SYMPOSIUM ON

Floating Exchange Rates In An Interdependent World

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P R E F A C E

Responding to congressional concern that the high value of the dollar on foreign exchange markets during the early 1980s harmed the competitive standing of U.S. firms and thus contributed to the severity of the last recession, the U.S. General Accounting Office was asked to undertake a study of the determinants of international exchange rates. As part of that effort the GAO sponsored a symposium with leading specialists on exchange rate behavior on February 18, 1983. Papers prepared for that seminar are published here as a companion to the GAO report Flexible Exchange Rates in an Interdependent World: No Simple Solution to the Problems. (GAO/NSIAD-84-68,)

Seminar participants addressed a wide range of questions regarding the recent "strong dollar" experience. First, they examined the theoretical and empirical explanations of exchange rate behavior. Because of the frequent charges during late 1982 and in 1983 that Japanese policies and actions artifically weakened the yen, this examination focused on the yen-dollar exchange rate. The seminar participants and discussants also analyzed the implications that floating exchange rates and economic interdependence have for the conduct of national macroeconomic policy and for the future of the international financial system. The agenda that was provided for the participants is included as appendix I.

The increased interdependence of U.S. and foreign economies in both trade and finance explains the importance of these issues. By influencing the trade-off between American and foreign production, an overvalued dollar can lead to a loss of competitiveness for U.S. products, both at home and internationally. Such a loss in competitiveness, some analysts argue, can have persistent adverse effects on U.S. firms by permanently lowering their market shares. Other analysts argue that while such long-term effects are unlikely, the short-term losses of production are severe enough to warrant attention. This raises a basic question for economic policy: whether some policy to manage exchange rates can mitigate or reverse these adverse economic effects--in either short-term or long-term--of exchange rate behavior.

As Jeffrey Frankel notes in his paper, however, there are alternative definitions of exchange rate overvaluation and several plausible sources of overvaluation. Each different situation has different implications for the desirability of an exchange rate management policy (such as exchange market intervention), the choice of a particular policy, and the chances of success. One goal of research into exchange rate behavior is distinguish among the possible cases of overvaluation and thus to identify the best available way to address overvaluation.

The limits to the research into exchange rate behavior, which are extensively discussed in the papers, partially explains the disagreement over exchange rate management policy. Richard Cooper, for example, notes that "the other side of the pervasive influence of exchange rates on modern economies is the pervasive influence of many economic variables on exchange rates." No one theory or model can provide a full explanation of exchange rate behavior; each theory focuses on one aspect of exchange rate determination and examines the individual effects of particular variables on exchange rates. While economic analysis has identified the determinants of exchange rates, these models have not been successful in predicting the movement of exchange rates over time.

Despite limits to the research conclusions, several areas of agreement emerge from the papers and discussions. Exchange rates are asset prices and thus inherently difficult to forecast; they are influenced by both monetary and real factors. Stanley Black notes that "as asset prices, exchange rates are likely to overshoot their long-run equilibrium values, especially when monetary policies or real factors change dramatically." Furthermore, they "are significantly affected by expectations of future developments in their determinants."

Furthermore, the participants agreed that floating exchange rates can neither insulate an open economy from economic disturbances that are transmitted across national borders nor

contain domestic disturbances within a single economy. In fact, Richard Cooper notes in an earlier paper that in some instances economic disturbances are "more forcefully" transmitted under flexible rates than under a fixed rate regime.[1] As Jacob Frenkel notes in his paper, the effectiveness and options of macroeconomic policy, particularly monetary policy, are constrained by the openness of today's economies. While flexible exchange rates do not allow governments to escape these constraints, the behavior of flexible exchange rates does provide additional information on how policy has affected economic activity. The combination of high nominal interest-rate differential between the United States and other industrial nations and the dollar's appreciation since 1979 "may indicate a rise in the demand for money," Frenkel notes. If the combination is a better gauge of money demand than only high nominal U.S. interest rates alone, it is a better reason for monetary expansion.

Although the panelists disagreed over the advisability of exchange rate management policies, they agreed that, for all their problems, flexible exchange rates are superior to fixed rates. Jeffrey Frankel, for instance, argued that the appreciation of the dollar during the early 1980s allowed both the United States and Europe to enjoy "more favorable" trade-offs

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[1]Richard N. Cooper, "Flexible Exchange Rates, 1973-1980: How Bad Have They Really Been?," in Cooper et al, eds., The International Monetary System Under Flexible Exchange Rates; (Cambridge, Mass.: Ballinger, 1982).

between economic output and inflation than they would have faced had the dollar not appreciated, although some sectors certainly did suffer losses as a result of the dollar's appreciation.

Given the uncertainty inherent in forecasting exchange rates and the complexity of their determinants, it is not surprising that the panelists disagreed on the desirability of adopting a policy to manage exchange rates. The complex behavior of flexible exchange rates makes it difficult to determine when and how to intervene on foreign exchange markets, for example. Stanley Black advocates intervention to lessen the extent of exchange rate overhooting and thus exchange rate risk. Richard Cooper notes that by signalling government intentions, intervention can influence market expectations, breaking market bandwagons, for instance. Jacob Frenkel, on the other hand, argues that market intervention is unlikely to be a reliable instrument to manage the market.

No participant felt that any form of exchange rate management would be feasible in countering underlying market trends or fundamentals. Policies aimed at countering "misaligned" exchange rates are going to have limited success if national macroeconomic policies differ markedly. Furthermore, as Rudiger Dornbusch notes, "there is no sense, whatsoever, in saying that

the exchange rate rather than monetary or fiscal policy is misaligned." A policy that addresses only the exchange rate and not the monetary and fiscal policies that help determine that rate can have only limited success.

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SUMMARY OF THE SYMPOSIUM ON EXCHANGE RATES

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SUMMARY OF THE SYMPOSIUM ON EXCHANGE RATES

Introduction

Prompted by congressional and public concerns about the loss of competitiveness of American products both at home and abroad and dark hints that other countries might be manipulating the exchange rates of their currencies to the competitive disadvantage of the United States, the General Accounting Office sponsored a seminar of specialists on exchange rates from the academic and banking communities in February 1983. The papers prepared for that seminar are gathered here for wider dissemination. This introduction will not attempt to summarize the papers or the lively discussion at the seminar in full, but rather to pull together the highlights of the discussion and the papers. It will attempt to do so in language accessible to non-specialists, although inevitably as with any technical subject a certain loss is incurred in doing that.

The concern which gave rise to the seminar reflects the pervasive influence in all modern economies, including the United States, of the value of a national currencey in terms of other currencies, that is, its exchange rates. Special focus in the United States has been placed on the rate of exchange between the U.S. dollar and the Japanese yen, due to the strong competitiveness of Japanese products both in the American Market and in competition with American goods in other countries, e.g., in Latin America. But U.S. sales have also met stiffer competition from European

goods and indeed from the products of newly industrialized nations, such as Korea and Brazil. Two questions are raised by these developments. First, how much role do exchange rates play in this loss of competitiveness? Second, what has made the dollar so strong (or the yen so weak) in recent years, and in particular has the yen rate, or other exchange rates, been manipulated by foreign governments to the disadvantage of the United States?

The seminar did not address the first of these questions directly. All participants took for granted the possible importance of exchange rates in determining competitiveness, at least over a period as short as several years. The focus was therefore on a general version of the second question: what can we say about the determinants of exchange rates? And how much, and through what channels, might governments influence them?

Models of Exchange Rate Determination

The other side of the pervasive influence of exchange rates on modern economies is the pervasive influence of many economic variables on exchange rates. There is no single, simple determinant of exchange rates; they are deeply integrated into modern economies and are therefore subject to many influences. Economists have constructed a number of simple "models" which attempt to isolate a relatively few determinants of exchange rates. These models, when applied to the real world, have not been very successful in explaining much less predicting exchange rates,

although when taken together they help elucidate some of the important factors that influence exchange rates. We will consider briefly the three principal frameworks that have been put forward, although each has many detailed variants. The purpose of such models, or frameworks, is not to provide a full and adequate characterization of reality in all its complexity, although sometimes some economists forget their modesty in this regard. Rather, they are to isolate certain factors that influence exchange rates, and through simple modelling understand better how each factor exerts influence.

The first of these frameworks has been called the monetary approach to the balance of payments. It starts from the observation that the exchange rate is really a price between two national monies and that movements in the exchange rate therefore must reflect the supply of and demand for those national monies. In particular, if the supply of money in one country, relative to demand for it, rises more rapidly than that in another country, the currency of the first country will depreciate relative to the currency of the second and in proportion to the extent of the excess supply of money.

The difficulty with this framework is that its starting point is an excess supply of money in one country and its supposition that the initial excess supply will be reflected fully in a change in exchange rates. This is tantamont to saying that the excess supply of money will have no effects on production, real income,

employment, or interest rates -- that is, that it will affect only the price level of the country. It therefore becomes a long-run theory of exchange rates, in which case the assumption of stable or predictable demand for money on any given definition of that term is suspect. Or else it presupposes such rapid adjustment of goods and factor prices to increases (or decreases) in the money supply that price levels reflect quickly changes in money and the exchange rate adjusts so as to preserve the "purchasing power parity" between the two currencies. In this case the real side of the economy (production, employment, etc.) are indeed insulated from monetary disturbances and the exchange rates loses its pervasive influence.

There is now ample evidence that purchasing power parity, on any of its several variants, is not maintained among major currencies and that relative movements in money supplies offer little explanation for exchange rate movements (more on the evidence below). Nonetheless, when one country is inflating very rapidly relative to another, as occurred in Europe during the early 1920s or as occurs in some developing countries today, the monetary approach does provide the dominant explanation for movements in the exchange rate. So it contains a part of the truth.

A second framework focuses on the market for goods and services and tries to reflect the heterogeniety of goods in modern economies, which leads to lack of close purchasing power parity relationships among currencies except in cases of extreme

divergences among national inflation rates. In this framework, wages and prices in national economies are "sticky" that is, slow to respond to upward or downward pressures of demand, and movements in exchange rates can therefore affect trade flows, and the changes in trade flows in turn affect both production and employment and the demand and supply of foreign currency. Thus, balances in goods and services affect the exchange rate and, with a lag, the exchange rate affects demand for goods and services. The lags can be on the order of one to two years, moreover, and this lagged response can generate cycles in exchange rates - depreciation now leading to appreciation later, and vice versa.

To focus exclusively on trade in goods and services, however, neglects longterm shifts of savings from one country to another, such as the steady importation of capital into the United States during the 19th century. Trade in goods and services must be assessed against such secular movements of capital. The notion of "basic balance" in international payments tries to capture the sum of these, with imperfect success. On this view, when the basic balance is negative, a country's currency should depreciate in order to correct the imbalance and the other way around when the basic balance is positive. But even this correction to the balance on goods and services does not allow for the influence on the exchange rate of movements of yield-sensitive internationally mobile financial capital.

A third framework, called the portfolio approach, shifts the orientation away from goods and services to holdings of foreign

securities that are imperfect substitutes for domestic securities but are nonetheless desired for their returns or their value in reducing portfolio risk. This framework, like the second one, usually assumes that goods prices are sluggish in the short to medium run, but, like the monetary approach, it assumes purchasing power parity (PPP) between currencies in the long run. The PPP assumption provides a well-defined value to the exchange rate in the long run; in the short run the exchange rate is then determined by portfolio preferences at home and abroad, which in turn are influenced inter alia by relative interest rates and by expected appreciation or depreciation of the currency in which the securities are denominated.

An example will illustrate the mechanism. Suppose a sharp, once-for-all increase in the money supply occurs. As in the monetary approach, that will lead to an equivalent depreciation of the currency in the long run, other things being equal. But what happens in the short run? Interest rates on financial assets will fall as some of the excess money holdings are diverted to them, and that in turn will lead both foreign and domestic holders of domestic securities to try to transfer some of their assets abroad. The attempt to do this will lead to an immediate depreciation of the currency. Moreover, the depreciation will be even greater than that required in the long run, since to induce the domestic securities to be held at the lower interest rate (relative to interest rules prevailing abroad) holders must expect

some future appreciation of the home currency, while goods prices are gradually adjusting to their new values. In the meantime, the depreciation of the currency relative to the price level will have lowered what below we will call the real exchange rate, and net exports of goods and services will increase, later to decrease again as domestic prices rise and the currency appreciates.

In short, the portfolio approach treats the exchange rate like an asset price, adjusting quickly to that level required to induce the world to hold the financial assets denominated in the currency in question. Like other asset prices, the exchange rate is therefore strongly influenced by expectations about the future (future changes in prices, future changes in regulations affecting the security or the ability to convert currencies, and so on). And these expectations can sometimes be altered rapidly by new information, leading to correspondingly rapid changes in exchange rates, just as occurs with prices of stocks on the stock market. This view helps to explain the apparently erratic week-to-week movements in exchange rates among major currencies, on the assumption that "news" relevant to the future values of those currencies also becomes available frequently and erratically. The portfolio approach can be integrated with either the monetary or the goods-and-service- balance approaches (or both) over a longer period of time.

The real world is of course much too complex to fit neatly into any simple framework, or model, especially one that focuses mainly on money or goods or securities, to the relative exclusion of the others. And indeed, the various attempts to explain, much

less to predict, exchange rates using relatively simple frameworks have not been very successful. In particular, purchasing power parity conditions between pairs of countries on any of the plausible price indices -- and choice of a particular, available index is itself a non-trivial problem to which theorists have given insufficient attention -- have been eggregiously violated. It is also the case that uncovered interest parity -- a condition implied by the assumption of perfect substitutability between foreign and domestic securities, as assumed in the monetary models -- has been shown not to hold empirically. Finally, while movements in exchange rates are to some extent correlated with the current account positions of the major countries, the correlation is weak and often of low predictive power.

These empirical findings should not be surprising in view of the remarks made at the outset of this summary. No simple explanation of exchange rate movements is likely to be satisfactory. This is not to say, however, that economists have nothing useful to say about the determinants of exchange rates. They have identified some of the factors that may dominate in the determination of exchange rates during particular times and circumstances, and will always have some influence on exchange rates, although in particular circumstances they may be diluted or even overwhelmed by other factors. In most circumstances there will be diverse and sometimes conflicting influences rather than a single dominant one. Apart from the factors that have already been mentioned, resource development and exhaustion (e.g., North Sea

oil), autonomous movements in the terms of trade (e.g., the increase in world oil prices in 1974), politically motivated movements of capital (e.g., following the declaration of martial law in Poland) have all in recent years had some influence on exchange rate movements, via their influence on portfolio decisions and/or trade flows.

Moreover, the subject of economics has generally concentrated on equilibrium conditions in various markets and has never shown marked aptitude for explaining or forecasting the dynamic path of a variable (such as the exchange rate) as it moves between two equilibrium values. Yet much of our perplexity about exchange rates concerns their high short-run variability. As noted above, this can be interpreted by regarding exchange rates in the short-run as being asset prices, subject to jostling about by new information as it continuously becomes available. But there is also another influence at work, which can transform the influence of news into larger changes in exchange rates than would otherwise occur. It is the presence of crowd and bandwagon effects in the trading community. Few know precisely how to interpret any new information, particularly since when it first becomes available it is incomplete and perhaps even partially incorrect (newly announced economic data are frequently revised later, for instance). Many use a movement in the exchange rate itself as a source of information about market sentiment. So as to avoid being left behind, they jump on the bandwagon, thus pushing the exchange rate

further in the direction it tended to go initially. Expectations feed on expectations. Economic theorists have lately discovered this age-old phenomenon and have called it a bubble in which prices can be rationally pushed beyond their long-run equilibrium value so long as the participants expect the risk of relapse to fall short of the prospect for further gain.

When this process is operating, even those who suspect the exchange rate has gone too far have an interest in holding an appreciating currency so long as the prospect for further gain outweighs the probability of reversal. Thus a secondary judgment, oriented toward market dynamics, is super-imposed on the re-assessment based on the new information and may come to dominate the movement of exchange rates for a time. This would not be troublesome if exchange rates had no consequential effects on the real side of the economy. But in some periods expectations about the "fundamental" determinants of exchange rates, and of other economic variables, may be so weakly held that the rate can be dominated by purely market dynamics for rather long periods, measured in weeks. When that is so, the exchange rate may in turn affect new information, such as the recorded change in price indices that include a heavy weight to imported goods, or it may set in motion urgent risk-avoiding behavior, as when multinational firms rush to protect their quarterly balance sheets against acconting exchange losses. So a vicious circle may temporarily be set in motion. It is in this context, as discussed below, that

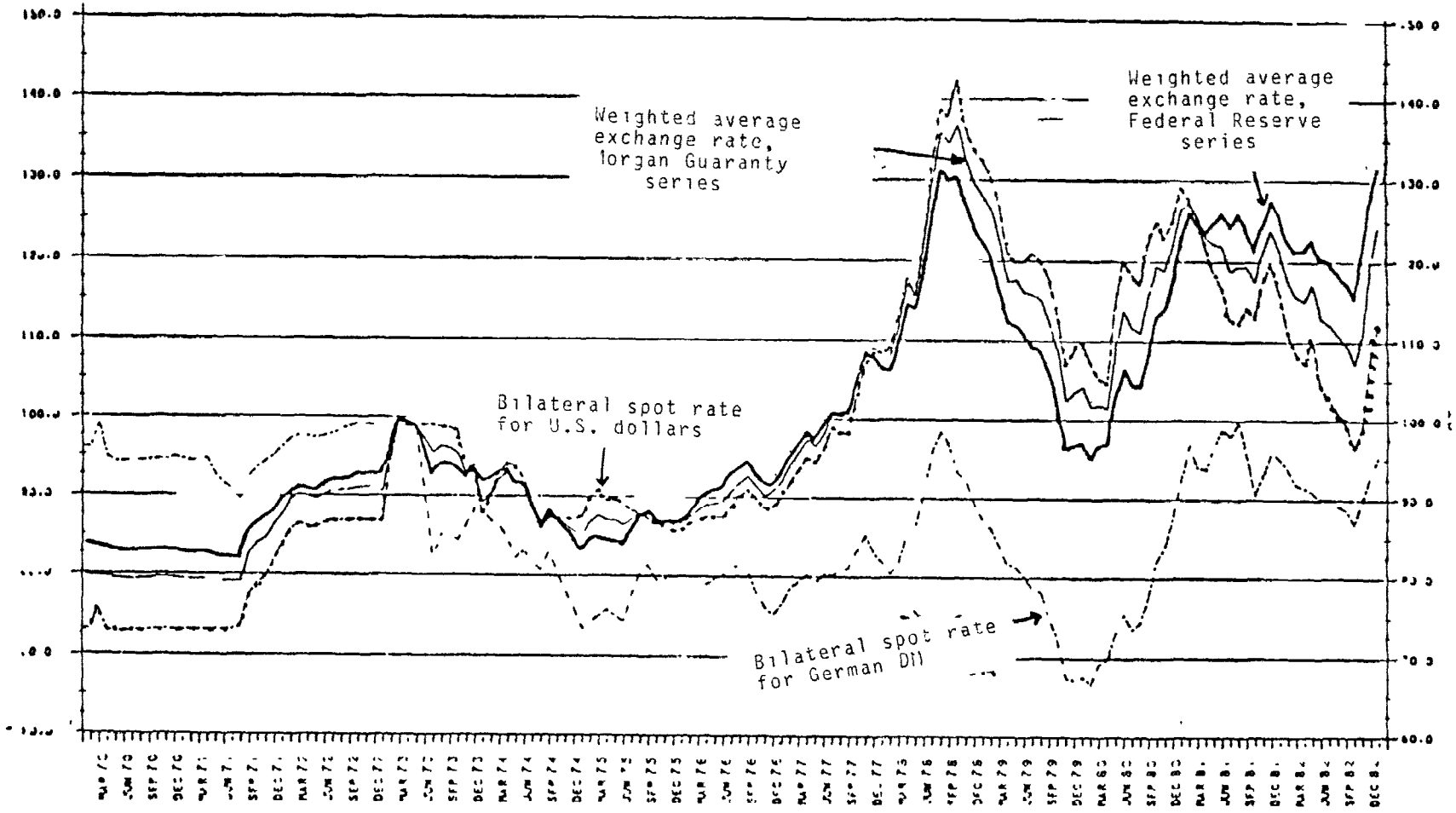
skillful policy actions, including intervention in exchange markets, can influence market dynamics in a way that limits the possible damage to the real side of the economy.

Measurement of Exchange Rates

Financial markets, for understandable reasons, have focused on bilateral exchange rates -- particularly the exchange rates between the U.S. dollar and the Japanese yen, and between the dollar and the German mark (DM). Within Europe, the exchange rate between the French franc and the DM has received a lot of attention, and also the relationship between the British pound and the dollar and between the pound and the DM. But there are many bilateral exchange rates, and to assess the impact of exchange rates on the real side of any national economy it is usually necessary and appropriate to take some weighted average of the bilateral exchange rates, leading to what has come to be called the "effective exchange rate" of a country's currency. There is some difference of opinion over what weights should be used, and in any case the appropriate weights depend on the exact purpose for which the effective exchange rate is to be used. Chart 1 plots the exchange rate between the Japanese yen and the U.S. dollar over the period 1970-82, along with two measures of the effective exchange rate of the yen. The Morgan Guaranty series uses weights drawn from Japan's trade with the other industrial countries and thus gives special weight to the U.S. dollar rate because of the high weight

Chart 1

EXCHANGE VALUE OF THE JAPANESE YEN MARCH 1973=100



exports to the United States has in total Japanese exports. The Federal Reserve series uses weights drawn from total trade of all OECD countries, and thus gives more weight to the exchange rates between the yen and the various European currencies. The series all show the same general movement over this period, but it is noteworthy that since 1980 the yen has depreciated much more in dollars than it has against other currencies, so that the effective rate of the yen has not declined nearly so much as the decline in the rate against the dollar might at first sight suggest. Moreover, on the Federal Reserve series the yen by the end of 1982 was at the highest nominal value it has even been, higher even than its peak value in 1978, although on the Morgan Guaranty series it did not quite regain its 1978 peak.

Nominal movements in exchange rates do not themselves reflect changes in competitiveness if they merely offset divergent movements in national price levels. This possibility has led to a second comprehensive measure of a currency's external value, its real effective exchange rate, where the real effective exchange rate is some measure of the effective exchange rate corrected for differential movements in some measure of national prices. Again, there is disagreement over what is the most appropriate measure of prices for these purposes. The Morgan Guaranty Bank regularly computes real effective exchange rates by deflating nominal exchange rates by movements in wholesale prices of non-food manufactured goods. On that basis, because inflation in the last

several years has been rather lower in Japan than in other countries, the yen does not show the great appreciation that the effective exchange rates of the yen do. Indeed, on an index March 1973 = 100 (when generalized floating began), the effective exchange rate of the yen (Japanese trade weights) had appreciated by 20 percent by the end of 1982, whereas the real effective exchange rate had depreciated by 15 percent.

Interpretation of Exchange Rate Movements

One can see in Chart 1 the recent history of exchange rates from the Japanese perspective: relative stability despite floating until late 1976 (in part because of heavy exchange market intervention, both as buyers and as sellers of dollars, by the Japanese authorities in order to limit movements in the rate). Then began a long and ultimately very worrisome appreciation of the yen, mainly against the dollar but also against other leading currencies, associated in part with relative economic expansion in the United States during 1977-78. Changes in economic policy in Japan and in the United States in the fall of 1978, followed soon by the Iranian revolution and the sharp increase in oil prices in 1979, both of which factors led to a sharp deterioration in Japan's current account position, led to a marked depreciation of the yen. When it became clear by late 1979 that Japan was going to be able to handle the second oil shock better than it had handled the first one, and better than other leading countries were likely to handle

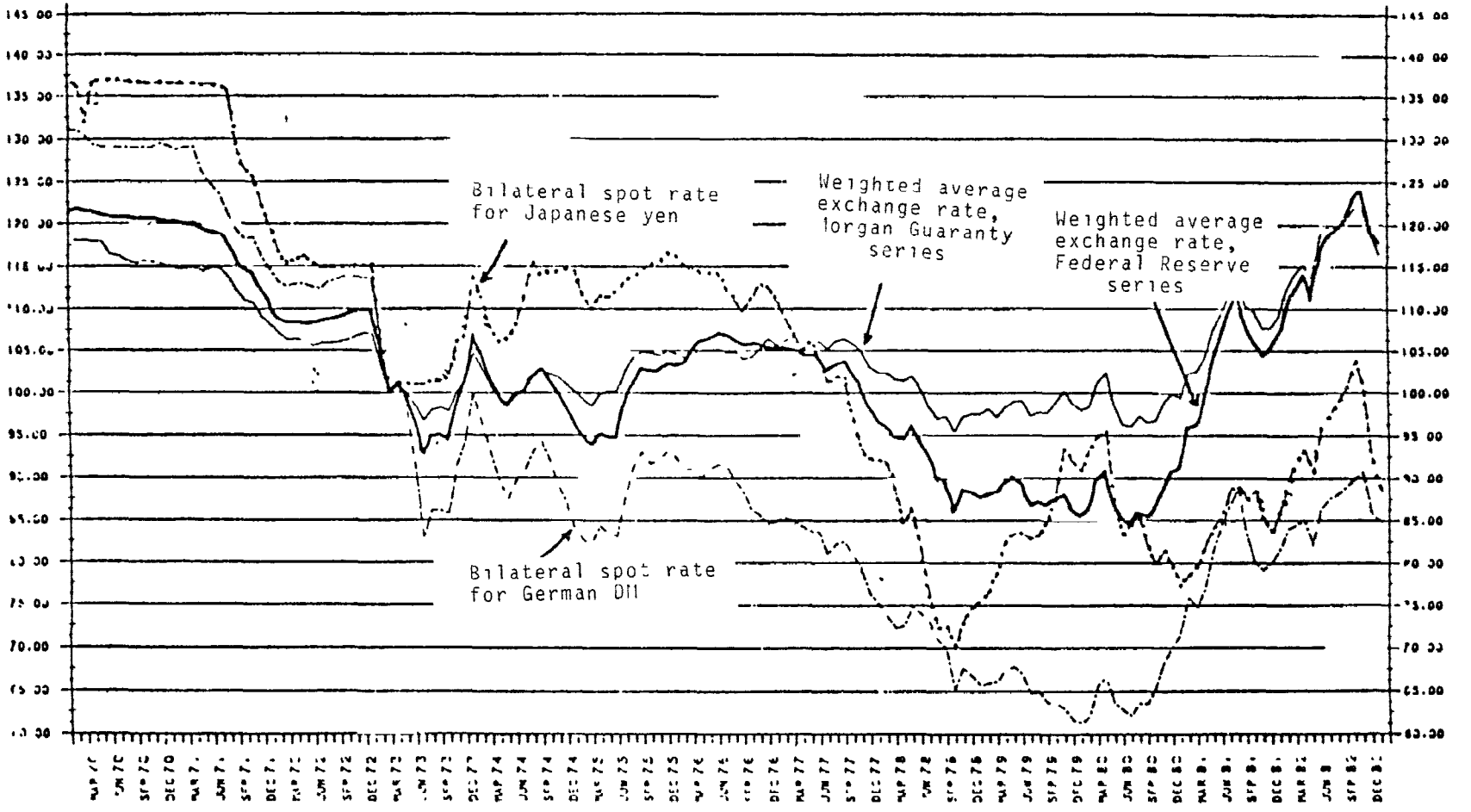
it, the yen again began to appreciate. This appreciation was brought to a halt in late 1980 by the sharp increase in U.S. interest rates which, following some capital market liberalization in Japan, pulled funds to the United States. From then until autumn 1982 the yen depreciated erratically but extensively against the dollar, appreciating again after U.S. interest rates fell sharply in late 1982. It is noteworthy that during the last two years of this period the yen did not depreciate sharply against other leading currencies, notably the DM, and it appreciated against the pound and the French franc.

Chart 2 shows the dollar-yen and dollar-DM rates from the perspective of the dollar (i.e., inverted as compared with Chart 1), along with two measures of the effective exchange rate of the dollar. What is most noteworthy about this chart is the great stability of the dollar during the period 1973-1980 when exchange rates are weighted by U.S. trade (which give about 20 percent weight to the Canadian dollar). It hardly moved more than 5 percent away from its position when floating began, in either direction. This relative stability overall stands in sharp contrast both with the marked movement in some bilateral exchange rates during this period and with the marked appreciation of the dollar in 1981 and 1982, an appreciation that occurred against all major currencies and one that is usually associated with tight monetary policy and high interest rates in the United States.

Since the seminar was held, Jeffrey Shafer and Bonnie Loopesko of the Federal Reserve Bank of New York have performed an analysis

Chart 2

EXCHANGE VALUE OF THE U.S. DOLLAR MARCH 1973=100



of the dollar-yen, dollar-DM, and dollar-pound exchange rates over the period 1973-82.[1] They attempt to quantify the importance and test the significance of various hypotheses about the determination of exchange rates. They use the vector autoregression technique of analysis, which is designed to "let the data speak for themselves," subject only to the choice and ordering of determining variables. Trying to capture the various alternative frameworks sketched above, the authors identified six possible determinants of exchange rates: money supply (M1), output (measured by industrial production), consumer prices, nominal short-term interest rate, differentials, and current account or trade balances of the two countries. For the first three variables, the unit of measurement was the percentage change in the variable of one country relative to that of the other.

The analysis attempted to "predict" all the variables for each month using current and lagged values of all the other variables higher in the list and lagged values of the variable itself, with the exchange rate being placed last on the list. This technique successfully predicted just under 60 percent of the one-month forward yen-dollar rate throughout the testing period (that is, the unexplained variance of exchange rates was reduced by 59 percent). Forecast errors for the six determining variables were then interpreted as unexpected "news" (news in the sense that someone

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[1]"Floating Exchange Rates After Ten Years," Brookings Papers on Economic Activity, 1983, No. 1.

using this technique during the period would have been surprised at the deviation in each month between forecast and the actual outcome) and in turn were investigated to see how much of the deviation of the exchange rate from its forecast value they could explain. This exercise was then performed not merely for one-month forward forecasts, but for longer-term forecasts as well, out to three years.

The results can be illustrated concretely by looking at the yen-dollar rate, the focal point for much recent attention. The general observation is that the autoregressive technique provided reasonably good (although not statistically significant) forecasts of the exchange rate for very short period ahead, but not for periods longer than a few months. On the other hand, "news" in the sense described above (and of course excluding news of all other kinds) provided very little predictive power for one or two month forecasts. Unexpected changes in relative interest rates, which accounted for about 25 percent of the unanticipated movement in the exchange rate, were the only exception. The rest remains inexplicable in terms of these variables.

Forecasts for longer periods ahead, in contrast, were very poor using the autogressive techniques, but the variables that were tried -- the "fundamentals" -- together accounted for about two-thirds of the variation in the exchange rate. Relative changes in money supply accounted for only 5 percent of the variation in exchange rates, giving little support to the simple version of the

monetary approach to exchange rates. Relative price movements, a rough test of purchasing power parity, did modestly better, accounting for about 10 percent of the variation. Output and trade balances together did much better, accounting for 29 percent of the variation.[2] And relative interest rates accounted for 22 percent of the variation. Thirty-four percent of the variation in exchange rates over a period a year or more ahead remains unexplained by these variables.

Roughly similar results obtain for the dollar-DM rate and the pound-dollar rate: the autoregressive forecast is reasonably good for the very short run, and "news" -- including in these cases changes in relative interest rates -- offers little help in explaining the forecast errors. Over time, however, the six "fundamentals" identified can explain about two-thirds of the variation in exchange rates, with the weights among variables differing slightly from those in the case of the yen-dollar rate, with slightly more weight going to the real variables (output and trade balances) in the case of the pound-dollar rate.

The central result is that for all three exchange rates the six "fundamental" variables when taken together have considerable explanatory power, but they fall far short of offering a complete explanation: about one-third of the variation in exchange rates remains unexplained.

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[2]It is difficult to separate relative output from the trade balances, since the latter are strongly influenced by the former, and output in this test was given causal priority.

The results of this study are consistent with the observations in the seminar. There it was pointed out that foreign exchange market dealers take into account a wide range of factors in forming judgment about the appropriateness of any particular exchange rate but that the predominant factors most of the time were differences in inflation rates, differences in interest rates, and current account positions.

Given the substantial unexplained portion of the yen-dollar rate, the question naturally arises whether the yen was being manipulated in recent years for unfair competitive advantage. It was the judgment of those at the seminar that no such manipulation was taking place. On the contrary, exchange market intervention by the Japanese authorities in 1981-82 tended to inhibit the yen from falling against the dollar even further then it did. And, as noted above, the yen did not depreciate against other major currencies.

A part of the explanation for a low yen-dollar rate in 1981-82 is the liberalization of capital flows into and out of Japan that took place in 1980, combined with exceptionally attractive yields in the United States not fully captured by short-term interest differentials. Thus a presumably once-for-all portfolio adjustment by Japanese financial institutions, involving the purchase of U.S. stocks and bonds, served to depress the yen relative to the dollar for several years.

Government Policies to Influence Exchange Rates

Can government influence exchange rates through exchange markets intervention, and, if so, should they? These have been active questions for policy-makers during the period of floating exchange rates. The simple monetary framework suggests that intervention in exchange markets that is sterilized -- that is, intevention that is not allowed to influence the supply of money -- cannot influence exchange rates. There are ample grounds, both empirical and theoretical, for rejecting this view. Intervention alters the relative supply of different assets in different currencies, and that can be expected to influence exchange rates. What is perhaps more important is the signal which intervention conveys to the market concerning the intentions and views of the authorities with respect to exchange rates. This signal can be especially important when market expectations regarding the exchange rate are fragile and weakly held or are driven by the dynamics of the market itself rather than by the fundamentals. Intervention skillfully applied, for instance, can break bandwagon effects.

Still, the monetary framework points to an important truth, namely that intervention that does alter monetary conditions is likely to be more influential on exchange rates than is sterilized intervention. But, contrary to what the monetary approach implies, close international coordination of monetary policy (in the sense of coordinating the growth rates of some measure of the money

supply) is not likely to achieve exchange rate stability. For that, monetary policy would have to be devoted exclusively to the purpose of achieving exchange rate stability, as it in effect was under the 19th century gold standard.

There is little doubt, however, that coordination of macroeconomic policies -- monetary and fiscal policies -- among nations can help to reduce variations in exchange rates, insofar as such coordination can reduce international differences in rates of inflation and insofar as such coordination can reduce medium-term swings in current account positions arising from the fact that national economies are at different stages of the business cycle.

Given that governments can influence exchange rates through their actions, should they? The seminar did not address that question explicitly, but it is probably fair to say that all participants would concede some scope for government intervention in exchange markets, although they would undoubtedly disagree over how ambitious governments should be with respect to their objectives of intervention. Those differences in turn would in part reflect differences in judgment about the costs of exchange rate variability, which also were not discussed in detail. Empirical studies of this question are still in their infancy, but so far have failed to find a discernable influence of higher exchange rate variability on world trade, which continued to grow as rapidly, relative to world output, during the period 1973-80 as it did in the final years of the fixed exchange rate system. World

trade has greatly slowed since 1980, and even fell in 1982, but that is related to the world depression; the separate influence of exchange rate variability will be difficult to disentangle.

It is noteworthy, however, that during the past decade rates of investment in Europe, the most open of the industrial countries, have been considerably lower than they were in the preceding decade. This reduction in rates of investment has been accompanied by a slowdown in economic growth. Some slowdown from the rapid growth of the 1960s was no doubt to be expected in any case, but a plausible suspicion is that uncertainty about export markets resulting from higher variability in exchange rates has played some role in reducing investment and hence growth.

At the more micro-economic level, there is ample anecdotal evidence that many multinational firms have added considerably to their operating costs in order to hedge against quarterly changes in balance sheet valuation arising from changes in exchange rates.

Governments take for granted that they should take action to limit completely unrestrained movements in exchange rates, although judgments differ greatly on how far monetary authorities should go in pursuit of stabilizing them. The Report of the Working Group on Exchange Rate Intervention, established in June 1982 by the Versailles economic summit, became available after the seminar. It details nicely several different concepts of "intervention" and offers qualitative judgments on their effectiveness in influencing exchange rates. These judgments do not differ consequentially from

those reached in the seminar: sterilized intervention can be effective, especially in the short run; unsterilized intervention is more effective; changing the "fundamentals" is necessary if there are to be long-run effects. In the short run exchange rates can and do deviate from what the fundamentals seem to indicate, although it is difficult to ascertain just exactly what they do indicate. There was wide agreement that intervention has on occasion been helpful in restoring order to disorderly markets (defined mainly in terms of increased bid-ask spreads), in reducing intra-day and day-to-day variations in exchange rates, in breaking up bandwagon movements, and in buying time (by inhibiting exchange rates movements that could prove damaging to national economic objectives) while new basic policies are put into place, or to give the market time to absorb the fact that new basic policies have been put in place. There was also general agreement that intervention alonge could not stem the tide of market forces if the fundamentals -- including macro-economic policies -- would lead to movement in the exchange rate.

So the question of how costly exchange rate variability has been remains open. In any case, such costs cannot be assessed in the abstract, but must be set against the costs and benefits of feasible alternatives. There is wide agreement that a return to fixed exchange rates is not feasible in the near future. A number of schemes for managing flexible rates have been proposed, involving more flexibility than prevailed under the Bretton Woods system, but less flexibility than under the system of nationally

managed flexible exchange rates that we have had since 1973. Now would seem to be a good time to examine these proposals at the official level in the light of our ten years' experience with floating exchange rates.

EXCHANGE RATE DETERMINATION AND INTERNATIONAL MONETARY REFORM

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EXCHANGE RATE DETERMINATION AND INTERNATIONAL MONETARY REFORM

This panel has been asked to address a series of questions relating to the fundamental determinants of exchange rates, the relationship of exchange rates to macroeconomic policy, the behavior of the Yen/Dollar exchange rate in particular, and the reform of the international monetary system. My statement will attempt to deal with these questions in order.

Determinants of Exchange Rates

The first issue is the current state of research on the determinants of exchange rates. My position is that we know a great deal about the factors that determine exchange rates, just as we know a great deal about the factors that determine flows in the balance of payments. And these are essentially the same factors in each case. But the number and complexity of these factors makes it very hard to forecast either the balance of payments or exchange rates.

The framework which I find most appropriate for analyzing the behavior of exchange rates is indeed the balance of payments, what may be called the "good old theory." This good "old" theory must of course be supplemented with some good "new" theory relating to the degree of substitutability of different types of assets, the degree of efficiency of markets, and the rationality of exchange rate expectations, in order for it to encompass the major issues.

There are of course several other possible frameworks for analysis, which I will mention briefly. Simple monetary models, which rely on demand and supply of money, together with either short-run or long-run purchasing power parity, typically give short shrift to real factors. Monetary models augmented by the current account of the balance of payments also seem inadequate, since they do not properly account for shifts in long-term capital flows, which are not very responsibe to portfolio-balance considerations. The data, as examined by Meese and Rogoff (1981), appear to reject these simple models.

The data also appear to reject several hypotheses which are the foundation of these simple theories. One such hypothesis is purchasing power parity, which asserts that price flexibility in different markets should guarantee that exchange rate changes simply reflect differential rates of inflation, either in the short run, according to some, or in the long run. The data do not support simple versions of this hypothesis, indicating either the importance of real factors or the lack of price flexibility or both [Frenkel (1981), Katseli (1979)].

Another simple hypothesis is uncovered interest parity, which asserts that interest rate differentials between assets denominated in different currencies should equal the expected rate of change in the exchange rate. This hypothesis is equivalent to the assumption of risk neutral attitudes on the part of investors, who treat assets denominated in different currencies as perfect substitutes.

By contrast, covered interest parity asserts that the interest differential is equal to the forward premium or discount on the exchange rate, since a forward sale of expected future foreign exchange receipts covers against exchange risk and offers a risk-free arbitrage. The assumption of covered interest parity implies that uncovered parity is equivalent to forward market efficiency, defined as a forward rate equal to the expected future spot rate.

These propositions have been generalized for the risk-averse investor by adding a risk premium to uncovered interest parity and to the forward market efficiency condition. But the data appear to reject both simple foward market efficiency and the notion of a stable risk premium [Hanson and Hodrick (1980)].

Even covered interest parity can only be found to hold between covered assets denominated in different currencies but located in the same country. Assets located in different countries often appear to be subject to political risk, involving the actual or possible imposition of exchange controls or capital controls limiting convertibility of domestic and foreign currency assets. [Levich (1979)].

Having said this, one must go on to sketch out the elements of a theory which does not adopt over-simplified assumptions and thus incorporates all the relevant factors. In the short run, the exchange rate is clearly an asset price, which must reflect the relative demands to hold assets denominated in different

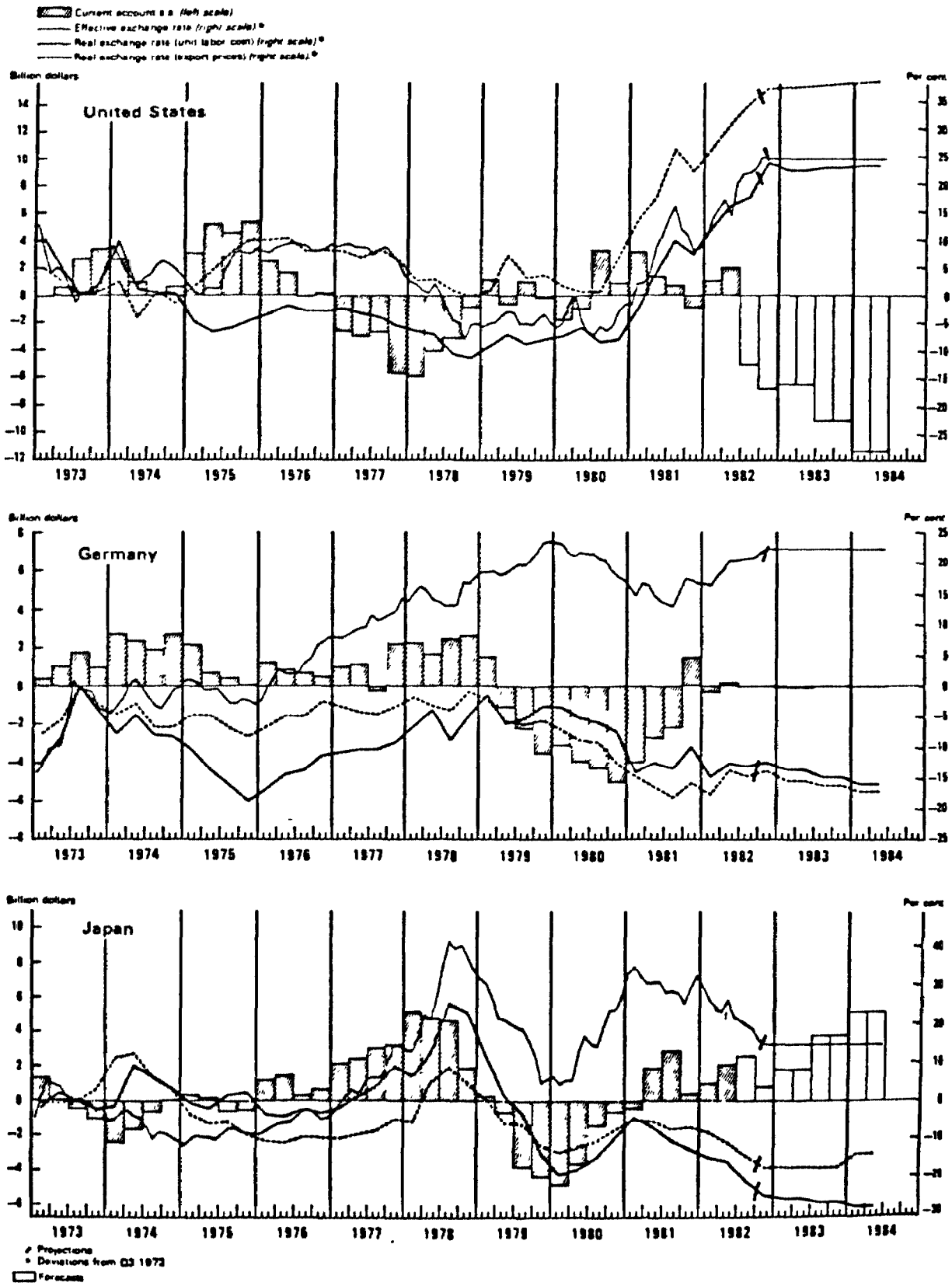
currencies. Thus other factors which influence the demands to hold such assets, as for example interest rates, expected changes and the risk of unexpected change in exchange rates, the possibility of long-term investments in different countries, should all affect the current values of exchange rates. Furthermore, the evolution of the relative supplies of assets denominated in different currencies, as influenced by the current account of the balance of payments and by official exchange market intervention, should also affect the evolution of the exchange rate, in the manner generally depicted by the stock-flow portfolio balance approach.

Thus long-term equilibrium exchange rates produce current account balances that keep the relative supplies of assets denominated in different currencies growing at rates consistent with the demands to hold them at the specified exchange rates. This definition is perfectly consistent in theory with a steadily depreciating exchange rate that simply offsets an excess of domestic over foreign inflation.

The general working of this process can be seen in Chart O, taken from the December 1982 OECD Economic Outlook. It is apparent that current account surpluses requiring a build-up in foreign currency assets lead to appreciation in the value of the domestic currency relative to foreign currencies. If the resulting appreciation exceeds inflation differentials and raises the real exchange rate, the current account tends towards deficit, thus reversing the movement in the foreign currency asset position and

Chart O

CURRENT ACCOUNT AND EXCHANGE RATES



Source: OECD Economic Outlook 32, Dec. 1982.

the exchange rate.

A general theory of this sort is hard to reject in practice, since it includes changes in expectations along with a multitude of other factors. Nevertheless, specific embodiments of such a theory in the form of a model of the balance of payments can easily fail to predict, due to specification error, shifts in coefficients, and inability to model political factors that cause changes in expectations (the "Ayatollah" factor).

But inability to forecast exchange rates should not blind us to substantial areas of agreement on the behavior of exchange rates. (1) Both monetary and real factors affect the behavior of exchange rates. (2) As asset prices, exchange rates are likely to overshoot their longrun equilibrium values, especially when monetary policies or real factors change dramatically. (3) As asset prices, exchange rates are significantly affected by expectations of future developments in their determinants. (4) Exchange risk is a significant factor affecting investors' willingness to hold assets denominated in different currencies. (5) A logical implication of these views is that exchange-market intervention that is consistent with underlying monetary policy can reduce the extent of overshooting and the degree of perceived exchange rate risk.

Macroeconomic Implications

The Jamaica Agreement of 1976 amending the Articles of Agreement of the International Monetary Fund to legalize floating

exchange rates represented a significant move away from the institutionally sanctioned rules of behavior that were explicit in the Bretton Woods Agreement. Max Corden (1981) has referred to present arrangements as international monetary "laissez-faire," in which there are virtually no constraints, other than perceived self-interest, on domestic macroeconomic policies. The two main forms which these perceived constraints take are the effects of exchange rates on the competitiveness of exporters and import-competing industries and the effects of exchange rates on domestic inflation. Of course these domestic impacts have mirror-image effects overseas, leading to the well-known "beggar thy neighbor" problem.

When monetary policy changes as dramatically as it did in the United States in late 1979 and early 1981, a major part of its impact occurs through the appreciation of the exchange rate, as shown in Chart O. That appreciation, while producing beneficial effects on domestic inflation, has also worsened the current account balance and contributed thereby to the depth of the present recession in the United States. It is obvious from the Chart that the dollar exchange rate has overshot its sustainable long-run equilibrium level, as it has moved far more than the relative improvement in inflation performance in the United States. This excessive degree of over-shooting has largely been caused in my judgment by two factors: (1) the excessive reliance on monetary restraint as compared with fiscal ease since the beginning of 1981;

and (2) the total abandonment by the United States Government of exchange rate intervention policies to smooth out movements in exchange rates.

Governments influence exchange rates by their monetary policies and their fiscal policies, which affect interest rates and inflation rates: by their exchange market intervention policies; and even by such things as energy pricing policies, which determine the magnitude of oil imports and required changes in the competitiveness of non-oil industries. Exchange market intervention is not the most important of these policies, but it should play a significant role in a smoothly functioning system of floating exchange rates. Non-sterilized intervention occurs when central banks do not offset the domestic monetary effects of their purchases or sales of foreign currency assets by matched sales or purchases of domestic securities. This type of intervention is more often practiced outside the United States, where instead all intervention is traditionally of the sterilized variety. When intervention is not sterilized, purchases of foreign currency to limit appreciation also have the effect of expanding the domestic monetary base, which thus works in the same direction to reduce the extent of appreciation. Conversely, sales of foreign currency assets have the effect of contracting the monetary base. Clearly, non-sterilized intervention will have more powerful effects than sterilized intervention. However, as long as intervention is

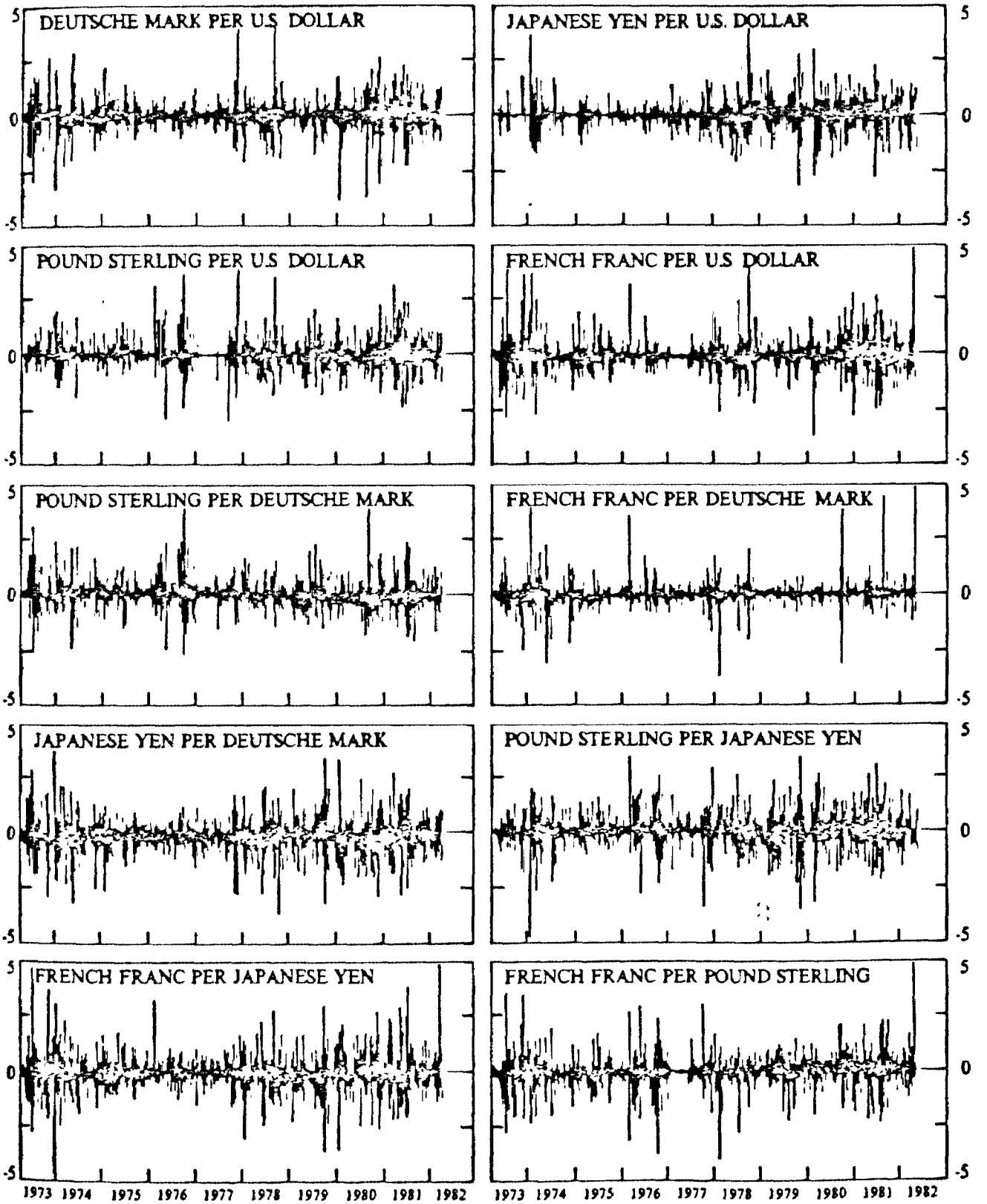
confined to smoothing operations which do not involve permanent position-taking, the long-term monetary effects of sterilized intervention are no different from those of non-sterilized intervention. Given the effects of overshooting and the short-run volatility of exchange rates as shown in Chart 14 from the 1982 Annual Report of the International Monetary Fund, such smoothing intervention can potentially have significant effects. It cannot, however, achieve target exchange rates that are out of line with underlying economic realities for more than brief periods of time, as shown by recent developments in the European Monetary System. See Argy (1982).

The costs and benefits of floating exchange rates are exceedingly complex to evaluate. Floating exchange rates allow reconciliation of divergent national inflation rates and relatively rapid adjustment to changes in real factors, such as the price of oil. To large countries like the United States, they offer the opportunity to adjust external imbalances without serious domestic repercussions, but at the same time, may delude authorities into ignoring the external consequences of their policies. To small countries, floating rates are more likely to offer destabilization of domestic prices, thus leading to their natural preference for some type of pegging.

The best measurements of the costs of uncertainty due to exchange rate variability have been made by my former student, David Cushman (1982), who estimates that the effect on trade flows is measurable but quite small. More serious is the effect of

Chart 14. Short-run variability in bilateral exchange rates for five major currencies, Apr. 2, 1973-June 30, 1982

(Daily percentage changes)



Source: 1982 Annual Report, International Monetary Fund.

overshooting on competitiveness. As the dollar has become increasingly over-valued, cries for protection have arisen from import-competing industries, such as automobiles, steel, and textiles, as well as from traditional exporters, such as agriculture. We are currently embroiled in a battle with the European Economic Community in a battle over export subsidies in agriculture, in large part because of low domestic prices which are affected by the high value of the dollar, although the EEC's Common Agricultural Policy bears a share of the blame.

The Value of the Yen/Dollar Rate

According to Chart O, fluctuations in the value of the Japanese yen since 1973 have by and large followed the theory outlined earlier, appreciating when the current account surplus was adding to foreign current assets and depreciating when foreign current assets were falling. However, during 1981 and 1982 despite a growing current account surplus. Since mid-November, the yen has risen sharply, wiping out some of the apparent difference from earlier behavior.

There appear to be several major reasons for the relative weakness of the yen during 1981-82; (1) divergent monetary and fiscal policies in the United States and Japan; (2) consicious efforts both in the United States and Japan to attract Japanese foreign investment to the United States; and (3) surprisingly weak markets for Japan's exports during 1982. The heavy reliance on

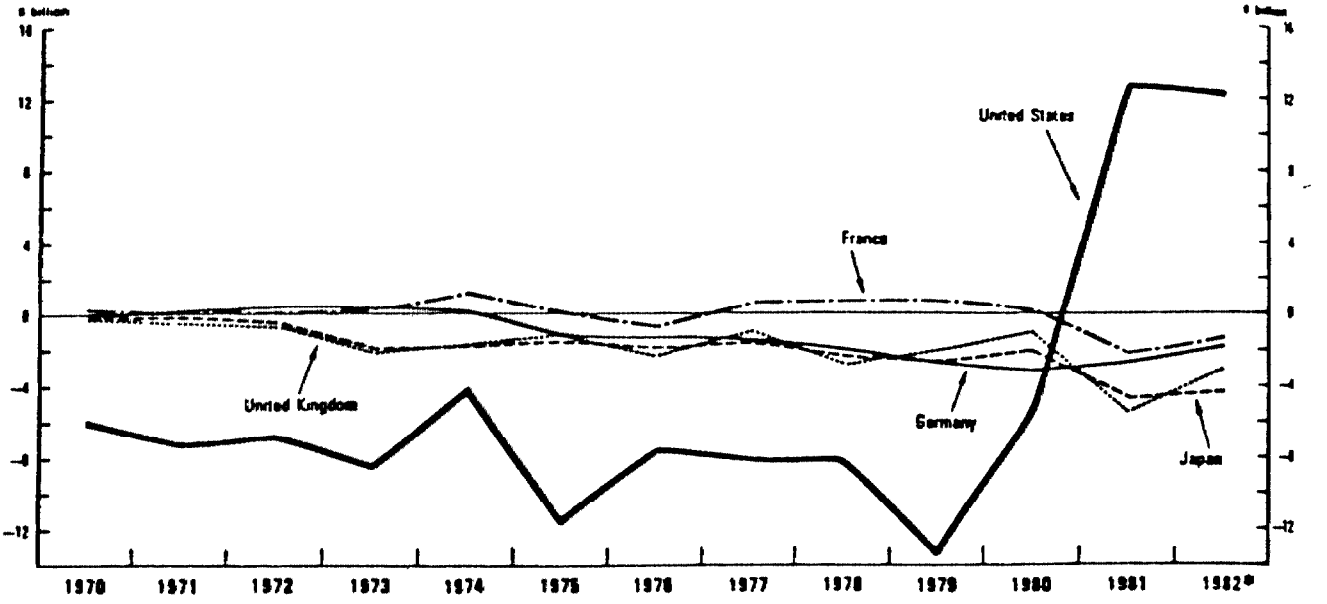
restrictive monetary policy combined with fiscal stimulus in the United States during 1981-82 has already been noted above. During the same period, Japan has followed a monetary policy of low interest rates, permitted by its remarkably low inflation rate, and reduction in the government budget deficit. The difference in interest rates associated with this difference in fiscal-monetary mix has been a major factor attracting capital from Japan to the United States.

A second factor attracting capital has been the further liberalization of Japanese exchange controls at the end of 1980. The resulting outflow of capital must to a significant degree reflect a one-time diversification into foreign assets. Other countries, however, particularly the United States, have been pressuring Japanese firms to invest abroad in order to stimulate employment in industries heavily affected by Japanese competition. As shown in Chart M from the December 1982 OECD Economic Outlook, the shift in direct investment flows has been quite substantial. From a broader perspective, the rise of long-term capital exports from Japan reflects its achievement of the stage of immature creditor-lender, in which its current account surplus is offset by accumulation of net foreign assets. Whether this stage is to be temporary or permanent remains to be seen, however.

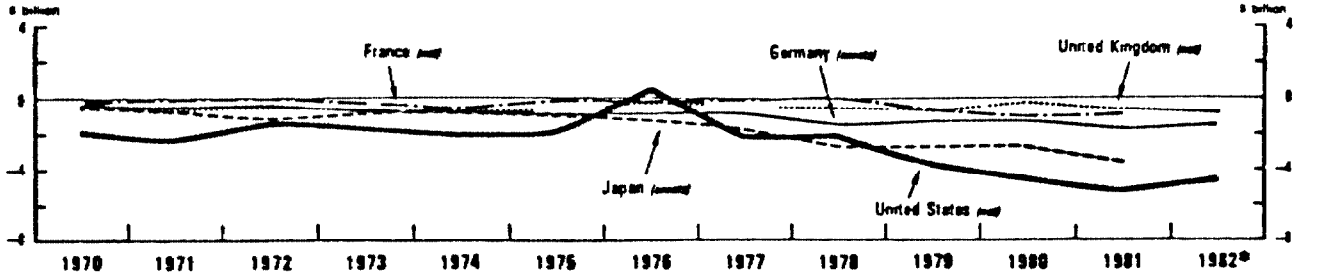
This review of factors affecting the yen/dollar exchange rate makes it clear that the policies of both governments have significantly influenced its value. These policies include

Chart M

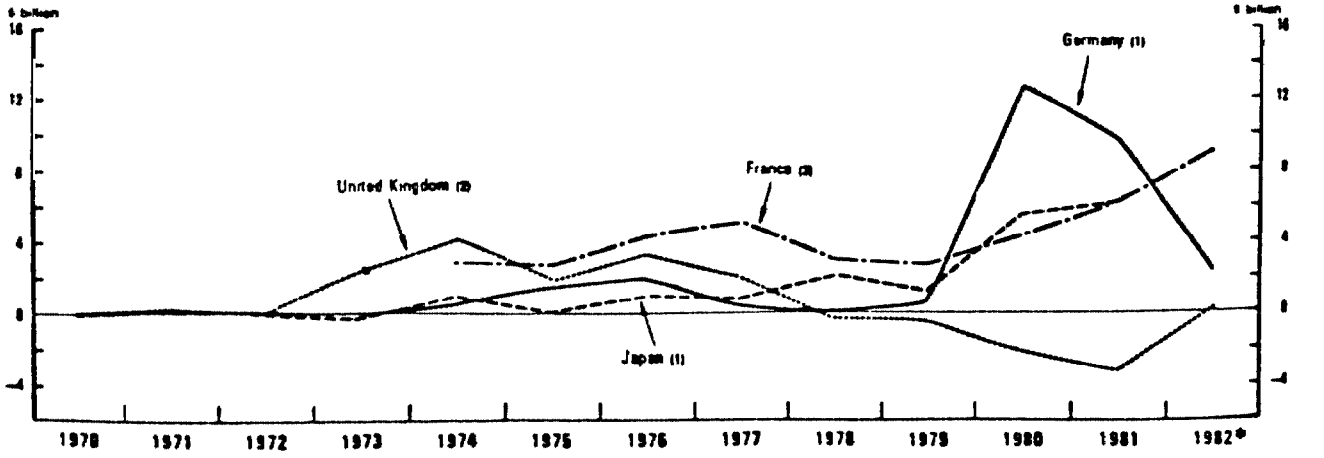
I. FOREIGN DIRECT INVESTMENT



II. OFFICIAL CAPITAL



III. SELECTED FOREIGN BORROWING



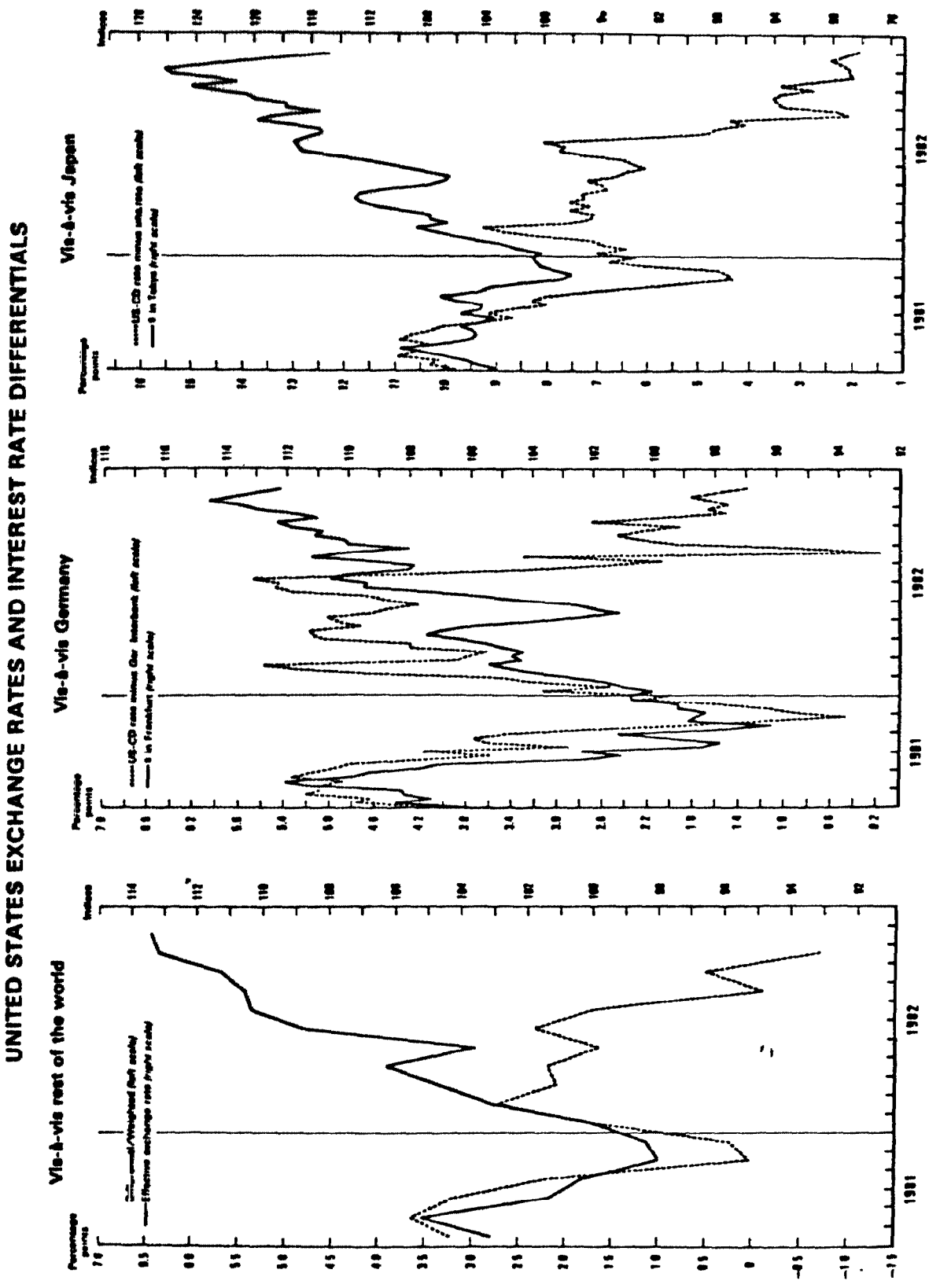
1 Official non monetary capital (liabilities).
2 Foreign currency borrowing by H M Government and public authorities.
3 Authorized foreign borrowing.
* First half at annual rate.

Source: OECD Economic Outlook 32, Dec. 1982.

monetary and fiscal policies, which were primarily designed with domestic targets in mind, and also exchange rate intervention policies and capital account policies. During 1980 and the first quarter of 1981, the Bank of Japan bought dollars as the yen rose strongly. Following the turn to tighter monetary policy in the United States, the yen fell unevenly through the rest of 1981 and 1982, until November. After refraining from significant intervention during 1981, the Bank of Japan sold dollars throughout 1982 to restrain the decline of the yen.

By contrast, the United States made no attempt to resist the rise in the dollar by intervening in exchange markets. Not only did the United States forgo intervention and at the same time rely heavily on monetary restraint, it was also embarked on a monetarist experiment in targeting closely the rate of growth of the money supply. The resulting wide swings in U.S. interest rates had a significant effect on fluctuations in the value of the dollar, relative to the yen as well as other currencies, as shown in Chart N from the December 1982 OECD Economic Outlook. For example, the brief strengthening of the yen in the fourth quarter of 1981 was attributable to the temporary decline in U.S. interest rates, which was reversed following the acceleration in U.S. monetary growth in early 1982. On the other hand, the decline in U.S. short-term interest rates since August 1982 was accompanied by a weaker yen up until November, as Japanese export volume fell throughout the year. Other factors strengthening the dollar have included relatively higher longer-term interest rates and some "flight to safety" amid fears of international financial collapse.

Chart N



Source: OECD Economic Outlook 32, Dec. 1982.

All in all, it appears that U.S. policies have been at least as important as, if not more important than, Japanese policies in affecting the yen/dollar rate. Both countries' monetary and fiscal policies tended to cause the yen to weaken, on average, while aiming at domestic targets. Japanese exchange market intervention sought to strengthen the value of the yen, while the absence of any U.S. intervention could have only had the effect of weakening it.

International Monetary Reform

The 1970's were not a propitious time for reform of the international monetary system, as witness the fate of the negotiations in the Committee of Twenty leading up to the Jamaica Agreement to disagree. Continued rapid growth in world trade, accompanied by divergent inflation rates, made any serious efforts to impose restraints appear foolhardy.

Now that world has declined for two straight years and the world is gripped in its most serious recession since the 1930s, with the spectre of international financial collapse ever present, the 1980s may indeed offer a change to reconsider whether laissez-faire is really the best rule in this less than "best of all possible worlds."

Let us first, following Corden (1981), consider how the system works. The basic problem of international monetary coordination is the financing and adjustment of multilateral payments imbalances. In a dollar-centered, pegged exchange rate system, such as Bretton

Woods, the key-currency country sets the world rate of inflation through its monetary policy and then stands ready to create adequate reserves to resolve any global payments surplus or deficit of the n-1 remaining countries. Individual countries must use policies of demand restraint or exchange rate adjustment to restore their own imbalances, but not the center county.

Under floating exchange rates, private capital flows must equilibrate current account deficits and surpluses, and exchange rates and interest rates must move significantly to guarantee that they do, unless there is official intervention in the exchange market. Because of the importance of the exchange rate as a price, many countries will have exchange rate targets, either explicitly or implicitly. These targets can be reconciled either by the center country allowing its exchange rate to fluctuate without limit or by sufficient flexibility in interest rates, according to Corden.

The achievement of global deflation in a floating exchange rate world has been accompanied by what are generally agreed to be excessively high real rates of interest. With hindsight, it is also easy to agree that the global expansion of the 1970s was achieved with excessively low real rates of interest. Thus it is appropriate to consider what sorts of changes in the international monetary system might promote somewhat greater stability in real interest rates.

Since the United States is primarily responsible for determining world interest rates, this focuses attention on our policies. I believe that the primary reason that our interest rates have swung so dramatically is that insufficient attention was paid to the external consequences of domestic monetary and fiscal policies, both in the late 1970s and the early 1980s. Floating exchange rates encouraged our policy makers to continue in the belief that exchange rate fluctuations would costlessly resolve the external consequences of domestic policy choices, whether for expansion or for contraction. This solution has not been without its costs, as we have seen.

Thus the primary goal of any reform should be to place external factors in a somewhat higher position in U.S. policy makers' perceptions. I suggest that a minimal reform in that direction would be resumption of exchange market intervention for smoothing purposes. If the United States Government is putting its resources on the line with some responsibility for exchange rate fluctuations, the result will be a greater degree of attention paid to the subject.

Furthermore, it can only help stabilize exchange markets, which in periods of uncertainty are often looking for some guidance and support. This does not imply that the authorities in their infinite wisdom should know the "right" exchange rate, merely that they be willing to assist as market markers when markets are disturbed.

The effects of the achievement of such minimal reform could then be studied for a year, with a view of proceeding to further

negotiations if it seemed appropriate. But the need for some degree of stabilization of interest rates and exchange rates grows ever more apparent. As noted earlier, wide fluctuations in exchange rates caused by over-shooting have caused comparably wide swings in balance of payments positions. As competitiveness of domestic producers is eroded through appreciation, frequent calls for protection have been heard. That way lies a repetition of the 1930s.

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THE OVERVALUED DOLLAR AND THE INTERNATIONAL MONETARY SYSTEM

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THE OVERVALUED DOLLAR AND THE INTERNATIONAL MONETARY SYSTEM

Since 1979 the dollar has appreciated sharply relative to the currencies of other industrialized countries. U.S. prices in manufacturing, compared to those of our trading partners, have risen sharply, thus worsening our competitive position in world markets. Compared to 1979 the loss in competitiveness amounts to almost 30%. It is now widely asserted that the dollar is overvalued. Thus the Chairman of the Council of Economic Advisors, Martin Feldstein has noted:[1]

> "The notion that the dollar is overvalued has become a commonplace assertion in discussions of the international position of the American economy. American businessmen point to an overvalued dollar as the primary reason for their loss of overseas markets and their problems in competing with imports from abroad."

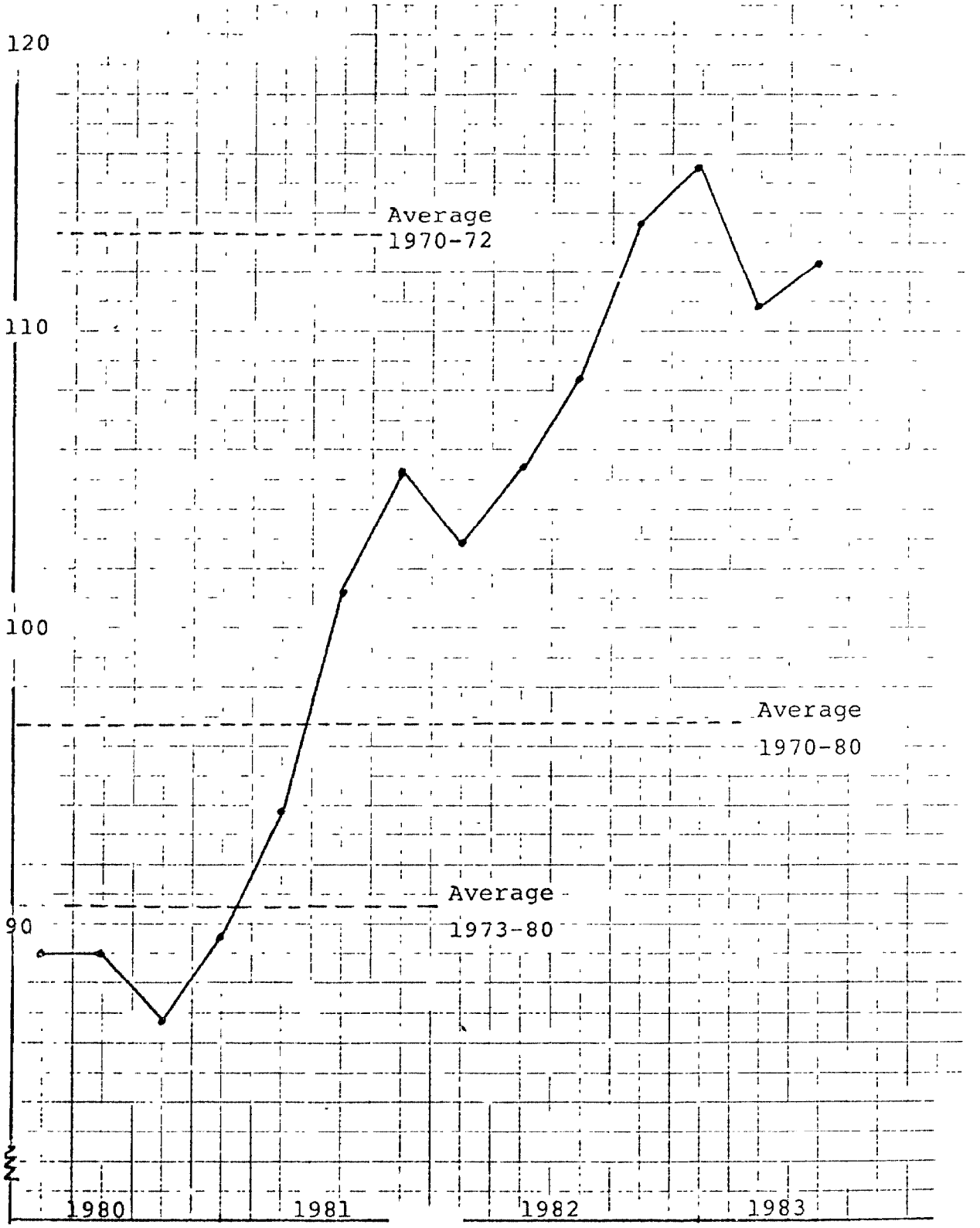
Figure 1 shows the relative price of U.S. manufactures compared to the dollar prices of a group of 15 major industrialized countries. The Figure brings out not only the magnitude of the real appreciation and its persistence, but also a comparison with the experience of the 1970s. Today the dollar is at the same level where it had been at the time the Bretton Woods system broke down <u>because of an overvalued dollar</u>. The magnitude of the real appreciation raises two questions:

- Is the dollar <u>over</u>valued or not?
- If the dollar is overvalued, what corrective action, if any, should be taken?

Figure 1

The Real Exchange Rate of the United States

(Index 1980-82 = 100)



Source: Morgan Guaranty World Financial Markets, Aug. 1983.

Both questions are difficult and controversial. But they are far from academic. Both the policy community and business are actively involved in the discussion. One comment due to C. Fred Bergsten leaves little question:[2]

> "...On average the current overpricing of the dollar has the same effect as placing a tax of 20-25 percent on all U.S. exports and paying a like subsidy on all foreign products (including travel abroad) imported by Americans...
>
> "Whichever course is chosen, urgent action is required... Jobs and profit losses will mount. U.S. firms will increasingly be forced to invest and source their sales abroad. America will suffer deindustrialization. Recovery will be severely retarded in the short run, stable growth undermined in the long run. Resolution of the currency problem is thus central to a lasting revival of the American economy in the 1980s."

The macroeconomic costs of the dollar appreciation have been quantified in a simulation study by Data Resources, Inc. The conclusions shown in Table 1 leave little question that the loss in trade competitiveness had a major impact on the U.S. economy. Certainly job losses of more than 1 million make the issue of potential dollar overvaluation a question of immense macroeconomic importance.

Table 1

Impact of Dollar Appreciation on U.S. Economy

	1981	1982	1983
Real GNP (%)	-0.5	-1.7	-2.3
Employment (Mill.)	-0.2	-0.7	-1.1
Unemployment Rate (%)	0.1	0.6	0.9
Net Exports ($Bill.)	3.4	-14.2	-24.4

Note: Simulation comparing actual performance of the U.S. economy with a scenario where the trade weighted dollar remains at the 1980:III level.

Source: Sara Johnson, "The Cost of a Strong Dollar," Data Resource Review of the U.S. Economy, July 1983.

The estimates of the macroeconomic costs of dollar appreciation, and the Bergsten quote above, might suggest that dollar overvaluation is a foregone conclusion and that there is ready agreement on the need for remedial policy action. But that is not the case. A recent careful study of exchange rate movements by Morgan Guaranty challenges the notion that the dollar is vastly overvalued:[3]

> "From the 1980-82 perspective the dollar still looks strong, but its apparent overvaluation as of the second quarter of this year is reduced by about one third, lowering the index from 120 to 112. It should be emphasized that the remaining 12% loss in the U.S. relative price competitiveness is only an estimate of the competitive loss sustained by the manufacturing sector. It is not a measure of the dollar's overvaluation from the standpoint of the U.S. economy in its entirety."

But even as some groups remain doubtful on the fact and measure of dollar overvaluation, policy action is taking place. The Harley-Davidson tariff and restrictive commercial policy moves on specialty steel, automobiles, and a whole range of products signal the threat of a wider potectionist backlash against the loss of competitiveness. These policies are exceptionally undesirable and a preferable course of action is to identify the source of overvaluation and seek an appropriate response, remedying the fundamental problems.

We start the analysis with a brief look at some data suggesting the extent of changes in competitiveness. From there we proceed to some analytical discussion of the notion and sources of overvaluation. We use formal models or theories of the determinants of exchange rates to shed light on what factor or factors are

behind the present high dollar. That analysis identifies the U.S. monetary-fiscal policy mix as the single most important source of the real appreciation. Moreover, in analogy with exchange rate overshooting, we argue that the dollar has prematurely adjusted to anticipated future policies in a way that has given rise to a present loss in competitiveness and employment.

The paper concludes with a short discussion of the dollar in the context of the international monetary system.

1. Some Facts

The extent of dollar appreciation can be judged from Table 1 and from Figure 1. Here we show the real exchange rate of the dollar, adjusted for prices in manufacturing in the U.S, and the trading partners' countries.

Table 2

The U.S. Real Exchange Rate

	1973	1980-82	1983:II
1976 Trade Pattern	100	110.1	118
1980 Trade Pattern	100	112.6	120.6

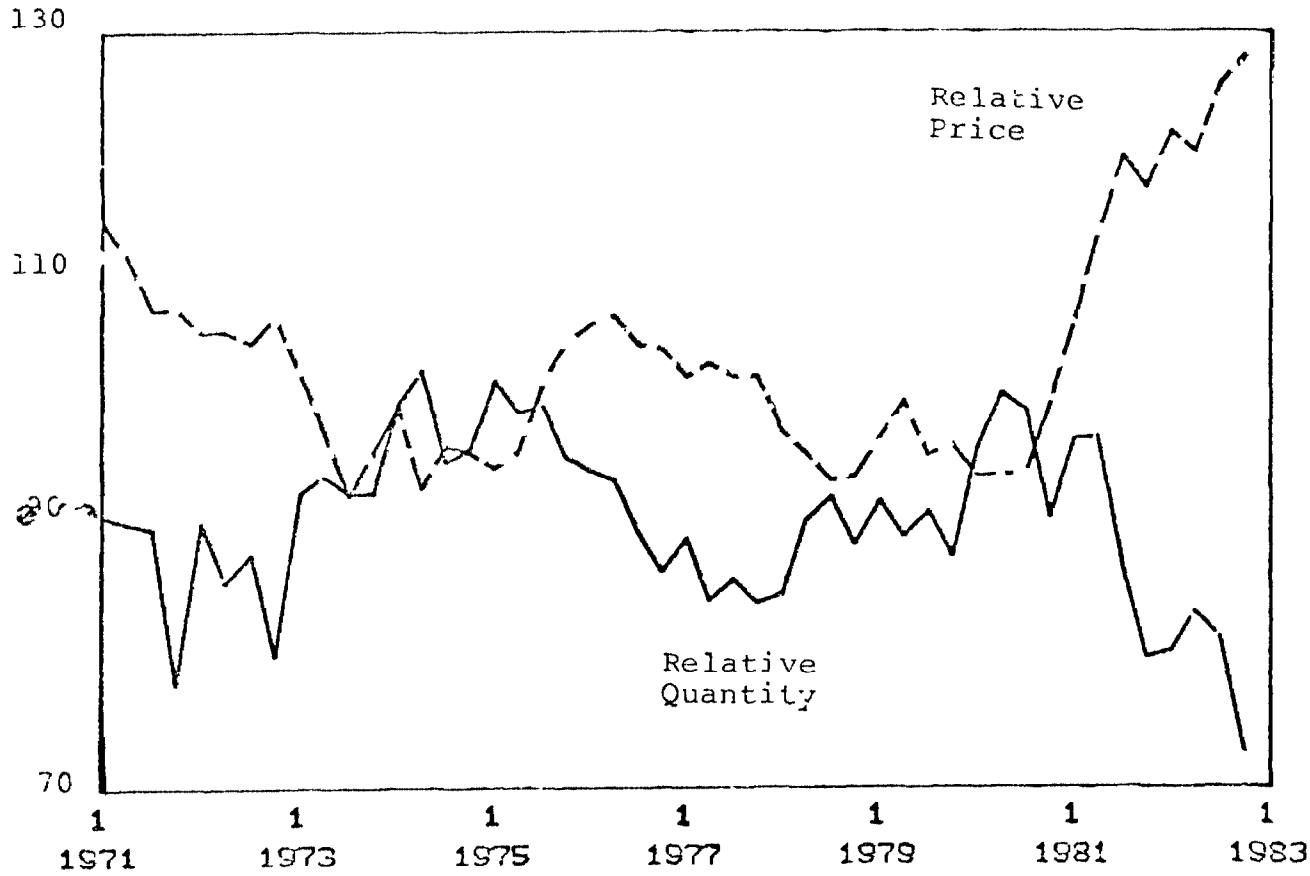
Source: Morgan Guaranty, World Financial Markets, July 1983, p. 8.

The table shows two measures of the real exchange rate, taking into account the change in trade patterns in the 1970s, in large part reflecting a decline in the relative importance of Canada, whose weight declined from 39% to 29%. On either measure the real appreciation since March 1973 is of the order of 20%.

Figure 2 shows the change in U.S. competitiveness measured by the relative price of manufactures exports and the relative export

Figure 2

Relative Export Quantity and Relative Export Price:
U.S. and Industrialized Countries



Source: U.N. Monthly Bulletin of Statistics.

performance measured by an index of U.S. export quantity relative to export quantity of all industrialized countries. The figure shows quite clearly that as the U.S. competitiveness deteriorates in 1980-82, our export performance as measured by relative export quantities declines steeply.

A third measure of competitiveness considers directly costs in manufacturing. A comparison of hourly compensation reveals that the U.S. remains in 1982 a high-wage country:

Table 3

Hourly Compensation in Manufacturing: 1982
(U.S. $ Per Hour)

	U.S.	Japan	Germany	Mexico
All Manufacturing	11.79	5.82	10.43	1.97
Motor Vehicles	19.43	7.22	12.94	2.55
Iron and Steel	22.74	10.18	11.51	2.37

Source: U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology.

Of course, the levels of hourly compensation cannot be used to infer directly cost competitiveness. An adjustment for productivity is required to arrive at least at unit labor costs. Table 4 shows that trends in unit labor cost in manufacturing have been unfavorable from a point of view of competitiveness.

Table 4

Changes in Unit Labor Costs Measured in U.S. Dollars
(Percent Change Per Year)

	1973-83	1980-82
U.S.	7.9	8.4
Japan	6.0	-0.4
Germany	7.4	-9.8

Source: Bureau of Labor Statistics, USDL-83-248, May 26, 1983.

The table brings out the striking fact that our competitors, because of the dollar appreciation, have experienced declining unit labor costs in dollars. Thus the real appreciation reported, for example in Figure 1, is in large part due to the nominal dollar appreciation. This is all the more the case because both in Japan and in Germany increases in unit labor costs in their national currencies proceeded at lower rates than in the U.S.

A final piece of evidence is the index of relative producer prices in manufacturing of the U.S. and Japan. Figure 3 shows this index of relative prices and brings out the large deterioration in bilaterial competitiveness. From 1978-79, a time of high U.S. competitiveness, the deterioration to early 1983 was of the order of more than 30%.

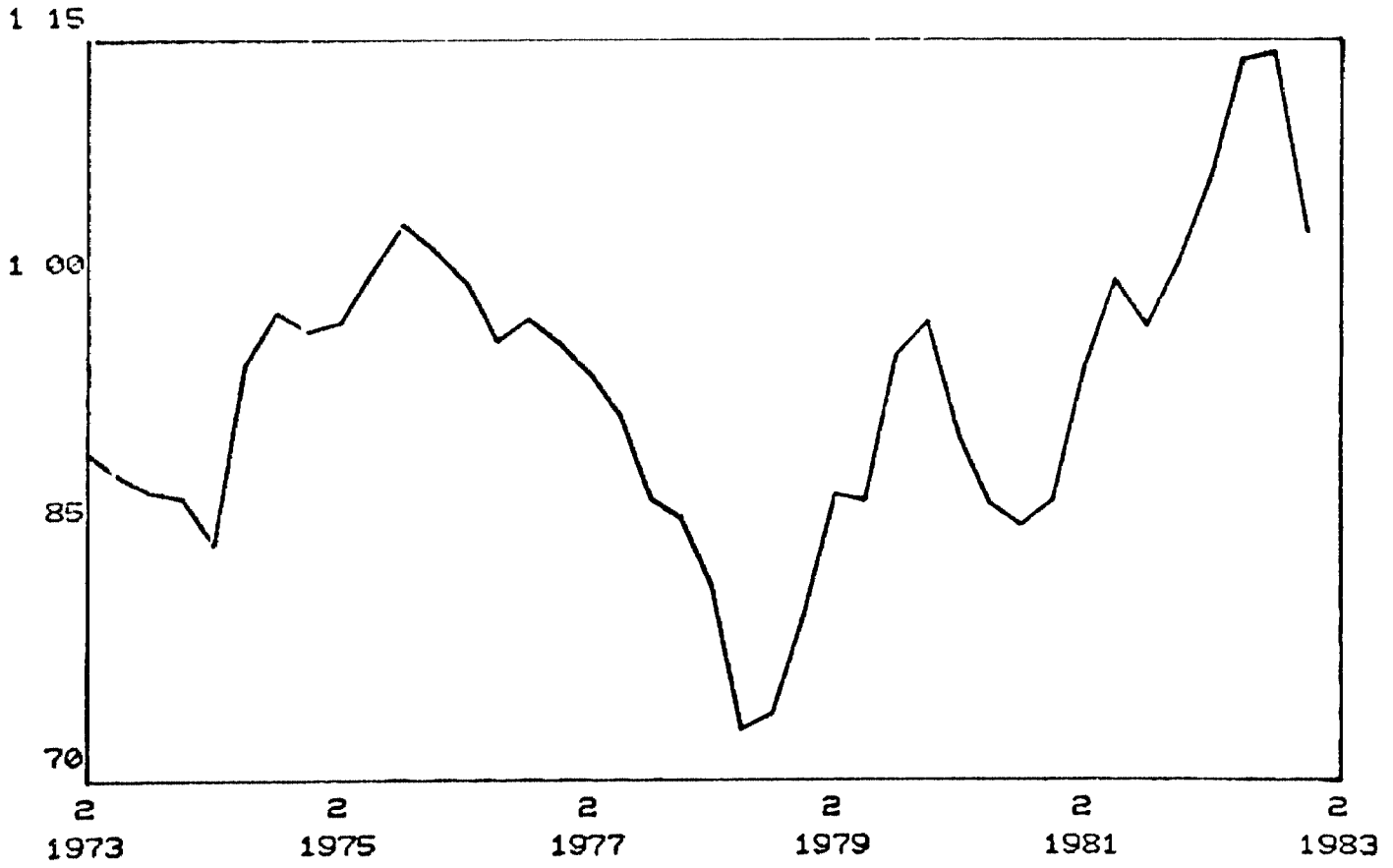
All this evidence, in different ways, suggests a decline in U.S. competitiveness, certainly on average and in manufacturing. The next step is to search for explanations for that loss in competitiveness and then inquire into the need and scope for policy intervention. We therefore now turn to a formal definition of equilibrium exchange rates and to an analysis of exchange rate determinants as suggested by the principal theoretical approaches.

2. Exchange Rate Theories

We define the equilibrium exchange rate as that rate, given tastes, technology, and commercial policy, as well as the setting of money and fiscal variables, which ensures full employment. With this definition an exchange rate that is lower--less dollars per unit of foreign exchange--means that imports are underpriced and

Figure 3

U.S.-Japan: Relative Prices in Manufacturing



Source: OECD Main Economic Indicators.

exports are overpriced leading to unemployment. Such an exchange rate undervalues, from a full employment point of view, our currency. Conversely, a higher price of foreign exchange, underpricing our goods and overpricing foreign goods, amounts to an undervaluation of our currency.

It is important to note that our definition of the equilibrium exchange rate is geared exclusively to the criterion of full employment. It leaves no room for such considerations as balanced trade or a balanced current account. There is no reason for such a criterion since zero net foreign lending (a balanced current account) should certainly not be a short-term objective of policy and not even a long-term one. Our definition also implies, in a world context, that the equilibrium exchange rate may not be the same for every country. In a world of deficient aggregate demand, because the world money supply in wage units is too low, every country may have an overvalued currency. This would appear peculiar, but is not really so. It merely signals the need for worldwide expansion through monetary or fiscal stimulus or wage deflation.

It is also worth noting the difference between the market determined exchange rate and the full employment rate. There is, of course, a sense in which the rate determined from day to day in financial markets is an equilibrium rate. It is an equilibrium rate because at that rate demand equals supply. But the fact that the foreign exchange market clears, given the determinants of demand and supply which include expectations that may or may not

have justification, does not imply anything about the macroeconomic desirability of the rate. By analogy, a high long-term real rate of interest may clear the bond market, but it may still be a major issue of concern to policy makers. In the same way the exchange rate that clears foreign exchange markets may be a disequilibrium one when viewed from the perspective of full employment.

Models: Exchange rate models can be organized along two criteria: the presence or absence of instantaneous, perfect substitutability of goods - purchasing power parity (PPP) or the "law of one price" - and the perfect or imperfect substitutability of financial assets. Table 5 shows the four possible approaches that have received attention. In each case we show a label and representative authors.

Table 5

Alternative Approaches to Exchange Rate Determination

Assets:	Goods: Perfect Substitutes	Goods: Imperfect Substitutes
Perfect Substitutes	Monetary Approach (Frenkel-Bilson)	Mundell-Fleming Model (Dornbusch-Frankel-Mussa)
Imperfect Substitutes	Porftolio Approach	Modern Macroeconomics Model (Kourri-Henderson)

We now comment on each of these approaches, in terms of the theory and in respect to empirical performance. We follow the order in which the theories have emerged starting with the monetary approach.

The Monetary Approach: This approach assumes full flexibility of prices, no significant international product diversification, and perfect substitutability between assets denominated in different currencies. Let e, P, P* denote the domestic currency price of foreign exchange or the the exchange rate, the home and foreign price levels and θ the equilibrium relative price of domestic goods, $\theta = eP^*/P$. Further assume that monetary equilibrium obtains so that $PY = MV$ where Y is the given real income, M the home quantity of money, and V planned velocity which depends on the home nominal interest rate. The home nominal interest rate is equal to the world rate plus the anticipated rate of depreciation. With these assumptions we derive an exchange rate equation:

$$(1)\quad e = \theta \frac{M}{P^*Y} V(i^*+x)$$

where x is the anticipated rate of depreciation and i* the given foreign rate of interest.

Equation (1) shows three main determinants of the nominal exchange rate. The first is the equilibrium relative price level, θ. The monetary approach takes this variable - relative GNP deflators in a common currency, the terms of trade or the real exchange rate - as given on the basis of the "law of one price." In other theories it assumes an essential importance as we shall see below. The second determinant is the ratio of home money relative to income measured at world prices, M/P^*Y. The approach predicts that a rise in money relative to real income leads to an immediate, equiproportionate depreciation of the exchange rate.

The third exchange rate determinant is planned velocity which is influenced by the nominal rate of interest. Because of perfect asset substitutability, the home nominal rate is the foreign rate plus anticipated depreciation, x. The higher the anticipated rate of depreciation, the higher velocity (or the lower real money demand) and hence the higher the exchange rate. An important, realistic element of this approach is the emphasis on expectations, but the link running from expectations to prices and the exchange rate is open to question.

How well does a model of this kind perform? Early empirical work found the model quite satisfactory in explaining exchange rates in the 1970s and, interestingly, also the experience in hyperinflation-Germany or in France prior to the Poincare stabilization of 1926. Today, however, enough new evidence has accumulated to show that the model can no longer be accepted as a reasonable specification, and progress in empirical testing throws significant doubt on the earlier interpretations of the 1920s.

The failure of the monetary approach is perhaps clearest in those instances where the disturbances are monetary. The best example surely must be the extreme case of a hyperinflation. Figure 4 shows the <u>real</u> exchange rate during the German hyperinflation in the 1920s. The variation in the real exchange rate, defined as an index of German prices relative to the exchange rate (January 1921 = 100), is so extraordinary that nobody could seriously believe that relative prices were constant, whatever the econometrics might demonstrate.

Figure 4

The Real Exchange Rate in Hyper-Inflation Germany

(Index January 1921 = 100)

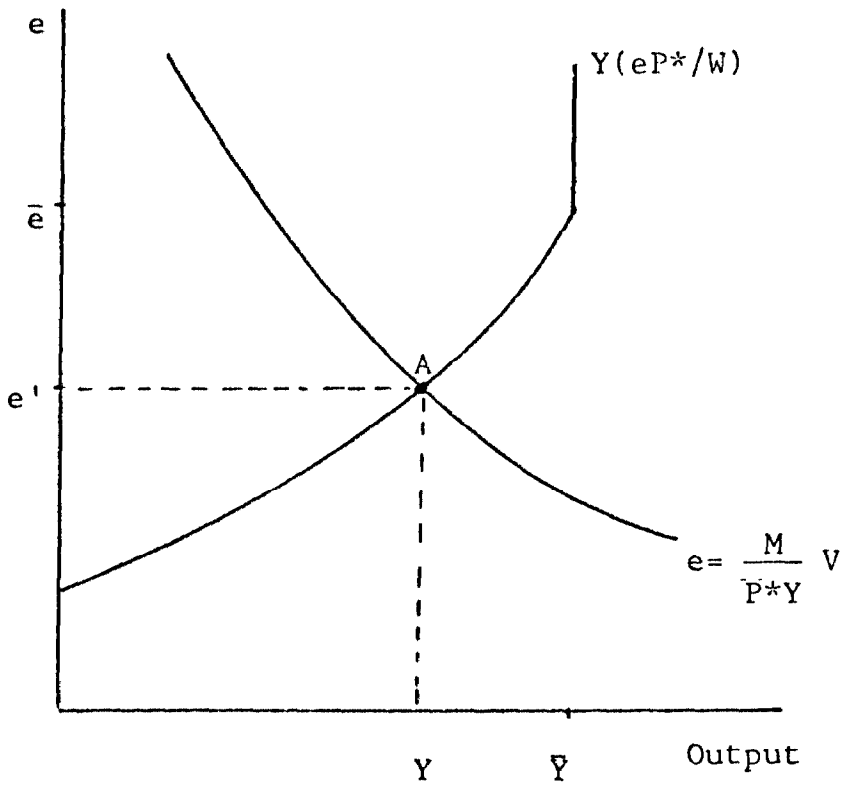
The German hyperinflation is not an isolated episode where monetary disturbances under floating rates lead to important changes in relative prices, thus invalidating the PPP approach. Bernholz has provided a highly readable account that makes it apparent that changes in real exchange rates under monetary dislocation are the rule, not the exception.[4]

Neoclassical Unemployment. Before proceeding to other models of exchange rate determination, we identify already a first possibility of exchange rate overvaluation. In the monetary approach, as it is ordinarily pesented, there is full price flexibility and full employment. But we can easily depart from that assumption, maintaining price flexibility but assuming downward wage stickiness. With that assumption employment and output will be determined, in neoclassical fashion, by the real wage, W/eP^*. Firms can sell any amount of output at the going price eP^*, but they will chose to produce only to the point where price equals marginal cost or the real wage equals the marginal product of labor.

In Figure 5 we show the demand side of the economy already stated in equation (1). The lower the exchange rate the higher the real money supply and hence income and spending. The supply side is shown as the upward sloping schedule which represents the firms' marginal cost schedule. To produce a higher level of output, the exchange rate and hence the price level must rise relative to the given wage. The resulting reduction in real wages makes it profitable for firms to hire more labor and produce a higher level of

Figure 5

Neoclassical Unemployment



output. The supply schedule becomes vertical at full employment because money wages are assumed upward flexible.

Equilibrium, given money wages and the nominal money stock, obtains at point A. As shown the economy produces at less than full employment. The reason is that the money supply is too low, measured in wage units, to achieve full employment. The full employment exchange rate is $\bar{e}$ which is higher than e'. At an exchange rate equal to $\bar{e}$, real wages would be low enough for firms to produce the full employment output level. But with the higher level of output and prices, given the nominal money stock, there would be an excess demand for money and pressure for interest rates to increase, capital to flow in and thus appreciate the exchange rate back to the level e'. Thus e' is an overvalued exchange rate from the employment point of view, and it is sustained unless the money stock rises relative to wages. Only an expansion in the nominal money stock, shifting prices upward, would bring about full employment.

Does the situation depicted in Figure 5 characterize the exchange rate problem of the U.S.? Is U.S. labor unemployed because firms can sell all the goods they choose to at the going price, but decide not to produce at full employment because real wages are too high? Such a situation is called "neoclassical unemployment" and is thought to explain a significant part, if not all, of the unemployment in Europe and especially in Germany. For the U.S. case, this model does not offer a good complete explanation. It is widely believed that American workers are unemployed because American firms cannot sell the goods they produce at the going

prices. Even so the neoclassical unemployment may well be some, even though a small part, of the aggregate unemployment problem, and it would be a mistake to dismiss it as completely irrelevant to all sectors of the U.S. economy. But for many sectors a more relevant model involves product differentiation and price competitiveness rather than the level of real wages.

The Portfolio Balance Model: This approach emphasizes imperfect substitution between domestic and foreign securities. Now the equilibrium interest rate and exchange rate are established jointly so as to clear asset markets. Still maintaining the assumption of PPP the exchange rate affects the assets markets through two separate channels. On one side a depreciation leads to increased money demand, because the price level and hence the transactions demand for money are higher. On the other hand, increased depreciation raises the demand for home securities because the value of wealth, certainly foreign wealth in home currency, increases. In what follows we assume that these valuation effects dominate. This is assuredly the case if the foreign country is relatively large so that its portfolio choices exercise a dominant weight in our assets markets.[5]

The portfolio balance model is, of course, familiar from discussion of "hot money" flows. In terms of modern macroeconomics, we think of these as portfolio diversification considerations which determine the allocation of a given wealth between assets denominated in different currencies. A portfolio shift then is a shift

between debt instrument of different currency denomination. A shift from foreign toward domestic securities leads, as expected, to currency appreciation and to a reduction in the required or equilibrium return on domestic securities.

Changes in the relative supplies of securities also matter. Unlike in the monetary approach, it is now essential to know how a change in the money stock is brough about. There are two possibilities: one is for the central bank to purchase money, selling foreign assets. This is a foreign exchange market operation. The alternative is to purchase money and sell domestic debt, the traditional open market operation. This difference is what the portfolio model is all about. In particular an open market purchase of money will induce a smaller appreciation if it involves selling foreign assets rather than home debt.

The relevance of the portfolio balance model, taken in conjunction with PPP, is of course open to the same objections as the monetary approach. PPP simply does not hold in fact as the evidence in Section 1 above arleady showed. It is essential therefore to move toward models of imperfect goods substitution and then decide whether imperfect asset substitution is, in addition, an important part of a realistic macroeconomic model.

The Mundell-Fleming Model: This model has become the main framework for analyzing exchange rate problems. It starts from the premise that domestic and foreign goods are imperfect substitutes. Moreover, it is assumed that in the short run prices are relatively

sticky. This implies that changes in nominal exchange rates are also changes in real exchange rates. These real exchange rate movements in turn affect international competitiveness and hence output and employment. Under conditions of perfect asset substitution, two results emerge: a home fiscal expansion leads to an incipient increase in income and interest rates which induce capital flows and currency appreciation up to the point where the current account has deteriorated by the precise amount of fiscal expansion. Thus there is full crowding out. A monetary expansion, by contrast, lowers interest rates and thus brings about capital outflows that induce exchange depreciation, a gain in competitiveness and thus an increase in output and employment. The exchange rate and the current account are the channels through which monetary and fiscal policies exert their effects on output and employment.

Once repercussion effects on the rest of the world are taken into account, the results are slightly modified: fiscal expansion now raises home income and income abroad. Monetary expansion, however, leads to an expansion at home and a contraction abroad. The contraction aborad is due to the exchange depreciation of the expanding country.

Extensions: The Mundell-Fleming model has been extended mainly in two directions. One is that expected currency depreciation introduces a wedge between home and foreign nominal interest rates. With expected depreciation taken into consideration, our nominal interest rate equals that abroad plus the anticipated rate of depreciation, x:

(2) $i = i^* + x$

Thus, if our interest rate is, for example, 15% and that abroad 10%, the level of the exchange rate must be such that expected depreciation is equal to 5%.

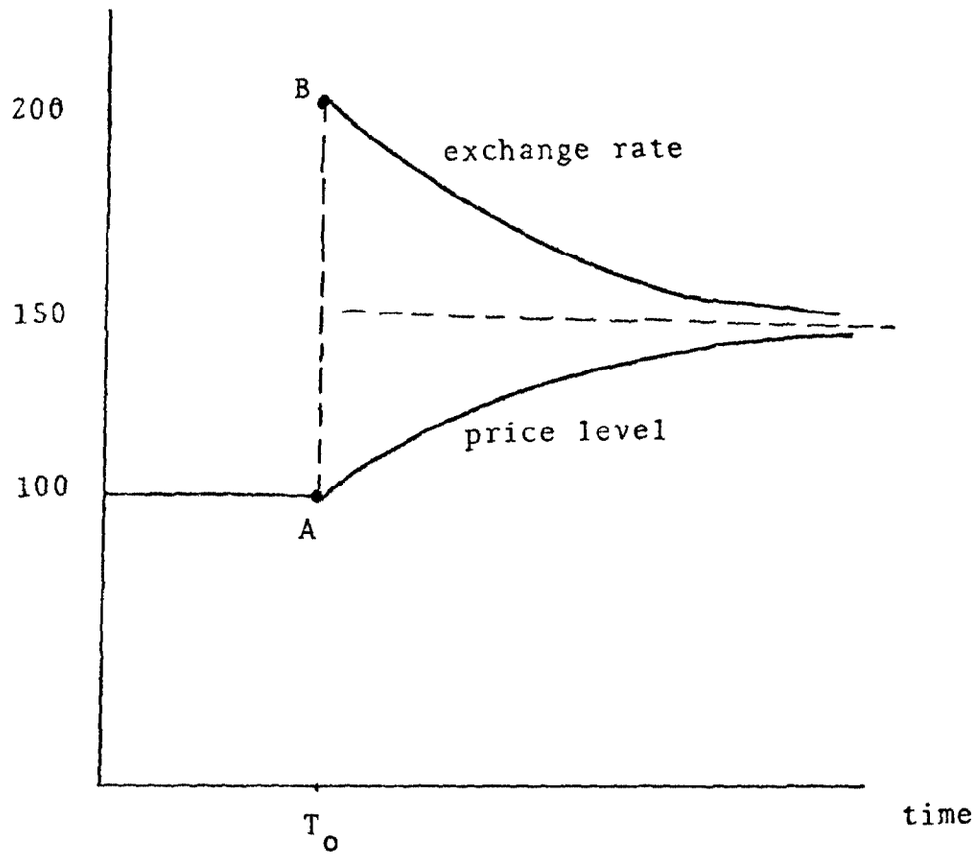
The second extension concerns a realistic formulation of wage price behavior. In the Mundell-Fleming formulation of the 1960s, there was no room for long-run price flexibility. Modern versions assume short-run price stickiness and long-run full price flexibility.

The combination of these two modifications yields an interesting framework for exchange rate dynamics. In particular, in response to a permanent monetary expansion, there will be an immediate depreciation in the exchange rate. Because prices are sticky in the short run, the real money stock rises and thus the equilibrium interest rate will fall. But if interest rates decline below the levels abroad, equilibrium in the capital market requires offseting expectations of appreciation. The only way the exchange rate can be expected to appreciate is if it initially overshoots its long-run level. Figure 6 brings out these ideas.

Suppose up to time T_0 the money stock, prices and the exchange rate are constant and for concreteness we consider an index for which we set the initial level equal to 100. Now at time T_0 the money stock is increased by 50%. In the long run, once all wages and prices are free to adjust, the exchange rate and the price level will rise in the same proportion--50%--and nothing real will happen. But in the short run, wages and prices are sticky and thus higher nominal money means an increased real money stock and thus

Figure 6

Exchange Rate Overshooting in Response to a Monetary Expansion



lower equilibrium interest rates. With lower interest rates domestic securities are unattractive unless there is an expectation of sufficient appreciation. Capital will tend to flow out, and this leads to a depreciation up to apoint like B in Figure 6. At B the exchange rate has depreciated so much that, looking ahead, it is expected to appreciate in the future and thus give holders of domestic securities a sufficient compensation relative to foreign bonds to make it worthwhile staying in domestic bonds. But as is apparent from the diagram, overshooting is essential to generate an expectation of appreciation.

Figure 6 shows that the domestic price level rises only gradually. Thus after T_o until long-run equilibrium is reached, the home country will have gained competitiveness, output will be higher, and so will be employment.

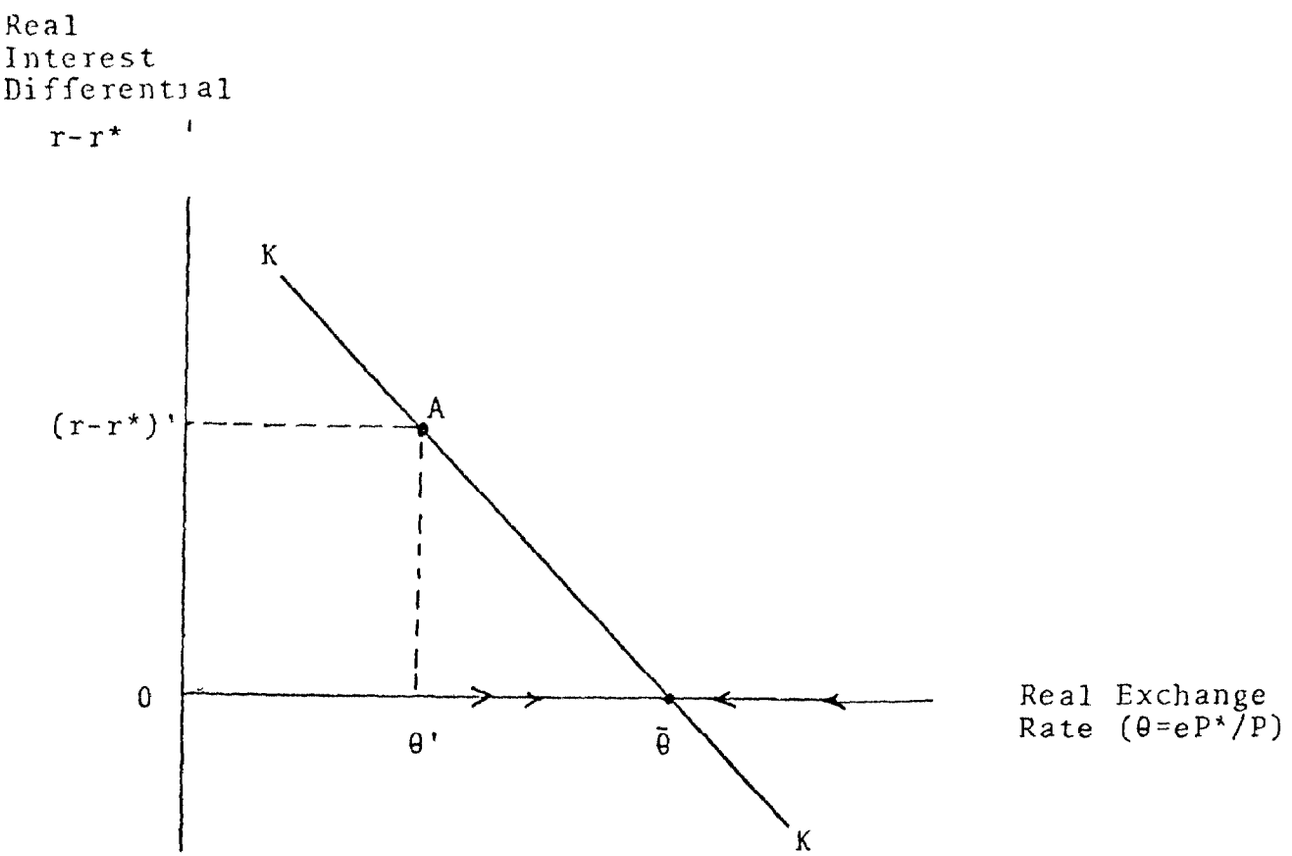
Thus the extended Mundell-Fleming model, with its emphasis on exchange rate overshooting, presents an attractive interpretation for the behavior of the dollar in the last three years. In terms of this model, tightening of money in dollar in the U.S. has led to a real interest differential in favor of the U.S. and therefore to incipient capital inflows, dollar appreciation, and hence in the short run to real appreciation. A clear implication of the model is the link between the real interest differential and the level and rate of change of the real exchange rate. Figure 7 shows the relation. When home real rates are high relative to those abroad, the real exchange rate is low and it is depreciating.

In Figure 7 $\bar{\theta}$ is the equilibrium real exchange rate to which the economy converges in long-run equilibrium, once wages and prices are fully adjusted. In the short run the equilibrium linkage between real interest differentials, $r-r^*$, and the real exchange rage is given by the downward sloping schedule KK. The higher the interest differential in favor of the U.S. the more appreciated our real exchange rate. Thus with a differential $(r-r^*)'$ the corresponding real exchange rate is θ'. But the model also predicts that the interest differential will be matched by real depreciation, since otherwise the whole world would only hold domestic securities and nobody would choose foreign assets. Thus high real interest rates at home mean a combination of a low real exchange rate and a depreciating exchange rate.

Fiscal Policy: Monetary tightness is insufficient to explain the persistent real appreciation of the dollar, but in conjunction with prospective fiscal expansion, we can arrive at an explanation. In the U.S. fiscal policy over the next five years is scheduled to take a vastly expansionary direction. The full employment budget deficit, as a fraction of GNP, is expected to reach 5% in 1987. Such a fiscal expansion, were it to occur now, would lead to immediate appreciation of the nominal and real exchange rate. But even though the fiscal expansion is only expected to occur in the future, it already exercises its effects today. The long-term real interest rate has risen in anticipation of the deficits, and the increased return on U.S. assets has attracted capital inflows and led to appreciation.[6]

Figure 7

Real Interest Differential and
the Real Exchange Rate



Future fiscal expansion is an attractive explanation for the dollar appreciation. This is so because we explain at the same time unusually high long-term interest rates and real dollar appreciation. The fiscal expansion simply produces crowding out on two fronts: the world real interest rate rises in response to increased aggregate demand in the world and the real exchange rate appreciates because the expansion increases the relative demand for U.S. goods.

It is worth nothing that in the fiscal explanation the future fiscal expansion leads to a current real appreciation, loss of competitiveness, and fall in output and employment. In the rest of the world, higher real interest rates and a gain in competitiveness exercise offsetting influences on output and employment. But in the U.S. the current effect of future deficits clearly slow down the recovery. The asset markets thus are too much forward looking, raising interest rates and appreciating the exchange rate ahead of the demand expansion which ultimately justifies these changes in prices and interest rates. From a point of view of current aggregate demand, the dollar is overvalued, although from a point of view of future demand, the equilibrium real exchange rate must appreciate. Rational expectations in asset markets unfortunately anticipated these future price and interest rate changes.

The Modern Macroeconomic Model: The Mundell-Fleming model, with suitable extension, thus appears capable of explaining the observed increase in real long-term interest rates and the concurrent, sus-

tained real dollar appreciation. There is no need to introduce the relative supplies of assets as an additional determinant of the exchange rate. But such an explanation is complementary with the theory already offered. Specifically, the modern macroeconomic model of exchange rate determination would emphasize that prospective deficit affect the exchange rate both through the impact on aggregate demand and hence equilibrium relative prices, but also through the increased supply of domestic currency denominated securities.

Aggregate demand and the financing of the deficit both lead to a currency depreciation. The fact that we cannot discriminate, empirically, between aggregate demand and financial effects is regrettable from the point of view of theory, but it does not have much practical relevance. In each case the dollar appreciation is explained by the tight money-easy fiscal policy mix, although through different, complementary channels. Table 6 summarizes the results of our discussion.

Table 6

The Policy Mix, Increased Rates, and the Exchange Rate

		Fiscal Policy	
		Easy	Tight
Money:	Easy	?	Real Depreciation Low Real Interest Rates
	Tight	Real Appreciation High Real Interest Rates	?

Table 6 brings out the interesting fact that only in two of the possible four combinations do we have unambiguous effects of

the monetary-fiscal mix on exchange rates. For example, tight fiscal policy and tight money are ambiguous. The tight fiscal policy implies reduced long-term real rates and a reduced long-run real exchange rate so as to maintain full employment. But at the same time tight money tends to raise the short-term real interest rate and may induce transitory real appreciation. Here the exact timing and magnitude of the policies and separate channels through which they operate become relevant.

Explanations of exchange rate behavior that emphasize imperfect substitution of goods and assets are radically different from the monetary approach. The monetary approach singles out the relative supplies of nominal money as the detriminant of relative price levels and hence the exchange rate. By contrast the imperfect substitution models place at the center of the discussion the relative supplies and demand for national goods and financial assets, including of course among them money. In particular, the emphasis on fiscal policy would have no room in a monetary approach.

3. Overvaluation?

What light does exchange rate theory shed on the question of dollar overvaluation? In a trivial sense a flexible exchange rate is always in equilibrium--the price is such that demand is equal to supply. But the question must go deeper to ask whether the factors that determine the market price are the real fundamentals or whether they are extraneous, possibly financial factors. The distinction is brought out most clearly by the Garber-Flood-Blanchard bubble problem.[7]

Suppose there are risk neutral speculators who anticipate that next period, with probability 1-q the exchange rate will return from a present overvaluation to its equilibrium level $\bar{e}$ and with probability q pursue its disequilibrium course. What is the path of the exchange rate in the absence of a collapse?

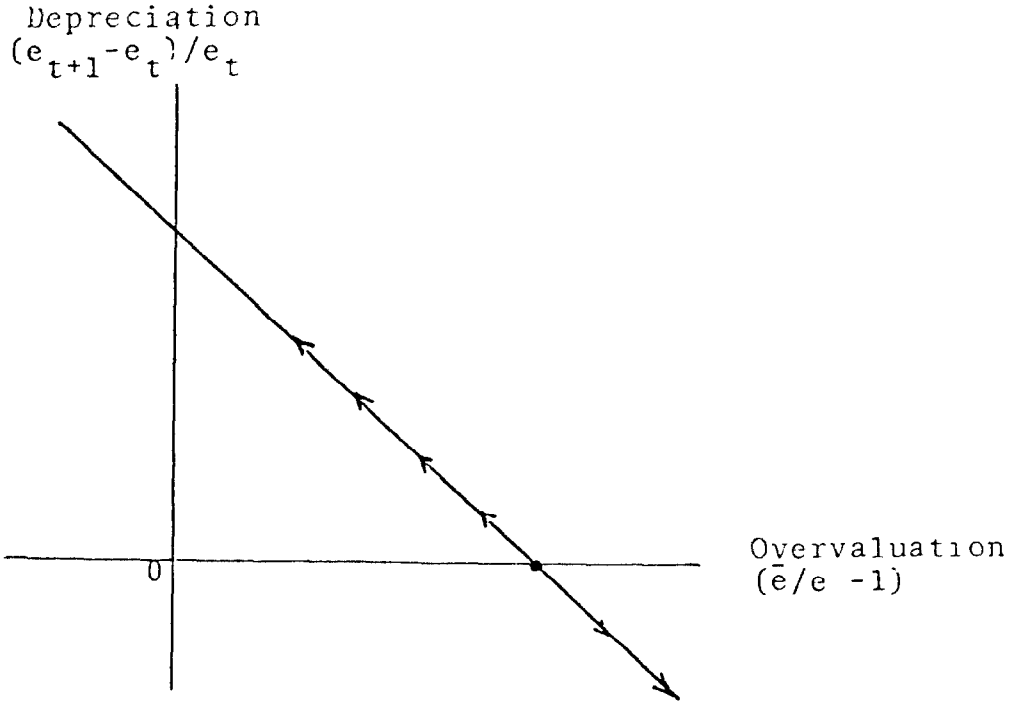
It can be shown that in such a model the rate of depreciation and the degree of undervaluation of foreign exchange are negatively related as in Figure 8.[8] When foreign exchange is highly overvalued, the rate will continue to appreciate and when it is already undervalued the rate will further depreciate. Thus the actual rate moves further and further away from the fundamental level as shown in Figure 8. Moreover it does so at an increasing rate. It is important to realize that such a divergence from fundamentals can be sustained by rational speculators. There are as yet no models of what causes the collapse, but in the meantime the possibility of bubbles has become a serious alternative explanation of the behavior of asset prices, including the exchange rate.

Leaving aside the possibility of bubbles, is there any other way in which the equilibrium exchange rate can diverge from fundamentals? Here we return to our definition of the equilibrium rate and to what is meant by fundamentals. We define the fundamentals exchange rate as the real exchange rate that yields <u>current</u> full employment given tastes, technology, and monetary and fiscal policy, as well as any sticky wages and prices. Let $\tilde{\theta} = eP^*/P$ be that real exchange rate. Then $\tilde{e}$ denotes the full employment level of the nominal exchange rate:

$$(3) \quad \tilde{e} = \tilde{\theta}\,(\ldots)\frac{P}{P^*}$$

Figure 8

The Bubble Problem



where the dots denote the determinants of the full employment real exchange rate. The degree of currency overvaluation can then be determined from the ratio between the actual rate that emerges from equilibrium in goods and assets markets, given all the expectations that impinge on decisions to hold different assets, and the full employment rate:

(4) overvaluation = $\tilde{e}/e = \tilde{\theta}(...)/(eP^*/P)$

Overvaluation of the nominal exchange rate thus simply means that the actual real exchange rate (eP^*/P) falls short of the full employment real exchange rate.

With these definitions there is no question that the exchange rate, although it establishes equilibrium in goods and assets markets, can perfectly well fail to establish full employment. It remains to ask, though, what are the reason for such an overvaluation? The most plausible channel, already noted above, is the prospective fiscal expansion in the U.S., combined with tight money. The expectation of the expansion, by raising the future real price of the dollar, leads in a setting of price inflexibility to current real appreciation and increased unemployment.

The policy implications of overvaluation are complicated by three facts:

- The full employment equilibrium exchange rate depends on the other macroeconomic policy instruments. Rather than attempting to adjust the exchange rate to fiscal and monetary policy, we could adjust fiscal and monetary policies to achieve full employment at the current exchange

rate. There is no sense, whatsoever, in saying that the exchange rate rather than monetary or fiscal policy is misaligned.

- There is a need to recognize the world economic implications of real exchange rate changes. In a situation such as 1983, there is a worldwide sense of overvaluation. Every economy has high unemployment and would wish (other things equal) to solve the unemployment problem by competitive depreciation. Action to make the dollar more competitive thus means forcing increased unemployment or compensating expansionary policies abroad.
- Adjustments in nominal exchange rates have effects on price levels (or inflation rates), both in the depreciation country and abroad. Action by the U.S. to depreciate the dollar would increase our inflation, but reduce it abroad.

Sensible policy discussion of the overvaluation issue then involves considering alternative monetary-fiscal policy mixes in different parts of the world. In discussion of such alternatives, one question clearly must be to solve the world unemployment problem.

Table 7

Unemployment Rates

	1975-80	1983
U.S.	7.1	10.3
Europe	5.3	10.8
Japan	2.1	3.0

OECD, Economic Outlook, July 1983.

To do so we need to decide whether high unemployment is cyclical--the money stock in wage units is too low and long-run real interest rates are too high--or classical in that real wages are too high relative to the productivity of labor. For the U.S. the perception is dominantly that the former is the case. In Europe, however, the belief predominates that unemployment, except in 1980-82, stems from excessively high real wages.[9] This is an important point because it implies that Europe sees part of the solution to overvaluation in a reduction of real wages, that is, in part at least, in a real depreciation. It is in this sense that a policy of seeking a real dollar depreciation is not a world economic strategy that commands consensus.

We have discussed the overvaluation issue from the premise that monetary and fiscal policies, here and abroad, present and prospective, jointly determine world real interest rates, the term structure of interest, and the path of real exchange rates. With less than full wage price flexibility policy shifts, or shifts in good and asset demand, lead to changes in equilibrium output and employment. The recent constellation of world tight money and expansionary future fiscal policy has led to <u>world</u> unemployment. The real dollar has appreciated because our monetary policy has been partially followed abroad and our fiscal policy not at all. The real appreciation thus induces anticipated crowding out in the external sector just as the extremely high real long-term interest rate brings about anticipated crowding out on the investment side.

Martin Feldstein has summarized this view as follows:[10]

> "The trade deficits are doing substantial damage to a major part of American industry. These trade deficits are caused by an overstrong dollar whose value has been increased by the rise in real long-term real interest rates. The reason for the very high level of the long-term real interest rates is undoubtedly the unprecedented level of the budget deficits that are now predicted for the years ahead if no legislative action is taken. ...But if Congress fails to take the necessary steps, real interest rates will remain high, the dollar will continue to be overvalued, and a large percent of American industry will suffer the consequence of declining competitiveness."

Intervention: Once dollar overvaluation is seen in the perspective of a world macroeconomic model, it is clear that there is no simple trick to unhook the dollar without further changes in other macroeconomic policies here and abroad. Specifically there is no reason to believe that intervention will help change the exchange rate significantly. Consider sterilized intervention--that is no change in monetary policy as measured by the high powered money aggregate. The only way the exchange rate would be affected by such a change in the world currency denomination of debts is via the impact on the risk premium. Studies of the effects of intervention are quite unanimous in claiming that the effectiveness of such policies is negligible.

Henry Wallich has recently given a good view of what intervention can and cannot do.[11]

> "Intervention can calm markets and restore order when they become disorderly. It can have a moderate effect on the level and direction of the rate, particularly when carried out in a coordinated fashion under appropriate circumstances. But these effects are unlikely to be either major or lasting."

If intervention is not effective in changing the real exchange rate, we are faced with the need to find internationally agreeable alternative macroeconomic strategies. If the U.S. prefers a lower relative price of U.S. goods and higher employment in the traded goods sector, policies have to be moved in the direction of fiscal expansion abroad, easier money everywhere, and a tightening of U.S. prospective budget deficits. But, of course, the rest of the world sees little reason to substitute employment in their export sector with fiscally sustained employment. The answer to the dollar overvaluation then is for the U.S. to offer a coordinated program of U.S. belt-tightening in exchange for transitory stimulus abroad. The rest of the world would benefit by reduced public debt service (which already improves the fiscal deficits) and increased aggregate demand. The U.S. would benefit from lower interest rates and increased competitiveness. It is clear that the initiative would have to lie with the United States.

4. The System

Exchange rate volatility and the large, persistent swings in real exchange rates have once again raised the question of reform of the international monetary system. Table 8 sets out a frame of reference. The alternatives involve the extent of fixity or flexibility of the exchange rate and the extent to which macroeconomic policy is internationally coordinated, taking into account targets such as world aggregate demand and world inflation. The four boxes represent the extreme possibilities of what is naturally a spectrum

of varying degree of exchange rate management and policy coordination.

Table 8

Alternative Systems and Policy Autonomy

	Flexible Rates	Fixed Rates
National Policy Autonomy	U.S. 1980-83	Bretton Woods
International Policy Coordination	1984?	Gold Standard World Monetarism

Some options are clearly defined. The experiment of fixed exchange rates and national policy autonomy is best described by the experience with the Bretton Woods system. Such a system, as we know both in theory and in fact is not viable. Equally unviable, as the recent experience has shown, is the combination of fully flexible exchange rates and the pursuit of national policy autonomy such as advocated, for example, by Treasury Undersecretary B. Sprinkel. Excessive variations in real exchange rates and international spill-over of inflation stabilization make the uncooperative system extremely unattractive.

An alternative that has received wide atention is the combination of fixed exchange rate and international coordination. One such scheme proposed by Robert Mundell is a return to the gold standard. The gold standard would integrate the world economy to a high degree. But, as the work of the Gold Commission had documented, it is not a practicable option at this time.

The other scheme that has a superficial attraction is due to Ronald McKinnon. This approach opts for exchange-rate-oriented monetary policy. Monetary policy given agreed rates of domestic credit creation in the chief industrialized countries, would be directed to maintaining exchange rates through non-sterilized intervention. As discussed elsewhere this approach fails to recognize that exchange rate movements due to capital flows arise from portfolio shifts between bonds in different currency denominations, not shifts between monies.[12] The approach also fails to recognize that when disturbances are monetary they are often deliberate money supply disturbances associated with stabilization policy, not shifts in money demand. Specifically, when the U.S. decides to tighten monetary policy to fight inflation, it stands to reason that it is not a good idea to turn around and increase the money supply in response to the induced currency appreciation, thus defeating inflation stabilization.

Once we leave the field of fixed exchange rates, we can ask what scope to assign to exchange rate management. Studies on the effectiveness of exchange market intervention have shown that sterilized intervention is important in case of identifiable international portfolio shifts. In this event sterilized intervention, by accommodating the currency composition of world debt to the changes in portfolio preferences, avoids the spill-over of a purely financial disturbance to interest rates, asset prices, and exchange rates and hence, to real activity.

Managed exchange rates, going beyond accommodating, sterilized intervention are not a viable exchange rate policy. As we have argued above, exchange rates are determined in the general macroeconomic setting. Exchange rate targets, if they are to make sense, can only be sustained by coordinated international targets for other key variables, including specifically, interest rates and monetary and fiscal policy. Setting exchange rate targets without clearly defined interest rate, money, and fiscal targets is ineffective.

The remaining policy regime is a fully flexible rate combined with international coordination of macroeconomic policies. This seems an attractive regime because it avoids the difficulty of setting and managing exchange rates. But it does not avoid the problem of inernationally agreeing on a set of policies that achieve the right level and composition of output without extreme movements in exchange rates. We have little experience with this regime, but continuing dollar appreciation will sooner or later force policy makers into recognizing the common interest they have in policy deals that involve incomes policy and world approach to fiscal policy, just as there has emerged a world approach to monetary policy.

FOOTNOTES

1. Martin Feldstein, "The Dollar and Exchange Market Intervention," Remarks before the French Institute of International Studies, Paris, Apr. 27, 1983.

2. C. Fred Bergsten, "Decimating U.S. Trade: The Feldstein Doctrine," Institution for International Economics, July 1983.

3. Morgan Guaranty Trust Company of New York, World Financial Markets, July 1983, p. 11.

4. See P. Bernholz, Flexible Exchange Rates in Historical Perspective, Princeton Studies in International Finance, 1982.

5. The model now is represented by the money market and the market for domestic debt: $M/P = L(i, i^*+x, Y)$ and $B = \phi(Y, i, i^*x, P)W + \phi^*(i, i^*+x, Y^*)eW^*$ where B is the home supply of debt and W and W^* are home and foreign wealth measured in the respective currencies. In addition there is PPP: $P \simeq eP^*$. In exchange rate interest rate space the money market equilibrium schedule is upward sloping, the bond market equilibrium schedule downward sloping.

6. For a further treatment of this fiscal effect, see M. Feldstein, op. cit., and the discussion by R. Dornbusch in Brookings Papers on Economic Activity, 1, 1983.

7. For further discussion and references, see R. Dornbusch, "Equilibrium and Disequilibrium Exchange Rates," Zeitschrift fur Wirtschafts und Social-Wissensschaften, 6, 1982.

8. The actual equation is: $(e_{t+1} - e_t)/e_t = (i-i^*) + (1-q)(1-\bar{e}/e)/q$.

9. See Giorgio Basevi et al, "Macroeconomic Prospects and Policies in the European Community," Center for European Policy Studies, 1983.

10. Martin Feldstein, "Interest Rates, Exchange Rates and the Competitiveness of American Business in World Markets." Remarks before the Chamber of Commerce International Forum, Sept. 14, 1983.

11. See Henry Wallich, "The 'Right' Exchange Rate," The Journal of Commerce, August 19, 1983. On the effectiveness of intervention see too the Report of the Working Group on Exchange Market Intervention, Washington, D.C., 1983.

12. See R. Dornbusch, "U.S. International Monetary Policies," Academic Consultants Meeting with the Board of Governors of the Federal Reserve, October 1982, and "U.S. Monetary and Fiscal Policy, the Dollar and the International Financial System," unpublished, MIT, 1983.

THE 1980-83 DOLLAR AND SIX POSSIBLE MEANINGS OF "OVERVALUATION"

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THE 1980-83 DOLLAR AND SIX POSSIBLE MEANINGS OF "OVERVALUATION"

I. INTRODUCTION

There is near unanimity that for several years the dollar has been overvalued and that ever since 1973 exchange rate movements generally have been excessive. Bergsten (1982, p. 1) warns

> The dollar is overvalued by at least 20 per cent, on average, and the yen is undervalued to an even greater extent in relation to the underlying competitive positions of the major national economies. These imbalances are as great as those in the final, breakdown stage of the Bretton Woods system of fixed exchange rates. They add significantly to national growth problems, both in countries with overvalued currencies (which suffer competitive losses) and countries with undervalued currencies (which are driven to adopt restrictive monetary policies)...

What does this word mean, "overvalued"? Economists have an instinctive aversion to it. But it is clear that the value of the dollar from 1980-1983 has indeed been very high, not only relative to its past history but relative to such long-term fundamentals as relative price levels (i.e. it is overvalued in real terms) or money supplies and income levels. This fact is documented in section II below. However, it is also noted below that, contrary to a widespread impression that appears in the foregoing quote, the dollar is no more out of line in terms of fundamentals against the yen than it is against European currencies.

This paper considers six possible, very distinct, definitions of the words "overvaluation" and "undervaluation," or the equivalently ambiguous term "disequilibrium."

First, the words could refer to a situation in which the exchange rate is at a level at which the supply of foreign exchange does not equal the demand. This possibility, nonclearing of financial markets, is dismissed out of hand in light of the very low levels of transactions costs, capital controls and other barriers to portfolio adjustment among most of the major industrialized countries.

Second, overvaluation of a currency could mean that its private supply exceeds its private demand; i.e., that there is foreign exchange intervention by one or more central banks to support the value of the currency at a level higher than it would be in a completely free market.

Third, overvaluation could be used to describe a currency that has a higher value than that dictated by long-term fundamentals but that is determined by short-term fundamentals, such as the real interest rate or the current account surplus. This is the phenomenon of overshooting and is discussed in section III.

Fourth, overvaluation could mean that one can, in expectation, make money by selling the currency forward. This is the possibility of irrational expections discussed in section IV.

Fifth, overvaluation could mean that, even though expectations are rational, the exchange rate nevertheless diverges from the equilibrium determined by fundamentals, short-run as well as long-run. This is the possibility of speculative bubbles discussed in section V.

Sixth, overvaluation could pertain to the real effects of the exchange rate, rather than its determinants. Under this interpretation the loss in competitiveness by the export and import-competing industries is undesirable, or the reverse effects on the corresponding industries in foreign countries are undesirable for them. The possibility of undesirable welfare effects is addressed in section VI.

A distinction that proves to be necessary throughout is between short-term volatility in exchange rates and long-term swings (not that either have been small in magnitude). To anticipate the conclusions in the paper, the 1980-83 overvaluation of the dollar is attributed to a sharp tightening of U.S. monetary policy after 1979 and consequent overshooting of the exchange rate. Irrational expectations or speculative bubbles may add to exchange rate variability, but there is no empirical evidence that they do so. More importantly, it is argued here that there is more scope for irrational expectations and speculative bubbles in causing short-term volatility than in causing long-term swings like the dollar overvaluation.

As to welfare effects, the resource cost of high short-term exchange rate uncertainty must exist, but there is no evidence that it is large. The effects of longer-term swings are more controversial. This paper argues that when a country adopts contractionary policies to fight inflation, it is better off if it allows the currency to appreciate, in the sense that then the terms

of the tradeoff between output and inflation are more favorable than they would be if the exchange rate were somehow kept fixed.

II. LONG-TERM MONETARY FUNDAMENTALS

The Monetarist Model

A useful starting point for considering exchange rate determination is the monetarist model. One component of this model views different countries' bonds as being essentially perfect substitutes in addition to viewing barriers to instantaneous adjustment of portfolios as being low. As a consequence, uncovered interest parity holds: international arbitrage equates the nominal interest differential to the expected rate of depreciation. The second component of the model views different countries' goods as being essentially perfect substitutes and views barriers to instantaneous adjustment in goods markets as being low. As a consequence, purchasing power parity holds: the exchange rate is given by the ratio of domestic and foreign price levels. The price levels are in turn given by nominal money supplies relative to real money demands, the latter usually modeled as functions of real income levels and rates of return.[1]

The empirical evidence of the last ten years is all against the assumption of purchasing power parity, and in turn against the monetarist model, as an even approximate description of short-run or medium-run reality. Two episodes in the recent history of the dollar stand out.

In 1977-78, the dollar depreciated sharply against the yen, mark, and other European currencies. Contrary to the purchasing power parity doctrine, the change in the exchange rate was not at all matched by a change in relative price levels. That is, the dollar depreciated greatly in real terms. Nor did the change in the exchange rate correspond to a change in relative money supplies. Indeed central banks in Europe and Japan were allowing their money supplies to grow at a faster rate than in the United States. While one could tautologically always explain the fall in the dollar's value as a fall in relative U.S. money demand, the most important conventional determinant of money demand, real income, was actually increasing in the U.S. relative to abroad. Table 1 shows the relevant numbers.

In 1980-82, the entire process was reversed. The dollar appreciated sharply against the yen, mark and other European currencies. The change in the exchange rate was again not at all matched by a change in relative price levels. That is, the dollar appreciated enormously in real terms. Nor did the change in the exchange rate correspond to a change in relative money supplies. Indeed most foreign central banks allowed their money supplies to grow at a slower rate than did the Federal Reserve Board. And again U.S. real income was also going the wrong way, decreasing relative at least to Japan, Germany and France. Dornbusch (1982a, p. 6) puts the nail in the coffin: "By now there are, I believe, no more serious claims for the empirical relevance" of the simple monetarist model.

Table 1

AVERAGE YEARLY RATES OF CHANGE

	PERIOD OF DOLLAR DEPRECIATION 1977 II - 1978 IV	PERIOD OF DOLLAR APPRECIATION 1979 IV - 1982 III
MULTILATERAL TRADE-WEIGHTED DOLLAR EXCHANGE RATE	12.0	-14.1
PRICE LEVELS (CPI)		
U.S.	8.1	9.4
Japan	3.5	4.8
Germany	2.6	5.7
Switzerland	0.9	5.6
France	9.3	12.7
U.K.	8.2	11.5
Canada	8.7	11.4
MONEY SUPPLIES (MI)		
U.S.	8.1	6.1
Japan	12.4	3.9
Germany	12.8	2.4*
Switzerland	13.1	5.2*
France	12.2	11.9*
U.K.	20.1	6.9**
Canada	10.3	3.6
REAL INCOMES (GNP)†		
U.S.	4.9	-0.2
Japan	4.9	3.2*
Germany	4.0	-0.1*
Switzerland	1.9	-0.4*
France	4.2	0.4**
U.K.	3.1	-1.0**
Canada	3.6	-1.2*

Sources: International Economic Conditions, Federal Reserve Bank of St. Louis, Oct. 1981 and Jan. 1983. Exchange rate from Economic Report of the President.

*Data up to 82 II

**Data up to 82 I

†GDP for France and U.K., industrial production for Switzerland

The large swings that exchange rates have experienced, in the absence of corresponding movements in the variables reported in table 1, have led some economists to conclude that exchange rates are not determined by fundamentals. The very high real value of the dollar over the most recent three years is considered to be obviously unjustified. And the exchange rate against Japan is often pointed to as being particularly far out of line, as in the Bergsten quote with which this paper opened.

Is the Yen Particularly Out of Line?

That the dollar has appreciated greatly in both nominal and real terms is clear. But the claim that the fall in the dollar/yen rate has been greater than the fall in the rate against the European currencies is not. In fact the reverse is true. For example, as of August 1982, the real appreciation of the dollar was only 36.8% against the yen as compared to 50.8% against the mark, if 1979, the year before the U.S. monetary contraction, is taken as the base year. The numbers are 2.0% compared to 31.4% if 1973, the year that rates began to float, is taken as the base year.[2]

What accounts for the widespread impression that the yen is undervalued in a sense that the European currencies are not, when the facts are so much to the contrary? No doubt much of the explanation is the same as that behind the current surge in anti-Japanese protectionism on the commercial policy front. Tight U.S. monetary policy and the accompanying recession has hit export and import-competing industries hard. Even though the loss in

competitiveness vis-a-vis Japan has been no greater than that vis-a-vis the Europeans, in many of these industries Japan is the main competitor. Nor can one rule out ethnic xenophobia as a factor in the political arena.

In the calmer arena of economic analysis, the perception that the yen is particularly undervalued may be partly due to a focusing on effective or trade-weighted exchange rates in place of bilateral exchange rates. The mark, for example, looks much stronger on an effective basis than against the dollar alone. As of 1982 III it was about even with 1979, and up significantly relative to the early 1970s, using the IMF's MERM weights.[3] The yen also looks better on a trade-weighted basis, since all currencies are down against the dollar, but less so.

The effective exchange rate is a very useful statistic if one is concerned about the macroeconomics of the country in question. But it is not the correct number to look at to make arguments about relative undervaluation against the dollar. This argument is due to Paul Krugman. Imagine that the yen, mark, franc, etc. were each down 20 percent against the dollar on a bilateral basis. One would not want to say that the yen is any more undervalued than the others. And yet when one computes the mark's effective exchange rate, the largest weights are assigned to France and to Germany's other trading partners within the EMS, against whom the mark has not declined. Thus the change in the mark's effective rate will be closer to zero. But when one computes the yen's effective rate,

the largest weight is assigned to the United States. Thus the change in the yen's effective rate will be closer to the original 20 percent. To see the arbitrariness of the result, imagine computing an effective rate for Europe as a whole; the change will be closer to the 20 percent. Or imagine computing it for an individual Japanese province; the change will be closer to zero.

The Six Meanings of Overvaluation

Let us now turn from the specific question of the yen's undervaluation to the question of the dollar's strength against all currencies. The numbers clearly support the claim that there is a sense in which the dollar is overvalued. It is no good giving the non-interventionist's knee-jerk reaction that whatever rate the market coughs up must by definition be the correct rate. But if an economist uses the term "overvalued," he must be prepared to explain what he means by it. I would like to propose six orders of meaning for the term, or for the equivalent term "disequilibrium."

First, as often in economics, disequilibrium can mean that the price does not equate current supply and demand. But given the very low levels of transactions costs, capital controls, or other barriers to portfolio adjustment, among the United States, Canada, Germany, the United Kingdom, and now Japan, such a disequilibrium can be ruled out. Individuals are holding the portfolios they desire.[4] If we wish to talk about being out of equilibrium, it should be in the alternative definition of equilibrium as a

situation in which the exchange rate is not changing over time, or at most is changing at a long-run, steady-state rate.

The second possible meaning of overvaluation of a currency is that the central bank is intervening in the market, adding to the market demand for the currency in order to keep its price at a higher level than it would otherwise have. Under a system of fixed exchange rates, of course, the central bank is committed to buy up however much of the currency is necessary to maintain the price, which is the excess supply left over from the private components of the balance of payments. A balance of payments deficit is often referred to as a disequilibrium, and it is, in the sense that the situation cannot persist indefinitely because the central bank will run out of foreign exchange reserves. Under floating exchange rates, the overall balance of payments deficit is a less useful concept. It has usually been U.S. policy not to intervene in the foreign exchange market at all. While many foreign central banks have continued to intervene, it is not necessarily any more accurate to say that they are accommodating or financing an imbalance exogenously determined by the private sector than to say that their exogenous intervention is what allows the private sector to run an imbalance. Furthermore, the magnitude of central bank sales of foreign exchange reserves, even when large, has sometimes been smaller than the statistical discrepancy in the accounts ("errors and omissions") so that the measurement of the balance of payments is in doubt. In any case, intervention in recent years has

generally been "leaning against the wind." Foreign central banks have fought the 1980-83 appreciation of the dollar by selling dollar reserves in exchange for their own currencies, rather than the reverse. This is particularly true of Japan; it is ironic that the Japanese government has recently been accused of manipulating the yen downward.[5] If the dollar is considered currently to be "overvalued," then the intervention definition cannot be the one that is meant.

The third possible meaning of overvaluation is that one can predict on the basis of economic fundamentals that the currency will in the future decline toward some long-run equilibrium. In other words the dynamics come out of a model. This is the phenomenon of overshooting, which implies volatility of the exchange rate. But overshooting is consistent with market efficiency. Certainly it is consistent with efficiency in the sense of one not being able to make excess (risk-adjusted) expected profits out of the dynamics. All that is needed is that the expected future depreciation is fully reflected in a positive forward discount and interest differential (with or without a risk premium), which is usually true in the overshooting models. It may even be consistent with efficiency in the sense of signaling a desirable allocation of real resources in the economy.

The fourth possible meaning of overvaluation is that the hypothesis of rational expectations is being violated. One can make money in expectation, in the present context, presumably by

selling the dollar forward. What effect such a failure of rational expectations has on the degree of exchange rate variability is another question.

The fifth possibility is that, while the hypothesis of rational expectations holds, the exchange rate diverges from its correct value even as determined by the short-run fundamentals. There have been some recent theoretical developments on the subject of speculative bubbles. However, I will argue that the current overvaluation of the dollar is not primarily of this nature.

The sixth possible interpretation is that, regardless which of the previous factors explains the value of the currency, it is higher than is optimal from the standpoint of its effects on the economy. We will consider the last four possible meanings of overvaluation in more detail, beginning with the third.

III. OVERVALUATION DUE TO SHORT-RUN FUNDAMENTALS

Sticky Prices and the Degree of Overshooting

There are two major directions in which the simple monetarist model discussed above is altered to make it more realistic and, in the process, to give it dynamics. In either case, the dynamics must come from a variable that is not free to jump at a moment in time--so that all the impact of, say, a decrease in the money supply, is reflected in the exchange rate instead--but that does adjust gradually over time, thus working off the "excess demand" for money and reversing the initial decrease in the exchange rate.

The first direction is to relax the assumption of purchasing power parity. The variable that is not free to jump is the price level. A decrease in the nominal money supply with sticky prices is a decrease in the real money supply. It raises the real interest rate, inducing an incipient capital inflow and an appreciation of the currency. The high real interest rate an loss in comptitiveness reduces the demand for goods and labor. (This is of course exactly what has happened in the U.S. economy since 1979.) If the market is foresighted, it realizes that the slack economy will reduce prices below their previously expected path, thus eventually undoing the contraction in the real money supply and with it the overvaluation of the currency. Under the rational expectations hypothesis, the expectation of future depreciation must be sufficient to offset the interest differential.

The story is by now a very familiar one from Dornbusch (1976). But one point that is occasionally missed is that the volatility that overshooting implies is not a consequence of "speculation," i.e., of the introduction of expectations into the model. Rather it is a consequence of slowly adjusting goods markets. In the words of Jacob Frenkel, "When commodity prices are slow to adjust to current and expected economic conditions, it may be desirable to allow for 'excessive' adjustment in some other prices" (in Bergsten et al., p. 18).

Let us begin by going back to the old elasticity-pessimism view according to which export and import elasticities are so low

that the Marshall-Lerner condition fails. If a floating exchange rate were called upon to clear the trade balance alone, the system would be unstable. A depreciation, say, would cause an initial trade deficit, that is an excess demand for foreign exchange, causing further depreciation, and so on. The empirical evidence is that trade elasticities are in fact high enough, once some time has been allowed to elapse.[6] But one still needs to introduce capital mobility to get the country through the short run, say the first year. Foreigners will lend to the country to finance its transitory trade deficit. In this sense capital mobility stabilizes the foreign exchange market.

What about speculative capital flows, considered by Nurkse (1944) and others since to be destabilizing? Speculation presumably means investors acting in response to the expectation of changes in the exchange rate. But, given slow adjustment in goods markets and rapid adjustment in asset markets, the introduction of expectations turns out to reduce exchange rate volatility. Let us again consider a decrease in the money supply. It must be met, one way or another, by a decrease in the level of money demand. The Mundell-Fleming model of perfect capital mobility had no role for expectations. The domestic interest rate was completely tied to the foreign interest rate. In this model, a decrease in the money supply had to produce an appreciation that was large enough to induce in turn a fall in output sufficient in itself to lower money demand. As Niehans (1975) pointed out, the empirical fact

that trade elasticities are low in the short run means that the requisite exchange rate change would have had to be enormous indeed. Introducing the possibility of expected future depreciation allows the domestic interest rate to rise above the foreign interest rate, thus absorbing some of the necessary fall in money demand. For example during the period of dollar overvaluation, 1980-1982, the dollar has sold at a forward discount against the yen and mark, or equivalently (given covered interest parity) U.S. interest rates have been higher than Japanese and German interest rates. This implies that speculators expect the dollar to depreciate in the future, from which one could infer that they are reducing the demand for the dollar, and thus reducing the extent of overvaluation, today. Expectations thus do not exaggerate but rather mitigate the degree of exchange rate volatility, assuming they are rational.

Portfolio Balance and Effect of Current Account

The second major direction in which the simple monetarist model is altered is to relax the assumption of uncovered interest parity that follows from perfect bond substitutability. Investors now balance their portfolios among all sorts of assets, including bonds, as functions of expected returns. The variable that is not free to jump is in this case the level of domestic claims on foreigners, or more generally the worldwide distribution of wealth. A decrease in the money supply in this case leads to a

fall in domestic demand for foreign assets, both because it constitutes a fall in the supply of domestic assets generally and because it increases the domestic interest rate. With the supply of foreign assets fixed at a moment in time, the fall in demand must be reflected in a fall in their price, the exchange rate. The loss in competitiveness will mean a fall in exports and increase in imports. A current account deficit means that the level of domestic claims on foreigners is falling over time, thus eventually undoing the initial excess supply of foreign assets and with it the decrease in the exchange rate. Once again we have overshooting. And once again, to the extent that the market foresees the future depreciation, "speculation" will reduce the current demand for domestic assets and thus mitigate the initial appreciation, not exaggerate it.[7]

One virtue of the portfolio-balance approach is the important role it gives the trade balance. The total neglect of trade flows by the early monetary models was a by-product of the excitement accompanying the dethroning of the old flow approach, and it is appropriate that the pendulum has been swinging back ever since.

It is worth noting that the portfolio-balance model is neither (1) sufficient nor (2) necessary to give a role to the current account. In the first place, if the reason for imperfect bond substitutability is exchange risk, then the "supply of foreign bonds" is the cumulated foreign government deficit (corrected for foreign

exchange intervention, if any), not the cumulated domestic current account surplus. But the cumulated current account will determine the worldwide distribution of wealth. It will thus still affect the exchange rate, via the demand for foreign assets rather than the supply, provided domestic residents have a lower propensity to hold foreign assets than do foreign residents. Furthermore, Dooley and Isard (1980) argue persuasively that the most important reason for imperfect substitutability is political and default risk, not exchange risk, so that bonds are identified by country of issuer rather than currency of denomination.[8]

It is not difficult to find other ways of getting the current account into the monetary model. Even if perfect bond substitutability is assumed, the current account can be viewed as an indicator of changing factors, such as productivity, that determine the long-run real exchange rate. Or the role of the cumulated current account as a component of domestic wealth will still have the desired effect on the exchange rate if wealth is a determinant of money demand.[9] One aspect of these models that may or may not be attractive is that while, like the portfolio-balance model, they imply a role for the current account, which is called for empirically, unlike the portfolio-balance model they imply no effect for sterilized foreign exchange intervention. Sterilized foreign exchange intervention changes the supplies of domestic- vs. foreign-dominated bonds but not the supplies of money. There is virtually no empirical evidence that such intervention in fact affects the exchange rate, although the issue is still open.

Econometric Troubles

To try to discover whether exchange rate movements are caused by the sorts of fundamentals we have discussed, we naturally turn to the econometrics. Certain basic empirical properties, such as the high degree of nominal and real exchange rate volatility, are very much in line with the theoretical models; indeed the models were originally developed to fit these properties.

When it comes to prediction, we must be careful. From the beginning it has been an implication of the asset-market models that the greatest part of changes in the exchange rate cannot be predicted. The argument is that if a change could have been foreseen, it would have already been incorporated in the previous exchange rate.[10] But there is danger of a "cop out" here. We do not want to say that it would be consistent with the models if we could not explain any exchange rate movement empirically. In the first place, we might hope to be able to predict, based on past information, that component of an exchange rate change that is rationally reflected in the forward discount or interest differential (perhaps corrected for a risk premium). In the second place, we would certainly hope to be able to explain ex post, based on contemporaneous information, a good part--ideally all-of exchange rate movements. In some empirical studies of the first five years of floating, it appeared possible to track exchange rate

movements closely using contemporaneous values of the variables that appear in the models, such as money supplies, real income levels, nominal interest rates, and inflation rates. But there were always errors, and they tended to have a high degree of serial correlation that was never adequately explained. More importantly, the models began to veer seriously off track subsequently. It is still possible to get good fits for the later period ex post, if one is allowed to make some theoretical alterations in the model that probably should have been made anyway.[11] Nevertheless one feels uncomfortable if one has to make alterations in the model to fit each new episode. Our worst fears were confirmed by Meese and Rogoff (1983a), who found that the monetary models are worse at predicting the spot exchange rate out of sample, at one-month to twelve-month horizons, than is the lagged spot rate, a state of affairs they attribute to chronic structural change. Theirs is not strictly speaking a test of predictive ability, since they use realized post-sample values of explanatory variables, but presumably the models would do even worse if they had to use end-of-sample values of the explanatory variables. All in all, the record with "reduced-form" regression equations cannot be pronounced encouraging.

What looks worst in the regression studies are parameter estimates that appear statistically insignificant, or even significant and incorrect in sign, particularly the coefficients on asset supplies: money supplies in the monetary models and net government debt supplies in the portfolio-balance models.[12] The

reason for such results is not hard to see; simultaneity problems are endemic. For example in the 1977-78 episode of dollar depreciation, foreign central banks leaned strongly against the wind; i.e., fought against the appreciation of their currencies by intervening in the foreign exchange market to buy up large quantities of dollars. To the extent that this intervention was not sterilized, it swelled up foreign money supplies. This explains the perverse movement in the exchange rate and relative money supplies that we already noted in Table 1. To the extent that the intervention was sterilized, and much of it was, it swelled up net foreign debt supplies, yielding an empirical relationship perverse to that predicted by the portfolio balance model. The 1980-82 episode of dollar appreciation constituted the reversal of the process. Foreign central banks fought depreciation of their currencies by selling dollar reserves. To the extent that the intervention was not sterilized, foreign money supplies fell relative to the U.S. money supply, giving us the perverse movement in this period as well. To the extent that the intervention was sterilized, it reduced relative net foreign debt supplies, again yielding a perverse relationship.

Monetary Tightening Does Explain 1980-82 Appreciation

If leaning against the wind accounts for the perverse movement of the aggregate asset supplies, what accounts for the wind?

Common sense here speaks too loudly to be ignored. The Federal Reserve Board was following a fairly expansionary monetary policy in the late 1970s. The consequences of such expansion that mainstream macroeconomic theory predicts, in fact occurred: real interest rates were low, output and employment were relatively high, and inflation was rising. All the exchange rate theories mentioned above, and I suppose any other serious exchange rate theory that one could imagine, predict a currency depreciation resulting from a monetary expansion. The second episode was more dramatic. The Fed contracted sharply, in a switch in policy regime that was formalized by the change in operating procedures in October 1979 and that really began to take hold in the second quarter of 1980. Real interest rates rose sharply, output and employment fell, and inflation began falling.[13] And again, all exchange rate theories predict the result that occurred, the sharp appreciation of the dollar. Thus our simultaneity bias and other problems with regression analysis should not blind us to gross facts, such as the consistency of our theories with the dollar's 1977-78 weakness and 1980-82 strength.

If the theories have some merit on this sort of gross long-term level, one would expect some predictive power on a long-term basis. To do meaningful long-term, out-of-sample testing, when the total data set is only ten years, it is necessary to specify parameter estimates a priori rather than using up most of the data to estimate them. In light of the simultaneity problems

and perverse regression estimates discussed above, this is just as well. In a second paper, Meese and Rogoff (1983b) pursue this strategy and find that the predictive performance of the structural model does indeed improve at horizons longer than a year. At the three year horizon, the sticky-price monetary model does about 50% better than the random walk in terms of root mean square error and mean absolute error for some plausible parameter values.[14]

The possibility of this sort of long-term explanatory power is of little comfort to the econometrician (not to mention the speculator or businessman!). It leaves out large quarterly or monthly, and even daily or hourly, fluctuations that one would like to be able to explain ex post, if not predict ex ante. One would like more empirical evidence before accepting the mainstream macroeconomist's world view on faith. For example, how do we know that the high nominal interest rates of 1980-82 in fact represented tight monetary policy and high real interest rates, as opposed to loose monetary policy and high expected inflation rates?

One piece of useful empirical evidence comes from a specific selection of those short-term fluctuations that are normally so troublesome. Every Friday at 4:15 p.m., the Fed announces the money supply for the week ending nine days previously. When the figure is greater than what the market had previously anticipated, the interest rate jumps up. Does this mean that the market has no confidence in the Fed to stick to its money growth targets, rather

interpreting the news as indicating higher future rates of money growth and inflation that are built into a higher nominal interest rate? Or, to the contrary, does it mean that that market trusts the Fed to stick to its targets, recognizes that the monetary aggregates can fluctate due to disturbances in the banking system or in the private economy, and expects the Fed to contract in the future to correct the deviation, in anticipation of which today's real interest rate rises? The foreign exchange market contains the answer. If it is losser monetary policy, the exchange rate models predict that the dollar should fall on the news. If it is tighter monetary policy, the models predict that the dollar should rise on the news. Empirically, the answer is the latter, and to a statistically significant degree. This finding supports at once the sticky-price monetary model and the view that the high interest rates we have seen are high real rates, if any further evidence was needed.[15]

The money announcement example is nice because it is one case where the econometrics are free from simultaneity bias. One can be confident that whatever factors go into the Friday-to-Monday change in the interest rate or exchange rate, they are likely to be independent of the predetermined error in the market's prediction of the money supply. But the systematic Friday-to-Monday fluctuation does not last long, and is only one of many fluctuations that occur throughout the week. What causes the others? More importantly, what causes the monthly fluctuations that our "reduced form" exchange rate equations do not seem able to track? Surely they are

not all related to fundamentals. We turn now to two other possible meanings of disequilibrium, irrational expectations and speculative bubbles.

IV. OVERVALUATION DUE TO IRRATIONAL EXPECTATIONS

Theoretical Argument Against Destabilizing Speculation

We have already seen that speculation, that is capital flows in response to expected exchange rate changes, is actually stabilizing, not destabilizing, if the expectations are rational. This is the powerful argument against the idea of destabilizing speculation originally made by Milton Friedman (1953). Assume some natural dynamic in the exchange rate due to fundamentals alone, such as seasonal agricultural fluctuations or the fluctuations in the money supply considered above. If speculation were to be destabilizing, it would have to add to the demand for foreign currency when its price was high anyway, in order to make its price higher, and add to the supply of foreign exchange when its price was low anyway, in order to make its price lower. But then the speculators are buying high and selling low, hardly a good prescription for making money! Friedman's argument was that such speculators would soon go out of business.

But let us now consider the possibility that irrational speculators, even if they are on average losing money, do exist. Perhaps there is a new sucker born every minute. Certainly there is by now a large literature devoted to testing this possibility econometrically.

Testing Forward Market Efficiency

There are many technical pitfalls in testing the hypothesis of market efficiency; i.e., the joint hypothesis that the market's expectation is rational given available information and that no barriers prevent the forward rate from reflecting the market's expectation. Overlapping contracts can create the illusion of serial correlation in expectational errors. A small probability of a large change in the exchange rate can skew the error distribution and bias standard errors (the "peso problem"). Variation in the purchasing power of domestic currency can introduce the illusion of bias due to Jensen's inequality. Fortunately each of these econometric problems can be handled.[16]

Even when those econometric problems are handled, the frequent finding is still that the forward rate deviates systematically from the future spot rate. The final, most daunting pitfall, is that this finding could be due to a risk premium that separates the forward rate from the market's expected future spot rate rather than irrational expectations that separate the market's expectation from the rational one. Some, like Bilson (1981a), naturally assume that it is a failure of rational expectations; others, like Hansen and Hodrick (1980) and Cumby and Obstfeld (1981), that it is a risk premium. If the finding is due to a risk premium, one would expect deviations to be systematically related to variables on which the risk premium is theoretically supposed to depend: asset supplies and asset demands, the latter being functions of the worldwide distribution of wealth and return variances and covariances.

However, the evidence seems to be that there is no such systematic relationship.[17]

Implications of Irrational Expectations for Exchange Rate Volatility

It might seem that as soon as we admit the possible failure of expectations to be rational, the Friedman argument about stabilizing speculation is off. Could "irrational expectations" account for some of the disequilibrium fluctuations in exchange rates, and in particular the 1980-83 overvaluation of the dollar?

In tests of rational expectations, not enough attention has been paid to what the alternative hypothesis is. One common test is to regress actual realized changes in the exchange rate against the forward discount. Under the null hypothesis (market efficiency and risk neutrality), we would expect a unit coefficient. Instead the coefficient often turns out to be significantly less than one.[18] Bilson (1981b) urges us to consider the alternative hypothesis seriously. It says that the forward market tends to overestimate the speed of adjustment of the spot rate, a situation that he calls "excessive speculation." But it turns out that this situation will move the spot rate closer to the equilibrium path determined by long-run fundamentals and thus reduce exchange rate volatility. This is because when the value of the currency lies above its long-run equilibrium path, if investors expect it to depreciate toward that path at a speed that is higher than is rational, they will reduce their demand for the currency, and thus

reduce its price, more than they would if their expectations were rational. In the 1980-82 context, if the expectation of dollar appreciation (which the market has embodied in the positive interest differential) was too great, this means that the dollar was less overvalued than it would have otherwise been. So this type of speculation smooths out exchange rate swings even more than does the rational kind of speculation considered earlier.[19]

Of course there are other ways in which expectations might fail to be rational. But those that have been detected empirically do not necessarily imply greater volatility for the exchange rate. For example, the fairly common finding that this period's prediction error is correlated with last period's prediction error could be symptomatic of the persistent tendency, just discussed, to overestimate the speed of return to equilibrium as easily as the reverse.[20] Perhaps some sort of failure of rational expectations does explain those short-term fluctuations in the spot rate that our models are incapable of explaining. But it seems less likely that expectations could explain large swings like the 1980-83 overvaluation of the dollar. In particular, if one accepts that the positive interest differential reflects a market expectation of future dollar depreciation (i.e., if one accepts the absence or small size of the risk premium), the conclusion seems inescapable that speculators are damping the dollar overvaluation rather than exaggerating it. The fact that the expectation of depreciation has proven ex post to have been premature (and perhaps even ex ante

irrational) only strengthens the argument that the value of the dollar in 1980-82 was lower than it would have been if speculators had accurately foreseen its 1983 value.

V. OVERVALUATION DUE TO SPECULATIVE BUBBLES

Theory of Bubbles with Crashes

The previous section's discussion as to whether the market overestimates the speed with which the spot rate moves toward long-run equilibrium left aside the possibility that the market expects the spot rate to move in the opposite direction from long-run equilibrium. Such expectations could even be rational if the spot rate does in fact turn out to move in the opposite direction from equilibrium. This is the possibility of the speculative bubble.

Theorists have long been pestered by the saddle-path stability problem when solving perfect foresight problems. That is, there is an infinite number of paths that satisfy the condition that expectations are correct, only one of which constitutes a stable path toward the equilibrium that is based on fundamentals alone. The typical strategy has always been to rule out the explosive solutions by assumption.[21] This strategy has seemed justified by the observation that there in fact have been relatively few episodes in history that one would want to nominate for "speculative bubble," and none that did not eventually come to an end. As soon as one admits that any bubble must eventually come to an end, it might seem that rational expectations would prevent them from ever getting started in the first place.

But there has been an exciting new theoretical development in this area. The development is a recognition that one can easily build in at each point in time a probability of the collapse of the bubble and the return to fundamentals equilibrium. (Of course when a bubble collapses, the market price could in theory jump to any of an infinite number of other rational expectations paths. But if each speculator is always guessing which path all the other speculators are expecting, it seems likely that only two paths have finite probability at each point in time: the stable path and whatever path the asset price has previously been on.) In the event of non-collapse, the rate of appreciation will have to be that much greater in order to balance out the possibility of collapse and give proper ex ante expected appreciation (equal to the forward premium or foreign-domestic interest differential in the case of risk-free exchange rate models).[22]

What is exciting about this development is that it allows us to think about speculative bubbles getting started and bursting in the real world. Even if the probability of collapse is taken as exogenous and constant, it is a fact that every Blanchard bubble will come to an end eventually. Furthermore, one might attempt to model the probability of collapse endogenously and to model the actual random event of collapse as the outcome when speculators (rationally) see the probability of collapse rise above some (arbitrarily specified) critical level. The stochastic element

would have to come in through asset supplies or through non-speculative components of asset demands. If one introduced risk-aversion into the model, one could even get the result that the current probability of collapse would be greater the longer the bubble had gone on, because the risk from holding the currency would be greater the farther from fundamentals equilibrium the currency has diverged. With sufficiently high risk-aversion, one could get the result that the actual exchange rate would lie arbitrarily close over time, by some metric, to the equilibrium path based on fundamentals.

These considerations suggest the possibility that small-scale speculative bubbles may be going on all the time. These may be the "runs" that market participants report on an hourly or daily basis. They may even be the large serially correlated deviations that plague our fundamentals models on a monthly basis.

Long-term Overvaluation or Short-term Volatility?

Could a speculative bubble explain the high 1980-83 value of the dollar? For an asset to be subject to a single prolonged bubble, it is not enough that it be overvalued. It must be increasingly overvalued over time; furthermore the overvaluation must be accelerating over time if there is a perceived probability of collapse, in order to counterbalance the increasingly large distance that it might fall. However, it may be difficult to spot such a trend with the naked eye. In the first place, even if there

is an obvious trend in the value of the currency, it could be due to fundamentals. One would have to do something like the sophisticated bubbles test of Flood and Garber (1980).[23] In the second place, and more relevantly, even if there is no trend in the value of the currency, a positive interest differential could itself represent a "bubble," as Dornbusch (1982a, pp. 15-16) ingeniously points out. For example a 20-percent probability of a crash per year and a five point interest differential would be enough to sustain an overvaluation of .05/.20 = 25 percent!

I can think of three objections to the idea that the, say, 25 percent real overvaluation of the 1983 dollar is entirely due to a speculative bubble. First, even a 20-percent probability of a crash would make more than three years without a crash not particularly likely ($.80^3 = .51$), and the actual nominal interest differential has been, if anything, <u>less</u> than 5 percent against most countries, actually falling to zero by late 1982 against Germany and Japan. Second, it is still the case that a bubble requires that the overvaluation be increasing (and at an accelerating rate) over time. For the observed exchange rate to be constant, this just means that the fundamentals path must constitute depreciation at the rate of the interest differential. That is no problem, in light of the overshooting models that were seen in section III to follow from short-run fundamentals. But it does in itself concede that much of the 25 percent real overvaluation is taken up by the short-run fundamentals, which leaves only a fraction to be taken up by a possible bubble.

The third argument, though subtle, follows from an obvious fact. A single bubble is in theory a smooth path, whereas exchange rates, as we have noted, undergo wild short-term fluctuations. Of course a path based on a single set of fundamentals is also in theory smooth, but it is easy to posit a perpetual inflow of bits of information, pertaining to monetary policy or other fundamentals, that displace that path. In the case of a single speculative bubble, it would seem that any event that jolted the asset price off its previous smooth path would send it crashing all the way to the fundamentals path. We could argue that it jumps to another nearby bubble path, but then we must abandon our framework in which the choice at each point in time is between whatever path we have previously been on and the fundamentals path. In that case, what determines which of the infinite number of bubble paths is the one to which the market jumps? We could imagine some variable that is fundamentally irrelevant but that speculators pay attention to nonetheless; each new bit of information about that variable would then displace the asset price to a new nearby bubble path. But until someone convincingly models such a process, it seems more realistic to assume that when a bubble bursts the asset price returns to the fundamentals path. This does not mean that bubbles do not occur, perhaps frequently. It just means that they are more promising as an explanation of short-term movements in the neighborhood of the fundamentals path than as an explanation of prolonged overvaluation.

Thus we are led to the same conclusion regarding speculative bubbles as we arrived at regarding irrational expectations. They may exist, and they may account for some of the wild short-term fluctations that have characterized floating rates and that introduce large monthly error terms into our exchange rate equations based on fundamentals. But they do not account for large long-terms swings. For that we have our models based on monetary policy and other fundamentals. For the remainder of this paper we will take as given that the 1980-83 strength of the dollar has been due to restrictive monetary policy, as in the models of sections II and III.

VI. THE WELFARE EFFECTS OF OVERVALUATION

Effects of Short-Term Uncertainty

Each of the possible interpretations of overvaluation considered above dealt with questions of what determines exchange rate movements. None addressed the question of the effects of exchange rate movements. Indeed the literature has lavished attention on the former question to the neglect of the latter. We now turn to the "value judgment" implicit in the term "overvaluation," that is, to the welfare effects of exchange rate variability.

If we rule out the first and fourth definitions of overvaluation, barriers of portfolio adjustment and irrational expectations, we have the property of market efficiency. But the

proposition that financial markets are efficient in this technical sense tells us nothing about whether resources are effeciently allocated in the economy. Even if we also rule out speculative bubbles, which leaves us with dynamic based only on Dornbsuch overshooting or other short-run fundamentals, there is no guarantee that these exchange rate movements are desirable. Whenever we admit macroeconomic considerations like sticky goods prices, all optimality theorems derived from a perfect Arrow-Debreu world are off. We cannot even argue that, given inefficiences in goods markets, welfare is necessarily higher with "efficient" capital markets than without them. Dornbusch (1982b, p.21) writes, in defense of an interest equalization tax, that such an argument

> mistakes the short-term money market rate for the social productivity of capital. Suppose a country reduces money growth and this leads to an increase in the interest rate on financial assets, as it will. Incipient capital flows will lead to currency appreciation and a current account deterioration financed by borrowing abroad. It is hard to argue that the current account deficit is a reflection of enhanced investment opportunities or increased time preference that, in an efficient and integrated capital market, would call for a redirection of lending toward the home country. On the contrary, the decline in demand will have reduced the profitability of domestic real capital. Once we admit that monetary policy exerts real effects, in particular on unemployment, there is little base for the view that any kind of tax is a bad tax. We consider first short-term exchange rate variability.

Before floating exchange rates become a reality, the major argument against them was that they would make international trade and investment riskier. For example, the importer with an obligation to pay a certain amount of foreign currency in 90 days

would not know how much it was going to cost him in domestic currency. This argument is why this paper has devoted so much attention to exchange rate volatility. One counter-argument was that the importer could buy the foreign currency on the forward exchange market if he wished to protect himself against exchange risk. Friedman (1953) expected that under floating rates, an active forward exchange market would develop in response to the need. In terms of the volume handled by the forward exchange market and the number of currencies covered, this has happened. On the other hand, transactions costs as represented by the bid-ask spread have increased, due to the increased risk faced by banks who take an open position even for only a few hours. The other component of the cost of forward exchange, the risk premium that separates the forward rate from the expected future spot rate, may also have gone up; but as mentioned in section IV, the risk premium seems to be too small to show up empirically.

It is worth noting in passing that if importers in the United States must pay a forward price for pounds greater than the expected future spot price, as the cost of hedging their future pounds payments, importers in Great Britian will be paying a forward price for dollars less than the expected future spot price, as the cost of hedging their future dollar payments.[24] If the risk premium is a negative factor for U.S. imports, it is a positive factor for British imports.[25] But the risk premium is determined in a market equilibrium in which somebody (speculators, in the old

Tsiang (1959) trichotomy) must be compensated for taking an open position. The forward price for dollars will be less than the expected future spot price only if there is on net a positive open dollar position that must be held. In the old trade flow approach, this will be the case if Britian runs a positive trade surplus.[26] But if Britian runs a surplus, the U.S. imports for which the risk premium is a negative factor are larger than the British imports for which the risk premium is a positive factor. Exchange risk on net discourages trade, which is the result we would expect.

Hooper and Kohlhagen (1978) conclude that increased short-term exchange rate uncertainty has not had a significant negative effect on the volume of world trade. The subject deserves further study. But current detractors of floating rates seem to be less concerned with short-term exchange rate uncertainty than with the large long-term swings that exchange rates have experienced, such as the dollar overvaluation. Kenen beleives "There has been too much emphasis on short-term instability...the medium-term swings in exchange rates, nominal and real, have done more damage..." (in Bergsten et al., p. 38). Dornbusch (1982a, p. 29) sees "no very good case why small noise in the market should be smoothed" in contrast to a "massive disturbance such as the dollar appreciation of 1980-82."

Effects of Long-term Overvaluation Arising from Monetary Contraction

Of course even if we restrict ourselves to the welfare effects of long-term fluctuations, there is an enormous amount to be said.

Here I will limit myself to one particular point.[27] I will take as given the conclusion that the cause of the 1980-83 dollar overvaluation was a contractionary monetary policy initiated in the United States at the end of 1979 in order to fight inflation. (I do not here pass judgment on whether it has been worth the cost.) The price of bringing down inflation will in any case be lost output and high unemployment. Clearly the appreciation of the dollar has further hurt output and employment in the U.S. export and import competing sector. The question is whether the appreciation makes the terms of the aggregate U.S. tradeoff between output and inflation better or worse than it would otherwise have been.

The appreciation of the dollar has also meant higher import prices for our trading partners, to whom we will for simplicity refer as Europe. To avoid losing ground in their own fight against inflation, the Europeans have felt it necessary to match the U.S. contraction part way, with a monetary contraction of their own as measured, for example, by real interest rates. They complain that the dollar appreciation has made them worse off. Thus a second question is whether th dollar appreciation makes the terms of the aggregate European tradeoff between output and inflation better or worse.

Dornbusch (1982a, p. 31) makes the extreme claim: "There is no sensible argument that tightening of money should involve as a desirable side effect a loss of exports [and] an increase in

imports...Because these side effects are undesirable, both here and abroad, we should attempt to the maximum possible extent to immunize the world economy against these spillovers." I will here take the opposite position that, given the U.S. monetary contraction, both in the United States and in Europe, welfare is higher with an appreciation of the dollar than it would be if the exchange rate had not changed, in the sense that in each country the terms of the output-inflation tradeoff are more favorable.

The key assumption needed to derive this conclusion is that within each of two sectors, an exportable sector and a nontradeable sector, the tradeoff between inflation and output is concave. At high levels of unemployment and excess capacity, demand expansion goes relatively more into output and less into the rate of price increase. Closer to potential output, demand expansion goes relatively more into the rate of price increase and less into output. It then follows that if we are interested in maximizing aggregate output and minimizing average inflation economywide, it is best if the level of demand is shared equally by the two sectors. If we decided to contract to fight inflation, we should contract equally in the two sectors. If we were to contract more in the non-tradable sector, then the marginal benefit to contraction in exportables, in terms of the reduction in inflation per unit of lost output, would be greater than the marginal benefit to contraction in the nontradeable sector. This imbalance is precisely what would happen if the United States contracted without

allowing the dollar to appreciate. High real interest rates would cut demand for housing and other non-traded goods and services, but autos, steel, agriculture and other tradable goods would be buoyed by foreign demand. Allowing the dollar to appreciate has meant that the tradable sectors have shared equally in the misery.

Now for the effect on Europe. It is not enough to observe that floating rates will not fully insulate Europe from a U.S. contraction or even to identify what the impact on a passive Europe would be.[28] European governments will react to the disturbance by resetting their policies so as to return as closely as possible to their chosen combination of output and inflation. If the exchange rate were somehow kept fixed when the United States contracted, the Europeans would suffer a loss in export demand and would find themselves at lower levels of output and inflation than desired (assuming that they were previously at their optimum). They would respond by policies to increase expenditure.

The European expansion would be concentrated relatively more in their non-tradable sector. To achieve a better balance between their two sectors, their currencies must depreciate against the dollar, thus making their tradables sector more competitive. Fortunately this is exactly what is best for the U.S. tradeoff as well and is what in fact happens anyway if the foreign exchange market is left undisturbed![29] Often-expressed concerns about divergent national policy interests apply to the levels of expenditure chosen by each country, but, given those levels, <u>not</u> to the exchange rate.

Of course there is no guarantee that the actual dollar appreciation that has occurred is of the optimal magnitude. It could be too big or too small. To compare the actual and optimal changes in the exchange rate it would be necessary to specify a complete model of exchange rate determination, to make assumptions about foreign exchange intervention practices and the monetary/fiscal policy mix, and to come up with estimates of the parameters in the model and of the elasticities of demand for tradables and non-tradables. The relatively model-free argument made here has the more modest objective of establishing that some degree of appreciation is desirable.[30]

VII. CONCLUSION

This paper has taken an optimistic view of floating exchange rates, relative to other observers who sound discouraged on the state of the science and positively alarmist on the state of the international economy. It is appropriate to quality that optimism in this conclusion.

On the state of the science, any substantive optimism would be misplaced. After ten years of constructing theories and running regressions, we still have very little idea what causes monthly movements in exchange rates, let alone daily or hourly fluctuations. Our fundamentals models may be correct when it comes to yearly movements. And these are, after all, the most important. But further research is clearly necessary to understand

shorter-term fluctuations, if for no other reason than so that economists are not forced to ask the public to take their models on faith, but can show them hard evidence, such as some predictive ability.

On the state of the economy, nothing here is meant to minimize the pain being suffered, partly at the hands of the overvalued dollar, by autos, steel, agriculture, and other U.S. industries that must compete internationally. As successful as the 1980 and 1981-82 recessions have been at reducing inflation, the cost seems to me to have been excessive. But the cause has been reduced money growth and high real interest rates. When judging the performance of the exchange rate, one must take as given the decision to contract to fight inflation, which after all seemed to be the national consensus at the beginning of this period. The overvaluation of the dollar has been nothing more than the natural concomitant of that monetary contraction.

FOOTNOTES

1. The references for the original flexible price monetary model are Frenkel (1976), Mussa (1976) and Bilson (1978).

2. Source: Economic Report of the President, 1983, p. 66.

3. Source: International Economic Conditions, Federal Reserve Bank of St. Louis.

4. Exceptions might be made for France and other countries with effective capital controls, though even then one can sometimes define an unofficial or financial rate, different from the official or commercial rate, at which local residents can obtain foreign assets.

5. Danker (1983) finds that the Japanese propensity to lean against the wind still held as of December 1980 and that, far from acting to depress the value of the yen, they intervene more strongly on the support side.

6. See, for example, Junz and Rhomberg (1973).

7. Credit for first applying the portfolio-balance model to the international context goes to Branson (1977), Girton and

Henderson (1977), Black (1973), and Kouri (1976). The latter two introduced rational expectations into the model. If the degree of speculation is defined as the degree of responsiveness to expected depreciation, i.e. the degree of bond substitutability, then its effect on exchange rate volatility depends on the source of the disturbance. See, for example, Driskill and McCafferty (1980).

8. In this case, what matters is again the cumulated (positive or negative) claims on foreigners. But the exchange rate is no longer the price of foreign assets, because they may be denominated in foreign currency and so cannot be determined by the valuation effect. Instead the long-run exchange rate must equilibrate the current account, and today's exchange rate is determined by expectations and the long-run anchor.

9. These two ways of getting the current account into the monetary model are implemented empirically by Hooper and Morton (1982) and Frankel (1982a).

10. This is the point about the "news" re-emphasized by Dornbusch (1980) and Frenkel (1981).

11. I have in mind for the 1973-1977 period the sticky-price monetary model with secular inflation in Frankel (1979b) and

for the period through 1980 the integrations of the current account into the model cited in footnote 8.

12. See Frankel (1983a) for dismal econometric results of this sort (and for a general survey of asset-market models of exchange rate determination).

13. There is always danger of oversimplification. Other factors, like the decline in oil prices, played a role. On the other hand, one can view the decline in the dollar price of oil as another effect of the U.S. monetary contraction, via both a fall in worldwide income and the appreciation of the dollar.

14. However, the structural models still do worse than the random walk for some other possible parameter values.

15. Engel and Frankel (1982).

16. To cite one paper for each problem: Hansen and Hodrick (1980), Krasker (1980), and Engel (1983), respectively.

17. Frankel (1982c).

18. See Tryon (1979) and Bilson (1981a, b). The finding in Meese and Rogoff (1983a) and Frankel (1980) that the forward rate is

often no better a predictor than the logged spot is closely related to the finding that the regression coefficient described in the text is less than one.

19. In Frankel (1983b) I demonstrate formally, in the Dornbusch overshooting model, that if the market overestimates the future rate of change of the exchange rate, the degree of volatility is less than it would be under rational expectations. A smaller increase in the current value of the currency becomes sufficient to generate the expected future depreciation necessary to offset a given interest differential, so overshooting is less extreme.

20. Among those finding serial correlation in prediction errors are Frankel (1930), Hansen and Hodrick (1980), and Cumby and Obstfeld (1981).

21. In the literature on exchange rate determination, examples are Mussa (1976) for the flexible-price monetary model, Dornbusch (1976) for the flexible-price monetary model, and Kouri (1976) for the portfolio-balance model.

22. Blanchard (1979).

23. Flood and Garber conclude that the German hyperinflation of 1921-23 was due to fundamentals-excessive money growth--not a

speculative bubble. Note, incidentally, that the sort of test that Flood and Garber develop could not be used to detect a situation in which bubbles are frequently forming and collapsing.

24. I have phrased the point under the assumption that exports are denominated in the currency of the producing country. To the extent that they are denominated in the currency of the importing country, it is the exporter who must hedge, by selling foreign exchange forward. If U.S. exporters are able to sell pounds at a forward price greater than the expected future spot price, so that the risk premium is a positive factor for U.S. exports, it will go the other way for British exporters. The same analysis applies as in the text.

25. There is an ambiguity due to Jensen's inequality: the pound/dollar forward rate will be less than one over the expected future dollar/pound spot rate, but the latter is not the same as the expected future pound/dollar rate. There are two ways around this problem. We can measure expected values in terms of purchasing power over a basket of goods assumed common to residents of both countries--see, for example, Frankel (1979a). Or, in the more realistic case in which residents of each country have a preferred habitat in their local currency, we can assume that the risk-premium is large

enough to outweight Jensen's inequality, which will be the case if the coefficient of risk-aversion exceeds one--see, for example, Krugman (1981).

26. In the modern stock approach, it will be the case if the net supply of dollar-denominated debt is large relative to pound-denominated debt. This could be interpreted as a positive cumulative trade surplus for Britian, if Americans deal in assets or liabilities denominated only in dollars. More generally, it is the net supplies of outside assets--government debts corrected for foreign exchange intervention--that matter most (see, e.g., Frankel (1979a)). But cumulated current accounts also enter to the extent that residents of each country have a preferred habitat in local currency (see Dornbusch (1983) and Frankel (1982b)).

27. The argument that follows is formalized in Frankel (1983c).

28. See Mussa (1979) for a review of the role of capital mobility and other possible complications in invalidating the old view that floating rates insulate a country from foreign disturbances.

29. If their currencies depreciate enough, the proper European policy response is to decrease rather than increasee expenditure, as they have done.

30. However, from 1979 to 1981 the change in employment in 14 non-traded U.S. industries was almost indentical to the change in employment in the (non-agricultural) economy as a whole. This suggests that the appreciation of the dollar that actually occurred may have been about right. See Frankel (1983c).

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FLEXIBLE EXCHANGE RATES: THE STATE OF RESEARCH AND IMPLICATIONS FOR MACROECONOMIC POLICY

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The last decade of floating exchange rates witnessed a growing interest in the operation and the determinants of exchange rates as well as in the relation between exchange rates and macroeconomic policies. This growing interest has been shared by both academic economists as well as policy makers. The large volatility and the unpredictability of exchange rates coupled with poor macroeconomic performance have stimulated a reexamination of prevailing theories and concepts. This paper reviews some of the central issues concerning the economics of exchange rates. The organization of the paper and the range of issues that are discussed correspond to the list of questions provided by the U.S. General Accounting Office.

I. The State of Research

Over the past decade, research on the economics of exchange rates has proceeded in two major directions. The first has been concerned with the empirical performance of various parity conditions and the second has been concerned with the developments of alternative models of exchange rate determination and with the empirical verifications of these models.

I.1 The Parity Conditions

There are three key parity conditions that have been the focus of much research. The first is the purchasing power parity (PPP) which links the evolution of exchange rates to the evolution of domestic and foreign prices; the second is the interest rate parity which links the evolution of exchange rates to the evolution of domestic and foreign rates of interest; and the third is the expectational parity which links the evolution of realized spot exchange rates to the evolution of past forward rates.

I.1.i The Purchasing Power Parity

The PPP doctrine is typically presented in two versions: the absolute version and the relative version. The absolute version states that the equilibrium exchange rate between domestic and foreign currencies equals the ratio of domestic to foreign price levels. The relative version of the doctrine relates equilibrium changes in exchange rates to changes in the ratio of domestic to foreign prices.

The intellectual origins of the doctrine can be traced back to the early part of the 19th century and its more recent revival owes much to Cassel's writings mainly during the 1920's. Much of the controversies concerning the usefulness of the PPP doctrine is due to the fact that the doctrine does not specify the precise mechanism by which exchange rates are linked to prices. Rather, the PPP doctrine may be viewed as a short-cut; it specifies a relationship between two variables without providing the details of the process which brings about such a relationship. As a result, the doctrine has been subjected to different interpretations. While some have argued that it provides a theory of the determination of exchange rates which may be used as a guide for policies, others have viewed it as postulating an equilibrium relationship that leaves much to be explained.

Empirical studies of the PPP doctrine start by expressing the PPP relationship as

$$(1) \qquad \ell n\, S_t = a + b\ell n(P/P^*)_t + u_t$$

where S_t and $(P/P^*)_t$ denote, respectively, the exchange rate (defined as the price of foreign exchange in terms of domestic currency), and the ratio of domestic to foreign price indices (with an asterisk denoting quantities per-

taining to the foreign country) and where u_t denotes an error term. The formulation in equation (1) corresponds to the absolute version of PPP. The corresponding relative version of PPP can be written as

$$(2) \qquad \Delta \ell n S_t = b \Delta \ell n (P/P^*)_t + v_t$$

where Δ denotes the first difference operator and where v_t denotes an error term.

From the empirical viewpoint several issues may be raised: (i) what price index should be used in equations (1)-(2)? (ii) are the data consistent with the hypothesis that b=1? (iii) is the constant term in the relative version of PPP zero as implied by equation (2)? Further refinements also examine whether the coefficients on domestic and foreign prices are equal to each other (in absolute value) as implied by the specification of equations (1)-(2).

The empirical record of the PPP doctrine has been mixed. While the theory performed reasonably well during the various experiences of the 1920's, it has failed dramatically during the current 1970's-1980's experience. During the past decade changes in exchange rates have not mirrored the differences in national inflation rates; rather, nominal exchange rate changes have been associated with large changes in real exchange rates.

Several explanations have been suggested for the apparent collapse of PPP in recent years. The first deals with the choice of the proper price index that should be used in PPP computations. Of course, when the structure of relative prices in the economy remains stable, as is likely to be the case when most of the shocks are of a monetary origin, the choice of the price index is immaterial. On the other hand, when there are real shocks which alter relative prices, the choice of the price index becomes crucial.

To illustrate, suppose that the domestic and the foreign aggregate price levels are a linear homogeneous (Cobb-Douglas) function of the prices of non-traded goods, P_N, and of traded goods, P_T, like in equations (3)-(4):

$$(3) \qquad P = P_N^{\beta} P_T^{1-\beta}$$

$$(4) \qquad P^* = P_N^{*\beta^*} P_T^{*1-\beta^*}$$

where β and β^* denote domestic and foreign expenditure shares on non-traded goods. From (3) and (4) the ratio of the prices of traded goods can be written as

$$(5) \qquad \frac{P_T}{P_T^*} = \frac{(P_T/P_N)^{\beta}}{(P_T^*/P_N^*)^{\beta^*}} \frac{P}{P^*} \quad .$$

Equation (5) links the relative price of traded goods to the ratio of the price levels through terms which summarize the internal price structures in the two economies. Suppose now that the formulation of purchasing power parities in equations (1) and (2) applies only to <u>traded</u> goods (so that S equals (P_T/P_T^*) plus an error term). Using equation (5) and adding a constant term yields

$$(6) \qquad \ell n\, S_t = a + \beta \ell n(P_T/P_N)_t - \beta^* \ell n(P_T^*/P_N^*)_t + \ell n(P/P^*)_t + u_t$$

or, assuming for expository purposes, that $\beta=\beta^*$, this becomes

$$(7) \qquad \ell n\, S_t = a + \beta \ell n\left(\frac{P_T/P_N}{P_T^*/P_N^*}\right)_t + \ell n(P/P^*)_t + u_t \quad .$$

A comparison of equation (7) with (1) reveals that when the internal relative price structure remains stable, its neglect would not affect the relationship

between the exchange rate and the ratio of aggregate price indices and its only influence would be confined to the estimate of the constant term. If, however, relative price structures do vary, then it is crucial to incorporate them explicitly into the PPP equations, and their omission introduces a specification bias. Empirical work which has allowed for changes in the structure of relative prices, has been able indeed to account for a significant part of the deviations from PPP.

A second explanation for the recent collapse of PPP focuses on the role played by net capital flows and large current account imbalances. The association between the deviations from PPP and the size of the current account can be illustrated in terms of the formulation in equations (3)-(4) and a specification of the link between the current account balance and the equilibrium relative price of traded goods. The current account surplus (T) equals the excess of income over spending and equilibrium in the market for non-traded goods implies that the relative price of traded goods depends positively on the excess of income over spending. Equations (8)-(9) describe this dependence where it is noted that $T=-T^*$.

$$(8) \qquad \ell n(P_T/P_N)_t = \gamma \ell n\, T_t$$

$$(9) \qquad \ell n(P_T^*/P_N^*)_t = -\gamma^* \ell n\, T_t$$

Substituting equations (8)-(9) into (5) and noting that $P_T=SP_T^*$, the deviation from PPP during period t can be expressed as

$$(10) \qquad \Delta_t = (\beta\gamma + \beta^*\gamma^*) \ell n\, T_t$$

where $\Delta_t = \ell nS_t - \ell n(P/P^*)_t$. Equation (10) expresses the deviations from PPP in terms of the surplus in the current account of the balance of payments. The dependence of the deviation Δ_t on the size of the current account depends on the shares of spending on non-traded goods (β and β^*) and on the elasticities of relative prices with respect to spending (γ and γ^*). In terms of this model, the deviations from PPP can be expressed in terms of variations in the relative price ratios (as exhibted by equation (6)); alternatively, these variations in relative prices are associated with variations in the current account surplus (equations (8)-(9)) which in turn are associated with deviations from PPP (equation (10)).

The third explanation for the collapse of PPP is based on an insight of the modern theory of exchange rates that yields the proposition that there is a fundamental difference between the characteristics of exchange rates and those of national price levels. This difference implies that, at least in the short run, exchange rate fluctuations would not be matched by corresponding price level fluctuations.

The central insight of the modern approach to the analysis of exchange rates is the notion that the exchange rate, being the relative price of two durable assets (monies), can be best analyzed within a framework that is appropriate for the analysis of asset prices. A key characteristic of the price of an asset is its strong dependence on expectations concerning the future. In an efficient market for assets, new information concerning the future is reflected immediately in current prices and thus precluding unexploited profit opportunities from arbitrage. The strong dependence of current prices on expectations about the future is unique to the determination of durable asset prices which are traded in organized exchange; it does not

characterize to the same extent the determination of prices of non-durable commodities (like fresh fish). The strong dependence of asset prices on expectations also implies that during periods that are dominated by "news" which induce frequent changes in expectations, asset prices exhibit large fluctuations. Since exchange rates are viewed as asset prices, they will also exhibit a relatively large degree of volatility during periods that are dominated by "news" which alter expectations. Since by definition the "news" cannot be predicted on the basis of past information, it is clear that by and large the fluctuations of exchange rates are unpredictable.

In contrast to these characteristics of exchange rates, aggregate price indices are not expected to reveal such a degree of volatility since they reflect the prices of goods and services which are less durable and therefore are likely to be less sensitive to the "news" which alter expectations about the future.

This distinction between commodity prices and asset prices is fundamental for interpreting the deviations from PPP. As is well-known, changes in commodity prices are serially correlated while changes in exchange rates are not. The "stickiness" exhibited by commodity prices need not reflect any market imperfection but rather it may reflect the cost of price adjustment which results in finite nominal contracts. Likewise it may reflect the results of a confusion between nominal and real shocks or between permanent and transitory shocks. This, in addition to the fact that commodity price indices are less sensitive to changes in expectations, imply that when there are frequent and significant changes in expectations as was certainly the case during the 1970's, exchange rates adjust immediately while commodity prices do not. Exchange rates reflect expectations about <u>future</u> circumstances

while prices reflect more present and past circumstances as they are embedded in existing contracts. This difference implies that large fluctuations of exchange rates are likely to be associated with large deviations from purchasing power parities and these large deviations reflect the intrinsic difference between commodity and asset prices. With this perspective the recent volatility of exchange rates and the associated departures from the predictions of the PPP doctrine are much less of a mystery; they reflect the volatile character of the 1970's which witnessed great turbulence in the world economy and large volumes of real shocks like the oil embargo, supply shocks, commodity booms and shortages, shifts in the demands for money and differential productivity growth. In addition, the 1970's witnessed great uncertainty about the future course of political and economic events which induced sharp and frequent changes in expectations.

I.1.ii The Interest Rate Parity

The second parity condition that has been subjected to empirical research is the interest rate parity. That theory states that the equilibrium forward premium on foreign exchange is

$$(11) \qquad \frac{F - S}{S} = \frac{i - i^*}{1 + i^*}$$

where F and S denote, respectively, the forward and spot exchange rates and where i and i^* denote, respectively, the domestic and the foreign rates of interest on securities that are identical in all respects except for the currency of denomination.

To gain an overall perspective on the performance of covered interest

arbitrage, Table 1 reports some descriptive statistics on the magnitude of the deviations from parity among various treasury bills as well as among securities that are traded in the Euro-market. Several inferences emerge from Table 1: (i) deviations from covered arbitrage among national treasury bills are not negligible; (ii) these deviations differ across securities: they are lower for arbitrage between U.S. treasury bills and the corresponding Canadian, British and German bills than for arbitrage between U.S. and Italian treasury bills; (ii) the deviations from covered arbitrage in the Euro-market are much smaller than the corresponding deviations among treasury bills; and (iv) the deviations tend to rise with the maturity of the arbitraged assets. These characteristics are not specific to the choice of the sample period or to the choice of currency of denomination; they were also documented for different periods and different currencies.

Several factors have been offered in accounting for the observed deviations from parity. These include differential tax treatment, differential risk, government controls, inelastic demand and supply schedules, transaction costs, time differential between observing a profit opportunity and executing the arbitrage activity, etc. As a general rule it has been found that once these factors (and most specifically transactions cost) are taken into account, covered interest arbitrage seems to have eliminated unexploited profit opportunities. While this relation between interest rate differentials and the forward premium on foreign exchange has been empirically robust, there is evidence that the cost of executing transactions associated with covered interest arbitrage has risen significantly during the recent decade of floating exchange rates.

TABLE 1

Deviations from Interest Rate Parity
Weekly Data: June 1973-December 1979

Securities	Maturity	Deviations with Absolute Value less than (in %)				Median Deviation (%)	Mean Absolute Deviation (%)
		0.3%	0.5%	0.75%	1.0%		
US-Canadian T.B.	3 month	76.7	92.7	99.1	100.0	0.11	0.21
Euro $-Euro $C	3 month	99.4	100.0	100.0	100.0	-0.06	0.07
	12 month	71.8	95.1	99.1	100.0	-0.19	0.23
US-UK T.B.	3 month	59.6	80.5	92.2	95.4	-0.13	0.32
Euro $-Euro £	3 month	96.2	98.8	99.4	100.0	-0.07	0.10
	12 month	66.0	85.2	95.4	98.0	-0.12	0.27
US-German T.B.	3 month	54.3	77.3	89.0	96.4	0.17	0.34
Euro $-Euro DM	3 month	99.4	99.7	100.0	100.0	-0.01	0.04
	12 month	95.6	99.1	100.0	100.0	0.01	0.10
US-Italian T.B.	3 month	23.8	38.9	49.2	56.6	-0.75	1.24
Euro $-Euro Lira	3 month	63.4	78.7	88.4	95.4	-0.20	0.32
	12 month	10.7	28.3	50.3	63.2	-0.74	1.10
US-Japan T.B.	3 month	48.2	66.2	80.4	89.4	0.03	0.62
Euro $-Euro Yen	3 month	99.1	100.0	100.0	100.0	-0.07	0.08
	12 month	63.6	86.6	97.7	99.1	-0.24	0.30

Note: The data are from the Weekly Review of International Money Markets, Harris Bank, Chicago.

I.1.iii Expectational Parity

The third parity condition that has been subjected to a vast amount of empirical examination is the expectational parity, i.e., a parity that links spot and forward exchange rates. This examination has typically been carried out within studies of the efficiency of the foreign exchange market.

If the foreign exchange market is efficient and if the exchange rate is determined in a fashion similar to the determination of other asset prices, we should expect current prices to reflect all currently available information. Expectations concerning future exchange rates should be incorporated and reflected in forward exchange rates. In examining this hypothesis the typical method has been a regression of the logarithm of the current spot exchange rate, $\ell n\ S_t$, on the logarithm of the one-month forward exchange rate prevailing at the previous month, $\ell n\ F_{t-1}$, as in equation (12).

$$\ell n\ S_t = a + b\ \ell n\ F_{t-1} + u_t \tag{12}$$

If the market for foreign exchange is efficient so that prices reflect all relevant available information, then the residuals in equation (12), u_t, should contain no information and therefore should be serially uncorrelated. Further if the forward exchange rate is an unbiased forecast of the future spot exchange rate (as should be the case under an assumption of risk neutrality), then the constant term in equation (13) should not differ significantly from zero and the slope coefficient should not differ significantly from unity.

In general, tests of foreign exchange market efficiency have focused on (i) the statistical properties of forward rates as predictors of future spot

rates, (ii) the time series properties of exchange rates and of deviations of exchange rates from past forward rates, (iii) the ability to improve on market forecasts of future exchange rates by using past spot and forward exchange rates and other publicly available information, and (iv) the capacity to make extraordinary profits by employing various trading rules. Tests of these questions along with tests of variants of equation (12) have been applied to different exchange rates in different time periods. These tests have not reached unanimous concensus concerning the narrow technical hypothesis of market efficiency, but the broader perspective of foreign exchange markets as asset markets has received considerable empirical support. Within this broader perspective, the poor forecastability of exchange rates does not indicate a failure of theory or market inefficiency. In fact, when the prime cause of fluctuations is new information, one may expect that lagged forward exchange rates (which are based on past information) are imprecise (even though possibly the best unbiased) forecasts of future rates.

The evidence lent support to this interpretation of exchange rate movements. If predicted changes in exchange rates can be measured by lagged forward premium, then a comparison between predicted and realized changes in exchange rates reveals that during the recent decade most of the changes in exchange rates were unpredictable. Only a small fraction of the actual changes in exchange rates were predicted by the lagged forward premium. This phenomenon is also reflected in the comparison between the variances of actual and predicted changes in exchange rates: Generally, the variances of monthly percentage changes in exchange rates exceed the variances of monthly forward premia by a factor that is larger than twenty. These facts suggest that the bulk of exchange rate changes seem to be due to "news" which, by definition, could not have been

anticipated and reflected in the forward premium or discount which prevailed in the previous period.

To further examine the role of "news" in determining exchange rate movements, we note that if the dominant factor underlying changes in exchange rates is new information which alters expectations about current and expected future exchange rates by approximately the same amount, then one should expect a high correlation between movements of spot and forward rates. This hypothesis is clearly supported by the evidence. Spot and forward exchange rates have tended to move together and by approximately the same amount. The correlations between spot and forward rates for the three pairs of currencies exceeded 0.99 and the correlation between the corresponding percentage changes of the spot and forward rates exceeded 0.96. These high correlations are consistent with the "news" hypothesis. They suggest that both spot and forward rates tend to respond at the same time to the same flow of new information.

I.2 Models of Exchange Rate Determination

Along side with studies of the performance of parity conditions, significant research efforts have been directed at the development and testing of alternative models of exchange rate determination.

Three of the popular models have been the monetary model, the portfolio-balance model and the current-account model. These models have typically been of small scale, and all have assigned a special role to expectations. The monetary model highlights the demands and supplies of domestic and foreign money. Applications of this model have focused on the determinants of the demands and supplies for money. In this context it became clear that the specification of

"closed-economy" demands for money may differ from the corresponding specification for an open economy with flexible exchange rates. As an empirical matter, many of the difficulties faced by domestic empirical money demand equations have been also faced by empirical exchange rate equations which employ estimates of money demand.

The portfolio-balance model recognizes that all rates of return and asset prices are jointly determined, and that when assets are not perfect substitutes to each other one needs to specify, in addition to the demands and supplies of money, the demand and supplies for other assets. In that expanded framework, the relative quantities of other assets influence the equilibrium exchange rates. One practical difficulty involved in testing such models involves the specification of the portfolio of assets and the availability of data on quantities and prices of the entire menu assets.

The current-account model, in its modern version, recognizes that if exchange rates depend on existing stocks of the various assets, then changes in these stocks should also influence exchange rates, since the current change in the stocks of assets determines the future size of the portfolio. The future portfolio determines the future exchange rate which, in turn, is linked to the current exchange rate through expectations. Thus, in this framework the evolution of exchange rates reflects the current account of the balance of payments.

The empirical testing of the various models produced mixed results. For example, during periods for which the main source of shocks has been of a monetary origin -- like the period of the German hyperinflation in Germany in the 1920's -- the monetary model performed very well. On the other hand, when applied to the 1970's its performance has not been satisfactory.

Likewise, the rest of the "structural" models have also resulted in mixed findings, Neither model outperformed the others systematically. Most recent examinations of the various models have found that in comparing out-of-sample fit of various structural models, the random walk model performs as any estimated models at one-to-twelve-month horizons for the major exchange rates during the 1970's. The structural models outperform the random walk model for out of sample horizons in excess of twelve months.

Based on that evidence it seems that for the purpose of forecasting, the usefulness of the structural models is confined to the longer term horizons rather than the short term. Furthermore, it is unlikely that the poor performance reflects poor econometric methods. Rather, it reflects the intrinsic characteristic of exchange rates which as asset prices are likely to be volatile and unpredictable.

It is important to note, however, that the fact that exchange rates are volatile and unpredictable should not be taken to imply that the effects of economic policies on exchange rates are unpredictable. On the contrary, the various structural models have taught us a great deal about the key "fundamentals" that are relevant for the determination of exchange rates, as well as about the channels through which parametric changes influence exchange rates and thereby also about the likely impacts of various policy measures.

I.3 Further Research Issues

Aside from the specific formulations of the various models, it is relevant to note that the past decade's research in open-economy macroeconomics marked a drastic shift in modeling methodology. By now it is understood

that proper modeling of open economy should not attach a foreign sector as an appendix to the otherwise closed economy model. Rather, it is now clear that the entire economic system operates in a different way once allowance is made for the openness of the economy, and, therefore, open-economy considerations should be incorporated in a consistent manner through the various layers of the open-economy macro model. It is noteworthy, however, that in spite of these advances, there are still numerous conceptual and technical issues that require further research. The following are examples of such issues.

I.3.i The Peso Problem

The first issue relevant for empirical research in the area of exchange rate determination may be referred to as the "Peso Problem." The original "Peso Problem" characterized the situation with the Mexican Peso which was eventually devalued during the third quarter of 1976. Since this devaluation was expected for several years, the Peso was traded at a forward discount in the market for foreign exchange. Obviously, as long as the devaluation did not take place, the forward exchange rate proved (ex post) to have been a biased forecast of the realized future spot exchange rate. But, once the devaluation took place it exceeded the prediction that was implied by the forward discount on the Peso.

Generally, the "Peso Problem" may be viewed as a situation in which there are many observations but much fewer events. For example, in Mexico's case, there were many days (observations) during which the forward discount prevailed, and yet there was only one event--the devaluation itself. These circumstances

affect the properties of the statistical distribution of rates of return and raise conceptual and practical difficulties for studies which attempt to examine the efficiency of foreign exchange markets and the biasness of forecasts of future spot rates based on lagged forward rates. Likewise in such circumstances it is not clear whether a rise in the number of observations in any sample, which is being brought about by a larger frequency of measurements, should be treated as a corresponding increase in the number of effective degrees of freedom. In a way the "Peso Problem" could be cast in terms of a small-samples problem and as such it has much wider application. However, since the foreign exchange market is strongly influenced by expectations of future events and of future policies, and sine current expectations of future change in policies (like a devaluation or a specific change in intervention policies) are based on probabilistic evaluations, it is evident that the "Peso Problem" is especially relevant in the foreign exchange market.

Another example that falls under the heading of the "Peso Problem" relates to the current price of gold. Studies of optimal portfolios have found little role for gold in the optimal portfolio of assets. One of the possible rationales for the observed holdings of gold can be provided by noting that current holdings and pricing of gold reflect the probability of a sharp rise in its price in the event of a fundamental change in the role of gold in the international monetary system. Again we have a situation where there are many observations but only one (or even no) event.

I.3.ii The Role of Innovations

The second issue relates to the role of innovations. One of the central implications of the rational expectations hypothesis is that

unanticipated events, "news," play a predominant role in affecting real variables and asset yields. This implication has been embodied in the modern theory of exchange rate determination. Accordingly, exchange rates are presumed to reflect current as well as expected future values of the relevant economic variables. The anticipatory role of exchange rates suggests that empirical research of exchange-rate determination should relate changes in exchange rates to the innovations in the relevant regressors. While this methodology has a strong theoretical justification, its empirical application is extremely complicated. Since the innovations are intrinsically unobservable, any empirical analysis involves the joint examination of the model as well as the measurement of the innovation (i.e., the measurement of the expected values which are used in the construction of the innovations). Since there is no practical way to avoid completely the joint-hypotheses problem, it seems that inference from empirical estimates should be made with great care.

A related difficulty also relates to the anticipatory nature of exchange rates and the prompt response of asset prices to new information. It concerns the implications of different frequencies of data collections for various time series. For example data on exchange rates and interest rates are available in a much greater frequency than data on national income or on the current account. These different frequencies of data availability are reflected in different patterns of revisions of expectations and may affect systematically the time series characteristics of the innovations of the various data.

I.3.III Structural Models

Recent examinations of the various structural models of exchange rate determination, including the monetary models, the portfolio-balance models,

the current-account models and others have shown that these models have not performed well in explaining movements in nominal exchange rates. With the benefit of hindsight it seems that the key reason for the poor performance of the various models is the intrinsic characteristics of exchange rates as asset prices. As indicated above, exchange rates are very sensitive to expectations concerning future events and policies. Periods that are dominated by rumors, announcements and "news" which alter expectations are likely to experience a relatively large degree of exchange rate volatility. Since by definition "news" cannot be predicted on the basis of past information, it follows that by and large the resulting fluctuations of exchange rates are unpredictable. In a way, this asset-market perspective suggests that we should not expect to be able to forecast accurately exchange rate changes with the aid of the simple structural models. The role of the simple structural models is to account for the systematic component of the evolution of exchange rates. In cases where the systematic predictable component is relatively small, we may expect to account for only a small fraction of the variability of exchange rates. A potentially productive line of research would examine the implications of the various structural models for the relation among the variance of exchange rates and the variance of the various "fundamentals."

I.3.iv Lucas' Critique

One of the central insights which has affected economic research during the past decade has been the "Lucas Critique". The key point of that critique is the observation that the behavior of economic agents reflects prevailing patterns of policies as well as agents' expectations concerning the future path of policies. As a result, policy actions which attempt to

exploit a correlation between two endogenous variables, e.g., the correlation between inflation and unemployment or the correlation between exchange rates and interest rates, may fail since the policy actions themselves might alter the structure of the relation between the two variables in a way that could not have been predicted from the historical correlations. Such an outcome is likely to occur when policies are based on reduced form relations rather than structural relations.

This critique is of course fundamental for the evaluation of the results of simulations based on parameter estimates that are obtained from historical data. It is pertinent to note, however, that as a practical matter the quantitative importance of Lucas' critique depends on the circumstances: it may be significant for some experiments while negligible for others. It certainly should not discourage further empirical research. Rather, it should encourage the use of an improved research methodology that takes into account the endogeneity of the "structural parameters."

These issues and others--like the treatment and identification of risk premia, the proper definition of money, the specification of the demand for money in an open economy, the relative degree of substitution among various assets and the role of portfolio balance in affecting exchange rates--remain at this point unresolved problems in exchange-rate analysis.

II. Exchange Rate and Macroeconomic Policy

This section deals with (i) the constraints that the openness of the economy and the exchange rate system impose on the effectiveness of macroeconomic policies, (ii) the meaning of foreign exchange intervention, (iii) the role that governments should play in influencing exchange rates and (iv) the role that exchange rates should play in influencing policy. The section concludes with some remarks on the causes of high real rates of interest and the strong dollar.

II.1 The International Constraints on Monetary Policy

Generally, macroeconomic policies for open economies differ in fundamentally important ways from the corresponding policies for closed economies. The openness of the economy imposes constraints on the effectiveness and proper conduct of macroeconomic policies in general, and of monetary control in particular. These constraints stem from the interdependence between the economy and the rest of the world. The open economy is linked to the rest of the world primarily through three key linkages: through international trade in goods and services; through international mobility of capital; and through international exchanges of national monies.

International trade links prices in different national economies. While the evidence on purchasing power parities reveals that this link is not rigid, it is evident that a country cannot choose its long-run trend in the inflation rate independent of the long-run courses of monetary policy and the exchange rate. This relation thus imposes a severe constraint on monetary policy.

International mobility of capital links interest rates on financial assets. In addition, by permitting countries to finance current-account imbalances, it provides for a channel through which macroeconomic disturbances are transmitted internationally. The international mobility of capital limits the power of monetary policy. Under a fixed exchange-rate regime, a monetary expansion in excess of money demand is likely to have only a limited success in sustaining the change in the nominal money stock. Any temporary reduction in the domestic rate of interest will induce capital outflow and a loss of foreign exchange reserves, and any attempts to sterilize the monetary consequences of the loss of international reserves is unlikely to be viable in

the long-run (more on this in Section (II.2). Under a flexible exchange rate regime the monetary authority regains control over the nominal money stock but the international mobility of capital still imposes a severe limitation on the ability of monetary policy to significantly affect the evolution of output and employment. A monetary expansion is likely to induce a rapid change in the exchange rate, which leads to prompt adjustment of prices and wages.

The implication of capital mobility on the efficiency of policies is illustrated in Figure 1 which highlights the role of portfolio balance and which describes the effects of open market operations under fixed exchange rates. Consider a portfolio which is composed of real cash balances M/P (where P denotes the price level) and common stocks, K, and let the price of a security in terms of goods be p_k. It is assumed that the ecconomy is small and fully integrated in world capital markets. As a result, since the foreign rate of interest is assumed to be given, the relative price of securities in terms of goods, p_k, is also assumed to be fixed for the small open economy. The price level for the small open economy, P, is assumed to equal SP* where S denotes the exchange rate and P* denotes the given foreign price. Thus, under fixed exchange rates the price level is given. The value of wealth, W, is thus

$$W = \frac{M}{SP^*} + P_k K \tag{13}$$

Suppose that the desired money/securities ratio depends negatively on the rate of interest as in equation (14).

$$\frac{M}{SP^*} = l\,(i) P_k\, K. \tag{14}$$

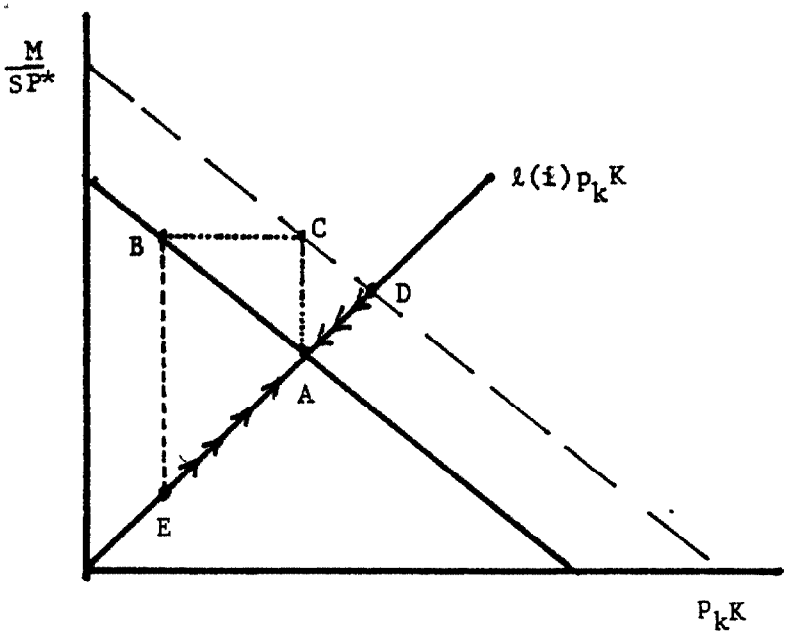

Figure 1: Portfolio Equilibrium and the Effects of Monetary Policy Under Fixed and Flexible Exchange-Rate Regimes.

Portfolio equilibrium is described by point A in Figure 1. The negatively sloped schedule describes the wealth constraint and the positively sloped schedule describes the desired composition of assets given the rate of interest. An open market purchase moves the economy from point A to point B at which the money supply has risen and the holdings of securities by the private sector has fallen. Since at point B the composition of the portfolio has been disturbed and since asset holders have access to world asset markets at the given rate of interest, they will restore portfolio equilibrium instantaneously by exchanging the increased stock of cash for foreign securities and thereby returning to point A. Thus, the fact that world capital markets are integrated and that open market operations are conducted in assets that are traded internationally at a given price, enables the private sector to nullify the actions of the monetary authority. In fact, in this case open market operations amount to an exchange of foreign exchange reserves for securities between the monetary authorities and foreign asset holders, and the entire process of adjustment is effected through the capital account of the balance of payments. The leverage of monetary policy can be somewhat enhanced if it operates in financial assets that are isolated from world capital markets since, in the short-run, the link between the rates of return on such assets with the world rates of interest is not as tight.

The same figure can be used for the analysis of a once and for all rise in the quantity of money that is brought about through an unanticipated transfer of cash balances which moves the economy from point A to point C. The impact of this policy is to raise the value of assets and to raise the relative share of money in wealth. Portfolio composition equilibrium is restored by an immediate exchange of part of the increased monetary stock for equities

as individuals move to point D. This exchange is effecterd through the capital account of the balance of payments. Since at D the vlue of assets exceeds the equilibrium value at A, individuals will wish to run down their holdings of both equities and real cash balances by increasing expenditures relative to income. This part of the process will be gradual. The transition towards long-run equilibrium follows along the path from D to A and is characterized by a deficit in the current account, a surplus in the capital account and a deficit in the monetary account of the balance of payments.

Under flexible exchange rates, adjustments of real balances occur through changes in the exchange rate. Using the same diagram the effects of monetary policies are very different. An open market operation which brings the economy from point A to point B in Figure 1 cannot be nullified through the capital account since under flexible exchange rates money ceases to be internationally traded commodity. Portfolio equilibrium is restored by an immediate rise in the exchange rate (i.e., a depreciation of the currency) which moves individuals from point B to point E. As may be seen, the percentate rise in the exchange rate exceeds the percentage rise in the money stock; this is the overshooting phenomenon. Since at E the value of assets falls short of the long-run equilibrium value, individuals will wish to accummulate both both equities and real balances by reducing expenditures relative to income. This part of the process will be gradual, and the transition from E to A is characterized by a surplus in the current account, a deficit in the capital account and an appreciation of the currency.[1]

[1] While these are the general characteristics of the adjustment process, the details of the precise path are somewhat more complicated since the expected transitional changes in the exchange rates will alter transitorily the rate of interest. Along the path between E and D the domestic currency appreciates and, if this appreciation is expected, the domestic rate of interest is below the world rate due to interest arbitrage. Therefore, during the transition period the desired ratio of money to equities will exceed the one described in Figure 1, and the initial depreciation will be somewhat smaller than the one indicated by point E. The new equilibrium is reached at point A when the exchange rate reaches its new level, and when the domestic and the foreign rates of interest are equalized.

In contrast, when the rise in the quantity of money is brought about through a transfer which moves the economy from point A to point C, the new equilibrium will be restored instantaneously through an equiproportionate depreciation of the currency which restores equilibrium at A.

The previous analysis of open market operations assumed implicitly that the returns on government holdings of securities are rebated to the private sector (in a lump sum fashion) but that the private sector does not capitalize the expected future flow of transfers. As a result the open market operations did not change the wealth position of individuals who moved from point A to point B along the given wealth constraint. Under the alternative assumption that asset holders anticipate and capitalize the flow of transfers and treat them as any other marketable asset, they effectively conceive of the equities that are held by the government as their own. In that case the open market purchase only raises the supply of real cash balances and moves the economy from point A to point C. The effects of this policy are identical to the effects of the pure monetary expansion that is brought about through the governmental transfer.

The analysis of these two extreme cases implies that when international capital markets are highly integrated, the effectiveness of the constraints on monetary policy under fixed and flexible exchange-rate regimes depends on the degree to which the private sector capitalizes future streams of taxes and transfers as well as on the marketability of claims to such streams. When such claims are not fully perceived by individuals or by the capital market, the effects of open market operations are nullified rapidly under fixed exchange rates while the adjustment is gradual under flexible exchange rates. In constrast, when

individuals and capital markets do fully perceive these claims, the adjustment to open market operations is only gradual when the exchange rate is fixed while it is rapid when the exchange rate is flexible. These cases illustrate that the ranking of alternative exchange-rate regimes according to the speeds of adjustments to monetary policies and the division of the adjustment process as between the current and the capital account, is not unambiguous since it depends on the mechanism of monetary policy and on the public's perception of such policies.

The international exchange of national monies and the requirement of monetary equilibrium also impose a severe limitation on the effectiveness of monetary policy. As stated before, under a fixed exchange rate regime the authorities lose control over the nominal money stock while under a flexible rate regime the requirement of monetary equilibrium ensures that in the long-run changes in the nominal money stock lead to a proportionate change in all nominal prices and wages. Because of the rapid change in the exchange rate, the constraint on monetary policy that is implied by the homogeneity postulate is likely to be manifested much more promptly in an open economy with flexible exchange rates than in a closed economy.

An additional consideration constraining the conduct of monetary policy follows from the dynamic linkage between current exchange rates and expectations of future exchange rates. This dynamic linkage implies that the effect of monetary policy on the exchange rate, and thereby on other economic variables, depends on its effect on expectations concerning future policies. These expectations, in turn, are influenced by the past and by the current course of policy, and it is likely that the mere recognition of this dynamic linkage will influence the conduct of policy. For the government, being aware that the effectiveness of any particular policy measure depends on the way by which it influences the

public's perception of the implications of the measure for the future conduct of policy, may become more constrained in employing the instrument of monetary policy.

In summary, the openness of the economy imposes constraints on monetary policy. These constraints are reflected in either a reduced ability to influence the instruments of monetary policy (like the nominal money supply under fixed exchange rates), or in a reduced ability to influence the targets of monetary policy (like the level of real output), or in an increased prudence in the use of monetary policy because of the potentially undesirable effects on expectations. Finally, it should be noted that while the above discussion focused on the constraints on monetary policy, similar considerations apply to fiscal policies. In fact, the overall government budget constraint provides the link among monetary policy, budgetary policy, and other manifastations of macro policies and this interdependence makes the distinction among the various policy instruments less sharp.

II.2 Foreign Exchange Intervention

The analysis of the international constraints on monetary policy is closely related to the analysis of the questions of whether the authorities can sterilize the monetary implications of the balance of payments and the monetary implications of interventions in the market for foreign exchange. In this context, however, the difficulties in analysing that question start with definitions since exchange-market intervention means different things to different people. Some, especially in the United States, interpret foreign exchange intervention to mean sterilized intervention, that is, intervention which is not allowed to affect the monetary base and thus amounts to an exchange of domestic for foreign bonds. Others, especially in Europe, interpret the intervention to mean nonsterilized inter-

vention. Thus, for the Europeans an intervention alters the course of monetary policy, while for the Americans it does not.

The distinction between the two concepts of intervention is fundamental and the exchange-rate effects of the two forms of intervention may be very different depending on the relative degree of substitution among assets. In principle, sterilized intervention may affect the exchange rate by portfolio-balance effects and by signaling to the public the government's intentions concerning future policies, thereby changing expectations. To the extent that sterilized intervention is effective in managing exchange rates, the constraint on the conduct of monetary policy would not be severe since the undesirable exchange rate effects of monetary policy could be offset by policies which alter appropriately the composition of assets. In practice, however, the evidence suggests that nonsterilized intervention which alters the monetary base has a strong effect on the exchange rate while an equivalent sterilized intervention has very little effect. These findings are relevant for both the theory of exchange rate determination and the practice of exchange rate and monetary policies. As to the theory, they shed doubts on the usefulness of the portfolio-balance model. As to the practice, they demonstrate that the distinction between the two forms of intervention is critical if the authorities mean to intervene effectively, and that it may be inappropriate to assume that the open-economy constraints on monetary policy can be easily overcome by sterilization policies.

The preceding discussion defined interventions in terms of transactions involving specific pairs of assets. In evaluating these transactions it might be useful to explore the broader spectrum of possible policies. Figure 2 summarizes the various pattern of domestic and foreign monetary policies and foreign exchange interventions. These policies are divided into three groups as follows:

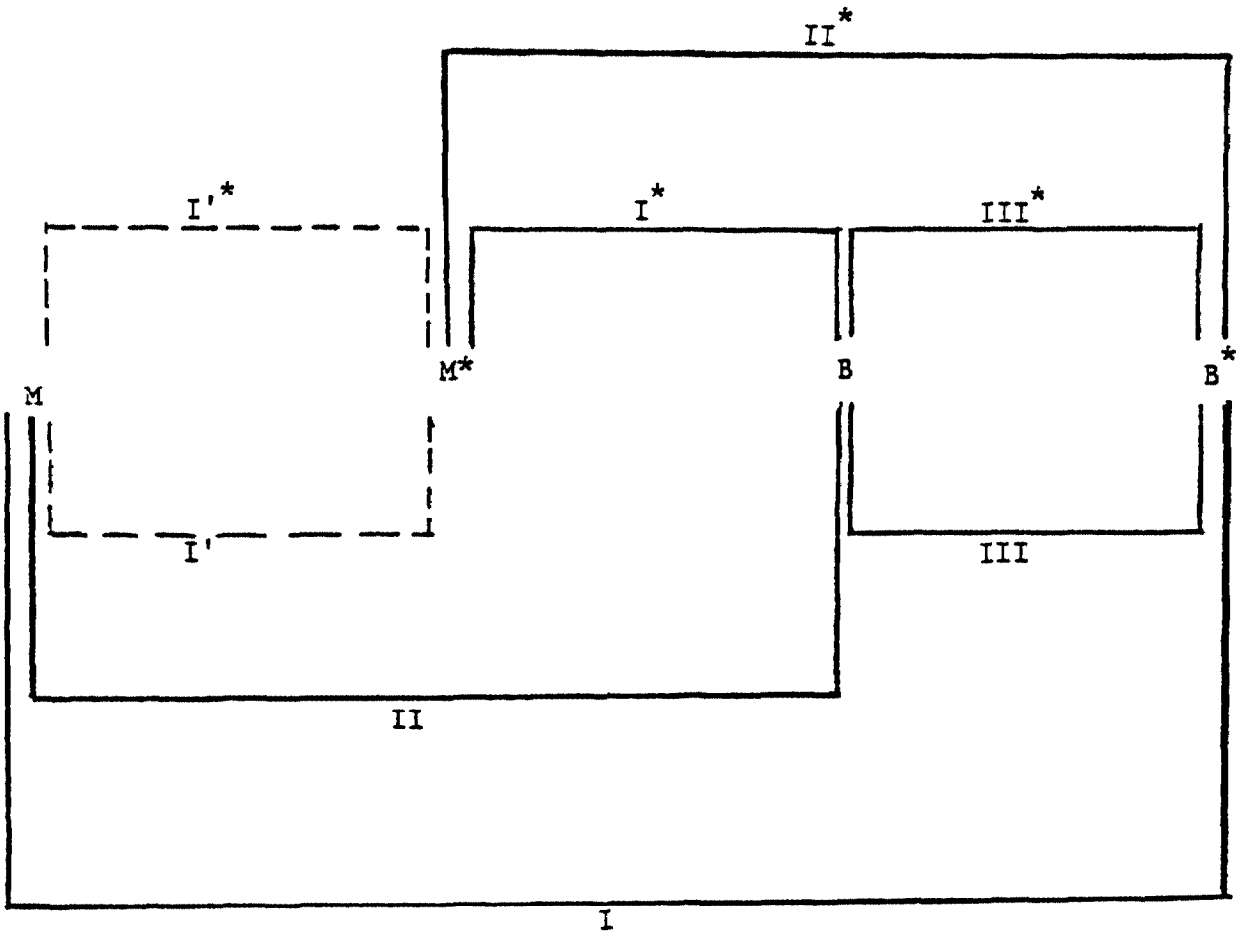

Figure 2: Patterns of domestic and foreign monetary policies and foreign exchange interventions.

I : Domestic nonsterilized foreign exchange intervention
I*: Foreign nonsterilized foreign exchange intervention
II : Domestic monetary policy
II*: Foreign monetary policy
III : Domestic sterilized foreign exchange intervention
III : Foreign sterilized foreign exchange intervention

This classification is based on the types of assets that are being exchanged. Thus, when the authorities exchange domestic money (M) for domestic bonds (B), the transaction is referred to as domestic monetary policy (as in II), while when the authorities exchange domestic bonds (B) for foreign bonds (B*), the transaction is being referred to as domestic sterilized foreign exchange intervention (as in III). Some have characterized pure foreign exchange intervention as an exchange of domestic money (M) for foreign money (M*) rather than the exchange of domestic money for foreign bonds. To complete the spectrum, this type of exchange is indicated in Figure 2 by I' and I'*, respectively.

The general classification highlights two principles. First, it shows that the differences between the various policies depend on the different characteristics of the various assets that are being exchanged. These different characteristics are at the foundation of the portfolio-balance model. Second, it shows that domestic and foreign variables enter symmetrically into the picture. Thus, for example, a given exchange between M and B* can be effected through the policies of the home country or through a combination of policies of the foreign country. This symmetry suggests that there is room (and possibly a role) for international coordination of exchange rate policies. It also illustrates the "(n-1) problem" of the international monetary system: in a world of n currencies there are (n-1) exchange rates, and only (n-1) monetary authorities need to intervene in order to attain a set of exchange rates. To ensure consistency the interna-

tional monetary system needs to specify the allocation of the remaining degree of freedom.

By and large, the evidence on the effectiveness of sterilized intervention has been based on a comparison between patterns I and III within a single-country framework. It is possible that some of the findings emerging from the single-country studies may be modified once the foreign countries' behavior is taken into account. But, until presented with such evidence, it is reasonable to conclude that it is very difficult to conduct effectively independent monetary and exchange rate policies.

II.3 How Should Governments Influence Exchange Rates?

The recent violatility of exchange rates and the accompanying large divergencies from PPP have been costly. They have resulted in social cost in that they generated capital gains and losses for holders of assets denominated in different national monies and presumably induced wealth holders to alter their behavior and expend resources in order to reduce risk. By interfering with the efficiency of the price system in guiding resource allocation, such volatility in real exchange rates may have also induced economically inappropriate patterns of production, consumption, and trade. Furthermore, the large changes in real exchange rates, the slow pace of world economic recovery, and the strong dollar have dangerously increased the popularity of protectionism and have also resulted in an increased perception that changes of exchange rates reduce the leverage of monetary policy. Attempts to alleviate some of these constraints have given rise to various proposals concerning rules for intervention in the foreign exchange market. Some of these proposals are variants of a PPP rule according to which the authorities are expected to intervene so as to ensure that the path of the exchange rate conforms to the path of relative price levels.

These proposals, if effective, amount to guidelines for the conduct of monetary policy.

There are at least four difficulties with a PPP rule. First, there are intrinsic differences between the characteristics of exchange rates and the price of national outputs. These differences, which result from the much stronger dependence of exchange rates (and other asset prices) on expectations, suggest that the fact that exchange rates have moved more than the price level is not, in and of itself, sufficient evidence that exchange rate volatility has been excessive. Exchange rate volatility should be assessed by comparison with variability of other asset prices, like securities. Viewed against this yardstick, the evidence shows that the variability of exchange rates has been about half that of the stock market indices. This, of course, does not mean that the volatility of either exchange rates or stock market indices has been acceptable but rather that the degree of volatility may not be judged as being excessive just by pointing at the fact that exchange rates have moved more than national price levels.

Second, the prices of national outputs do not adjust fully to shocks in the short run, and thus intervention in the foreign exchange market to ensure purchasing power parity would be a mistake. When commodity prices are slow to adjust to current and expected economic conditions, it may be desirable to allow for "excessive" adjustment in some other prices.

Third, there are continuous changes in real economic conditions that require adjustment in the equilibrium relative prices of different national outputs. Under these circumstances what seem to be divergences from purchasing power parities may really reflect equilibrating changes.

Fourth, if there is short-run stickiness of prices of domestic goods in terms of national monies, then rapid exchange rate adjustments, which are capable of changing the relative prices of different national outputs, are a desirable response to changing real economic conditions. An intervention rule which links changes in exchange rates rigidly to changes in domestic and foreign prices in accord with purchasing power parity ignores the occasional need for equilibrating changes in relative prices.

Having outlined the key limitations of a policy which adopts a rigid PPP rule, what is left of the usefulness of the PPP doctrine? Its main usefulness is in providing a guide as to the general trend of exchange rates, in particular in circumstances where the main shocks underlying the trend are of a monetary origin. As for the conduct of macroeconomic policy, it serves as an important reminder that the exchange rate and the price level cannot be divorced from each other and that policies which affect the trend of domestic (relative to foreign) prices are likely to affect the exchange rate in a similar manner.

Emphasis on the fact that exchange rates and prices are both endogenous variables is important in view of the recent allegations that flexible exchange rates have been inflationary during the 1970's and have slowed down the recovery from the beginning of the 1980's up to the present. Both exchange rates and prices respond to the same set of shocks and both can be influenced by a similar set of policies. The fact that exchange rates adjust faster than commodity prices reflects the known phenomenon that asset markets clear relatively quickly. This fact does not imply that as an economic matter the chain of causality runs from exchange rates to prices.

The recognition that exchange rate fluctuations reflect the underlying circumstances rather than creating them is fundamental. It implies that, for a given conduct of macroeconomic policy, the basic choice is not between

costly turbulence and free tranquility but rather between alternative outlets to the underlying turbulence. If the source of evil was the variability of exchange rates, then pegging the rate would have been the simple and the feasible solution. The experience with the Bretton Woods system indicates that this is not the case. One could argue, however, that the obligation to peg the rate would alter the conduct of policy by introducing discipline. Experience suggests, however, that national governments are unlikely to be disciplined by the exchange rate regime; rather, the exchange rate regime is more likely to adjust to whatever discipline national governments choose to have.

Further, as an analytical matter, it is difficult to make the case for transferring the effects of disturbances from the foreign exchange market, since there is no presumption that transfering disturbances will reduce their overall impact and lower their social cost. On the contrary, since the foreign exchange market is a market in which risk can easily be bought and sold, it may be sensible to concentrate disturbances in this market rather than transfer them to other markets, such as labor markets, where they cannot be dealt with in as efficient a manner.

The government can make a positive contribution to reducing costly and unnecessary fluctuations of exchange rates by reducing the variability of monetary expansion. This is especially important because exchange rates are affected not only by current policy actions but also by expectations about future policy actions. If these expectations are highly sensitive to current policy, then instability of policies can have a magnified effect on the variability of nominal and real exchange rates. This variability can be reduced by adopting a stable and predictable pattern of government policy.

II.4 How Should Exchange Rates Influence Policy?

What should be the role of the exchange rate in the design of monetary policy? Generally, given that monetary and exchange-rate policies should not be viewed as two independent instruments, consideration of the external value of the currency should play a relatively minor role in the design of monetary policy. The major consideration that should guide the monetary authority is that of achieving price stability.

While this prescription may seem to represent a revival of the "benign neglect" attitude the opposite is the case. In the past, one of the major arguments for the "benign neglect" attitude in the U.S. was that the U.S. economy was relatively closed and the foreign trade sector was relatively unimportant. The typical statistic which was used to justify this position was the low share of imports in GNP. This argument was inappropriate in the past and is even less appropriate under present circumstances. The U.S. has always been an open economy. The relevant measure of openness to international trade in goods and services is not the share of actual trade in GNP but rather the share of tradeable commodities in GNP (i.e., of potential trade) which is by far larger than that of actual trade. Furthermore, as stated in Section I, one of the main linkages of the U.S. to the world economy is operating through world capital markets with which the U.S. is clearly well integrated. The same principle applies to the measures of openness of most countries.

The prescription is based on the notions that the economy <u>is</u> open, that the external value of the currency <u>is</u> important, that the restoration of price stability is an important policy goal, and that policy which views the exchange rate as an independent target or, even worse, as an independent instrument, is

likely to result in unstable prices. Furthermore, if monetary policy succeeds in achieving price stability, it might be useful to allow for fluctuations of the exchange rate which provide for a partial insulation from misguided foreign monetary policies.

Even when monetary policy is not guided by exchange rate targets it might attempt to offset disturbances arising from shifts in the demand for money. Such shifts in demand may be especially pronounced under a regime of flexible exchange rates. A policy which accommodates such demand shifts by offsetting supply shifts, would reduce the need for costly adjustments of exchange rates and national price levels. The difficulty with implementing this policy is in identifying when a shift in money demand has occurred. As is obvious, the nominal rate of interest is not a reliable indicator of money market conditions. The more relevant indicators are the components of the nominal rate of interest -- the real rate of interest and the expected rate of inflation -- but these components are unobservable.

Here the exchange rate may be useful as an indicator for monetary policy especially when frequent changes in inflationary expectations make nominal interest rates an unreliable indicator of fluctuations in money demand. In order to determine the way in which exchange rates may serve as a useful indicator for the conduct of policy it is useful to start with an examination of the empirical record concerning the links between interest rates and exchange rates.

One of the striking characteristics of the relation between the exchange rate and the interest differential has been the dramatic reversal of the relation which had taken place by the latter part of 1979. The empirical record shows that there

were generally two phases to the link between the value of the dollar and the interest differential. First, during the period 1973 through the latter part of 1979, a higher interest rate in the U.S. (relative to foreign rates) was associated with a depreciation of the dollar and second, since late 1979, a higher interest differential has been associated with an appreciation of the dollar in terms of foreign exchange.

The same inference can be drawn from a comparison of the correlation coefficients between innovations (news) in the interest differentials and the various exchange rates. As shown in Table 2, the correlation coefficients have changed sign since the latter part of 1979. This general pattern is independent of whether the various interest rate news are correlated with the level of the exchange rates or with the rate of change thereof. Nor does it depend on whether one uses the various measures of the exchange rates or the innovations (news) in these measures.

The reversal of the relation between the external value of the dollar and the U.S. rate of interest (or more precisely the interest rate differential) may be reconciled in terms of the factors which governed the variability of the rate of interest. Accordingly, the combination of a high nominal-interest-rate differential and a depreciation of the currency, that seems to have prevailed in the U.S. during most of the 1970's, may have indicated a rise in inflationary expectations. Under such circumstances an increase in the supply of money was not desirable. On the other hand, a combination of a high nominal interest-rate differential and an appreciation of the currency that seems to have prevailed since the latter part of 1979 may indicate a rise in the demand for money. Under such circumstances accommodation by an expansionary monetary policy may be very desirable.

TABLE 2

CORRELATIONS BETWEEN INNOVATIONS IN INTEREST DIFFERENTIALS AND EXCHANGE RATES

Monthly Data: June 1973-July 1979 and August 1979-January 1982

		Innovations in One-Month Interest Differentials		Innovations in Twelve-Months Interest Differentials	
	Exchange Rates	6/73 - 7/79	8/79 - 1/82	6/73 - 7/79	8/79 - 1/82
ln S	Dollar/Pound	.06	-.21	.08	-.22
	Dollar/Franc	.14	-.11	.13	-.16
	Dollar/DM	.07	-.09	.07	-.14
Innovations in ln S	Dollar/Pound	.27	-.65	.37	-.68
	Dollar/Franc	.30	-.48	.29	-.70
	Dollar/DM	.25	-.30	.24	-.45
Δln S	Dollar/Pound	.29	-.56	.37	-.59
	Dollar/Franc	.28	-.46	.26	-.69
	Dollar/DM	.25	-.31	.24	-.48
Innovations in Δln S	Dollar/Pound	.23	-.65	.34	-.68
	Dollar/Franc	.31	-.47	.25	-.69
	Dollar/DM	.24	-.29	.24	-.44

Note: Interest rates are the one-month and the twelve-months Euromarket rates. The expected interest rate differentials used in generating the innovations in the interest rate differential were computed from regressions of the interest differential on a constant, two-legged values of the differential, and the logarithm of the lagged forward exchange rate. The expected logarithm of the exchange rate used in generating the innovations in exchange rates was computed from a regression of the logarithm of the exchange rate on a constant, lagged values of the logarithms of the spot and the forward exchange rates and lagged interest rate differentials. The expected change in the logarithm of the exchange rate was computed from a regression of the percentage change in the exchange rate on lagged values of the percentage change of the exchange rate, lagged value of the forward premium and lagged value of the interest differential.

This prescription that is based on the relation between exchange rates and interest rates can also shed light on the recent controversy concerning the proper conduct of U.S. monetary policy in view of the high rates of interest that have prevailed since 1980. The relatively tight monetary policy which accompanied the high nominal rate of interest in the U.S. was justified on the grounds that the high nominal rate of interest was primarily due to high inflationary expectations. As a counter argument it was argued that the prime reason for the high nominal rate of interest was the high real rate rather than inflationary expectations. Obviously, the two alternative prescriptions call for fundamentally different monetary policies. To combat inflationary expectations monetary policy had to be tight but to combat high real rates of interest a case could be made for a more relaxed monetary policy.

Here again the relation between the exchange rate and the rate of interest can provide the monetary authority with information that can be helpful in solving the "signal extraction" problem. By and large, since the latter part of 1979, the high nominal rate of interest in the U.S. has been accompanied by an appreciation of the dollar. This suggests that since late 1979 through the present the important factor underlying the evolution of the nominal rate of interest in the U.S. has been the evolution of the real rate of interest rather than inflationary expectations. Under such circumstances the U.S. monetary policy could have afforded to be more relaxed while paying even more attention to the underlying reasons for the high real interest rates.

II.5 Reasons for High Real Rates of Interest and the Strong Dollar

Our previous discussion concluded that the key source for the high nominal rates of interest and for the strong dollar since late 1979 has been the rise in the real rates of interest. There are several factors that have contributed to this rise.

II.5.i The Budget Deficits

Among the most frequently cited factors have been the high current budget deficit as well as the prospects of high future deficits. These budget deficits are expected to crowd out private sector borrowing and result in a higher real rate of interest. While these deficits point at the correct direction, it has been argued that their quantitative magnitudes are much too small to account for the large rise in the real rate and especially the rates on loans with short maturity. This counter argument ignores however an important point: the budget deficit that is relevant for the determination of the real rate of interest is not just the U.S. budget deficit but rather the world budget deficits. The main conclusion of the discussion in Section I.1.ii was that the world capital market seems to be sufficiently integrated to render an analysis that is based only on U.S. developments incomplete and potentially misleading. Data in the IMF publication Government Finance Statistics Yearbook, 1982 show that the world average of central government deficits as a faction of GDP reached in 1980 3.3 percent which marked a rise from about 3.0 percent in 1979 and from about 1.5 percent in 1973 and 1974. In the U.S., the Federal budget deficit which averaged during 1950-79 about one percent of GNP, rose to about 3.6 percent of GNP in fiscal year 1982 and exceeded 6 percent of GNP in fiscal year 1983. This rise in the relative shares of budget deficits has been widespread;

the proportion of countries reporting deficits in excess of 4.0 percent of GNP rose from 20 percent in 1973 to 48 percent in 1980. Thus, from a global perspective the role of the budget deficits may be more pronounced than it might appear at first glance. These large and growing current and prospective budget deficits in the United States and in the rest of the world have been (and are expected to be) associated with large borrowing needs for government finance and with a significant decline of U.S. national savings (from about 7 percent of GNP up to 1981 to about 1.5 percent in 1982 and 1983), which put upward pressures on real rates of interest. Since the deficits are expected to prevail in future years, both short and long term real rates of interest have gone up.

II.5.ii Disinflation Policies

A second factor which has caused the rise in the real rates of interest has been the conduct of monetary policies. Following the inflationary conditions of the 1970's, the United States initiated a drastic disinflation policy. The resulting monetary tightness created liquidity shortage and induced upward pressures on real rates of interest. The successful performance of the Fed during this disinflationary experience, has resulted in the expectation that future deficits are unlikely to be monetized. This expected future monetary policy has also contributed to the perception of future monetary tightness and, thereby, to higher real rates of interest.

II.5.iii Bonds Lost Their Hedging Quality

Another factor that has contributed to the rise in the real rate of interest has been the emergence of stagflation. In contrast with the 1960's during which

high inflation was accompanied by high economic activity, the phenomenon of stagflation accompanies high inflation with low economic activity. Under such circumstances bonds lose some of their attraction as a hedge against poor economic performance since when the economy is weakened the real rate of return on bonds declines due to the high inflation. To compensate for this diminished attractiveness, bond holders require higher real yield. Of course it might be argued that the phenomenon of stagflation emerged long before the dramatic rise in the real rates of interest but it should be noted that the rise in the real rates occurs only once the stagflation phenomenon is perceived and is expected to prevail.

One of the reasons for the emergence of the stagflation phenomenon could be actual and expected counter-cyclical policy. Accordingly, in periods of low economic activity policy is expected to be expansionary and thus generating expected and realized inflation.

II.5.iv The High Rates Represent Risk Premium

An additional factor which as contributed to the rise in the real rate of interest has been the increased risk. Several factors can be mentioned in this context. First, the rise in the budget deficit introduces uncertainty with respect to the means of financing the deficits. Further, budget deficits are associated with a rise in the share of government in GDP and this rise may cause concern to those who worry about increased socialization of economic activity.

Second, the volatility of monetary policy since late 1979 is alleged to have induced a rise in the risk premium. The argument that has been advanced is that a high volatility of money growth exerts negative influence on real economic activity and induces a rise in a risk premium. Like with other arguments, when viewed in isolation, it is hard to ascribe the large increase in the real rate to the volatility in monetary policy;

it seems, however, that at least a fraction of the rise can be accounted for by this factor.

Third, the fragility of the world financial system has contributed to the increased risk premium. The sequence of major banking crises increased the perception of sovereign risks and resulted in increased sesnitivity to large exposure. The financial crises of Brazil, Mexico, Argentina, to metnion but three recent examples, have involved major private and government resources and have resulted in a much greater reluctance of lenders to extend credit. These developments have contribted to the rise in the real rate of interest through both tightening the conditions in credit markets as well as through inducing a rise in the risk premium.

The rise in risk can be manifested in various ways in the foreign exchange markets and in the bonds market. In the former it results in increased spreads between buying and selling rates in the spot and forward exchange markets. In the latter, the increased risk is expected to increase the attractiveness of high quality bonds relative to lower quality bonds as asset holders attempt to adjust their portfolios. As a result we expect to observe a large rise in the real rates of interest on lower quality bonds and only a samll rise in the real rate on higher quality bonds. This pattern seems to be found in the data.

The previous discussion pointed at several factors that may have contributed to the rise in real rates of interest. While neither of these factors can fully account for the entire rise, together they may account for a significant portion of the explanation for the strength of the dollar and interest rate puzzle.

III Reform

The final issue that the U.S. General Accounting Office asked me to address relates to the needs for a fundamental reform. As a general rule, I believe that our attitude towards the international monetary system should be somewhat similar to the attitude towards a constitution. One does not change a system whenever it reveals some weaknesses and deficiencies. Rather, one should attempt to improve its operation while staying within the overall rules of game. The smooth operation of the system requires trust and confidence which is being built up only with great difficulties and which can be destroyed very easily. The economic system, through the mechanism of memory that builds itself into expectations, shows little tolerance for fundamental errors. Therefore, one should think of a reform of the system as something that can be allowed to occur once in a life time. It would be irresponsible to experiment with a new system just to learn how it works out. In general, the cost of delaying the adoption of a new system while attempting to improve the operation of the existing one, is likely to be very small relative to the cost of a premature adoption of a new system.

There might be, however, an institutional reform that might be considered (within the existing system) in view of the recent rise in protectionism and its implications for exchange rate policies and for the resulting tensions among the U.S., Europe and Japan. World recession and rising unemployment have led to the dangerous growth of protectionism and of inward-looking policies. These policies have reflected themselves in the imposition of barriers to the international free flow of goods and capital as well as in attempts to manipulate exchange rates. These measures were introduced as countries attempted to diminish the constraints that the openness of the economy imposes on the effectiveness of policies.

In principle, the legal framework necessary for the prevention of such measures is partially in place. The principles and procedures for IMF surveillance of exchange-rate policies should contribute to diminishing the number of incidents of exchange-rate manipulation which are aimed at preventing effective balance of payments adjustment. Likewise, the rules of GATT are intended to reduce the number of incidents of policy induced trade barriers. Consequently, it is extremely important that such international institutions be strengthened.

One may wish to consider an important institutional reform that would provide for a key addition to the GATT and to IMF surveillance. The GATT deals with interventions that affect the trade account of the balance of payments, and IMF surveillance deals with interventions that affect exchange rates. Under a clean float, however, any policy that affects the current account of the balance of payments must also be fully reflected in the capital account, and vice versa. It follows that capital-market interventions may have protectionist trade effects as severe as those resulting from the imposition of more conventional trade barriers. A third agreement might be needed to deal directly with interventions that affect the capital account of the balance of payments. Without a capital-account analogue to the GATT--which maybe called GACF--(for General Agreement on Capital Flows)--or without a proper extension of the principles of surveillance to the broader range of monetary policies and capital market interventions, efforts to reduce protectionism maybe futile as countries attempt to regain monetary control through the imposition of barriers to the free flow of capital.

ISSUES FOR THE GAO SEMINAR ON EXCHANGE RATES
(February 18, 1983)

Prompted by allegations of deliberate attempts to keep the value of the yen low, the Senate Foreign Relations Committee, the Senate Banking Subcommittee on International Finance and Monetary Policy, the House Energy and Commerce Committee, and the House Ways and Means Subcommittee on Trade, have requested that GAO study the yen/dollar exchange rate.

The issue of the yen/dollar exchange rate includes both the extent to which the yen may be undervalued relative to the dollar, and the extent to which the dollar may be overvalued relative to the currencies of all major trading countries, including the yen. More fundamentally, the extent to which exchange rates may be "misaligned" raises questions both about the current international monetary system and the determinants of exchange rates. Therefore, we will be looking at the determinants of exchange rate problems surrounding the yen/dollar rate, and issues related to the current floating exchange rate system:

The questions we would like you to touch on include:

(A) What is the current state of research on the determinants of exchange rates?

  (1) Evaluate the strength of the empirical support for the different exchange rate theories.

  (2) What relevant determinants, if any, are neglected in current theories?

(3) Under what circumstances or over what time periods are current theories adequate explanations of exchange rate determination?

(B) What is the relationship between exchange rates and macroeconomic policy and performance?

(1) What constraints does the current system place on the exercise of monetary and/or fiscal policy? Are exchange rate movements an unavoidable consequence of pursuing monetary and fiscal policies aimed at domestic targets?

(2) What role can governments play in influencing exchange rates? How is intervention defined and what are the limits to what it can achieve?

(3) What are the costs of floating exchange rates? Is there a measurable trade loss due to uncertainity about rates? What is your estimate of the trade loss? How much has it cost to hedge the major currencies (percent/years)?

(C) Yen-dollar rate questions:

(1) There is a widely voiced belief in the business community and the popular press that the yen-dollar exchange rate is

"misaligned". Is there a basis in economics for such an assessment? Do you feel that recent movement in this rate (the recent rise from the Y270 range to the Y230 range) reflects adjustment after the rate "overshot"?

(2) (a) Is there a "correct" rate? (b) If so, what would constitute the "correct" exchange rate between the yen and the dollar?

(3) Is there substantial evidence that either the Japanese or American government has significantly and/or deliberately influenced the exchange rate?

(D) Reform of the International Monetary System.

(1) Are currency fluctuations sufficiently severe and/or misalignments sufficiently common and serious that there is a need to modify the current floating exchange rate system? What alternatives would you suggest or what alternatives do you think are most worthy of further consideration? At this time, what do you believe to be the costs of these alternative exchange rate systems.

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