NBER WORKING PAPER SERIES

THE FLEXIBLE EXCHANGE RATE SYSTEM: EXPERIENCE AND ALTERNATIVES

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Working Paper No. 2464

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 1987

This paper was written for a conference on "Survival and Growth in a Polycentric World Economy," Basle, Switzerland, October 14-17, 1987. It is forthcoming in a book of the International Economic Association (Macmillan: London). The authors would like to thank Charles Engel, Kenneth Froot, Charles Goodhart and Alan MacArthur for comments on an earlier draft. The second author would like to acknowledge support under an Alfred P. Sloan Research Fellowship. The research reported here is part of the NBER's research program in International Studies. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

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ABSTRACT

We review ten aspects of how floating exchange rates have worked in practice, contrasted with ten characteristics that the system was supposed to have in theory. We conclude that the foreign exchange market is characterized by high transactions-volume, short-term horizons, and an absence of stabilizing speculation. As a result, the exchange rate at times strays from the equilibrium level dictated by fundamentals, contrary to theory.

We then look at ten proposed alternatives to the current system. Four entail decentralized policy rules: new classical macroeconomics, a gold standard, monetarism, and nominal income targetting. Four foresee enhanced international coordination: G-7 "objective indicators," Williamson target zones, McKinnon "world monetarism," and a "Hosomi Fund." Two propose enhanced independence: a "Tobin tax" on transactions, and a dual exchange rate. We conclude that one might build a case for intervention from the observed failure of international financial markets to behave as in the theoretical ideal, but that government intervention in practice is just as likely to fall short of the theoretical ideal.

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The experience with exchange rates over the last fifteen years has in many ways differed from what was anticipated in 1973 when the major industrialized countries abandoned the effort to keep the values of their currencies fixed. There is a widespread feeling that exchange rates have turned out to be more volatile than they were expected to be, than they should be, and perhaps than they need be. Many practitioners believe that exchange rates are driven by psychological factors and other irrelevant market dynamics, rather than by economic fundamentals. Support has grown in the 1980s for some sort of government action to stabilize currencies, perhaps a reform of the world monetary system.

In this paper we consider the record with the current flexible exchange rate system, and then different alternatives that have been proposed. We will begin with (I) ten characteristics that economists expected floating exchange rates to have in theory, as of the start of the floating rate era; and then (II) contrast ten aspects of how they have turned out to work in practice. The paper concludes with (III) an analysis of ten proposed alternatives, including (1) proposals for decentralized rules ("new classical" nihilism, gold standard, monetarism, and nominal income targeting), (2) proposals for enhanced coordination of policy-making (setting of "objective indicators" à la G-7, target zones à la John Williamson, "world monetarism" à la Ronald McKinnon, and a supranational fund for foreign exchange intervention à la Takashi Hosomi), and (3) proposals to enhance independence (a "sand in the wheels" tax on foreign exchange transactions, à la James Tobin, and a dual exchange rate à la Dornbusch).

I. HOW THE SYSTEM WAS SUPPOSED TO WORK IN THEORY

When we recall how economists expected floating exchange rates to

operate, we must take care not to paint an over-simplified caricature of the state of the art as of 1973. The large effect that international capital flows would have on exchange rates was recognized in the literature of that time. As we go through the ten attributes that the system was supposed to have, we will note discrepancies with caricature views that may appear in the press and other popular accounts, but that have not in fact been widely held by economists for many years.

1. Exchange rates were supposed to be as stable as macroeconomic fundamentals. This is not the same thing as saying that exchange rates were supposed to be stable. Milton Friedman (1953) and other early proponents explicitly recognized that if countries followed divergent monetary policies, it would show up in their exchange rates.

2. Countries would likely have divergent policies and divergent inflation rates. A system of truly fixed exchange rates forces countries to keep their price levels in line, and therefore to keep their macroeconomic policies in line. The penalty of following a more expansionary policy than one's neighbors is a trade deficit. This penalty would be smaller under floating exchange rates, so governments would presumably be more likely to follow divergent policies. But decentralization of policy-making was considered a virtue, not a drawback, of the system. The logic here is similar to that for a domestic economy: letting each individual actor act independently in his own self-interest is more likely to give the best outcome for the largest number as compared to putting all under the control of a more centralized political process in which the most unreliable actors have as much vote as the reliable. [For a recent statement of this viewpoint, see Corden (1983).]

3. There would be smaller trade imbalances, and therefore less political pressure for protectionism. Nobody claimed that trade balances would be zero under floating exchange rates. While it is true that when the central bank follows a policy of refraining from intervening in the foreign exchange market the overall balance of payments is by definition zero, in the presence of international capital flows this is not the same thing as saying that the trade balance is zero. Nevertheless, from the standpoint of the United States in the closing years of the Bretton Woods regime, the deteriorating trade balance seemed to force a clear tradeoff between downward flexibility of the value of the dollar on the one hand, versus the imposition of trade restrictions on the other. [In 1971, the U.S. trade balance went into deficit for the first time in the postwar period. In response to the deficit, and to a corresponding loss in international reserves, President Richard Nixon simultaneously placed a tariff surcharge on imports, devalued the dollar unilaterally in terms of gold and foreign currencies, and ended the U.S. government's commitment to sell gold for dollars to foreign central banks.]

The argument that a move to floating exchange rates would reduce protectionism was made generally, as Dunn (1983, p.6) reminds us:

> In addition to gains for macroeconomic policy, flexible exchange rates also promised to eliminate mercantilism as an argument for tariffs and other protectionist devices, thus producing an era of free or at least more liberal trade. Harry Johnson noted that a tariff merely causes an appreciation of the local currency which taxes export and unprotected import competing industries without improving the trade account or increasing aggregate demand...The expectation that protectionism can improve the balance of

payments and generate an increase in aggregate demand obviously makes no sense if the exchange rate adjusts to maintain payments equilibrium with most of the payments adjustment to the exchange rate occurring in the current account.

4. There would be less transmission of disturbances internationally. (A corollary is that there would be less need for international coordination of those policies; enhancing independence was considered one of the chief virtues of the system, as mentioned above.)

Floating exchange rates would not give complete insulation from foreign disturbances. At least as far back as Laursen and Metzler (1950), economists had demonstrated a variety of channels of transmission that hold even when the overall balance of payments is set equal to zero by a central bank policy of not intervening in the foreign exchange market. The most important channel is international capital flows, which have become even more important in the 1970s and 1980s than in the 1960s. A foreign fiscal expansion, for example, would raise the demand for domestic goods through a foreign trade deficit and domestic trade surplus; the non-zero trade balance is matched by a flow of capital to the country initiating the expansion. But it still seemed that the magnitude of the transmission should be smaller than under fixed exchange rates, at least for monetary policy. A foreign monetary expansion would cause the foreign currency to depreciate, thereby mitigating the deterioration in the foreign trade balance. In fact, in the model of Mundell (1963, 1964) and Fleming (1962), the currency effect actually reversed the direction of movement of the trade balance and therefore of the international transmission: domestic output would, if anything, fall when the foreign country expanded.

5. Central banks would have less need to hold foreign exchange reserves, because they would have less need to use them. In the 1960s, those who pondered reform of the monetary system were concerned about insuring an adequate supply of reserves for the world economic system as a whole, as much as with adjustment of imbalances among countries. Hence the proposals to raise the price of gold, create Special Drawing Rights, etc.. It was believed that moving to a system of floating exchange rates would be one, at least partial, solution. If the primary reason for holding reserves, to intervene in the foreign exchange market, were removed, then the demand for reserves would fall.

6. There would be a general tendency for exchange rates in the long run to be determined by relative price levels, that is, by purchasing power parity (PPP). Not many argued before 1973 that the tendency to return to PPP would be instantaneous and complete. There were still plenty of unreconstructed Keynesians who believed that prices adjusted extremely slowly to conditions of excess supply, if at all. Even Friedman recognized the importance of short-run adjustment costs in prices. And everyone recognized that the long-run real exchange rate could be shifted by real trends, for example a faster rate of productivity growth in traded goods than in non-traded goods (e.g., Balassa (1964)). But the general consensus was that monetary trends probably dominated supply factors as determinants of the nominal exchange rate. So when economists said that exchange rates would be as stable as fundamentals (point 1 above), they meant observable macroeconomic fundamentals like M1, not unobservable tautologically-defined shocks to the equilibrium real exchange rate.

7. The stickiness of goods prices implies that the return of the real exchange rate to long-run equilibrium would not in fact be rapid. The slow adjustment of goods prices was of course emphasized in models such as that of Mundell and Fleming, as opposed to the world view of the monetarists. The resulting conflict over exchange rate determination was mirrored in conflicting interpretations of the interest rate. In the Mundell-Fleming view, a high interest rate was a signal of tight monetary policy; as a consequence, there would be increased demand for the country's assets and the currency would appreciate. In the monetarist view, a high nominal interest rate was a signal of inflationary monetary policy; as a consequence, there would be decreased demand for the country's assets and the currency would depreciate. The conflict was reconciled by the overshooting model of Dornbusch (1976).[1] An increase in the interest rate, to the extent that it is an increase in the real interest rate, signifies a tight monetary policy, and thus will appreciate the currency in the short run. But the tight monetary policy and resulting excess supply of goods will then cause the price level to fall gradually over time, eventually restoring the real money supply, the real interest rate, and the real exchange rate, to their original levels. The term "overshooting" is applied to the property that after the initial appreciation, the currency can be expected to depreciate over time. The overshooting model's synthesis of the Mundell-Fleming and monetarist views had become widely accepted by the late 1970s.

8. "Speculation" should be stabilizing rather than destabilizing. The argument originated with Friedman's claim that any class of speculators who added to the variance in the exchange rate must be buying when the price is already high and selling when the price is already low; this is a sure-fire recipe for losing money

and such speculators should disappear from the market over time. Speculation was also stabilizing in the Dornbusch overshooting model, though this was not always recognized by some who focussed simplistically on the model's implication of high exchange rate volatility. (Define speculation as investors acting on the basis of their expectations of changes in the exchange rate.) The high volatility is a result of sticky prices in goods markets combined with instantaneous adjustment in asset markets, not of speculation. When the currency appreciates in the short-run overshooting equilibrium, the investors recognize that it will depreciate in the future toward long-run equilibrium; in response, they sell the currency and dampen the original appreciation. The movement in the exchange rate turns out to be smaller than it would have been in the absence of speculation.

9. Expectations are rational, implying that (a) exchange rates should not jump except in response to unforecastable information regarding economic fundamentals ("news"), and that (b) any systematic patterns of movement in exchange rates should be incorporated into investors' expectations as reflected, for example, in the forward discount (perhaps adjusted for an exchange risk premium). In the context of the Dornbusch and other monetary models, this means that (a) exchange rates should not jump discontinuously except in response to news about current money supplies, expected future money growth rates, and real output, and (b) the forward discount or interest differential should be a conditionally unbiased forecast of the future change in the exchange rate. It does not mean, as is often asserted, that exchange rate changes should be completely unforecastable, i.e., that the exchange rate should follow a random walk. Under rational expectations, we should be able to predict that part of exchange rate changes that is correctly predicted by participants in the foreign exchange market, as reflected in the forward discount.

For example, a country that has a record of high money growth and inflation should have a currency that can be predicted to depreciate, at a rate that is appropriately reflected in the expectations of market participants, in the forward discount, and in the interest rate. Another example arises in the overshooting equilibrium; the regressive parameter in investors' equation of expectations formation should be equal to the actual speed of return to long-run equilibrium in the absence of future disturbances.

10. Markets in forward exchange and other instruments for hedging exchange risk should develop, offering the importer, exporter, or international investor an antidote to the increase in foreign exchange risk that would accompany the move to a floating exchange rate system. The cost of short-term uncertainty was one of the major concerns of Kindleberger (1969), McKinnon (1976), and the few other original holdouts against floating rates. They thought that the absence of a single international money would retard trade and investment. The standard counterargument was that one could hedge risk on the forward exchange market. Such markets already existed in major currencies in 1973. But it was predicted that the transactions costs would fall and the trading volume would increase, in response to the increased demand under floating exchange rates.

II. HOW THE SYSTEM HAS APPEARED TO WORK IN PRACTICE

1. Exchange rates move inexplicably. As noted, the fact that exchange rates have turned out to be highly variable, which they have, is not in itself contrary to theory. They were supposed to have been as variable as macroeconomic fundamentals. This did not mean that if the standard deviation of countries' money supply changes is on the order of 5 per cent per year, then the exchange

rate changes should also have a standard deviation of 5 per cent per year. The overshooting theory says that the latter should be a multiple of the former. The multiple can be quite large, if the expected speed of adjustment to long-run equilibrium is slow. The difficulty is that regression studies of the existing macroeconomic models show poor results by standard statistical criteria (incorrectly signed coefficients, insignificant magnitudes, low R-squared, poor out-of-sample forecasting performance).[2]

Most of these problems could be explained by small time samples, simultaneity bias and other problems in the estimation of the parameters. (For example, the positive relationship between the money supply and the exchange rate, which exists in all theories, often does not show up econometrically because the central bank is reacting endogenously to the exchange rate.) But these problems can be addressed. Meese and Rogoff (1983b) tried an entire grid of possible combinations of parameter values, as an alternative to estimating the parameters in-sample. While many plausible combinations of parameter estimates did give predictions that beat a random walk, many other combinations did not; most importantly, for present purposes, in no case was the predictive performance impressive compared to the total variation in the exchange rate. The clear conclusion is that exchange rates are moved largely by factors other than the obvious, observable, macroeconomic fundamentals. Econometrically, most of the "action" is in the error term.

This conclusion tends to undermine any defense of exchange rate variability made on the grounds that it is appropriate given changes in monetary policy. If exchange rate changes were in truth explainable by changes in money supplies, either contemporaneous or anticipated, we would have much better results in our regressions than we do. (Note that this conclusion holds regardless of

sophisticated theories of rational stochastic speculative bubbles, etc., that can be built for the expectations term in the equation.)

Saying that there are large unknown factors contributing to movement in the exchange rate is not quite the same thing as saying that these factors make it more variable than it would otherwise be. The error term could in theory be negatively correlated with the macroeconomic fundamentals.

There is a widespread impression that the variance-bounds tests which have been proposed in recent years are the way to show excessive volatility. Testing whether exchange rates are more volatile than observable macroeconomic variables has both intuitive appeal, and the appearance of being on less restrictive ground econometrically than the traditional regression tests. However this appearance is illusory. In the context of the foreign exchange market, there are two kinds of variance-bounds tests: those that check to see if the variability of expectations is too large given the variability of the future spot rate, and those that check to see if the variability of the spot rate is too large given the variability of macroeconomic determinants (taking account of the rationally expected future spot rate as one of the determinants).[3] The first sort of variance-bounds test, of which Huang (1984) is an example, is criticized in an Appendix to this paper. The second sort of variance-bounds test is crippled by our ignorance as to the correct macroeconomic determinants, let alone the precise parameter values of their coefficients. For example, Diba (1987) points out that the calculation is sufficiently sensitive to the semi-elasticity of money demand with respect to the interest rate, that an error made by Huang (1981) and Vander Kraats and Booth (1983) in expressing this parameter is entirely responsible for their finding that the spot rate is more volatile than would be expected from the fundamentals. The conclusion is that, for either sort of variance-bounds test,

there exists a more traditional regression equation that tests the identical condition (rational expectations, jointly with other conditions such as the absence of an exchange risk premium). The variance-bounds tests give up the power to reject the null hypothesis gratuitously, with a gain in nothing but complexity. The regression tests in themselves give adequate ground for concluding that exchange rate movements cannot be explained by fundamentals.

2. The trend in rhetoric is toward greater coordination of policies, rather than the reverse. Until now, countries have wanted to follow independent policies, and floating exchange rates have helped achieve some of that independence, as they promised to do. True, the 1974 recession struck across countries, but it was attributable to the common supply shock faced by all oil-importing countries. In the 1970s, countries followed increasingly divergent rates of money growth and inflation, as one might expect under a floating-rate system. Germany and Switzerland were said to be in virtuous cycles of firm monetary policies, low inflation rates, and appreciating currencies. Italy, France, the United Kingdom and -- to a lesser extent -- the United States (and -- to a much greater extent -- many LDCs) were said to be in vicious circles of loose monetary policies, high inflation rates, and depreciating currencies. Subsequently, the United Kingdom in 1979 and the United States in 1980 decided to tighten monetary policy in order to reduce inflation. This represented a sharp change in policy in these countries, with no change in Germany. The consequent appreciation of their currencies helped reduce inflation much faster than would have been possible under fixed exchange rates. The floating exchange rate system facilitated their independent shifts in policy priorities, just as it was supposed to. But by 1986 the shifts had also brought about a striking convergence of inflation rates, around the German

level, suggesting the possibility of a return to stable exchange rates, maintained by convergent policies, if it is desired.

The mix of macroeconomic policies, as opposed to the overall degree of expansion, remains widely divergent among the G-5 countries in the 1980s, with the United States having shifted to a massive structural budget deficit unaccommodated by either monetary policy or private saving, and with Japan, Germany, and some other European countries having shifted in the opposite direction. This policy divergence has given us large trade imbalances (the next point to follow) and widespread sentiment for institutional reform to enhance policy coordination (the point after that).

3. Although variation in national saving rates across countries has on the whole been reflected in variation in current accounts to as great an extent since 1973 as before, the United States has financed its increased budget deficit in the 1980s in part by borrowing from abroad on an unprecedented scale. The resulting record U.S. trade deficit has given rise to new protectionist pressures in the United States, which in turn put the entire world trading system in jeopardy. If it is accepted that the occurrence of large trade imbalances gives rise to protectionist pressures, then the question is whether this occurrence is more likely under fixed exchange rates or under floating exchange rates. The dollar overvaluation of the early 1970s arose because the exchange rate was not free to move to offset U.S. inflation; the dollar overvaluation of the early 1980s arose precisely because the exchange rate did move.

The tendency for variation in national saving rates among most countries to be reflected in investment rates more than in current accounts, to an even greater extent after 1973 than before 1973, has been documented by Feldstein

(1983) and Frankel and MacArthur (1987), among many others. [Obstfeld (1986) and Frankel (1986) find that U.S. behavior in the 1980s is an exception in this regard.] Similarly, real interest rates have diverged across countries to a greater extent since 1973. If one thinks of such statistics as tests of the degree of international capital mobility, then the finding appears surprising because many barriers to capital movement have been removed over the latter period. But if one thinks of the greater scope for divergent macroeconomic policies and divergent real interest rates that is possible under a regime of variable nominal and real exchange rates, then this finding is not surprising: even if capital mobility enforces parity among interest rates when expressed in terms of a common currency, a country that suffers a shortfall in national saving can still drive its real interest rate above world levels and thus crowd out domestic investment. In other words, the observed tendency for financial policies to have their major real interest rate effects within the country originating them, rather than abroad, is precisely the sort of enhanced independence that floating exchange rates were supposed to give us.[4]

4. Despite the widespreadly professed sentiment for increased coordination of monetary policies, there is no agreement on the nature of international transmission; therefore there is no agreement on whether coordination means cooperative monetary expansion, or something quite different.

International macroeconomic policy coordination has been the most popular topic for research in the field in recent years.[5] Agreements at the G-7 Summit Meetings in Tokyo in 1986 and Venice in 1987, and at various ministerial meetings in between, purportedly support an increased degree of coordination. It would appear that there has been a reduction in the desire for increased

independence of national policy-making that accompanied the move to floating rates in the 1970s.

But absent is a consensus on precisely what coordinated package of policy changes is called for under current circumstances. Since 1985, the U.S. Secretary of the Treasury, James Baker, has called for more expansionary policy in Germany and Japan, including monetary policy, under the reasonable-sounding assumption that this would have a positive impact on the U.S. trade balance and on U.S. growth. The Mundell-Fleming model, on the other hand, says that the effect of a depreciated mark and yen would dominate, and that the impact on U.S. trade and growth would be negative. Of twelve leading international econometric models, half show a positive effect (in the second year after a monetary expansion by the non-U.S. OECD), and half show a negative effect. In part because policy-makers subscribe to different beliefs as to how the economy works, they are likely to be unable to come to an agreement as to the desirable coordinated package of policy changes, even when they find it attractive to agree in principle that coordination is desirable.[6]

5. Central banks continue to hold and use foreign exchange reserves on a large scale. Frenkel (1983) found that there was no downward shift in central banks' demand for reserves in 1973-79 relative to the preceding period, despite the abandonment of the commitment to intervene in the foreign exchange market. The magnitude of intervention, though not sufficiently large to prevent large changes in exchange rates, has from time to time been larger in absolute terms than under the Bretton Woods system. In 1977 and 1978, central banks in Europe and Japan, in an attempt to resist the appreciation of their own currencies, bought up dollars in greater quantities than they had in the final years of defense of fixed exchange

rates. Intervention became smaller in the 1980s, particularly because the U.S. government renounced it altogether, but this changed with the Baker initiative to bring down the dollar in 1985. By 1986-87, central banks in Europe, and especially Japan, were once again intervening on a very large scale to dampen the appreciation of their currencies against the dollar.

It is clear why central banks might still intervene in substantial magnitudes even assuming they are willing to allow a greater degree of flexibility in their exchange rates now than before 1973. A given quantity of intervention that might have been sufficient to limit exchange rate movement to a certain range in the 1960s is no longer sufficient to do so. The likely explanations are a higher degree of international capital mobility (investors' asset holdings are highly sensitive to expected rates of return) and a higher "elasticity" of expectations (investors' expectations as to the future level of the spot rate are far more sensitive to the current level of the spot rate than to any notion of fundamental long-run equilibrium).

6. Not only does purchasing power parity clearly fail in the short run, but it is difficult to disprove the claim that it also fails in the long run. By the mid-1970s, it had become an academic orthodoxy that PPP was a realistic assumption, even in the short run, and that this constituted empirical support for the "equilibrium" view of the economy; that prices were flexible enough to equilibrate supply and demand rapidly, not only in the markets for foreign exchange and other assets, but in the markets for goods and labor as well. But under the weight of overwhelming empirical evidence, of which Krugman (1978) and Kravis and Lipsey (1983) were just two examples, the pendulum rapidly began to swing back the other way. It helped that the large nominal appreciation of the dollar in 1981-85 was almost

entirely reflected as a real appreciation as well. In the 1980s there is no longer support for the proposition that the speed of adjustment to PPP is infinite, or even that it is high.[7]

Ironically, some proponents of the equilibrium view have now swung to the opposite extreme. They claim that the speed of adjustment to PPP is zero. It is true that most statistical studies on post-1973 data fail to reject the proposition that the real exchange rate follows a random walk.[8] What is surprising is that anyone considers this evidence supportive of the equilibrium theory of exchange rate determination or, for that matter, of any economic theory.[9]

The argument that a random walk supports the equilibrium theory, which appears often in modern macroeconometrics, is a sort of extrapolation of the rational expectations revolution. In the "bad old days," economists were the omniscient model-builders, who understood the complete model while the actors within the model did not. As a useful correction to this sometimes-arrogant perspective, the theory of rational expectations argued that if there were any empirical regularities that were well-established among economists, then rational profit-maximizing individuals would soon take them into account.

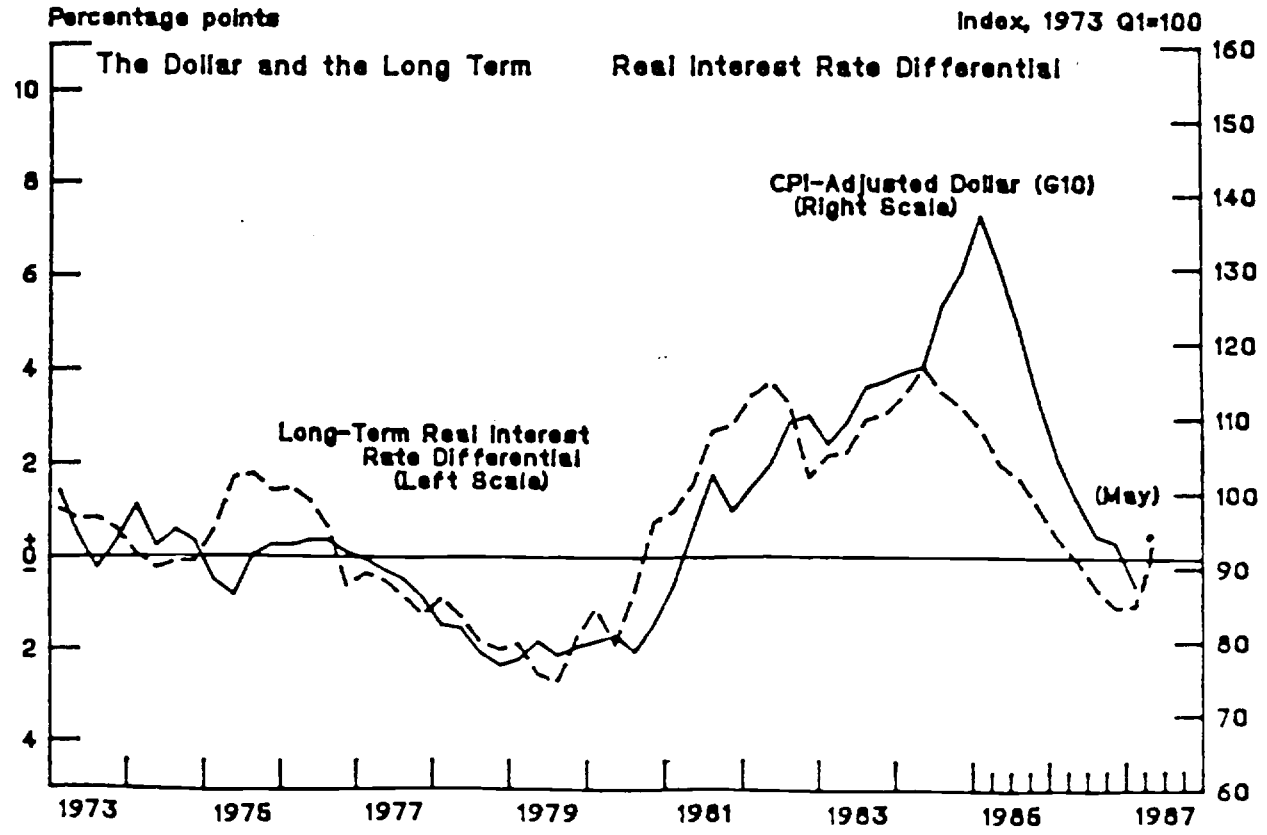
The ultimate extrapolation of the argument occurs when the modern macroeconomist derives pride from his failure to explain any movement in the macroeconomic variable in question, in this case the real exchange rate. Theoretical models are derived in which investor behavior is rigorously derived from principles of optimization. Changes in the exchange rate are attributed to shifts in technology and tastes that, though known to all the agents in the economy, are not known to the economist. Thus, as far as the economist is concerned, the exchange rate could move up as easily as down; the theory -- which is admitted to be in its infancy -- as yet contains no information that could

be used to explain specific changes in the real exchange rate. He then goes to "test" his theory "empirically" by seeing whether he can statistically reject the hypothesis that the real exchange rate follows a random walk. Rather than being humbled or embarrassed about his statistical failure to explain any movement in the macroeconomic variable that he has been investigating, he proudly proclaims it as confirming his theory, on the grounds that the theory too did not explain any movement in the variable![10]

7. <u>While the overshooting theory does seem to explain gross movements in the real exchange rate, better at least than competing theories, shorter-term movements remain completely unexplained.</u> At times it seems that the exchange rate "overshoots the overshooting equilibrium."

In some ways the relationship between the real exchange rate and the real interest differential is clearer in the 1980s than it was in the 1970s, perhaps as a consequence of the movements being larger. By various measures, the long-term real interest differential between the United States and its trading partners increased by about 5 points from 1980 to mid-1984, which would explain a large increase in demand for U.S. assets. The estimate in footnote 7 suggests that the real exchange rate regresses about 14 per cent of the way to long-run equilibrium per year, on average.[11] If this estimate is right, and if the real interest differential is assumed equal to the expected rate of real depreciation (no risk premium), then it follows that between 1980 and 1984 the dollar appreciated by about 35 per cent (=5/.14) relative to its perceived long-run equilibrium. This matches fairly well the real appreciation of the dollar between 1980 and 1984, as can be seen in Figure 1. No large shift in the long-run equilibrium real exchange rate need necessarily have taken place. Subsequently, in 1985-87, the real

Figure 1



Source: Peter Hooper, U.S. Federal Reserve Board

interest differential fell, and the dollar followed suit.[12]

The chief problem with the overshooting theory, and indeed with the more general rational expectations approach, is that it does not explain well the shorter-term dynamics. In the first place, the entire increase in the real interest differential and in the value of the dollar should have occurred in one (or two or three) big jumps, for example when it was discovered that monetary policy was going to be tighter than previously expected, or fiscal policy looser. Yet the appreciation in fact took place month-by-month, over four years (with investor expectations, as reflected in the forward discount, interest differential, or survey data, all the while forecasting a depreciation). It is no good to utter the words "peso problem," and argue that the market was forecasting a correction of macroeconomic policy that happened not to occur in the sample period. If the market systematically mis-predicts the direction of policy, that itself is a violation of the rational expectations hypothesis.

In the second place, it is particularly difficult to explain the rapid last 20 per cent of the appreciation that took place between July 1984 and February 1985. (See Figure 1.) During this period all measurable fundamentals -- not only real interest differentials, but also money growth rates, real growth rates, the current account, and the country risk premium versus the Eurodollar market -- were, if anything, moving the wrong direction. It appears that the dollar overshot the overshooting equilibrium. Some have suggested that this episode may have been an example of a speculative bubble, one that does not conform to rational expectations.[13]

8. <u>It appears that little of the speculation that takes place is stabilizing</u>. The arguments come from several directions. In the first place, expectations may not

be rational. Studies show that expected exchange rate changes -- as reflected in either the forward discount or surveys of market participants -- are biased forecasts of actual exchange rate changes. In the case of the forward market, these findings could in theory be attributed to an exchange risk premium, but in the case of the survey data they cannot. (See, for example, Frankel and Froot, 1987.)

In the second place, even if speculation is rational, rational speculation may not in fact be stabilizing. All the random-walk, or "near random-walk", results imply that it would be rational for investors to base their expectations as to the future spot rate almost entirely on the current spot rate, and not at all on an estimate of fundamentals equilibrium. If "expected depreciation" is a variable that is always equal to zero, then it cannot have a stabilizing effect on investor behavior. Furthermore, the modern theory of rational stochastic speculative bubbles has all but demolished Friedman's claim that investors who bet on destabilizing expectations will lose money. In a rational speculative bubble, investors lose money if they don't go along with the trend.

In the third place, there is direct evidence that most market participants pay scant attention to fundamentals. By 1985, most of the forecasting services that appear in an annual survey by Euromoney were described as using technical analysis. "In the early 1980s, the surveys appeared to have convinced many readers that forecasts could be used profitably and that the most profitable forex forecasters were technical rather than those who focused on economic fundamentals." (August, 1987, p. 121) The 1987 survey of services reported that none offered pure fundamentals forecasts, 5 offered fundamentals forecasts at longer horizons and technical analysis at shorter horizons, 3 offered forecasts combining the two techniques, 13 offered only technical analysis, and 4 did not

specify a technique (these last firms often show their clients how to hedge risk, rather than trying to outguess the market)[14].

In Frankel and Froot (1986), if technical analysts or "chartists," who rely on time-series extrapolation, make better predictions month after month for four years than "fundamentalists," who forecast a return to macroeconomic equilibrium, then Bayesian portfolio-managers will gradually pay more attention to the chartists and less to the fundamentalists, even though the latter may prove to be correct in the long run. This is only one of a recent group of models with heterogeneous investor expectations. De Long, Shleifer, Summers and Waldmann (1987) construct a model in which there exists a class of traders who follow irrelevant noise, and yet who prosper over time[15], contrary to Friedman's argument that destabilizing speculators would be driven out of the market.

9. Most short-term variability seems unrelated to news. To summarize, there are two serious empirical problems with the standard theory. First the proportion of exchange rate changes that are forecastable in any manner -- by the forward discount, interest differential, survey data, or models based on macroeconomic fundamentals -- appears to be not just low, but almost zero. Second, the proportion of exchange rate changes that we can explain ex post, after we have observed the contemporaneous macroeconomic determinants -- also appears to be low. Exchange rates must be reacting to something else, either economic variables that are unknown to the economist, as the equilibrium theorists would have it, or to irrelevant noise.

One kind of evidence that prices in financial markets are reacting to noise more than news comes from French and Roll (1986). They looked at days when the New York stock market happened to be closed, but business was

otherwise conducted normally; they found that stock prices moved much less during such periods compared with periods of equal length when the stock market was open. The implication is that movement in stock market prices comes out of the dynamics of trader interaction within the marketplace, rather than primarily from the processing of new information from the outside. Because foreign exchange markets tend to be open wherever people are awake, it has not been possible to apply the French-Roll test to them.[16] But this is a promising area for future research.

10. Trading volume in foreign exchange markets has become enormous; most of it seems unrelated to trade in goods, as well as to long-term or medium-term investment. In March 1986, transactions in the U.S. foreign exchange market (eliminating double-counting) averaged $50 billion a day among banks (up 92 % from 1983), and $34.4 billion a day among brokers and other financial institutions. Most importantly, only 11.5 per cent of the trading reported by banks was with non-bank customers (of which 4.6 per cent was with nonfinancial customers), only 14.3 per cent of brokers' transactions involved a non-bank, and only 19.2 per cent of trading reported by other financial institutions was with customers (of which 7.7 per cent were nonfinancial institutions)[17] In London the total was $90 billion a day. Only 9 per cent of the banks' transactions were directly with customers.[18] Tokyo was counted at $48 billion. The rest of the Pacific has been estimated at $29 to 37 billion, and Zurich and Frankfurt together have been estimated as big as New York. These totals are not only many times greater than the volume of international trade in goods and services; they are also many times greater than the volume of international trade in long-term capital.[19]

The prediction that the forward market would become more developed in

response to demand for hedging under floating exchange rates has in some ways been borne out (number of currencies traded, number of markets, volume of trading). But the U.S. banks reported that only 4.7 per cent of their foreign exchange transactions in March 1986 were in the forward market, as compared to 63.2 per cent in the spot market. (Swaps were 29.8 per cent and futures and options accounted for the rest.) Though the volume of trade does not appear to have suffered from exposure to exchange risk, only a small proportion of international trade is in fact hedged on the forward market. In both the forward and spot markets, the prediction that the bid-ask spot spread would decline has not been borne out. When volatility is high, so that taking an open position, even if only briefly, is risky for a bank, the bid-ask spread widens. The evidence is surveyed in Levich (1985, pp. 997-999).

Clearly, trading among themselves is a major economic activity for banks and other financial institutions. Schulmeister (1987, p.24) has found that in 1985, twelve large U.S. banks earned a foreign exchange trading income of $1,165 million. Every single bank reported a profit from its foreign exchange business in every single year that he examined. Goodhart (1987, p.25 and Appendix D) has surveyed banks that specialize in the London foreign exchange market: "Traders, so it is claimed, consistently make profits from their position-taking (and those who do not, get fired), over and above their return from straight dealing, owing to the bid/ask spread" (p.59). The banks report that their speculation (that is, taking an open position) does not take place in the forward market [and only 4-5 per cent of their large corporate customers were prepared to take open positions in the forward market]. Rather the banks take very short-term open positions in the spot market. Apparently they consider the taking of long-term open positions based on fundamentals, or of any sort of position in the forward exchange market,

as too "speculative" and risky. But the banks are willing to trust their spot exchange traders to take large open positions, provided they close most of them out by the end of the day, because these operations are profitable in the aggregate. In the description of Goodhart, and others as well, a typical spot trader does not buy and sell on the basis of any model, but rather trades on the basis of knowledge as to which other traders are offering what deals at a given time, and a feel for what their behavior is likely to be later in the day.

The reported profits are not so large that, when divided by the volume of "real" transactions for customers, they need necessarily lie outside the normal (relatively small) band of the bid-ask spread. In other words, the profits represent the transactions cost for the outside customers. One might expect that this large volume of trading therefore cannot be relevant from a larger macroeconomic perspective, i.e., for understanding the movement of the exchange rate (except perhaps on an intra-daily basis). But putting together these emerging characteristics of the actual dynamics of trading, it is possible to come up with the loose outlines of an unconventional model of endogenous bubbles in the foreign exchange market.

In the first place, the large volume of trading, which most finance models have absolutely nothing to say about, in itself suggests that market participants are not identical agents who share the same, rational, expectation. Participants are heterogeneous, with respect to both the portfolios they hold and the expectations they hold. (In the expectations survey data, the high-low range of responses averages 15.2 per cent.[20]) In the second place, most trading is motivated by a very short-term horizon.[21] There were few investors, as of 1984, anxious to buy and hold long-term mark or yen securities merely because the dollar was overvalued according to the fundamentals. This is what McKinnon

(1976) refers to as "an absence of stabilizing speculation". In the third place, there is for some reason a breakdown of the economists' rule of rationality that the long run is the sum of a series of expected short runs.[22] The result is that economic fundamentals do not enter into most traders' behavior, even if fundamentals must win out in the long run. Indeed, most traders are so young, and have been at their current job so short a time, that they may not even remember the preceding major upswing or downswing four years earlier! This short-term perspective need not be irrational from the viewpoint of the individual bank. Allowing its traders to take a sequence of many short-term open positions in the spot market may be the bank's only way of learning which traders can make money at it and which cannot.

The high volume of trading arises both when those with pessimistic expectations sell to those with optimistic expectations, and when those who find themselves with too-large open positions in a given currency sell to those without. The high volume of such intraday trading will in itself create movement -- within (the small band of) the bid-ask spread -- that is not related to fundamentals. If there existed significant numbers of other investors in the market who were willing to bet on fundamentals, then the intraday trading could not push the spot rate far from its appropriate value. But if most of the other investors in the market ignore fundamentals, and instead use technical analysis, or form expectations in any other way so that small exchange rate movements become self-confirming, then the rate may drift far away from its appropriate level. As with any other bubble, it does a single investor little good to recognize that the market is incorrectly valuing the currency, if the market is likely to be making the same mistake six months later when he wants to sell. Even though such a model may deviate from the rational expectations norm in that the market is not taking

adequate account of the fact that the exchange rate must return to equilibrium eventually, there is no easy way for an investor to make expected profits from this mistake, unless he has sufficient patience, and sufficiently low risk-aversion, to wait through the high short-term volatility.[23]

III. ALTERNATIVES

Discussion of reform of the international monetary system is at least 120 years old. In the second part of the 19th century international monetary conferences chased one another. The topic of that time was bimetallism and the role of silver. Later, in the early 1920s silver was largely out and the dollar was in. The Genoa conference moved for a gold exchange standard, with dollars doing the work and gold keeping the system honest. By the 1930s the complete breakdown of the international system made international monetary reforms a non-starter. Roosevelt sank the London Conference in l933 when he argued:

> "The sound internal economic system of a nation is a greater factor in its well-being than the price of its currency in changing terms of the currencies of other nations" (Quoted Pasvolsky (1933)).

The Bretton Woods reconstruction was built on very pragmatic pillars: capital mobility was not even in the minds of the architects of the new system, pervasive exchange control being the rule. Exchange rate policies were narrowly circumscribed to leave room for adjustment only in case of "fundamental disequilibrium"-- for any other grief the system provided liquidity.

Gold was still around, but the role of the dollar was even more central. The system lasted until the late 1950s; throughout the 1970s European convertibility for capital account transactions and the growing disparity in current

account imbalances raised issues about a system where European currencies were kept undervalued (enhanced by a trade diverting Common market) while central banks accumulated ever larger-dollar balances. The background to international monetary reform was the European complaint about a system that gave the U.S. both seigniorage and an almost exclusive voice in setting the trend of world monetary policy.

The transition to floating rates in the early 1970s was not an amicable divorce. But a postmortem of the fixed rate system left little doubt that it could not work: the incompatibility of inflation targets put all the burden on surplus countries: they could chose between inflation and appreciation, but they could not force the center deficit country into adjustment.

In the present discussion no easy agreement can be achieved because different parties in the discussion have in mind very different problems. They hold widely differing beliefs about the scope of alternative arrangements and see different aspects of the present exchange rate experience as the chief problem as we already saw in the preceding part.

- Some argue that one must see exchange rate regimes in the wider context of economic and social arrangements that set an institutional structure for free market forces to play themselves out in the most unimpaired fashion. Foremost among these rules should be a firm circumscription of the role of government and the arbitrary power of government to interfere with, modify or dissolve private contracts by changing the value of money.

- Others argue that rates move as much because of underlying lack of synchronization in policies, a synchronization which might have been more substantial under a regime of more nearly fixed rates. But that leaves the question whether the latter system merely substitutes more acute crises for

extended, massive swings.

- An increasing number of participants in the debate accept that large, persistent exchange rate swings appear almost unrelated to fundamentals (policies and economic trends) and seem more nearly the result of the peculiar operation of speculative, short-horizon markets. Like stock markets, markets for long term bonds or for precious metals may simply take trips away from fundamentals because they do not have an umbilical cord.

- For some observers economic nationalism, and the independence of monetary and fiscal policies are the pillars of successful national economic performance. But there are rare opportunities where ad hoc collaboration can enhance each participant's performance. Unwinding of large disequilibria is such an instance because controlled action avoids hard-landing scenarios that might accompany the bursting of a bubble.

- A large number of participants in the debate express concern about the serious risk of trade conflicts induced by large swings in exchange rates. They are therefore concerned to limit exchange rate fluctuations so as to avoid reinforcing protectionist sentiment.

Discussion of monetary reform of the 1980s has participants holding at least one of these issues to be the central problem of international monetary reform. But since these concerns are very different and vary over a wide field, it is no surprise that proposals pass each other like ships in the fog. In the meantime policy makers flirt with the idea of reform and hence keep the debate going.

In the remainder of this part we impose a structure on the discussion by highlighting ten important directions of search for solutions. We organize them under three headings: proposals focusing on decentralized national rules, proposals

that make enhanced cooperation their central feature and finally proposals to reduce interdependence.

A. Decentralized, National Rules

A return to the gold standard, Friedman-monetarism or its modern version of nominal income targeting are all in the class of decentralized, national rules. But so is the nihilism of the rational expectations market clearing school. We start with the latter view.

1. Rational Expectations, Market Clearing:

The new classical reconstruction of macroeconomics has not stopped at the borders of the closed economy. Research by Stockman, Helpman and Razin and others has explored what role the choice of exchange rate regime can play in macroeconomics.[24]

Not surprisingly the literature concludes that the exchange rate regime plays little role. Monetary policy (other than for unanticipated changes) has no effects on the real equilibrium except when money is used as an instrument of public finance. The welfare economics of exchange rate regimes does not offer much other than prescriptions about monetary policy in a model of optimal taxation.

The literature is important in imposing uncompromising maximizing standards in the discussion, assessing alternative arrangements in terms of welfare criteria. But at the same time the literature is also uncompromisingly uninteresting because theirs is a world without problems. Accordingly the exchange rate regime can make no difference.

2. The Gold Standard Proposal:

Mundell (1968, p.15) once said "dollars are money, gold is not." No doubt he would find a way of rationalizing the remark. But it is a straining experience to witness the continued advocacy of gold as the center of the international monetary system. Lewis Lehrman, Congressmen Paul and Kemp, and now Secretary Baker all share a surprising confidence in what gold could do for macroeconomic stability. Paul and Lehrman conclude their case arguing (1982, p.200): "Either we must move to a gold standard and monetary freedom, with longrun stability of prices and business, rapid economic growth and prosperity, and the maintenance of a sound currency for every American; or we will continue with irredeemable paper, with accelerating core rates of inflation and unemployment, the punishment of thrift, and eventually the horror of runaway inflation and the total destruction of the dollar. The failure of irredeemable money nostrums is becoming increasingly evident to everyone--even to the economists."

But it would certainly be a mistake to believe that support of the gold standard is a common conservative front. A conservative case against the gold standard was already made in Simon (1948,p.262) where he writes: "The place of gold in the monetary system is hard to discuss quite seriously. All talk about currencies based on gold is a bit silly...We may hitch gold to the dollar if and as we choose. To think of hitching the dollar to gold is almost not to think at all; one does not hitch a train to a caboose!"

The gold commission, appointed as a result of President Reagan campaign commitments, came down with a resounding condemnation of gold as a serious part of the world monetary system. Anna Schwartz, who had served as secretary of the gold commission, wrote a particularly forceful survey of the role of gold in monetary history, indicating the absence of magic or sterling performance. She

(in Bordo and Schwartz (1985, p.20)) summarized her findings on the gold standard in the following terms: "... the objective factors that served to promote the international gold standard in the past are no longer favorable to such an institution. And, as noted, the psychological factor of reverence for the standard has all but vanished except among a minority of faithful believers. Like Miniver Cheevy, they probably were born too late."

The continued support (not only from cranks, but even from scholarly monetary economists such as Robert Mundell or the late Jacques Rueff) is best explained by Henry Simons' (1948,p.168) observation: "The worship of gold, among obviously sophisticated people, seems explicable only in terms of our lack of success in formulating specifications for a satisfactory, independent national currency -- and certainly not in terms of the need for stable exchange rates for orderly international currency. Indeed, it indicates how little progress liberals have made in showing, by way of answer to revolutionists, what kind of money rules might be adopted to make capitalism a more workable system."

We now turn to such an alternative system, monetary rules.

3. National Monetarism:

Milton Friedman's proposal for a monetary rule was an unusual idea at the time it was proposed.[25] Keynesian economics was in vogue and money had virtually disappeared from academic circulation. But in the aftermath of the inflation shocks of the 1970s monetary targeting has become an integral party of central bank jargon and even of operations. For the strict monetarist a monetary rule, the quantity theory, purchasing power, and flexible rates represent the four-leaved clover that grows at the end of the rainbow.

A monetary rule, given the quantity theory, PPP and flexible rates, would

be expected to isolate a country from unwelcome world inflation trends without the need to adjust the domestic wage price structure. Serious discussion of the costs and benefits of flexible rates, and the possible lack of an anchor is brushed aside in this discussion by a double argument: the price level (and hence the exchange rate) cannot run off unless authorities accommodate the inflation. Second, speculation is stabilizing. Nurkse (1937) had challenged flexible rates with the argument that expectations and speculation can become self-fulfilling: speculation could set off depreciation which, via the budget and passive money, leads to inflation and thus becomes self-fulfilling. The argument is turned around, mistakenly, by pointing out that speculators simply anticipate the money creation and inflation, failing to note that without the speculation the inflation would not have occurred in the first place.

Here is an important field of research in the area of multiple equilibria (in policies) that has not even started to be opened up. We owe to simplistic national monetarism the insight into these problems because only the stark assumption of a constant, exogenous growth rate of money (come hell or high water) can highlight that such a thing will not, in practice be easy to implement. And if money is not exogenous then expectations and policies have strategic interaction which robs national monetarism of its attractive simplicity and simplistic claims.

4. National Nominal Income Targeting:

The idea of national nominal income targeting as a decentralized rule for operations under flexible exchange rate system is on the surface not far away from simple monetarism. But the essence of the proposal, making allowance for velocity shocks, is crucial. This point is altogether obvious when we consider the massive

changes in velocity that occurred in the U.S., and in other industrialized economies, in the early 1980s. Of course, recognition of the velocity problem has been part of the more sophisticated monetarist tradition since Henry Simons first assessed monetary rules. Simons (1948) writes: "With all its merits, however, this rule cannot now be recommended as a basis for monetary reform. The obvious weakness of fixed quantity, as a sole rule of monetary policy, lies in the danger of sharp changes on the velocity side..."

Nominal income targeting, as first proposed by Hicks, Meade and Tobin, would solve the chief problem of a strict monetary rule, namely changes in velocity which happen randomly or, in disinflation, systematically. By automatically accommodating velocity changes the system would avoid, for example, the Mundell problem -- high real interest rates during periods of disinflation. (See Mundell,1971.)

In the closed economy nominal income targeting takes the simple form of an aggregate demand equation:

$$(1) \qquad y + p = x$$

where x denotes the policy determined level of nominal income. Aggregate supply will depend on wages (which may be a proxy for price level expectations in the past) and on supply shocks:

$$(2) \qquad y = a(p - w) + u$$

where y, p, and w denote output, the price level and the wage all in logs and u denotes supply shocks. The behavior of this system can then be contrasted to

one where the authorities follow a constant money rule which yields an aggregate demand equation: (see, for example, Blanchard et al (1985)).

$$(1a) \qquad y = g(m-p) + v$$

where v denotes aggregate demand shocks, for example, shifts in velocity. It is immediately apparent that the constant nominal income rule accommodates aggregate demand shocks (whether stemming from velocity or animal spirits). In the case of aggregate supply shocks it does not necessarily dominate the constant money rule. But even here a case can be made for the nominal income rule, for example, if preferences weigh inflation and output equally.

The open economy version of such a model is considerably more complicated. In the open economy there are some fine points to clarify about nominal income targeting: should the government stabilize nominal spending or nominal income? The difference is important not only because of the implied shifts in the current account but also because of the difference in reaction to terms of trade shocks. Assuming, to keep matters simple, the same aggregate supply equation as in (2), the aggregate demand equation is:[26]

$$(3) \qquad y = f(e-p) - gi^* + v$$

where e is the exchange rate and i^* the world rate of interest. Once again the nominal income rule is

$$(4) \qquad x = y + p$$

Combining (2) and (4) yields

(5) $x = (1+a)p - aw + u$

and from (2) and (3) we obtain:

(6) $p = [f/(a+f)]e + (v-u-gi^*)/(a+f) + [a/(a+f)]w$

It is apparent from the equations that demand shocks or foreign interest rate shocks (v,i*) only change the exchange rate, leaving output and prices unchanged. Supply shocks (w,u) affect both output and prices. Specifically a wage shock increases prices and lowers output. The exchange rate appreciates!

In this simplest case, nominal income targets are unequivocally superior when movements in velocity are the dominant disturbance. When disturbances to aggregate demand and to aggregate supply are also at issue the nominal income rule may still be preferred, but now that case rests on preferences, parameters and relative variability. In a closed economy the 1:1 tradeoff between output and prices implied by (4) might appear as striking a prudent balance. But in the open economy the variability of the real exchange rate, is also an issue. The nominal income rule has a problem in this respect since in the face of a demand shock it immunizes output and prices, shifting the entire burden of adjustment on the exchange rate and the current account.

An entirely different consideration is how decentralized nominal income targeting works out in an interdependent world economy. We noted above that demand shocks translate into real exchange rates and changes in the current account, leaving output and prices unaffected. Such a pattern of adjustment does

not have attractive adding-up properties in the world economy unless there is an explicit coordination agreement that renders the targets compatible.[27]

We now turn to a radically different approach, focussing on a cooperative rather than national perspective on the exchange rate system.

B. Enhanced Coordination of Policy-Making

There is, of course, a wide variety of proposals for a more integrated world economy. These proposals flourished in the 1960s, when the fixed rate system was breaking down, and they have been springing up once again in response to dissatisfaction with the present flexible rate system. We review here four directions of change: coordination by policy-makers, target zones, world monetarism and an independent intervention fund.

5. Coordination:

The various summit meetings have, at least in their language, converged on the agreement to consider closer forms of coordination. Coordination presumably already includes the exchange of information, although one is not certain whether the exchange does not consist mostly of disinformation or of explanations why reasonable policy measures cannot be undertaken.

But coordination discussions have also in the more recent past focussed on developing a set of "objective indicators" which could be triggering policy actions or at least meetings at which pressures for action could be applied. The initial list of indicators designed to prompt cooperation measures included ten items, running from growth and unemployment to budgets, reserves, money growth, exchange rates, inflation and current account balances. The list has been trimmed since and the IMF is charged with monitoring the surviving indicators.

The last three years have a virtual explosion of talk about cooperation. But that is not unlike the talk about world monetary reform in the late 1960s. The reason is the fundamental problem of dollar overvaluation and differences of opinion about who should do what. There is certainly no reason to believe that there is an actual advance in cooperation, except perhaps in the foreign exchange market where intervention has become massive and talking down of the dollar less frequent.

At the academic level, recent research has deprived cooperation of much of its former glamour. The Mundell-Fleming model of the 1960s (as, indeed, the much earlier writings of Modigliani and Neisser) had stressed international interdependence. International macroeconometric models such as Project Link developed the quantitative patterns and research by Cooper (1986) had built a strong case for cooperation. But that literature took a very different direction when Hamada (1985) and others approached interdependence from a game-theoretic point of view. This approach pointed out the difference between cooperative and Nash equilibria. Work by Oudiz and Sachs (1984,1985) reached the surprising conclusion that the benefits from cooperation might be quantitatively minor. Rogoff (1985) showed that cooperative monetary policy might be counterproductive.

The case for collaboration has been further weakened by an analysis of various complications in the coordination game. The game runs into obstacles before it has even begun, at the stage where policy-makers within each country must decide what they want the other country to do (e.g., expand or contract). (See Frankel (1987b).)

- Policy makers may not diagnose the existing economic situation in the same fashion (Germans think there is no unemployment in any relevant

macroeconomic sense in their country).

- They may have different objective functions in that they differ in the relative weights they assign to such variables as inflation and unemployment.

- They may disagree on which is the model of the world economy, and even if they can agree on a model, it may differ from the true model. The combination of all these differences, if they could be considered jointly, makes it doubtful that cooperation could come out ahead.

One starting point of this questioning of cooperation is the recognition that we do not, in fact, know which quantitative model is the correct model for the world economy, or even the one most closely resembling it. Policy makers must therefore pick a model, or a number of models, to pursue their individual policy decisions and their cooperative exercises. Analyzing the predictions of 12 world macroeconometric models, Frankel (1987a) concludes: "There turns out to be relatively little disagreement as to the effects on output, prices and the exchange rate. The greatest disagreement is rather over the question whether a monetary expansion worsens or improves the current account and accordingly whether it is transmitted positively or negatively to the rest of the world."

The model difference is the point of departure for another issue: what if policy makers cooperate, each having in mind a model, but not necessarily the right model. Analyzing the possibilities (with two countries and ten models), Frankel and Rockett (1986) conclude that the United States would be ahead as a result of monetary cooperation only 55% of the time; it loses 32 percent of the time and cooperation makes no difference in 13 per cent of the cases. For the rest of the OECD, monetary cooperation results in gains slightly less often.

This kind of finding supports skepticism about the fruits of cooperation. But it is in fact only the tip of an iceberg. The problems go even further

because of perceived or actual constraints on policy and because side constraints on policies and preferences over instruments vastly complicate actual bargaining. If that were not enough, there is also an important time dimension coming from the political business cycle and from the differing lead times of policies.

The conclusion then is that grand concerted fine tuning is unlikely to become reality, but that this may not even be a loss.

6. Target Zones

Williamson (1985) made the case that countries should agree on target zones for exchange rates, limiting the extraordinary rate swings and fluctuations (see Figure 1) by adopting suitable exchange rate-oriented monetary policies and by making intervention commitments.

The Williamson proposal has fared well in practice since there is evidence of massive central bank intervention and of implicit target zones in a gradual unwinding of the dollar overvaluation. Figure 2 shows the actual monthly average of the yen since January 1985 as well as a band of plus 5 and minus ten percent of the average exchange rate over the preceding three months. Since late 1985, following the Plaza agreement the Yen lies roughly in these bands. Of course, this is a very weak form of target zones, controlling only the rate at which the dollar overvaluation is undone.

The gradual unwinding of the dollar overvaluation has an interesting aspect, quite independent of the target zone issue. One would have thought that policy makers would be eager to announce publicly a target zone arrangement to enlist the support of stabilizing speculation. But that is not possible when there is an agreement for a gradual (though steep as measured by existing interest differentials) depreciation. The explanation for the secrecy maintained regarding

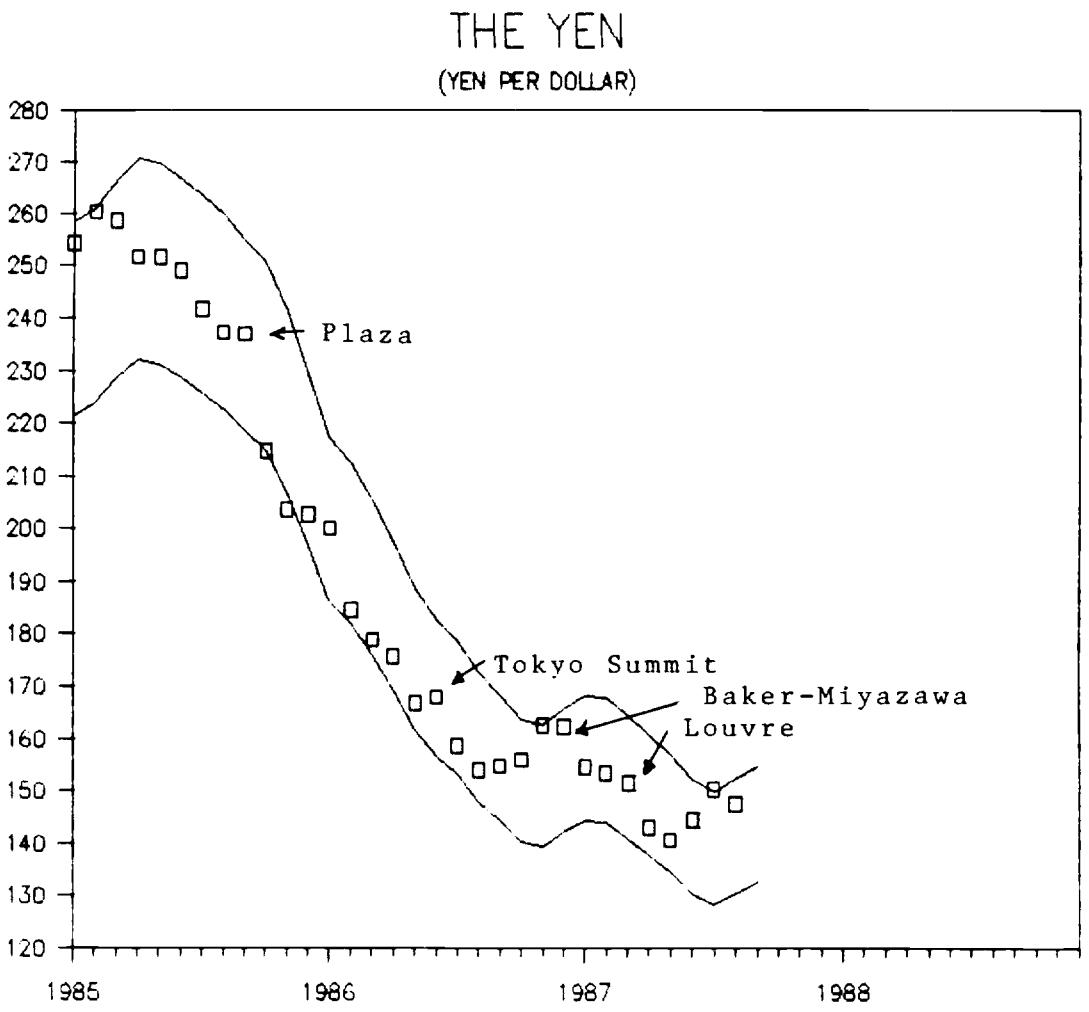

THE YEN
(YEN PER DOLLAR)
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
1985
1986
1987
1988
Plaza
Tokyo Summit
Baker-Miyazawa
Louvre

FIGURE 2

the bands in the Louvre Accord and the other G-7 agreements, assuming they have in fact been serious agreements, is that the authorities were consciously fooling the market. Moreover, looking ahead, if the dollar is to decline another 30 percent, as many observers predict, why does the dollar not collapse in the absence of a compensating differential? The most plausible explanation draws on the absence of long term stabilizing speculation already discussed in part II.

In the absence of long term speculation, central banks can reduce the extent of speculation by increasing uncertainty. Moderate changes in interest rates can bring about appreciation as likely as depreciation in the very near term. Speculation is reduced by the elimination of the one-way only option. Intervention (on a massive scale) becomes a plausible counterweight for the limited amount of long-term speculation. It is of the essence in carrying out this kind of policy that the public should not understand whether authorities truly believe that the dollar is already in the right place or whether they have a firm agreement to bring about another 20 or 30 percent depreciation in a controlled fashion over a year or two. Only if the market is sufficiently uncertain can the depreciation be managed without matching interest differentials.

There is a quite separate question of whether this gradual depreciation is desirable in comparison with a rapid, once-and-for-all drop. The hard-landing discussion, particularly by Marris (1985, 1987) emphasizes the potential inflationary upsurge accompanying a steep dollar decline and the risk that the Federal Reserve may have to stop the spreading of depreciation to wages by extra high interest rates. On the other side of the argument is the real economy. Here an argument can be made the other way: rapid depreciation gives the best chance to reverse the effects of overvaluation on resource allocation. It provides an effective way of exterminating hysteresis effects by depriving foreign companies in the U.S. of

adjustment time to reinforce their beachheads. It is perhaps not surprising that policy makers favor the controlled descent since the real resource costs appear small relative to the fear of sharp inflationary pressure, especially in politically sensitive times.

Returning to the Williamson proposal, it is interesting how much it has evolved over the past four years. Initially, exchange rate-oriented monetary policy was the cornerstone of the proposal. In its most recent form (See Williamson and Miller (1987)) the original proposal is barely recognizable. Here are the main policy principles and prescriptions in their current "blueprint":

- The real exchange rate will not deviate more than 10 percent from the agreed "fundamental equilibrium exchange rate".
- The average level of world real interest rates should be set with a view to achieving a target growth of nominal world demand.
- Short-term interest rates in individual countries should supplement intervention in achieving the exchange rate target.
- National fiscal policies should be managed to hold the growth of domestic demand to the target path.
- The rules are implemented subject to the condition that real interest rates stay in their historically normal range and that increasing or excessive ratios of debt to GDP be avoided.

The explicit introduction of real interest rates and fiscal policy takes into account many of the criticisms of the earlier, simplistic proposal. But in taking these issues into account, it is also clear that the very plausibility of such cooperation is challenged. Few seriously argue that the large exchange rate swings are altogether unrelated to the extravagant monetary or fiscal policies of the past years. Without these policies, exchange rates might not exhibit the same volatility

they now show. If this is correct, the "blueprint" has less to do with exchange rates than with imposing limits on the national policy mix. Moreover, since in practice we are talking of currency blocks, the main issue is, as always, the question whether key currency countries can be persuaded to sacrifice some of their national preferences to make the "world" features of this proposal come off.

There is no reason to believe that any change in the unwillingness to sacrifice autonomy has occurred since the 1960s. On the contrary, were it not for the risk of dollar collapse and protection we might not see the little collaboration that is there. A system that does not have teeth is unlikely to generate collaboration which is perceived as inconvenient if not costly.

A major, if not overwhelming, difficulty in the Williamson scheme is the notion of the fundamental equilibrium exchange rate. The need for U.S. budget correction requires acceptance by Europe and Japan of smaller trade surpluses. Much of the adjustment will come from correction of U.S. macro policies, but there are inevitable repercussions abroad as foreign trade surpluses shrink and dollar depreciation sustains U.S. employment. There are also questions about worldwide real exchange rate adjustments necessitated by the emergence of the NICs who seem to sell in the U.S. and buy in Japan.

7. World Monetarism

For over ten years McKinnon has advocated a new monetary system centered on fixed exchange rates between the Yen, the DM and the U.S. dollar. Already in 1974 he argued for new monetary arrangements based on rigidly fixed rates but built on stronger foundations -- world monetarism rather than national monetary discretion. (See McKinnon (1974)). Since then he has refined his plan for monetary integration under rigidly fixed exchange rates--"a gold standard

without gold" as he recently called it (See McKinnon (1987c)).

His proposal has fallen on fertile soil because the dramatic exchange rate volatility makes the financial press and the business community grasp for ready answers. Although the scheme seems to solve the problem of currency instability, there is little theoretical or empirical basis for his standard. McKinnon's analysis has become even more controversial since he has added to world monetarism the claim that the dollar is undervalued and the yen is substantially overvalued.

The basic proposition of McKinnon is this: World monetary growth should be targeted to achieve price level stability. Countries should follow an assigned domestic credit target and use symmetric, unsterilized intervention to stabilize exchange rates. The proper level of the dollar is 170-190 Yen/$ and 2.0-2.2 DM/$. (See McKinnon (1987d)).

The question of PPP has already been discussed in Part II, when we discussed short run deviations and the question of whether the exchange rate has a tendency to revert. We add here the problems posed by trend in the equilibrium real exchange rate due to real changes. Specifically, in a context of cumulative productivity growth or major shifts in the budget there is absolutely no presumption that PPP should hold over time, either absolutely nor even relatively. In the case of the U.S. and Japan, for example, there is an obvious Ricardo-Kravis-Balassa trend real appreciation due to the much higher productivity growth.

In earlier work McKinnon has more strongly advocated the view that exchange rate movements are caused predominantly by money demand shifts between different currencies.[28] More recently he recognizes that portfolio disturbances involve dominantly shifts between interest bearing assets. But the basic emphasis on an M1-disturbance view of exchange rates is still lingering.

This narrow view of exchange rates determinants leaves out two important explanations for exchange rate movements. Exchange rates can move for any of a number of reasons. But what is the evidence that would support the view that money demand disturbances are the dominant source? If exchange rate movements are not caused primarily by shifts in money demand from one country's M1 to another's, there is no basis for preferring fixed exchange rates over flexible rates. Moreover, there certainly is no presumption for using unsterilized intervention as the rule.

If uncoordinated, large fiscal swings are a possibility there is no presumption that fixed rates with unsterilized intervention are the best kind of monetary policy. A fiscal expansion would now lead to an expansion of home credit and to a contraction abroad. World interest rates would rise and our trading partners risk falling into recession. Neither the fixed rate nor the monetary rule seems in this context a very attractive feature. Of course, that brings out precisely the problems of the past five years.

If a choice must be made among rules, either so central banks can establish more credible commitments vis-à-vis their domestic constituents not to inflate, or so national governments can establish more credible commitment vis-à-vis each other not to "cheat" on joint bargains (such as coordinated expansions or contractions), then nominal income targeting seems a much more sturdy possibility then M1 monetarism. Any rule will turn out to have difficulties for certain disturbances, and within a given period would be dominated by discretion. But discretion itself has become suspect because of time consistency problems. With this point in mind nominal income targets surely dominate commitments to fix the stock of money (not to mention the price of gold).

8. An Independent Intervention Fund

The previous directions of change focused on governments agreeing to more active cooperation. An alternative is to create an institution which, independently, plays the role of achieving the results cooperative policies would otherwise bring about. Such a scheme has been advanced by Hosomi (1985).

The Hosomi plan envisages a fund which is endowed with the main currencies on a sufficient scale to be able to conduct effective intervention policy. The fund would develop criteria for appropriate exchange rates, would announce them and intervene to move markets in the direction of these rates. Decisions would presumably be voted by a board of governors representing the largest central banks, along the lines of the Bank for International Settlements. Individual governments would remain free to pursue their own policies, possibly intervening against the fund, but at least they would be known to be out of line and would have some competition.

The chances of seeing such a fund are, of course remote. Governments have been extraordinarily slow in giving a major mandate for surveillance to the IMF, for example, and even in the EMS intervention remains a highly politicized issue. On the world level it is doubtful that Germany or the U.S. Treasury would allow themselves to be outspeculated with their own money. But one can advance a different line of argument. Which is more likely to come about: abandoning monetary sovereignty in a Williamson-Miller coordination agreement, or allowing the emergence of a new institution that competes but not necessarily out-competes the national authorities? If institution- building is the point a Hosomi fund may be a good strategy to progress. It is a dimension along which the system realistically could move halfway from the noncooperative solution to the cooperative solution (or however far there is sufficient political support; the less strong the consensus

for ceding monetary sovereignty, the smaller would the fund be).

C. More Independence for National Policies

In this final section we review a very different strand of proposals emphasizing segmentation of capital markets. This literature takes its respectability from Nurkse, Modigliani and Tobin who each have noted that excessively mobile capital interferes with policy independence without commensurate gains in terms of resource allocation. The implication for policy is that if hot money flows could be cooled, policy-makers would have more instruments at e disposal to get on with the task of achieving non-inflationary growth.

9. Tax Deterrents to Hot Money

The best known proposal to interdict hot money flows is Tobin's suggestion to "'put some sand in the wheels of international finance". Tobin observes (1978): "I believe the basic problem today is not the exchange rate system, whether fixed or floating. Debate on the regime evades and obscures the essential problem...The basic problems are these. Prices in goods and labor markets move more sluggishly, in response to excess supply or demand, than the prices of financial assets, including exchange rates. ...There are two ways to go. One is toward a common currency, common monetary and fiscal policy, and economic integration. The other is toward greater financial segmentation between nations or currency areas, permitting their central banks and governments greater autonomy..."

The Tobin scheme is a moderate, worldwide transactions tax on foreign exchange. The disincentives for trade would be negligible, and so would be the

disincentives for long-term capital movements. But the profitability of short-term round trips would be dramatically curtailed. Suppose the rate of return at home is i per year. The required rate of return abroad (including tax evasion and exchange gains,) i^* depends on the Tobin tax, t, and on the duration of the investment f (measured as the fraction of years for which a foreign position is held):

$$(6) \qquad i^* = (if + t)/f(1-t)$$

It is apparent that the Tobin tax penalizes speculative investments more the shorter the horizon. For example, with a home interest rate of 10 percent, a 2 percent tax and a 6 month investment horizon the foreign yield would have to be 14 percent. If the horizon were only 1 month the foreign yield would need to be 34 percent per annum.

There are several objections to such a tax. One is that the taxation of all foreign exchange transactions acts as a disincentive to trade. The effective counterargument is that hot money flows, by misaligning exchange rates create macroeconomic costs far in excess of moderate trade taxation and, over and above, may invite protectionism.

The second concern, expressed for example by Marston (1987, p.53), is that the system would fail to stem the influence of capital flows driven by longrun fundamentals. This is really not an objection but rather a reinforcement of the Tobin argument. The proposal is specifically designed to strengthen the role of long-term speculation which now is dominated entirely by short horizon round tripping. It is possible to slip into the mistake of thinking that if a Tobin tax discourages only short-term capital investments, rather than long-term investments,

then it can reduce only short-term exchange rate volatility, not long-term misalignment. But we argued in Part II that, in a market where speculators fully adjust their expectations of the future rate to reflect the latest fluctuation in the current spot rate, and few investors take positions based on long-term fundamentals, the short-term movements become self-confirming, and can cumulate into long-term misalignment.

There are other tax variants that seek the same objective. Specifically Liviatan (1980) and Dornbusch (1986a,1986b) have argued for a real interest equalization tax. Such a tax, levied cooperatively would reduce the incentives for short-term money movements and thus remove their dominant influence from exchange rate determination.

A third and common objection to the Tobin tax, or to an interest equalization tax, is that they are impractical because they are difficult or impossible to enforce. There is certainly merit to this objection, particularly when the tax is implemented by an individual country leaving scope for off-shore evasion. When implemented as an international system, the chances are more nearly like those of collecting the corporate income tax from multinationals. No doubt, since the vast majority gross capital flows have to do with minimizing, avoiding or outright evading taxes, there won't be massive support for such a policy on the part of financial institutions. But the proposals compete with alternatives that are no more persuasive: a world central bank, coordinated fiscal policy, etc. The key point of these proposals, in the end, is to highlight that short-term capital flows may be a major destabilizing factor in the world macro economy.

10. Dual Exchange Rates

We conclude with a proposal that, just as the preceding tax proposals, draws its inspiration from the problem of volatile (and often unproductive) short-term capital flows. The proposal envisages instituting a dual exchange rate system. Governments of the main industrialized countries would establish a fixed (or rigid crawling peg with trend) exchange rate for commercial transactions. But for all capital account transactions the exchange rate would be flexible.

A possible macroeconomic advantage of this system is that real exchange rates relevant for trade flows would be more stable, even when fiscal polices get far out of line. Of course budget deficits that are prevented from showing up as trade deficits will show up elsewhere instead, for example as crowding out of investment. If elements other than fundamentals are important in asset markets, then goods markets are fully sheltered from their influence.

Dual exchange rates are known from the experience of a number of developing countries, specifically Mexico, but also from Belgium, France and Italy at various times. Would they work between major currencies? If one takes the view that flexible rates today are dominated by speculation based on considerations other than fundamentals, the shift to another system can be viewed as an advantage. If the speculative influence is only an overlay on real factors then detaching the asset market rate may make it much more volatile. But where is the cost of that volatility?

Concluding Remarks

This essay has taken a broad view at the experience with flexible rates and at alternatives. We do not suffer from a dogmatic commitment to flexible rates per se, nor do we feel that interference with speculative capital flows is

ethically unacceptable. Finally, we don't preclude the possibility of enlightened cooperation, sometime in the future. Where then is the bottom line on proposals for change?

The basic question seems to be whether exchange markets are dominated by speculation that drives the price away from fundamentals. If that is not the case, the mere pursuit of more reasonable macroeconomic policies, without much cooperation, will assure that exchange rates fluctuate much more moderately. Reasonable policies under current circumstances mean first and foremost a correction of the U.S. budget deficit.

But if asset markets are dominated by speculation unrelated to market fundamentals then there may also be a potential for improvement from basic policy reform. If such speculation dominates, then taxation or decoupling of asset markets theoretically becomes a possible step to enhance microeconomic efficiency. Whether this is best done by a Tobin tax or by dual exchange rates is largely an administrative question. The interesting point of nearly fifteen years with flexible rates is the suspicion that speculation might do more harm then good. The possibility is an active part of the research agenda in many areas of finance.[29]

On the other hand, to establish a case for government intervention it is not sufficient to show that the international financial system as it works in practice is a flawed version of the optimal efficient-markets equilibrium of theory. Nor would it even be sufficient to show theoretically that optimal intervention might improve world economic welfare. It must be recognized that government intervention historically has been every bit as flawed a version of the theoretical optimum as have been the results given by the market.

In the meantime serious professional discussion of these issues in October 1987 has been set back by Secretary Baker's pronouncement at the IMF Annual

Meeting:

"Accordingly, the United States is prepared to consider utilizing, as an additional indicator in the coordination process, the relationship among our currencies and a basket of commodities, including gold..."

APPENDIX ON VARIANCE-BOUNDS TESTS

Two different methodologies are in use to test whether expectations are excessively volatile: regression tests and the newer variance-bounds tests.

The traditional regression test of rational expectations uses the equation:

$$D\, s_{t+1} = a + (b)\, D\, s^{e}_{t} + u_{t+1},$$

where the lefthand-side variable is the ex post change in the (log) spot rate and the righthand-side variable is investors' expected rate of depreciation as measured, for example, by the forward discount (which requires the assumption that no risk premium separates the two). We reject the hypothesis of rational expectations if the estimate of the coefficient is significantly less than 1, which is the usual finding. We could choose to describe a finding that $b < 1$ as a finding that expected depreciation ($D\, s^{e}$) is excessively volatile (which is how Bilson (1981) originally described it: speculators would do better to reduce their expectations toward zero). This would be just another way of saying that expected depreciation is a biased predictor.

Huang (1984, p.159, eq. 11) applies the variance-bounds test by computing the variance of the prediction error, and arguing that expectations are excessively volatile if it exceeds the variance of the changes in the spot rate. This is a true statement, because

$$\mathrm{Var}(D\, s_{t+1} - D\, s^{e}_{t}) > \mathrm{Var}(D\, s_{t+1}) \quad \text{implies}$$

$$\mathrm{Var}(D\, s_{t+1}) + \mathrm{Var}(D\, s^{e}_{t}) - 2\, \mathrm{Covar}(D\, s^{e}_{t}, D\, s_{t+1}) > \mathrm{Var}(D\, s_{t+1})$$

$$1/2 > \mathrm{Covar}(D\, s^{e}_{t}, D\, s_{t+1}) / \mathrm{Var}(D\, s^{e}_{t}) .$$

This last ratio is simply our regression coefficient b, so it is certainly true that if it is statistically less than 1/2, then it is also statistically less than 1, and we can reject rational expectations. But this would be a foolish way of doing the test, because it needlessly throws away the ability to reject the null hypothesis if b happens to fall into the range between 1/2 and 1. Indeed, Huang is able to reject the null hypothesis for fewer currencies when he applies his variance-bounds test than when he applies the traditional regression test to the same currencies. The variance-bounds test adds absolutely nothing to our understanding in this context. This point is generalized in Frankel and Stock (1987) and Froot (1987).)

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ENDNOTES

1. Steady-state inflation was introduced into the Dornbusch model in Frankel (1979) and Buiter and Miller (1982).

2. Dornbusch (1980), Frankel (1984), Haache and Townend (1981), Backus (1984) and Meese and Rogoff (1983a).

3. The criticisms made here are spelled out in Frankel and Meese (1987) and Froot (1987).

4. This point is elaborated in Frankel (1986) and Frankel and MacArthur (1987).

5. The literature began with Hamada (1985). A number of contributions appear in Buiter and Marston (1985).

6. The consequences of coordination when policy-makers subscribe to conflicting models such as the 12 in question are explored in Frankel and Rockett (1986). A related point, which emerges also in Oudiz and Sachs (1984) and other empirical studies of coordination, is that the magnitude of the transmission effects, whatever their sign, is in any case so small that it is difficult to see how coordination could be important.

7. For a survey, see Dornbusch (1985).

8. On the other hand, a statistically significant tendency for the real exchange rate to regress to PPP is more apparent when 116 years of U.S.-U.K. data are used. The speed of adjustment is estimated at 15 per cent a year in Frankel (1986) and 9 per cent a year in Edison (1987). Given parameters so small in size, and given the large magnitude of the disturbances to the real exchange rate in the

floating-rate data, it is not surprising that most studies on the short post-1973 period have been statistically unable to reject zero.

9. Examples where a statistical failure to reject a random walk on the real exchange rate is claimed as evidence in favor of an equilibrium theory include Roll (1979), Adler and Lehmann (1983), and Stockman (1987).

10. This disturbing trend in modern macroeconometrics is an extreme case of the old problem that a statistical failure to reject a null hypothesis does not entitle one to claim an interesting finding. The failure to reject may simply be due to low power in the test, especially if the null hypothesis is a weak one, as Summers (1986, p. 593-594) reminds us in the context of testing for efficient financial markets. Traditionally in econometrics, the goal is supposed to be to succeed in statistically rejecting one economically interesting hypothesis in favor of another, i.e., to get results that are "statistically significant at the 95 per cent level," rather than the reverse. What makes the trend away from this principle so remarkable is that the popular null hypothesis of a random walk is so weak that a failure to reject it is nothing other than a failure to explain any movement in the variable of interest.

11. Survey data on the expectations of market participants suggest that they expect the exchange rate to regress to PPP at a rate of 12 to 17 per cent per year. (Frankel and Froot, 1986, 1987.)

12. Of course one or two empirical observation does not constitute a statistical test. A number of recent studies on monthly data claim a degree of success using the long-term real interest differential to explain the real exchange rate: Shafer and Loopesko (1983), Sachs (1985), Hutchison and Throop (1985), Golub et al

(1985), and Feldstein (1985). But it must be remembered that repeatedly in the past a version of the monetary approach that has appeared to work well for the sample period on which it was estimated has subsequently gone awry.

13. Krugman (1985), Marris (1985), and Frankel and Froot (1986).

14. Schulmeister (1987) offers a useful description of the various rules of technical analysis that are in widest use, calculates that many of the rules would have made money over the period 1980-86 (p.9), cites a 1985 statistic from the Group of 30 that 97 per cent of banks and 87 per cent of securities houses report the belief that "the use of technical models has had an increasingly significant impact on the market" (p.14), and expresses disapproval that economists have not seriously studied such rules that are actually used by traders. Reszat (1987) also reports that technical analysis is in widespread use. Goodman (1979) finds that the forecasts of technical analysts perform relatively well (for example, beating the forward rate), but Blake, Beenstock and Brasse (1986) find the reverse.

15. In their model there exists a riskier asset, which must pay a higher expected return to compensate the rational investors to hold it. The "noise traders" hold more of this asset because they have a mistaken idea of the risk-return tradeoff (they "rush in where wise men fear to tread"), and so their share of wealth can grow over time.

16. See Ito and Roley (1987).

17. Federal Reserve Bank of New York (1986).

18. The source is Bank of England (1986). See also Goodhart (1987, p.59).

19. 59 times greater, for the case of Germany, according to an estimate by Schulmeister (1987, p.8).

20. The survey was conducted by the Economist, at a six-month horizon, for five exchange rates, June 1981-December 1985.

21. According to Euromoney, August 1987, p. 113 one forecasting service makes forecasts every 15 minutes. Another gives its customers beepers so they can be contacted at short notice. Many of the services refused to give Euromoney forecasts at a horizon as long as six months, saying their systems "'were orientated [sic] towards a shorter-term horizon'" (p. 119). De Long et al call this the "Wojnilower problem."

22. The survey data suggest that investors, while expecting a gradual return to equilibrium at 6 or 12 month horizons, tend to extrapolate at 1 week or 1 month horizons. This pattern is itself a violation of the principle of rationality that the long run is the sum of iterated short runs; it is as if each trader thinks he can ride the current trend a little longer, and at the first sign of a reversal will be quick enough to get out before everyone else does. (At any horizon, a comparison with actual ex post changes suggests that a rational expectation would be closer to zero depreciation.)

23. Summers (1986) argues that, because variability is so great, neither the econometrician nor the investor can tell if there are expected excess profits to be made from buying an asset whose market price appears to exceed its fundamental price due to a slow-disappearing "fad." Arrow (1982) argues similarly. Both cite the work of Tversky and Kahneman (1981) that individuals overreact to current, visible information, which in this context means putting too much weight on the

current spot price in forming their expectations, and not enough weight on long-term fundamentals. Dornbusch (1982) shows how investors' extraneous beliefs, such as an imagined future influence of the current account on the exchange rate, can cause the spot rate to deviate far from the fundamentals rate; yet if the current account changes slowly over time, again, neither the investor nor the econometrician could detect the deviation except in very large samples.

24. See Helpman (1981), Helpman and Razin (1979, 1982), Stockman (1979, 1980, 1983, 1987), Miller and Wallace (1985) for some of the most influential papers in this tradition.

25. The 1936 article by Simons "Rules versus Authorities in Monetary Policy" reproduced in Simons (1948) already advances a sophisticated discussion of a proposal for constant money.

26. We abstract entirely from dynamics and expectations. For a different formulation see Dornbusch (1987a).

27. We noted above the need to decide whether income or spending should be targeted. The point is significant for world consistency since an individual country can achieve a nominal income target by an improvement in the external balance thus possibly using beggar-thy-neighbor policy.

28. See the discussion in Cuddington (1983), Dornbusch (1986b, 1987a), and McKinnon (1984a,b).

29. For a recent assessment of apparent deviations from full market fundamentals see the collection of essays in Hogarth and Reder (1986).