"THE SWINGING DOLLAR: IS EUROPE OUT OF STEP?"

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ABSTRACT

This paper takes a European view at the large Dollar fluctuations of the last decade, often seen as a classic case of lack of coordination. It makes five points. First, the two "countries" interdependence is quite limited as far as trade and income flows are concerned. Second, on the contrary, financial interdependence is intense. Third, and consecutively, Europe has little incentive to stabilize its terms of trade vis a vis the US and would rather attempt to stabilize its real interest rates. Fourth, if the US take the initiative of a sharp change in its policy mix, it is by no means obvious that Europe's best course of action is to reciprocate if the US may then react. Fifth, as Europe is not a single country, the asymmetry between strong and weak currency countries allows the former to control their interest rates and leaves the latter in a more exposed situation. The policy conclusion for the current situation is that Europe is not likely to be willing to take much action to solve the existing world imbalances for the sake of helping out the US. The paradox is that the domestic situation of most European countries warrants the fiscal expansion called forth by a coordinated solution.

1 - INTRODUCTION

The large dollar swings which occured since the late seventies offer a real-life case of absence of policy coordination. Whether the dollar was appreciating or depreciating, the US authorities have been accused of benign neglect and the Europeans have complained bitterly. While the reasons behind the dollar swings are not yet fully accounted for, there is a strong presumption that US policies played a major part in three stages: tight money in 1979-1982, fiscal expansion in 1982-1985 and relaxed money since 1985. Of course, the dollar would never have moved as much if other countries had adopted similar policies as those of the US, so that the absence of strong reaction in Europe (and Japan) must also be taken into account. Indeed, the apparent lack of coordination must be a crucial part of any explanation.

The situation could be another illustration of the famous battle of the sexes. The US wanted to go to theatre, Europe to opera and both would have been better off going together. Each one blames the other for a poor evening and one is tempted to impartially blame both. In the US, many consider that the superior macroeconomic performance of the US is a proof that the theatre offered a superior show and that the Europeans have only themselves to blame (see e.g. Blanchard, 1987). In Europe, there is a feeling that the show at the theatre started well but ended up badly and that the US must now figure out how to deal with the consequences of black October 1987.

This paper takes a European view of these events. The purpose of this paper is to discuss this clash from a European angle, i.e. taking the US policy shifts as given, assessing their effects on the European economies and investigating the possible policy responses. Section 2 briefly contrasts

the policy stance in the US to the European one. In the Section 3, I first look at the channels through which the dollar swings affect Europe. The main point is that the relative price, income flow and inflationary effects are all limited because the two sides of the Atlantic are relatively closed, with modest direct trade interactions. On the other side, financial linkages are powerful and that is where most of the game is being played. This sets the stage for Section 4 where I discuss what were Europe's options when the dollar started its ascent in late 1979. Many observers have found Europe unreasonably passive. It is not clear that a more aggressive response would have benefited Europe, neither in the short nor in the long run. It is not clear either that the EC could have reacted aggressively given a number of asymmetries between its member countries. This is the central issue of Section 5. Furthermore, and this is discussed in Section 6, it is possible that there never was much of an option anyway because of the overwhelming power of the financial forces at work. Section 7 concludes with a discussion of the current situation. Now as in the early eighties, incentives for cooperative action with the US are relatively weak. This does not mean that there is not a strong case for a European expansion. This case, however, rests on Europe's own internal conditions. If there is to be real breakdown of cooperation, it is to be found within Europe.

2 - THE POLICY SETTING

Both the EC and the US have similar size, with 1986 GDPs of, respectively, ECU 3 509 billions and 4 225 billions. Both are equally relatively closed, with import/GDP ratios standing at 9.5 % and 10.2 % for the EC and the US respectively. Yet financial integration is fairly complete. Finally both

countries faced similar macroeconomic conditions at the beginning of the eighties with relatively high inflation and unemployment around 6 %. The current account was not an issue on either side of the Atlantic and while the EC was facing budget deficits, the net public debt was still, on average, comfortably modest and of the same order of magnitude as in the US.

The main affair of the early eighties has been the fight against inflation. With very few, short-lived, exceptions (France in particular in 1981-82), all governments shared the view that the slow and relentless rise in inflation, started in the sixties and culminating in two oil shocks, had to be stopped and reversed.

> "All of the seven are now sitting on the same side of the boat, leaning away from inflation. The range is huge: from Japan's tiny 3 % inflation since a year ago (the by product of last year's rising yen) to Italy's 13 %. But every government is nervously watching the level rise. If all respond with a monetary and fiscal squeeze, the world will be lucky to avoid tipping over into quite marked recession [...] Demand management has been virtually voted out of the summiter's dictionary"
>
> The Economist, June 2, 1979

The effort has produced its effects, and the gains are very similar in the EC and the US. It has involved a marked slowdown in GDP growth, with many instances of outright recessions. While the timing has differed from country to country, growth performances are now very similar (see Table 1). In these respects, the overall performance of the EC and the US is almost identical.

This similarity, however, conceals serious divergences, and indeed much of the stock market plunge of late 1987 reflects the view that these divergences are unsustainable. The first difference concerns unemployment. While unemployment has moved cyclically in the US, where it was by late 1987

at about the same level as in 1979-80, it has steadily risen in the EC (with the notable exception of the UK recently), more than doubling between 1979 and 1987. This difference is most likely rooted in the structural problems of Europe and largely unrelated to the dollar. Accordingly, it is not an issue relevant to this paper.

[Table 1 about here]

The second difference concerns the policies which have been used in the fight against inflation. While monetary policy has been, at some point in time at least, restrictive everywhere, the role of fiscal policy has widely differed. The similar buildup of net public debts in the US and in Europe is the outcome of two separate processes illustrated in Table 2. In Europe, debt growth is the result of early deficits. As measured (imperfectly) by the structural budget balance net of interest payments, fiscal policy has turned increasingly restrictive since 1979 (with, again, the exception of the UK where a relaxation has occured as early as 1983). In the US, debt growth has accelerated since 1979 as fiscal policy has become more expansionary. The result is all too well-known: the US now face a growing public debt problem, while this is (or should be seen as) largely a non-issue in most European countries (Italy and Belgium differ quite seriously in this respect).

This important divergence has had international repercussions. One of them concerns the current account. The EC, as a whole, has moved from a small deficit to a small surplus, while the US has moved from a small surplus to a reasonably large deficit. The second major difference is the exchange rate. The ECU-dollar exchange rate has risen from 0.69 in late 1979

to 1.48 in March 1985 - a 47 % depreciation of the ECU - and then declined to 0.78 by January 1987 - thus almost returning to its earlier value. This is not to assert that the evolution of the current accounts and of the exchange rate are uniquely and directly related to fiscal policy divergences. But at least part of the dollar swing can be safely ascribed to the clash between a tight-money, tight-fiscal policy stance in Europe and a three-staged tight-money, easy-fiscal, easy-money policy stance in the US.

[Table 2 about here]

3 - WHICH DOLLAR PREDICAMENT FOR EUROPE?

In this section, I set the stage for the analyses which follow. The focus is on what happened in Europe when the dollar went through swings since 1973. When referring to Europe, in fact I consider the European Community (EC). This is partly for data availability, but not only. At least since the creation of the EMS in 1979, most EC countries have operated within the constraints of a fixed exchange rate regime, (the exceptions being Britain and the recent EC members). [1] Another reason to consider the EC as a block is the intensity of intra-EC trade relations, as opposed to the EC's relatively small degree of openness vis a vis the rest of the world. As shown on Table 3, intra-EC trade represents close to 60 % of all exports. Finally, the EC countries account for 82 % of total OECD Europe GDP.

1. In fact, ever since 1973, these same countries have attempted to steer their currencies together. While the "snake" arrangement did not quite succeed, it still represented a joint effort.

[Table 3 about here]

3.1. The dollar is an outlier

Figure 1 presents nominal effective exchange rates for some European countries and the US. The dollar does not stand out; indeed all currencies have considerably fluctuated since 1973. The picture changes, though, when we look at bilateral exchange rates vis a vis the dollar on Figure 2: all European rates seem to follow a similar pattern, which of course is simply the mirror image of the dollar movements apparent on Figure 1. Yet, between the Italian Lira an the Deutsch Mark, there is still a wide range of variation, which would still not single out the dollar completely. These differences are almost entirely due to inflation differentials, as Figure 3 shows: real bilateral exchange rates of European countries vis a vis the dollar move almost identically for most of the period (with the possible exception of the Dutch Guilder during the Snake period). It now becomes clear that it does make sense to separate out the dollar from European currencies. Yet, it is not clear that the large fluctuations in real bilateral exchange rates reflect mainly a "dollar problem". Figure 4 makes that point. European real effective exchange rates have remained remarkably stable, being confined within a $\pm$ 10% band since 1973. Further a large part of their movements reflect what happened with the dollar which clearly stands out.

[Figures 1, 2, 3, 4 about here]

Given the wide swings of the dollar, the next question is why would that matter for Europe? Any reasonable model would identify four main channels: 1) relative competitiveness in trade flows; 2) the associated macroeconomic income flows; 3) absolute price movements affecting inflation rates. These channels are reviewed in the following sections; 4) financial effects due to interest rate movements.

3.2. Trade Effects

The main conclusion from Figure 4 is that the US price competitiveness has been reduced by at least 40 percent between late 1979 and early 1985, only to be restored between early 1985 and late 1987. While short-lived movements in relative prices are not necessarily expected to produce meaningful trade effects, the sheer size and duration of the real appreciation of the dollar suggests that we are dealing with a non trivial evolution. Table 4 presents the evolution of the relevant market shares in manufacturing. The first observation is how small these market shares generally are. The second observation is that, while market shares have moved as theory would like them to move (a decline of US market shares in Europe and an increase of European market shares in US), the movements from 1981 to 1985 have been small and generally failed to offset the opposite changes which occured between 1979 and 1981.

[Table 4 about here]

Of course, this discussion only deals with direct bilateral exchanges and may miss most of the action, namely US-European competition on third

markets. Table 5 confirms that the global picture does not tell a different story. The US share of OECD worldwide exports (excluding intra-EC trade) has declined from 1981 to 1985, but was then still higher than in 1979. The export shares of the EC have declined by a mere 1 percentage point from 1981 to 1985.

[Table 5 about here]

The conclusion to be drawn is that huge real exchange rate swings deliver minute relative trade effects. There are two broad explanations. The first one suggests that trade relations are highly plastic: hysteresis effects (Krugman and Baldwin (1987)) guarantee limited effects. Another explanation emphasizes the lag of trade responses and suggests that sharper movements might have occured had not exchange rates turned around. This may be true, but the point is that exchange rates did turn around before too much had happened, and that may be more than sheer good luck. Apparently, exchange markets react before trade is seriously disrupted.

The implication is that, at least for trade purposes, concern with exchange rate movements among large industrialized blocks is likely to be overblown. This is not to deny that particular industries or corporations may be seriously affected. At the aggregate level, though, it is hard to escape that conclusion.

3.3. Income flows

The manufacturing market shares studied in the previous section do not exhaust all the possible income and output effects of exchange rate

movements. Other possible channels include trade in services, the effects of term of trade changes on income, wealth and spending, and the cumulative impact of the income multipliers. Figure 5 does not suggest that the conclusions reached so far should be modified. The EC growth rate appears to have risen while the dollar appreciated, and then edged downwards as the dollar depreciated. As for the US growth rate, it nicely fits the now standard decomposition: a Volker contraction followed by the Kemp-Roth fiscal expansion.[2] The exchange rate movements appear to be a by-product very much along the lines of the standard Mundell-Fleming model. Certainly, the dollar appreciation probably offset part of the impact of US macropolicies, but these must have been of a second order of magnitude.

[Figure 5 about here]

These findings conform well to the tenuous links shown in Tables 3 and 4 and to simulation studies which bring together the various channels at work, such as Oudiz and Sachs (1984) or The Brookings Workshop designed to compare several large macroeconomic models. For example, the average effect on the US current account of faster growth in all of the rest of the world (not just Europe) is shown in Table 6. With a world GDP up by 3% above the baseline (after 5 years), the US current account is improved by 0.4% of US GDP, which is quite small relative to the own effects of US policy actions.

[Table 6 about here]

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2. See Blanchard (1987).

3.4. Inflation effects

A large body of literature considers the possibility of attacking inflation through a policy of real exchange rate appreciation. A standard implication is the beggar-thy-neighbor aspect of such a policy (see e.g. Sachs, 1983). Indeed, Europeans have much complained about the inflationary impact of the dollar appreciation, likening it to a third oil shock. There are several possible linkages involved. First is a direct effect of US imported goods. Given their modest size in European final or intermediate spending, this channel cannot be expected to play any major role. A second linkage emphasizes the demand pressure which follows a shift in world demand away from US goods. A very sizeable part of this shift is likely to affect Europe which, along with Japan, is a natural place to look for substitutes. The conclusion of the previous section suggests that this switch has probably been of a limited magnitude. A possible measure is the shift in the US and European current accounts: between 1979 and 1986 the US current account has worsened by 3.5 % of its GDP, while the EC's largest improvement, between 1980 and 1986, represents 2.5 % of its own GDP. It would require Europe to operate under very tight capacity constraints for such a shift, spread over several years, to play any major role. Indeed, recent evidence (see Dreze et al., 1987) suggests that European capacity has gradually adjusted downward towards a rather anemic demand over this period. Thus, this channel cannot have had a significant effect.

The third possible channel is based on the fact that a large proportion of commodities are priced in dollar. Accordingly, if their dollar price had remained unchanged, once translated in local currencies it could have had a significant impact on European costs of production, yet, not one for one.

Indeed, simple reasoning suggests that in the absence of any other disturbance, the price of commodities should remain unchanged vis a vis the world price level: it should rise in ECU terms and decline in dollar terms. This is indeed what happened as seen on Table 7 below.

[Table 7 around here]

Working against these channels is the behavior of profit margins. As noted by Krugman and Baldwin (1987), at a time of appreciating dollar, European exporting firms may well take up some of the effect through improved profit margins, allowing them to keep prices lower on their home domestic markets. This would work toward moderating the inflationary impact of a dollar appreciation, and the disinflationary impact of a dollar depreciation.

The foregoing discussion implies that the overall effects of the dollar swings on Europe's inflation may well be of second order of magnitude. Figure 6 shows that inflation has steadily declined on both sides of the Atlantic. The two curves' parallel evolutions confirm that disinflation has proceeded undisturbed by the dollar swings. But have policies been restrictive both in the US and the EC? Figure 7 presents the unemployment rates in the US and the EC. While Europe's overall policy stance has evidently been mainly directed at fighting inflation, US unemployment peaked in 1982 and its subsequent decline did not lead to a resumption in inflation. If the US has indeed been able to export inflation, has the EC imported some of it?

What the EC may have imported is either outright inflation or the incentive to take stronger anti-inflationary measures. The result would be a

worse inflation-unemployment trade-off (assuming that such a trade-off exists in the short run at least). Figure 8 presents some informal evidence by relating changes in sacrifice ratios to real exchange rates. Sacrifice ratios, a crude measure of the unemployment costs of fighting inflation, are the ratio of the cumulative change in unemployment (starting from a base period) to the decline in the inflation rate. The figure shows sacrifice ratios for the US, Germany, France, the UK and Italy computed for two sub-periods: 1975-1979 and 1980-1985. For each country, an arrow shows how these ratios have changed. In the US the trade-off improved dramatically, while it worsened in Germany and the UK. Italy's trade-off improved as the Lira appreciated in effective terms vis a vis the other EC countries.

[Figures 6, 7 and 8 about here]

A more formal test is presented in Table 8. For the EC and the three largest countries, the inflation and unemployment rates were regressed on 4 lags of themselves and each other, and on the real exchange rate vis a vis the dollar. Table 8 only reports the estimates for the real exchange rate coefficient.[3] There is some (weak) evidence that a real depreciation vis a vis the dollar lowers the unemployment rate in France, the UK and the EC as a whole. The case of Germany is suspicious as a real depreciation vis a vis the dollar seems to increase unemployment. The effect is very small: if the coefficient were equal to minus unity, a 10% real depreciation would reduce the unemployment rate by one tenth of a percentage point. On the other side,

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3. Up to 4 lags were also tried on the real exchange rate. The results are very similar, both for the sum of the estimated coefficients and the significance level.

there is no significant effect on inflation rates (with perverse signs in the case of France and the UK).

[Table 8 about here]

3.5. Financial linkages

The discussion, so far, has turned up only very limited dollar effects of the dollar on Europe. At the heart of these results lies the relative closeness of the EC and the tenuous direct US-EC trade links. Financial linkages are of an altogether different nature. While it is tue that several European countries have operated during this period under capital controls, there is evidence (Claassen and Wyplosz (1982), Giavazzi and Pagano (1985)) that these controls exert only short-lived influences. These recurrent effects have only provided limited and sporadic protection against very tight financial linkages.

Overlooking the role of capital controls therefore, the discussion is organized around the interest parity condition written in real terms:

$$r_t - ({}_tq_{t+1} - q_t) = r^*_t \qquad (1)$$

where r and r* are, respectively the European and US real interest rates, q_t the (log of the) real exchange rate (ECUs per dollar) and ${}_tq_{t+1}$ the one period ahead market expectation. In principle, a risk premium term should be added. Empirical work on this issue (see Frankel (1986a), Hodrick and Srivastava (1984), (1986), Frankel and Meese (1987), among others) has yielded uncertain results. There seems to exist a small, highly volatile,

risk premium. However, failure to explain its behavior by policy-related variables can be used as a justification for omitting it in policy-oriented discussions.[4]

The parity condition (1) is a good starting point to consider the policy options. When the US decides on policies which lead to an increase in r^*, taking ${}_tq_{t+1}$ as given, Europe (and the rest of the world as well) faces the choice of an equal increase in its own real interest rate or a real depreciation, or any combination of both. The preceding discussion has shown that Europe remains relatively immune to real exchange rate changes. Movements in the real interest rates, on the contrary, are likely to entail considerably more powerful effects. Real interest rates directly affect stock prices and investment, intertemporal choices relevant to consumption and saving, income transfers between net lenders and net borrowers. They also affect the dynamics of the public debt by worsening the budget deficit. Thus they tighten the government constraint, with implications for taxation and public programs. It is quite obvious, then, that interdependence between the US and Europe works primarily through the financial link.

4 - EUROPE'S POLICY OPTIONS

4.1. Stylized facts

The previous characterization of US-European relationships will be used to review Europe's policies in the eighties. The main conclusions reached so

4. However it is quite possible that the premium is influenced by unobserved expectations about future policy action. In that case, omitting the risk premium would be a serious limitation.

far are briefly summarized. First is the relative unimportance of trade and income flows in comparison to financial links. Some transmission of inflation has been found. Second, three times since 1979 the US have changed their policy mix: tight money in 1979, easy fiscal policy in 1982 and an easing of monetary conditions in 1985. Each time, it has been a US initiative largely motivated by domestic considerations, leaving Europe (and the rest of the world) with the option of reacting, not sharing in.

The first point allows to simplify the analysis but organizing it around the parity condition (1). In practice I will use it to overlook the distinction between monetary and fiscal actions, subsumming them to the behavior of US real interest rates. This simplification is a priori misleading because US real interest rates may rise for two very different reasons: a tightening up of monetary policy or a fiscal expansion. Obviously, the income flow effects will differ drastically in these two instances. The excuse for ignoring this difference is, of course, the view that income flows are only of second order of magnitude.

It might be tempting at this stage to conclude that the best course of action for Europe, when faced with a rise in the US real interest rate, is to give up on the real exchange rate and concentrate on controlling its own real interest rate. This could be seen as a variant of the principle of effective market classification proposed by Mundell (1962). Figure 9 presents an ex-post measure of the short-term (i.e. three month) (Euro-) interest rates in the US, Germany and France. The ex-post returns are, of course, a very improper measure of the true ex-ante rates which actually matter. Using published forecasts by DRI, I have constructed a series of short-term real interest rates shown on Figure 10. Summary figures are given in Table 9. There is an indication that real short-term interest rates have

increased in the US, France and the UK. The results for Germany are more ambiguous, if only because Germany already had relative high interest rates in 1979-1980.[5]

[Figures 9 and 10 and Table 9 about here]

These stylized facts are now well established and have led to stylized policy options. Blanchard and Dornbusch (1986) and Dornbusch (1986) have suggested that Europe should have matched the US stance. Europe's passivity is seen as having allowed the US to deflate and expand simultaneously, forcing upon Europe a new "supply shock". Sachs (1983) has provided a static analysis of monetary policy interactions which confirms this view. However, when dynamic aspects are brought in, sharp and simple conclusions no longer survive as yesterday's dollar strength is mirrored in tomorrow's weakness. Accordingly the gains of the US and the losses of Europe are only temporary and are eventually swapped back. Leaving aside temporarily these difficulties, it is worth adopting the static framework and investigating whether Europe can be faulted with a policy mistake.

4.2. A static framework

A generic model based on the recent literature on policy coordination (see e.g. Canzoneri and Gray (1983), Sachs (1983), Hamada (1985)) is presented in Appendix 1 and its implications drawn on Figure 11. It describes two identical countries faced with initial inflationary conditions (a reasonable

5. Similar numbers have been presented by Blanchard and Summers (1984).

point of departure for the EC and the US). Both governments dislike unemployment and inflation. Their only policy instrument is the real interest rate.

As both real interest rates are linked via the parity condition, the two countries are interdependent. One country's real appreciation amounts to exporting inflation and importing unemployment. This trade-off, achieved via an increase in the real interest rate relatively to the other country (and holding exchange rate expectations constant, thus losing all dynamic considerations), is represented by the reaction lines $R^E R^E$ for the EC and $R^{US} R^{US}$ for the US.

The intersection of $R^E R^E$ and $R^{US} R^{US}$, the Nash equilibrium point N, is the outcome when each country acts to protect its own interest. For Europe, the overall best solution (bliss) corresponds to point B^E where both inflation and unemployment are at their target levels. The US bliss point is B^{US}. Clearly the US would like Europe to expand its money supply to obtain a disinflationary effect via the dollar appreciation, as well as a fall in unemployment thanks to Europe's expansion, aided if need be by a reduction in its real interest rate r^{US}. A global dictator would pick point C, where no country export inflation and both do their share of the adjustment.

4.3. A policy mistake ?

The lack of (visible) coordination between the US and Europe over the period under review, would suggest either that both countries settled for the non-cooperative Nash solution or that one country, the US, exercised leadership, selecting a point along Europe's reaction line $R^E R^E$. But for the dollar to appreciate, given the future real exchange rate, we need (in this model)

that $r^{US} > r^{E}$: we must be above the 45° line in the symmetric case shown on Figure 11. That would imply that Europe is not on its reaction line, (or, worse, on this line beyond point N). Since the reaction line is the best that Europe can achieve for a given US real interest rate, a dollar appreciation looks like a policy mistake.

Before accepting this view, however, one must think about the assumptions involved in the analysis. The Nash solution can be understood as the outcome of two processes (see Johansen, 1982). Either we assume both governments to be very sophisticated: they understand fully each other's option, how one reacts optimally to the other one, and conclude that the best possible non-cooperative outcome is the Nash solution. Or else they proceed by iterations, reacting optimally to each other's move until they reach the Nash point. It is not clear that either story can account for the facts. We are looking at a one-time major shift in policies, so that the iterative explanation is ill-fitted for the task. Similarly, the view that governments have explored in detail all the possible reactions of the other players to discover the Nash solution may well credit them with more foresightedness than is reasonable.[6]

Consider instead the best policy option for the US under the assumption that Europe will do nothing, so that $r^{E} = 0$. Clearly, the US would chose point A on $R^{US}R^{US}$. But what could Europe then do? Given the US choice of r^{US}, clearly Europe should retaliate and raise r^{E} until point A' is reached:

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6. Given, in particular, that both the US and Europe are quite closed economies, it is doubtful that so much thought was devoted to international reactions to policy moves primarily aimed at domestic targets. In particular, the early Volker contraction in the US, while recognizing the dollar implications, was driven by domestic considerations. (And it seems that those who engineered the post-1981 fiscal expansion never quite understood its exchange rate effects).

Europe's welfare is improved as shown by the iso-utility curve closer to the bliss point B^E. But is that a smart move? Only under the assumption that the US will not retaliate. Of course, the US is considerably worse-off at point A' and has every incentive to retaliate by raising further r^{US}. This is the familiar route which leads through successive retaliations to the non-cooperative solution at point N. But is is not clear that, from Europe's point of view, point N is superior to point A (indeed, with the model in the Appendix, the result is ambiguous). Therefore, Europe may be better off by accepting point A, off its reaction line, than to initiate a process of successive retaliatory actions which will ultimately lead to point N.

The argument can be generalized. Conditional upon the possibility that the US takes the initiative and moves to point A, Europe's best interest may be best served by not reacting fully all the way to point A'. Smaller increases in r^E will help from the European viewpoint and may be accepted by the US as the counterpart of the fait accompli that it created. Points like A" describe such outcomes and they lie comfortably close to the fully coordinated solution at point C.

[Figure 11 about here]

4.4. A smart move?

There is some paradox in the foregoing argument, though. A standard analysis of US leadership would not suggest that it would choose point A. Leadership is instead interpreted as choosing r^{US} such that the best that Europe can do is exactly what the US wants it to do. Graphically, this means choosing a point along Europe's reaction line. But any point along $R^E R^E$ corresponds to

a rate of interest lower in the US than in Europe, hence to a dollar depreciation. The fact that the dollar appreciated seems therefore to rule out an interpretation stressing the US leadership in the normal sense. More paradoxically, the dollar appreciation is entirely consistent with a European leadership. By choosing a moderate increase in its real interest rate, Europe would have left the US with the best option of rising more its own rate as at point L^E. If indeed point L^E were to represent the actual outcome of the early eighties, Europe should be credited with a smart strategy, given that the US availed itself the advantage of a first mover.

4.5. Intertemporal complexities

All of the discussion so far has been conducted within an explicitly static framework. This is quite troublesome as it misses the essential considerations which dominate the policy questions of the latter part of 1980s. A real appreciation has to be followed by a period of real depreciation. That such a swing is unavoidable follows from a large number of models[7] and seems to be quite vindicated by the post-February 1985 evolution of the dollar. The implication is that the particular see-saw movement of the dollar and European currencies must be looked as an inter-temporal trade-off.[8]

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7. It was stressed early on in the case of the Pound by Buiter and Miller (1982). Among the many authors who have discussed this point, see Sachs (1983), Sachs and Wyplosz (1984).

8. Unfortunately, the dynamic counterpart to the static analysis presented above is very complex. It has been conducted so far through simulation experiments so that no general results are known.

The see-saw movements in the dollar may be rationalized on two counts. The first one is a difference in the rate of time preference. If the US is more impatient in solving the inflation problem, it may make sense for Europe to accept importing initially some inflation. There must be an agreement that Europe will be paid back, both capital and interest. This may involve a deeper depreciation of the dollar, or a longer period of dollar undervaluation if that is what Europe cares about. This argument is not convincing. Not only do differences in time preference have little justifications, but there is the serious problem of time inconsistency and enforceability. The second argument would be that a policy of appreciation-first depreciation-next is more efficient in the US than in Europe. One is tempted to think about downward price and wage rigidities. An appreciation can then trigger a virtuous circle if the economy is widely indexed. Conversely a depreciation allows for real producer wage reductions in an economy with sticky nominal wages. The problem with this view is that it is Europe which has (had) the most widespread indexation schemes and the US which seems to enjoy more nominal wage rigidity. On this count, the real exchange rate swings should have gone the other way around!

Finally, the fact that real exchange rate imbalances must eventually be reversed can be seen as one explanation of Europe's possible passive stance. Indeed, matching the US interest rates in the early 1980s to reach a situation of excessive world contraction (point N on Figure 11), may make no sense when the benefits are "only" in intertemporal shifts. A more moderate stance all along may then appear as a rational response.

5. EUROPE'S DIVISIONS AND THE ROLE OF THE EMS

What difference does it make that the EC is not one single country with one single government and one single currency? Several authors (see e.g. Giavazzi and Giovannini (1986), (1987), Melitz (1987), Fischer (1987)) have argued that the EMS operates as a DM zone. The exact content of this assertion is not altogether settled. A common version is that Germany manages the DM-dollar exchange rate, leaving to the other countries (apparently including the UK since 1985) the task of pegging to the DM.

5.1 Sources of asymmetry

A first reason for asymmetry emphasizes the pattern of substitutability among assets denominated in different currencies. This view has been explored by Giavazzi and Giovannini (1986). Because of the existence of capital controls, local financial regulations or other national restrictions, assets in other European currencies are presumed to be less substitutable to the dollar than the DM. Accordingly, any disturbance on the dollar strongly affects the DM with more limited, and possibly indirect, effects on the other EMS currencies. Based as it is on well-established institutional characteristics, this view must evidently have an element of relevance. Its relevance, however, is not well established.[9]

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9. Frankel (1985) finds a theoretical contradiction between the assumed pattern of substitutabilities and the exchange rate movements to be explained. Empirically, Giavazzi and Giovannini (9185) could not detect supporting evidence.

A second reason for asymmetry has been presented by Giavazzi and Pagano (1987), Giavazzi and Giovannini (1987) and Fischer (1987). It is based on Rogoff's (1985) idea that a country may benefit from appointing a central banker with a stronger aversion to inflation than society. The application of this principle to the EMS is natural: an inflation prone country can achieve the same kind of restriction by entering in a fixed exchange rate arrangement with a country pursuing more anti-inflationary policies. Inflation-prone countries like France and Italy thus "borrow" the Bundesbank reputation by entering into the EMS. Implicitly, therefore, the inflation-prone countries accept a German leadership. This view is quite intuitive but it requires the existence of an unescapable and credible loss in case of misbehavior. The claim is that the EMS works by imposing realignments short of PPP, so that the competitiveness of inflation-prone countries is eroded from devaluation to devaluation. A variant of this argument is that the rate of depreciation is a priori imposed by the EMS on its members: countries with higher inflation rates face the choice between reducing their inflation or continuously losing competitiveness. There are three problems with this. First the empirical support is tenuous as can be seen on Figure 4. Second, such a system would be unstable since inflation-prone countries would permanently lose competitiveness, unless they become for a while the lower inflation members of the EMS, a feature with no empirical support obviously forthcoming. Third, there is always the option of leaving the EMS if the punishment is too harsh. A more serious reason to doubt this explanation is that it would be surprising that countries find it preferable to adopt a foreign Central Banker, rather than designing their own institutions. A solution based on foreign restraint may be acceptable temporarily when inflation is the over-riding policy objective, so that the Central Bank has

no other valid concern and need not care about other types of disturbances.[10] As a permanent arrangement, it runs the risk of removing a minimum of ability to respond to country-specific disturbances and therefore may not be a durable welfare-enhancing system.[11]

A third possible source of asymmetry, often used to criticise the Bretton-Woods system, has apparently not been articulated in the case of the EMS. Under a fixed exchange rate system, a country with more than average inflation must eventually run into current account deficits and, sooner or later, this must lead to overall balance of payments deficits and a loss of exchange reserves. Conversely, a country with less than average inflation must eventually accumulate reserves. Because of the obvious difference between the two situations, the less inflationary country may enjoy a strategic advantage over the more inflationary country. The more complex design of the EMS was intended to break this asymmetry: divergence thresholds, joint obligations to intervene and illimited short-term borrowing facilities at the limit of the margins of fluctuation were all meant to establish an even situation. It is therefore puzzling that, in this respect, the EMS may have failed.

The symmetric EMS intervention rules are not well adapted to the particular situation which emerges at a time of balance of payments crises. When a realignment is perceived to be imminent, the volume of funds which can be thrown in a speculative attack would be unbounded in the absence of

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10. It is interesting to note that successful experiences with hyperinflation (e.g. Germany in 1922, France in 1926, Israel in 1985) relied on a domestic institution. Attempts to peg to a foreign currency (Chile in the 1970s, Argentina) have all failed.
11. Current strains within the EMS may reflect the fact that the de-facto German leadership is losing its appeal as concern is shifting away from inflation.

restrictions to capital movements. This is the reason why capital controls are perceived to be a crucial ingredient of the EMS (see Giavazzi and Pagano (1986), Wyplosz (1986)). Interestingly enough, capital controls only exist in devaluation-prone countries.

In normal, quiet, periods, the EMS functions as a symmetric system, but then it is barely needed at all. The crucial periods are crisis periods when realignments may occur with a non-zero probability: the asymmetry resurfaces and low inflation countries are in a position to resist speculative pressures much longer than high inflation countries. Because this is the time when the system becomes relevant, this sporadic asymmetry is of permanent strategic importance.[12]

The issue can be illustrated with a very simple two-country model. In the short run relevant for a crisis period, prices are irrelevant and assumed to be constant and normalized to unity. The money equilibrium conditions are:

$$M = R + D = - a\ i \tag{2}$$

$$M^* = R^* + D^* = - a\ i^* \tag{3}$$

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12. It may provide an alternative explanation to the observation by Giavazzi and Giovannini (1987) and Bini Smaghi and Vorra (1987) that France and Italy intervene constantly on exchange markets (the so-called infra-marginal interventions) while Germany limits its interventions to those which are strictly required, i.e. at the margins of fluctuations. The recent September 1987 Nyborg agreement calls for more infra-marginal interventions by all EMS member countries. Characteristically, it has been presented by France as a requirement to better share the burden of a smooth functioning of the EMS.

where R and D are the exchange reserves and domestic credit components of the money base M, i the nominal interest rate. A star denotes the foreign country. The authorities control D and D*. The (temporarily) fixed exchange rate is set at unity, so total reserves are :

$$\bar{R} = R + R^* \tag{4}$$

When an exchange rate realignment ε comes to be expected, the interest parity implies :

$$i = i^* + \varepsilon \tag{5}$$

Then we have :

$$i = -(\bar{R} + D + D^*)/2a + \varepsilon/2 \tag{6}$$

$$i^* = -(\bar{R} + D + D^*)/2a - \varepsilon/2 \tag{7}$$

If both countries want to stabilize their interest rates, they will wish to modify D and D* respectively. If $\varepsilon > 0$ the home country (which is expected to devalue) will want to increase D to limit the increase in i. But the foreign country will want to reduce D* to keep i* up. As what matters for both i and i* is $(\bar{R}+D+D^*)$, clearly this is a zero-sum game in the run-up to the realignment.

If the home country proceeds to increase D, it will lose reserves as :

$$R = \frac{\bar{R} + D^*}{2} - \frac{D}{2} - \frac{a}{2}\,\varepsilon \qquad (8)$$

If the foreign country **retaliates** by reducing D* so as to keep at least (D+D*) constant, this will further reduce R, and correspondingly increase R*. When the market sees R falling, it will increase ε (the expected rate of depreciation increases with the probability of its occurrence and when it is expected to come sooner) and sell-off M against R. In both cases, the home country is in an untenable position with R falling to zero, while abroad R* grows to $\bar{R}$.

The implication is that the home country has little scope for stabilizing its own interest rate, while the foreign country may, for some time, bring down D*, and therefore ($\bar{R}$+D+D*), sufficiently to offset the downward pressure on i of the expected appreciation of its currency.

5.2. The EMS and the dollar

The practical implication of the previous argument is that all of the expected exchange rate pressure is likely to be borne by the depreciating currency, allowing the appreciating country to control its interest rate. As a consequence, matters will look as if the strong currency operates as the anchor of the pattern of interest rates.

Figure 12 shows the dollar values of the FF and the DM around the dates of the 6 realignments which have led to changes in the DM-FF parity since the creation of the EMS. Table 10 presents the standard deviation of one month interest rates on Euro-deposits 50 trading days before and after the realignment. Clearly, four out of these six episodes were a purely internal

EMS affair: 1981, 1982, 1983 and 1986. While these realignments always lead to a depreciation of the FF relatively to the dollar, the relative movement of the DM vis a vis the dollar is not systematic (with no clear direction of change in 1981 and 1983, a depreciation in 1982 and an appreciation in 1986). Yet, in all cases the German interest rate remains essentially unchanged both before and after the realignment. In contrast, the French interest rate shows an enormous amount of volatility before realignments. This asymmetry confirms the anchor role of the strong currency.

The two other realignments (1979 and 1987) appear to have been related to dollar movements. It is noteworthy of course, that in both cases, the dollar was then depreciating sharply. There is no instance when an appreciating dollar forced an EMS realignment - although the Banque de France intervened in 1980 to support the DM.

[Figure 12 and Table 10 about here]

5.3. Policy implications

The previous arguments lead us to consider separately the case of dollar appreciations and depreciations. When the dollar appreciates, it becomes the anchor of the international financial system, the benchmark against all currencies must position themselves. This situation does not add much to the asymmetry which arises at the time of EMS realignments. Judging from the 1982 and 1983 experiences, the expectation of EMS realignments temporarily stops the slide of the DM vis a vis the dollar. The main conclusion is that, in and by itself, the dollar appreciation does not exacerbate the fundamental asymmetry within the EMS. Consequently, as far as the exchange

rate policy is concerned, it does not require any particular policy reaction.[13]

On the contrary, a depreciation of the dollar leaves the DM as the main "strong" currency, possibly along with the Yen. Given that, for example, the fundamental inflation differential between the DM and the FF makes periodic FF depreciation inevitable, the dollar downward trend is bound to lead to the expectation of different rates of change of the dollar vis a vis the DM and the FF. Consequently, any (expected) depreciation of the dollar reactivates the policy conflict analysed in section 4.1. As appears clearly on Figure 12 (in 1986 and 1987), in such instances the pressure on the FF is even more pronounced than on the dollar, a normal implication of exchange rate fixity since it means a foreseeable discrete change in parities. The strategic asymmetry discussed above guarantees the outcome: Germany is able to stabilize its interest rate and is not interested in stabilizing the dollar. France (as well as the other weaker EMS currencies) is unable to pursue a policy which would both lower its interest rate and stabilize the dollar-franc rate (and usually resorts to capital controls in an attempt to recover some control on its internal interest rate, not shown on Figure 12).

6 - NON-EXISTING OPTIONS ?

The line of reasoning, so far, has been that the dollar swings affect Europe via the financial linkages and that this is where the issue of response arises. implicitly, it has been assumed that such a response, if desirable,

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13. There might be other reasons for Europe to react to the dollar appreciation. They have been discussed in section 3. If these reasons were to lead Germany to counteract and restore a strong DM, then we revert to the standard case.

is indeed possible. In this section, I present some arguments which question the possibility of effective policy response.

The channel of interdependence has been identified as the interest parity applied to the real interest and exchange rates. Equation (1) is rewritten as :

$$r_t - r^*_t = {}_tq_{t+1} - q_t \qquad (1')$$

Given an exogenous change is the US real interest rate r*, the question which runs through this paper is what is the best choice for Europe's own real interest rate r. In principle, r can be chosen by Europe provided the implied real exchange rate change $q_{t+1} - q_t$ is accepted. But can such a real exchange rate change be freely chosen?[14]

As is obvious from (1'), the ability to affect r (relative to an exogenously given r*) depends upon the ability to affect the expected real exchange rate q. There is now a significant body of empirical literature on the behavior of q. In a recent survey, Frankel and Meese (1987) note the difficulty to reject the random walk hypothesis for <u>both</u> the real and

14. The question of the ability of monetary authorities to affect the real interest rate has been raised by Shiller (1985) in a closed economy. His conclusion is affirmative but does not consider the additional constraint of integrated international financial markets.

nominal exchange rates.[15] The implication for (1') is quite striking. In the short run, the right hand-side is zero so that $r_t = r^*_t$: there is no short run possibility to affect the real interest rate if markets believe that q follows a random walk. If this interpretation is correct, it might explain Europe's apparent passivity in letting its real rates follow the US lead.

A test of this hypothesis consists in checking whether the real interest rate differential r - r* is a purely random variable. A simple way of performing such a test is to check whether (r-r*) can be explained by its past evolution and by past changes in the real exchange rate. Table 11 presents the results of such tests for Germany, France, and the UK, using the ex-ante real interest rates shown on Figure 9. More lags for both explanatory variables have been tried out but were never significant. The results are mixed. For France, none of the explanatory variables are statistically significant. In the case of Germany and the UK, there is a significant autoregressive component and, in the UK, the lagged real exchange rate change also enters significantly. The relatively small

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15. While this hypothesis is easy to accept in the case of the nominal rate, it is quite surprising for the real rate for at least two reasons. First, quite mechanically, since real exchange rate changes follow changes in both the nominal rate and relative prices, for real rates to follow a random walk, given that nominal rates do, would require a strong restriction on the behavior of inflation differentials. In particular, as it is known that inflation rates are quite strongly autoregressive, the result is quite surprising. Second, a random real exchange rate would imply that the relative price of domestic and foreign goods, or relative competitiveness, fluctuates with no tendency to return to a given level or trend. In their work, Frankel and Meese find that one needs long sample to conduct test with power against the alternative of an autoregressive process with roots fairly close to unity . The interpretation is that the tendency to return to equilibrium is very slow, and not easy to capture in short samples.

coefficient of autoregression (around 0.5) suggests that the room for independence, while existing, is quite limited.

7 - POLICY IMPLICATIONS

7.1. World imbalances and coordination

Table 12 reminds us of the familiar basic world imbalances. Three main conclusions emerge immediately. First, the imbalances are reasonably moderate in size and, while clearly unsustainable, they do not require urgent treatment. Second, the situation has remained virtually unchanged for at least three years, raising concerns that it may remain unattended for some more time. Third, it makes the obvious point that the US current account cannot be improved without a concurrent change in Japan and Europe.

The implication of unsustainability is that something has to happen sometime. The coordinated action looks at the current account as the difference between national income and national spending: in this view, the US need to increase output and/or moderate spending, while Japan and Europe need to reduce output and/or increase spending. In order to choose among these alternatives we need to look at the unemployment situation. The US being close to full employment, the best option is to maintain output and reduce spending, which naturally points to a gradual reduction of the budget deficit and a compensating absolute increase in exports. Japan is facing a moderate level of unemployment and therefore should not aim at lowering its output. Europe faces a historically record high unemployment and needs to boost output, and therefore spending.

The uncoordinated solution occurs when none of these actions are taken. The markets may contribute to resolving current account imbalances by reassigning world spending away from Japan and the EC towards the US.[16] This is done by real exchange rate changes. The uncoordinated solution, however, has two main drawbacks. First, it has to be seen against the background of the US needs to bring down its budget deficits, thus exercising a downward influence on world spending. Exchange rate changes work in the context of non-expansionary situation, moderating the contractionary effects of fiscal stabilization in the US and weakening further the slow growth in the EC and Japan. Second, given the relative closeness of each of the three zones, sizeable effects require very large real exchange rate movements, with undesirable effects as discussed in Section 2.

7.2. Incentives for coordination

The previous section shows that the choice between the coordinated and the uncoordinated solutions amounts to a choice between an expansionary and a contractionary solutions. This choice is not in US hands, since the US has no degree of freedom left given the budgetary situation, at least if we exclude a strong compensating expansion in money supply. So the issue is what can Europe and Japan do, and I focus here on Europe.

An implication of Section 4 is that it is by no means sure that it is in Europe's best interest to match US policy moves. In the situation of the late eighties, this means that Europe has no strong incentive to prevent a

16. The LDCs, the fourth player, can in no way contribute to this process. Their situation requires treatment too, but the issue is beyond the current paper.

dollar depreciation,[17] much as it did not have a strong incentive to prevent the dollar appreciation in the early eighties.

Given that stabilizing exchange rates cannot be a major objective there remains the very real threat of a world slowdown, if not a recession, when US spending contracts as a result of its efforts to reduce the budget deficit. This is the basis for suggestions that Europe should expand, via monetary or fiscaly policy actions, to boost world demand. In the next section I return to this issue from Europe's own vantage point. Here I simply wish to consider what Europe could do for the sake of helping out the US.

The answer is: not much. Or rather, it would require Europe too much of an expansion to have significant effects of the US. The reason is the relatively closeness of both the US and Europe, as documented in Tables 3 and 6. Assuming that Europe's marginal propensity to import is 17%,[18] a 10% increase in Europe's GDP would increase its imports by 1.7% of its GDP, which is about the sie of the US GDP (Table 3). In the most favorable case, all these imports would be provided directly or indirectly - via multipliers and third country effects - by the US. Such a momentous move still falls short of the US current account deficit. A more reasonable case would be a

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17. In the tradition of Mundell and Fleming, this could be achieved either by a monetary expansion, or a fiscal contraction, or a combination of both. It remains to understand why many have asked for a European fiscal expansion as a mean of preventing a fall in the dollar. According to Sachs and Wyplosz (1984) a fiscal expansion may lead to a depreciation with imperfect asset substitutability, when income flows dwarf the financial effects. This does not seem a realistic description of the US-European interdependence.

18. The marginal propensity to import is $m = \partial M/\partial Y = ((\partial M/M)/(\partial Y/Y))\ (M/Y)$ where M and Y are, respectively imports and GDP. $M/Y \simeq 12\%$ and the elasticity $\partial \log M/\partial \log Y$ is shown to be 1.4 in Dreze et al. (1987).

5% reduction (relative to trend) of US GDP matched by a 5% increase of European GDP, with a possibly similar effect on the US GDP. For countries which grow a a rate of 2 to 3% per year, the changes are quite considerable and unrealistic. A more reasonable swing (+ 2% in Europe, - 2% in the US) only improves the US current account by 0.7% of the US GDP. This is better than nothing, but hardly an enthusiastic enough incentive to convince Europe to double its rate of growth if it does not see the need for it, or even fears inflationary pressures.

7.3. Europe's best interest

Europe may not feel that it can achieve much for the sake of world imbalances by expanding demand. This does not mean however that Europe has no reason to expand. Indeed, the bitter irony is that European governments have every reason to expand for their own best interest, irrespective of what it means for the US. There is no paradox or inconsistency here. It is one thing to say that the gains from coordination are small enough not to warrant adapting Europe's policy mix to the needs of the US. It is another thing to look at Europe's own situation and find that what is best for Europe turns out to be what is also best for the US.

Indeed, the same tension goes back to the early eighties. The analysis of Section 4 says that, starting from a situation similar to that of the US, Europe may have been right in not matching the US policy mix shifts. That is not to say that Europe's policy mix has been, and is, right. Indeed, far from simply refusing to follow the US in the post-82 fiscal expansion, Europe has moved to a fiscal contraction. Further, different supply conditions - particularly on the labor markets - should have led to

different policies in Europe. The worsened unemployment-inflation trade-off has led most governments to accept ever increasing unemployment rates. One may then sympathize with the view that fiscal policy has been too restrictive all along given the internal European conditions, and yet argue that mimicking the US on the basis of coordination gains was not an appealing objective.

As for the late eighties, the true paradox is that Europe, with the possible exception of the UK, still fights a vanishing inflation and accepts record high unemployment. The situation has all the aspects of a Pareto inferior situation. Some European expansion would greatly benefit Europe, and help the US a little. The reason for the stalemate is largely a failure of inter-European coordination, not of transatlantic cooperation. Indeed, because of the rather intense trade and income flow links within the EC, which come on top of tight financial links, any significant shift in the policy mix will have to be either coordinated, or spearheaded by the anchor country, namely Germany (this point is developed at length in Dreze et al. (1987)). The most spectacular paradox is undoubtedly to be found in Germany. With inflation safely locked in the range between zero and two percent, the inflationary risks of an expansion are bound to be limited, while the costs of slow growth and high unemployment are considerable. Yet there is no sign that the German authorities are willing to alter their policy mix. As long as they do, the EMS operates as a contractionary constraint on the other countries.

APPENDIX

A Simple Two-Country Model

The following model follows recent models of policy coordination. It assumes that nominal wages are indexed on the consumer price index and respond to unemployment:

(1) $$dw = (1 - a)dp + a(de + dp^*) - bu$$

where w is the log of nominal wages, p and p* the log of the price of domestic and foreign goods respectively, e the log of the nominal exchange rate, and u the unemployment rate.

Domestic prices are set as a mark-up on wages and imported goods:

(2) $$dp = m_1 dw + m_2(de + dp^*)$$

Denoting by q the log of the real exchange rate:

(3) $$q = e + p^* - p$$

We can use (1), (2) and (3) to get:

(4) $$dw = \theta_1\ dq - \gamma_1 u$$

where $\theta_1 = [a + m_2/(1-m_2)]m^{-1}$, $\theta_2 = bm^{-1}$ and $m = 1-m_1/(1-m_2)$

It is assumed that in the initial period, both q and u were at their long run equilibrium levels. Re-interpreting q and u as deviations from these levels, (4) can be rewritten for the current period as:

$$(4') \qquad w = w_o + \theta_1 q - \gamma_1 u$$

Unemployment is driven by aggregate demand. In the absence of active fiscal policy, aggregate demand responds to monetary policy via the real interest rate r and to foreign demand via the real exchange rate:

$$(5) \qquad u = - \sigma q + \mu r$$

Substituting (5) into (4′), we obtain:

$$(6) \qquad w = w_o + \theta q - \gamma r$$

with $\theta = \theta_1 + \sigma\gamma_1$, $\gamma = \mu\gamma_1$

Note that we omit a direct effect of foreign monetary policy (via the real interest rate r*) on domestic demand. Nothing of what follows would change as long as the effect of q on u in (5) is larger in absolute value than the effect of r* which is omitted.

The foreign real interest rate r* affects domestic aggregate demand through the real exchange rate which satisfies the interest parity condition:

(7) $$\bar{q} - q = r - r^*$$

where $\bar{q}$ is next period's expected value of q.

The same equations as (5), (6) and (7) hold for the other country, with the same structural parameters.

The situation is treated as a static game. In the previous period $u=u^*=q=0$ in both countries. What is given then is previous period's nominal wages w_o and w_o^* as well as next period's real exchange rate $\bar{q}$.

Both countries are assumed to minimize a social loss function:

(8) $$L = (u^2 + \beta w^2)/2 \ ; \ L^* = (u^{*2} + \beta w^{*2})/2$$

The interpretation of (8) is obvious and standard. Both governments want unemployment to stay at its long-run equilibrium level, which is assumed to be socially efficient so that deviations in either direction are undesirable. They also want to minimize the variability of wages around a trend which is assumed to be flat and normalized at zero.

The resulting game is represented by Figure 11 in the text. The home bliss point corresponds to:

$$\tilde{r} = - (\sigma/\mu\theta_1)w_o$$

$$\tilde{q} = - w_o/\theta_1$$

which would require that $r^* = -\bar{q} - (\sigma+\mu)w_o/\mu\theta_1$. A symmetric solution describes the foreign bliss point.

Comparison of points A and N

The value of the loss function (8) at the Nash point is:

$$L^N = \beta\mu^2 D w_o^2 / 2(D-A)^2$$

where $A = \sigma(\sigma+\mu) + \beta\theta(\theta+\gamma)$ and $D = (\sigma+\mu)^2 + \beta(\theta+\gamma)^2$

At point A on Figure 11, we have

$$L^A = \beta w_o^2 [\beta\sigma^2(\theta+\gamma)^2 + (D+\theta(\theta+\gamma))^2] / 2D^2$$

These values are computed for $\bar{q} = 0$ and $w_o = w_o^*$. In this example, there is no simple condition for $L^A \gtrless L^N$.

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Table 1. Macroeconomic Indicators: US and Europe

	Europe (EC 12)		US	
	1979-80	1987	1979-80	1987
Real GDP Growth	2.3	2.2	1.0	2.3
Inflation (GDP Deflator)	12.1	4.1	8.9	2.8
Net Public Debt (% of GDP)	21.4	33.5	19.7	30.0
Budget Deficit (% of GDP)				
Unemployment	5.8	11.8	6.5	6.7
Current Account (% of GDP)	- 0.7	0.7	0.3	-3.2

Source: European Economy, 33, July 1987

Table 2. Structural Budget Balances Net of Interest Payments

(% of potential GDP/GNP)

	1979	1980	1981	1982	1983	1984	1985	1986	Change 81-85
US	2.2	1.6	2.6	2.2	1.7	1.7	1.5	1.5	-1.1
Germany	-1.9	-1.6	-1.2	0.5	1.8	1.9	2.5	2.3	+3.7
France	0.2	1.8	0.8	0.4	0.6	1.5	2.4	2.1	+1.6
UK	1.0	3.3	6.6	7.4	5.2	4.7	4.6	3.8	+3.6[a]
Italy	-4.2	-2.9	-5.3	-4.3	-1.7	-2.4	-3.8	-3.0	+1.5

Source: OECD Economic Studies, N° 7, Autumn 1986

Note: a) Change 1979-85 for the UK as the policy shift occured earlier.

Table 3. Europe, the US and the European Community (1986)

OECD Europe GDP	$ 6366 billions
EC GDP	$ 5192 billions
EC's exports to rest of OECD Europe (% GDP)	3.4
EC's exports to the US (% GDP)	2.6
EC's exports to the world excluding EC (% GDP)	11.9
Intra-EC trade (% GDP)	16.0

Sources: GDPs: OECD Economic Outlook. Export Shares: European Economy, N° 33, July 1987

Table 4. Market Shares in Manufacturing

	US Market Share (% of local GDP) in:				
	Germany	France	UK	Italy	Netherlands
1979	1.06	0.99	1.98	1.31	4.26
1981	1.43	1.23	2.04	1.50	5.97
1983	1.25	1.11	2.19	1.06	5.63
1985	1.36	1.12	2.35	1.23	5.62

	European Markets Share in the US (% of US GNP) in:				
	Germany	France	UK	Italy	Netherlands
1979	0.45	0.19	0.32	0.19	0.07
1981	0.38	0.18	0.40	0.17	0.07
1983	0.38	0.17	0.37	0.16	0.08
1985	0.48	0.21	0.37	0.24	0.09

Source: OECD Foreign Trade Statistics and OECD National Accounts

Note: Market share of country i in country j is defined as m_{ij}/y_j where y_j is country j's GDP/GNP and m_{ij} is manufacturing imports from country i to country j.

Table 5. Export Market Shares in Industry

	US	EC 10
1979	15.26	27.04
1981	17.92	26.65
1983	16.49	26.03
1985	15.99	25.60

Source: European Economy, N° 3, July 1987

Note: Ratio of exports to total exports of all OECD countries excluding intra-EC trade. EC10 excludes Spain and Portugal.

Table 6. Simulated effects on the US current account[a]

(Deviations from baseline in % of US GDP)

	Year 1	Year 2	Year 3	Year 4	Year 5
1. World expansion and US change in policy mix	0.2	0.4	0.8	1.3	1.7
2. US change in policy mix	0.0	0.1	0.4	0.9	1.3
3. World expansion alone (line 1 - Line 2)	0.2	0.3	0.4	0.4	0.4
World expansion:					
. GDP growth	1.6	2.0	2.5	2.75	4.6
. US dollar (%)[b]	0.6	-0.8	-2.5	-4.4	-5.2

Source: Brookings Discussion Paper N° 58, March 1987.

Notes: (a) All data are averages of simulations from 5 macromodels. The world increases real public spending by 1% of GDP, money growth is increased by 2% a year. The US cut real public spending by 1% of GDP in year 2, 0.66% in years 3 and 4, money growth is increased by 2% a year from year 2 onwards. (b) A minus indicates a depreciation.

Table 7. Non-oil Commodity Prices in Dollar and ECU

(1980 = 100)

	1979	1980	1981	1982	1983	1984	1985	1986	1987
Price index in dollar[a]	94.1	100.0	89.4	80.6	85.6	87.4	76.0	73.1	75.9
Price index in ECU[c]	95.5	100.0	111.0	114.3	133.7	153.8	139.0	103.7	92.5
Dollar per ECU[b]	98.6	100.0	80.2	70.4	63.9	56.7	54.8	70.7	81.7

Sources: (a) International Financial Statistics, World Non-Oil Commodity. Price Index (76 ax). 1987 is for second quarter. (b) European Economy, N° 33, July 1987. (c) Line 1 divided by Line 3.

Table 8. Effects of the real exchange rate vis a vis the dollar on European inflation (π) and unemployment (U)

	π	U
France	-0.69	-0.24
	(-0.24)	(-1.00)
Germany	2.05	0.71*
	(1.10)	(1.51)
UK	-3.20	-0.63**
	(-0.63)	(-2.02)
EC	2.61	-0.96*
	(1.02)	(-1.41)

Note: t-statistics in parentheses. (*) significant at the 10% level. (**) significant at the 2.5% level. π: rate of change of the GDP deflator. U: standardized OECD unemployment rate. $q = eP^{US}/P$ (index 1978:1=1.00) where e is the dollar exchange rate (European terms), P^{US} is the US GDP deflator, P is the local GDP deflator.

Method: instrumental variables. Instruments: all regressors except the real exchange rate; money base, in levels and growth rates; and ratio of government spending to GDP, in levels and changes. All instruments include the three countries and the US.

Source: IMF and OECD

Table 9. Short-Term Real Interest Rates. Averages of Quarterly Rates

	USA		GERMANY		FRANCE		UK	
	ex-post	ex-ante	ex-post	ex-ante	ex-post	ex-ante	ex-post	ex-ante
1979-1980[a]	4.0	1.8	3.5	3.7	1.4	1.8	-2.3	3.1
1981-1985	7.2	5.6	4.4	3.9	7.0	6.2	5.7	3.5
1986-1987[b]	4.2	3.1	1.8	5.2	6.6	6.1	7.9	7.1

Notes: Ex-post rates use actual annualized inflation over the quarter. Ex-ante rates use DRI forecasts for the CPI as published at the end of the previous quarter.
(a) 1979:2-1980:4 for ex-ante rates; 1980:1-1980:4 for ex-post rates. (b) 1986:1-1987:2 for the USA and Germany; 1986:1-1987:1 for France and the UK.

Sources: Nominal interest rates: begining of period returns on Euro-deposits, from DRI-FACS. Actual inflation: GDP deflators from IFS. Expected inflation: DRI European Review.

Table 10. Standard deviation of short-term interest rates around EMS realignments (%)

		Before Realignment	After Realignment
1979	G	0.5	0.6
	F	0.5	0.4
	US	0.7	1.2
1981	G	0.1	0.3
	F	4.9	1.6
	US	1.3	1.5
1982	G	0.2	0.2
	F	5.6	0.8
	US	0.4	2.0
1983	G	0.3	0.1
	F	24.5	0.9
	US	0.2	0.3
1986	G	0.1	0.1
	F	2.1	0.4
	US	0.2	0.1
1987	G	0.6	0.3
	F	1.3	0.4
	US	0.6	0.1

Source: DRI - FACS

Table 11. The real interest rate differential

(1980:3-1987:1)

Germany SEE = 2.58 DW = 1.92

$$r-r^* = -0.17 + 0.53\,(r-r^*)_{-1} - 0.01\,(q-q_{-1})$$

$$(-0.34)\ (3.39) \qquad -(0.65)$$

France SEE = 3.23 DW = 1.86

$$r-r^* = 0.84 + 0.26\,(r-r^*)_{-1} - 0.03\,(q-q_{-1})$$

$$(1.34)\ (1.57) \qquad (-1.41)$$

U.K. SEE = 2.81 DW = 1.78

$$r-r^* = 0.02 + 0.48\,(r-r^*)_{-1} - 0.06\,(q-q_{-1})$$

$$(0.00)\ (3.17) \qquad (-2.82)$$

Notes: Seemingly unrelated regressions of the ex-ante real interest rates. r is the real interest rate on 3 month Euro-deposits; r* corresponds to Euro-dollar deposits. q is the (log of) real exchange rate vis a vis the dollar.

Table 12. World imbalances (% of GDP)

		Savings-Investment	Current Account	Budget Deficit
USA	1985	0.6	-2.9	3.5
	1986	-0.1	-3.5	3.4
	1987	-0.7	-3.3	2.6
Japan	1985	4.9	3.7	1.2
	1986	5.3	4.3	1.0
	1987	4.0	3.5	0.5
EC12	1985	5.6	0.5	5.1
	1986	5.9	1.2	4.7
	1987	5.0	0.9	4.1

Source: European Economy, N° 30, November 1986

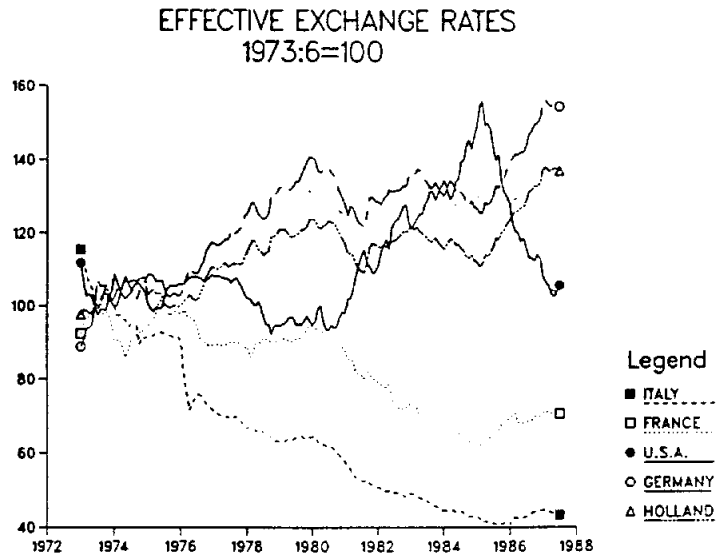


Figure 1.
Source: IFS

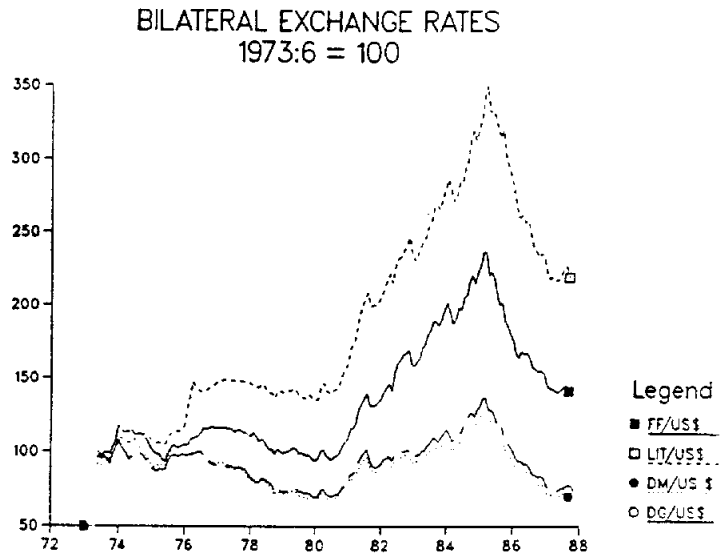


Figure 2.
Source: IFS

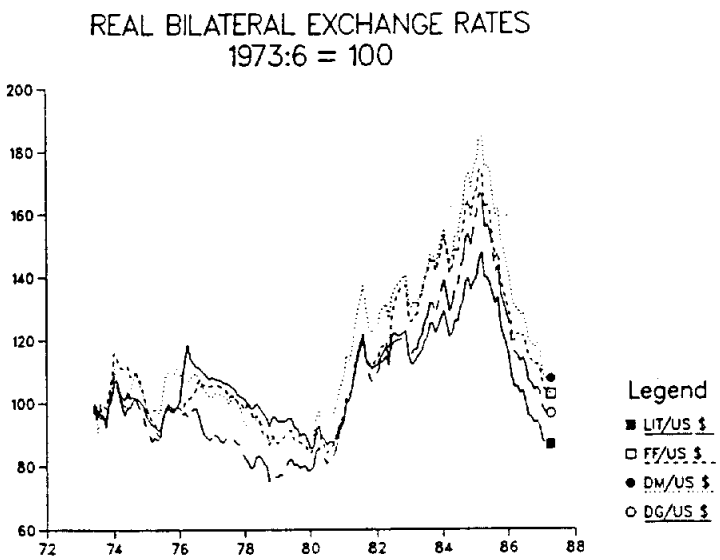


Figure 3.
Source: IFS

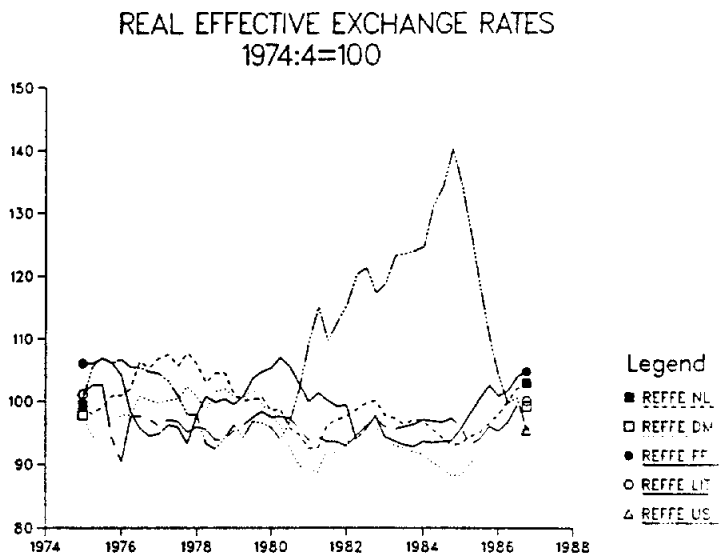


Figure 4.
Source: IFS

US REAL EFFECTIVE EXCHANGE RATE & REAL GNP GROWTH IN THE EC & THE US

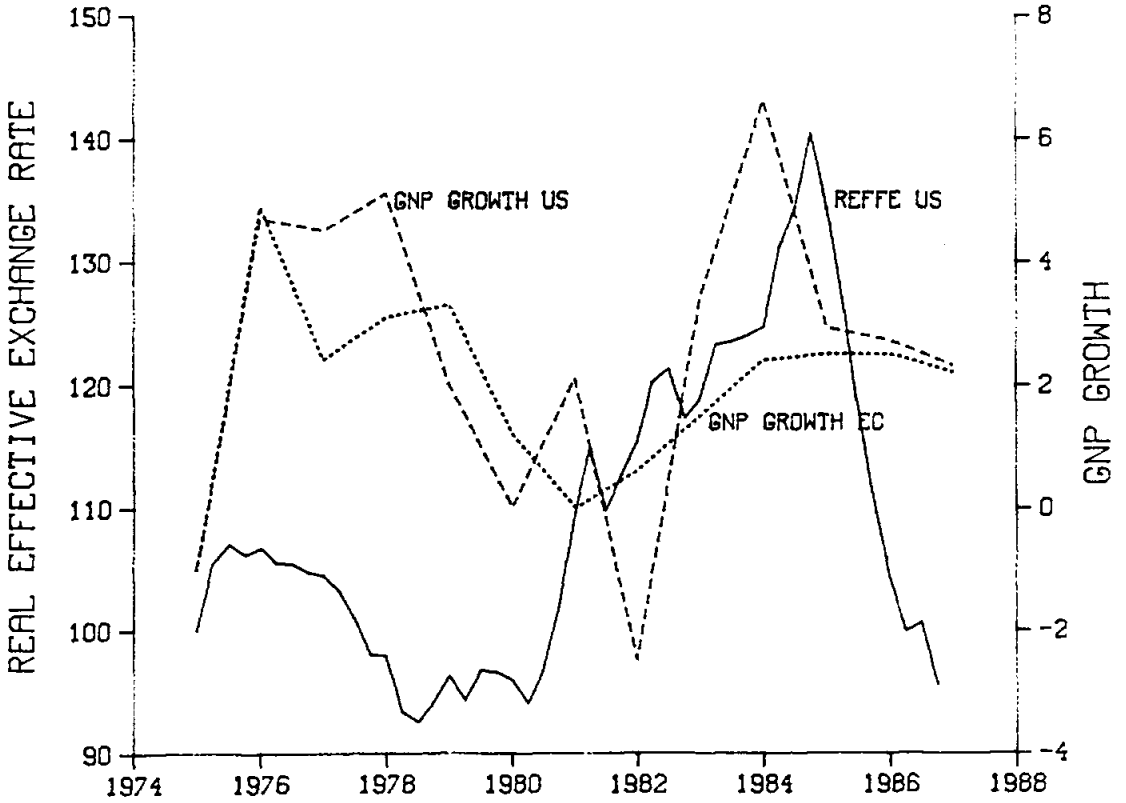


FIGURE 5.

US REAL EFFECTIVE EXCHANGE RATE & GNP DEFLATOR IN THE EC & THE US

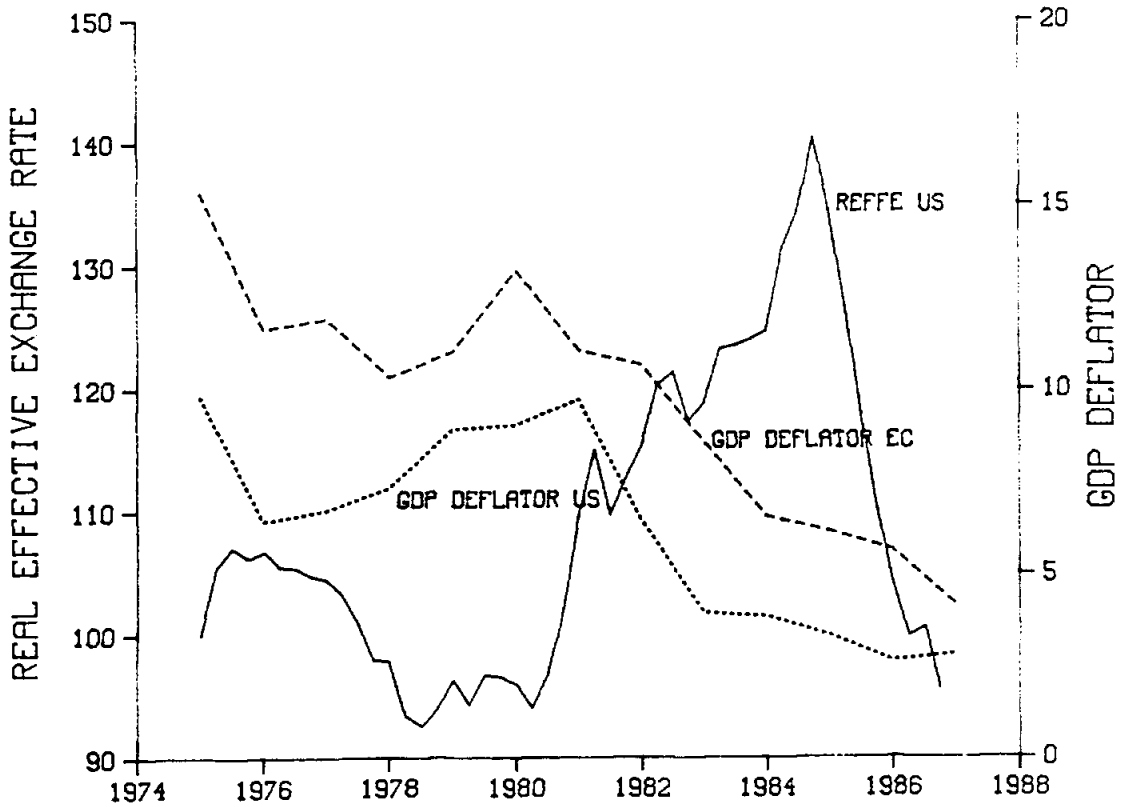


FIGURE 6.

US REAL EFFECTIVE EXCHANGE RATE & UNEMPLOYMENT IN THE EC & THE US

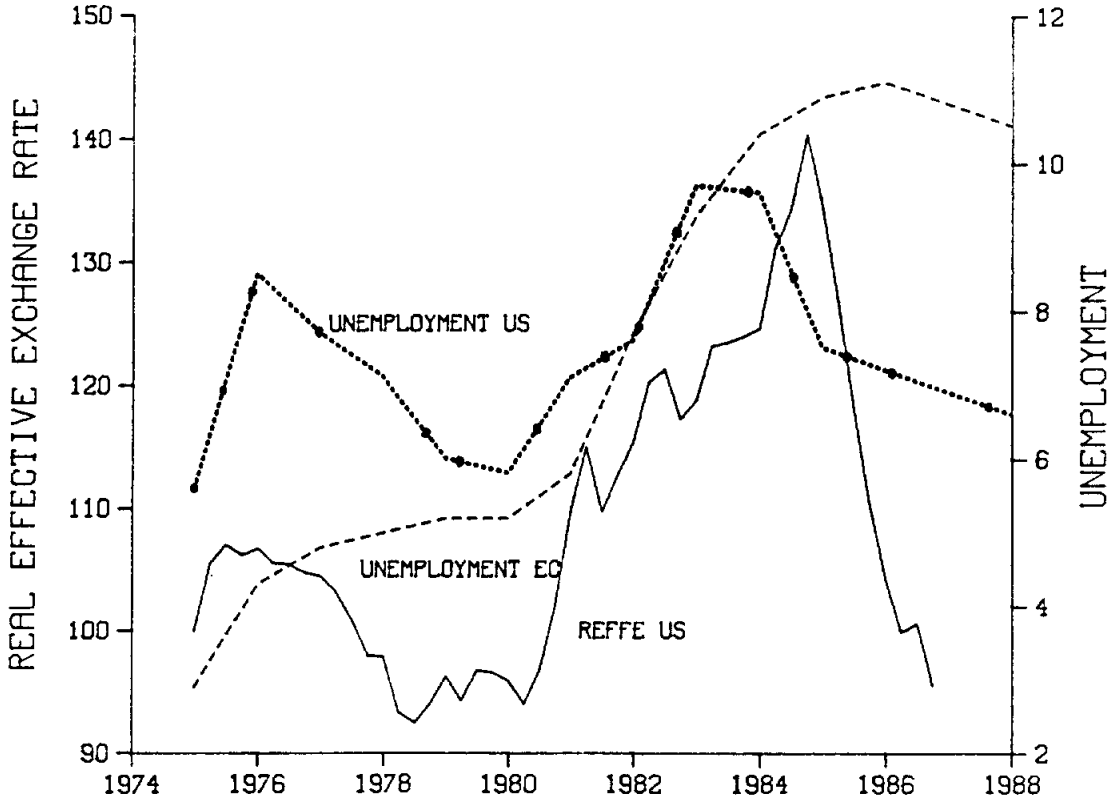


FIGURE 7.

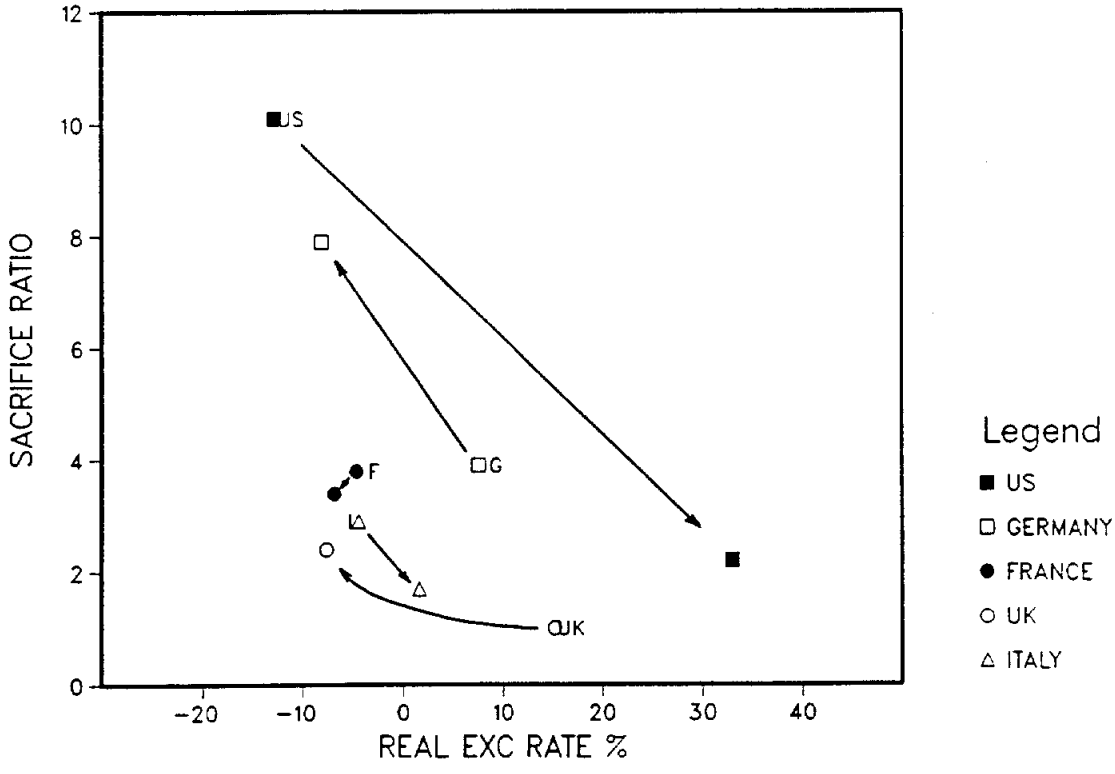
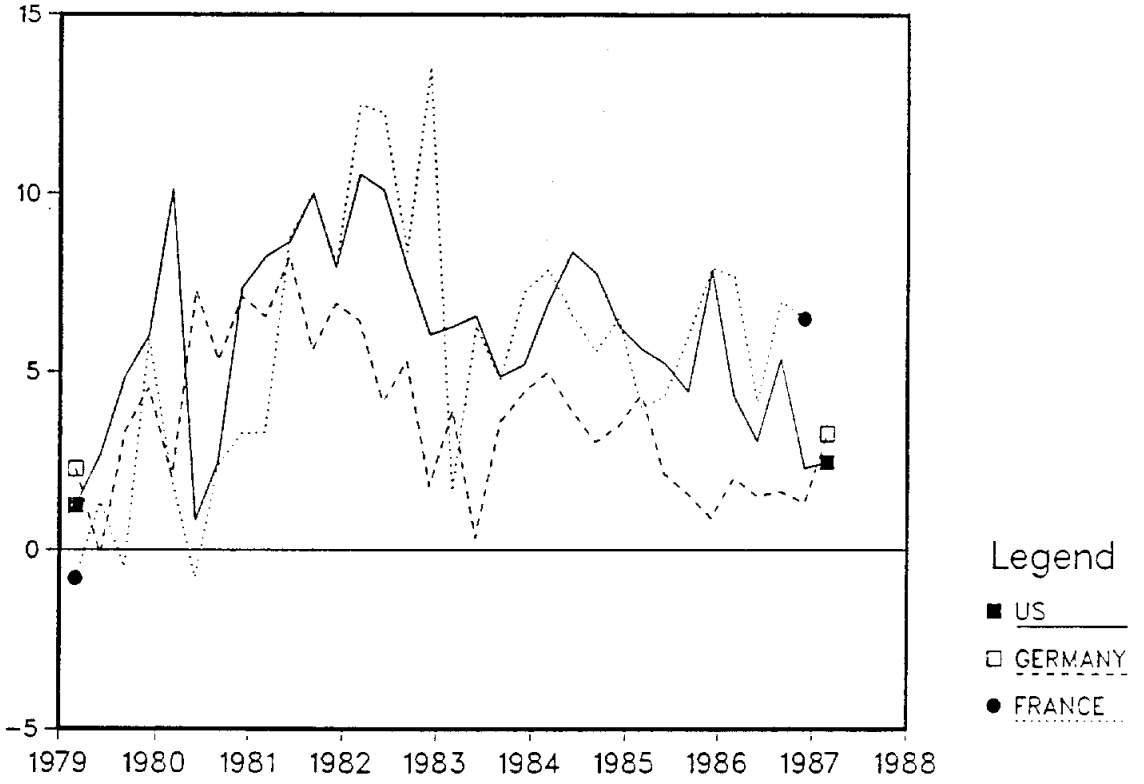


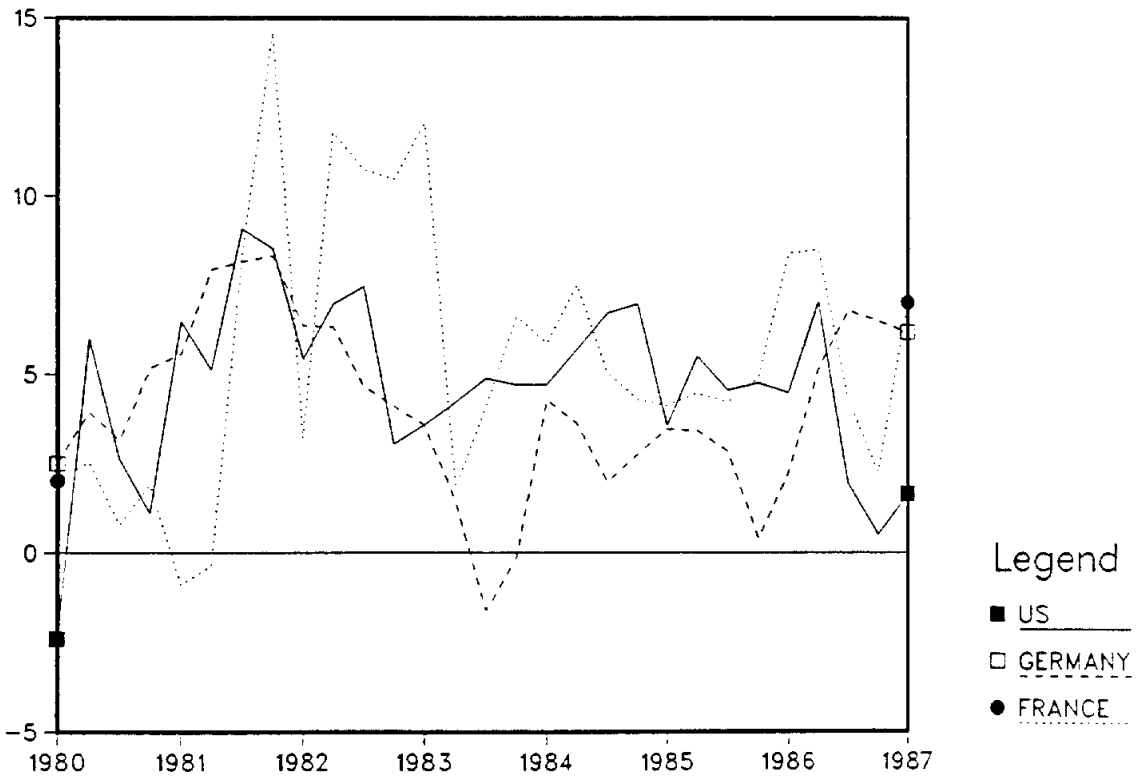
FIGURE 8.

Figure 9. Short-term real interest rate - Ex-ante
(3 month, begining of period, Euro-deposits less actual GDP Deflator inflation)



Source: DRI

Figure 10. Short-term real interest rate - Ex-post
(3 month, begining of period, Euro-deposits less DRI inflation forecast)



Source: DRI

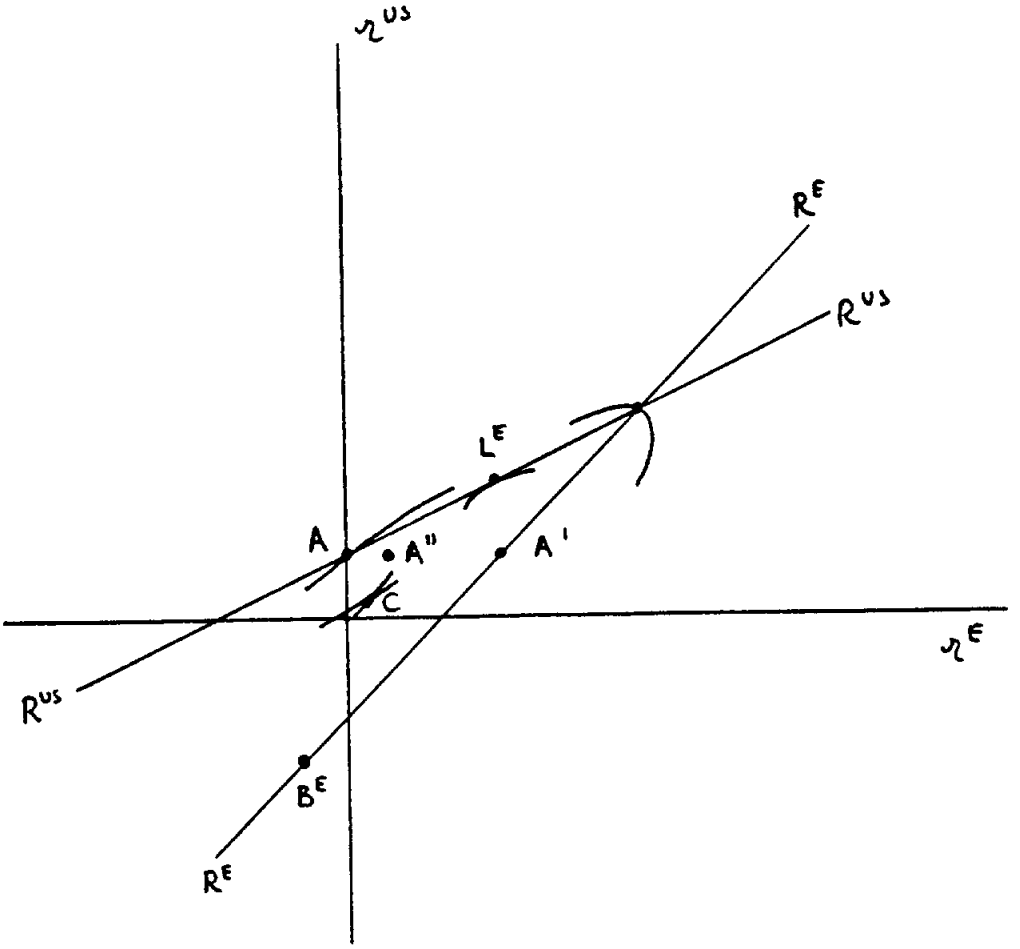
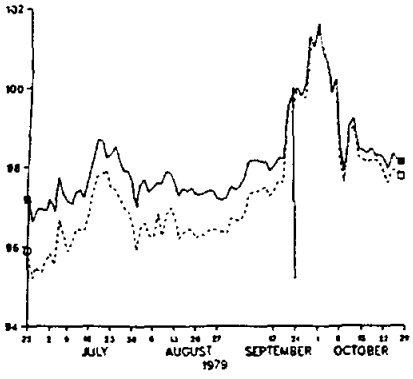


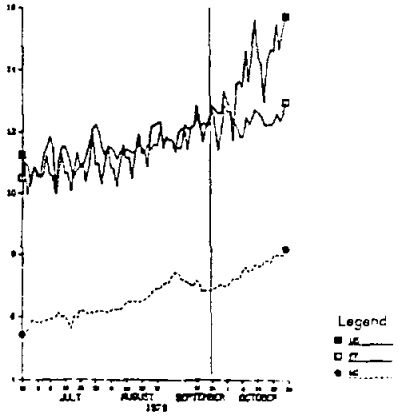
FIGURE 11.

Figure 12. EMS Realignments and the dollar

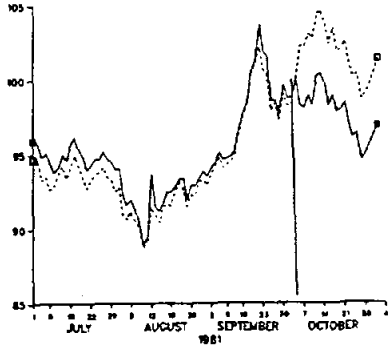


Exchange Rates

September 24, 1979

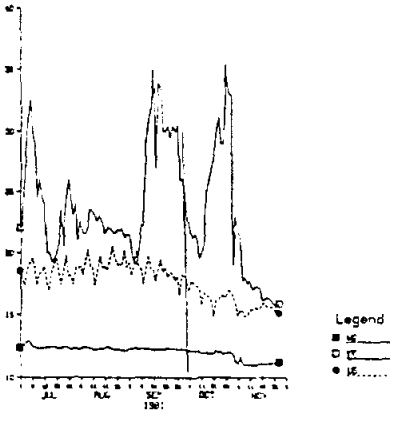


1-Month Interest Rates

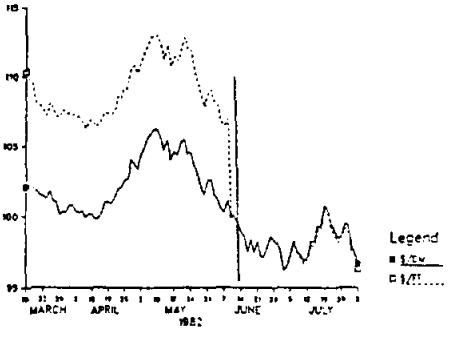


Exchange Rates

October 5, 1981

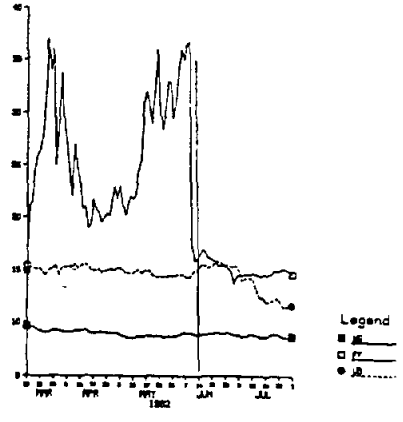


1-Month Interest Rates



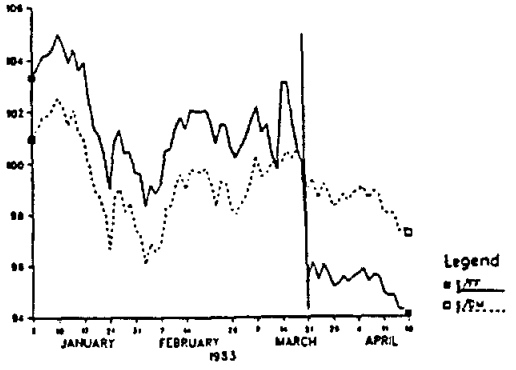
Exchange Rates

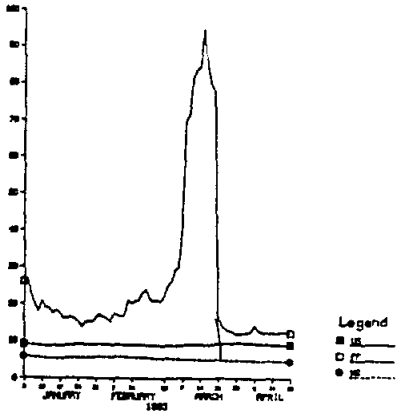
June 14, 1982



1-Month Interest Rates

Figure 12 (continued).





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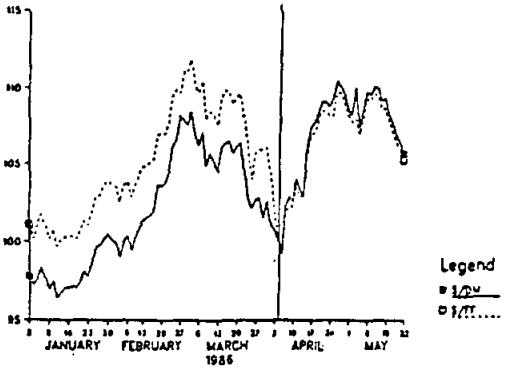

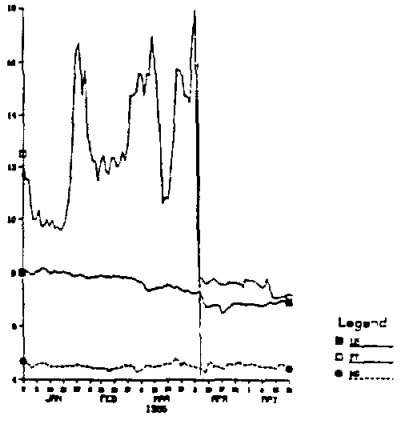

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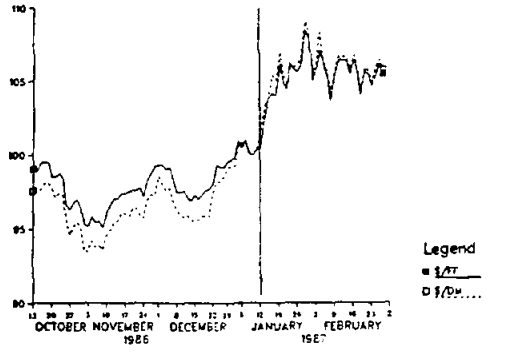

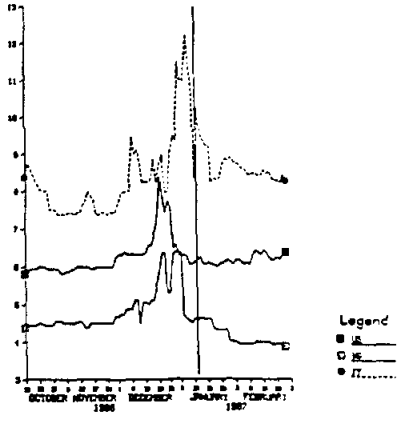

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