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Short-term interest rate linkages between the United States and Europe

SHORT-TERM INTEREST RATE LINKAGES BETWEEN THE UNITED STATES AND EUROPE

by

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Summary

The transition to floating exchange rates has induced an increased segmentation of international financial markets, which however was gradually reversed in the ensuing years. Since 1981 tighter monetary policy and high interest rates in the United States have maintained pressure on European interest rates; rather than fully aligning their interest rates, European countries have let the exchange rate take up part of the adjustment.

In Europe, since the inception of the EMS the DM has become the standard for monetary coordination, while at the same time increasing its role as a main dollar-substitute in international portfolios, with two consequences. First, the transmission within the EMS of external monetary shocks largely depends on the German monetary policy response. Second, for given other conditions, when the dollar strengthens vis-à-vis the DM, the latter weakens in the EMS, improving the system's cohesion; the opposite happens when the DM strengthens vis-à-vis the dollar.

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SHORT-TERM INTEREST RATE LINKAGES BETWEEN THE UNITED STATES AND EUROPE (*)

I Introduction

Short-term monetary linkages between the United States and Europe in the early eighties have meant high interest rates in the United States pushing interest rates up and exchange rates down in Europe, with negative consequences for growth and inflation. In the main, the overall US policy stance is not contested. Rather, the source of the problem is identified in the "policy mix": overly expansionary fiscal policy is seen as causing overly restrictive monetary policy, since the expansion of monetary aggregates has to be restrained in line with the objective of non-inflationary growth.

This policy conflict across the Atlantic is not new:

> "The ... issue is the appropriate international level of interest rates. Evidently, national rates must be more closely aligned to each other as international money and capital markets improve. But surely the low-rate country should not always do the aligning. This would impart a deflationary bias to the system... In the present situation European countries are fighting inflation by tightening their money markets rather than their budgets. They are forcing the United States to fight unemployment with a tight money-easy budget mixture... a mixture of policies quite unfavourable to long-run growth"[1/].

(*) This paper was prepared for the conference on "Europe and the Dollar" organized by Columbia University, M.I.T. and the Istituto San Paolo di Torino (Torino, June 4-5, 1984). The authors wish to thank J.C. Martinez-Oliva, M. Michelangeli and S. Rebecchini for helpful comments and suggestions. The authors retain exclusive responsibility for remaining weaknesses and for the views expressed in the paper.

1/ J. Tobin (1964), p. 126.

These few sentences, written by James Tobin over twenty years ago, could have been read in yesterday's Financial Times or Le Figaro, if it were not for the fact that the contenders have since swapped places.

The noteworthy feature of this passage is not that history tends to recur, nor that the best arguments in support of one's case can often be found in the opponent's files. Rather, it is that the issue seems to have changed very little, in spite of the transition from fixed to flexible exchange rates.

The proposition that -- for given overall stance of aggregate demand policies -- a US policy mix of monetary restraint and fiscal expansion depresses aggregate demand abroad holds under fixed exchange rates. It applies under floating exchange rates to the extent that (a) increasing international capital mobility and financial integration make exchange rates highly responsive to divergences in national interest rates, and (b) the effects of dollar appreciation on inflation in foreign countries are strong enough to exhaust rapidly whatever margins they had for easing domestic monetary conditions. Elements of these propositions are frequently found in various combinations in the policy debate across the Atlantic. Other important components of that debate are to be traced to institutional differences between the two areas and to their implications for policy responses to monetary disturbances. Finally, it seems useful to examine how Europe has actually responded to high US interest rates since 1980 and how the existence of the EMS has influenced the response.

After recalling the institutional aspects and the resulting differences in policy attitudes between Europe and the United States (Section II), this paper reviews some of the empirical evidence available on

the above mentioned points (a) and (b) for the period 1960-83 (Section III). It then describes two particular aspects of short-term monetary linkages between the United States and Europe in the early eighties: the "coupling-uncoupling" issue and the special role of Germany and the DM in these linkages (Section IV). In the conclusions (Section V) an assessment is made of policy options and constraints on the European side.

II The Background

In the last 25 years the economic weight of the United States in the world economy has declined and that of the European Community has increased; much of the gap which existed between the two areas in terms of productivity, technology and living standards has been closed. These developments, however, have not been paralleled in the financial field.

Whereas the efficiency and breadth of US financial markets have grown enormously, financial development in Europe has lagged behind with the partial exception of London. The process of economic integration has not spread to financial markets, which are still highly segmented and organized very much on a national basis, largely owing to the maintenance of extensive administrative controls. The Euromarkets, of course, constitute a highly efficient structure of financial intermediation; at present, however, for all practical purposes they are seen less as a potential component of a common European financial network than as an "extension" of US financial markets to be kept separate from national markets.

The US dollar is still by far the principal instrument for official reserve holding, settlements and interventions in foreign exchange

markets, as well as the preferred currency for the denomination of assets and liabilities in international finance. Europe does not have a common internationally held currency, notwithstanding the role formally assigned to the ECU in the EMS and in the EEC common agricultural arrangements. The DM, whose function as an international currency has indeed increased, is mainly held for reserve purposes and is used only to a limited extent as an intervention and settlement currency within the EMS[2/].

Taken individually, European countries are much more open to international trade than the United States. True, on a consolidated basis, i.e. when intra-Community trade flows are netted out, this difference decreases considerably[3/]. However, since the formulation of macropolicies is still almost entirely at the national (as opposed to Community) level, the attitude of policy makers is inevitably influenced by the situations of their own countries and by an acute perception of the potential aggregate and sectoral effects of large exchange rate changes. This attitude is closely linked to the higher degree of social protection in Europe and to the existence of an important range of goods whose prices are set or constrained administratively. Large exchange rate changes can in fact exert an unsettling influence on the difficult balance between economic constraints and political needs usually involved in administered price setting.

2/ Cf. Padoa-Schioppa (1981) and Siglienti (1981).

3/ While individual European countries' ratios of imports or exports to GDP are two to five times higher than those of the United States, the Community values come down to around 14-15 per cent, which compares with US values around 8-9 per cent.

With administered prices, exchange rate oscillations can also generate (upward) "ratchet" effects on inflation. Policy attitudes have been influenced considerably by these facts.

In Europe, less developed money and foreign exchange markets have typically been accompanied by central banks playing a more active role in these markets. As for money markets, their insufficient depth reduces confidence that temporary imbalances between supply and demand can be smoothly accommodated without excessive price (interest rate) oscillations and that speculation can play its stabilizing role. Central banks therefore tend to be in the market more or less continuously and to absorb the balance of private operations on the credit lines open to commercial banks. This is made easier by a large share of the operations being concentrated with a (relatively) small number of commercial banks[4/]. In the United States, on the other hand, a large network of intermediaries ensures that price changes usually remain within narrow ranges. The central bank limits intervention to countering "abnormal" situations and implementing its monetary objectives. Since the adoption in late 1979 of the new operating procedures for monetary policy, which entail a rather rigid control over banks' (non-borrowed) reserves, sharp oscillations in interest rates have in fact been observed.

4/ Traditionally, stabilizing interest rates in the very short term has also been assigned considerable emphasis in the Bank of England's operations, in spite of the greater depth and efficiency of financial markets in London. The role of channelling money market balances to the central bank is largely assigned to the discount houses, which for this reason have ready access to central bank refinancing. In the foreign exchange market a policy of non-intervention was adopted around the end of the seventies. However, since sterling started to weaken the Bank of England has intervened on occasion.

In foreign exchange markets, the tendency to "lean against the wind", especially in cases of depreciation, is enhanced in Europe by the openness to foreign trade and by the special role that the dollar still plays in the commercial and financial spheres. In the United States changes in the exchange rate are regarded as events rather remote from the domestic economy.

Furthermore, when official intervention is undertaken, its domestic effects are "sterilized" in the United States (that is offset by money market operations) but to varying extents left "unsterilized" in Europe. The US approach stems from treating changes in the demand for dollars as being primarily changes in international dollar holders' portfolio preferences, to be accommodated and not allowed to affect domestic monetary conditions. The European approach stems instead from the importance of external balance and financing considerations in exchange rate developments, so that a change in market sentiment has usually been seen as requiring some adjustment in domestic monetary policies.

Each attitude, of course, can produce undesirable consequences if maintained regardless of circumstances. For any type of disturbance, the European attitude normally produces more rapid effects on domestic interest rates, but in a direction which helps to stabilize expectations. The US attitude, on the other hand, tends to reduce interest rate changes in connection with disturbances in the foreign exchange markets, but can also lead at times to wider exchange rate oscillations.

III Some Empirical Evidence

This section discusses empirical evidence on (i) the evolution over time of international financial integration; (ii) its impact on exchange rates, in the presence of divergent interest rates in national markets; and (iii) the effects of exchange rates on domestic inflation in selected European countries.

III.1. International financial integration and interdependence of national monetary policies ought to show up first in a tendency for nominal interest rates in national markets to converge and to move together[5/]. Money market interest rates seemed an appropriate choice because they refer to assets that are relatively homogenous except for currency denomination and, furthermore, because they are more directly influenced by central banks. Tables 1 to 3 summarize and update the evidence that is commonly examined in the literature[6/] for the period 1960-83; data on real interest rates[7/] have been added as a summary measure of monetary stances.

On the basis of a priori considerations, the sample has been divided into three subperiods: (a) the fixed rate period, 1960I-1972I, henceforth called the "fixed" period; (b) the first seven years of floating,

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5/ Aliber (1978).

6/ Cf. Aliber (1978), Fase (1976) and Swoboda (1983).

7/ Nominal interest rates deflated with 12-months CPI rates of change. Reference to ex-post real rates seems adequate for our purposes, as the analysis refers to multi-year averages and in all events to long-run developments.

1972I-1979I, called the "pre-EMS" period; (c) the years 1979II-1983IV, called the "EMS" period. The start of the EMS has been used as the dividing line between the two subperiods of the floating era, but, as we shall see below, 1979 can be regarded as a kind of watershed in other respects as well.

The divergence between average (uncovered) nominal interest rates in the United States and some major European countries increased from the fixed to the pre-EMS period, and again from the pre-EMS to the EMS period (Table 1). However, once they are corrected with forward premia or discounts vis-à-vis the dollar, the divergence in 1979-83 is smaller than in the early years of floating; if Italy is excluded, interest rate parity is re-established fairly closely[8/]. It would seem that there was an initial "disintegrating" effect of floating on world financial markets, which was then re-absorbed over time.

This is not conclusive evidence of the existence and evolution of policy interdependence. The crucial issue, in this regard, is how far the forward premia and discounts measure exchange rate expectations rather than differences in the risk component of the returns on assets denominated in different currencies. This would in turn imply imperfect substitutability of assets in investors' portfolios; the larger the share of this component, the greater the scope for independent national monetary policies.

8/ The poor quality of the data does not allow us to be very confident on the precise level of these covered spreads; their evolution over time, however, is a sufficient indication for our purposes.

Table 1

MONEY MARKET INTEREST RATES IN SELECTED COUNTRIES (1)

	1960 I-1972 I	1972 II-1979 I	1979 II-1983 IV
		uncovered nominal rates	
US	4.6	6.9	12.5
UK	5.7	9.1	12.4
GE	4.2	5.6	8.0
FR	5.4	8.6	12.7
IT	4.3	11.2	17.5
SD (2)	0.67	2.14	3.36
	(0.69)	(1.61)	(2.27)
		covered interest rates (3)	
US	4.6	6.9	12.5
UK	6.9	13.9	12.6
GE	5.6	8.1	12.9
FR	5.4	7.4	13.1
IT	3.6	3.3	8.6
SD (2)	1.23	3.82	1.88
	(0.95)	(3.25)	(0.28)
		real interest rates (4)	
US	1.6	-0.2	3.3
UK	1.2	-4.0	1.1
GE	1.4	0.4	3.1
FR	1.2	-0.8	0.8
IT	0.2	-2.5	0.4
SD (2)	0.54	1.80	1.36
	(0.19)	(1.96)	(1.30)

Source: IFS.

(1) US: Federal Funds; UK: three month Treasury bills; Germany: interbank; France: call money; Italy: six month Treasury bills. (2) Standard deviation of interest rates in reference periods; in parenthesis standard deviation excluding Italy. (3) Adjusted with forward premia or discounts vis-à-vis the dollar. (4) Nominal interest rates deflated with the CPI growth rates in the four quarters up to and including the reference quarter.

Indirect evidence on this issue can be found in the observed tendency of interest rates in national markets to move together; simple measures of covariation are provided by correlation and principal component analysis[9/]. These measures, of course, do not identify causal links; moreover, observed covariations may reflect common responses to exogenous "disturbances". Following Swoboda (1983), correlations and principal components have also been calculated for interest rate "innovations"[10/], which may better reflect responses to exogenous shocks and/or discretionary changes in policy.

For nominal interest rates and their innovations, correlation and principal component analysis seem to confirm that with the transition to

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9/ The principal component technique is described in Theil (1971); it was first applied to the analysis of interdependence and financial integration by Fase (1976) and then by Swoboda (1983). In Fase correlations and principal components are calculated for interest rate levels; in Swoboda, for their first differences. The former approach is more suited to describe the relationship between "trend" behaviors; the latter, to emphasize common responses to short-run disturbances. We present our calculations for (nominal and real) interest rate levels, as well as - following Swoboda (1983) - for interest rate "innovations" (cf. footnote n. 10). The results for interest rate changes are not presented, as qualitatively rather similar to those for innovations. It can also be noted that our calculations are based on quarterly data, as monthly series for the entire fixed rate period were not available. Comparison of monthly and quarterly data calculations for the two floating rate periods seem to indicate that the results are not significantly affected by the use of lower frequency data.

10/ As in Swoboda, innovations are obtained, for each nominal interest rate variable, as the residuals of a regression whose explanatory variables include a time trend, four seasonal dummies and four lagged values of the dependent variable.

Table 2

CORRELATION COEFFICIENTS BETWEEN INTEREST RATES IN SELECTED COUNTRIES

(a) 1960 I-1972 I (b) 1972 II-1979 I (c) 1979 II-1983 IV

	United Kingdom			Germany			France			Italy		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
						nominal interest rates						
US	.77	.40	.52	.63	.62	.89	.92	.58	.44	.56	-.21	.27
UK				.46	.24	.57	.73	.52	.04	.39	.11	-.27
GE							.64	.49	.57	.67	-.72	.41
FR										.61	.08	.88
						real interest rates (1)						
US	.44	.76	.72	.15	.59	.31	.20	.64	.75	-.18	.43	.80
UK				.30	.57	-.27	.25	.51	.73	.00	.35	.83
GE							.65	.71	.06	.39	-.29	.03
FR										.62	-.03	.78
						interest rate innovations (2)						
US	.13	.03	.00	.14	.27	.44	.38	.18	.60	.09	.36	.41
UK				.10	-.24	-.30	.14	.12	.12	.08	.23	-.29
GE							.05	-.10	.00	.27	-.14	.12
FR										.14	.38	.78

Source: IFS.

(1) Nominal interest rates deflated with the CPI growth rates in the four quarters up to and including the reference quarter. (2) Innovations for each subperiod are the residuals from regressing (nominal) interest rates on a constant, a time trend, three seasonal dummies and four lagged values of the dependent variable.

floating the degree of covariation of interest rates across the Atlantic decreased; and that this development reversed between the pre-EMS and the EMS years, in varying degrees for different countries. The implication is that, together with the gradual "recomposition" of financial markets during the period of floating, there was also a decline in the ability of individual countries to maintain an independent course of monetary policy.

For Germany, France and Italy the innovation correlations with the United States are highest in the EMS period; in the case of Germany this is also true for the interest rate level (Table 2). As for principal components, the presence of a strong common element is reflected in the high share of cumulative variance (see line CV, Table 3) explained by the first three components (P1 to P3) in the three subperiods. Both for interest levels and for innovations the United States uniformly shows a high factor loading for the first principal component[11/], although not always the highest in each subperiod: this finding highlights its special role in determining world financial conditions. It can also be seen that once we come to the EMS period, the United Kingdom stands out as having followed a course of its own[12/]; based on innovation data, Germany's behavior also seems different from that of the three remaining countries (United States, France and Italy) in this subperiod. In the case of the United Kingdom, this

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11/ The factor loading measures the correlation between the variable and the principal component.

12/ Its factor loadings are high for the components having low values for the other countries in the sample.

Table 3

PRINCIPAL COMPONENTS OF MONEY MARKET INTEREST RATES IN SELECTED COUNTRIES (1)

	1960 I - 1972 I			1972 II - 1979 I			1979 II - 1983 IV		
	P1	P2	P3	P1	P2	P3	P1	P2	P3
				nominal interest rates					
US	.93	.23	.01	.84	.09	.29	.86	.34	.35
UK	.80	.48	.01	.58	.57	-.58	.45	.80	-.40
GE	.80	-.41	-.44	.87	-.43	.00	.93	.26	.11
FR	.94	.15	.07	.76	.45	.25	.80	-.51	-.24
IT	.75	-.54	.36	-.44	.85	.22	.64	-.74	-.06
CV (2)	.71	.87	.93	.51	.80	.91	.57	.90	.97
				real interest rates					
US	.32	.80	.49	.91	.26	.05	.90	.29	.16
UK	.49	.66	-.52	.86	.23	-.39	.90	-.34	.16
GE	.82	-.05	-.12	.80	-.51	-.15	.05	.99	.02
FR	.90	-.17	.19	.82	-.29	.45	.90	.02	-.44
IT	.65	-.59	.03	.22	.95	.14	.94	-.02	.12
CV (2)	.45	.74	.85	.59	.86	.94	.66	.90	.95
				interest rate innovations (3)					
US	.68	.40	.21	.53	.69	.25	.80	.04	.46
UK	.44	.06	-.89	.47	-.47	.67	-.20	-.76	.57
GE	.50	-.63	.03	-.22	.82	.19	.39	.73	.47
FR	.67	.46	.21	.69	.01	-.54	.86	-.45	-.08
IT	.52	-.58	.18	.83	.06	-.04	.85	-.09	-.44
CV (2)	.33	.56	.73	.34	.61	.78	.46	.72	.92

(1) Quarterly figures for all series. Columns P1, P2 and P3 correspond to the first three principal components. (2) Cumulative share of variance explained by the principal components (in per cent). (3) Innovations for each subperiod are the residuals from regressing (nominal) interest rates on a constant, a time trend, three seasonal dummies and four lagged values of the dependent variable.

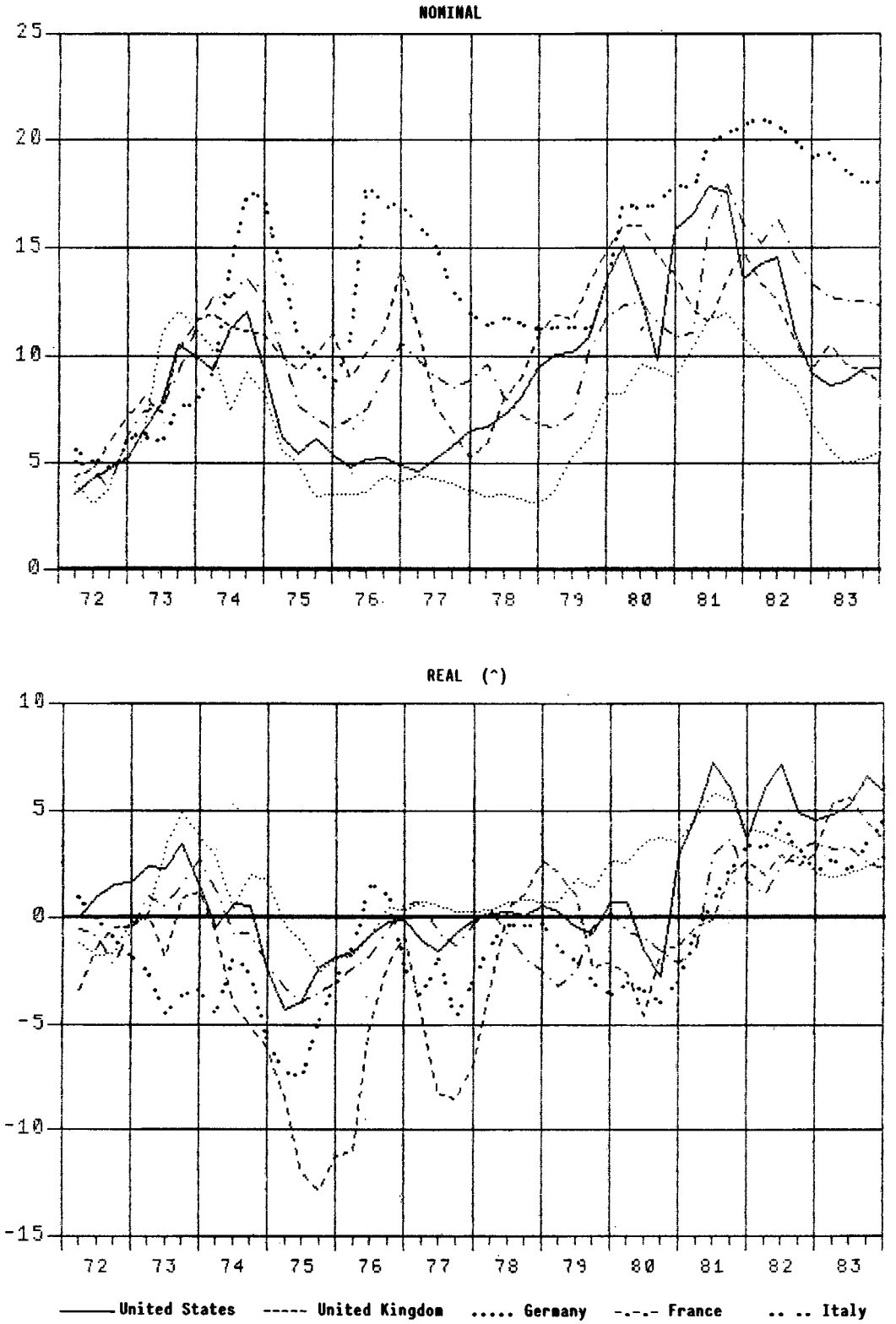
may reflect a divergent inflation performance until the late seventies and then the different impact of the oil price increase; as for Germany, what is presumably being singled out is the "smoother" course followed by interest rates, reflecting the lower acceleration and variability of inflation after the oil shock (see Chart 1).

We now turn to real interest rates. Insofar as they can be read as indicators of domestic monetary stances, the degree of convergence and covariation of real interest rates suggests that the picture for nominal interest rates largely reflects the evolution of domestic policies.

The increased divergence of nominal interest rates in the early years of floating does correspond to divergent paths in real interest rates, which were mostly negative and in all cases below their levels in the pre-EMS period (Table 1); in the EMS years real rates have become positive and their divergence has decreased somewhat, reflecting the changed attitude towards inflation after the second oil shock. Covariation across the Atlantic increased steadily during the sample period, as shown both by correlations and by the CV explained by the first three principal components. The real interest rate (monetary stance) in the United States shows a very high correlation with the first principal component in both the subperiods of floating, reflecting perhaps the leading role of this country both in the worldwide acceleration of inflation in the pre-EMS period and then in the reaction against it. Italy emerges as the "divergent" country in 1972-79, when the stabilization effort was delayed and interest rates were often substantially exceeded by inflation. Germany seems to have followed a separate course in the EMS period: Chart 1 shows an earlier rise and a smoother path of the real rate.

Chart 1

SHORT-TERM NOMINAL AND REAL INTEREST RATES IN SELECTED COUNTRIES



(^) Real interest rates are obtained by deflating nominal interest rates with the (ex-post) CPI percentage changes in the four quarters up to and including the quarter of reference.

In the EMS period real interest rates were highest in the United States; the difference would be greater if one excluded the first two years from the period (see Chart 1). This may reflect not only greater monetary restriction, but also a structural increase in the "equilibrium" real rate in the United States. Part of the explanation may lie in changes in the tax structure: interest deductibility for tax purposes has been greatly enhanced by inflation, which raises marginal tax rates; provisions for accelerated depreciation and other tax allowances have also reduced the impact of interest rates on capital spending. A "permanent" increase in government demands on private savings might also imply a higher equilibrium real interest rate. The latter, in turn, might cause a rise in the "equilibrium" exchange rate of the dollar[13/] and, via the tendency of interest rates to converge internationally, a deflationary bias for monetary policies outside the United States.

III.2. The increased covariation of interest rates in Europe and the United States during the period of floating has also been associated with seemingly stronger effects of interest rate differentials on the corresponding bilateral exchange rates; the relationship seems less close for France and Italy.

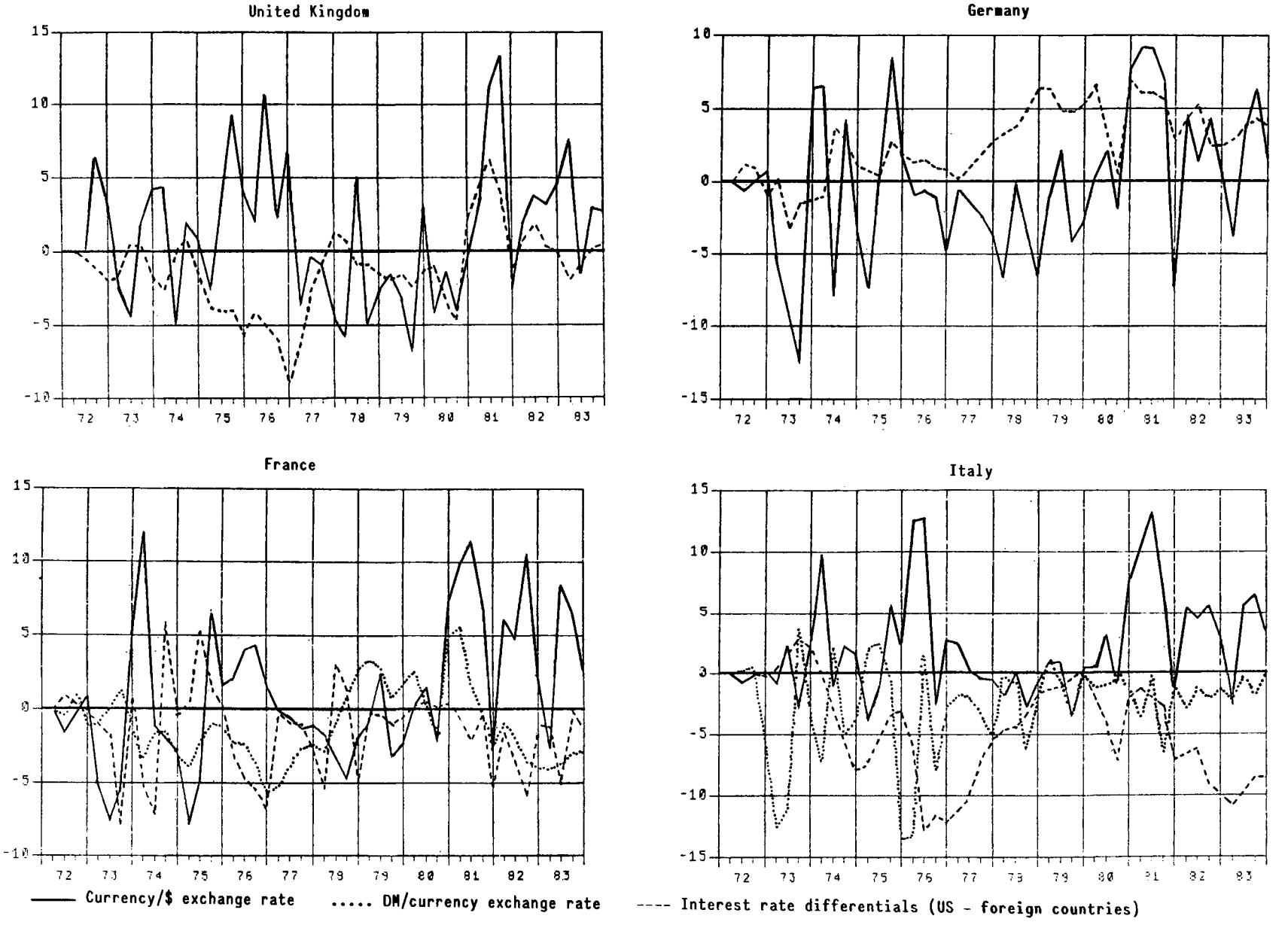
Chart 2 shows bilateral interest differentials and the corresponding dollar exchange rate changes[14/] for the four major European countries;

13/ Cf. Blanchard-Dornbusch (1983).

14/ Quarterly percentage changes (on an annual basis).

SHORT-TERM INTEREST DIFFERENTIALS AND EXCHANGE RATE CHANGES IN SELECTED COUNTRIES

Chart 2



for France and Italy, bilateral exchange rates vis-à-vis the DM have been added. It can be seen that since late 1977 for the United Kingdom and since 1980 for Germany interest differentials go a long way towards explaining the broad tendencies in exchange rates, although the latter display a greater variability.

In the case of Germany this "unstructured" evidence is confirmed by the estimates of a model of the dollar/DM exchange rate developed in the Banca d'Italia[15/]: they suggest that interest differentials exerted little influence on exchange rate changes in 1973-79, but were very important in the EMS period. The trade account variable, on the other hand, exerted a strong and significant effect in the first period and a statistically insignificant one in the second. Tests for structural stability confirm that a change in structure took place from one period to the next. The dynamic simulations of the model and the separate contributions of the two explanatory variables are shown in Chart 3; the estimated equation is reported in the annex.

In France and Italy's case, the dollar exchange rate seems to bear little relation to the interest differential. Since the inception of the EMS, on the other hand, there has been a marked and increasing negative correlation between these countries' exchange rates vis-à-vis the dollar, and the latter's rate vis-à-vis the DM (Chart 2): in other words, when the

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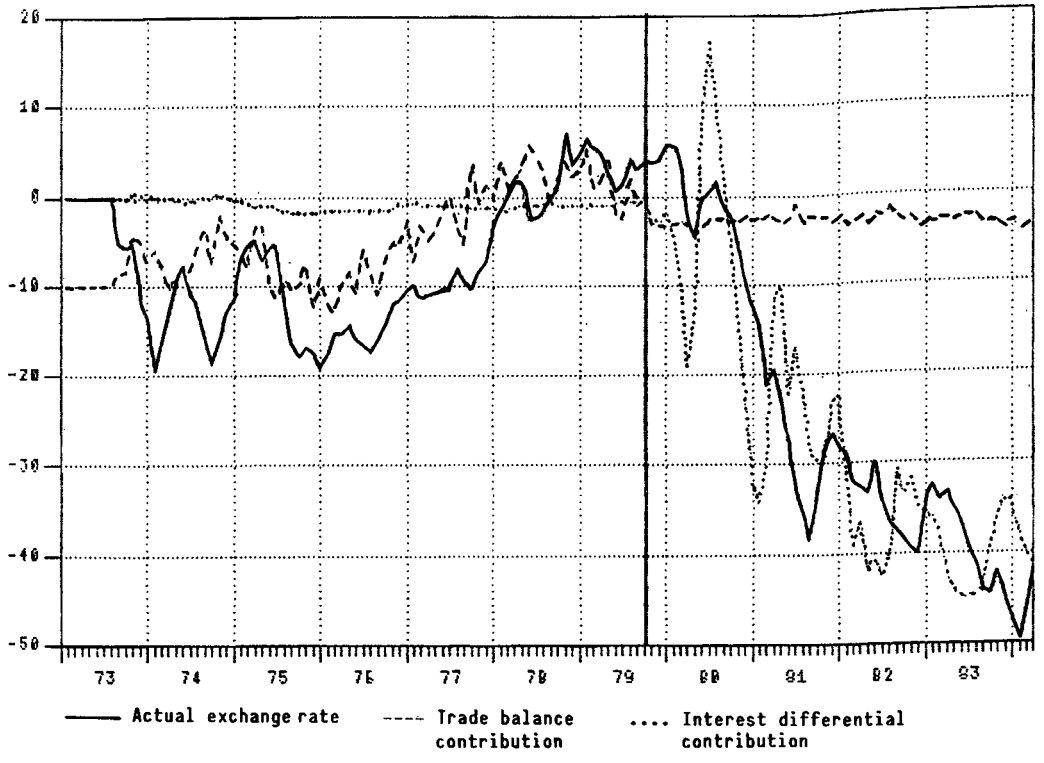
15/ Cf. Martinez Oliva-Rebecchini (1984). The model is a modified version of that proposed by Frankel (1979) "On the Mark: a theory of floating exchange rates based on real interest rate differentials"; on the left hand side the estimated equation has the real exchange rate and on the right hand side the real interest differential, the foreign trade balance component that is not "explained" by competitiveness, and the lagged dependent variable.

Chart 3

DYNAMIC SIMULATION OF THE $/DM EXCHANGE RATE MODEL

CUMULATED $/DM EXCHANGE RATE PERCENTAGE CHANGES
AND THEIR DETERMINANTS



dollar rises against the DM, the franc and lira also strengthen vis-à-vis the German currency, usually by a fraction of the dollar's movement, and viceversa when the dollar weakens vis-à-vis the DM. The reasons for this will be discussed in Section IV.

III.3. Finally, we turn to the effects of the exchange rate on domestic inflation. The identification and measurement of these effects is an extremely difficult task, which we shall not try to tackle in this paper. Scanty and heterogeneous as it may be, the evidence available from model estimates suggests that the inflation elasticity of effective exchange rate depreciation is considerably smaller for the United States (of the order of .05 in the first year) than for individual European countries. The OECD Interlink model, on the other hand, shows an impact of dollar appreciation on European inflation no larger (in absolute size) than that estimated for the United States[16/]. However, there are considerable differences between how "dollar sensitive" individual European countries' effective exchange rates are, owing to such institutional aspects as trade composition and invoicing (cf. Table 4, the difference between dollar and effective exchange rate changes).

The impact of the dollar appreciation on European countries' inflation has actually been moderate recently and less than was feared. Import unit values show that Germany and France recorded a cumulative increase after the second oil shock very similar to that observed after the

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16/ The US figure is that of the MCM model of the Federal Reserve, and is reported in Wallich (1984), p. 6. For the Interlink results see OECD (1983).

Table 4

EXCHANGE RATE CHANGES AND INFLATION IN SELECTED EUROPEAN COUNTRIES (1)

(a)	(b)
1974	1980
1975	1981
1976	1982
1977	1983

	UK		Germany		France		Italy	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Bilateral dollar	-5.0	12.5	5.2	-4.2	-4.3	-3.8	-12.2	-8.3
exchange rates	-16.7	-11.2	2.2	-18.4	0.4	-24.8	-14.3	-30.6
	-32.7	-22.3	10.2	-26.8	-10.9	-39.9	-32.4	-42.1
	-26.0	-30.7	19.3	-31.6	-8.1	-47.9	-33.6	-48.9
Effective exchange rates	-4.2	14.7	6.7	-2.5	-4.0	-1.6	-13.6	-7.0
	-15.5	2.8	4.3	-3.9	3.1	-12.1	-13.9	-19.5
	-30.2	2.1	17.7	-0.7	-6.5	-20.9	-31.5	-23.9
	-26.2	-4.7	23.9	-1.6	-6.5	-28.0	-35.7	-28.9
Import unit values	73.6	13.8	33.9	25.9	62.8	32.3	117.1	54.2
	97.1	28.7	36.6	38.2	51.4	56.3	116.6	100.9
	150.3	31.9	40.8	38.9	80.1	76.9	185.9	118.6
	165.3	46.3	40.8	39.8	88.6	87.6	215.1	126.4
Terms of trade	-10.7	4.5	-7.5	-7.0	-13.7	-6.5	-16.1	-9.0
	-5.5	3.0	-5.5	-9.4	-6.5	-10.0	-12.4	-14.1
	-8.5	5.8	-3.8	-5.5	-10.3	-9.8	-15.3	-11.3
	-2.9	3.2	-4.2	-6.1	-9.0	-5.0	-13.5	-6.8
GNP/GDP deflators	24.5	24.6	10.3	5.8	16.5	16.5	29.0	28.6
	55.3	37.2	14.5	10.7	29.8	32.6	45.7	51.4
	74.6	47.4	18.8	16.1	43.5	44.6	77.7	76.5
	97.4	52.4	23.3	19.0	55.8	52.6	106.0	98.7
Real money stocks (M2) (2)	1.5	-1.0	0.3	0.4	6.0	-1.3	-0.7	-6.2
	-11.5	13.0	7.4	0.1	11.0	-3.3	8.6	-12.2
	-12.0	20.4	12.6	2.0	14.4	-1.0	7.4	-12.5
	-15.5	24.4	18.8	5.5	19.7	-4.7	13.0	-12.2

Source: IFS.

(1) Cumulative percentage changes in fourth quarter of listed years with respect to 1973 for (a) and to 1979 for (b). (2) Nominal money stocks deflated with GNP/GDP deflators.

first, while Italy and the United Kingdom recorded a substantially lower one, in spite of the larger appreciation of the dollar observed in the EMS period (Table 4). Furthermore, the acceleration of inflation - as measured by GNP/GDP deflators - has also been smaller after the second oil shock.

The appreciation of the dollar has been partly offset by declining commodity prices on world markets. In addition, after the second oil shock, domestic policies have followed a restrictive course in most countries[17/]. The debate on the "vicious circle" hypothesis in the late seventies had already highlighted the importance of domestic policies in determining the inflation response to exchange rate depreciation.

On the whole, the question remains as to whether the recent modest inflationary impact of dollar appreciation on European countries was the result of probably unrepeatable circumstances or the expected outcome of sounder domestic policies, or both. What does stand out is the apparent disproportion between fears and actual developments on the European side: the "open economy syndrome" which seems to affect European policy makers might be at least partly responsible.

17/ The expansion of UK monetary aggregates after the second oil shock does not provide a reliable measure of monetary stance, owing to the impact of financial deregulation (which swelled monetary aggregates).

IV Uncoupling and the Role of the DM

We shall now discuss some of the problems of the EMS period. Two issues are of particular interest here. First, the "coupling-uncoupling" problem, or the extent to which European interest rates can move (and have moved) independently of those of the United States. Second, the special role that Germany and the DM play in the monetary linkages between the United States and Europe.

IV.1. The transition to floating exchange rates was in a way the result of widening and irreconcilable policy divergences in major countries; in the early years of floating these countries behaved as if every external constraint on their domestic policies had been removed, each choosing its own independent course. However, the drawbacks of such an approach were gradually recognized: the amplification of economic cycles, the disruptive effects of inflation on domestic economic structures, and the distortions large exchange rate swings produced in resource allocation and trade. Renewed recognition of an external (exchange rate) constraint on domestic policy coincided in the United States with the dollar rescue package of late 1978, reinforced in the following year by the change in policy by the Fed. It was also the main factor leading to the establishment of the EMS in early 1979.

Thanks to its (relative) success in stabilizing the exchange rates of participating currencies and in preserving cohesion in the face of large exogenous (oil and dollar) shocks, the EMS seems to be gradually emerging as an autonomous monetary pole in the international monetary system.

Under the EMS exchange arrangements the commitment to limit mutual exchange rate changes was conceived from the start as being linked to the adoption of consistent domestic policies. In general the exchange rate has become a key indicator of national monetary conditions and of their consistency within the system. Almost every country announces independent monetary objectives, which nonetheless do take account of the exchange rate constraint. In the short-run, the immediate line of defense against exchange market pressures has been intervention, but supporting changes in domestic monetary conditions have also been made when such pressure was persistent. In practice Germany has emerged as the monetary "center of gravity" of the EMS, to which the other countries tend to adjust when exchange rates begin to signal inconsistency. At the same time, as the DM has come to represent a substitute for the dollar in international portfolios, Germany's monetary policy has also come to play a central role in determining the external value of the (jointly floating) EMS currencies[18/]. Some leeway, as regards both national monetary objectives and exchange rates, has been provided by the possibility of varying central rates.

IV.2. We shall first take up the coupling-uncoupling issue, which has been so hotly debated over the last few years.

In the aftermath of the second oil shock a gradual shift to monetary restraint and a rise in interest rates were common to all the major

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18/ To some extent this development has been fostered by the EMS, which has added to the external attractiveness of the DM by making it the reference standard of a large and increasingly "harmonized" area.

industrial countries (Chart 1)[19/]. Although the rise in US interest rates preceded that in continental Europe, there was little complaint that the former was "forcing" the latter or that the rise was not warranted on domestic grounds. In fact, judging by (ex-post) real interest rates, monetary conditions were tightened gradually everywhere during 1980 and, if anything, more rapidly in Germany than in the United States.

After the summer of 1980 interest rates in the United States started to rise rapidly, climbing in the first half of 1981 to historical peaks, in real terms well above those observed in any other industrial country. At the beginning of 1981 Germany also lifted its interest rates considerably[20/] to forestall mounting pressure on the DM; this "change of pace" in monetary policy, which spread rapidly to the rest of the EMS, seems to mark the emergence of an external (US) interest rate constraint on Europe.

The problem was acute again in the first part of 1982 and, more recently, in late 1983 and early 1984: on these occasions the rebound of interest rates in the United States slowed their decline in Europe.

This influence is confirmed by empirical evidence. In Table 5 we have summarized the results of the estimation of various vector auto-

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19/ In the United Kingdom - which as an oil producer did not suffer from the second oil shock - the stabilization effort had already started with the access to power of the new conservative administration.

20/ In this period, with the suspension of the Lombard facility, the interest rate adjustment was no longer "accompanied" by the Bundesbank, but rather left to the market to determine in much the same way as the Federal Reserve's new (October 1979) operating procedures.

Table 5

VECTOR AUTOREGRESSION MODELS OF INTEREST RATES IN SELECTED COUNTRIES

period of estimate: 14.11.1979 - 28.3.1984
(weekly data)

dep. var. (1)	independent (lagged) var.s (2)			FPE_{AR} (3)	FPE_{MV}	χ^2 (4)
RUS	RUS(2)	RGE(1)		.926	.965	1.9
	"	RUK(2)		"	.921	5.1
	"	RGE(1)	RUK(1)	"	.924	1.3/4.5
RUK	RUK(13)	RUS(1)		.343	.344	0.8
		RGE(1)		"	.341	3.2
	"	RUS(1)	RGE(1)	"	.344	0.1/2.5
RGE	RGE(18)	RUS(1)		.207	.200	9.7°
	"	RUK(1)		"	.206	3.7
	"	RFR(1)		"	.207	2.2
	"	RUS(2)	RUK(1)	"	.194	16.2°/8.3*
	"	RUS(2)	RFR(1)	"	.197	14.5°/5.1*
RFR	RFR(4)	RUS(4)		.115	.113	12.7*
	"	RUK(10)		"	.116	
	"	RGE(20)		"	.106	71.0°
	"	RUS(4)	RUK(1)	"	.112	15.5*/2.9
	"	RUS(4)	RGE(1)	"	.114	9.2/0.3
RIT	RIT(7)	RUS(1)		.021	.021	0.7
	"	RUK(2)		"	.021	7.7*
	"	RGE(5)		"	.020	19.1°
	"	RUS(3)	RUK(2)	"	.021	4.8/8.1*
	"	RUS(1)	RGE(5)	"	.020	1.8/20.2°
	"	RUS(1)	RFR(1)	"	.021	0.3/2.6

Source: Financial Times.

(1) Natural logarithm of money market rates respectively in the US, the UK, Germany, France and Italy. (2) In parentheses the number of lagged values included for each variable. (3) FPE = $[(T+m+1)SSR/(T-m-1)T] \times 100$, where T is the number of observations, m is the number of lagged variables and SSR the sum of squared residuals. The subscripts AR and MV refer respectively to the autoregressive and multivariate models. (4) Under the null hypothesis, the log-likelihood ratio of the best MV and AR equation residuals -- $L = -2\ln(SSR_{MV}/SSR_{AR})^{T/2}$ -- is asymptotically distributed as a central χ^2 with degrees of freedom equal to the number of restrictions. * indicates rejection of the null hypothesis (that the additional variable or variables do not improve FPE) at a 5 per cent significance level; ° indicates rejection at a 1 per cent significance level. For trivariate equations, the χ^2 values refer to the variables in column (2) in the same order.

regression models of money market interest rates in selected countries[21]: they show a strong and significant contribution of US interest rates to the predictive performance of German and French interest rate equations, while little influence is detected for the United Kingdom and Italy. Within Europe, the German interest rate strongly improves the performance of both the French and Italian interest rate equations; in both cases, when the German interest rate is included on the right hand side together with the US rate, the latter becomes insignificant. Interest rates in the United Kingdom do not seem strongly affected by those in the United States; this finding, however, might be primarily due to the experience before 1981, as subsequently in a number of occasions the UK monetary authorities

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21/ The models were estimated on weekly data (Wednesday data for each week) from November 1979 to March 1984, with OLS. VAR models can be estimated consistently with OLS provided that i) the model variables are widesense stationary stochastic processes; and ii) the error terms satisfy the usual orthogonality conditions (cf. Sargent 1979). The approach adopted in estimation and model evaluation was the following: for each variable the "best" autoregressive equation was searched by choosing the lag length which minimized the equation final prediction error (FPE, defined in the footnote to Table 5); this criterion for comparing predictors was suggested by Akaike (1970). The search procedure, on the basis of the same error minimization criterion, was then extended to multivariate equations including as "explanatory" variables the "optimal" number of lags of each dependent variable and varying lags of the other variables in the model, individually and jointly. When one variable improved the FPE - relative to that of the best autoregressive equation - a likelihood ratio test of significance was also performed on its contribution.

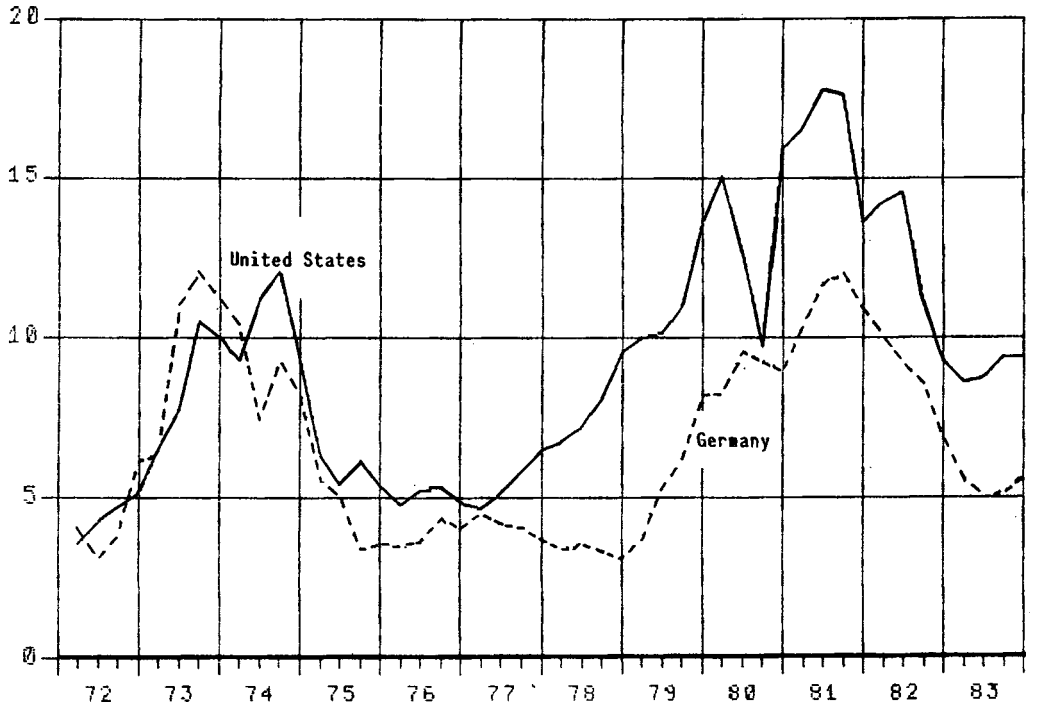
appeared to respond to US interest developments to support the pound. European interest rates, not surprisingly, do not enter the US interest rate equation significantly[22/].

While strongly influenced by developments in US financial markets, interest rates in Europe were to an extent "uncoupled" from those in the United States, by letting the exchange rate take up the balance of the adjustment. It can be seen in Chart 4 that in 1979-83 German interest rates, while showing a similar time profile, were kept on a much smoother course, and that (lower quadrant of Chart 4) this course was more or less common to the other European countries (including, since 1981, the United Kingdom).

It can also be seen (Table 6) that, while the variability of US interest rates in 1979-83 was much greater than in previous periods, this was not the case for the other countries under review. As a consequence, much of the increased variability in US interest rates was reflected in dollar exchange rates: as the correlations at the bottom of Table 6 show, since 1980 dollar bilateral exchange rates are strongly "associated" with interest rates in the United States and weakly with interest rates in foreign markets.

22/ It should be noted that failure to detect a contribution of one variable to the explanation of another could not be taken as conclusive evidence of functional independence: indeed, if one thinks of the VAR model as a reduced form of a structural model in which contemporaneous values of the endogenous variables enter all the equations, then it is easy to see that a significantly non-zero coefficient of one variable in another variable's equation in the structural model can be consistent with a small and/or insignificant coefficient in the corresponding reduced form equation (cf. Rogoff 1983, Appendix B).

SHORT-TERM INTEREST RATES IN THE UNITED STATES AND GERMANY



SHORT-TERM INTEREST RATE DIFFERENTIALS IN SELECTED COUNTRIES
VIS-A-VIS THE UNITED STATES
(US - foreign countries)

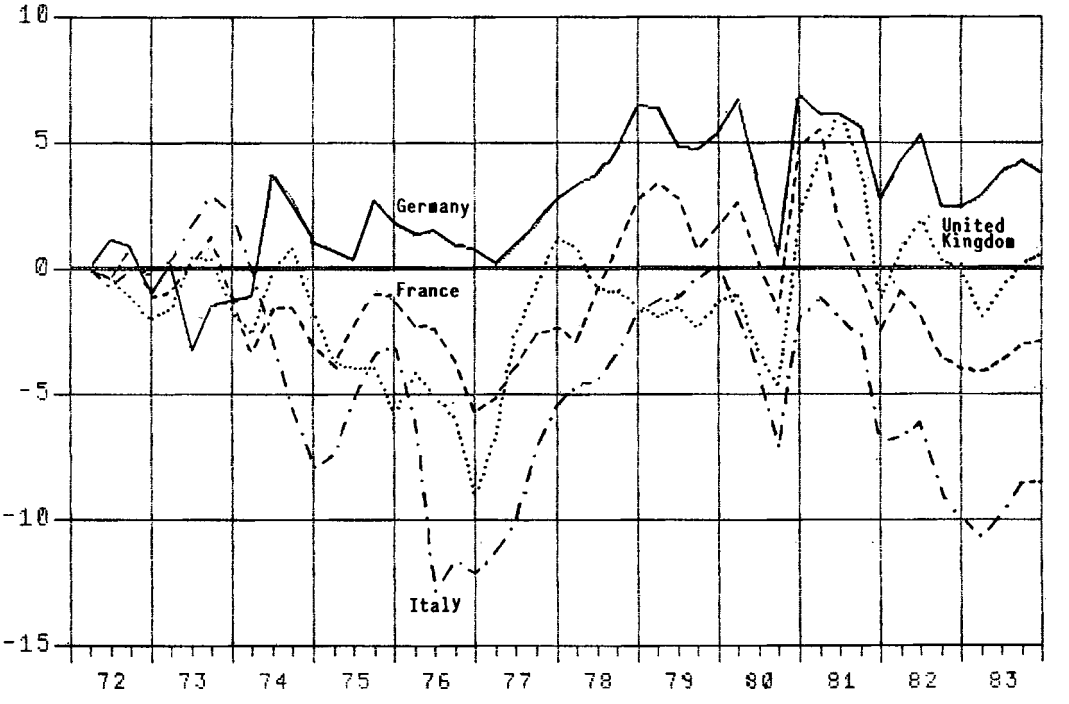


Table 6

VARIABILITY OF MONEY MARKET INTEREST RATES AND OF EXCHANGE RATES IN SELECTED COUNTRIES (1)

	1973-83	1973-79	1980-83	1983
variability of money market interest rates				
- United States	1.13	0.74	1.81	0.48
- United Kingdom	1.44	1.57	1.22	0.67
- Germany	1.02	1.10	0.87	0.39
- France	1.25	1.31	1.15	0.21
- Italy	1.50	1.93	0.75	0.60
variability of effective exchange rates				
- US dollar	1.61	1.39	2.00	1.30
- sterling	1.62	1.51	1.80	2.27
- DM	1.36	1.49	1.12	0.94
- French franc	1.32	1.36	1.25	0.95
- lira	1.20	1.44	0.78	0.52
variability of DM bilateral exchange rates vis-à-vis				
- US dollar	2.63	2.52	2.80	1.86
- sterling	2.35	2.36	2.34	2.66
- French franc	1.33	1.52	1.00	1.11
- lira	1.75	2.52	0.88	0.92
correlation coefficient between exchange rates and money market interest rates (2)				
- $ effective **(a)**	0.336	0.097	0.371	0.392
- £/$ **(a)**	0.010	0.113	-0.326	0.217
(b)	0.177	-0.125	0.303	0.109
- DM/$ **(a)**	0.089	-0.052	0.056	0.013
(b)	0.309	0.018	0.327	0.427
- FF/$ **(a)**	0.251	0.044	0.027	-0.317
(b)	0.326	-0.012	0.327	0.260
- Lit/$ **(a)**	0.139	-0.076	0.037	-0.220
(b)	0.238	-0.163	0.391	0.495

Source: IFS.

(1) Variability is measured by the standard deviation of monthly percentage changes. (2) **(a)** Correlation with national interest rates. **(b)** Correlation with US interest rates.

Of course, the ability of European countries to "uncouple" from US interest rates was not independent of domestic conditions in view of their influence on exchange rate expectations. In early 1981, for instance, pressure on the DM was enhanced by Germany's deteriorating inflation performance and weak external position, both of which compared unfavourably with those of the United States. On the contrary, stronger domestic and external conditions made it possible to weather the rebound in US interest rates in spring 1982 without changing the course of German monetary policy; in part the outcome was the same when US interest rates started to rise again in the fall of 1983.

IV.3. We have noted above that since the inception of the EMS the DM has de facto become the reference standard for monetary coordination within the system as well as an important dollar-substitute in international (private and official) portfolios.

There are two consequences of these developments. First, within the EMS area external monetary shocks tend to be transmitted "through" Germany, that is their timing and intensity are largely determined by the response of German monetary policy. Some evidence of this has already been provided by our VAR results, which show that German interest rates exert a strong influence on French and Italian rates and also that the effect of US rates becomes insignificant when the German rates are included as "explanatory" variable. In other words, it appears that the "information" stemming from US interest rates is "conveyed" to France and Italy via the German rates. It can also be seen that in the EMS period the (nominal) interest rate (level) correlations (cf. Table 2) are stronger on the one

side between the United States and Germany and between Germany and either France or Italy, than they are between the United States and either France or Italy.

The other consequence of the special role of the DM in the EMS stems from two causes. First, since the DM is the only EMS currency that has a reserve function in the international monetary system it tends to take "more than its share" in movements of capital in and out of the dollar. Second, as Germany has the best record in terms of price stability, the DM tends to be strong vis-à-vis the other EMS currencies. Thus, other things being equal, when the dollar strengthens vis-à-vis the DM, the latter becomes weaker vis-à-vis the other EMS currencies. This improves the system's cohesion and makes the exchange rate constraint on weaker countries less binding: as the expectations of strains or realignments within the EMS subside, margins for easier monetary policy are created in these countries. The opposite is true when the DM appreciates vis-à-vis the dollar.

The existence of a negative correlation between the dollar/DM exchange rate and the DM rates vis-à-vis the other EMS currencies has already been noted in commenting Chart 2. This evidence can be supplemented by adding that almost every realignment since 1981 has been "precipitated" either by a change in policy in Germany to halt the DM fall vis-à-vis the dollar (e.g., March 1981) or by a reversal of expectations about the dollar exchange rate itself (June 1982, March 1983). This complex interaction between dollar/DM exchange rates and EMS cohesion is one of the main reasons for the observed weak impact of US interest rates on those of France and Italy.

Although convergence of "real" variables - notably inflation - has improved during the past year, this special role of the DM in the EMS

suggests that a strengthening of the DM vis-à-vis the dollar in the future could somewhat increase the pressure on weaker EMS countries to adjust and deprive them of a shield behind which to delay their adjustment efforts.

V Conclusions

The transition to floating exchange rates produced a greater segmentation of international financial markets, which however was gradually reversed in the ensuing years; as a consequence of this reversal, the impact on exchange rates of any given interest rate differential has tended to increase over time. Since 1981, and especially in 1982 and 1983, tighter monetary policy and high interest rates in the United States have maintained pressure on European interest rates; the constraint has been more binding when inflation and external deficits were depressing expectations on exchange rates.

Instead of fully aligning their interest rates to those in the United States, European countries have let the exchange rate take up part of the adjustment. The inflationary consequences of this choice have been lower than feared, not only as a result of weak commodity prices in international markets, but also because of the non-accommodating stance of domestic policies. At the same time, rapid growth in the United States, largely due to fiscal expansion, and the improved international competitiveness of European goods, due to the appreciation of the dollar, have favored the growth of exports and fuelled the recovery in Europe.

Since 1982 monetary conditions have been eased considerably in Europe. In fact in most instances money (M2) velocity is at present not very

far from its trend value (Table 7). Further monetary expansion is not currently sought by monetary authorities - as clearly reflected in their targets for 1984 - for the recovery is now under way and inflation figures have recently tilted upwards. In France and Italy these considerations are strengthened by the need to bring inflation back in line with major competitors.

Thus, it would appear that the higher costs of an inappropriate policy mix in the United States and of the dollar overvaluation have been borne so far by the United States themselves[23/]. We do not claim that an external interest rate constraint is substantially limiting the room for maneuver in Europe at present. Of course, the situation could change if the current trends in US markets were to continue.

It is the long-term implications of the current interest and exchange rate situation that are worrying.

First, with the recovery of world demand and of commodity prices in world markets, cost pressures in importing countries outside the United States will be higher than in the past if the dollar stays high or, worse, goes higher. Conversely, there would be benefits from a decline of the dollar, if this were gradual. Second, a substantial and protracted dollar over-valuation is already changing the pattern of world trade and productive specialization, and is displacing resources. This can hardly be seen as "optimal" and in any case may have to be reversed at a later stage, adding to the adjustment costs which are already being borne. Resistance to these

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23/ Cf. in the same vein de Grauwe-Fratianni (1983), Emminger (1984) and Wallich (1984).

Table 7

NOMINAL GDP AND MONETARY AGGREGATES IN SELECTED COUNTRIES

	Average 1973-82	1982	1983	1984 (1)
		nominal GDP growth		
US	9.9	4.2	7.9	9-10
UK	15.8	9.8	8.6	8.0
GE	6.9	3.8	4.1	5.5
FR	13.7	14.4	10.9	7.7
IT	20.1	17.1	13.8	12.7
		monetary aggregates (M2)		
US	8.1	10.0	14.0	6-9
UK	15.9	18.6	18.2	7-11 (2)
GE	7.9	5.3	6.1	4-6 (3)
FR	13.5	11.2	10.1	5.5-6.5
IT	18.9	14.1	13.7	10-11 (4)
		money velocity		
US	2.9	3.0	2.8	2.8
UK	2.9	2.7	2.6	2.7
GE	1.9	1.9	1.8	1.8
FR	2.1	2.2	2.3	2.2
IT	1.3	1.4	1.3	1.4

Source: IFS

(1) Forecasts and targeted growth rates. (2) Common target range for M1, M3 St. and PSL2. (3) The target is defined for central bank money, whose behavior however has been on average broadly in line with that of M2. (4) Italy does not announce targets for M2; a "desirable" expansion of money balances is however implicit in the set of financial projections published every year with the government's Relazione Previsionale e Programmatica.

developments takes the form of protectionist pressures in the United States and elsewhere, which are opposed with varying, but decreasing success by Governments.

Furthermore, a continuation of the present policy mix and high real interest rates in the United States is "forcing Europe to fight unemployment with a tight money-easy budget mixture a mixture of policies quite unfavorable to long-run growth" (see the quotation from Tobin in Section I, with Europe replacing the United States). These concerns are heightened by the differential effects of fiscal structures, which in recent years may have raised the "equilibrium" (real) interest rate level in the United States. Considerations of this type have led to proposals for an interest-equalization tax, designed to restore relative positions across the Atlantic.

What can Europe do? While maintaining an open trade and financial system, Europe can reduce its disproportionate "financial dependence" on the United States. In particular, there are substantial benefits to be gained from a strengthening of the process of financial integration and from a greater use of European currencies - or perhaps of its common currency, the ECU - in commercial and financial transactions.

Moreover, in spite of their high degree of economic integration, European countries continue to behave very much as "small open economies", notably in the formulation of their economic policies. This "open economy syndrome" is a consequence of lack of coordination of macropolicies at the Community level. In this regard, even though the EMS has induced some progress towards greater convergence and coordination of monetary policies, more still needs to be done.

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ANNEX

OLS ESTIMATE OF DOLLAR/DM RATE EQUATION 7304-8403 (MONTHLY DATA) (1)

$$\ln DM = \underset{(-4.5)}{-10.92} \underset{(-4.2)}{-4.93 DUM} \underset{(-2.2)}{-4.99 \cdot 10^{-4} TB_{-3} (1-DUM)} \underset{(0.3)}{+0.59 \cdot 10^{-4} TB_{-3} DUM} \underset{(0.2)}{-3.87 DIF(1-DUM)} +$$

$$\underset{(-4.1)}{-0.78 DIF \cdot DUM} \underset{(22.5)}{+82.72 \ln DM_{-1}}$$

$R2C = 0.98$; $SE = 0.07$; $H = 0.25$; $RHO = \underset{(3.8)}{0.32}$

Equilibrium coefficients

Variable	7304-7909	7910-8403
TB	$-2.89 \cdot 10^{-3}$ (-2.3)	$0.34 \cdot 10^{-3}$ (0.3)
DIF	-0.22 (-0.2)	-4.48 (-6.0)

Variables:

DM = Dollar/DM exchange rate (dollars for 1 DM); period averages

DUM = Dummy variable with value 0 in 7304-7909 and 1 in 7910-8403

TB = Foreign trade balance component which is not explained by (past) competitiveness. This variable is in turn obtained from a separate equation

DIF = Real interest rate differentials (United States - Germany). Nominal interest rates are deflated with CPI percentage changes over 12 months

ln indicates natural logarithm

Source of data: IMF-IFS

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(1) All coefficients are multiplied by 100; the numbers in parenthesis are Student's t ratios.

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