	---	---
21	Mar.	1983	+5.5	+3.5	-2.5	+1.5	-2.5	+2.5	-3.5
22	Jul.	1985	+2.0	+2.0	+2.0	+2.0	-6.0	+2.0	+2.0
7	Apr.	1986	+3.0	+3.0	-3.0	+1.0	---	+1.0	---
4	Aug.	1986	---	---	---	---	---	---	-8.0
12	Jan.	1987	+3.0	+3.0	---	+2.0	---	---	---

Source: *Commission of the European Communities*

Note: *The numbers are percentage changes of a given currency's bilateral central rate against those currencies whose bilateral parities were not realigned. A + denotes an appreciation and -a depreciation. On March 21, 1983 and on July 22, 1986 all parities were realigned.*

BFR = Belgium/Luxembourg franc, DKR = Danish kroner,
DM = Deutsche mark, FF = French franc, LIT = Italian lira,
IRISH £ = Irish pound, HFL = Netherlands guilder.

TABLE 2

Percentage Change in Bilateral Parities from March 13, 1979 to January 12, 1987

	BFR	DKR	DM	FF	LIT	IRISH £	HFL
BFR		2.94	-27.18	10.13	18.30	7.48	-23.29
DKR			-30.12	7.19	14.75	4.54	-26.23
DM				37.31	45.48	34.16	3.89
FF					8.18	-2.64	-34.81
LIT						-10.82	-41.59
IRISH £							-30.77

Note: *A + denotes a devaluation and - an appreciation of the currency shown in the column heading with respect to the currency shown in the row heading.*

BFR = Belgium/Luxembourg franc, DKR = Danish kroner, DM = Deutsche mark, FF = French franc, LIT = Italian lira, IRISH £ = Irish pound, HFL = Netherlands guilder.

Source: *Ungener et al. (1986, Table 6) and SanPaolo, ECU Newsletter, January 1987.*

TABLE 3

Cumulative Bilateral Inflation Differential
Measured by the Wholesale Price Index
Over the Period 1979-1986

	BFR	DKR	DM	FF	LIT	IRISH £	HFL
BFR		28.1	-4.3	37.9	59.3	33.1	-2.9
DKR			-32.4	9.8	31.2	5.0	-31.0
DM				42.2	63.6	37.4	1.4
FF					21.4	-4.8	-40.8
LIT						-26.2	-62.2
IRISH £							-36.0

Note: *A positive (negative) number indicates that the inflation rate of the country shown in the column heading is cumulatively higher (lower) than that of the country shown in the row heading.*

BFR = Belgium/Luxembourg franc, DKR = Danish kroner,
DM = Deutsche mark, FF = French franc, LIT = Italian lira,
IRISH £ = Irish pound, HFL = Netherlands guilder.

Source: *IMF, IFS, Yearbook 1987.*

TABLE 4
Cumulative Bilateral Inflation Differential
Measured by the Consumer Price Index
Over the Period 1979-1986

	BFR	DKR	DM	FF	LIT	IRISH £	HFL
BFR		17.7	-18.8	27.0	65.0	69.6	-15.8
DKR			-36.5	9.3	47.3	31.9	-33.5
DM				45.8	83.8	68.8	3.0
FF					38.0	22.6	-42.8
LIT						-15.4	-80.8
IRISH £							-65.4

Note: *A positive (negative) number indicates that the inflation rate of the country shown in the column heading is cumulatively higher (lower) than that of the country shown in the row heading.*

BFR = Belgium/Luxembourg franc, DKR = Danish kroner,
DM = Deutsche mark, FF = French franc, LIT = Italian lira,
IRISH £ = Irish pound, HFL = Netherlands guilder.

Source: *IMF, IFS, Yearbook 1987.*

TABLE 5
Percentage Change in Bilateral
Real Exchange Rate Realignment
From March 13, 1979 to January 12, 1987

Wholesale Price Index

	BFR	DKR	DM	FF	LIT	IRISH L	HFL
BFR		-25.16	-22.88	-27.77	-41.00	-25.62	-20.39
DKR			2.28	- 2.61	-16.45	- 0.46	4.77
DM				- 4.89	-18.12	- 3.24	2.49
FF					-13.22	2.16	5.99
LIT						15.38	20.61
IRISH 1							5.23

Consumer Price Index

	BFR	DKR	DM	FF	LIT	IRISH L	HFL
BFR		-14.76	- 8.38	-16.87	-46.7	-62.12	- 7.49
DKR			6.38	- 2.11	-32.55	-27.36	7.27
DM				- 8.49	-38.32	-34.64	0.89
FF					-29.82	-25.24	7.99
LIT						4.58	39.21
IRISH 1							34.63

Note: A positive number indicates a real depreciation of the country's currency shown in the column heading with respect to the country's currency shown in the row heading. The real exchange rate changes were obtained by subtracting the cumulative inflation differences of Table 3 and Table 4 from the cumulative nominal parity changes shown in Table 2.

BFR = Belgium/Luxembourg franc, DKR = Danish kroner,
DM = Deutsche mark, FF = French franc, LIT = Italian lira,
IRISH £ = lrish pound, HFL = Netherlands guilder.

TABLE 6
Variability of the Annual Growth
of the Effective Exchange Rate

	period 1974-78		period 1979-86		
EMS countries	*standard deviation*	*standard deviation / mean*	*standard deviation*	*standard deviation / mean*	*F ratio*
Belgium	*1.40*	*0.53*	*4.68*	*3.78*	*11.15*
Denmark	*1.61*	*3.36*	*3.68*	*1.77*	*5.19*
France	*5.73*	*3.31*	*3.77*	*2.04*	*0.43*
Germany	*2.15*	*0.45*	*3.32*	*1.14*	*2.38*
Ireland	*2.02*	*0.63*	*4.25*	*1.81*	*4.43*
Italy	*4.31*	*0.44*	*3.03*	*0.82*	*0.50*
Netherlands	*0.91*	*0.28*	*3.42*	*1.81*	*14.09*
Sum EMS	*1.55*	*5.33*	*2.72*	*13.69*	*3.07*
Austria	*1.34*	*0.49*	*1.54*	*0.74*	*1.34*
Switzerland	*6.50*	*0.61*	*3.14*	*1.07*	*0.23*
United Kingdom	*5.17*	*0.83*	*6.00*	*11.64*	*1.34*
Sum Euro non-EMS	*4.11*	*1.44*	*4.18*	*16.27*	*1.04*
Canada	*6.16*	*2.21*	*2.98*	*1.31*	*0.23*
Japan	*9.83*	*1.88*	*10.51*	*2.18*	*1.14*
United States	*4.64*	*5.31*	*1.42*	*1.35*	*0.09*
Sum non-Euro non-EMS	*2.41*	*5.34*	*4.81*	*2.77*	*3.99*

Source: OECD, Economic Outlook N. 41 (June 1987) data diskettes.

Note: F ratio is the ratio of the variance of the 79-86 period to the variance of the 74-78 period. The value of the F(7,4) statistic at the 1 percent level = 14.98; at 5 percent level = 6.09.

TABLE 7
EMS vs. Non-EMS Countries:
A Comparison of Inflation and
Money Growth Rates

	Annual Percentage Change Consumption Deflator			Annual Percentage Change Money Stock		
Countries	74-78	79-86	Difference	74-78	79-86	Difference
Belgium	8.54	5.53	-3.01**	11.77	6.14	-5.63*
Luxembourg	7.49	6.03	-1.46	-	-	-
Denmark	10.37	7.79	-2.58	-	15.87	
France	9.93	8.57	-1.36	-	9.79	
Germany	4.66	3.43	-1.23	8.83	5.92	- 2.91*
Ireland	14.87	11.00	-3.87	17.14	10.96	- 6.18
Italy	16.12	13.17	-2.95	19.05	12.89	- 6.16*
Netherlands	7.65	3.75	-3.9 *	12.07	7.05	- 5.02**
EMS Countries	9.04	7.10	-1.94	-	-	-
European non-EMS Countries[a]	12.40	7.15	-5.25*	4.91	11.63	6.72*
Non-European Countries[b]	8.04	5.24	-2.80**	10.30	8.75	-1.55**

Source: OECD, Economic Outlook N. 41 (June 1987) data diskettes.

a = Austria, United Kingdom and Switzerland

b = Canada, Japan and the United States

* Statistically different from zero at the 5 percent significance level (t distribution, 11 degrees of freedom)

** Statistically different from zero at the 10 percent significance level (t distribution, 11 degrees of freedom)

TABLE 8
Growth of the Monetary Base in the EMS Countries
(Quarterly Data 1974:2-1986:4)

	Own Growth Rate			Relative Growth Rate		
Countries	74-78	79-86	Difference	74-78	79-86	Difference
Belgium	6.00	2.40	-3.60	-1.38	-5.3	-3.92
Denmark	11.58	12.37	0.79	4.39	5.06	0.67
France	0.34	8.19	7.85	-9.88	1.04	10.92***
Germany	4.84	4.00	-0.83	-3.86	-5.37	-1.51
Ireland	16.83	7.59	-9.24***	9.59	0.13	-9.46***
Italy	21.46	13.97	-7.49***	17.44	8.03	-9.41*
Netherlands	8.88	5.78	-3.10	1.69	-1.82	-3.51
Sum EMS	7.32	7.46	0.14			
Rest of the World	8.07	7.25	-0.82			

Source: International Monetary Fund, International Financial Statistics, line 14, various issues

Note: The first three columns refer to the annual percentage change of the monetary base of the indicated country; the second three columns refer to the difference between the country's growth rate and the rest of the EMS'. Rest of the world is defined as the weighted sum of Canada, Japan, the United Kingdom and the United States.

* Statistically different from zero at the 5 percent significance level (t distribution, 49 degrees of freedom)

*** Statistically different from zero at the 20 percent significance level (t distribution, 49 degrees of freedom)

Table 9
EMS vs. non-EMS Countries:
A Comparison of Real Interest Rates

OECD Data

	1974-1978		1979-1986			
	mean	std	mean	std	t stat	F ratio
Belgium	1.31	2.03	6.11	1.35	-4.61	0.44
France	-0.13	1.32	3.61	3.49	-2.14	6.99
Germany	1.33	1.27	4.27	1.91	-2.80	2.26
Ireland	-4	2.99	3.17	4.51	-2.90	2.28
Italy	-1.58	2.2	3.65	4.73	-2.13	4.62
Netherlands	-1.09	1.75	4.02	1.44	-5.26	0.68
EMS countries	0.08	1.04	4.04	2.63	-2.96	6.40
European non-EMS countries	-2.85	1.95	3.51	2.48	-4.48	1.62
Non-European Countries	0.1	0.28	2.45	1.12	-4.23	16.00

HARRIS BANK Data

	1974-1978		1979-1986			
	mean	std	mean	std	t stat	F ratio
Belgium	0.206	3.718	5.87	3.08	-63.06	0.69
France	-1.26	2.07	4.18	4.25	-57.43	4.22
Germany	0.22	2.34	3.25	2.61	-45.16	1.24
Ireland	N.A.					
Italy	-4.49	7.94	1.51	5.44	-34.11	0.47
Netherlands	N.A.					
UK	-4.91	6.25	3.18	5.78	-50.54	0.86
Canada	-0.98	3.09	4.42	2.76	-69.55	0.80
Japan	-2.65	5.41	2.84	3.87	-44.99	0.51
USA	1.7	2.2	3.44	86.12	-0.98	1532.37

Source: OECD, Economic Outlook N. 41 (June 1987) data diskettes;
and Harris Bank, Weekly Review, various issues.

t statistic: the critical values with 11 degrees of freedom (OECD Data) are 2.2 (5 per cent) and 1.8 (10 per cent); with 154 degrees of freedom (Harris Bank Data) 1.98 (5 per cent) and 1.65 (10 per cent).

F statistic: the critical values with (7,4) degrees of fredom (OECD Data) are 14.98 (1 per cent) and 6.09 (5 per cent); with (92,62) degrees of freedom (Harris Bank Data) approximately 1.71 (1 per cent) and 1.46 (5 per cent).

TABLE 10
EMS vs. Non-EMS Countries:
A Comparison of Output Growth
and Unemployment Rates

Countries	Annual Percentage Change Of Real GNP			Unemployment Rate		
	74-78	79-86	Difference	74-78	79-86	Difference
Belgium	2.31	1.42	-0.89	5.25	10.75	5.5 *
Luxembourg	1.18	2.28	1.1	0.37	1.24	0.87*
Denmark	1.55	2.31	0.76	5.16	8.69	3.53*
France	3.03	1.52	-1.51**	4.42	8.41	3.99*
Germany	2.00	1.74	-0.26	3.54	6.30	2.76*
Ireland	3.77	0.55	-3.22*	7.72	12.56	4.84*
Italy	2.12	1.99	-0.13	6.38	9.14	2.76*
Netherlands	2.55	1.04	-1.51***	5.15	11.45	6.3 *
EMS Countries	2.38	1.66	-0.72	4.62	8.18	3.56*
European non-EMS Countries[a]	0.99	1.70	0.71	3.46	7.76	4.3*
Non-European Countries[b]	2.81	2.54	-0.27	5.76	6.57	.81

Source: OECD, Economic Outlook N. 41 (June 1987) data diskettes.

a = Austria, United Kingdom and Switzerland

b = Canada, Japan and the United States

* Statistically different from zero at the 5 percent significance level (t distribution, 11 degrees of freedom)

** Statistically different from zero at the 10 percent significance level (t distribution, 11 degrees of freedom)

*** Statistically different from zero at the 20 percent significance level (t distribution, 11 degrees of freedom)

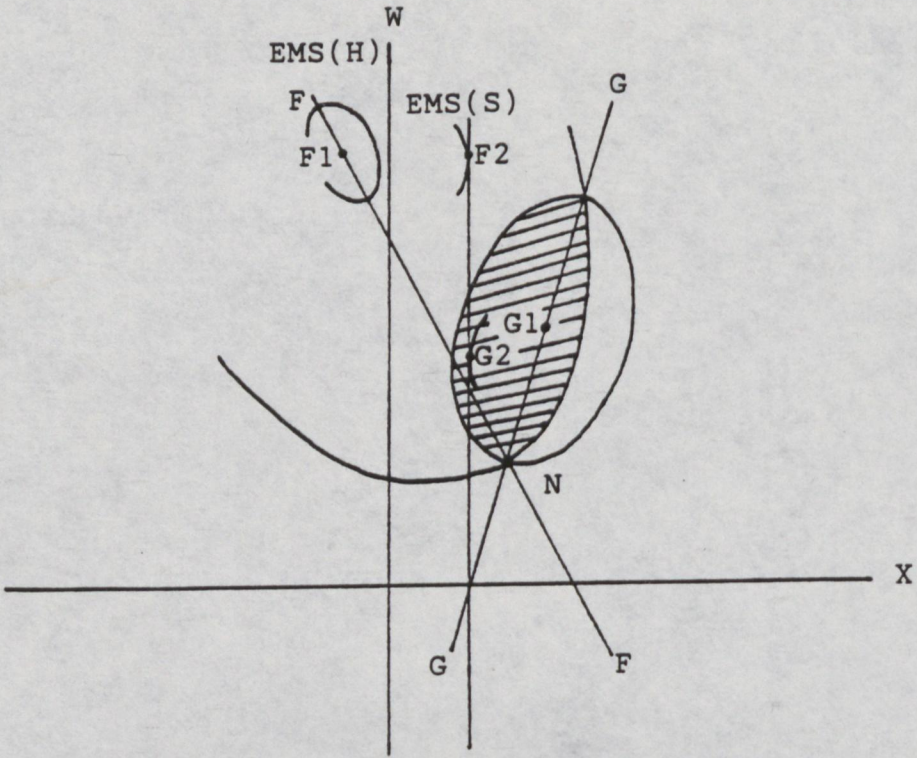

FIGURE 1: SOFT COOPERATIVE STRATEGY

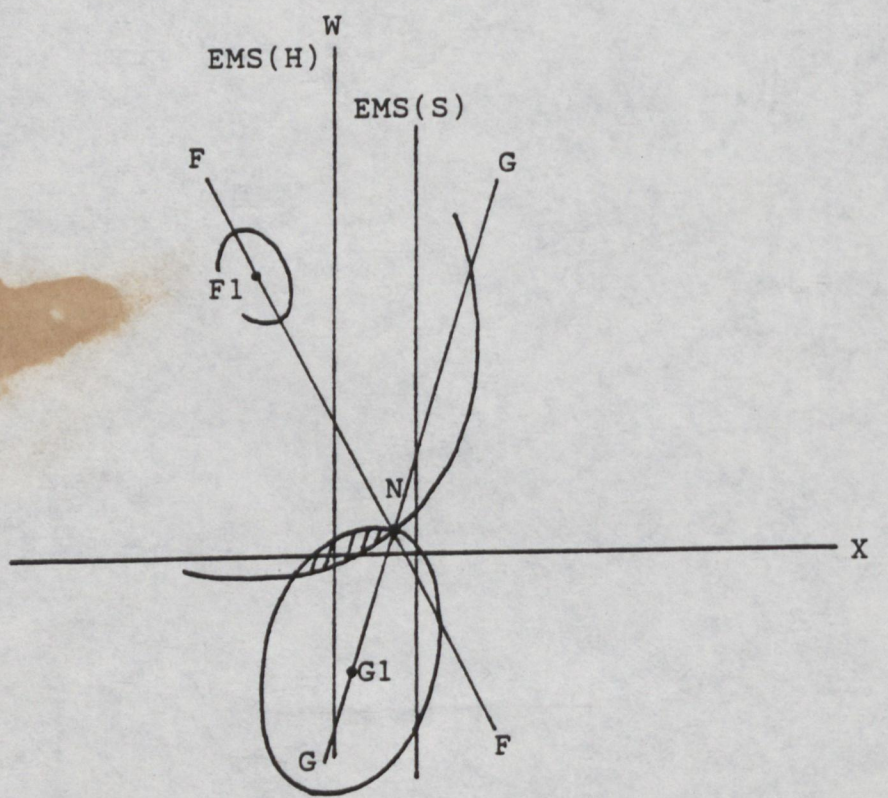

FIGURE 2: HARD COOPERATIVE STRATEGY

X= FRENCH INFLATION RATE MINUS GERMAN INFLATION RATE

W= AVERAGE OF FRENCH AND GERMAN INFLATION RATES