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HAVE FLEXIBLE EXCHANGE RATES HANDICAPPED MACROECONOMIC POLICY?

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INTERNATIONAL FINANCE SECTION
DEPARTMENT OF ECONOMICS
PRINCETON UNIVERSITY · 1980

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International Finance Section

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Introduction

This paper examines the impact of greater exchange-rate flexibility on the conduct of macroeconomic policy in industrial countries. The basic plan is to survey both the 1973-79 experience with managed floating and the literature on flexible exchange rates in order to determine if and how flexible rates have made macroeconomic policy more difficult.

To keep the paper to manageable proportions, a number of restrictions have been placed on its scope. First, while an important characteristic of floating rates is that lines of influence between exchange rates and domestic macroeconomic policies run in both directions, the emphasis here is on the effect of the exchange-rate regime on domestic policies and targets rather than the other way around. Put in other words, the paper is not a survey of exchange-rate determination.[1]

Second, any discussion of the relative merits of managed floating or flexible rates must by definition have some standard of comparison in mind—the familiar "Compared to what?" question. Rather than consider a wide range of alternatives (pure floating, truly fixed rates, crawling pegs, target zones, reference rates, etc.), this paper uses the adjustable-peg system as the sole benchmark for the existing floating-rate system.[2] Managed floating is assumed to be differentiated from the adjustable-peg system by the greater frequency of exchange-rate changes, by the larger share of the external adjustment burden that is assigned to the exchange rate, and by the absence of a publicly declared target exchange rate.[3]

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[1] This restriction is not hard to rationalize, because several excellent surveys of exchange-rate determination already exist (see Isard, 1978; Schadler, 1977; and Kohlhagen, 1978).

[2] Although the vast majority of countries now maintain pegged exchange rates of one type or another (95 out of 134 members as of October 1978), the existing exchange-rate system is best characterized as "floating" when the measure is either the proportion of world trade conducted by countries with floating rates or the proportion of world trade conducted across floating-rate areas. Recent IMF staff estimates indicate, for example, that less than one-fifth of world trade in 1977 moved across pegged exchange rates (see IMF, 1978, p. 38).

[3] Farber *et al.* (1977) compared the distribution of exchange-rate changes under fixed (1957-71) and floating (1971-75) exchange rates for seventeen developed countries. They found that the proper distinction in the 1960s and 1970s was not between fixed and fluctuating rates but between large infrequent adjustments and small frequent adjustments of exchange rates. Because the empirical distributions

Finally, the paper does not include much detailed description or evaluation of the actual macroeconomic policies followed by individual industrial countries during the floating-rate period.[4] Instead, the focus is on the major issues and arguments among the industrial countries about how, when, and where flexible rates complicate the task of macroeconomic management, and on the empirical evidence relevant to choosing among these competing views.

The paper is organized around the discussion of seven major questions about the effects of flexible rates. The first three deal with inflation, the fourth with unemployment, the fifth with monetary policy, the sixth with shocks or disturbances, and the seventh with trade flows. These questions can be compactly stated as follows: (1) Do flexible rates reduce the authorities' will or discipline to fight inflation? (2) Do flexible rates *cum* downward price inflexibility have a tendency to ratchet up country and global price levels? (3) Do flexible rates exacerbate intercountry inflation differentials by drawing weaker countries into a "vicious circle" of inflation and currency depreciation, and stronger ones into a "virtuous circle" of price stability and currency appreciation? (4) Do flexible rates affect unemployment either by allowing some countries to maintain higher inflation rates than would be possible under fixed rates or by generating enough "noise" in relative price signals to increase frictional unemployment? (5) Do flexible rates increase the independence or effectiveness of domestic monetary policy? (6) Do flexible rates have much value as insulators or shock absorbers against external disturbances? And (7) do flexible rates alter the responsiveness of trade flows to exchange-rate changes? Conclusions appear at the end of the discussion of each major question and in a final section that draws together the main lessons from the analysis.

A Caveat

Table 1 provides a quick comparison of inflation, unemployment, real income growth, and unused industrial capacity for the seven largest industrial countries during the floating-rate period (1973-78) and during the last decade of the adjustable-peg system (1962-72). The clear message is that the industrial countries as a group have fared far worse during the past six years of floating rates than during the preceding decade of adjustable par values. Indeed, the last column of Table 1 says

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are non-normal for all these countries, a comparison of standard deviations does not adequately summarize the difference between the two exchange-rate regimes.

[4] Black (1977) provides a detailed analysis of the macroeconomic and exchange-rate policies followed by Germany, France, Sweden, the United Kingdom, and the United States during the early years of floating. An update is given in Black (1978).

TABLE 1

SUMMARY INDICATORS OF MACROECONOMIC PERFORMANCE FOR THE SEVEN LARGEST INDUSTRIAL COUNTRIES, 1962-72 AVERAGE VS. 1973-78 AVERAGE

	Canada	*France*	*Germany*	*Italy*	*Japan*	*U.K.*	*U.S.*	*Unweighted Average*
Consumer prices:[a]								
1962-72	3.1	4.5	3.1	4.4	5.7	4.9	3.1	4.1
1973-78	8.9	10.1	5.1	15.5	11.5	15.0	7.7	10.6
Unemployment rate:[b]								
1962-72	5.0	1.8	1.0	3.2	1.2	2.3	4.7	2.7
1973-78	6.9	4.0	3.7	3.7	1.7	4.4	6.7	4.4
Real GNP:[a]								
1962-72	5.5	6.0	4.6	4.6	10.3	2.4	3.9	5.3
1973-78	4.0	3.1	2.3	2.7	4.7	3.0	3.0	3.2
Output gap in manufacturing:[c]								
1962-72	–4.5	n.a.	–1.7	–4.0	–1.9	–3.2	–2.0	–2.9[d]
1973-78	–7.8	n.a.	–7.6	–7.0	–15.6	–8.9	–5.6	–8.7[d]

[a] Annual percentage change.
[b] As per cent of labor force.
[c] Defined as potential output less actual output, as percentage of actual output. A negative figure indicates manufacturing sector is operating at less than normal capacity. The figures are recent revisions of those in Artus and Turner (1978).
[d] Excludes France.

that inflation rates have been over twice as high, unemployment rates more than one and a half times as high, real income growth only about 60 per cent as fast, and output gaps in manufacturing about three times as large.[5] If macroeconomic policy were judged only by what happens to the "bottom line," the conclusion would be hard to escape that it has been noticeably less successful under floating rates.

But care needs to be taken to avoid confusing the *period* of flexible rates with the *effects* of flexible rates themselves. Specifically, one wants to be able to distinguish between the proposition that macroeconomic policy in general has become less effective in industrial countries during the floating-rate period and the proposition that flexible rates per se have made macroeconomic policy less effective.

To appreciate the extent of this identification problem, it is sufficient to mention just some of the other major factors affecting the stance and efficacy of macroeconomic policies during the period of floating rates.

As regards shocks or disturbances, the two major ones according to Black (1978) were the tripling of world oil prices in 1974 (Pierce and Enzler, 1974) and the huge expansion (57 per cent) in international reserves from 1970 to 1972 associated with the collapse of the Bretton Woods system (Heller, 1976).[6] The oil shock produced large stagflationary effects in most industrial countries, even given the recycling of much of the OPEC current-account surplus and the avoidance of competitive devaluation among the oil-consuming countries. From 1975 on, macroeconomic policy had to deal with high inflation and high unemployment simultaneously. The international liquidity shock, in combination with the decision of many countries to pass through reserve increases to their money supplies, meant that the floating-rate period began with substantial monetary expansion in the pipe, the impact of which allegedly contributed to the high inflation rates of 1973-75.[7]

On the structural and institutional fronts, there were the changes in

[5] The qualitative conclusion of this comparison is not much affected by the dating of the adjustable-peg period (1960-70 vs. 1962-72), the number of countries included in the industrial-country average (14 vs. 7), the weighting of the individual country figures (GNP-weighted vs. unweighted), or the particular price indices or output-gap measures employed.

[6] Some observers would also want to include the world commodity boom of 1972-74 as another major shock. It cannot, however, be considered totally exogenous to the exchange-rate system because the exchange-rate instability of 1973-74 apparently fueled some speculation in commodities (see Cooper and Lawrence, 1975).

[7] Heller (1976) has estimated that a 10 per cent increase in world reserves leads to an increase in world consumer prices of about 5 per cent, and that the mean lag is roughly three years. For a critique of Heller's estimates, see Sweeney and Willett (1977). On the question of causality, Khan (1979) finds uni-directional causality running from international reserves to inflation for the fixed-rate period but two-way causality for the floating-rate period.

the demographic composition of industrial-country labor forces, with their effects on measured and natural unemployment rates (Perry, 1970, and Haveman, 1978); the spread of indexation of wages and salaries in response to the high and variable rates of inflation (Braun, 1976), with its implications for the magnification of supply shocks (Fisher, 1977) and the reduced scope for real exchange-rate changes (Modigliani and Padoa-Schioppa, 1978); the rapid growth of the Eurodollar market and the switch from asset to liability settlement of external imbalances for even non–reserve-currency countries; and the adoption of pre-announced money-supply targets by several industrial countries in response to both high inflation and excessive exchange-rate variability (IMF, 1979b).

Finally, even the theoretical support for stabilization policy underwent some revision with the general acceptance of the vertical nature of the long-run Phillips curve (Friedman, 1968, 1977) and the growing popularity of the rational-expectations critique of activist stabilization policy (Lucas, 1976, and Sargent and Wallace, 1976).

The practical upshot of this intermingling of shocks, policy responses, and structural and institutional changes is that there are strong limits to the inferences one can draw from the observed data about the independent effects of flexible rates on macroeconomic policies. This should be kept in mind when the "evidence" on the various hypotheses about flexible rates is presented.

The Discipline Hypothesis[1]

One of the older arguments against flexible rates is that they reduce the resolve or discipline to fight inflation. This argument is worth examining in some detail, because even long-time supporters of flexible rates like Sohmen (1963), Haberler (1964), and Yeager (1968) have regarded it as perhaps the most potent objection to a system of flexible rates.

The discipline hypothesis can be stated as follows: Under fixed exchange rates, a country that inflates at a rate higher than its trading partners will, *ceteris paribus*, suffer a deterioration in its balance of payments (i.e. a loss in international reserves). Since a devaluation will be regarded as an indicator of the failure of government policies, the high-inflation country will have to discipline itself by restraining aggregate demand so as to bring its inflation rate into line with those of its trading partners. Implicit here is the notion that the fixed exchange rate and the declining stock of international reserves provide the rallying points necessary to convince the public or the authorities in the high-inflation country to accept the imposition of unpopular domestic restraints (e.g. the unemployment costs associated with refusing to validate excessive money-wage increases). A much weaker discipline is said to exist for surplus countries under fixed rates because there is no equivalent constraint on the accumulation of reserves.

This asymmetry in discipline is claimed to be absent under flexible rates. When rates are floating, the immediate consequence of a relatively high inflation rate is a currency depreciation and, in turn, a higher nominal price level in the high-inflation country. But since a flexible exchange rate automatically equilibrates supply and demand in the foreign-exchange market, the balance-of-payments constraint upon domestic policy is said to be eliminated for surplus and deficit countries alike. Thus, external pressures to reduce the inflation rate in the high-inflation country will disappear, and, according to the discipline argument, inflation will be higher than under fixed rates.

The merits of the discipline hypothesis can perhaps best be ascertained by looking one at a time at its component propositions: (1) A devaluation under fixed rates carries heavy political costs. (2) Fixed rates reduce the dispersion of inflation rates across countries by preventing both low- and high-inflation countries from exercising their different inflation/unemployment preferences. (3) This reduction in dispersion is narrowed more by reducing the inflation rates of high-inflation countries

[1] Much of this chapter draws heavily on Crockett and Goldstein (1976).

than by increasing those of low-inflation countries (i.e. discipline operates asymmetrically). (4) External constraints on domestic policy are removed by the balance-of-payments clearing properties of flexible rates. And (5) the internal discipline on high-inflation countries under flexible rates is weak.

Political Costs of Devaluation

Evidence on the political costs of devaluation is scanty, quite apart from the question of whether economists are best qualified to make such judgments. In a study of thirty-six devaluations in less-developed countries, Cooper (1971) found that in nearly 30 per cent of the cases the government fell within a year after the devaluation; the corresponding figure for the control group of countries (those not devaluing) was 14 per cent. Ministers of Finance fared worse, nearly 60 per cent losing their jobs in the year following devaluation (vs. 18 per cent for the control group).

No similar analysis exists for industrial countries, but there are some clues to suggest that the political costs of devaluation are apt to be lower. For one thing, the emerging public-choice literature, which seeks to relate voting behavior and government popularity to economic variables, generally finds that only the traditional domestic macro targets (real income growth, inflation and unemployment rates, etc.) matter, and further that only recent performance counts; voters have very short memories (Fair, 1978; Frey and Schneider, 1978). This would imply that devaluation is politically costly in industrial countries only insofar as it has adverse effects on real income, inflation, or unemployment and, even then, only if these effects show up within a year or two of election time. The observed frequency of exchange-rate changes and the preponderance of devaluations during the adjustable-peg period also cast doubt on the devaluation-aversion thesis. For example, from 1959 to 1970 the longest period without an exchange-rate change by any of sixteen OECD countries was four years (1962-66). The number of departures from the "snake" by high-inflation countries also does not lend much support to the discipline hypothesis.

Dispersion of Inflation Rates

On the question of dispersion of inflation rates across countries under fixed and flexible rates, quite a bit of empirical work has been done but its interpretation is ambiguous. Calculations of the standard deviation of inflation rates among the industrial countries invariably indicate greater dispersion of inflation rates under floating than during the adjustable-peg period (Whitman, 1976; Fieleke, 1978). A representative calcula-

tion is that the standard deviation of consumer-price-index inflation rates among the seven largest industrial countries listed in Table 1 increased from 1.6 for 1962-72 to 4.4 for 1973-78.[2] The difficulty with such comparisons is that lower dispersion of inflation rates under fixed rates is consistent not only with the hypothesis that countries have less freedom to exercise their differing inflation propensities but also with alternative hypotheses, such as increased transmission of inflation across countries, stronger common external price shocks, greater vulnerability to such shocks, greater convergence of rates of productivity growth across countries, the then smaller relative size of the nontradable sector in most countries, and the endogeneity of the exchange-rate regime itself to the size of these inflation differentials. Thus, while it is clear that inflation disparities were smaller under fixed rates, it is not clear why this was so.[3]

A second line of approach to the dispersion question is to try to establish that the intercountry inflation differences that did exist during the fixed-rate period were small enough so that it is meaningful to speak about a single world inflation rate. The trick here, of course, is to find an appropriate measuring rod for these differences. It is not enough merely to observe that correlations of price levels or of inflation rates across countries were high (R^2's = 0.9) under fixed rates. Genberg (1977) has offered perhaps the most original idea by proposing that differences in inflation rates among U.S. cities be used as the benchmark for intercountry differences. Using quarterly inflation rates for sixteen OECD countries over the 1959-70 period (and various subperiods, including the 1962-66 period of no exchange-rate changes), Genberg concludes that, on balance, the variation in inflation rates between countries was no greater than that within the United States. Hence, if the United States is considered to be an integrated market, so too should the world economy. Lawrence (1979) has recently shown, however, that Genberg's analysis-of-variance tests were inappropriate to the question at hand. Once corrected, they yield the robust result that inflation rates were much more similar within than across countries, in both the short and long run.

[2] If the coefficient of variation is used as the relevant dispersion measure rather than the standard deviation, the differences between the two periods are not surprisingly much reduced (e.g. 0.39 for 1962-72 vs. 0.41 for 1973-78). Which measure to use depends on one's purpose. The standard deviation seems more appropriate when the aim is to measure how the exchange-rate regime affects the dispersion of countries' relative price levels (Parkin, 1976).

[3] Swoboda (1977) suggests that the observed inflation differences across countries during the fixed-rate period can be explained in terms of the nonfixity of exchange rates, impediments to trade and sluggish goods arbitrage, the existence of nontraded goods, and errors of measurement in the price data.

Asymmetry in Reserve Discipline

Even if we accepted that greater fixity of exchange rates reduces the dispersion of inflation across countries, lower dispersion would not by itself make fixed rates anti-inflationary unless reserve discipline operated more strongly on the high-inflation countries.[4] What can we say about such an asymmetry?

One can certainly identify periods under the fixed-exchange-rate regime when individual industrial countries were led to adopt restrictive domestic policies for balance-of-payments reasons—the United Kingdom (1954-55, 1957, 1960-61, 1965-66), Italy (1963-64), Japan (1956-57, 1963-64, 1966-67), France (1956-57), etc. The trouble is that it is not much harder to find cases where other or the same deficit high-inflation countries did not adopt restrictive domestic policies, the United States during the Vietnam period in the late 1960s being perhaps the classic counterexample.[5] Cases can similarly be cited on both sides of the aisle as regards surplus low-inflation countries (see Crockett and Goldstein, 1976).

All in all, the Bretton Woods experience probably lends qualified support to the proposition that balance-of-payments deficits prompted stronger demand-management adjustment measures than comparable surpluses. This is essentially Michaely's (1971) conclusion from his study of the responsiveness of demand policies to balance-of-payments developments in nine industrial countries over the 1950-66 period:

> Countries whose monetary policy generally responds to changes in the balance of payments tend to make exceptions to this pattern of behavior mainly when they are in surplus. Similarly, compliance of monetary policy with balance-of-payments requirements in generally non-complying countries tends to be found at times of deficit. . . . The loss of reserves is viewed with concern; but their accumulation . . . is viewed, in fact, with satisfaction or indifference" (pp. 63-64).

External Constraints under Flexible Rates

The next step in the discipline argument, that flexible rates will remove the external constraint on domestic policy via the market-clearing properties of the exchange rate, would seem to be the weakest link. Whatever the explanation, be it the absence of supporting macropolicies, or the importance of nonprice factors in international trade, or the perceived temporary character of exchange-rate changes, it is by now clear

[4] Indeed, some economists (e.g. Haberler, 1979) view the greater dispersion of inflation rates under floating simply as evidence that floating has enabled some countries to become much-needed oases of price stability in an inflationary world.

[5] Reserve-currency countries, of course, represent a special case for the discipline hypothesis (see Black, 1977).

that even sizable real exchange-rate changes will not equilibrate current accounts in the short run (Artus and Young, 1979).[6] Even more to the point, where there have been conflicts between internal and external targets under managed floating, the conflict has often been resolved in favor of the external target. Black (1978), for example, identifies the following periods as classic dilemmas in the sense of Meade: Germany in 1973, France in 1974-76, Japan in 1974, the United Kingdom in 1974-76, Italy in 1974 and 1976, Canada in 1974-76, and Sweden in 1974-76. His conclusions are worth reporting:

> In most cases, some influence of the external target on monetary or fiscal policy is evident, except for Germany in 1973, the United Kingdom in 1974, and Canada in 1974. Furthermore, the influence of external targets appears to have been rising, as the 1976 conflict cases (France, Italy, Canada, the United Kingdom, and Sweden) have all been resolved in favor of the external target over the internal target. This flies in the face of the conventional wisdom about floating exchange rates, which should supposedly *reduce* [his italics] the influence of external targets (p. 626).

Internal Discipline under Flexible Rates

The view that internal disciplinary pressures against inflation would be weak under flexible rates has also been challenged.[7] Emminger (1973), for one, argues that the only immediate consequence of a high-inflation policy under fixed rates is a rundown in the stock of reserves. Under flexible rates there will be a currency depreciation, and this will lead to an additional increase in domestic prices and to recognition by the public that domestic incomes carry less and less purchasing power over foreign goods. Thus, pressures will soon be brought to bear on the authorities to halt their inflationary policies.

The import of this argument would seem to depend on the time span under consideration and on the public's response to many small price changes vs. a single large one. That is, once one admits the reasonable possibility that under an adjustable-peg system, a high-inflation country will ultimately have to devalue, then the issue reduces to (1) whether a given increase in inflation now will have a greater disciplinary effect than the perceived inflationary cost of a devaluation later; and (2)

[6] In Artus, 1979, it is noted that private capital flows have covered little of the current-account imbalances for the three largest industrial countries over the 1970-78 period. Artus argues that the relevant question is not whether flexible rates will clear the current and capital accounts without any official intervention, but rather at what *level* of exchange rates the market will clear without intervention.

[7] Another argument for why flexible rates can provoke stronger discipline than fixed rates is that flexible rates "bottle up" inflation in the originating country (relative to the sharing of exporting of inflation under fixed rates). The counterargument to this is that flexible rates bottle up unemployment as well, so that it is unclear why inflationary mistakes would be avoided more than deflationary ones.

whether the public's perception about inflation is greater when it occurs in a large discrete jump.[8] There is some indirect evidence on the latter point but none on the former. Specifically, Hamermesh (1970), Eckstein and Brinner (1972), and Gordon (1972) have all found that the elasticity of money wage with respect to domestic price changes in the United States is greater when inflation is high than when it is low (i.e. there is a threshold effect). On the other side of the ledger, flexible exchange rates have not changed in the smooth, gradual manner predicted by their early supporters.[9] To some observers, the relevant choice is therefore more and more between many and few large exchange-rate changes, not between many small and a few large changes.

As a final piece of evidence on the discipline hypothesis, it can be noted that industrial countries as a group have not been running their economies closer to full capacity during the floating-rate period than before (see the last two rows in Table 1). But this was the outcome, not necessarily the intention, of macroeconomic policy. Rates of monetary expansion have been higher on average for the 1973-78 period than during the preceding decade,[10] and the larger observed output gaps during floating are probably attributable to the deflationary effects of the 1974 oil-price shock and to the tendency for a given dose of expansionary demand policy to yield less real output growth and more inflation now than before. This latter point is supported in a recent empirical study by von Furstenberg and White (forthcoming) on the inflationary effects of monetary expansion for ten industrial countries over the 1960-78 period. They conclude:

> . . . A given rate of money supply growth would now (post 1973) be expected to produce almost 3 percentage points higher rates of inflation than before 1974. Thus, there is far less real economic growth and more inflation to be had from given rates of monetary expansion. . . . The inflation penalties attending any given increase . . . in the amount of money supplied are now more severe than before throughout the industrial world almost without exception (p. 21).

[8] Johnson (1969) makes this point when he argues that "under a flexible rate system, exchange rate adjustment would occur gradually, and would be less likely to require drastic revisions of wage and price-setting decisions . . . (p. 216).

[9] The short-run variability of both bilateral dollar exchange rates and effective exchange rates for the seven largest industrial countries over the 1972-79 period can be seen in IMF (1979a, Charts 14 and 15).

[10] The average annual percentage change in M_1 for the fourteen industrial countries was 7.5 per cent for 1962-72 vs. 9.1 per cent for 1973-78. Similarly, von Furstenberg and White's (1979) weighted M_2 measure for ten industrial countries (the big seven plus Belgium, the Netherlands, and Switzerland) increased on average by 9.9 per cent for 1962-72 vs. 11.2 per cent for 1973-78. In addition, rates of real income growth have been much lower on average during the 1973-78 period, so that the excess supply of money was probably considerably larger during the latter period.

Conclusions

In summary, there are good arguments on both sides of the issue of reserve discipline, and the evidence does not point strongly in one direction. Much of the argument hinges on distinctions between purely flexible and truly fixed exchange rates, and these distinctions are blurred in a comparison of managed floating and adjustable par values. In the end, countries' resistance to inflation is probably determined more by their past histories of inflation and unemployment, their structural characteristics (e.g. degree of openness, relative strength of unions vs. business), the effectiveness of their monetary and fiscal institutions,[11] and the existing protections against inflation and unemployment (e.g. indexation, unemployment benefits) than by the type of exchange-rate regime.[12] At the same time, it seems more than coincidental that since the disappearance of fixed rates, there has been an active search in high-inflation countries for some type of *institutional* mechanism that will provide discipline against inflation—be it tax-based incomes policies, pre-announced money-supply targets, IMF letters of intent, the European monetary system, or even a constitutional amendment for a balanced budget.

[11] An important factor is the extent to which a country's central bank is independent of the government. This has a bearing on both its obligations to monetize government deficits and the speed with which it can implement changes in monetary policy.

[12] Corden (1976), Claassen (1976), and Crockett and Goldstein (1976) conclude that the *world* rate of inflation will also not be much influenced by the exchange-rate regime.

The Ratchet Hypothesis[1]

Explanations of inflation that give a prominent role to downward price inflexibility have been a recurrent theme in the inflation literature for many years (e.g. Means, 1935, on "administered" inflation and Schultze, 1959, on "demand shift" inflation). The ratchet hypothesis gets its product differentiation by showing how exchange-rate changes can interact with downward price inflexibility to progressively ratchet up both country and global price levels.[2]

In its simplest form, the ratchet hypothesis states that flexible exchange rates have an inflationary bias, both for individual countries and for the world economy, because in a world of downward price inflexibility, devaluations lead to price increases in the devaluing country but produce no (or smaller) offsetting price decreases in the revaluing country. Thus, for example, were country A to devalue its exchange rate by 10 per cent vis-à-vis country B and then one year later reverse the process by revaluing by 10 per cent—so as to cause no net change in the exchange rate over the whole period—then, so goes the ratchet argument, domestic prices would be higher in both countries and so too would the world price level. This outcome is to be contrasted with that in a world of flexible prices, where nominal prices would be expected to rise in the devaluing country and fall in the revaluing one.

The crucial element, and indeed the only unconventional one, in the ratchet hypothesis is the proposition that domestic prices either do not fall or fall by less in the revaluing country. A number of explanations have been offered for this proposition, but we shall concentrate on the two most popular ones.

Laffer-Mundell Thesis

The first explanation has been put forward by Laffer and Mundell, or at least has been attributed to them by Wanniski (1974).[3] Their ar-

[1] This chapter borrows liberally from Goldstein (1977).

[2] One of the earliest treatments of the ratchet hypothesis can be found in Triffin (1960).

[3] While the writings of Laffer and Mundell repeatedly stress the global advantages of fixed exchange rates and the inability of exchange-rate changes to permanently alter relative prices, their published papers (to my knowledge) contain almost no reference to a "ratchet," or asymmetry, effect. An exception is the brief (and rather oblique) recent reference to such an asymmetry in Mundell (1976). However, since Wanniski's interpretation of their views has generated considerable attention and since neither Laffer nor Mundell has (again, to my knowledge) challenged Wanniski's exposition, the following commentary is based on Wanniski's two articles (1974, 1975).

gument begins from the assumption that national economies are now so closely integrated that goods arbitrage will ensure that the "law of one price" holds true.[4] In its aggregate form, the law of one price states that the domestic price level will equal the foreign (world) price level multiplied by the exchange rate. While this relationship ensures that an exchange-rate change will not alter the relative prices of foreign and domestic goods, it does not specify which price level, the domestic or the foreign one, will bear the major part of the adjustment. Here Laffer and Mundell assert that it will be the price level in the devaluing country that bears the major adjustment role, both because producers in the devaluing country will seek to avoid a fall in the real international purchasing power of their incomes and because the response of prices and money wages to the exchange-rate change will be more rapid in that country than in the revaluing one.[5] In brief, then, the Laffer-Mundell thesis is that domestic prices will not fall (or will fall by only a little) in the revaluing country because export-price increases in the devaluing country will be so large and will occur so fast as to leave little or no scope for a reduction in the revaluing country's import prices.

The Laffer-Mundell result would seem to be more the special than the usual case. The distribution of price changes between the devaluing country and the revaluing country after an exchange-rate change will depend on the sizes of demand and supply elasticities and marginal spending propensities for traded and nontraded goods in the devaluing country relative to those in the revaluing country.[6] As long as these parameters are roughly similar in the two countries, there is no reason to expect one country to absorb most or all of the price change. Also, considering just the import-price change in the revaluing country, a low pass-through is possible only when the absolute value of the price elasticity of demand for imports is large relative to the price elasticity of supply for imports[7]—a condition that is at variance with econometric estimates of these elasticities.[8]

[4] For recent empirical evidence on the law of one price, much of which tends to be damaging to the hypothesis even at fairly fine levels of disaggregation, see Genberg (1977), Isard (1977), Kravis and Lipsey (1978), and Kalter (1979).

[5] See Wanniski (1975, p. 36) and Mundell (1976, pp. 156-157).

[6] For an exact expression for the country distribution of price changes (at least in a simple model with two countries and one traded and one nontraded good in each country), see Dornbusch (1975, pp. 281-282).

[7] The elasticity of import prices (in domestic currency) with respect to an exchange-rate change, call it K, can be expressed as

$$K = \left(1 - \frac{dm}{sm}\right)^{-1},$$

where dm is the own price elasticity of demand for imports and sm is the own price elasticity of supply for imports. K must lie between zero and one because,

The Laffer-Mundell hypothesis (at least in its strong form) also carries the empirical implication that declines in the domestic-currency price of imports should occur infrequently. Pigott *et al.* (1975) have documented, however, that such declines occurred in about 35 per cent of the quarters from 1957 to 1974, at least for the United States, the United Kingdom, Canada, Japan, the Federal Republic of Germany, and France, taken together. The corresponding figure for the decline in export prices was 29 per cent, and these qualitative conclusions apply equally well to annual data over a slightly longer period. As regards specific exchange-rate changes, one might note (counter to the Laffer-Mundell thesis) that the domestic-currency price of imports fell in the years following the German revaluations of both 1961 and 1969 as well as in 1978, when the effective exchange rates of the yen and the DM appreciated sharply.

The empirical evidence on export-price behavior after tariff reductions also casts doubt on the complete-offsetting hypothesis. For example, Kreinin (1961), in a study of the price behavior of exporters toward the U.S. market during the 1950s, concluded: "It appears plausible that close to half of the benefit of tariff concessions granted by the United States accrued to foreign exporters in the form of increased export prices" (p. 317). Most estimates of the export-price response to exchange-rate changes (e.g. Artus, 1974; Robinson *et al.*, 1979) also stop short of complete offsetting, except for the smallest, most open industrial economies.

Effect on Domestic Prices of Changes in Import Prices

The second rationalization for the ratchet hypothesis focuses on a possible asymmetry in the effects of increases and decreases in import prices on the change in domestic prices. In brief, the argument here begins from the proposition that there are costs to changing prices in imperfectly competitive markets, and that firms will therefore change their prices only in response to cost and demand changes that they view as permanent.[9] To obtain the ratchet or asymmetry conclusion, it is then

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by definition, $0 \geq dm \geq -\infty$ and $0 \leq sm \leq \infty$. Clearly, if sm is very large relative to dm, K will approach one, whereas K will approach zero in the opposite case (see Branson, 1972).

[8] See Stern *et al.* (1976) and Goldstein and Khan (1976, 1978).

[9] See, for example, Eckstein and Fromm (1968), Nordhaus (1972), and Okun (1975). The reasons given in the literature for this "sticky" price behavior range from the direct costs of changing prices (e.g. printing costs to inform buyers of new prices), to uncertainty about the firm's demand curve, to the firm's desire to provide stable prices to its customers as a "service" (presumably in exchange for a larger market share or a higher average price), to the availability of other adjustment mechanisms (e.g. inventories, order backlogs, output changes), to the firm's atten-

necessary only to assume that declines in import prices are viewed as more temporary than rises.

This approach, too, is not without its problems. The distinction expected in theory is that between permanent and transitory changes, and this distinction need not coincide with that between increases and decreases. That is, the theory of "normal cost" pricing leads to the conclusion that there will be sticky prices but not necessarily that they will be sticky in only one direction.[10] For some large industrial countries, declines in import prices (in domestic currency) have occurred too frequently in the postwar period (Pigott *et al.*, 1975) to be regarded as unusual events.[11] For example, whereas declines in import prices occurred in only four of the eighteen years from 1956 to 1973 for the United Kingdom, they occurred ten times for the Federal Republic of Germany during the same period. Also, the theory of normal-cost pricing itself is open to criticism. Nordhaus (1972) has shown that normal-cost pricing will be a good rule of thumb (i.e. will produce a profit-maximizing result) only under pure competition, when in fact it has been attributed exclusively to concentrated industries.

These arguments aside, the econometric evidence is not favorable to the hypothesis that increases in costs (be they import or labor costs) have a significantly different effect on prices than decreases. In a series of pooled cross-section time-series regressions for five large industrial countries (the United States, the United Kingdom, Germany, Italy, and Japan) over the 1958-73 period, Goldstein (1977) found no evidence of asymmetry in the effect on domestic prices of increases vs. decreases in import prices. This result held for both aggregate price changes (changes in the GDP deflator or the consumer price index) and disaggregated price changes (changes in the deflator for manufacturing). Ripley and Segal (1973), in a study of pricing behavior in nearly four hundred U.S. manufacturing industries, concluded that ". . . the response of prices to positive increases in unit labor costs was no different than the response to negative changes in unit labor costs" (p. 269). Similarly, Tobin (1972), summing up a series of econometric studies

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tion to maximizing long-run rather than short-run profits, to the existence of long-term contracts, etc.

[10] Cagan (1974), for example, has shown how time lags in the adjustment of prices to cost and demand changes can give the impression of downward price inflexibility when, in reality, the stickiness of prices over time has increased in both directions, although not necessarily by the same amount.

[11] Of course, all that would be required for a "weak" version of the asymmetry hypothesis is that decreases in import prices be considered more temporary than increases, and the postwar evidence does indicate that decreases have occurred less frequently than increases.

of the pricing process, concluded that if there is an inflationary bias in the American economy, it ". . . cannot be attributed to product pricing, which apparently passes on proportionately changes in labor costs. In general, changes in labor costs are passed in both directions—down as well as up" (p. 10). Finally, DeRosa and Finger (1978) examined the relationship between final product prices and raw commodity input prices for twenty product groups during the 1950-75 period and found no evidence of a ratchet effect.

Conclusions

In sum, the downward inflexibility of money wages and finished-goods prices in the face of sometimes substantial slack in aggregate demand is surely one of the more difficult problems for macroeconomic policy in industrial countries. At this stage, however, there is not much evidence that flexible exchange rates are an important contributory factor to this problem, at least directly.[12] Rather, there seems to be growing support for the view that prices continue to rise even during recessions because workers and producers are now convinced that governments can sustain contractionary demand policies for only short periods (Cagan, 1978; Solow, 1975; Hicks, 1974). Hence, longer-term expectations about inflation are not much affected by these policies. In this sense, if there is a ratchet effect associated with flexible rates, it has more to do with their "discipline" effects on government behavior than with any price-cost asymmetries induced by short-run rate fluctuations.

[12] If wage-rate indexation formulas are asymmetrical or if real-wage resistance in general is asymmetrical, depreciations will raise labor costs by more than equivalent appreciations will lower them, thus imparting an upward bias to the inflation rate. In such circumstances, however, it is not clear why exchange rates rather than the wage-setting rules themselves should be regarded as inflationary, since any factor that moves the price level up and down will add to inflation in such an environment. For a good treatment of the response of factor prices to exchange-rate changes, see Kenen and Pack (1979).

Vicious and Virtuous Circles

The debate on whether floating rates give rise to vicious and virtuous circles emerged strongly in 1975-76 (BIS, 1976; Lewis, 1976; National Bank of Belgium, 1977), when disparities between weak and strong industrial countries became more and more visible. During that two-year period, Germany and Japan had a combined trade-balance surplus of $40 billion, a combined average inflation rate (GDP deflator) of about 6 per cent, and nearly stable effective exchange rates (IMF MERM-weighted indices). In contrast, the corresponding figures for Italy and the United Kingdom were a $19 billion combined trade-balance deficit, a combined average inflation rate of over 19 per cent, and depreciations of over 20 per cent in each country's effective exchange rate.

The mechanism by which this process works is straightforward. Any downward movement in the exchange rate immediately raises import prices in local currency. These feed quickly to domestic prices, and the latter in turn provoke higher money wages, higher domestic prices, more exchange-rate depreciation, higher import prices, and so on. Further, if there are strong "J curve" effects on the trade balance, and if the exchange rate reacts strongly to expectations of both future inflation and future current-account deficits, the inflation-depreciation circle will be even quicker and more adverse. The same process operates in stronger countries but in the opposite direction, with exchange-rate appreciation driving import and domestic prices lower, and the latter driving the exchange rate higher.[1] Under fixed rates, it is claimed, the circle is broken. The comparative stability of the export prices of low-inflation countries tends to restrain the increase in domestic prices in high-inflation countries; conversely, the rapid rate of increase in the export prices of high-inflation countries tends to encourage inflation in low-inflation countries.

To assess the vicious-circle hypothesis, we first identify those elements of the argument that seem right; next, pick out what is either wrong or missing; and, finally, indicate what countries might do to escape from the vicious circle.

The Case for the Vicious Circle

Taking the positive side first, three things seem "right" about the vicious-circle argument. One is that a depreciating exchange rate can

[1] Note the basic inconsistency here between the virtuous circle and the ratchet hypothesis, where, if there is downward price inflexibility, there can be vicious circles but not virtuous ones.

indeed have a rapid and sizable inflationary effect on the depreciating country's import prices, domestic prices, money wages, and export prices. In smaller industrial countries, the domestic price effects are apt to be substantial enough to offset within a year or two almost all of the competitive price advantage achieved by the depreciation. Second, flexible exchange rates seem to shorten the time lag between money-supply changes and domestic price changes via the effect of money-supply changes on the exchange rate, thus steepening the slope of the short-run Phillips curve. Third, the exchange-rate depreciation that begins (and ends) the circle can, at least in the short run, be generated by forces outside the control of the authorities in the depreciating country (i.e. it need not be their fault).

Table 2 presents some representative estimates of a number of the key parameters that influence the domestic price effects of exchange-rate depreciation.[2] The most interesting aspect of Table 2 is not really the absolute sizes of the elasticities themselves, which vary quite a bit from study to study, but rather the ranking of elasticities across open vs. relatively closed countries, which is more robust.

Beginning with the effect of exchange-rate changes on import prices in local currency, the so-called "import pass-through," most studies indicate that the lags are short, with almost all of the pass-through taking place within, say, two to three quarters. As for the size of the pass-through, import prices can be expected to rise by the full extent of the devaluation (100 per cent pass-through), except perhaps in the cases of the largest industrial countries, which have significant buying power on the international market. Kreinin (1977), for example, estimates the import pass-through at about 50 per cent for the United States, 60 per cent for Germany, 80 per cent for Japan, and virtually 100 per cent for all other countries. Spitaeller (1979) finds full pass-through for all countries except Germany (75 per cent). Other pass-through estimates (Branson, 1972; Kwack, 1977; Hooper, 1976) tend to cluster in the 70 to 100 per cent range, depending in part on what type of effective-exchange-rate index is used.[3]

Moving to the effect of import-price changes on the domestic inflation rate, almost all inflation studies find a significant postive effect in virtually all countries (Ball and Duffy, 1972; Kwack, 1977, 1978; Dornbush and Krugman, 1976; Spitaeller, 1978; Goldstein, 1977). The lags are

[2] Two caveats should be mentioned about the estimates in Table 2: (1) They come from studies where the exchange-rate change is assumed to be exogenous. (2) The estimates can be unstable over time.

[3] Hooper (1976), for example, finds a 70 per cent import pass-through for the United States when multilateral trade weights are used for the effective exchange rate. With bilateral trade weights, the estimate rises to 100 per cent.

TABLE 2

DOMESTIC PRICE EFFECTS OF EXCHANGE-RATE CHANGES:
REPRESENTATIVE ESTIMATES OF KEY PARAMATERS FOR THE SEVEN LARGEST INDUSTRIAL COUNTRIES

	Canada	*France*	*Germany*	*Italy*	*Japan*	*U.K.*	*U.S.*
Effect of a 1% change in exchange rates on import prices within 2 quarters:							
Kreinin (1977)	0.90	n.a.	0.60	1.00	0.80	n.a.	0.50
Effect of a 1% change in import prices on consumer prices within 1 year:							
Dornbusch and Krugman (1976)	0.20	0.16	0.03	0.28	0.24	0.19	0.14
Spitaeller (1978)	0.24	0.32	0.08	0.36	n.a.	0.20	0.16
Effect of a 1% change in exchange rates on export prices within 2 years:							
Robinson *et al.* (1979)[a]	0.89	0.71	0.93	0.99	0.65	0.79	0.58
Artus (1974)[b]	n.a.	0.37	0.36	n.a.	0.40	0.35	0.11
Measure of real wage resistance—excess real wage, 1975-76 average:							
Sachs (forthcoming)[c]	–2.8	0.0	–0.2	12.8	–3.5	10.6	–1.6
Degree of wage indexation:							
Braun (1976)	Mod-erate	Low	Low	Wide-spread	Mod-erate	Wide-spread	Mod-erate
Size of traded-goods sector relative to GNP, 1972:							
Salant (1977)[d]	0.24	0.17	0.21	0.22	0.10	0.23	0.07

[a] Estimates refer to total export prices.
[b] Estimates refer to manufactured export prices.
[c] Measures percentage of excess real wage over full-employment equilibrium real wage (where the latter is a function of labor productivity and the terms of trade). Large plus value (Italy, U.K.) suggests high real-wage resistance.
[d] Foreign trade in goods and services as percentage of GNP.

longer than for the import pass-through, but most studies find that at least half the total effect occurs in one year. As regards the size of the elasticity, there is more disagreement among the studies, because some include second- and third-round induced wage-price effects while others do not.[4] In any case, a consensus estimate might be that a 10 per cent change in import prices leads after a year to a change in the consumer price index of anywhere from 1.5 to 4.0 per cent, with the United States at the low end of the range and Italy, the United Kingdom, and France near the upper end (among the seven largest industrial countries).[5] Other things equal, we expect the final effect on domestic prices to be larger the larger the share of imports in total output or final expenditure, the larger the elasticity of money wages with respect to actual or expected domestic price changes, and the larger the elasticity of domestic prices with respect to money wages.[6]

The first factor is the major source of intercountry differences in the total elasticity, since countries differ much more with regard to the sizes of their traded-goods sectors (openness) than to either labor's share in total output or the response of money wages to domestic inflation.[7] Indeed, if there was some degree of money illusion in the 1950s and 1960s, it seems to have disappeared in the 1970s, with most aggregate wage equations now reporting a unitary coefficient on expected inflation rates (Laidler and Parkin, 1975; Seater and Santomero, 1978; Gordon, 1976).[8] Of course, in industrial countries with widespread indexation (e.g. Belgium, Italy, the United Kingdom, and Denmark), actual price changes replace expected price changes in the wage equation, and intercountry differences in the extent of indexation could be a source of intercountry differences in the domestic price effects of exchange-rate changes (Braun, 1976).

[4] See Hooper and Lowry (1979) for a survey of the empirical studies on the inflationary effect of exchange-rate devaluation in the United States. Ball *et al.* (1977) review the relevant studies for the United Kingdom.

[5] Using a pooled sample of sixteen OECD countries for the 1972-76 period, Bruno (1978) found that a 10 per cent change in import prices leads to a 1.8 per cent change in consumer prices within one year. The final effect on consumer prices was a 3.7 per cent change.

[6] See Goldstein (1974), Kwack (1977).

[7] When the GNP deflator is substituted for the consumer price index, the influence of openness diminishes sharply, because imported final goods do not enter GNP. Thus, estimates of the effect of devaluation on the GNP deflator tend to be more similar across countries than those on the CPI (see Artus and McGuirk, 1978).

[8] Braun (1979) argues that what happened in the 1970s was not simply a gradual disappearance of money illusion but rather a growing increase in the effective organization of labor induced by the absorption of excess manpower and the strengthening of unions in countries where they had been restrained, such as Germany and Japan.

The effect of a depreciation on export prices is less certain as to size and timing, in part because of the dubious quality of the export-price data. Nevertheless, a number of conclusions are pretty well established. First, the time lag for export prices to respond to an exchange-rate change is considerably longer than that for import prices, so that exchange-rate changes will affect the terms of trade over the medium run of one to two years (see IMF, 1977a, Chart 10). Second, prices of manufactured exports will be slower to respond to exchange-rate changes than commodity prices, in keeping with the general properties of customer vs. auction markets. The implication is that countries with relatively high proportions of manufactures in total exports may be able to keep the relative price advantage from depreciation longer, *ceteris paribus*, than those with lower proportions. For U.S. manufactured exports, Artus (1974) estimated that only 10 per cent of the exchange-rate change would be offset by export-price changes within the first two years; the corresponding figure for the four other countries considered (Japan, France, Germany, and the United Kingdom) was 30 to 40 per cent. The third and most robust conclusion is that export prices rise more after depreciation in the smaller, more open industrial countries than in the larger, less open ones. Put in other words, export prices in the more open countries respond less to domestic cost considerations and more to competitors' export prices than in the less open ones (Samuelson, 1973; Deppler and Ripley, 1978; Dornbusch and Krugman, 1976). As for the sizes of the elasticities, two recent studies reach similar conclusions. Robinson *et al.* (1979) find that within one year the price of total exports in domestic currency will rise so as to offset nearly 100 per cent of the depreciation for small open economies (e.g. the Netherlands, Austria, Belgium), 70 to 90 per cent for medium-sized economies (e.g. France, the United Kingdom, Germany, Italy), and as much as 60 per cent for large, relatively closed economies (the United States and Japan). Spitaeller's (1979) estimates, derived from the 1973-78 experience, indicate one-year offsets of 100 per cent for Italy, 95 per cent for Canada, about 60 per cent for France, Japan, and the United Kingdom, 32 per cent for the United States, and only 25 per cent for Germany.

Whatever the true sizes of the elasticities, one thing that the foregoing evidence on inflation feedbacks does establish is that small, relatively open economies have much more to complain about when it comes to exchange-rate-induced domestic price effects than larger, less open ones.[9]

[9] Of course, when the exchange rate appreciates, openness can be a positive anti-inflationary force. In this regard, the depreciation of the dollar vis-à-vis the DM in 1978, combined with the pricing of oil in dollars, helped many open European economies to control the effects of oil-price increases. Also, some of the larger countries have become more open during the floating-rate period. For example, the

The country ranking of elasticities in Table 2 suggests strongly that Italy, the United Kingdom, France, and Canada are likely to get less relative-price advantage and more domestic inflation from depreciation than the United States, Japan, or Germany. The smaller industrial countries would presumably be at an even greater relative disadvantage in this regard.

The second area where the vicious-circle proponents have a legitimate point is that flexible rates probably shorten the time lag between money-supply changes and domestic price changes. This follows from the fact that money-supply increases will, *ceteris paribus*, be transmitted rapidly into exchange-rate depreciation, thereby driving up import prices and, in turn, domestic prices. And if the trade balance initially responds unfavorably to the depreciation (à la J curve), and investment is insensitive in the short run to interest-rate changes or is unfavorably affected by higher domestic inflation, it is possible for the demand for domestic output to fall, thereby generating a short-run increase in unemployment as well (Niehans, 1975). As Wallich (1977) has noted, these problems severely limit the scope of antirecessionary action under flexible rates, particularly in the post-1975 situation where many industrial countries face high inflation and high unemployment simultaneously.[10] If fiscal policy is flexible in the short run and operates effectively on aggregate demand, this dilemma can be eased by adopting a policy mix consisting of expansionary fiscal policy and accommodating monetary policy, so as to increase real output while stabilizing the interest rate and the exchange rate (Dornbusch and Krugman, 1976).

At this point, there is very little empirical evidence, one way or the other, on whether flexible rates have shortened the lag between money and prices. This is because few inflation studies explicitly test for such an effect as between the pre- and post-floating periods and because, even if such a shortening were found, it would be difficult to establish whether it was caused by flexible rates or other factors, such as the faster adjustment due to higher rates of inflation per se (Khan, 1977). Nevertheless, it is interesting to note that Spitaeller (1978), in a study of the inflation process in industrial countries from 1958 to 1976, found that the adjustment of inflation to its determinants (money-supply

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ratio of exports plus imports to GNP increased in the United States from about 7 per cent in 1972 to over 10 per cent in 1977.

Helliwell (1979) argues that openness can convey some advantages. In particular, more open economies require less exchange-rate variation to achieve a given target change in the trade balance.

[10] A shortening of the lag between money and prices may, however, have at least one longer-term beneficial effect: it should reduce the scope for managing the economy for short-run political advantage. See Nordhaus (1975) for the role that the slope of the short-run Phillips curve plays in the "political business cycle."

changes, the output gap, import prices) was almost three times as fast after 1973 as it was on average over the 1958-76 period as a whole. This finding is corroborated by the conclusion of Robinson *et al.* (1979) that the feedback from exchange-rate changes to domestic prices is now larger and quicker than it used to be in the 1950s and 1960s:

> The main conclusion . . . is that parity changes have a larger and quicker effect on the rate of inflation than they used to have and a smaller effect on real variables such as the terms of trade, the volume of payments or the rate of growth (p. 48).

Further, Robinson *et al.* (1979) attribute part of this change to the introduction of floating, which has focused attention on exchange-rate changes and on the real international value of currencies, and has induced many more exporters to quote prices in foreign-currency terms. The other factors cited are a secular increase in openness among industrial countries and a widespread decline in both exchange-rate and money illusion.[11]

The third contention of some merit in the vicious-circle argument is that the exchange-rate movements that initiate the vicious circle could well be beyond the control of the authorities in the depreciating country. One of the implications of viewing the exchange market as an asset market is that the current exchange rate will depend heavily on expectations about the future value of the exchange rate. The problem is that the list of factors influencing these expectations is long and varied and, more important, subject to frequent changes in an environment of high inflation and irregular economic growth (Kouri and Macedo, 1978).[12] Thus, short-run exchange-rate changes could be initiated not only by changes in monetary and fiscal policies in the weak country but also by unexpected policy changes in other countries (e.g. foreign interest-rate changes or the imposition or relaxation of capital controls), "new" political developments abroad, changes in intervention policies by other countries, etc. Further, while the jury on the "efficiency" of the foreign-exchange market is still out (Dooley and Shafer, 1976; Willett and Sweeney, forthcoming; Levich, 1978; Tryon, 1979), there is a presump-

[11] See Salant (1977, Table 3) for ratios of imports and exports to GNP from 1929 to 1972 for each of twenty-two OECD countries.

[12] Mussa (1978) has recently hazarded the estimate that over 90 per cent of month-to-month changes in exchange rates are attributable to unexpected developments. The random appearance of new information is also the explanation given for the poor performance of forward rates as predictors of future spot rates at the maturity of the contract. To say that forward rates are bad predictors is not the same, of course, as saying that they are biased predictors or that they are not as good as any other predictors (see Levich, 1978; Aliber, 1975; Black, 1978; Bilson and Levich, 1977).

tion (Artus and Crockett, 1978) that risk aversion, combined with legal and regulatory constraints on open foreign-exchange positions by institutional investors, can create a situation where weak currencies are subjected to excessive downward pressure relative to longer-term equilibrium levels.

The Case against the Vicious Circle

What then about the case against the vicious circle? In broad terms, there are at least four areas where important factors are either ignored or misrepresented. First, there is insufficient recognition that exchange-rate depreciation and domestic inflation are both endogenous variables and often respond to the same driving force—an excessive rate of domestic monetary expansion. A second, related point is that the vicious-circle hypothesis is framed too much in the short run. Once the time horizon is extended, it becomes more and more unlikely that a country can stay in the vicious circle unless its macro policies are faulty. A third criticism is that the vicious-circle scenario is too partial-equilibrium in nature, because it neglects the expenditure-reducing role of the exchange-rate depreciation. Last, apologists for the vicious circle mention certain expectational factors operating on exchange rates to the exclusion of others that could help to stabilize the weak country's exchange rate.

Once the exchange rate is viewed as endogenous, it becomes less meaningful to talk about exchange-rate depreciation *causing* domestic inflation even when the data indicate that exchange-rate depreciations lead upsurges in the domestic inflation rate (Willett, 1977). Rather, one then has to ask what led the exchange rate to depreciate in the first place. The answer that currently receives the most support from the empirical literature (Frenkel and Johnson, 1978; Bilson, 1978, 1979b; Tullio, 1979; Keren, 1979) is that a country's exchange rate will depreciate, *ceteris paribus*, when that country expands its supply of money (relative to the demand for it) at a faster rate than other countries.[13] When this answer is coupled with the assumption that exchange rates respond more rapidly to money-supply changes than do domestic prices, the "optical illusion" can be created that exchange-rate depreciation is causing domestic inflation, as alleged by the vicious-circle hypothesis (Bilson, 1979a). In reality, the excessive rate of domestic monetary expansion will be the true initiating factor. This, of course, still leaves unanswered the ques-

[13] Portfolio models of the exchange rate (Branson *et al.*, 1977; Porter, 1977) similarly imply that an increase in the supply of domestic nominal assets (money included) relative to external assets depreciates the exchange rate. These portfolio models have many advantages over strict monetary models but they are generally more intractable empirically because their data requirements are more demanding.

tion of what determines the differential rates of monetary expansion (Gordon, 1977).[14]

After the exchange-rate depreciation induces an increase in import, domestic, and export prices, the declining value of real money balances in the depreciating country should provide an automatic check to the vicious circle. That is, the excess demand for money will cause asset holders to save more and spend less on all goods, including imports, thereby creating an incipient current- or capital-account surplus and an exchange-rate appreciation, even if no relative price advantage at all is obtained from the depreciation. This is why critics of the vicious circle argue that even if an exogenous erratic change in the exchange rate begins the vicious circle, it can be sustained only with accommodating monetary expansion.[15] This is also why critics like Haberler (forthcoming, p. 6) have said that ". . . countries are not by chance on one side or the other (of the vicious/virtuous circle)."

The few studies that have been done on money-supply behavior in industrial countries before or during vicious circles lend support to the monetary-accommodation thesis. Gordon's (1977) study of inflation and monetary behavior in eight industrial countries from 1958 to 1973 concludes, *inter alia*:

> Today's dichotomy between healthy nations . . . and sick nations . . . shows up in differences in behavior before the advent of flexible exchange rates in 1973. Growth cycles in the money supply in Germany and Japan appear to have followed a counter-cyclical reaction, whereas accommodation was the rule in Italy and the United Kingdom (p. 448).

Similarly, the Annual Report of the Bank for International Settlements (1977, pp. 38, 40) notes:

> The first striking fact . . . is that both the United Kingdom and Italy got into the vicious circle because of domestic developments. . . . One need not be an orthodox monetarist to regard the 30 percent rise in the money supply (M_3) as the main factor behind the sharp decline in the value of sterling during the same year. . . . In Italy the money supply (M_2) was already expanding at an excessive rate in 1973 (and more so early in 1974) but the wage explosion during the same year also played an important role in weakening the lira on the foreign exchanges.

It should be noted that there is nothing in this approach to the vicious circle that conflicts with the view that more open economies will have more trouble with the vicious circle than less open ones. There is, how-

[14] See Rodriguez (1978) for a model where monetization of the internal *fiscal* deficit is the driving force behind the vicious circle.

[15] Basevi and De Grauwe (1977) show how a vicious circle can arise without monetary accommodation, but only if there is downward price inflexibility and short-run fixity of the domestic interest rate.

ever, a wider or more general-equilibrium view of the problem that suggests that the degree of openness and the speeds of wage and price adjustment are not all that matters. Specifically, the income and interest-rate elasticities of the demand for money, the degree of substitution in demand between imports and domestic goods, and the reaction function of the monetary authorities also count.[16]

Critics of the vicious circle also take issue with the picture of the exchange rate that is put forward in the usual argument. To begin with, the proposition that the exchange rate will be closely tied to month-to-month inflation differentials is inconsistent with most of the empirical evidence on purchasing-power parity (Officer, 1976a; Genberg, 1978; Krugman, 1978). This evidence says that purchasing-power parity will provide a good explanation of exchange-rate movements in the long run but not in the short run.[17] Two empirical regularities (as Mussa, 1978, calls them) are that month-to-month changes in exchange rates are not well correlated with month-to-month changes in relative purchasing-power parities, and that whenever an exchange rate undergoes a substantial change over a short period of time, this change is almost always associated with a significant divergence from relative purchasing-power parity. Thus, it is too mechanical to assume that once a weak country experiences an upward slip in its inflation rate, its exchange rate will immediately depreciate by that month's inflation differential. A more important consideration would be the market's view of the longer-term prospects for monetary and fiscal policies in the weak country. In the monetary view, these are the expectations that count (Mussa, 1978). The prosecution's Exhibit A is the dramatic turnaround in sterling with the acceptance of the IMF standby in the fall of 1976. Exhibit B is the recovery of the dollar after the announcement of the November 1, 1978, package of measures in the United States.

Escaping from the Vicious Circle

This brings us to the final important question in the vicious-circle debate: How do weak countries escape from the dilemma? There are basically four options: decrease the rate of growth of the money supply, increase the rate of growth of real income or real output, defuse or at

[16] See Bond (1979) for some empirical evidence on these and other parameters relevant to the vicious circle.

[17] Even over the long run, there can be systematic divergences from purchasing-power parity because of the existence of nontraded goods and the tendency for productivity growth to be manifested largely in tradables. This can raise the overall price level in fast-growing countries relative to slow-growing ones (see Balassa, 1964, and McKinnon, 1971). For empirical tests that are unfavorable to the productivity-bias hypothesis, see Officer (1976b).

least slow down the wage-price spiral (via an incomes policy or the like), or intervene in the exchange market to try to halt the depreciation. Each, undertaken separately, stands little chance of success but, done in combination, the prospects should improve markedly.

There is little question that slowing the rate of monetary expansion will work if it is sustained. The problem, of course, with a prolonged monetary slowdown is that it will usually involve significant employment losses, and this will be very difficult for the government to see through if the unemployment rate is already high.

The second option seizes on the observation that if the excess supply of money $(M - y)$ is the root cause of the problem, it can be handled just as well by increasing y as by decreasing M (Bilson, 1979a). Real output (y) can be increased either by increasing the demand for or the supply of domestic goods. If demand is chosen, however, it must be obtained by pure fiscal policy, without an increase in the money supply. But fiscal policy may be frustrated if there are constitutional limits on public expenditure, or if the market interprets the fiscal expansion as prefacing loose demand policy for the future, or if private consumption responds little to transitory changes in income, or if the elasticity of substitution between home goods and imports is high (so that appreciation shifts private demand toward imports enough to prevent y from rising). Increasing aggregate supply sounds more attractive because it simultaneously raises output and lowers price, the opposite of the oil shock. But the instruments available (relaxation of safety and environmental restrictions, lower payroll taxes, employment subsidies) may not increase supply very much within the politically feasible range of variation.

This leaves incomes policy and official intervention. The former could slow nominal wages and prices for a time, but it will be very difficult to limit money-wage increases or price increases if import prices are pushing up the cost of living and firms' costs of material. Also, incomes policies have such a bad track record that they may not alter the market's expectation about the future exchange rate. Official intervention per se is likewise limited in what it can do if the monetary indicators or wage-price developments are not favorable. In the end, a coordinated strategy employing a combination of most of these instruments will probably be necessary to escape from the vicious circle. Monetary restraint is necessary to convince the market that the fundamentals are right. Incomes policy can help to ensure that past inflationary developments do not dominate today's wages and prices. And intervention may buy time until the market is convinced that a real change in policy intentions has taken place.

Conclusions

To sum up, much of the controversy about the vicious circle is traceable to misconceptions about the importance of exchange rates. Larger, less open countries have assigned exchange rates too little importance; smaller, more open countries, too much. This has led the larger countries to underestimate the domestic price effects of exchange depreciation for others and the implications of flexible rates for the lag between money and prices. It has also led the smaller countries to blame exchange rates and the exchange market for a dilemma that is generally attributable in the main to domestic monetary policies.

Flexible Exchange Rates and Unemployment

Thus far, the discussion has concentrated on the consequences of flexible rates for the conduct of anti-inflationary policy. Ultimately, such a discussion must involve the effects on unemployment as well, simply because unemployment is the main constraint on reducing inflation in industrial countries. In addition, the behavior of unemployment has been almost as disappointing over the floating-rate period as that of inflation. Since the trough of the 1975 recession, when unemployment for the seven major industrial countries stood at 5.4 per cent, it has declined very little (it was still 5.0 per cent in 1979).[1] Over the 1970s as a whole, there has been a secular increase in the long-duration unemployment rate (Haveman, 1978); a distinct outward shift in the unemployment/vacancy relationship, indicating an increased mismatch at the margin between the supply and demand for labor (Deppler and Regling, 1979); and a perceptible worsening in the short-run tradeoff between inflation and unemployment (Haveman, 1978; Wachter, 1976). Thus, even if we take for granted the claims that measured unemployment rates are now less reliable indicators of the excess supply of labor than they used to be (Perry, 1970; Taylor, 1970) and that the costs of unemployment are less severe now than they used to be both absolutely (Feldstein, 1978) and relative to the costs of inflation (Wallich, 1978b), it remains true that industrial countries have been faced with a serious unemployment problem over the floating-rate period.

Two questions about the impact of flexible rates on unemployment are discussed below: (1) Do flexible rates allow some countries to maintain lower unemployment rates than would be possible under fixed rates? (2) Does high exchange-rate variability lead to an increase in frictional unemployment?[2]

As a prelude, a more general observation about the effect of exchange-rate flexibility on employment should be made. It begins with the recognition that the rationale for using exchange rates in stabilization policy is that nominal wages and the prices of some goods are sticky downward. Consider the familiar tradable/nontradable model, where a current-account deficit implies an excess demand for tradables and an excess supply of nontradables. The solution to the problem is to engineer an

[1] This aggregate figure conceals important differences among the major industrial countries. In particular, the unemployment rate in the United States has declined from 8.5 per cent in 1975 to about 6.0 per cent in 1979.

[2] Other questions about the alleged greater efficacy of monetary policy on real output and employment under flexible rates are discussed in the next chapter.

increase in the ratio of the price of tradables to nontradables (PT/PNT) so as to simultaneously increase the supply of, and reduce the demand for, tradable goods. But if prices of nontradable goods are inflexible downward, it will not be possible to do this by demand policy alone without accepting an increase in unemployment in the nontradable sector. A devaluation provides the solution to this dilemma by bringing about a rise in PT/PNT via an upward movement in PT, without any accompanying unemployment (Corden, 1977).

The same type of conclusion follows in the case of a country whose real wage is out of line with its competitors but who cannot reduce real wages without increasing unemployment because nominal wages are inflexible downward. Once again, a devaluation produces the necessary adjustment via an increase in the general price level. But all this ability to influence relative prices, and ultimately to affect labor supply and labor demand, vanishes if real wages are inflexible downward, that is, if the level of real wages is restored to its initial level within the period under consideration (Lindbeck, 1976). The relevance of this point to our discussion is that, to the extent that money illusion has disappeared in industrial countries with the persistence of high inflation rates, and to the extent that the competitive price advantages gained by depreciation now last less long than before, one would expect the ability of the exchange rate to influence real variables (employment included among them) to decline as well.[3] In this context, the exchange rate becomes more and more an instrument to influence the price level and less and less one to affect unemployment. Having said that, we can turn to the two specific hypotheses mentioned earlier.

Flexible Rates and the Inflation-Unemployment Tradeoff

One of the more alluring arguments for flexible rates was that they would permit countries to choose and to maintain their preferred positions on their downward-sloping Phillips curves. Since revealed preference seemed to indicate that different countries attached different relative weights to inflation and unemployment, it followed that global welfare would be maximized by ensuring this freedom of choice. If fixed rates prevailed and if a common rate of inflation was required of all countries, the formerly high-inflation countries would have to accept more unemployment than they wanted, while the formerly low-inflation countries would have to accept more inflation. Therefore, both groups would be worse off (Johnson, 1969).[4] And if reserve discipline operated

[3] See Sachs (forthcoming) for some evidence on the increasing degree of real-wage resistance in industrial countries.

[4] If individual-country Phillips curves are nonlinear, or if these Phillips curves have

mostly on high-inflation countries, so that the common inflation rate was closer to the low range of country experience, the high-inflation countries would be particularly disadvantaged, because a much lower inflation rate would imply a much higher unemployment rate.

Although this argument continues to receive attention in connection with the viability of the new European Monetary System, it is clear that its force has been much eroded by the widespread acceptance of the vertical (or near vertical) slope of the long-run Phillips curve (De Grauwe, 1975a). As Santomero and Seater (1978) document in their recent survey of the inflation-unemployment tradeoff, almost all empirical wage and price studies that incorporate the inflation experience of the late 1960s and early 1970s are now unable to reject the no-tradeoff-in-the-long-run conclusion. The implication is straightforward. If the equilibrium, or natural, rate of unemployment is independent of the rate of inflation, then flexible rates cannot buy high-inflation countries more employment; nor can fixed rates cost them less employment (Artus and Young, 1979). The unemployment rate cannot be kept away from its "natural" level for long. The exchange-rate regime cannot take away what was never there in the first place. In fact, the sign of any long-run employment changes under fixed rates might even be positive.[5]

Friedman (1977) has argued that countries are now in a transitional period where the inflation-unemployment tradeoff is positively sloped. In a nutshell, his argument is that high rates of inflation are likely to be variable rates of inflation (Logue and Willett, 1976, and Jaffe and Kleiman, 1975) and that high volatility of inflation raises recorded unemployment by increasing the amount of noise in market signals. If this is so (and it has yet to be subjected to empirical testing), it means that any higher inflation made possible by flexible rates would actually raise rather than lower unemployment rates in the medium to long run.

But even if the relevant tradeoff is between less unemployment today and more unemployment tomorrow rather than between more inflation today and less unemployment today, countries need not be indifferent to the former choice. Several writers (Phelps, 1967; Taylor, 1975) have noted that if there is a high rate of time discount, it can be optimal to reduce unemployment now and obtain the associated benefits in the

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different slopes across countries, the global inflation rate will also be altered even if the changes in country unemployment rates leave the global unemployment rate unchanged (see Fleming, 1971, for an analysis of these "aggregation" effects on the world inflation rate). If, however, all country Phillips curves are vertical, there can be no such aggregation effects.

[5] Thygesen (1979), for example, has argued that membership in the European snake probably has increased output and employment, even for the smaller member countries.

short run, and then accept the higher inflation and its costs in the long run. A more fundamental objection is that whatever the long-run equilibrium properties of the economy (i.e. its tendency to revert to the natural unemployment rate), the argument is moot about how to reduce the inflation rate from a high to a low level and about what the interim employment losses would be.[6] Okun (1978) has inspected six recent macroeconomic Phillips curves for the United States and found that an extra percentage point of unemployment maintained for a year reduces the ultimate inflation rate by only between 0.15 and 0.50 percentage points. Put differently, the cost of a 1 percentage point reduction in the inflation rate is about 10 per cent of a year's GNP.[7] Cagan's (1978) estimate, also for the United States, is that maintaining the unemployment rate 1 percentage point above the full-employment rate for a typical four-year business cycle reduces the inflation rate by between 1.5 and 3.0 percentage points (depending on whether rational or adaptive expectations are assumed). If these estimates are representative of those for other industrial countries with high current inflation rates (France, Italy, the United Kingdom), it is not surprising that policy makers are wary of any measure that requires a large reduction in the inflation rate. This is one area, however, where openness can help smaller countries if the larger countries are willing to accept any employment losses associated with reducing their own inflation rates. Lindbeck (1976) notes in this regard that most small countries were able to take a "free ride" on the anti-inflationary policies of the big countries in 1974-75 as long as they were willing to accept a deterioration in their current accounts.

Flexible Rates and Frictional Unemployment

Next, what about the claim that flexible rates increase frictional unemployment? In brief, the argument is that high exchange-rate variability induces labor to shift back and forth between tradable and nontradable industries in response to transitory relative-price signals, thereby impairing the efficiency of the labor market and raising the natural unemployment rate.[8] McKinnon (1976) has called this effect of floating rates on resource allocation and trade flows "false trading," since the movements of goods and factors may bear little relationship to longer-run comparative advantage.

[6] There is also the question of whether a gradual or a rapid movement to the lower planned inflation rate is better (see Modigliani and Papademos, 1978).

[7] Okun's (1978) calculation assumes that a decline of 1 percentage point in unemployment is associated with 3 percentage points of extra real GNP relative to potential GNP.

[8] Cooper (1977) has put forth this argument as one reason why the welfare-maximizing exchange rate will in general show less variability than the momentary or actual exchange rate.

Even if we concede that uncertainty about exchange rates has increased under floating rates (Aliber, 1975; Hooper and Kohlhagen, 1978), there are at least two major slips between cup and lip before one could conclude that flexible rates increase frictional unemployment. The first caveat is that other types of uncertainty, equally relevant to workers' and producers' employment decisions, may be higher under more rigid exchange rates, so that total uncertainty would be no different (Willett, 1978).[9] This would be the case, for example, if more exchange-rate fluctuation was a substitute for more fluctuation (and uncertainty) in other government policies (official intervention, commercial policy, capital controls, etc.). Makin (1976) has argued that total uncertainty will be less under flexible rates because the public can predict the timing and size of exchange-rate changes better when the inputs for prediction are market forces rather than guesses about political judgments. The second caveat is that it is unclear whether increased uncertainty in the labor market will actually increase recorded unemployment rates. One response by firms to increased uncertainty about demand is to hold larger inventories of labor (Miller, 1971), and increased labor hoarding would, *ceteris paribus*, reduce measured unemployment. Similarly, after some initial experience, workers would be expected to respond only to wage and employment opportunities that they regarded as relatively permanent. Both of these factors would limit any increase in frictional unemployment. They do not, however, dispute the claim that the more noise exchange-rate movements pass on to relative prices, the less efficient will the market be in allocating resources.

Conclusions

In summary, there is little in the way of theoretical argument, even less in empirical work, to suggest that flexible rates have had a major influence on unemployment rates in industrial countries. The high unemployment rates that have prevailed during the floating-rate period are better explained by cyclical conditions; changes in the demographic, occupational, and industrial composition of labor supply and demand; a growth in generosity and in the coverage of unemployment benefits; increases in minimum wages; changes in policies relating to foreign workers; and changes in underlying rates of productivity growth (Haveman, 1978; Deppler and Regling, 1979). This is not to say that the level of the exchange rate does not have strong effects on sectoral employment

[9] As Friedman (1953, p. 174) put it over twenty-five years ago, "the substitution of flexible for rigid exchange rates changes the form in which uncertainty in the foreign exchange market is manifested; it may not change the extent of uncertainty at all, and, indeed, may even decrease uncertainty."

in individual countries. Surely, the large amount of official intervention that has taken place over the floating-rate period (Black, 1979; Lamfalussy, 1979; Williamson, 1976) has something to do with countries' attempts to obtain and to hold a competitive relative price advantage for their workers in export and import-competing industries. But the large amount of intervention has more to do with how individual countries manage their floating rates than with the properties of flexible rates themselves.

Monetary Policy under Flexible Rates

Nowhere, perhaps, has there been as wide a gulf between the promise and performance of flexible rates as in the area of monetary policy. The promise was based on two widely held conclusions: first, that flexible rates would permit countries to control their own money supplies, since there would be no change in the foreign component of the monetary base; and second, that flexible rates would make expansionary monetary policy operate more powerfully on real output and employment via the positive effects of the induced depreciation on net exports.

Control over the Money Supply under Fixed and Flexible Rates

The argument that flexible rates would permit countries to control their own money supplies was most appealing to Germany and Switzerland. In the late 1960s and early 1970s, these countries were finding that running a restrictive monetary policy was increasingly incompatible with maintaining both a fixed exchange rate and relative freedom for international capital movements. They seemed to be caught in their own type of vicious circle; restrictive monetary measures (e.g. increases in reserve requirements) brought forth capital inflows, official intervention to support the dollar, more restrictive domestic monetary measures, more capital inflows, etc. In February and March of 1973, the Bundesbank purchased about $8½ billion; over $2½ billion were purchased on March 1 alone. The process culminated in the inauguration of floating later that month. Emminger's (1977, p. 4) comments on the rationale for the decision to float are instructive:

> For countries like Germany and Switzerland . . . the main—or even only —reason why they went over to floating in the spring of 1973 was the necessity to regain control over their own money supply. . . .

The theoretical and empirical support for the view that countries would find it difficult if not impossible to control their money supplies under fixed rates came from the monetary approach to the balance of payments (Frenkel and Johnson, 1976; IMF, 1977b) and especially from its application to the explanation of international capital flows (Kouri and Porter, 1974). The three crucial assumptions are (1) that the demand for nominal money balances is a stable function of the price level, real income, and the interest rate; (2) that the supply of money always equals the demand for money; and (3) that there is no sterilization of changes in international reserves. When these are coupled with the

identity that the money supply equals the product of the money multiplier and the sum of international reserves and domestic credit, it can be shown that decreases in domestic credit will be offset by increases in international reserves and increases in domestic credit will be offset by decreases in international reserves. When there is full employment and the country is "small" enough that its price level and interest rate are exogenous (set in the rest of the world), the offset will be complete; the authorities will then be able to control the composition of the money supply but not its level. That is, under fixed rates, the money supply will become a completely endogenous variable beyond the control of the authorities. This conclusion will be softened when the full-employment and small-country assumptions are relaxed. In this case, an expansion of domestic credit will affect domestic prices and the output gap as well as the international-reserve component of the domestic monetary base (e.g. see Aghevli and Rodriguez, 1979).

Extension of the monetary approach to international capital flows generally involves the additional assumption that the induced change in the international component of the monetary base comes primarily through the capital rather than the current account, at least in the short run. Private capital flows thus become the chief channel by which an excess supply or demand for money is eliminated (Kouri and Porter, 1974).[1]

For our purposes, the most relevant empirical papers are those that provide estimates of so-called "offset" and "sterilization" coefficients during the fixed-rate period. The offset coefficient measures the extent to which changes in the domestic component of the monetary base are offset by changes in the international component, while the sterilization coefficient measures just the reverse. An offset coefficient of -1 and a sterilization coefficient of 0 imply no control over the domestic money supply, whereas a sterilization coefficient of -1 and a 0 offset coefficient imply complete control.

There are by now many estimates of offset and sterilization coefficients for industrial countries (reviews are provided in Kreinin and Officer, 1978, and Magee, 1976). Unfortunately, most of these estimates are suspect because they ignore several sources of simultaneous-equations bias, not the least of which is that between the domestic and international components of the money supply.[2] Thus, unless a monetary-policy variable is selected that is independent of international reserve changes (Porter, 1972) or unless the capital-flow and sterilization equations are

[1] The Kouri-Porter (1974) model is actually a portfolio model rather than a strict monetary model, but it yields the same policy implications.

[2] See Kreinin and Officer (1978), Magee (1976), and Fratianni (1977) for a discussion of these biases.

estimated simultaneously (Argy and Kouri, 1974; Genberg, 1975; De Grauwe, 1976; Herring and Marston, 1977; Hodjera, 1976), we will get biased estimates of both coefficients.

While the estimates vary quite a bit across different studies, my reading of the evidence is that offsetting and sterilization were both high in most industrial countries under fixed rates. Porter (1972), for example, found that about 80 per cent of the impact of changes in average reserve requirements on base money in Germany was offset by capital flows within one month. Argy and Kouri (1974), however, found a sterilization coefficient for Germany of about −0.45, while the estimate of Herring and Marston (1977) was −0.91. Genberg's (1976) offset and sterilization coefficients for Sweden were −1.2 and −0.53, respectively. Kouri and Porter's (1974) offset coefficients for Italy and the Netherlands were −0.43 and −0.58, respectively, while the sterilization coefficients obtained by Argy and Kouri (1974) for the same two countries were −1.37 and −0.74, respectively. The best conclusion is perhaps that most industrial countries found it possible but at times very difficult to control their money supplies under fixed rates. Within the industrial-country group, control over the money supply was most difficult in Germany, Switzerland, Belgium, Austria, and France, and least difficult in Japan, the United States, the United Kingdom, and Italy (De Grauwe, 1975b; Thygesen, 1973; Hickman and Schleicher, 1978). The estimates don't permit one to go much further than that.

What about control over the money supply under flexible rates? One important factor here is the extent to which the exchange rate is regarded as an instrument rather than as a target of policy. The greater freedom provided by flexible rates is derived from the absence of any obligation to use intervention to peg the exchange rate. In this way, exchange-market pressures take the form of price changes (exchange-rate changes) rather than volume changes (reserve movements), and the foreign component of the monetary base ceases to be a source of changes in the money supply.[3] But this extra degree of freedom is progressively eroded as the authorities increase their management of the exchange rate. In short, theory says that with high capital mobility, countries can maintain either a money-supply target or an exchange-rate target but not both. Practice suggests, however, that most industrial countries regard this choice as unacceptable and prefer instead to sacrifice some departure from each of the targets in order to influence the other. If changes in foreign-exchange reserves are taken as a rough indicator of official

[3] See Girton and Roper (1977) for a model where excess money balances affect exchange rates *and* reserve movements. The chief advantage of using such a joint dependent variable is that it permits estimation under both fixed and floating exchange rates.

intervention, it is clear that countries have been anything but indifferent to exchange-rate movements during the floating-rate period.[4] For the Group of Ten countries plus Switzerland, Black (1979) notes that such reserve changes averaged about $3.8 billion per month in 1973, $3.3 billion in 1974, and $2.6 billion in 1975. Since then, intervention has gotten progressively larger (as has the variability of exchange rates), rising to $4.4 billion per month in 1976, $5.1 billion in 1977, and $6.3 billion in 1978.[5]

It is not necessary here to catalog all the reasons why industrial countries have deemed it necessary to intervene so heavily in exchange markets during the last six years (see Artus and Crockett, 1978; Cooper, 1977; and Willett, 1978). In some industrial countries, most intervention was tied to exchange-rate obligations within the European Economic Community's snake; in others, it was done mainly to iron out large short-run swings in exchange rates; and in still others, there is evidence of prolonged intervention to maintain an exchange rate consistent with some target rate of trade competitiveness (Black, 1979). More generally, the lack of strict adherence to money-supply targets in the floating-rate period can be explained by two observations: (1) Uncoordinated money-supply changes across countries can lead to large and rapid exchange-rate changes (Artus, 1976; Bilson, 1978). (2) Large exchange-rate changes can have significant short-run effects on inflation rates, real output, and employment (Dornbusch and Krugman, 1976).

At this point, there has been little formal testing of the hypothesis that countries have had greater control over their own money supplies under floating rates (intervention and all) than during the fixed-rate period. Hickman and Schleicher's (1978) weighted diffusion indices for sixteen industrial countries indicate that synchronization of changes in the monetary base was lower in the 1973-76 period than during, say, the last four years of the adjustable peg. Less formally, it seems clear that floating rates have provided particularly low-inflation countries like Germany and high-inflation countries like the United Kingdom with additional freedom for monetary policy because of the longer-run tendency for exchange rates to offset much of the intercountry inflation differentials.[6] Thus, while the competitive positions of Germany and the

[4] See Williamson (1976) and Suss (1976) for comparisons of reserve use under fixed and floating rates. Frenkel (1978) and Heller and Khan (1978) estimate the demand for reserves during the fixed vs. managed-floating periods.

[5] Lamfalussy (1979) presents figures on gross foreign-exchange market interventions by Western central banks for the 1973-79 period (based on published data from the Federal Reserve Bank of New York). These figures indicate a steady growth in such intervention from $36 billion (for March 1973 to February 1974) to $118 billion (for February 1978 to January 1979).

[6] Another interpretation of this offsetting is that flexible rates weaken anti-infla-

United Kingdom, expressed in domestic currency, changed substantially from 1973 to 1978, these positions normalized for exchange-rate changes moved far less.[7]

Effectiveness of Monetary Policy under Flexible Rates

If flexible rates do in general permit greater control over the domestic money supply, their contribution to the effectiveness of monetary policy is less certain. A whole range of factors affect the final outcome (Cooper, 1976; Aliber, 1975; Dornbusch, 1978), but we shall concentrate here on just four: (1) the adjustments of the trade balance and factor costs to exchange-rate depreciation, (2) the degree of substitutability between foreign and domestic assets, (3) the role of exchange-rate expectations, and (4) the response of real output to anticipated vs. unanticipated changes in the money supply.

Much of the optimism about the prospects for monetary policy under flexible rates stems from two early theoretical results of Mundell (1968) and Fleming (1962). The first result was that under conditions of high capital mobility, a given dose of expansionary monetary policy will lead to a larger increase in income under flexible than under fixed rates. In fact, when capital mobility is perfect, so that there can be only one interest rate in the world, monetary policy under fixed rates completely loses its ability to affect domestic income. This is because the temporary fall in domestic interest rates relative to foreign rates induces a massive capital outflow that restores the original money supply and the domestic interest rate and prevents any effect on the domestic level of income. In contrast, under flexible rates, the temporary fall in domestic interest rates leads to an incipient capital outflow, a depreciation of the exchange rate, an improvement in competitiveness, and an expansion in net exports.

The second result was that under flexible rates and high capital mobility, an expansionary monetary policy is more effective in increasing income than an expansionary fiscal policy, because the former is accompanied by a fall in domestic interest rates, while the latter is accompanied

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tionary discipline, because depreciations prevent excessive wage claims from being translated into large losses in competitiveness, with their attendant employment losses in the traded-goods sector (see, e.g., Braun, 1979).

[7] Expressed in domestic currency, the ratio of German to competitors' wholesale prices in manufacturing decreased by about 22 per cent from 1973 to 1978. Normalized for exchange-rate changes, however, this ratio increased by over 2 per cent; that is, exchange-rate changes transformed a large potential gain in competitiveness into a small actual decline. In the case of the United Kingdom, the corresponding figure in own currency terms was an increase of about 54 per cent vs. a decrease of about 10 per cent when normalized for exchange-rate changes. Here, the exchange rate turned a large potential fall in competitiveness into a moderate gain. I am indebted to Michael Deppler of the IMF for providing me with these data.

by a rise. This means that with fiscal policy the initial income stimulus is choked off by currency appreciation, but with monetary policy it is reinforced by currency depreciation.[8]

1. Of the many limitations of the Mundell-Fleming model, two stand out immediately from our earlier discussion. One is the assumption that exchange-rate changes translate quickly into changes in competitiveness. The Mundell-Fleming analysis ignores feedbacks from the exchange rate to domestic factor costs and prices. If these feedbacks are quick and large, terms-of-trade changes will be much reduced, and so, *ceteris paribus*, will be the net expansion of exports. In fact, Argy and Salop (1979) show that when *real* wages are constrained to be constant, it is more likely that expansionary monetary policy will affect only prices and the exchange rate, whereas expansionary fiscal policy will raise the level of output.[9]

The second poor assumption is that changes in competitiveness lead to rapid improvements in the depreciating country's net export position. While the long-run effects of real exchange-rate changes on trade flows are sizable, the effects in the short run (one or two quarters) are almost universally regarded as much smaller. Indeed, there is a strong suspicion that the response of the trade balance to depreciation will follow the J-curve (Spitaeller, 1979). If this holds true, then Niehans (1975) shows that the stimulating effect of monetary expansion will initially be weakened by a trade deficit rather than strengthened by a trade surplus.[10] These two changes in assumptions, necessary to reflect the realities of the 1970s, substantially weaken monetary policy's comparative advantage.

2. Another area where the Mundell-Fleming analysis can be misleading is in suggesting that both the effectiveness and the scope for monetary policy under flexible rates necessarily increase with the degree of substitutability between domestic and foreign assets. With high substi-

[8] This also leads to the familiar assignment results that under flexible rates and perfect capital mobility monetary policy should be assigned to internal balance and fiscal policy to external balance. The reverse holds true for fixed rates. These results follow from Mundell's principle of effective market classification, which says that policy instruments should be assigned to the targets on which they have the relatively greatest impact.

[9] Fiscal policy "works" in the Argy-Salop (1979) model because workers bargain for after-tax real income and because a change in import prices affects labor supply but not labor demand; i.e., producers use a different deflator for real wages than do workers. Sachs's forthcoming model also shows the ineffectiveness of monetary policy under fixed real wages.

[10] Dornbusch (1976c) shows that monetary policy can still stimulate aggregate demand even if it fails to generate a trade surplus in the short run, but only if exchange-rate expectations are inelastic. The results also depend on whether or not savings decline to offset the terms-of-trade effect on income.

tutability, monetary policy *will* have larger effects on the demand for assets and on exchange rates than with low substitutability, but this does not guarantee increased effectiveness or scope. Two constraints merit explicit mention.

The first constraint is the case of the small and very open economy, where exchange-rate changes provoke little relative price adjustment and hence little change in the current account from standard expenditure-switching channels. In this situation, monetary policy must affect real rates of return on financial assets if it is to affect domestic income.[11] But if the country is not large enough to affect world aggregates, it will be able to affect such real rates of return only if it can generate some degree of international immobility of capital or create some degree of imperfect substitution between its assets and foreign assets.[12] One way to generate capital immobility is via nontraded assets (Branson, 1976). Nontraded assets permit the monetary authorities to affect real returns, since there can be no offsets to either supply or demand from the rest of the world. Imperfect substitution is necessary, because if foreign and domestic assets are perfect substitutes (and if there is high capital mobility), one cannot speak meaningfully about a market-determined relative price between them. In other words, changes in the supplies of foreign and domestic assets will not affect the relative price because the demand curve will be perfectly horizontal.[13] This is why some writers (Mussa, 1979; Porter, 1979) have argued that high asset substitutability reduces the effectiveness of monetary policy regardless of the exchange-rate regime. This view also carries the implication that if floating rates are to increase the effectiveness of monetary policy in small open economies without the imposition of new restrictions on international capital flows, they must do so by making domestic and foreign assets less perfect substitutes for one another. Presumably, this is accomplished because the relative returns on assets under flexible rates depend in part on changes in the exchange rate, and the behavior of the exchange rate

[11] Once rates of return and wealth are affected, the result still depends on whether they induce an increase in expenditure. Allen and Kenen (forthcoming) show that, in the long run, an increase in asset substitutability will enlarge the steady-state increase in income if and only if crowding out does not dominate.

[12] Although capital mobility is often expressed as a function of the degree of asset substitutability, the two can be distinguished. Perhaps the easiest way to visualize the difference is to consider bonds in two countries that have identical characteristics but are not traded at all because one or both countries have strict controls on capital inflows and outflows.

[13] Recognition of the consequences of *perfect* asset substitution has been responsible for the dominant position in the literature of portfolio models in which foreign and domestic assets are imperfect substitutes (e.g. McKinnon and Oates, 1966; Girton and Henderson, 1977; Boyer, 1977; Henderson, 1977; Allen and Kenen, forthcoming).

is less predictable under flexible rates than under fixed rates. This assumption is supported by empirical evidence (Aliber, 1976) indicating that forward exchange rates have been less accurate predictors of future spot rates under floating than under the adjustable peg.

The other constraint involves the *size* of the exchange-rate changes that can occur in response to changes in monetary policy when domestic and foreign assets (including currencies) are highly substitutable. This is a "normative" constraint for central-bank officials in small and large countries alike. The main point is that currency depreciations and appreciations may go much farther than the authorities like when domestic and foreign assets are close substitutes.[14] Depreciations that are originally looked upon with satisfaction as helping to restore current-account equilibrium can become excessive as the weaker currency's store-of-value and even unit-of-account and medium-of-exchange functions begin to be replaced by stronger currencies. In consequence, high asset substitutability can limit the scope for monetary policy. This point is being increasingly recognized both in models of "currency substitution" (Calvo and Rodriguez, 1977; Miles, 1978; Kareken and Wallace, 1978; Brillembourg and Schadler, 1979) and in more standard portfolio models, where residents are assumed to hold bonds denominated in both foreign currencies and the domestic currency (e.g. Allen and Kenen, forthcoming). As Brillembourg and Schadler (1979, pp. 515-516) note:

> The lesson is that when currencies are substitutes monetary authorities face similar types of constraints under flexible rates and under fixed rates. . . . When exchange rates are permitted to change, a continuing attempt to expand the money supply faster than the demand for it grows will steadily erode demand and increase the rate of depreciation as money holders attempt to switch into other currencies. . . . In the long run, excessively expansionary policies must be reversed or capital and trade restriction will have to be imposed.[15]

3. One more factor that is missing from the early Mundell-Fleming models is exchange-rate expectations. Under flexible exchange rates, asset holders will not choose between foreign and domestic assets solely on the basis of nominal interest-rate differentials unless the anticipated rate of change of the exchange rate is zero. That is, any shortfall of the

[14] Empirical efforts to measure the degree of substitution among currencies are just beginning. Miles (1978) found high substitution between the U.S. dollar and the Canadian dollar, especially in the floating-rate period. Brillembourg and Schadler (1979) found close complementarity among continental European currencies, and substitution between these European currencies and the U.S. dollar.

[15] Branson (1979, p. 76) has recently drawn the same conclusion: "Thus it is clear that the shift to more-or-less floating exchange rates has not 'freed' monetary policy from the 'balance-of-payments' constraint. It has just changed the name to the 'exchange rate' constraint."

domestic interest rate relative to the foreign interest rate will have to be compensated for by an equal expected appreciation of the domestic currency relative to the foreign currency.

This familiar interest-rate-parity condition contains a number of implications about the effects of monetary policy under flexible rates. One is that changes in the exchange rate will respond both to changes in interest-rate differentials and to changes in the future expected exchange rate. Monetary policy thus operates on the exchange rate via two channels, its direct effect on interest rates and its indirect effect on expected future exchange rates.[16] The authorities must therefore realize that their success in halting a depreciation by more restrictive monetary policy may hinge as much on convincing the market that the tighter monetary policy is relatively permanent (and thus affecting the future expected exchange rate) as on engineering a temporarily favorable interest-rate differential. Similarly, the depreciation induced by an expansionary monetary policy will, *ceteris paribus*, be smaller the greater is the expectation that the easy monetary policy is only temporary. The fallacy of ignoring expectations and looking at interest-rate differentials alone as predictors of exchange rates is well illustrated by the observation that the U.S. dollar was depreciating relative to the DM from mid-1976 through most of 1978 despite the rise in U.S. interest rates relative to those abroad (Dornbusch, 1979).

A second implication of the interest-rate-parity condition is that short-term interest rates can become unreliable intermediate targets for monetary policy. This is because short-term interest rates under flexible rates incorporate expected exchange-rate changes. Thus, if country X has a higher short-term interest rate than country Y, it may just mean that the market expects currency X to depreciate relative to Y and not that monetary policy is "tight" in country X and "loose" in country Y. McKinnon (1978) claims that a misreading of such signs was responsible in part for the decline of the dollar vis-à-vis the yen in 1976-78. He argues that instead of correctly concluding from the movement of the yen/dollar exchange rate that there was excess liquidity in the United States and not enough liquidity in Japan, authorities in both countries looked at short-term interest rates and erroneously concluded that U.S. monetary policy was one of restraint and Japanese monetary policy one of expansion. This confusion caused delays in removing the true liquidity differences.

[16] The effects on the exchange rate and on real output both at home and abroad depend on how expectations about the future exchange rate are formed. For analyses of the leading alternative possibilities, see Kouri (1976), Mussa (1979), Mathieson (1977), and Argy and Porter (1972).

Yet another implication of interest-rate parity is that exchange rates can "overshoot" their long-run level in response to a permanent money-supply change if there is perfect capital mobility, short-run price inflexibility, and a given world interest rate (Dornbusch, 1976a).[17] Under these conditions, an increase in the nominal money supply will require a decrease in the interest rate so that the public will voluntarily hold the larger money stock. But if interest-rate parity is also to hold, the exchange rate will have to depreciate enough immediately to create the expectation of a future appreciation exactly equal to the interest-rate differential. The exchange rate thus depreciates by more than it will in the long run, that is, by more than the increase in the nominal money supply. The size of the overshooting varies inversely with the speed of adjustment in the goods market. Overshooting, whatever its explanation, is apt to be troublesome whenever the authorities have either an implicit exchange-rate target or a firm view that short-run exchange-rate fluctuations have a depressing effect on domestic investment and employment.

4. The final challenge to the effectiveness of monetary policy under flexible rates is more general than all the rest. In fact, it is generally put forward without any mention at all of the exchange-rate regime. This is the rational-expectations critique of activist stabilization policy popularized by Lucas (1976), Sargent and Wallace (1976), and Barro (1978). Its main point is that only unanticipated movements in the money supply affect real output and employment; anticipated movements affect only prices. More generally, aggregate output is a function of the difference between expected and actual policy actions. Individual economic agents are presumed to know the policy-reaction function of the monetary authorities. If a change in policy occurs, they revise their expectations fully by the start of the next period. There is no long-run tradeoff between inflation and unemployment, and the short-run tradeoff can be exploited only if the monetary authorities deceive the public.

The rational-expectations thesis carries at least three important implications for monetary policy under flexible exchange rates. First, it makes little difference if flexible rates allow countries to control their own money supplies, since countries can do little with the money supply to affect real variables. If money-supply changes are fully anticipated, they will affect neither real output nor even the exchange rate, because the present exchange rate will fully reflect all available information. Second, if the monetary authorities choose to affect real output and employment by changing monetary policy in a variable unpredictable fashion, they

[17] Other explanations for exchange-rate overshooting are discussed in Isard (1978).

will induce high volatility of exchange rates. And if high exchange-rate volatility adversely affects domestic investment and employment, short-run expansionary monetary policy can have perverse effects on real variables. Third, greater stability in the conduct of monetary policies will induce greater exchange-rate stability. This, however, will be a necessary rather than sufficient condition for exchange-rate stability, since exchange rates will still respond to "new" information about other determining factors.

Critics of the rational-expectations school have argued that the hypothesis ignores the costs of acquiring information about the economy and policies (economically rational expectations); applies only in the long run, thus leaving monetary policy still effective in the short run; does not take account of the rate of time preference (which, if high, can make it optimal to trade off less unemployment now for more inflation later); does not recognize the stickiness of wages and prices (which can permit the monetary authority to speed up the recovery process in response to a real shock); forgets about the effect of changes in the anticipated inflation rate on the capital stock (which restores real effects to anticipated changes in the money stock); and erroneously dismisses the possibilities that the monetary authority has better information than the public on the state of the economy and that this information could be costly to disseminate.[18]

The empirical evidence on the rational-expectations hypothesis is just emerging, and it is too early to draw strong conclusions about the effects of anticipated vs. unanticipated money-supply changes on real output and prices (cf., e.g., Barro, 1978, and Gordon, 1979). Most econometric studies (and large-scale models) do not disaggregate money-supply changes into anticipated and unanticipated components, and the results of those that do are sensitive to how they measure anticipated changes and to the assumed or estimated distributed-lag patterns.

Argy and Spitaeller (1978) provide a representative example of studies that use the simple observed change in the money supply. They examine the response of real GNP and consumer prices to money-supply changes in six major industrial countries (Canada, France, Germany, Italy, the United Kingdom, and the United States) from 1961 to 1975. They find that over the first two quarters real output uniformly responds more strongly to monetary expansion than does inflation. After that, real output peaks and begins to fall toward its initial level while prices continue to climb. Adjustment speeds are slow, however, and after eight

[18] For a review of these objections to rational expectations, see Santomero and Seater (1978).

quarters real output is still generally above its initial level, while prices have still not risen as much as the increase in the money supply.

In contrast, the studies that do split money-supply changes into anticipated and unanticipated components (e.g. Barro, 1978, for the United States; Korteweg, 1978, for the Netherlands; Fratianni, 1978, for Italy; Neumann, 1978, for Germany) are unable to reject the rational-expectations predictions. Inflation rates are explained in the main by anticipated money-supply changes, whereas deviations of actual real output from its trend level are explained by unanticipated variables (including unanticipated money-supply changes).

Conclusions

In sum, it seems clear in retrospect that the case for the efficacy of monetary policy under flexible rates was subject to a certain amount of false advertising. Early models did not take sufficient account of the slow response of trade flows to exchange-rate changes, of the wage-price feedbacks of exchange-rate changes, of the limits imposed by high substitution between domestic and foreign assets (including currencies), and of expectations about exchange rates and money-supply changes themselves. At the same time, if one normalizes for the probability that monetary and fiscal policy are in general less effective than they used to be in controlling real variables, it is still probably so that monetary policy is more effective under flexible rates than under fixed rates. The few empirical studies that are able to make such a comparison (e.g. Berner *et al.*, 1979a, and Kenen, 1978a, for the United States; Caves and Reuber, 1969, for Canada) generally find that monetary policy has more powerful effects on both real output and prices under flexible rates, and there is a strong suspicion that the differences between the two regimes would be more pronounced for countries with abnormal inflation rates.

The Insulating Properties of Flexible Rates

The answer to the question of whether flexible exchange rates provide better insulation against shocks or disturbances than do fixed rates has always been the same: "It all depends." What has changed over time is the perception of what it all depends on. While the literature on optimum currency areas (Tower and Willett, 1976; Kenen, 1969) shows that many factors are relevant (e.g. degrees of openness, labor mobility, export diversification, and wage-price flexibility), two of the more important ones in the context of the 1970s are the degree of international capital mobility and the extent to which foreign price changes alter the relative prices of traded goods.

One still-popular analysis of the issue runs as follows: Flexible rates insulate a country from disturbances abroad but make it bear more fully the consequences of disturbances that originate at home. Fixed rates, in contrast, permit a country to export some of its domestic disturbances to other countries but also make it more susceptible to foreign disturbances. The moral of this story is that countries that typically suffer most from external disturbances should adopt flexible rates, whereas those whose disturbances are predominantly home grown should opt for fixed rates.[1]

Insulation with High vs. Low Capital Mobility

Implicit in this country-of-origin analysis of the relative insulating properties of fixed and flexible rates is the assumption that flexible rates provide complete insulation against foreign disturbances. It is now widely recognized that while this is a reasonable working assumption when there is no—or low—international mobility of capital, it must be soundly rejected for conditions of high capital mobility.[2] Indeed, a central message of the Mundell-Fleming models of monetary and fiscal policy under flexible rates and perfect capital mobility is that any disturbance (whether private or government-induced) that affects one country's in-

[1] Conclusions about the relative desirability of the two exchange-rate regimes for global stability can similarly be derived by making assumptions about the distribution and timing of disturbances across countries (Laffer, 1973; Haberler, 1973; Tower and Willett, 1976).

[2] Even when there are no capital flows, a flexible exchange rate will not provide complete insulation from foreign disturbances if import prices affect the profitability of producing domestic output or the demand for money, or if expenditure in the home country is affected by the terms of trade (see Mussa, 1979).

terest rate will trigger massive incipient capital flows and, in turn, exchange-rate changes that will affect real output and employment in *both* countries.[3] The relevant issue is then not whether flexible rates transmit foreign disturbances to the home country but rather how they affect the direction and size of such transmission effects as compared with fixed rates.

Although drawing conclusions in the absence of a precisely specified model can be hazardous, two well-known results of the high-capital-mobility asumption (Argy and Porter, 1972; Mussa, 1979) can be stated as follows: (1) A foreign monetary disturbance will have opposite effects on foreign and domestic output under flexible rates but will move output in the same direction under fixed rates. (2) A foreign-expenditure disturbance, be it induced by fiscal policy or otherwise, will be transmitted to domestic output with greater strength under flexible rates than under fixed rates. Monetary disturbances are treated separately from fiscal and other expenditure disturbances because of their opposite effects on the foreign country's interest rate. For example, a foreign monetary expansion lowers the foreign interest rate, while a foreign fiscal expansion raises it. With high capital mobility this means that the two types of disturbances will produce opposite exchange-rate movements and hence also opposite net trade-balance and output effects for the home country (home-country output falls in response to a foreign monetary expansion but rises in response to a foreign fiscal expansion). Fixed rates are distinguished from flexible rates because an increase in capital mobility affects the transmission of disturbances differently under the two regimes. Specifically, under fixed rates, capital mobility spreads out the transmission of monetary disturbances from the originating country to the rest of the world while bottling up expenditure disturbances more in the country of origin. Under flexible rates, an increase in capital mobility does just the opposite—it spreads out the transmission of fiscal disturbances and magnifies the domestic effects of monetary disturbances at the expense of creating negative transmission effects in the rest of the world (Mundell, 1968; Mussa, 1979).

These results have a number of interesting policy implications. One is that countries cannot count on flexible rates to insulate them from foreign disturbances. If they want such insulation, they or the originating country have to "do something." In this regard, Dornbusch and

[3] Kouri and Macedo's (1978) updated restatement of this message is that anything that affects asset supplies or asset demands can affect exchange rates, and hence real variables, in both countries. This paper also stresses the role of asset preferences (of home vs. foreign investors) in the transmission process. In general, the more symmetrical are asset preferences around the world, the less will exchange rates fluctuate in response to redistribution of asset supplies.

Krugman (1976) show that the beggar-thy-neighbor effects of foreign monetary expansion on the home country can be avoided if either the home or foreign country undertakes expansionary fiscal policy. The idea of employing a policy mix of expansionary fiscal policy and accommodating monetary policy is to stimulate aggregate demand while stabilizing the interest rate, and hence also the exchange rate. With exchange rates steady, the main channel of transmission is plugged off.

A second policy implication of the disturbance literature is that a simultaneous expansion of economic activity in a number of countries (with flexible exchange rates) is best achieved if fiscal rather than monetary policy is the main instrument of economic stimulus. This view surfaced in 1975-76 in connection with the "locomotive" hypothesis, as industrial countries were struggling to engineer a global recovery from the 1974 oil-price shock. The thought was that if the stronger industrial countries (then the United States, Germany, and Japan) could take the lead and adopt expansionary fiscal policies, they could help pull the weaker countries out of their recessions as well. Since fiscal expansion by the locomotive countries would appreciate their currencies relative to the others, the weaker countries' exports would expand for both relative-price and foreign-income reasons. The weaker countries would also not have to worry so much that their own stimulative policies would aggravate their trade deficits and thereby usher in a speculative cycle of depreciation and inflation.

As Whitman (1978) has noted, however, most "policy-mix" proposals face a number of formidable obstacles in practice. One is that the policy mix can change the composition of output in a politically unfavorable way. For example, fiscal-led expansion *cum* exchange-rate appreciation penalizes exports relative to domestic demand. If excess capacity is already substantial in the export sector, and if profits in the export sector are already low, exchange-rate appreciation will aggravate the situation and may bring forth strong political opposition. A second obstacle is that the instruments of fiscal and monetary policy can themselves become intermediate policy objectives. The "30 per cent rule" in Japan, which prior to 1978 restricted deficit spending to not more than 30 per cent of total government expenditures, is a case in point. Third and finally, transmission of monetary and fiscal disturbances via the exchange rate, whether they are desired or not, will be limited in size by the same set of factors that constrain their effect on domestic real variables: J-curve effects, real-wage resistance, crowding out, and anticipations about the policy changes themselves. That is, changes in real variables may be small in both countries.

Insulation against Overall vs. Relative Price Changes

The second major distinction that needs to be made in appraising the insulating properties of flexible rates is that between overall price changes and relative price changes. A flexible exchange rate can completely insulate the domestic economy from a general rise in the world price level, because an appreciation of the currency proportional to the increase in foreign prices prevents wealth or relative-price effects from taking place.[4] In short, the flexible rate stops the disturbance at the country's border (Cooper, 1976). The same is not true of a change in relative prices of traded goods, say an increase in the price of imported oil or food. This conclusion follows from the more general propositions that real variables in the domestic economy will change if relative prices change, and that an exchange-rate change can offset changes in the price of tradables relative to nontradables (or sometimes of imports relative to exports) but not in the relative prices of various categories of imports or exports. To accomplish the latter, one needs a more disaggregated policy instrument, such as taxes and subsidies.

Buiter (1978) has recently examined the effects of an indexed (to OPEC import prices) increase in the price of an intermediate imported input under flexible rates. The short-run properties of his model are Keynesian (sticky money wages), whereas the long-run properties are classical. He concludes:

> In the short-run unemployment will increase, the exchange rate will depreciate and output, real income and real wages will decline. In the long-run the economy is placed on a permanently lower balanced growth path although the natural rate of growth itself is not affected (p. 267).

Argy and Salop (1979) similarly find rather gloomy prospects for the response of an economy to an oil-price increase under flexible rates and in the complete absence of money illusion. The oil-price increase reduces both aggregate demand and the market-clearing real wage in the oil-importing nations. With real wages constrained to be constant, the new output level is characterized by unemployment.[5] Further, if the govern-

[4] Another distinction should be made here—between the short run and the long run. A flexible exchange rate will leave real variables unaffected in the short run only if speculators have perfect foresight about the exchange rate (Dornbusch, 1976b). Kenen (1978a) reaches a similar conclusion about insulation against a foreign price change, but for different reasons. In his model, an increase in the foreign price level appreciates the exchange rate and temporarily raises domestic income. Over time, savings and capital flows lead to changes in stocks of wealth and holdings of foreign bonds that push income back to its original level. Complete insulation against a foreign price change is therefore achieved only in the long run in both these models.

[5] Bruno and Sachs (1979) also show that real output will fall more in response

ment tries to reduce unemployment by adopting expansionary monetary policy, the only result will be an increase in domestic prices and a depreciation of the exchange rate. Expansionary fiscal policy can increase employment, but only if money-wage demands are sensitive to tax cuts and if workers evaluate their real wages using a price deflator different from that used by producers (i.e. only if import-price changes affect labor supply but not labor demand).

Empirical Evidence

Identifying the effects of flexible rates on the transmission of foreign economic disturbances is one thing. Measuring or estimating these effects has proved to be quite another. There are two major constraints: (1) Most econometric models are not designed to operate under both pegged and flexible exchange rates. Exchange rates are typically assumed to be constant or are varied exogenously as a policy variable. But if the exchange rate is not endogenous, one of the major channels of transmission under flexible rates is excluded by assumption, and inferences about the effects of floating on insulation from foreign disturbances cannot be made. (2) The period of experience with floating is still quite limited. The restricted sample size makes it difficult to obtain accurate estimates of parameters during the floating-rate period. The practical upshot of these constraints is that we have plenty of estimates of international income and price-elasticity multipliers (Deardorff and Stern, 1977; OECD, 1978) but very little evidence on how flexible rates per se have affected the size of the multipliers.

If we examine the indirect evidence first, there is little to suggest that flexible rates have weakened the international transmission of disturbances. Ripley (1979) has analyzed the observed synchronization in levels of manufacturing activity for ten industrial countries from 1961 to 1975 and various subperiods. Irrespective of whether this synchronization was measured by correlation analysis, factor analysis, or regression techniques, the conclusions were similar:

> The observed degree of synchronization was found to have increased between the late 1960s and the period of managed floating. When the period immediately following the oil shock was excluded from the managed rate period, the observed degree of covariation between changes in activity levels remained high (p. 18).

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to an import-price increase the greater the degree of indexation of money wages. This is the open-economy analogue to the closed-economy results of Fisher (1977) and Gray (1976) that indexation exacerbates the effects of real shocks. It also explains why small open economies might want, at least temporarily, to abandon indexation in the face of commodity-price shocks.

Hickman and Schleicher (1978), using the models of Project LINK to study synchronization of movements in real GNP, consumer prices, and wages among sixteen industrial countries from 1951 to 1976, likewise find an increase for 1973-76. They attribute this increase, however, not to stronger transmission of disturbances but rather to common shocks and policy responses:

> Our hypothesis is that these fluctuations stem from simultaneous shocks rather than from the transmission of disturbances originating in one country or a small group of countries. . . . The current worldwide synchronization phenomenon reflects the global disequilibrium in the international financial system and the global disequilibrium on the raw materials markets, notably the oil problem. These common shocks strongly synchronized both the initial disturbances to individual economies and the restrictive policy actions which followed during 1973-74 (p. 696).

To go beyond the period of flexible rates to the contribution of flexible rates themselves to insulation, we need models that can simulate the effects of various disturbances under both fixed and flexible rates. As mentioned earlier, these are few and far between (especially for countries other than Canada) and, where they do exist, the published simulation results usually do not permit one to extract the marginal effects of floating on insulation.[6]

Here, I just briefly describe one recent effort for the United States. This is the medium-size (about seventy-five behavioral equations) model of the U.S. economy developed by Kenen (1978b). It is Keynesian in spirit but deals in some detail with the determination of the price level and with financial relationships. In one recently reported simulation exercise (Kenen, 1978a), the effects of a permanent increase in the level of real economic activity in the outside world are compared under pegged and cleanly floating exchange rates. When the exchange rate is pegged, the increase in world income leads to the usual increase in U.S. real GNP, an improvement in the U.S. current account, and an increase in the U.S. overall balance-of-payments surplus. Under a floating rate, the dollar begins to appreciate immediately, constraining the increase in

[6] The multicountry model developed by Berner *et al.* (1977) at the U.S. Federal Reserve Board is fully capable of turning out the types of answers required, since it can operate under a variety of exchange-rate regimes. At this point, however, the reported simulation results (Berner *et al.*, 1979a, 1979b) do not make it possible to isolate the effects of floating on insulation from foreign disturbances. The simulations generally cover just floating rates, not a comparison of fixed and floating rates. When fixed- and floating-rate cases are compared, it is only for the country in which the disturbance originated, not for the foreign country. Mention should also be made of the multicountry model developed by Knight and Mathieson (1978) at the IMF, which also can operate under both fixed and floating rates; it has yet to be subjected to simulation analysis, however.

both the U.S. current account and U.S. real GNP. After one year, the changes in both these variables (relative to the control situation) are about half as large under flexible rates as under fixed rates. Insulation is therefore not complete but not trivial either.

Conclusions

To sum up, we still have a lot to learn about the insulating properties of flexible rates against external shocks and disturbances, especially in quantitative terms. It is abundantly clear from the experience of the last six years, however, that we must abandon the old textbook view of flexible rates as insulators *par excellence* against a wide variety of foreign disturbances. In its place, we must substitute more qualified views. Flexible rates will be better insulators than fixed rates against some types of foreign disturbances but not against others.[7] Distinctions have to be made between high and low capital mobility, overall price changes and relative price changes, the short run and the long run, asset-market disturbances and goods-market disturbances, accurate expectations and inaccurate ones, nominal and real wage stickiness, domestic portfolios with and without foreign-currency-denominated assets, and on and on. The fact that flexible rates can provide less insulation than was previously supposed means that, on balance, the case for active policy against foreign disturbances (including the use of exchange-market intervention) has been strengthened. This is especially true for the smaller, more open economies, where foreign disturbances transmitted via the exchange rate are apt to have the relatively largest impact on domestic variables.

[7] Cooper (1976) gives three examples: a general rise in the world price level, a world increase in demand for the home country's exports, and an increase in foreign demand for the home country's securities (at constant interest rates). In the first case, a flexible rate provides complete insulation; in the second, it mitigates the impact relative to fixed rates; and in the third case, it aggravates the situation relative to fixed rates. The same conclusions follow if these three types of disturbance occur in the home country.

Flexible Rates and Foreign Trade Flows

The size and speed of the response of trade flows to exchange-rate changes play an important role in almost all the issues discussed thus far. Also, the persistence of current-account imbalances for some of the larger industrial countries during the past three years in the face of sizable exchange-rate changes (see Table 3) has been interpreted by some as *prima facie* evidence that flexible rates "don't work." For these reasons, it is useful to review the empirical evidence on the relationship between exchange rates and foreign trade flows, and to discuss if and how flexible rates themselves could alter this relationship.[1] The general review focuses on nominal vs. real exchange rates, short-run vs. long-run price elasticities of demand, the dominant short-run influence of real income movements, the role of nonprice characteristics of domestic vs. foreign goods, and the effects of flexible rates on the size of price elasticities.

Nominal vs. Real Exchange-Rate Changes

One of the things about exchange-rate movements and trade imbalances that is sometimes overlooked is that exchange rates are only one component of a country's competitive price position. The other major component is the behavior of traded-goods prices in that country relative to its competitors. In other words, real rather than nominal exchange-rate changes are what matter for trade flows. While divergences from purchasing-power parity have apparently been more pronounced under flexible rates than under the adjustable peg (Genberg, 1978), it has still been true that relative inflation rates have offset much of the effect of exchange-rate changes on countries' relative competitive positions.

The last three rows of Table 3 illustrate this point for the seven largest industrial countries over the 1976-78 period.[2] Of special note are the numbers for the four countries (Italy, the United Kingdom, Japan, and Germany) with the most "abnormal" domestic price behavior. While Italy's effective exchange rate depreciated by more than 16 per cent, its inflation rate was sufficiently high relative to that of its trading partners

[1] Magee (1975) and Leamer and Stern (1970) provide comprehensive reviews of empirical trade studies. An exhaustive comparison of estimates of price elasticities in international trade can be found in Stern *et al.* (1976).

[2] Sachs (forthcoming, p. 2) draws the same conclusion for the five largest industrial countries over the 1973-76 period: "Although the five countries listed experienced very different rates of price inflation during 1973-76, relative competitive positions remained remarkably stable."

TABLE 3

TRADE BALANCES, CURRENT ACCOUNTS, EXCHANGE RATES, AND RELATIVE PRICES FOR THE SEVEN LARGEST INDUSTRIAL COUNTRIES, 1976-78

	Canada	*France*	*Germany*	*Italy*	*Japan*	*U.K.*	*U.S.*
Trade balance:[a]							
1976	1.4	–4.7	16.7	–4.3	9.9	–6.4	–9.4
1977	2.7	–2.7	19.4	0.1	17.3	–2.9	–31.1
1978	3.1	1.3	24.4	3.0	25.1	–2.1	–34.2
Current account:[a, b]							
1976	–3.9	–5.9	3.8	–2.9	3.6	–2.0	4.3
1977	–3.9	–3.3	3.7	2.3	10.7	0.8	–15.3
1978	–3.8	2.2	8.1	5.6	16.7	0.2	–16.3
Percentage change, 1976-78:[c]							
Effective exchange rate[d]	–16.7	–7.7	13.7	–16.4	32.0	–6.0	–10.3
Unadjusted relative wholesale prices[e]	3.8	4.7	–8.8	18.7	–12.5	18.7	1.6
Adjusted relative wholesale prices[f]	–13.6	–3.4	3.3	–0.4	15.3	11.8	–8.9

[a] In billions of U.S. dollars.

[b] Includes goods, services, and all current transfers, both private and official.

[c] Data for calculations from IMF staff.

[d] IMF MERM index. A positive figure denotes an appreciation, a negative one a depreciation.

[e] Percentage change in ratio of own to competitors' wholesale prices for manufactures. A positive figure denotes deterioration in country's position, a negative one improvement.

[f] Percentage change in ratio of own to competitors' wholesale prices for manufactures adjusted for effective exchange rates. A positive figure denotes deterioration in country's position, a negative one improvement. Since relationship is multiplicative rather than additive, numbers in two rows above will not sum to those in this row.

that its competitive position remained almost constant. In the case of the United Kingdom, its high relative inflation rate swamped the modest (6 per cent) depreciation of sterling and produced an appreciable decline in competitiveness. In contrast, Germany's relatively low inflation rate permitted an appreciation of the DM of over 13 per cent to impair its competitive position by only about 3 per cent. Similarly, almost half the appreciation of the yen was offset by Japan's relatively low domestic rate of inflation. The point is simply that once one moves from nominal to real exchange-rate changes, the limited size of changes in countries' relative competitive positions can constrain the effect of exchange-rate changes on trade imbalances even when price elasticities themselves are reasonably high.[3] This is just another indication that exchange-rate changes will reduce external imbalances only if supported by macro polices that make a significant share of the original competitive price change "stick."

Short-Run vs. Long-Run Price Elasticities

Once relative traded-goods prices among countries do change, the response of exports and imports will depend in part on the size of export and import price elasticities of demand. Two conclusions emerge from empirical work on these elasticities: First, relative price elasticities are statistically significant and large over the long run (two years) in virtually all industrial countries. Second, these elasticities are considerably smaller over the short run (one quarter to one year). More specifically, econometric estimates from recent studies (Deppler and Ripley, 1978; Stern *et al.*, 1976; Goldstein and Khan, 1976, 1978; Beenstock and Minford, 1976; Hooper, 1978) indicate that the long-run (two to three years) price elasticity of demand for total imports in industrial countries is about −0.75 to −1.25, while that for total exports is −1.25 to −2.50. Short-run (up to one year) price elasticities would be about half as large; that is, 50 per cent of the total adjustment takes place in one year. The estimated price elasticities tend to be larger (a) the greater the share of manufactures in total exports and imports (Deppler and Ripley, 1978); (b) when aggregation biases are removed by estimating import and export equations disaggregated by commodity (Barker, 1970); (c) when the simultaneous relationship between export quantities and prices is taken into account via simultaneous-estimation techniques (Goldstein and Kahn, 1978); and (d) when the domestic price index

[3] Note, however, that relative inflation rates offset little of the effect of exchange-rate changes on competitiveness for Canada and the United States during 1976-78. Also, the absolute change in Japan's competitive position was still large (15 per cent) despite substantial offsetting. Other explanations must therefore be sought for the persistence of current-account imbalances in these three countries.

for import substitutes excludes most nontradable goods, that is, when the WPI or something similar is used in preference to the CPI or the GNP deflator (Goldstein *et al.*, forthcoming).

Three implications of the difference between short-run and long-run relative price elasticities deserve explicit mention.

1. The trade-balance response to a depreciation can follow the J-curve. This is because in the short run import prices rise more rapidly in local currency than export prices, and there has not yet been enough time for the volume of trade to adjust. Hence, in the short run depreciation worsens and appreciation improves the value of the trade balance. As time passes, this adverse movement in the trade balance is first checked and then reversed, as the volume response of imports and exports grows and as export prices catch up with import prices. Using plausible parameters for price elasticities and import and export pass-throughs, Goldstein and Young (1979) and Spitaeller (1979) show that the deterioration or improvement in the trade balance following a depreciation or appreciation, respectively, is likely to last about four or five quarters. At its low point, the deterioration could amount to as much as 8 to 10 per cent of the local-currency value of imports.

2. An implication of low short-run price elasticities is that countries looking for a quick turnaround in their trade accounts may rely on policy instruments other than the exchange rate, even when these instruments adversely affect the global gains from trade. The recent popularity of "administrative solutions," such as voluntary export restraints, derives in part from their quick effects: They reduce the value of exports quickly, affect only a portion of the country's trade (rather than all exports and import-competing goods, as with an exchange-rate change), and can be turned off as soon as the trade imbalance declines.

3. By far the most important implication of low short-run price elasticities is that short-run movements in countries' trade balances will be dominated by cyclical real income movements at home and abroad. Over periods up to a year, the combined income elasticities for imports and exports will typically be anywhere from two to four times larger than the sum of price elasticities (Deppler and Ripley, 1978; Gylfason, 1978; Goldstein and Kahn, 1976, 1978; Hooper, 1978).[4] In fact, the usual practice in econometric trade models is to enter only the current level of real income in the import- and export-volume equations, even where

[4] The 1978 IMF Annual Report reaches a similar conclusion even over the medium run: ". . . the results indicate that an increase of 1 per cent in manufacturing output maintained for three years has a strong negative effect on the trade balance in all 14 countries, ranging from 1½ to 3½ per cent of 1977 trade flows. By way of comparison, rather sizable exchange rate changes, in most cases on the order of 5 to 15 per cent, would be necessary to produce the same trade balance effects" (p. 42).

quarterly data are used; that is, short-run and long-run income elasticities are the same. As regards their size, a consensus income elasticity for total imports in industrial countries would be 1.25 to 2.0; the income elasticity for exports is about the same.

The Dominance of Real Income Movements

The immediate consequence of large short-term income elasticities is that a country's trade and current-account positions will generally deteriorate when its growth rate (relative to its potential) exceeds that abroad. Again, the 1975-78 experience of the largest industrial countries is instructive. From 1967 to 1973, the average annual percentage change in U.S. real GNP was 3.8 per cent, while that for other Group of Ten countries plus Switzerland (weighted by 1972-76 global trade shares) was 6.3 per cent. In contrast, from 1975 to 1978, the corresponding figures for the United States and foreign industrial countries were 5.1 per cent and 3.6 per cent, respectively (see Truman, 1979, Table 2). Almost regardless of which model one uses, this turnaround in past growth relationships between the United States and its trading partners explains a sizable proportion of current-account developments for Germany, Japan, and the United States from 1975 to 1978 (Table 3 above). Lawrence (1978) attributes about one-fourth of the deterioration in the U.S. trade balance from 1975 to 1977 to the failure of cyclical recovery abroad. Wallich (1978a) estimates that the 1977 U.S. trade deficit of $31 billion would have been $10 to $20 billion lower if there had been full employment in the major industrialized countries. Truman (1979) similarly calculates that if U.S. real GNP growth had slowed over 1976-78 so that the fourth-quarter 1978 level had been about 3 per cent lower than that actually observed, the 1978 U.S. current-account deficit would have been roughly $9½ billion instead of $16 billion. By the same token, if there is greater convergence of real growth rates among industrial countries in 1979-80, there is a strong expectation that external imbalances will diminish and that exchange rates will show greater stability.[5]

[5] Within this general relationship between rates of economic growth and the trade balance, a number of distinctions should be made: (a) Cyclical increases in GNP generally worsen the trade balance and depreciate the exchange rate, while increases in potential GNP have the opposite effect (Bazdarich, 1979). (b) Even parallel movements in real income at home and abroad can generate trade imbalance if income elasticities differ significantly across countries (Houthakker and Magee, 1969, vs. Hooper, 1978). (c) The absorption approach reminds us that the current-account balance depends not on income alone but rather on the difference between income and expenditure, i.e., the current-account surplus equals the excess of private savings over the sum of private investment and the public-sector deficit. (See Artus, 1979, and McKinnon, 1978, for application of the absorption approach to the current-account surpluses and deficits of Japan, Germany, and the United States.)

Nonprice Characteristics of Traded Goods

The final factor that can weaken the observed association between exchange-rate changes and trade flows is the nonprice characteristics of traded goods. If delivery schedules, after-sales service, or general product quality differ as between foreign and domestic goods, the goods will be imperfect substitutes, and consumers will be induced to shift between them only if relative price changes are large. Further, if changes in relative *non*price terms offset much of the effect on countries' competitive positions of relative price changes, then the connection between exchange-rate changes and trade-balance changes will be reduced for exchange-rate changes of all sizes.

Attempts to incorporate nonprice variables in trade equations have taken a variety of forms. Some studies have used the data on export delivery delays (Marston, 1971); others have tried to relate "effective" prices to own or relative capacity-utilization rates (Gregory, 1971); and still others have used foreign investment variables to proxy the introduction of new products or rapid increases in the share of products with low weights in established price indices (Hooper, 1978). Each of these efforts has met with some success, but it is doubtful that we will ever have time-series data on nonprice characteristics of traded goods. Nevertheless, the fact that we cannot measure nonprice characteristics does not make them unimportant in explaining changes in trade performance.

Effects of Flexible Rates on the Size of Price Elasticities

With the overall evidence on the responsiveness of trade flows to exchange-rate changes in mind, we can next ask how flexible rates might alter this relationship. The central issue here is whether flexible rates reduce price elasticities of demand for traded goods. The affirmative case for this proposition is put forward most clearly by Niehans (1975, p. 267):

> . . . consider the probable effect of flexible rates on foreign trade elasticities. It is convenient to introduce the distinction between the actual exchange rate and what, in analogy to permanent income, may be called the permanent exchange rate. . . . What matters for trade flows in physical units is mostly the permanent rate. Major changes in the international division of labor require new production facilities, new distribution networks, new sources of supply and the development of new markets. Most firms will try to avoid making such long-term decisions on the basis of exchange rates which turn out to be only temporary. . . . With flexible rates, in view of the slow adjustment of permanent rates to actual rates, this process will be even slower, and many fluctuations in actual rates will have hardly any effect on permanent rates, and thus trade flows.

McKinnon (1978, p. 4) makes basically the same point:

> With the advent of floating, the future direction of exchange rate movements has proved highly uncertain. . . . And it may not be in the interest of merchants to engage in active arbitrage in industrial commodities if tomorrow's exchange rate is unknown. Hence, the quantities of goods traded respond sluggishly to exchange-rate fluctuations giving rise to a modern version of elasticity pessimism. . . .

Once again, there are plenty of estimates of elasticities during the floating-rate period but practically no attempts to estimate the impact of floating per se on these elasticities. In fact, there does not seem to be even *one* study that compares price elasticities during the fixed- and floating-rate periods for a group of industrial countries. Nor has there yet been an attempt to test Niehans's (1975) hypothesis more directly by defining a measure of the permanent exchange rate, comparing deviations of actual rates from permanent rates during periods of fixed and floating rates, and testing whether permanent exchange rates explain trade flows better than do actual exchange rates during the floating-rate period.[6]

Hooper's (1978) study of the stability of income and price elasticities in U.S. trade from 1957 to 1977 comes closest to the issue at hand. He finds no change in the price elasticity of demand for U.S. nonagricultural exports as between 1972-77 and the whole period 1957-77. In the case of U.S. nonfuel imports, the results are ambiguous. A standard import-volume equation does yield a substantially lower long-run price elasticity (-0.44) for the 1972-77 period than for the 1957-77 period (-1.15). However, Hooper also argues that the standard import equation is inappropriate because it ignores important nonprice foreign-supply effects. No indication is given as to whether the import-price elasticity in the "improved" equation has declined during the floating-rate period.

A study by Gylfason (1978) provides less direct evidence on temporal changes in price elasticities, but it covers a wider range of countries (the seven largest industrial countries plus Austria, Belgium, and the Netherlands). Gylfason's export- and import-volume equations cover only 1971 to 1977, but comparisons are made with studies of the fixed-rate period (Stern *et al.*, 1976; Hickman and Lau, 1973; Houthakker and Magee, 1969; Goldstein and Khan, 1976, 1978). In brief, Gylfason's import-price elasticities are about 20 per cent higher than those of the other studies, despite the higher share of oil imports in the floating-rate period

[6] The rub here is how to define the permanent or equilibrium exchange rate. For an analysis of the difficulties associated with alternative definitions of the equilibrium rate, see Artus (1978).

and Gylfason's use of monthly rather than quarterly or annual data. On the export side, Gylfason's estimated price elasticities are about the same as those obtained by others for the fixed-rate period.

Two other empirical questions are worth mentioning in connection with the price-elasticity issue. One is whether large changes in exchange rates or relative prices have different proportionate effects on trade flows than small changes, as originally suggested by Orcutt (1950). Goldstein and Khan (1976) found that neither the size of the price elasticity nor the speed of adjustment was related to the size of the change in prices. Their investigation, however, was restricted to total imports of twelve industrial countries over the 1955-73 period. No such results are available for the flexible-rate period. The second issue is whether exchange-rate changes provoke a trade response different from that provoked by equivalent changes in prices measured in local currency. Junz and Rhomberg (1973) were the first to test this question. They found the responses to be very similar. More recently, Wilson and Takacs (1979) have reexamined this hypothesis using more sophisticated lag techniques. They find a quicker and stronger total response to exchange-rate changes than to changes in exporters' national-currency prices, but their results, like those of Junz and Rhomberg, refer only to the Bretton Woods period. In fact, Wilson and Takacs go on to suggest that they would not expect any difference under floating rates because ". . . exchange rate changes have now largely lost the attributes (size, speed, and permanence) that distinguished them from price shifts under the Bretton Woods system" (p. 279). In line with this contention, it is now generally believed (Hooper, 1976) that any differences between observed exchange-rate responses and local-currency price responses are attributable to data deficiencies in the export unit-value indices. That is, random measurement errors in the export-price data have the effect of biasing the coefficient on export prices toward zero.

Conclusions

To summarize, there is nothing in the flexible-rate experience to contradict the propositions that relative price changes eventually have a strong influence on the volume of imports and exports, and that exchange-rate changes make an important contribution to the external adjustment process. Nor does there seem to be any persuasive evidence that flexible rates have reduced the size or slowed the response of trade flows to exchange-rate changes.

But the short run is not the same as the long run and exchange rates are not the only determinant of trade and current accounts. In the short run, price elasticities of demand are low and the trade balance can

respond perversely to an exchange-rate change. And when cyclical conditions diverge widely across countries and inflation differentials offset much of the effect of exchange-rate changes on relative competitive positions, the association between nominal exchange-rate changes and the trade balance will be weak, even in the medium or long run.

Finally, current-account imbalances can influence exchange rates just as exchange rates influence current accounts. Actual current-account surpluses and deficits change the supply of foreign assets relative to domestic assets, and expected future current accounts affect expectations about future exchange rates, and hence present exchange rates as well. Where future macroeconomic policies are not expected to be sufficient to close large current-account imbalances, the prospect of large future exchange-rate changes will induce large present exchange-rate changes. That is why several writers (e.g. Dornbusch and Krugman, 1976) have suggested that the floating-rate experience is more consistent with the view that exchange rates moved a lot *because* current accounts moved so little than with the alternative view that current accounts moved little *despite* the fact that exchange rates moved a lot.

Concluding Observations

At the cost of ignoring some important issues and of minimizing the complexity of some others, let me conclude by outlining five broad lessons of the preceding analysis.

Lesson number one is that it is important to distinguish between the *period* of flexible rates and the *effects* of flexible rates. If a serious attempt is not made to hold "other things equal," it is inevitable that flexible rates will be blamed for, or credited with, macroeconomic outcomes that are only marginally related to the exchange-rate regime. In this regard, flexible rates should not be considered an important determinant of either the high inflation rates or the high unemployment rates experienced by industrial countries as a group over the past six to seven years. No exchange-rate regime can be expected to overcome the effects of large and recurrent foreign supply shocks, obstinate long-term inflation expectations, strong downward real-wage resistance, and decreases in underlying rates of productivity growth. Macroeconomic policy has indeed become more difficult during the period of flexible rates, but not primarily because of flexible rates.

The second lesson is that flexible rates will present greater difficulties for macroeconomic management in some industrial countries than in others. In particular, the smaller more open countries will face larger domestic-price feedbacks and will obtain less-lasting relative price changes from exchange-rate changes than the larger more open countries. To the extent that some countries pay more and get less from flexible rates than others, there are sure to be continuing intercountry differences about the optimal degree of exchange-rate flexibility. The same suit of clothes doesn't fit everybody.[1] The heterogeneity of exchange-rate arrangements sanctioned by the Second Amendment to the IMF Articles of Agreement may therefore be more than just a transitional state.

Lesson number three is that in a world of high international capital mobility and high substitutability between assets (including monies) in different countries, policy autonomy is a myth, regardless of the exchange-rate regime. Flexible rates are better insulators than fixed rates against some types of disturbances and are poorer insulators against others. The independence of domestic monetary policy will be increased by flexible rates, but more in the short run than the long run. The ef-

[1] For a good account of the different national positions and interests in 1971-74 negotiations on the exchange-rate regime, see Williamson (1977).

fectiveness of monetary policy may not be increased at all when real wages are rigid downward, or when there is an implicit exchange-rate target, or where monetary-policy changes themselves are fully anticipated. Since policy autonomy is not achievable anyway, all countries have an interest in policy coordination to ensure that their macroeconomic and exchange-rate policies do not work at cross purposes.

The fourth lesson concerns the time dimension of macroeconomic policy under flexible rates. Because present exchange rates are heavily dependent on expected future exchange rates, and because expected future rates are dependent on expected future macroeconomic policies, present policies operate on exchange rates in part by affecting expectations about future policies. This is a two-edged sword. On the one hand, it can make it difficult for countries to quickly reverse long-standing appreciations or depreciations. For example, restrictive monetary policy will halt such a depreciation only if the authorities can convince the market that present policy foreshadows a *long-term* tightening of policy. On the other hand, once the market is so convinced, temporary deviations from the long-term trend will not affect exchange rates much. In a similar vein, instability in the conduct of macro policy generates great uncertainty about future policies and hence induces exchange-rate instability, because there is no firm anchor for long-term expectations. There is therefore a sense in which flexible rates penalize unstable myopic behavior and reward stable forward-looking behavior by the policy-making authorities.

The fifth and final lesson is that exchange-rate changes do help to equilibrate current-account imbalances, but in the long run rather than the short run and only when their effects are not offset by relative income and price developments. There is no evidence that everybody's trade-forecasting equations have gone "off track" since early 1973, or even that coefficients or time lags on relative prices have changed appreciably, as a result of flexible rates. The 1976-78 experience, which saw both persistent current-account imbalances and large nominal exchange-rate changes, is not an indictment of flexible rates. It is rather an illustration of what happens when both surplus and deficit countries fail to take appropriate supporting macroeconomic policies and when progress in overcoming longer-term structural problems is slow.

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