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THE U.S. DOLLAR— RECENT DEVELOPMENTS, OUTLOOK, AND POLICY OPTIONS

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A Symposium Sponsored by the
Federal Reserve Bank of Kansas City

Jackson Hole, Wyoming
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Contents

Foreword v
The Contributors vii
The Moderators xi
Robert Roosa
Walter Heller

1. Gauging the Evidence on Recent Movements in the Value of the Dollar, *Richard M. Levich* 1

Commentary on "Gauging the Evidence on Recent Movements in the Value of the Dollar," *Robert Z. Lawrence.* 29

2. Causes of Appreciation and Volatility of the Dollar, *William H. Branson* 33

Commentary on "Causes of Appreciation and Volatility of the Dollar," *Jacob A. Frenkel* 53

3. Effects of the Strong Dollar, *Robert Solomon* 65

Commentary on "Effects of the Strong Dollar," *John S. Fleming* 89

4. The International Role of the Dollar, *Otmar Eminger* 93

5. Is the Strong Dollar Sustainable?, *Paul R. Krugman* 103

Commentary on "Is the Strong Dollar Sustainable?," *Michael L. Mussa* 133

6. The U.S. Payments Deficit and the Strong Dollar: Policy Options, *Richard N. Cooper* 157

Commentary on "The U.S. Payments Deficit and the Strong Dollar: Policy Options," *Paul Craig Roberts* 177

7. Is There a Case for More Managed Exchange Rates?, *Jeffrey D. Sachs* 185

Commentary on "Is There a Case for More Managed Exchange Rates?," *Ronald I. McKinnon* 213

8. Overview Panel

C. Fred Bergsten 227

William Poole 235

Henry C. Wallich 241

Symposium Participants 245

Foreword

Early in 1985 the value of the U.S. dollar reached a record high against most foreign currencies. While the strength of the dollar helped to keep the U.S. inflation rate low, it also led to major imbalances in our economy. As a result, many questioned whether the strength of the dollar could and should be sustained. And, if the strength of the dollar was not sustainable, when and by how much should the dollar fall? And, finally, what should be the appropriate role for monetary and fiscal policy, both here and abroad, in these circumstances?

To achieve a better understanding of these concerns about the U.S. dollar, we brought together leading authorities from academe, government, and the private sector for a two-day symposium on "The U.S. Dollar — Recent Developments, Outlook, and Policy Options." The symposium, the eighth in a series sponsored by the Kansas City Fed, was held August 21-23, 1985 at Jackson Hole, Wyoming.

We hope that the proceedings of this symposium will be of interest to all those wishing to learn more about factors affecting the value of the U.S. dollar.

Roger Guffey
President
Federal Reserve Bank of Kansas City

The Contributors

C. Fred Bergsten, director, Institute for International Economics. Dr. Bergsten' is the first director of the Institute for International Economics. Prior to this, he was Assistant Secretary of the Treasury for International Affairs from 1977 to 1981 and Undersecretary for Monetary Affairs in 1981. In those capacities, he had responsibility for U.S. policy in the international monetary, trade, investment, and development areas. Dr. Bergsten also served for three years as Assistant for International Affairs to Henry Kissinger on the senior staff of the National Security Council, and has been a senior fellow at the Brookings Institution. He has authored several books and numerous articles on a wide range of international and economic issues.

William Branson, professor of economics and international affairs, Princeton University. A member of the Princeton University faculty since 1966, Dr. Branson is also a senior adviser to the Brookings Panel on Economic Activity and the Director of Research in International Studies for the National Bureau of Economic Research. Dr. Branson is co-editor of the ***Journal of International Economics*** and associate editor of the ***Review of Economics and Statistics.*** In addition, he has been a consultant to numerous government and international agencies. Dr. Branson has published numerous scholarly articles in international economics.

Richard N. Cooper, Maurits C. Boas Professor of International Economics, Harvard University. Dr. Cooper has divided his career between academic work and government service. He was Undersecretary for Economic Affairs in the Department of State (1977 to 1981), a consultant to the National Security Council (1969 to 1970), and Deputy Assistant Secretary of State for International Monetary Affairs (1965 to 1966). Before coming to Harvard University, Dr. Cooper was the Frank Altschul Professor of International Economics at Yale university. He is the author of numerous books and articles in the area of international economics.

, **Otmar Emminger,** former president, Deutsche Bundesbank. Dr. Emminger was a member of the Board of Governors of the Deutsche Bundesbank from 1953 to 1979. He served as Deputy Governor and Vice-Chairman of the Board of Directors. From 1977 to 1979, he served as president of the Deutsche Bundesbank. Dr. Emminger also was International Monetary Fund Executive Director for Germany from 1953 to 1959. He has served in a host of other important international positions, including chairman of the Deputies Committee of the Group of Ten, German Governor of the International Monetary Fund, and member of the Board of the Bank for International Settlements. He has written extensively in German and in English.

John S. Flemming, economic adviser to the governor, Bank of England. Before joining the Bank of England as Head of the Economics Division in 1980, Mr. Flemming had taught economics at Oxford University since 1963 where he also managed the internationally diversified endowment portfolio of Nuffield College. He has published articles in macro and monetary theory, capital theory, and public finance, as well as applied topics and a book on inflation. Between 1976 and 1980 he edited the ***Economic Journal*** for the Royal Economic Society and earlier was an editor of ***Oxford Economic Papers*** and the ***Review of Economic Studies.***

Jacob A. Frenkel, David Rockefeller Professor of International Economics, University of Chicago. A member of the University of Chicago faculty since 1970, Dr. Frenkel has also been a visiting faculty member at the Tel Aviv University, Israel. He is a research associate of the National Bureau of Economic Research, a Fellow of the Econometric Society, and a consultant to the International Monetary Fund and the World Bank. Dr. Frenkel is the co-editor of nine books and the author of numerous scholarly articles on international macroeconomics.

Paul R. Krugman, professor of economics and management, Massachusetts Institute of Technology. Before joining the faculty in 1980, Dr. Krugman was on the faculty at Yale University. He is also a research associate with the National Bureau of Economic Research. He has done consulting work for a number of organizations, including the Bank of Portugal, the National Academy of Sciences Panel on Advanced Technology Competition, and the U.S. State Department on industrial policy. From 1982 to 1983, Dr. Krugrnan served as international policy economist on the Council of Economic Advisers. He has written a number of scholarly publications in the field of international economics.

Robert Z. Lawrence, senior fellow, Brookings Institution. A specialist in international economics, Dr. Lawrence has served as a consultant to the Federal Reserve Bank of New York and to the World Bank, a member of the Special Study on Economic Change by the Joint Economic Committee of the U.S. Congress, and on the Brookings Panel on Economic Activity. He was a professorial lecturer at the School of Advanced International Studies at Johns Hopkins University for three years. Before joining Brookings as a research associate in 1976, he was an instructor at Yale University. He has published a number of papers, reviews, and economic essays.

Richard M. Levich, associate professor of finance and international business and chairman of the International Business Program, New York University Graduate School of Business Administration. A member of the New York University faculty since 1975, Dr. Levich is also a research associate with the National Bureau of Economic Research. In addition, he has been a visiting faculty member at the University of Chicago, Yale University, Centre D'Enseignement Superieur des Affaires (France), and the University of New South Wales (Australia) and a visiting scholar at the Board of Governors of the Federal Reserve System. Dr. Levich is the author or co-editor of four books and numerous articles in professional journals.

Ronald I. McKinnon, Eberle Professor of Economics, Stanford University. Dr. McKinnon has been a member of the Stanford economics faculty since 1961. In addition, he has also served as a consultant to many international organizations and foreign governments, including Colombia, Kuwait, Chile, Uruguay, and Peru. Dr. McKinnon is the author or editor of four books and many articles on the international macroeconomy.

Michael L. Mussa, William H. Abbott Professor of International Business, University of Chicago. Before joining the faculty of the Graduate School of Business in 1976, Dr. Mussa was on the faculty of the Department of Economics at the University of Rochester. During this period he was also a visiting faculty member at the Graduate Center of the City University of New York, the London School of Economics, and the Graduate Institute of International Studies in Geneva, Switzerland. In 1981, Dr. Mussa received the Prix Mondial Nessim Habif from the University of Geneva for his research in international economics. Dr. Mussa also serves as a consultant to the World Bank. He has published several articles in the areas of international economics, monetary economics, and municipal finance.

William Poole, professor of economics, Brown University. Dr. Poole was a member of the President's Council of Economic Advisers from 1982 to January 1985. He also spent a year at the Research Department of the Reserve Bank of Australia. Before joining the Brown faculty in 1974, Dr. Poole served as an adviser to the Federal Reserve Bank of Boston and as an economist at the Board of Governors of the Federal Reserve System. He has also taught at Johns Hopkins University, the Massachusetts Institute of Technology, Harvard, Georgetown, George Washington, and the American Universities. Dr. Poole has written numerous scholarly papers in the area of monetary theory and macroeconomics.

Paul Craig Roberts, William E. Simon Chair in Political Economy, Georgetown University. Dr. Roberts is also a Senior Research Fellow in the Hoover Institution at Stanford University. Before joining the faculty at Georgetown University, Dr. Roberts served as Assistant Secretary of the Treasury for Economic Policy. He was involved in the drafting of the Kemp Roth bill. Dr. Roberts is a leading supply-side spokesman, and has written many articles on public policy issues.

Jeffrey D. Sachs, professor of economics, Harvard University. In addition to his responsibilities at Harvard, Dr. Sachs is a research associate with the National Bureau of Economic Research, a member of the Brookings Panel of Economists, and a consultant for the World Bank. He also has done consulting work for the International Monetary Fund and Organization for Economic Cooperation and Development. Dr. Sachs worked as a research associate with the Falk Institute of Economic Research in Jerusalem and the London School of Economics, was a junior fellow in the Harvard Society of Fellows, and was a visiting scholar at the Institute for International Economic Studies in Stockholm. He is the author of numerous publications.

Robert Solomon, guest scholar, Brookings Institution and president of RS Associates, Inc. Before coming to the Brookings Institution, Dr. Solomon was with the Federal Reserve Board from 1948 to 1976. While at the Board of Governors, he became Adviser to the Board and Director of its Division of International Finance. Dr. Solomon also served as Senior Staff Economist at the Council of Economic Advisers in 1963 to 1964 and in 1972 to 1974 served as a Vice Chairman of the Deputies of the Committee on Reform of the International Monetary System (Committee of Twenty). He is the author of ***International Economic Letter*** and writes a column for the ***Journal of Commerce.***

Henry Wallich, member, Board of Governors of the Federal Reserve System. Dr. Wallich has been a member of the Board of Governors since 1974. Before coming to the Board of Governors, he was on the faculty at Yale University from 1951 to 1974; from 1970 to 1974 he was the Seymour H. Knox Professor of Economics. Dr. Wallich was an assistant to the Secretary of the Treasury in 1958 and 1959, a member of the Council of Economic Advisers from 1959 to 1961, and a Senior Consultant to the Secretary of the Treasury from 1969 to 1974.

The Moderators

Walter Heller, Regents' Professor of Economics, University of Minnesota. A member of the University of Minnesota faculty since 1946, Dr. Heller has also served in many government positions. He was Chairman of the Council of Economic Advisers from 1961 to 1964, a Consultant to the Executive Office of the President from 1965 to 1969 and 1974 to 1977, and a Consultant to the Congressional Budget Office since 1975. Dr. Heller is also a director of the National Bureau of Economic Research, a member of the TIME Board of Economists, a member of the board of contributors to *The* Wall *Street* Journal, and a commentator on the PBS "Nightly Business Report."

Robert Roosa, partner, Brown Brothers Harriman & Co. Dr. Roosa is a director of American Express Company, Owens-Corning Fiberglas Corporation, Texaco, Inc., and the National Bureau of Economic Research, and Chairman of the Brookings Institution, Chairman of the New York Stock Exchange Advisory Committee on International Capital Markets, and is a member of the Advisory Committee of the International Finance Corporation. Before joining Brown Brothers Harriman & Co. in 1965, he was Undersecretary of the Treasury for Monetary Affairs (1961 to 1964), and preceding that was with the Federal Reserve Bank of New York for 15 years. Dr. Roosa has written extensively on international financial arrangements.

1
Gauging the Evidence on Recent Movements in the Value of the Dollar

Richard M. Levich

This symposium is being called at a time when there is great concern about the floating exchange rate system in general and the foreign exchange value of the dollar in particular. Since the early 1970s, with the Smithsonian Agreement in late 1971 and the move to generalized floating in early 1973, news about exchange rate developments and events that might affect the path of exchange rates have become a staple in the diet of national policymakers and business executives. But over the last several years, the dollar has embarked on an unprecedented course. The dollar's rise through 1985:Q1 has been called "phenomenal," "dazzling," even "astronomical."[1] In its current *Annual* Report, the Bank for International Settlements (1985, p. 143) characterized the late-February 1985 period as one of "dollar euphoria."

Events of the last several years have led researchers to reexamine some basic questions:

1. At an "objective" level, what has been the record of exchange rate movements-that is, the behavior of nominal and real, bilateral, and multilateral rates, and their volatility--over the recent years?

2. At a more subjective level, what is meant by a "strong dollar" and in what ways might one measure a currency's performance? Has the market tended to produce exchange rates that conform well to this measure of an "equilibrium" exchange rate (i.e., "public" market efficiency)?

3. If we find episodes of currency misalignment, can we attribute them to causes such as misguided intervention, market inefficiency (of private mar-

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T. Q. Hung (1985) of Merrill Lynch Capital Markets noted that "The phenomenal appreciation of the U.S. dollar in the past five years has revealed the deficiency of some of the traditional explanations of the dollar's exchange value." Jeffrey Frankel (1985) titled his recent article "The Dazzling Dollar." *The New York Times* (May 16, 1985) refers to an amendment introduced by Senators Bill Bradley of New Jersey and Alan Dixon of Illinois calling for "moderate intervention" to bring the dollar down from its "astronomical" highs.

ket participants), or poor coordination of national macroeconomic policies?

The paper to follow is organized along the lines of the above three questions. We first review the experience of nominal bilateral and real effective exchange rates since the early 1970s as well as evidence on exchange rate volatility. The next section begins with an overview of recent asset models of exchange rate behavior and exchange market equilibrium and some estimates of exchange rate misalignment are presented. The penultimate section considers the evidence on the causes of currency misalignments. Here we adopt Williamson's (1983) taxonomy and analyze the case for misguided official intervention, private market inefficiency, or poor coordination of macroeconomic policies in explaining currency misalignments. The final section contains a summary of the major arguments.

A number of excellent analyses of exchange rates have appeared recently and the dollar's strength has been so pronounced and prolonged that the mass media regularly editorializes on its magnitude, causes, and cures.[2] Consequently, we will break little new ground here, attempting instead to synthesize the evidence and assess where matters stand.

While it may have been easily anticipated, the statistical evidence is mixed and its interpretation ambiguous. As a consequence, we cannot reach closure on the key issues for policy. However, we can conclude, first, that the modem asset view of exchange rates offers an exceedingly complex and rich framework for analysis. So much so, that the distinction between disequilibrium rates, reflecting private market or public policy failures, and equilibrium rates, reflecting a peculiar albeit efficient adjustment path, becomes exceedingly difficult to draw. Second, several major building blocks-purchasing power parity (PPP), unbiased forward expectations, and stabilizing private speculation—must return center stage for reevaluation. The recent experience and empirical evidence have undermined all of these relationships and reawakened proposals for a managed flexible exchange rate system with target zones or other forms of exchange rate surveillance. Despite the unsettling evidence, or perhaps because of it, we must also conclude that the case for official intervention or closer central bank surveillance is not substantiated either. While the theory of speculative bubbles and bandwagons suggests that exchange rate changes may themselves be the cause of future exchange rate changes, the empirical evidence is not conclusive. Controlling exchange rate changes directly may amount to treating symptoms rather than causes, which is always a dangerous approach to health care.

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[2] See the analyses by Feldstein (1983), Frankel (1985), Islam (1984), Shafer and Loopesko (1983), and Williamson (1983, 1985).

The objective behavior of exchange rates

The argument for flexible but stable exchange,rates rests firmly on the assumption that national economic policies would be stable, predictable, and coordinated and that exogenous disturbances would be few or at least moderate in size. Proponents of pegged or managed exchange rates have argued that the above conditions are not sufficient—a shortage of stabilizing speculative capital, an excess of destabilizing speculative capital, or certain features of the adjustment process itself (e.g., sticky prices) might cause actual exchange rates to be relatively volatile, even if "economic fundamentals" were fairly calm. All parties in the debate on the international monetary system seek stable and predictable exchange rates, in order to promote the gains from trade and capital flows. But for one reason or another, stability and predictability have been elusive.

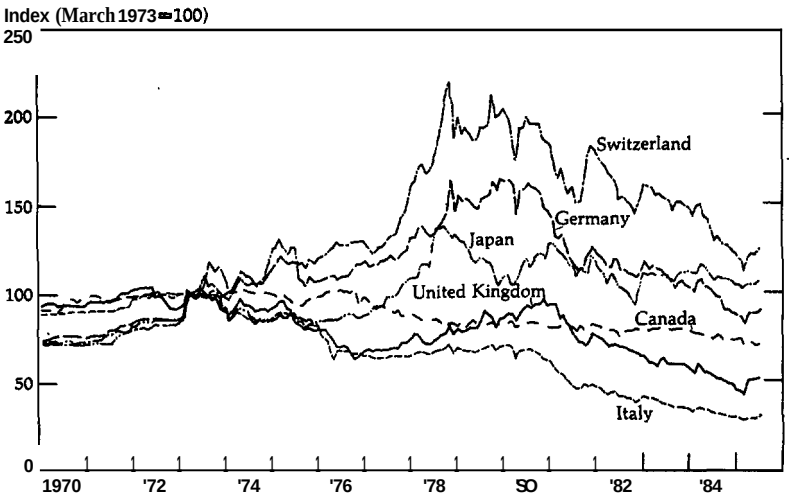
Prior to the 1970s, most exchange rates were pegged to the U.S. dollar, their values held within one percent of the parity rate through official intervention. In response to a fundamental disequilibrium, the central bank would make a discrete, step adjustment in the parity and then resume its official support. Since March 1973, the values of the currencies of the major industrial countries have been determined primarily by free-market forces in a floating exchange rates system. (The Canadian dollar was allowed to float in June 1970 and the British pound in June 1972.) From time to time, central bankers have intervened ostensibly to smooth "disorderly" market conditions, making the term managed floating more appropriate. In fact, most countries (roughly two-thirds of the 148 International Monetary Fund member countries) have chosen to fix their currencies formally to something (e.g., a single currency or a basket) in order to promote stability.

Nominal exchange rates

Chart 1 presents indexes of selected nominal, bilateral exchange rates in U.S. dollars per foreign unit. The graph clearly shows the divergent paths that these bilateral rates have taken after having once been pegged for long periods of time. From 1973 through mid-1975, several currencies (the DM and Swiss franc in particular) demonstrated a strong cyclical pattern, rising by 20-30 percent and then falling back on three separate occasions. This behavior led observers to propose that exchange rates may overshoot their equilibrium values. From mid-1975 through the end of 1976, exchange rate movements for the DM, Swiss franc, Japanese yen, and Canadian dollar were relatively flat, leading some observers to feel that the learning period had been passed and the era of flexible but stable rates had arrived. The U.S. dollar slide erupted again in 1977 to be capped for the DM (at $0.5780) and the Swiss franc (at $0.6787) by the major U.S. intervention announced on

CHART 1

Nominal Bilateral Exchange Rates
$/Local Currency



Data Source: International Financial Statistics

November 1, 1978. The Japanese yen continued to appreciate until late 1979. After March 1973, the British pound depreciated sharply until late-1976 (reaching a then historic low of $1.59 in the week ending October 29, 1976). The pound subsequently appreciated roughly 50 percent over the next four years ending late-1980.

Since 1980 and until very recently, the story has been all U.S. dollar appreciation as shown in Chart 2. The slide of all currencies against the dollar has been almost uninterrupted. The cumulative decline for the British pound and DM reached 50 percent on March 8, 1985.[3] The Japanese yen has been an important exception, its nominal value trading within a 10 percent range of its January 1980 value for most of the last five years. While the dollar's rise has been dramatic, the nominal movements are roughly the same as for the DM, Swiss franc, and yen during the 20-month period ending November 1, 1978.

The strength of the dollar certainly has been remarkable, but all the more given the U.S. balance of payments position. In its *Annual Report*, the Bank

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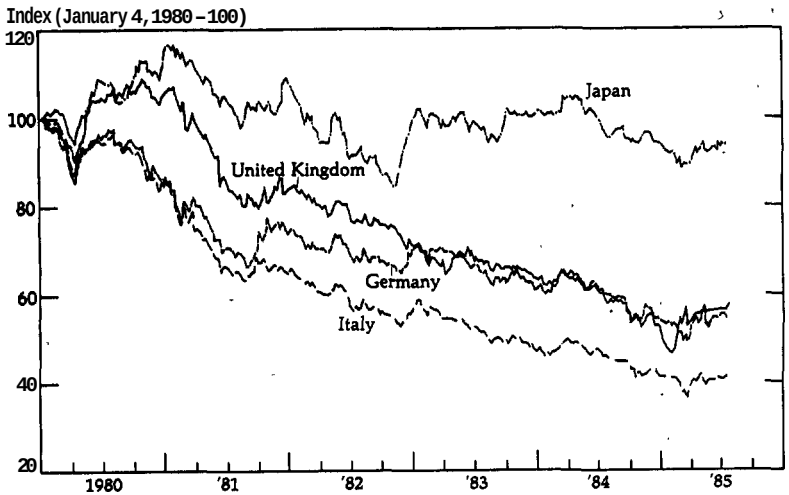
[3] Note that these rates are in $/foreign currency. For example, the DM declined from $0.5840 (i.e., 1.7122 DM/$) on January 4, 1980 to $0.2929 (i.e., 3.4144 DM/$) on March 8, 1985—a 50 percent decline in $/DM terms and a 100 percent increase in DM/$ terms.

CHART 2

Nominal Bilateral Exchange Rates
$/Local Currency



Data Source: Harris Bank Weekly Review
Weekly Data: 1/4/80 — 6/28/85

for International Settlements (1985, p. 147) commented, "There is no parallel for this phenomenon of an ever strengthening currency based on ever increasing capital inflows with the current account steadily deteriorating." The contrast with the strength of the DM and the yen in the 1970s and their current account positions is striking.

Real effective exchange rates

While a nominal bilateral exchange rate is the most common measure of currency value, it may provide misleading signals when price levels and inflation rates differ across countries. ***A real*** exchange rate expresses the value of a currency in terms of real purchasing power. Very often, the real exchange rate is quoted as an index relative to a PPP exchange rate, so that

$$S_{real,t+n} = S_{t+n} / S_{PPP,t+n}$$

where

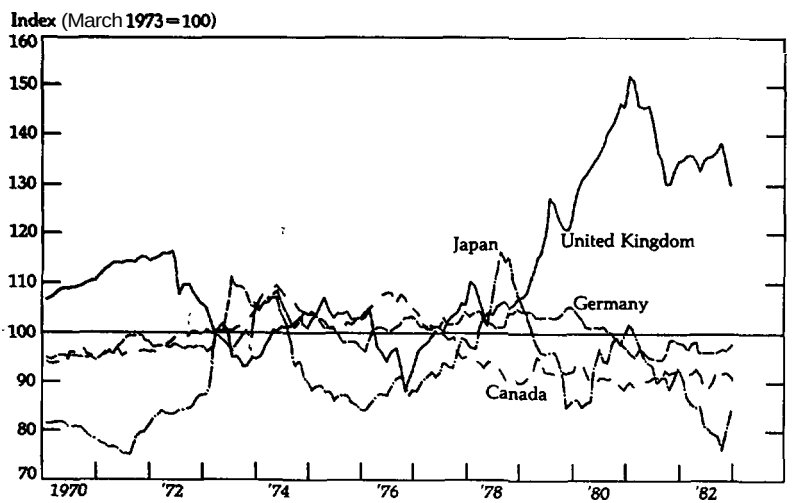
$$S_{PPP,t+n} = S_t (P_{\$,t+n}/P_{F,t+n}) / (P_{\$,t}/P_{F,t}),$$

and S is a nominal exchange rate in dollars ($) per foreign currency (F). This formulation assumes that ***relative*** PPP holds and that period ***t*** is an equilibrium base period. Values of S_{real} greater (less) than unity indicate real depreciation (appreciation) of domestic currency, i.e., more (less) U.S goods are required to purchase one unit of the foreign market basket. Values of S_{real} equal to unity indicate that the real exchange rate and relative purchasing power parity were maintained (i.e., that the nominal exchange rate change was exactly offset by the differential change in U.S. and foreign price indices). Consequently, the real exchange rate is a useful device for measuring the competitiveness of domestic goods in international markets, for predicting future changes in trade patterns, and for evaluating long-term real investment projects.

The ***real effective exchange rate*** is a multilateral rate that attempts to measure the overall competitiveness of home country goods in international markets. Several institutions (International Monetary Fund, Federal Reserve Board, Morgan Guaranty Trust, and others) regularly calculate these rates, however, each institution uses its own weighting scheme and its own base period. These differences become important if real exchange rate movements are taken as a measure of misalignment, as we will discuss further in the next section. While a summary statistic such as the real effective

CHART 3

Real Effective Exchange Rates



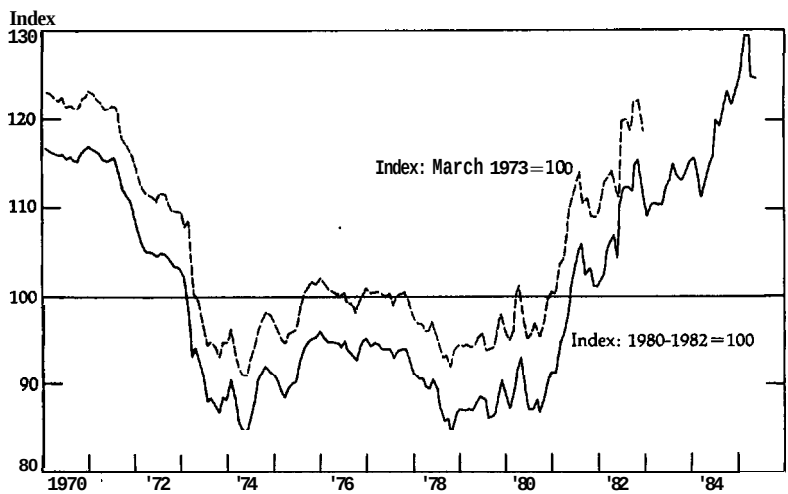
Data Source: Morgan Guaranty Trust

exchange rate should be interpreted with caution, it ought to provide a rough measure of the change in international competitiveness.

A sample of real effective exchange rates is displayed in Chart 3. (The data here are in foreign currency per dollar, so values greater than 100 indicate real appreciation.) The data clearly indicate that during the first seven years of generalized floating, real effective exchange rates were considerably less volatile than nominal rates. In part, this is because a multilateral exchange rate, by its nature, conceals the price behavior of individual bilateral markets. But it also reflects the fact that exchange rate changes were to some extent a response to relative inflation rates, i.e., there was some tendency for PPP to hold over this period. Britain is an exception, where we observed the nominal $/pound rate increasing steadily through 1980, not offset by lower British inflation.

CHART 4

Real Effective Exchange Rate
U.S. Dollar



Data Source: Morgan Guaranty Trust

Over the 1973-1979 period, the band of real exchange rate fluctuations may seem relatively narrow.[4] For example, the real effective rate for Germany varied between 97 and 111, and between 85 and 116 for Japan. Chart 4

[4] Cooper (1984, p. 18) noted that "Contrary to widespread opinion the figures suggest that there have not been wild gyrations in these rates."

shows that the real effective rates for the U.S. (March 1973 = 100) varied between 91 and 103 in the same period. To keep the magnitude of these movements in perspective, it is worth noting that a 20 percent real exchange rate change may be fatal to an exporter who operates on a 20 percent profit margin or whose cost advantage over a producer in another country is 20 percent. In highly competitive industries, small real rate changes may matter significantly.

The behavior of real effective exchange rates for the U.S. dollar since 1980 is clear from Chart 4. The real appreciation of the U.S. dollar amounted to 47.5 percent from a low of 88 in 1980 until peaking at 129.8 (on the new index of 1980-82 = 100) in February and March 1985.[5] We will return to Chart 4 in the next section to discuss the two U.S. indices.

Exchange rate volatility

Along with concern over the level of nominal and real exchange rates, interest in the extent of exchange rate volatility has grown as well. The primary concern is whether exchange rate volatility is "excessive" and deviations from PPP "prolonged." For some observers, this concern reflects a problem in positive economics (i.e., are exchange rates too volatile to be consistent with a credible model of exchange rate determination) rather than a normative issue (i.e., are exchange rates too volatile to allow countries to reach their targets for internal and external balance). Measures of "excessive" volatility require some benchmark of "equilibrium" volatility given economic fundamentals, including institutional market arrangements. We will return to this theme after a look at volatility statistics.

The data which follow measure the total or unconditional volatility of exchange rates. This may confuse expected drift with volatility. Under the assumption that the forward rate reflects the market's expectation of the future spot rate, forward forecast errors measure the conditional or unanticipated exchange rate movements. These results are presented in a later section.

A recent study by Bergstrand (1983) measures exchange rate volatility over the January 1977-May 1983 period for six major currencies and compares these results to the volatility in other financial markets and commodity markets. Bergstrand's results on this broad sample reconfirm earlier calculations by Frenkel and Mussa (1980) and Levich (1981)—exchange rates, although more volatile than aggregate price indices, are "the least volatile of

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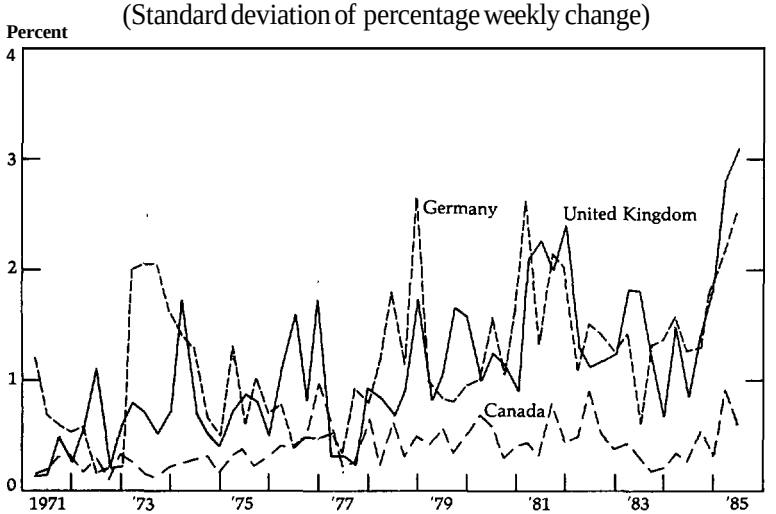
[5] It is not clear how to interpret the high real effective exchange rates for the dollar prior to 1973. They may represent the alleged advantage enjoyed by the U.S. during the Bretton Woods period.

a representative sample of financial and real asset prices."[6] Furthermore, Bergstrand argues that exchange rate volatility increased (along with volatility in other asset prices) after the October 1979 switch to money supply targeting, but this volatility declined during his last September 1982-May 1983 subperiod.

Updated measures of spot exchange rate volatility appear in Chart 5.[7] These results confirm a surge in exchange rate volatility in 1978:Q4 and again in 1980 and 1981 after the changeover in monetary targeting. However, our results indicate that in 1985:Q2 volatility has again jumped, meeting or exceeding the levels of the past ten years.[8] Other data reported by the Bank for International Settlements (1985, p. 146) confirm these results.

CHART 5
Spot Exchange Rate Volatility
(Standard deviation of percentage weekly change)



Data Source. Harris Bank Weekly Review
Quarterly data: 1971:Q1 — 1985:Q2

The subjective behavior of the dollar

The major question facing policymakers is whether the exchange rate behavior described in the preceding section approximates a set of justifiable,

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6 Bergstrand (1983, p. 14).

7 The technique of computing the standard deviation of percentage exchange rate changes over a period is suggested by Lanyi and Suss (1982), who also report on an extensive study of bilateral and multilateral exchange rate variability.

8 The results for the three countries in Chart 5 are representative of the other countries (Belgium, France, Italy, Netherlands, Switzerland, and Japan) we examined.

"equilibrium" exchange rates arrived at through an efficient markets process, or whether, in fact, we are passing through a period of exchange rate "misalignment" that demands action of some sort. Notions of "equilibrium rates" or "excessive volatility" require a benchmark, and consequently they are both tests of the benchmark and the market's ability to set prices to conform to the benchmark. If the benchmark is hard to identify, we are in deep trouble. We continue with a brief look at theories of exchange rate determination and then go on to consider alternative standards for assessing the relative "strength," "overvaluation," or "misalignment" of the dollar.

Exchange rate determination[9]

It is now widely agreed that the price of foreign exchange is determined largely by asset market considerations. This view, which relies heavily on a stock equilibrium concept, stands in sharp contrast to flow equilibrium models of the balance of payments. In a flow approach, the demand (and supply) for foreign exchange was modeled as a derived demand, derived from the ultimate demand for goods and services in international trade. In the post-World War II period, with limited capital mobility, a small pool of liquid funds, and no Euromarkets, this was probably a reasonable first-approximation. A stock approach stresses that the supply of financial assets denominated in U.S. dollars (or DM or Japanese yen) must be willingly held at any moment in the trading day, and it is the intersection of demand and supply in this context that largely determines the exchange rate. In principle, a general equilibrium would require both flow and stock equilibrium, but in a world with high capital mobility and large pools of liquid capital, it is clear that asset market considerations must play a major role.[10]

One implication of the view that foreign exchange is a financial asset is that the current spot rate reflects the expected values of future exogenous variables, discounted back to the present. This is, of course, analogous to the notion that a security's price reflects the present value of expected future cash flows. At this point, we wish to argue that while this analogy is useful, the pricing of foreign exchange ought to be considerably more complex than the popular capital asset pricing models (CAPM) of the 1960s and 1970s.

The CAPM framework assumes that asset returns are stochastic and investors are risk averse utility maximizers. It makes two further critical assumptions: (1) assets are in fixed supply, and (2) there are many securities in the world and the relative supply of each is small. Given these two simplifying assumptions, investor demand for return and risk (measured relative

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[9] For a more complete review of exchange rate determination models, see Levich (1984).
[10] See Kouri (1976) and Dornbusch and Fischer (1980) for models that incorporate both stock and flow equilibrium characteristics.

to a market index), scaled by the fixed supply of assets, is sufficient to determine asset prices. The first assumption implies that trivial supply .shocks, such as a stock split, have a direct effect on share prices. But stochastic supply shocks (e.g., exercise of warrants, executive stock options, exchange of convertible bonds, corporate "buy-back" programs) lead to more complicated and ambiguous effects on the general equilibrium share price. The second assumption suggests that dramatic shocks affecting any individual security do not spill over into other securities to require extensive portfolio rebalancing. A foreign exchange rate pricing model cannot make either of these assumptions and still hope to provide a realistic explanation of exchange rate behavior. First, supplies of foreign currency and of government debt denominated in foreign currency are definitely not fixed, and their growth rates are not easily predicted. In addition, one component of supply, official intervention, may be a reaction to the private demand function. Second, private demands for foreign currency and foreign currency denominated assets will depend on the expected rate of return on these assets and on how well the currency contributes to private utility by providing services as a medium of exchange and store of value at low risk. These factors presumably depend on the supply process so that monetary discipline (i.e., slow and predictable monetary growth) and fiscal discipline (i.e., budget balance) will have a positive impact on currency demand. This strongly suggests that an asset pricing framework for foreign exchange ought to account for the simultaneous determination of supply and demand and the stochastic nature of supply.

Furthermore, the CAPM assumption of many securities and little need for portfolio re-balancing in response to security specific shocks cannot be transplanted easily in the foreign exchange market. World financial wealth is concentrated in a handful of currencies, current account imbalances redistribute sizable pools of wealth, and shifting spending patterns may cause global currency mangers to realign their transaction balances. The attempt of many actors to execute these transactions at once, in response to changing exchange rate or interest rate expectations, could easily produce substantial exchange rate swings.

The above discussion suggests that a complex version of capital market theory combined with macroeconomics is required to achieve a close approximation to the real world setting of exchange rate determination. Unfortunately, capital market theory places major emphasis on expectations, which are unobservable and difficult to approximate empirically. This suggests that it may be extremely difficult to document exchange rate behavior, especially short-run behavior, and determine whether or not prices seem to be evolving rationally in response to an equilibrium model.

The current literature brings into sharp focus the question of what one means by "the fundamentals" in a model of exchange rate determination.

Models that assume that consumer prices adjust slowly (relative to the speed of adjustment in asset markets), or that desired asset accumulation proceeds slowly through the current account, will produce exchange rate "overshooting" (i.e., a short-run change in the exchange rate that exceeds the required long-run equilibrium change) in response to an unanticipated disturbance."[11] But surely, the speed of consumer price change and asset accumulation are fundamental factors in the economy. Moreover, the ***realization*** of a change in fundamentals is not a necessary condition—the expectation of a future disturbance is sufficient to move exchange rates immediately. If these expectations are not realized, one is strained to conclude that speculators, setting price ex ante, performed irrationally (unless these expectations are repeatedly not realized).[12] Thus, the asset market environment is capable of rationalizing an extremely wide range of exchange rate behavior.

In sum, the asset view of exchange rates posits that the current set of exchange rates (spot and forward) reflects everything that is known (about economic structure and fundamentals) or expected to happen. As a corollary, the exchange rates deviate from their expected drift pattern only in response to news. And as another corollary, we would expect exchange rates (on average) to move very little (about their drift), but not be surprised if exchange rates moved a great deal.

Standards for comparison

In his recent monograph on the exchange rate system, Williamson (1983) defines three concepts of equilibrium:

Market equilibrium. The exchange ***rate*** that clears private supply and demand without official intervention.

Fundamental equilibrium. A real exchange rate that could be expected to produce a current account balance offsetting the underlying capital account over the business cycle (i.e., external balance) while maintaining internal balance and without imposing controls on trade or pay-

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[11] These results were developed in Dornbusch (1976), Branson (1977), and surveyed in Levich (1981). In an interesting historical analysis, Bernholz (1982) argues that this style of overshooting was observed in all periods of floating exchange rates over the last two centuries. Further, this pattern and its explanation were known to economists of the day.

[12] If speculators push up the price of orange juice futures several weeks prior to a freeze in northern Florida, we would be unlikely to conclude that "speculators cause weather," rather, that speculators took expectations into account for pricing. Speculators should be held blameless if their expectations are not met. The possibility of a "speculative bubble," especially one that is rational, i.e., based on the likelihood that other investors will appear to buy an overvalued asset, raises further problems regarding the meaning of "market fundamentals."

ments. The fundamental equilibrium rate may change in response to real changes in the economy.

Current equilibrium. A nominal exchange rate that reflects all information including temporary factors such as a divergence between current and desired asset positions, real interest rate changes resulting from a change in monetary/fiscal policy mix, and so forth. Exchange rate overshooting, described earlier, is an example of a current equilibrium that rationally diverges from its long-term fundamental equilibrium value because of temporary factors.

An important issue, which we leave until later, is whether a divergence between the fundamental equilibrium exchange rate (FEER) and a current equilibrium ought to be labeled as a "misalignment." The above definitions make clear that the assessment of an exchange market equilibrium or its absence, i.e., a misalignment or disequilibrium, involves a subjective evaluation relative to a benchmark. We move on to consider alternative candidates for the FEER.

Recent studies on exchange rate misalignment have focused on two empirical approaches: PPP and Current Account balance. As everyone should be aware, PPP calculations are haunted by numerous difficulties. Among these are the selection of an equilibrium base period, the selection of appropriate price indices, accounting for differences in consumption patterns and non-traded goods, specifying whether PPP applies to current prices or expected future prices, gauging a reasonable speed of adjustment between actual exchange rates and their PPP levels, and, of course, accounting for the possibility that PPP may be violated if there are real disturbances that require real exchange rate changes.

Chart 4 illustrates one of these problems. In 1983, Morgan Guaranty Trust (1983a, 1983b) came to believe that a strong dollar did not necessarily imply overvaluation or misalignment. Their reasons included confidence in U.S. monetary policy, progress toward energy price decontrol, changes in U.S. bilateral trade patterns, and serious overstatement of the U.S. current account deficit. They concluded that the earlier period no longer provided "a relevant yardstick for gauging the degree of dollar overvaluation. . . ."[13] As a result, Morgan Guaranty Trust selected 1980-82 as a new base period, reducing the index value at the time from 120 to 112. The report argued that this index implied a 12 percent loss of competitiveness in the U.S. manufacturing sector. It was not, however, "a measure of the dollar's overvaluation from the standpoint of the U.S. economy in its entirety."[14] This final state-

[13] Morgan Guaranty Trust (1983a, p. 11).
[14] Morgan Guaranty Trust (1983a, p. 11).

ment seems to suggest that there are strong reasons to abandon PPP as a guide for measuring misalignment.[15]

None of this should suggest that the current account balance approach is either objective or error-free. Among the difficulties in determining the equilibrium current account, we mention (a) estimating current and desired levels of domestic savings and investment over the appropriate cycle, (b) measuring the impact of government borrowing on domestic credit market conditions, (c) judging the appropriate use of foreign borrowing toward investment or consumption, (d) accounting for productivity changes, (e) coordinating the external balances of various open economies, and (f) doing all of the above with an imprecise statistical base.

While the notion of a country balancing its inflow and outflow of savings has strong intuitive appeal, it is supported neither by economic theory nor historical evidence. Opportunities and preferences for domestic savings and investment, taking tax incentives into account, may require an economy to be a net foreign borrower (or lender) over a long period. The cumulative current account (i.e., the net international investment position) may be non-zero, even though the expected current account at any distant point should approach zero, to keep the international investment position from exploding to infinity. But in a world characterized by growth and inflation, it is difficult to say whether any nominal cumulative current account is unsustainable.[16]

The perpetual current account surpluses in the United Kingdom (1870-1911) and in the United States (1946-70, except for three years) are useful episodes to keep in mind. These persistent "imbalances" would probably not be taken as evidence of serious macroeconomic disequilibrium. In a similar vein, Feldstein (1985) has argued that the persisting Japanese current account surplus has clear structural origins in taxation and savings behavior, rather than the result of exchange rate misalignment or trade practices. Cooper (1985) approaches the U.S. current account from the rest-of-the-world perspective. If non-American GNP is roughly $10 trillion, a 10 percent savings rate corresponds to $1 trillion, of which 10 percent (matching the roughly $100 U.S. capital inflow) might willingly be placed in the U.S. The breadth, depth, and liquidity of dollar-asset markets, both in the U.S. and offshore, lends credence to the view that foreign investors might willingly pay a premium for dollar assets compared with otherwise similar non-

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[15] Also, on this point, Maciejewski (1983, p. 493) notes that real exchange rate measures must be combined with a forward-looking analysis of the balance of payments. "In no case should the results obtained by any of the...indices be elevated into firm norms and used as the only indicators of currency overvaluation or undervaluation." See, also, Williamson (1983, p. 14) on this point.

[16] See the paper by Krugman for this Symposium.

dollar assets.

Overlaying these analytical issues is the problem of data itself. Morgan Guaranty Trust (1983a), Cooper (1985), and others have pointed out that the "Errors and Omissions" category of the U.S. Balance of Payments has become exceptionally large—$30 billion in 1982 and 1984. For the world, the total is close to $70 billion, and the likelihood is that most of these flows are headed toward U.S. dollar financial assets.

Estimates of misalignment

The preceding was intended to persuade the reader that estimates of currency misalignment ought to be handled with caution. Estimates of the FEER could easily be in error by 10 percent or more. Overshooting in response to current unanticipated shocks or future expected shocks could lead to a current equilibrium that diverges further from the FEER.

As of May 1985, the real effective U.S. dollar exchange rate stood at 125 (Chart 4).[17] So by this indicator, the dollar would need to decline by roughly 20 percent against all currencies to restore a competitive equilibrium in the U.S. manufacturing sector. However, as we argued earlier, this need not be evidence of a current misalignment from the standpoint of the entire economy.

Another approach is to consider the current long-term real interest differential (r-r*) as a forecast of the expected real exchange over some interval, and therefore an indicator of the current real exchange rate misalignment. Frankel (1985) estimates a ten-year real interest differential (U.S.-weighted foreign average) of 2.9 percent per annum. Compounded continuously over ten years, a 25 percent decline in the real effective dollar equalizes real returns on the dollar in comparison to the currency basket. There are several problems to consider. First, a longer time span would indicate that the real effective dollar is expected to depreciate further, seemingly without limit.[18] Second, ex ante real interest differentials cannot be observed directly, so they are subject to estimation error. Third, in the presence of a risk premium on the U.S. dollar, the interest rate differential overstates the market's expected rate of dollar depreciation, or equivalently, the extent of its current overvaluation or misalignment.

The final approach to measuring dollar misalignment seeks to estimate the set of exchange rates that would induce a set of current account balances

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[17] The Morgan Guaranty Trust index, as of late 1984, produced values that were as much as 12 percent below other indices. See Williamson (1985, p. 100), Figure A1 for a comparison of eight real effective exchange rates.

[18] See the paper by Krugman for a discussion of how asset accumulation constraints may affect the exchange rate path.

necessary to offset underlying capital flows. Williamson (1983, 1985) applies this approach, setting the desired U.S. current account balance (1976-77) at zero and adjusting for relevant macroeconomic changes after the base year. Williamson admits that the required assumptions are heroic and that barring major changes in the assumptions, the exchange rate estimates should have an error of as much as 10 percent. The estimates in Williamson (1985) indicate that in 1984:Q4, the dollar was about 40 percent above its fundamental equilibrium levels.

Sources of misalignment

The taxonomy introduced in the last section provides a useful guide to discuss exchange rate misalignments. An exchange rate misalignment, i.e., a deviation between the actual current spot rate and its FEER value, may develop through three channels:

(a) Actual spot rate ≠ market equilibrium rate.
(b) Market equilibrium rate ≠ current equilibrium rate.
(c) Current equilibrium rate ≠ fundamental equilibrium rate.

The first channel suggests the case in which private supply and demand are not permitted to produce a market clearing rate because of official intervention. Although official intervention is intended to stabilize exchange rates, some would argue that the actual effect has been destabilizing. A study by Taylor (1981) observes that central banks realized substantial intervention losses in the 1970s and, therefore, their overall effect must have been destabilizing. A later study by Jacobson (1983) argues that measures of profitability are sensitive to the sample period, the level of net intervention and the inclusion of interest opportunity costs. The results tor U.S. intervention are more positive after accounting for these factors. Another study by Mayer and Taguchi (1983) points out that the common concordance between unprofitable (profitable) and destabilizing (stabilizing) speculation is incorrect when the exchange rate has a sustained drift factor. Their own analysis shows that central banks tend to lean against the wind and that they succeed on about 80 percent of their interventions in reducing the volatility of exchange rates about a long-run average.[19]

In theory, official intervention could be destabilizing if private agents discover the intervention rule and attempt to take on profitable positions in advance. This is, of course, a specific example of the general result that sta-

[19] Mayer and Taguchi's study (1983, p. 29) includes Germany, Japan, and the U.K. over the period January 1974-June 1982. To the contrary, in the foreign exchange options market, where volatility is priced directly, recent casual evidence suggests that government intervention is linked with increases in implied volatility and option prices.

bilization policy may be futile in a world with agents who formulate rational expectations. Another theoretical consideration is whether sterilized intervention (i.e., one that leaves the domestic money supply unaffected) can have a significant effect on the exchange rate. A sterilized intervention to depress the dollar would, in essence, increase the outstanding supply of U.S. dollar bonds relative to DM bonds. If investors consider these bonds to be perfect substitutes, then sterilized intervention has no impact on the exchange rate. Perfect substitutability between foreign and domestic currency assets is equivalent to there being no foreign exchange risk premium. The empirical evidence on exchange risk premia is considered below.

The third channel allows that temporary factors (stemming from uncoordinated macroeconomic policies, unanticipated policy developments, or other unanticipated exogenous events) may cause a current equilibrium to deviate from the long-term fundamental equilibrium exchange rate. Certainly over the last decade, the world economy has been hit by several severe real disturbances, major shifts in macroeconomic policy stance, and a lack of policy synchronization across countries. Given the asset pricing framework we described earlier, it is well established that current exchange rates could justifiably deviate from their long-run equilibria. The empirical question is whether markets have pushed current exchange rates "too far."

This brings us to the second channel for introducing an exchange rate misalignment. Market inefficiency may cause the market equilibrium rate to deviate from the current equilibrium rate. The literature on foreign exchange market efficiency has exploded over the last ten years.[20] In an efficient market, prices reflect everything that is known or expected to happen. By implication, the market's expectational errors would average to zero and show no serial correlation. As a corollary, agents acting with the same information set as the market should not be able to earn unusual or risk-adjusted profits.

Empirical evidence on efficiency

Empirical studies have almost always shown that when uncertainty is absent (assuming away default risk) arbitrage profit opportunities are consistently less than transaction costs. The possible exceptions are the apparent covered interest arbitrage profit opportunities in long-dated forward contracts, and violation of put-call-forward parity in the foreign exchange options market, which may reflect either thin-market conditions or other institutional factors.

When uncertainty is present, such as in spot or forward speculation, the researcher must posit both a risk measure and an equilibrium price for risk-

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[20] See Levich (1984) for a recent survey.

bearing to determine whether any speculative returns are unusual on a risk-adjusted basis. A consensus is still waiting to be formed on these issues, so empirical studies that uncover profit opportunities are subject to several interpretations.

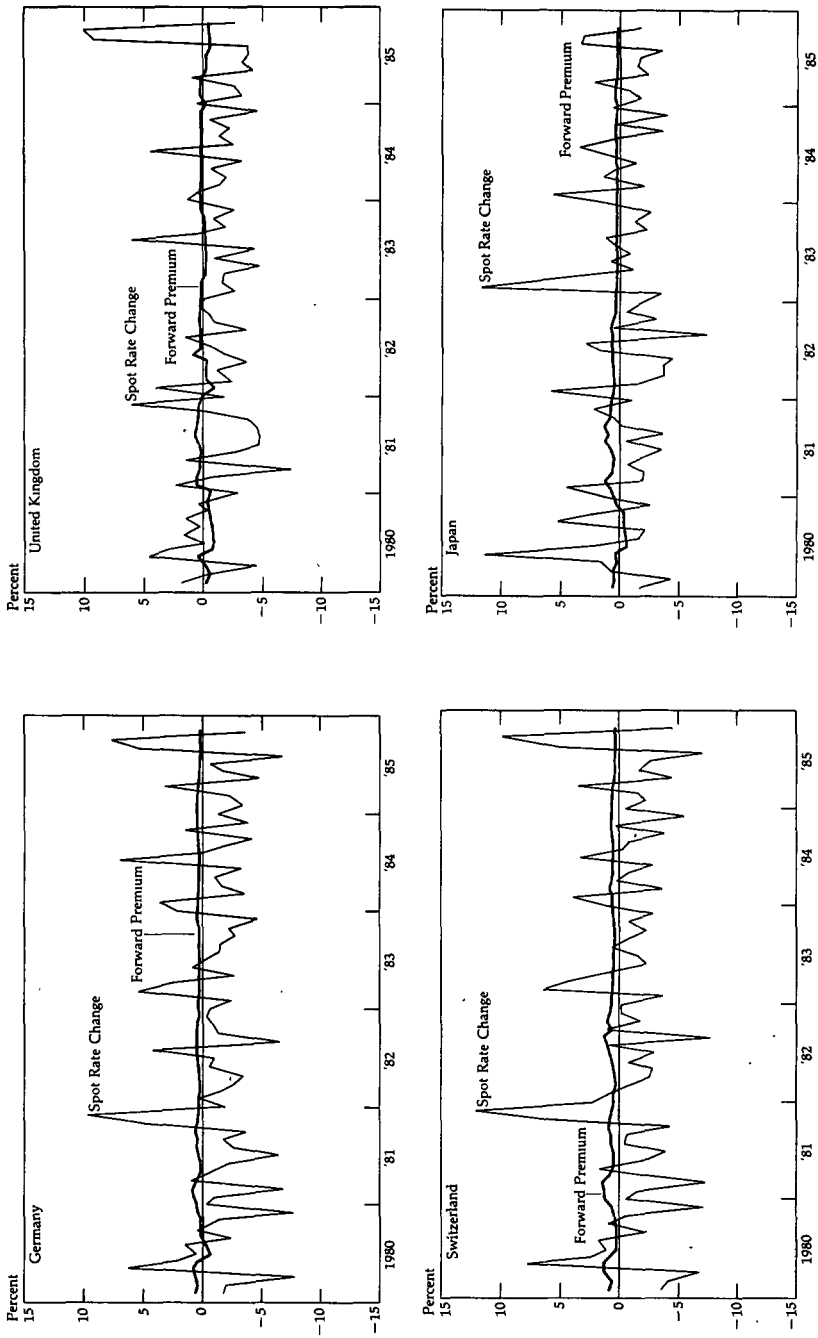
As far as spot speculation is concerned, the filter-rule studies by Dooley and Shafer (1976, 1983) are modem classics. In these studies, speculative positions are taken when the nominal value of a currency advances a small amount (say, one percent or three percent) above a recent low, or if it declines from a recent high. The null hypothesis in a filter-rule is essentially Fisherian—the interest rate differential should offset the anticipated exchange rate change so that expected returns equalize across currencies. But, after adjusting for transaction costs and the interest expense of establishing spot positions, Dooley and Shafer report that substantial profits remain and persist over the eight-year sample period.

There are several interpretations. On the one hand, profitability of trend-watching may suggest that bandwagons and speculative bubbles characterize spot market dynamics. Speculators may be overly excitable, pushing rates higher only because they expect other buyers to come along. A shortage of stabilizing speculators permits these bandwagons. On the other hand, the evidence could also reflect the fact the spot speculation involves considerable risk as speculators attempt to time currency positions. The filter-rule profits may represent the market's compensation for carrying these risks.

The notion of a risk premium has been investigated directly in the context of forward speculation and forward market efficiency. Studies of forward market efficiency have tested the null hypothesis of "simple efficiency" (today's n-period forward rate, $F(t,n)$, equals the expected future spot rate, $ES(t+n)$) versus the alternative "general efficiency" hypothesis ($F(t,n) = ES(t+n) + RP(t)$, the foreign exchange risk premium at time t). Mussa (1979) summarized the stylized empirical facts as of 1979: "The forward rate is an unbiased predictor of the corresponding future spot rate, [it] is close to the best available predictor...but [it] is probably not a very good predictor. . . ." Recent empirical studies now claim that the current spot rate (i.e., a random walk, no drift model) is a better forecaster of short-term exchange rates, and the forward rate is a biased forecaster of the future spot rate. If the forward rate bias is the result of a risk premium, then foreign and domestic assets are not perfect substitutes in investor portfolios. In this case sterilized intervention can affect the exchange rate.

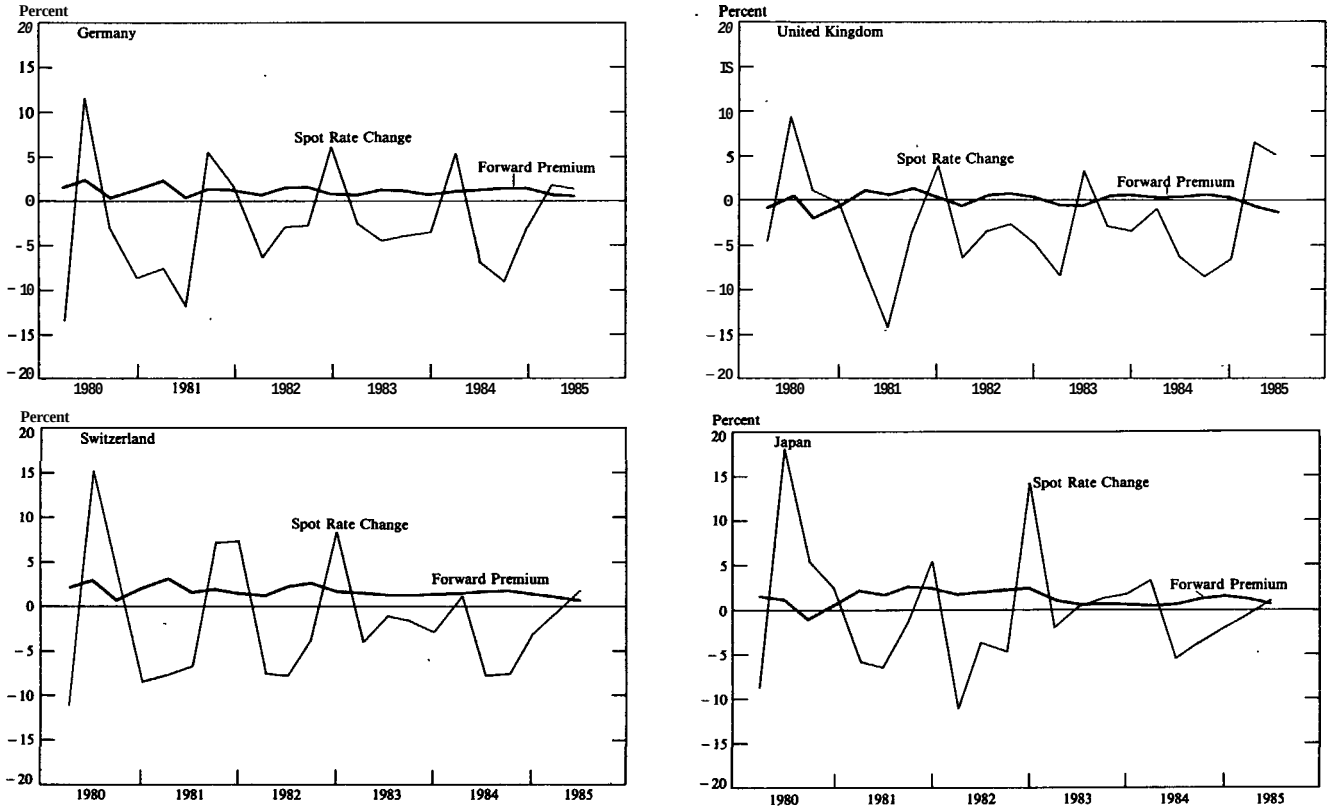
A set of data on forward premia and future spot exchange changes, for one-month and three-month intervals, are displayed in Charts 6 and 7. The tranquil nature of the percentage forward premium series versus the volatile nature of short-run exchange rate changes is clear from both charts. The charts also establish that the DM, Swiss franc, and Japanese yen consis-

CHART 6
Percentage Forward Premium and Percentage Future Spot Rate Change: Monthly Data



Data Source: Harris Bank Weekly Review

CHART 7
Percentage Forward Premium and Percentage Future Spot Rate Change: Monthly Data



Data Source: Harris Bank Weekly Review

tently traded at forward premia over the last five years, while the exchange rates actually depreciated in the vast majority of periods.

Summary statistics on these data are presented in Tables 1 and 2. The analysis confirms that over this 5-1/2 year period the mean forward premium was positive while the mean exchange rate change was negative. This resulted in significant forward rate prediction errors for the DM, British pound, and Swiss franc. Estimates of the one-month forward bias ranged between -0.6 percent for the yen and -1.4 percent for the Swiss franc. For quarterly data, the bias is roughly three times as great, suggesting a constant

TABLE 1

Summary Statistics of Forward Rates as Predictors
Non-overlapping Monthly Observations,
January 1980-June 1985, N = 70

Currency	Variable	Mean	T-Value	RMSE	RHO/RATIO /AUTO
DM	Forward Premium	0.398	17.445	—	-0.105
	Spot Change	-0.775	-1.826		346.040
	Forward Error	-1.309	-3.050*	3.797	-0.037
British Pound	Forward Premium	0.003	0.088	—	-0.267*
	Spot Change	-0.763	-1.990	—	127.670
	Forward Error	-0.875	-2.253*	3.344	0.128
Swiss Franc	Forward Premium	0.610	21.294	—	-0.167
	Spot Change	-0.643	-1.427	—	246.620
	Forward Error	-1.402	-3.086*	4.027	0.062
Japanese Yen	Forward Premium	0.420	10.744	—	-0.178
	Spot Change	-0.033	-0.084	—	100.800
	Forward Error	-0.558	-1.431*	3.286	0.118

Notes: RHO: Correlation of percentage forward premium and percentage spot rate change

RMSE: Root mean squared error of percentage forward premium forecast of future spot rate change

AUTO: Autocorrelation of forward rate errors

RATIO: Variance of percentage spot changes relative to variance of percentage forward premia

* Significant at the 5 percent level

Data are from Harris Bank Weekly Review

TABLE 2

Summary Statistics of Forward Rates as Predictors Non-overlapping Quarterly Observations, January 1980-June 1985, N = 22

Currency	Variable	Mean	T-Value	RMSE	RHO/RATIO /AUTO
DM	Forward Premium	1.211	10.966	—	0.122
	Spot Change	-2.392	-1.821	—	141.420
	Forward Error	-4.076	2.966*	7.502	-0.105
British Pound	Forward Premium	0.100	0.709	—	-0.392
	Spot Change	-2.259	-1.871	—	72.910
	Forward Error	-2.755	-2.076*	6.675	0.284
Swiss Franc	Forward Premium	1.794	13.427	—	0.018
	Spot Change	-1.930	-1.294	—	124.500
	Forward Error	-4.290	-2.746*	8.347	-0.122
Japanese Yen	Forward Premium	1.295	7.546	—	-0.357
	Spot Change	-0.018	-0.013	—	70.830
	Forward Error	-1.754	-1.194	6.958	-0.016

Note: See Table 1

bias per unit of time. The negative sign indicates that the forward premium (with the forward rate expressed as $/foreign currency) has consistently overstated the realized dollar depreciation. If this risk premium for holding dollar assets persists, then the interest differentials suggested earlier overstate the expected dollar depreciation. Another measure of forecasting accuracy, the RMSE, averages 3.6 percent for monthly data and 7.4 percent for quarterly data. The autocorrelation tests indicate that the forecast errors, while generally non-zero, are essentially white noise.

To understand these prediction errors better, Thiel's U procedure allows us to decompose the mean squared error into the proportions due to bias, unequal variance, and imperfect correlation between the predictor and the actual exchange rate. These results are presented in Table 3. Not surprisingly, they show that most of the errors result from the fact that spot rate variance far exceeds forward premium variance (factor U2). However, sample bias explains onequarter of the three-month prediction errors for the DM and Swiss franc.[21]

[21] These results are similar to those reported by Agmon and Amihud (1981) for the 1974-1978 period. Their estimates of U1 were generally less than 5 percent and U2 more in the neighborhood of 55 to 80 percent.

TABLE 3

Forward Rate Prediction of Future Spot Rates— Proportions Due to Bias (U1), Unequal Variance (U2), and Imperfect Covariance of Forward Rates (U3)

Horizon	Currency	U1	U2	u3	Total
I-Month	DM	9.7	79.7	10.6	100.0
	British Pound	5.1	74.7	20.2	100.0
	French Franc	9.7	77.2	13.1	100.0
	Japanese Yen	1.8	76.2	22.1	100.0
3-Month	DM	25.7	63.1	11.1	100.0
	British Pound	13.6	61.0	25.5	100.0
	French Franc	22.0	64.3	13.7	100.0
	Japanese Yen	3.3	68.2	28.5	100.0

Several studies also rejecting the forward unbiasedness hypothesis have recently appeared in the literature.[22] However, the link between a forward bias and an exchange risk premium remains in dispute. Applying the name "risk premium" to the forward ratelfuture spot rate deviation may amount to unwarranted labeling of the residual; further analysis is needed.

Fama (1984) and Hodrick and Snvastava (1986) use an econometric decomposition $[F(t,n) - S(t) = F(t,n) - ES(t+n) + ES(t+n) - S(t)]$ to show that while variance in the forward premium is small, it can be broken into two pieces which vary inversely. The studies conclude that volatility in the risk premium far exceeds volatility in the expected exctiange rate change component. Dooley and Isard (1983) estimate risk premia using a structural model and arrive at moderate estimates, about 2.5 percent per year in the $1 DM rate. However, the risk premium explains only a small fraction of forward rate prediction errors. Frankel (1985) adopts a mean-variance optimization framework to estimate the exchange risk premium. His conclusion is :that risk premia are negligible, perhaps only two to three basis points per year. The implication would be that persistent forward rate prediction errors are a sign of inefficiency.

Conclusions

The objective of this paper was to gather and report "facts" regarding

[22] See Fama (1984), Hsieh (1984), and Hodrick and Srivastava (1986), as well as other references in Levich (1984).

exchange rate behavior over the floating rate period. One conclusion is that there are relatively few facts. Nominal bilateral exchange rates (their level, changes, and volatility) and forward premiums (their behavior and prediction power) are straight-forward measures that were reviewed in detail. But other important variables (e.g., a real effective exchange rate, an ex ante real interest rate, or an exchange risk premium) are theoretical constructs that require us to impose an equilibrium base period, a weighting scheme to aggregate across countries, or an estimate of (unobserved) expectations. The really interesting questions—whether the dollar has been too strong or too volatile and whether forward markets are efficient--depend heavily on the benchmark model and other judgments regarding parameter values. Our discussion of exchange rate theory and empirical evidence intended to show that because of these judgment issues, assessments of the floating rate experience are likely to differ.

To be certain, the experience of the last five years has rekindled interest in ways to measure misalignments and stabilize exchange rates. On the one hand, the evidence on speculative profit opportunities and forward rate bias has raised doubts regarding market efficiency and the presence of stabilizing speculators. Admonitions from Nurkse (1944) are beginning to reappear.[23] His views on freely floating exchange rates were unequivocal.[24]

> **If there is anything that inter-war experience has demonstrated, it is that paper currency exchanges cannot be left free to fluctuate from day to day under the influence of market supply and demand. There has been what may almost be termed a secular change by which the public has become (a) more liquid** and **(b) more sensitive or 'elastic' in regard to expectations. If currencies are left free to fluctuate, 'speculation' in the widest sense is likely to play havoc with exchange rates.**

But equally as important, the asset-approach to exchange rates has made us keenly aware of the need for exchange rate changes that are sometimes large, always quick, and hopefully in advance of expected events. In a well-functioning asset market, the responsibility for "misaligned" exchange rates and "excessive" exchange rate volatility falls on real disturbances (perhaps beyond anyone's control) and the coordination of macroeconomic policies (potentially under official control). The distinction between markets that exhibit "private efficiency" (by clearing and eliminating excess profit opportunities) versus "public efficiency" (by setting prices equal to their fundamental equilibrium value) may be useful in the discussion of

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[23] See, for example, Dornbusch (1982) and Islam (1983).
[24] Nurkse (1944, pp. 137-138).

exchange rate policies.[25] In the current environment, we may have the exchange rates we deserve, even though they are not the exchange rates we want.

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[25] This distinction is emphasized by Friedman (1984) in the context of equity market behavior as described by Shiller (1984). See, also, McKinnon (1979).

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Commentary on "Gauging the Evidence on Recent Movements in the Value of the Dollar"

Robert Z. Lawrence

The title of Richard Levich's paper is somewhat misleading. Although it includes mention of the dollar, in fact he has written a paper appraising exchange rate movements in general, rather than about the recent dollar movements in particular. In these comments I will provide some reactions to the paper but, in addition, I will make some comments about the reasons for the dollar's strength.

Levich describes the volatile nature of recent exchange rate movements (both real and nominal), discusses how in principle we ought to evaluate them, and then surveys the empirical evidence in the light of these principles. Throughout the paper he emphasizes the complexities of the theoretical and empirical considerations that inhibit definitive conclusions given the appropriate configuration of disturbances and adjustment mechanisms. Theory appears able to rationalize almost any degree of volatility. The very concept of a fundamental equilibrium exchange rate value is tenuous and certainly not to be confused with the purchasing power parity rate or the rate consistent with a zero current account. The empirical evidence is also disquieting—it provides compelling evidence that the market predictions of rates are poor, and disquieting indications that they may be biased and perhaps inefficient.

I found the paper full of insights and judicious observations. I think its central message, that few firm conclusions about the recent exchange rate movements are warranted, is probably correct. It strikes an appropriately cautionary note for us to keep in mind in the course of our policy discussions. In my view the models we build using theory are unlikely to be very useful in tracking short-run exchange rate movements.

In fact, experience in trying to model copper prices (much easier than exchange rates) suggests to me that simple supply (depending on long-run costs) and demand (on income and the availability of substitutes) curves may help in tracking 20-year movements, but over shorter periods such as a decade, one needs to model mining and smelting capacity and, over periods

less than three years, inventories are important. Even after all these factors are taken in account, there remains a large degree of short-run variance we just cannot explain. For somewhat different reasons, theory is also unable to provide us with a set of rules for an exchange rate system which is likely to be optimal under all circumstances. Thus neither over the very long run nor in the short run are our conclusions likely to be very firm.

The policymaker reading Levich's paper or listening to my statements is likely to feel extremely frustrated. Our science seems to offer few guides to short-run action. Indeed it reminds me of the story of the two men who were taking a ride in a balloon. At the outset, their trip went well but all of a sudden they were blown into some thick clouds and were totally lost. Eventually the clouds parted, and they found themselves over a field. They looked down and saw a man in the field. "Where are we?," they cried to him in desperation. "You're in a balloon," he replied. Whereupon the winds blew again, the clouds came together and again they were lost. "You know, that man down there must have been an economist," said one of the balloonists. "Only an economist could have given us an answer with such great precision and so little use."

But while caution is in order, I do feel theory is of some guide in allowing us to deduce the dominant reasons for medium-run exchange rate movements, and I would recommend Branson's paper in this conference as an example of this reasoning. Branson's firm conclusions are a striking contrast to Levich's tentative conclusions. I think they illustrate the kinds of questions economists can and cannot answer, rather than the particular achievements of the authors. Theory *does* help to pin point the crucial role of the U.S. budget deficit in causing high real U.S. interest rates and exchange rates.

There are some who have argued that perhaps more important than the U.S. budget deficit has been the dramatic increase in U.S. domestic investment in this recovery. They suggest that tax cuts, directed towards business, have been the main cause of this behavior. Indeed, interpretations about the nature of this recovery differ widely. Some authors such as Branson, Cooper, and Frankel see an aggregate savings bust (via the budget deficit) rather than an investment boom. Others such as Bill Poole, Bill Niskanen, and Alan Melzer place much more emphasis on strong domestic investment. Levich quotes the BIS which asserts the dollar strengthening with a growing current account deficit is unique. In magnitude it may be but Norway in the mid-1970s had a similar experience that related to the increased attractiveness of oil investment. For these authors, the U.S. has experienced an analogous shift in the investment climate. The third interpretation, which provides a dominant role for autonomous inflows of foreign savings (either because of safe havens or tighter budgets abroad) is not compatible with the configuration of both high real U.S. interest rates and a strong dollar. If cap-

ital inflows because of an increased supply of foreign capital were the dominant shock, interest rates should be low in the U.S., not high.

But is investment really unusually strong in this recovery? Interpretations differ about the role of investment because people look at different numbers. The real and nominal measures of investment tell different stories because of a significant fall in the relative price of investment goods. In both nominal and real terms, the first two years of this recovery were quite typical. But in this recovery, while nominal investment growth accounted for about 32.7 percent of the growth (compared with 23.7 percent in the postwar average) real investment growth accounted for 51.6 percent (compared with the 29.0 percent in the postwar average). For the purposes of the exchange rate I would argue it's the nominal rather than the real measures that are relevant, and they suggest the investment share of GNP in this recovery could have been financed domestically had the budget deficit also been its average level. In my view, therefore, while it is significant from the viewpoint of productivity and the issue of deindustrialization that investment has been strong because of relative price declines, the overwhelming source of the dollar's strength is the budget deficit.

There is also the question of whether we should have let the dollar get as high as it did. Rick Levich is reluctant to advocate active intervention and suggests the exchange rate is the symptom rather than the disease. Again, I would agree with him. Many commentators in this conference place the blame for the dollar on international (net) capital movements. In my view, too much emphasis is placed on the capital flows, and insufficient attention is paid to the lack of substitutability in the goods market. It takes rather large shifts in relative prices (given overall elasticities in the region of 1 to 1.5) to shift the current account of an economy such as the U.S. Paul Krugman in his paper points out that it takes about a 10 percent increase in the real U.S. exchange rate to shift the current account by 1 percent of GNP.

It is instructive to ask whether the U.S. could have run a full employment fiscal deficit of the current magnitude under fixed exchange rates? For analytical purposes, we can assume that over the medium run the same real outcome would have resulted. Yet, under a fixed rate system, it would have required a massive rise in the nominal prices of U.S. products and a highly inflationary U.S. monetary policy. Alternatively, substantial deflation abroad would have been required. Under fixed rates, in my view, the Federal Reserve would never have supplied the liquidity, and thus at full employment the real dollar would have been much weaker, and real U.S. interest rates much higher. The system has therefore enabled the U.S. to borrow from abroad and hence to have its budget deficit. Indeed it has allowed much greater international transfers of capital but with the associated pressures on the goods markets of large relative price changes. Feldstein and Horioka have presented evidence, using for the most part data

from the fixed exchange rate period, that shifts in domestic savings and investment have been closely associated. I believe the imperfect substitutability in the goods markets which often induce domestic policies to prevent international transfers explain this finding.

While the day to day and even month to month movements in the dollar will remain a mystery, the broad medium term (three-year movements) suggest strongly we have the real exchange rate our fiscal policy requires. Had we intervened, some of the problems in the traded goods markets may have been reduced but at the expense of high inflation and less investment. As Levich has put it, we have the exchange rate we deserve.

2
Causes of Appreciation and Volatility of the Dollar

William H. Branson

Introduction and summary

In 1981 real interest rates in the United States increased spectacularly, and the dollar appreciated in real terms by about 20 percent. Since the end of 1981, long-term real interest rates have remained in the range of five to ten percent, with nominal long rates above short rates. This suggests that the financial markets expect rates to rise. The dollar appreciated further, but more gradually, until early 1985, and has come down by six to seven percent since then. This paper argues that these movements in real interest rates and the real exchange rate are due to the budget program that was announced in March 1981, and has been subsequently executed. In particular, the shift in the high employment—or "structural," as the responsible parties have taken to calling it—deficit by some $200 billion requires an increase in real interest rates and a real appreciation to generate the sum of excess domestic saving and foreign borrowing to finance it. The argument is a straightforward extension of the idea of "crowding out" at full employment to an open economy.

The current situation is not sustainable, however. It is a "temporary equilibrium," to use the jargon of macroeconomic dynamics. Eventually international investors will begin to resist further absorption of dollars into their portfolios, so U.S. interest rates will have to rise further, as the markets seem to expect, and the dollar will have to depreciate. This will continue until the current account is back in approximate balance, and the entire load of deficit financing is shifted to excess U.S. saving. The following sections of this paper describe the mechanisms that will generate this outcome, if it occurs.

The first two sections of this paper present the "fundamentals" framework of the analysis. This is fundamental in the sense that it emphasizes the variables, such as the high-employment deficit, that the market should look to when it is forming expectations about movements in interest rates or the

exchange rate. The focus is on real interest rates and the real (effective) exchange rate; these are the variables whose movements have been surprising. The argument that the shift in the budget can explain the rise in real interest rates and the dollar is presented in these two sections.

The role of expectations and the timing of the jump in interest rates and the dollar is discussed in the section of this paper entitled "Expectations and timing." The Economic Recovery Tax Act of 1981 provided a credible announcement of a future shift in the budget. The financial markets reacted by raising interest rates and the dollar well in advance of the actual fiscal shift, contributing to the recession of 1981-82.

The volatility of the dollar is briefly discussed in the section entitled, "Volatility." Modem models of the foreign exchange market emphasize the idea that the exchange rate is proximately determined in financial markets, and should be expected to fluctuate like a stock price. Exchange-rate fluctuations may be of more concern to policymakers than stock-price fluctuations, because the exchange rate directly influences the price of tradeable goods.

Finally, in the last section, three alternative explanations of recent movements in the dollar are analyzed. The arguments that these could be due to tax changes that have increased investment incentives or to financial deregulation are plausible, but would require evidence of an investment boom to be quantitatively important. The argument that the strong dollar is due to a shift in international portfolio demands--the "safe haven" effect—runs up against the old problem of identification. If this were driving the dollar, U.S. interest rates should have been down, not up.

I have attempted to make the exposition here as non-technical as possible, to maximize accessibility. The paper draws heavily on Branson (1977, 1983, 1985) and Branson, Fraga, and Johnson (1985). The technical details are given in those references; here I attempt to lay out the logic and the implications for policy.

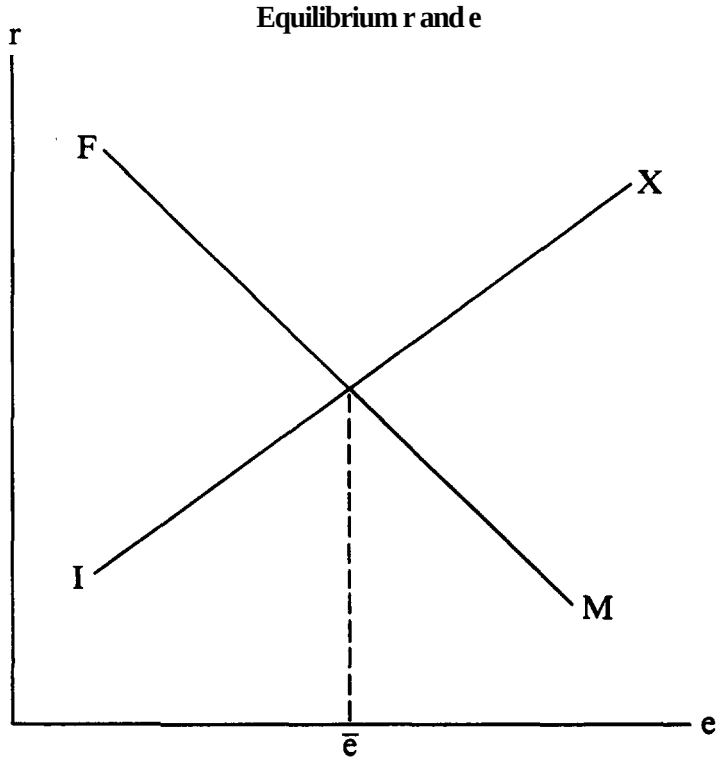
Short-run equilibrium in a fundamentals framework

A good start for our discussion of the causes of the strength and volatility of the dollar since 1980 is exposition of a "text-book-ish" framework that describes the determination of movements in real interest rates and the real exchange rate. The focus is on *real* rates because these have been the source of surprise and concern. If nominal interest rates had simply followed the path of expected or realized inflation and the exchange rate had followed the path of relative prices, the world would be perceived to be in order. It is the movement of interest rates and the exchange rate relative to the price path that is of interest here. So we begin by taking the actual and expected path of prices as given, perhaps determined by monetary policy, and focus on real

interest rates and the real exchange rate. In this section we develop a framework that integrates goods markets and asset markets to describe simultaneous determination of the interest rate and the exchange rate. It is "short run" in the sense that we take existing stock of assets as given. Movement in these stocks will provide the dynamics of the next section of this paper. It is a "fundamentals" framework because it focuses on the underlying macroeconomic determinants of movements in rates, about which the "market" will form expectations. The latter are discussed in "Expectations and timing." The framework is useful because it permits us to distinguish between external events such as shifts in the budget position (the "deficit"), shifts in international asset demands (the "safe haven effect"), and changes in tax law or financial regulation by analyzing their differing implications for movements in the interest rate and the exchange rate. We begin with the national income, or flow-of-funds, identity that constrains flows in the economy, then turn to asset-market equilibrium that constrains rates of return, and finally bring the two together in Figure 1.

FIGURE 1

Equilibrium r and e



Flow equilibrium: The national income identity

The national income identity that constrains flows in the economy is generally written as

$$Y = C + I + G + X = C + S + T,$$

with the usual meanings of the symbols, as summarized in Table 1. Note that X here stands for ***net*** exports of goods and services, the current account balance. All flows are in real terms. We can subtract consumer expenditure C from both sides of the right-hand equality and do some rearranging to obtain a useful version of the flow-of-funds identity:

$$(1)\ G - T = (S-I) - X$$

In terms of national income and product flows, Equation (1) says the total (federal, state, and local) government deficit must equal the sum of the excess of domestic private saving over investment less net exports.

Let us now think of Equation (1) as holding at a standardized "full-employment" level of output, in order to exclude cyclical effects from the discussion. This allows us to focus on shifts in the budget at a given level of income. If we take a shift in the full-employment deficit (G-T) as external, or exogenous to the economy, Equation (1) emphasizes that this shift requires some endogenous adjustment to excess private saving (S-I) and the current account X to balance the flows in income and product. In particular, if (G-T) is increased by $200 billion, roughly the actual increase in the "structural" deficit, a combination of an increase in S-I and a decrease in X that also totals $200 billion is required.

Standard macroeconomic theory tells us that for a given level of income, (S-I) depends positively on the real interest rate r, and X depends positively on the real exchange rate e (dollars per unit of foreign exchange, adjusted for relative price levels).[1] So the endogenous adjustments that would increase S-I and reduce X are an increase in r and a reduction in e. Some combination of these changes would restore balance in Equation (1), given an increase in G-T.

We can relate this national income view of the short-run adjustment mechanism to the more popular story involving foreign borrowing and capital flows by noting that net exports X is also net foreign investment (NFI)

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[1] Here, for simplicity, I ignore changes in the term structure of interest rates and focus on "the" real rate. See Branson, Fraga, and Johnson (1985) for the analysis of relative movements of short and long rates consistent with the story being told here.

TABLE 1

Definitions of Symbols

National Income Flows (all in real terms)

Y = GNP

C = Consumer expenditure

I = Gross private domestic investment

G = Government purchases of goods and services

X = ***Net*** exports of goods and services, or the current account balance

S = Gross private domestic saving

T = Tax revenue

NFI = Net foreign investment by the U.S.

NFB = Net foreign borrowing = - NFI

Prices and Stocks

r = Real domestic interest rates

i = Nominal domestic interest rate

i* = Nominal foreign interest rate

e = Real effective exchange rate (dollars per unit of foreign exchange); an increase in e is a depreciation of the dollar

$\hat{e}$ = Expected rate of change of e

$\hat{P}$ = Expected rate of inflation

ρ = Risk premium on dollar-denominated bonds

B = Outstanding stock of government debt

from the balance of payments identity:

X - private NFI = public NFI, or

(2) X = national NFI

Since national NFI is minus national net foreign borrowing (NFB), so that, X = NFI = -NFB, the flow-of-funds Equation (1) can also be written as

(3) (G-T) = (S-I) - NFI = (S-I) + NFB

This form of the identity emphasizes that an increase in the deficit must be financed either by an increase in excess domestic saving or an increase in net foreign borrowing (decrease in NFI). One way to interpret the adjustment mechanism is that the shift in the deficit raises U.S. interest rates, increasing S-I. The high rates attract foreign capital or lead to a reduction in U.S. lending abroad, appreciating the dollar, i.e., reducing e. This process continues, r increasing and e falling, until the increase in S-I and the decrease in X add up to the originating shift in the deficit.

The actual movements in the government deficit, net domestic saving (S-I), net foreign borrowing, and the associated movements in the real long-term interest rate r and the real exchange rate e (indexed to 1980 = 100) are shown in Table 2. The total deficit was roughly zero at the beginning of 1981. It expanded to a peak of $179 billion in the bottom of the recession in the fourth quarter of 1982, and then shrank in the recovery. But the shift in the ***federal*** budget position leaves the total government deficit at $140 billion in early 1985, after two years of recovery. The recent ***World Development Report*** (1985) estimates that the inflation-adjusted shift in the total deficit for 1979 to 1984 is $160 billion. Initially the deficit was financed mainly by net domestic saving, which also peaked at the bottom of the recession. But since 1982 the fraction financed by net foreign borrowing has risen; by early 1985 three-quarters of the government deficit was financed by foreign borrowing.

The movements in the real interest rate and the real exchange rate roughly reflect this pattern of financing. The real interest rate jumped from around two percent to over five percent in 1981, fell during the recession, and rose in the recovery, staying in the five to ten percent range since mid-1983. The real exchange rate shows an initial fall of 20 percent in 1981, and a more gradual decrease beginning in early 1983. The standard lags in adjustment of net exports to changes in the exchange rate can explain the slow reaction of net exports (net foreign borrowing) to the dollar appreciation.

The data in Table 2 are roughly consistent with the story of maintenance of the flow-of-funds equilibrium in Equation (1), with one big exception and

TABLE 2

National Income Flows, Interest Rates, and Exchange Rates

Year	Current Account Deficit (billions)	Excess Domestic Saving (billions)	Total Budget Deficit (billions)	Real LT Interest Rate (%)	Real Exchange Rate ($/composite)	Ratio Budget Def. to GNP (%)
1979:Q1	-3.4	-15.4	-22.2	'0.5	1.01	0.4
Q2	4.3	-17.4	-20.1	-0.2	0.99	0.2
Q3	-2.7	-14.6	-12.9	0.3	1.03	0.7
Q4	4.6	-15.6	-2.1	1.6	1.01	1.1
1980:Q1	2.9	-7.3	7.5	3.6	1.00	1.5
Q2	-7.9	43.0	38.1	2.1	0.99	2.5
Q3	-21.5	61.3	43.3	1.9	1.02	2.8
Q4	-3.5	37.1	33.9	3.0	0.99	2.5
1981:Q1	-13.6	9.5	9.7	2.5	0.95	1.6
Q2	-1.8	5.1	11.4	2.9	0.88	1.7
Q3	-2.9	19.5	23.3	5.1	0.83	2.0
Q4	-9.3	69.0	62.4	4.4	0.87	3.2
1982:Q1	-2.5	84.6	73.8	5.3	0.83	3.5
Q2	-11.1	91.8	77.6	6.4	0.80	3.6
Q3	18.9	112.4	130.4	5.8	0.76	5.3
Q4	20.9	147.8	179.2	5.2	0.76	6.8
1983:Q1	4.1	140.1	151.7	6.6	0.78	5.8
Q2	30.9	88.5	123.4	6.4	0.76	5.1
Q3	41.5	96.7	133.5	8.1	0.74	5.4
Q4	59.1	75.0	129.3	8.4	0.74	5.2
1984:Q1	77.7	27.5	107.4	8.3	0.73	4.5
Q2	85.0	33.2	109.2	9.6	0.72	4.4
Q3	119.4	26.6	133.0	9.0		4.8
Q4	81.5	71.6	140.1	7.8		5.1

Data from Citibase and IFS tapes. Real long-term interest rates are the net of the long-term (20 year) bond rate and inflation. The real exchange rate series (IFS) is based on relative normalized unit labor costs. A decrease in the real exchange rate represents an appreciation, The TOTBDEF series include the federal balance as well as the state and local balances. The CAB is MPA net foreign investment summed with net capital grants received by the U.S. XDOMSVNG is the difference between Gross Domestic Savings and Gross Domestic Investment in the U.S. FDEFGNP is the ratio of the U.S. federal deficit to GNP (muhiplied by 100).

one major loose end. The exception is that interest rates and exchange rates jumped in 1981, while the structural deficit only began actually to emerge in 1982. In the next section, we argue that this reflects the market's anticipation of the shift in the budget. The loose end is that we have not said anything about what determines the precise mix or combination of rise in r and e that achieves short-run equilibrium. For this we turn to the financial markets.

Financial market equilibrium and rate of return

We can obtain a relationship between r and e that is imposed by financial market equilibrium by considering the returns that a representative U.S. asset-holder obtains on domestic and foreign assets of the same maturity. The return on the domestic asset is i in nominal terms, and $r = i - \hat{P}$ in real terms, where $\hat{P}$ is the (exogenous, from our point of view) expected rate of inflation. The return on the foreign asset is $i^* + \hat{e}$ in nominal terms, where $\hat{e}$ is the expected rate of change in the exchange rate. In real terms the U.S. asset-holder's return would be $i^* + \hat{e} - \hat{P}$. In equilibrium, the difference between the two returns must be equal to the market-determined risk premium $\rho(B)$. Here we assume that dollar-denominated bonds are imperfect substitutes for foreign-exchange-denominated bonds, so that the risk premium on dollar bonds increases with their supply: $\rho'(B) > 0$. The equilibrium condition for rates of return in real terms is then

$$(4)\quad r - (i^* + \hat{e} - \hat{P}) = \rho(B)$$

Next we need to relate the expected rate of change of the exchange rate to the actual current rate. If we denote the perceived long-run equilibrium real rate that sets the full-employment current account balance at zero as $\bar{e}$, one reasonable assumption is that the current rate is expected to return gradually toward long-run equilibrium. Following Dornbusch (1976), we can write this as a proportional adjustment mechanism:

$$(5)\quad \hat{e} = \theta(\bar{e} - e)$$

If e is below the long-run equilibrium, it is expected to rise, and vice versa. If we put Equation (5) into the equilibrium condition Equation (4), and rearrange a bit, we obtain the financial-market relationship between e and r:

$$(6)\quad e = \bar{e} - \frac{1}{\theta}[r - (i^* - \hat{P}) - \rho(B)]$$

This condition says that for given values of the bond stock B, inflation $\hat{P}$, the foreign nominal interest rate i^*, and the long-run equilibrium real

exchange rate e, and increase in r requires a decrease in e to maintain equilibrium in financial markets. Why? If the home interest rate rises, equilibrium can be maintained for a given foreign rate only if the exchange rate is expected to rise. From Equation (5), this means that the actual current rate must fall to establish $\hat{e} > 0$. In terms of market operations, the rise in domestic rates r causes sales of foreign assets and a fall in e until equilibrium is re-established.

Below we argue that this is essentially what happened in 1981 with the announcement of a path of future deficits. This did not substantially change the long-run $\bar{e}$ that would balance the current account, but did move r and e.

Interest rates and the exchange rate

We can now join the flow equilibrium condition Equation (1) and the rate-of-return condition Equation (6) to form the short-run framework for simultaneous determination of r and e. Let us re-write Equation (I) to show the dependence of S and I on r, and of X on e:

$$(7)\ G\text{-}T = S(r) - I(r) - X(e)$$

For a given level of the full-employment budget, the trade-off between r and e that maintains flow equilibrium is given by the positively-sloped IX curve in Figure 1.[2] For a given G-T, an increase in r, which reduces (S-I), requires an increase in e, which increases X, to maintain flow equilibrium. An increase in G-T will shift the IX curve up or to the left, requiring some combination of a rise in r and fall in e to maintain flow equilibrium.

The rate-of-return condition Equation (6) gives us the negatively-sloped FM curve in Figure 1, for given B, i^*, $\check{P}$, and $\bar{e}$. Its slope is $-\Theta$, the speed-of-adjustment parameter for expectations. An increase in the risk premium p, due to a rise in the supply of U.S. bonds B, will shift the FM curve up and to the right, requiring an increase in r for any given value of e.

In the short run, equilibrium r and e are reached at the intersection of IX and FM in Figure 1; there both equilibrium conditions are met. For the purposes of the analysis here, we assume that initially $e = \bar{e}$, with no ***expected*** movement in exchange rates. This is taken to represent the equilibrium around 1980, before the surge in interest rates and the exchange rate that we are trying to explain.

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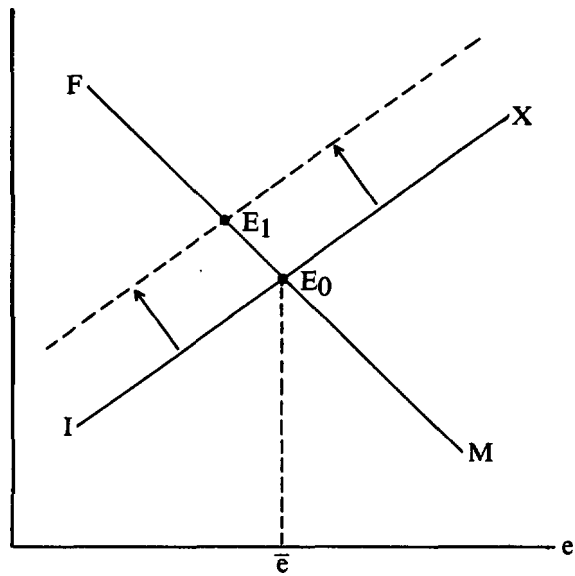
2 The slope is given by X'/(S'-I').

FIGURE 2
Shift in the Structural Deficit



Effects of a shift in the budget

A shift in the full-employment, or structural, budget towards deficit shifts the IX curve up, as shown in Figure 2. The real interest rate rises, and the real exchange rate falls, as described earlier. The composition of these movements is determined by the slope of the FM curve, representing financial market equilibrium. The movement of r and e from E_0 to E, raises excess domestic saving (S-I) and reduces net exports X by a sum equal to the shift in G-T. This also produces the short-run equilibrium financing of the shift in the deficit by domestic saving and foreign borrowing. The results of the shift in G-T are the movements in excess domestic saving and foreign borrowing, and in r arid e, that are shown in Table 2. Thus the framework of Figure 2 roughly captures the movements of r and e from 1981 to 1985.

Dynamic adjustment to long-run equilibrium

In Figure 2, point E_0 is taken to represent the initial equilibrium of 1980 or 1981, before the shift in the structural deficit, and point E, may represent the economy in 1984 or 1985, after the full shift in the budget was completed. The next question that arises is: is the equilibrium E, sustainable? The short answer is no. This takes us to the dynamics of debt accumulation.

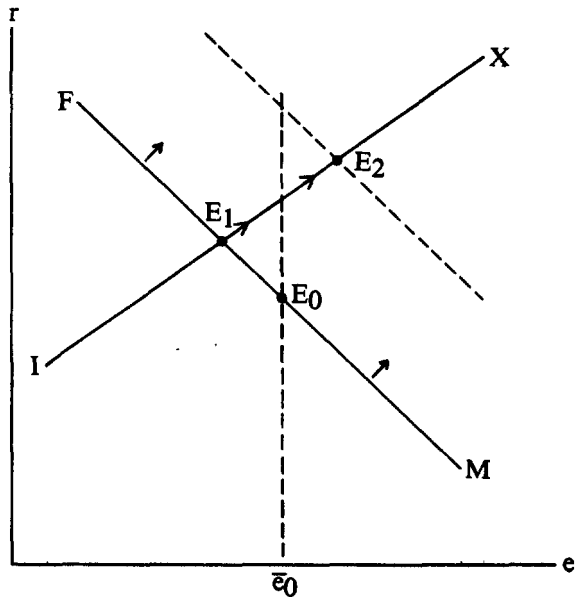
At point E_1 in Figure 2, the economy is running a substantial current-account deficit, perhaps $150 billion in 1985. This is adding, on balance, that amount each year to the holdings of dollar-denominated assets in international portfolios. Either the U.S. is borrowing abroad to finance partially the budget deficit, or it is reducing its lending as U.S. asset-holders shift into government debt. In either case, the net foreign position in dollar-denominated assets is growing. This will lead eventually to international resistance to the absorption of further increases in dollar-denominated assets, and to a rise in U.S. interest rates and the exchange rate.

At any given set of interest rates and exchange rates such as point E, in Figure 2, international investors will have some desired demand distribution of their portfolios across currencies. This will depend, of course, on a whole array of expectations as well as current market prices. As the U.S. current account deficit adds dollars to these portfolios from the supply side, this disturbs the initial portfolio balance, shifting the distribution towards dollar assets. In order to induce investors to hold the additional dollar assets, either U.S. interest rates have to rise or the exchange rate must be expected to rise, offering investors a higher rate of return on dollars. This is the dynamic adjustment of the exchange rate discussed in terms of sustainability by Krugman (1985). As the dollar depreciates, the current account deficit will shrink, if the long-run equilibrium is stable. As the deficit shrinks, the rate at which international portfolio distributions are changing is reduced, and so is the rate at which the dollar depreciates. Eventually, the economy returns to a long-run equilibrium where the current account is again balanced, and excess domestic saving finances the budget deficit. The dynamics of this adjustment mechanism in a fundamentals model were described in detail in Branson (1977); the version with a rational expectations overlay is given in Branson (1983). Krugman (1985) explores the question of whether the U.S. economy is currently on such a stable path back to long-run equilibrium.

This adjustment mechanism has a straightforward interpretation in the fundamentals framework of the first section of this discussion. Consider the position of the economy at point E_1, reproduced in Figure 3. Remember that $\bar{e}_0$ was the initial value of the real exchange rate that produced current-account balance. At point E_1, the current account is in deficit, and dollar-denominated debt in international portfolios is increasing. This tends to raise the equilibrium U.S. interest rate r or the exchange rate e. In Figure 3, this is captured by a continuing upward drift in the FM curve. In Equation (6) for rate-of-return equilibrium, the bond stock B is growing. This raises the risk premium p, shifting FM up.[3] As FM shifts up, driven by the current-account deficit, the interest rate and exchange rate rise along IX. This move-

[3] The vertical measure of the shift is just $\rho'(B)$

FIGURE 3
Accumulation of Dollar-Denominated Debt



ment continues until the current balance is again roughly zero, at point E_2 in Figure 3. There the real interest rate has risen enough that S - I = *G* - T at full employment.

If most of the increase in S - I has come from a reduction in investment, the E_2 equilibrium will have a significantly lower growth path than the original E_o equilibrium. Through the shift in the budget, the economy will have traded an increase in consumption (including defense) for a reduction in investment.

The point E_2 in Figure 3 has an exchange rate above e,, suggesting that in the new equilibrium the dollar will have depreciated in real terms relative to its initial 1980 position. Why? In the transition from E, to E,, the U.S. is running a substantial current-account deficit. This will reduce the U.S. international investment position. In fact, it is shifting this position from net creditor to net debtor. As Krugman (1985) shows, the E_2 equilibrium could produce a U.S. debt position similar to that of Brazil in the early 1980s. The consequence of this shift in the iriternational credit position of the U.S. is a reduction in the investment income item in the current account. In the current situation, the former positive flow of investment income will become a negative flow of debt service.

At the original E_o equilibrium, with a surplus on investment income and the service account, the current account balanced with a trade deficit. The

deficit on 'trade in goods offset the surplus in services. But at the new E_2 equilibrium, the service account will be in deficit, requiring a trade surplus to produce current account balance. The real exchange rate at E_2 will have to be higher than at E_0 to produce the required shift in the trade balance from deficit to surplus. It should be clear that the result does not depend on the investment income account actually becoming negative. A series of current account deficits that reduces the investment income surplus would lead to a new equilibrium with a smaller trade deficit and therefore a higher value for $\bar{e}$. This consequence of the dynamic adjustment through current-account imbalance is discussed in **Branson** (1977).

The reversal of the movement of the dollar in spring 1985 may be the beginning of the movement for equilibrium E_1 toward E_2. The dollar peaked in early 1985 and has fallen by six to seven percent in real terms up to July. Interest rates began to rise in June 1985. In addition, the mix of financing of the current-account deficit has shifted from U.S. foreign borrowing towards a reduction in U.S. bank lending abroad. This may signal the rise in foreign resistance to further lending in dollars. So there is some evidence that the movement from equilibrium E, toward E_2 has begun. Whether it can proceed fast enough to converge to E_2 without the U.S. foreign debt growing unstably is another question, to be discussed by **Krugman** (1985).

Expectations and timing

Earlier in this discussion I presented the "fundamentals" framework for analyzing the determinants of movements in real interest rates and the exchange rate, both in a short run with asset stocks fixed, and in a longer run in which the budget and the current account gradually change the country's international investment position. This framework suggests that agents in financial markets should form expectations about the exogenous variables that move the IX and FM curves-the flow and stock equilibrium loci—in order to anticipate movements in real interest rates and the exchange rate. The timing of the jump in these variables in 1981 suggests that this is, indeed, the case.

The Economic Recovery Tax Act of 1981 had one particular aspect that is unusually useful for macroeconomic analysis. It provided an example of a clear-cut and credible announcement of future policy actions at specified dates. A three-stage **tax** cut was announced in the Tax Act in March 1981. Simultaneously, a multi-stage buildup in defense spending was announced. This implied a program of future high-employment—now "structural"—deficits, beginning late in 1982. The fundamentals framework tells us that this would begin a process which starts with the IX curve shifting up, to E_1 in Figures 2 and **3,** causing a rise in real interest rates and appreciation of the dollar. It then continues with a current-account deficit, a further rise in inter-

est rates, and a real depreciation of the dollar toward a new long-run equilibrium E_2, which may or may not be stable. The initial movement to E, is more certain than the eventual convergence to E_2. If the tax changes were enacted when they were announced, British-style, we would expect to see the jump in real interest rates and the exchange rate come on the heels of the tax changes.

But in the U.S. case, the 1981 announcement implied a forecast of a growing high-employment deficit beginning in 1982. During the period from March to June of 1981, projections of the likely structural deficit emerged from sources such as Data Resources, Inc., and Chase Econometrics and circulated through Washington and the financial community. This meant that the financial markets could look ahead to the shift in the budget (and the IX curve) and anticipate its implications for bond prices and interest rates.

The expected emergence of a persistent structural deficit provided a prediction that real long-term interest rates would rise (moving from E_o to E, in Figure 2), and bond prices fall. Once that expectation took hold in the market, the usual dynamics of asset prices tells us that long rates should rise immediately, in anticipation of the future shift in the budget. Indeed, in the early fall of 1981 the long rate moved above the short rate, and has remained there since, through recession and recovery.[4] This is consistent with the bond market anticipating the movement not only to E, as the budget shifts, but also toward E_2 as the effects of debt accumulation are felt.

The markets could also anticipate an appreciation of the dollar, i.e., the fall in e from E_o to E, in Figure 2, as the structural deficit emerged. This expectation could have been derived from national income reasoning or from thinking about capital movements. One could ask the series of questions: 1) What will have to be crowded out to make room for the deficit? Answer: investment and net exports. 2) How will net exports get crowded out? Answer: dollar appreciation. Or one could reason that the rise in interest rates would attract financing from abroad, leading to appreciation of the dollar. The first section showed that these are two views of the same adjustment mechanism. Either says that the dollar would appreciate. Once that expectation takes hold, the dollar should be expected to jump immediately.

Indeed, the steepest appreciation of the dollar came across 1981, well before the emergence of the structural deficit. The deficit data are summarized in Table 3. Real interest rates and the dollar show their major movements across 1981; the structural deficit begins to appear in 1982. This is consistent with the view that the markets anticipated the shift in the budget

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[4] The technical analysis of the movements in long and short rates with expected fiscal policy, complete with speculative bubble dynamics, is given in Branson, Fraga, and Johnson (1985).

TABLE 3

Cyclical and Structural Components of the Federal Budget Deficit, Fiscal Years 1980-89

(Billions of Dollars)

FISCAL YEAR	TOTAL	CYCLICAL	STRUCTURAL
Actual:			
1980	60	4	55
1981	58	19	39
1982	111	62	48
1983	195	95	101
Estimates (current Services):			
1984	187	49	138
1985	208	44	163
1986	216	45	171
1987	220	34	187
1988	203	16	187
1989	193	-4	197

Sources: Budget of the United States Government Fiscal Year 1985 and Council of Economic Advisers.

position when they understood the implications of the program that was announced in 1981. The anticipation of the shift in the budget by real interest rates and the real exchange rate in 1981 provide an important example of the effect of credible armouncements and expectations in financial markets.

The implied reversal of the path of the real exchange rate as the fundamentals model moves from E_o to E_1 to E_2 also has its influence through expectations. If, as the exchange rate falls (the dollar appreciates) from E_o toward E_1 in Figure 2, agents in the market believe that the movement will eventually be reversed towards E_2, this anticipated depreciation of the dollar 'will temper their increase in demand for dollar assets as real interest rates in the U.S. rise. This would tend to reduce the magnitude of the appreciation from E_o to E_1, and the subsequent depreciation to E_2. This dampening of price fluctuations is a general property of rational expectations analysis (it used to be called "stabilizing speculation"). An example is given in Branson (1983).

The downward jump in the exchange rate from E_o to E,, and 'gradual movement back toward E_2, are also consistent with market agents' anticipating the shift in the U.S. international position from creditor to debtor. This is implied by a sufficiently long period of current-account deficits to finance the budget deficit. This, in turn requires an initial appreciation of the dollar.

But, eventually, the dollar must fall again, to a point somewhat below (e above) its original position. In anticipation of this swing, the market would generate an initial jump smaller than the one from E_o to E_1, smoothing the path somewhat.[5]

Thus, expectations of the implications of first, the shift in the budget position, and second, the implied switch of the U.S. from international creditor to debtor, would generate the movements in real interest rates and the exchange rate that we have seen since 1980. In particular, anticipation of the budget shift based on the March 1981 program can account for the movements in rates that came before the actual emergence of the structural deficit. Finally, it should be noted that anticipations of reversals in the path of asset market prices (generally known as "overshooting") reduce the magnitude of their fluctuations. It is shifts in the fundamentals that cause the fluctuations; in general, expectations can be expected to stabilize.

Volatility

The expected volatility of exchange rate movements, resembling stock prices, is by now commonplace. In a comment on Marina Whitman in 1975, I characterized exchange rates as being approximately determined by asset market equilibrium. In 1976, Jacob Frenkel and Michael Mussa described the exchange rate as the relative price of national monies. In an important paper in 1981, Frenkel surveyed and extended results that showed that exchange rates fluctuate like stock prices rather than goods prices. The fundamentals model presented in the first section shows exchange rates and interest rates being determined by the same set of equilibrium forces.

When we add the expectations layer to the fundamentals model, the expected volatility of exchange rates becomes more obvious. Forward-looking financial niarkets bring the future consequences of real disturbances into the present. As discussed in Branson (1983), news about the trade balance can be interpreted as a predictor of the future accumulation of the foreign asset position, a future shift in B in Equation (6). This will lead the market to anticipate a movement in the real exchange rate, and the rate will jump immediately. As noted earlier, expectations will also bring the consequences of future policy actions into the present. The anticipation of a future shift in the budget position resulted in a jump in the real exchange rate in 1981.

Volatility of exchange rates, following time series processes like stock prices, is thus a normal feature of modern thinking about exchange-rate

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5 The technical analysis of a switch from creditor to debtor position is provided in Buiter (1984) and in Branson (1985). The switch moves the market onto a saddle path into the new debtor equilibrium.

determination. Considerations of current account balance and purchasing power parity, which were in the center of models of exchange-rate determination in the 1960s, now are part of the longer run equilibration process. Analysis of exchange-rate fluctuations and their consequences is essentially the same as the analysis of stock price fluctuations and investment flows.

While volatility is a normal feature of the exchange market, its consequences may be more important than stock price volatility, and therefore policy reactions may differ. In an open economy, fluctuations in the exchange rate must emerge as fluctuations either in the prices of tradeable goods or in the profits of the firms producing them. Volatility in either may be of concern for policy. If fluctuations in exchange rates cause price fluctuations (as opposed to persistent inflation), this may discomfort consumers. if exchange-rate fluctuations are absorbed in profits, the resulting variability increases risk in investment in the tradeable goods industry. This may reduce such investment, and raise legitimate policy concerns. Thus the statement that volatility is a normal and expected feature in the exchange market does not imply that it is a good thing, or even acceptable. Policy regarding this volatility is rightly an urgent matter for discussion.

Alternative explanations

This paper has argued that the major cause of the historic increase in real interest rates and the real value of the dollar in the first half of the 1980s was the shift in the federal budget position that was announced in early 1981. The movements shown in Figures 2 and 3, and the anticipation by interest rates and the exchange rate of the shift in the budget position are consistent with this view. There are at least three other explanations for the strength of the dollar that we will consider here, if too briefly. The first is the effect of tax changes in 1981 on investment incentives in the U.S. The second is the "safe haven" argument that we have seen in a shift in international portfolio demands toward the dollar. The third is the effect of financial deregulation pulling foreign funds into the U.S. We will consider each in turn.

Tax effects

A reduction in profits or investment taxation could yield results similar to those in Figure 2. The increase in the after-tax yield would increase investment demand, shifting the IX curve up; the rest would follow, with the U.S. borrowing abroad to finance investment at home. There are three points to make concerning this argument as an "alternative."

First, it is unclear how much changes in the tax laws have actually changed after-tax yields or the cost of capital. In a fairly detailed analy-

sis, Bosworth (1985) argues that the 1982 tax bill reversed most of the incentive effects of the Tax Act of 1981. He ascribes most of the change in the cost of capital to a reduction in the price of capital goods relative to output. Given the increasing share of imports in expenditure on capital goods in the U.S. since 1981, some of this relative price effect probably comes from dollar appreciation. Thus the shift in the budget may have indirectly stimulated investment by reducing the price of capital goods imports via dollar appreciation. The argument stands on its head.

Second, it is not clear that investment is booming in the U.S., as we would expect if the IX shift came from tax changes stimulating investment. The 1980-82 recessions generated a severe slump in investment, and the 1983-85 recovery brought it back. But the level of investment relative to GNP is not unusually high, as we would expect from this argument.

Finally, if we think an investment boom would lead to a rise in real interest rates and real dollar appreciation, via a shift in the IX curve in Figure 2, we should also believe that a major shift in the structural budget deficit would do the same. In one case the stimulant is investment spending; in the other, it is consumer spending and defense. Both would raise real interest rates and pull in foreign capital. It is clear that the budget deficit has shifted. So the logic of the investment argument should lead one to accept the budget argument.

Safe haven effects

The second alternative explanation is a shift in international portfolio preferences toward the dollar, generally called a "safe haven" effect. This can be easily analyzed using Figure 1. A shift in preferences toward the dollar would effectively reduce the risk premium in Equation *(6)* for any given level of B. This would shift the FM curve in Figure 1 down by the same amount. The result would be a reduction in e, but a fall in real interest rates.

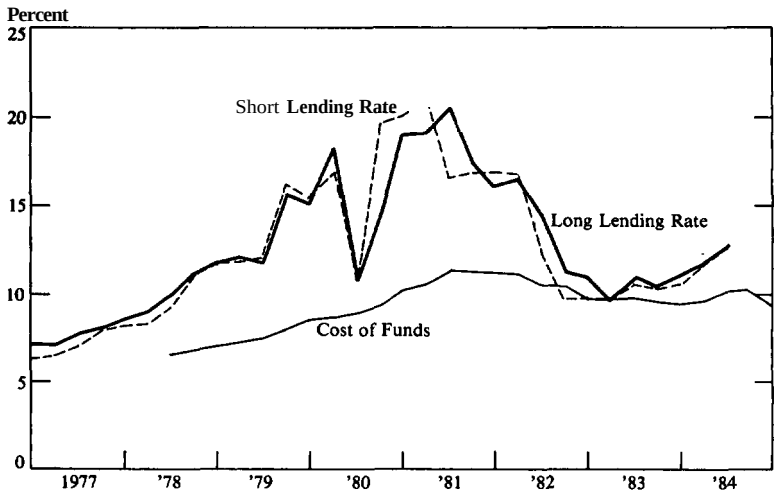
The safe haven argument is based on a shift in the ***supply*** of funds to the U.S.; the shift in the budget deficit moves the demand for funds. Both would result in dollar appreciation in the short run, but the budget deficit delivers the rise in real interest rates. So, while there may well have been some supply shift, the dominant effect must have come from the demand side.

Financial deregulation

The final alternative, more promising than the safe haven argument, is financial deregulation. This would raise deposit rates, drawing funds

FIGURE 4

Bank Borrowing and Lending Rates



Lending rates: Commercial loans and investments.
Cost of funds: To savings and loans.

from abroad. If it signaled an increase in financial competition in the U.S., it might draw foreign funds into non-bank lending. This would contribute to downward pressure on bank lending rates, contributing to a narrowing of the spread. It is obvious from Figure 4 that this narrowing has indeed occurred. The inflow would also result in dollar appreciation.

This alternative is susceptible to the second two counter-arguments presented to the tax effect. It should be expected to yield an investment boom as lending rates fall, and its logic says that a major shift in the budget deficit should have the effects shown in Figure 2. So to this writer the conclusion is clear: the shift in the budget did it!

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Commentary on "Causes of Appreciation and Volatility of the Dollar"

Jacob A. Frenkel

Introduction

Our experience with flexible exchange rates has been very sobering. We have been reminded time and again that exchange rates, and especially short-term changes in exchange rates, are unpredictable.

I am sure that many of us—academics, policymakers, and market practitioners alike — have shared at one point or another the frustration of what Governor Henry Wallich termed as "the allusive dollar." When we thought that the purchasing power parity model worked, it collapsed; when we thought that the simple monetary model worked, it failed; when we thought that a richer portfolio-balance model worked, it also failed; when we turned to the current-account model, we did not get much help—and so on and so forth. In fact, as a first approximation, exchange rates seem to follow a random walk. Therefore, by and large, changes in exchange rates (aside for trends) are unforecastable.

In view of these inherent difficulties, market analysts have adopted one of the following two alternative strategies. First, they have been mainly concerned with long-term forecasts. In this vein we have recently been offered doomsday forecasts on the future course of the dollar. According to such forecasts the dollar is bound to fall at some future time and, when it falls it will fall very fast. Such crash-landing forecasts may at best be useful in highlighting possible implications of inconsistent macroeconomic policies. They are of little use for the short and the medium runs. Furthermore, since such long-run forecasts are typically open ended, in many cases they cannot even be refutable. In this sense the usefulness of such predictions may not be much greater than Keynes' dictum that "in the long run we are all dead"—a dictum about which Robert Solow of MIT once remarked that Keynes was always good in making long-term forecasts.

The alternative strategy adopted by market analysts reflects the belief that "if you can't forecast well, forecast often." The basis for such a belief must

probably be the notion that "a theory a day keeps your critics at bay." As a result, there has been nothing more confusing than reading through the ex-post journalistic explanations offered for the day-to-day changes in the U.S. dollar. For example, over the past few years we were told that:

> "The dollar ***fell*** because the money supply grew faster than expected — thereby generating inflationary expectations,"

but, on another occasion we were told that:

> "The dollar ***rose*** because the money supply grew faster than expect — ereby generating expectations that the Fed is likely to tighten up and raise interest rates."

On another date we were told that:

> "The dollar ***fell*** since the budget deficit exceeded previous forecasts — thereby generating inflationary expectations on the belief that the Fed will have to monetize the deficit,"

but, on another occasion we were told that:

> "The dollar ***rose*** since the budget deficit exceeded previous forecasts-hereby generating expectations that government borrowing-needs will drive up interest rates since the Fed will be unlikely to give up its firm stance."

On yet another day we were told that:

> "The dollar ***fell*** since oil prices fell--thereby hurting Mexico and other debt-ridden oil-producing countries whose bad fortune may bring about the collapse of important U.S. banks,"

but, on another occasion we were told that:

> "The dollar ***rose*** since oil prices fell--thereby helping the debt-ridden oil-consuming countries whose improved fortune will help the vulnerable position of important U.S. banks."

How did the "theory a day" approach explain the zig-zag in the value of the dollar during the past three days? Here the explanation was given in terms of the estimates of GNP growth rate; accordingly we were told:

"The dollar changed again because the extent of the revision of the estimated GNP growth rate was smaller than the expected revision of previous forecasts of these estimates."

One cannot but sympathize with the difficulties shared by newspaper reporters and financial analysts who feel obligated to come up with daily explanations for daily fluctuations of exchange rates, and one can only imagine the deep frustration that yielded the recent headline in the ***International Herald Tribune*** according to which:

"The dollar rose on no news."

Branson's analysis

Evaluated against this background, William Branson's paper on the "Causes of Appreciation and Volatility of the Dollar," represents a serious effort to provide a logical story accounting for the evolution of the U.S. dollar since early 1981. His framework is attractive in that it recognizes that even though day-to-day changes in exchange rates are intrinsically unpredictable, economic theory and experience have taught us that broad trends can frequently be accounted for in terms of conventional economic fundamentals. Accordingly, in explaining the evolution of the dollar, Branson focuses on one important fundamental—the budget deficit—which he believes did it all. In his words "...the conclusion is clear: the shift in the budget did it!"

In order to establish his thesis Branson constructs a simplified ***real*** model in which the monetary sector is not even invited to make a guest appearance. According to the basic story, the announcement of The Economic Recovery Tax Act of early 1981 along with the announcement of multi-stage build-up of defense spending, implied large structural budget deficits and started the process of dollar appreciation. Treating the structural deficit as the exogenous shock and using the identities of national income accounts, Branson shows that the budget deficit must crowd out domestic spending by raising the saving-investment gap; alternatively (or in addition) the deficit can be financed by the rest of the world through the generation of a deficit in the current account of the balance of payments. Branson concludes, sensibly, that the rise in the rate of interest and the real appreciation of the dollar were necessary in order to bring about the saving-investment gap and the current account deficit needed to finance the large U.S. budget deficit.

This brings us up to February 1985. But what about the decline of the dollar that took place in the subsequent few months (and which I assume resulted in a change in the title of this conference from the original title on the "***strong*** U.S. dollar" to the present title on "the U.S. dollar")? In order

to account for that reversal Branson introduces the critical issue of sustainability. He argues that the rise in U.S. debt-service requirement and the path along which U.S. debt increases continuously are not sustainable. The cumulative current account deficit will eventually make foreign investment in the United States risky and will command a risk premium. As a result it is likely that further capital inflows into the United States will not be forthcoming. The limited capital inflow will make the deficit in the current account of the balance of payments unsustainable, and will necessitate its reduction. The mechanism that will bring about such a reduction is a drastic depreciation of the dollar. According to Branson the depreciation which took place after the dollar reached its peak in February 1985 may have signaled the start of that process.

Even though this story seems consistent with the general course of events, Branson recognizes that there is a bit of a problem in accounting for the precise timing of the events at both ends of the process. To begin with, the announced Tax Act of 1981 implied that the structural deficit will occur only by late 1982. Yet, interest rates and the dollar started their upward trend much earlier. A similar difficulty is also present at the other end of the process. Specifically, it is not clear what caused the start of the reversal in late February 1985 (leaving aside the more important question whether the process of depreciation has actually began?) In order to deal with the difficult question of timing Branson relies on the powerful (but somewhat arbitrary) argument —xpectations. Accordingly, the early 1981 credible announcement of the *future* deficit induced asset holders to anticipate a future appreciation of the dollar and a rise in interest rates. As a result, like all good asset market theories tell us, these anticipated future changes were translated into immediate changes in interest rates and exchange rates even though the policies which have allegedly induced these changes have not yet been undertaken. Similarly, Branson argues that the decline of the dollar can be explained in terms of expectations. Accordingly, the inevitable *future* implications of continuous debt accumulation have already raised current risk premia and, thereby, have induced the dollar depreciation that started in late February 1981.

Additional factors

Branson's analysis is consistent with the facts and, as such, it cannot be rejected on purely logical grounds. He designed his analytical framework in order to highlight the unique role that U.S. budget deficits have played in effecting the path of the dollar and of real interest rates. Within this framework he accomplished his task. My main comment, however, is that by focusing the discussion on U.S. policies alone and by constraining the analysis to a "real" model, Branson's explanation does not allow for two important

additional factors-those which stem from the monetary sector and those which stem from development in the rest of the world.

Monetary policy

Concerning the first, it seems clear to me that the drastic (and highly successful) course of the disinflationary monetary policy that was undertaken by the United States has surely contributed significantly to the early rise in real interest rates and to the early phase of dollar appreciation. Most likely during those early phases ***actual*** monetary policy rather than ***expected*** future fiscal policy was at the center stage. The evidence that lends credence to this alternative explanation is provided by the fact that ***short-term*** rates of interest rose. Such a rise can be easily accounted for in terms of tight money. It is much more difficult to account for it in terms of expectations about future budget deficits. Similarly, the recent depreciation occurring at the other end of the period under analysis (since February 1985) can also be explained in terms of conventional monetary factors. Accordingly, the dollar's drop owes much to the significant slowdown in the rate of growth of the U.S. economy coupled with the prevailing growth of the money supply. The combination of the path of monetary policy and the slow growth of real GNP has meant that, in relative terms, money was more loose than before and, therefore, the dollar depreciated. In view of these considerations I would suggest that in explaining the evolution of the dollar a stronger role be given to the course of monetary policy.

The budget deficit: a broader perspective

Branson's formulation views the "budget deficit" as the basic measure of the stance of fiscal policy. I believe that this concept, even when modified to allow for cyclical factors, may not be sufficiently operational for concrete policy recommendations. Almost any macroeconomic model suggests that there is a significant difference between the effects of budget deficits arising from a change in government spending and the effects of equivalent deficits arising from a change in taxes. (And one does not need to believe in the extreme version of the "Ricardian equivalence" proposition in order to make this assertion.) Further, most models suggest that the structure of taxes and government spending may be critical. For example, it matters very much whether the tax cut falls on the corporate sector or on households and whether the tax cuts are transitory or permanent. Likewise, it matters whether government spending falls on goods produced by the tradable goods sector or by the non-tradable goods sector and whether changes in spending are permanent or transitory. Finally, the exchange-rate and real interest-rate effects of budget deficits depends critically on whether the defi-

cits are likely to be financed through borrowing or through monetary expansion. All of these issues are of prime importance. The entire profile of the relations among exchange rates, interest rates, and fiscal policies may hinge on them. Therefore, even in a "real" model that focuses on the role of fiscal policies, I would prefer to *see* the budget deficit decomposed into its components.

I wish to emphasize that I am in full agreement with Branson's conclusion that fiscal policies in the United States have played a major role in recent years. It is almost self evident that the evolutions of the U.S. dollar and real rates of interest during the past few years cannot be fully explained without attaching a significant weight to U.S. fiscal policies. At the same time, however, it is noteworthy that the historical record concerning the relation between budget deficits and real exchange rates is not unambiguous. As a matter of fact the experiences of other countries as well as that of the United States during other periods do not suggest a clear cut, strong, and universal relation. In view of this ambiguity it would be useful if we supplement the data from the most recent U.S. experience with additional data pertaining to other experiences here and abroad during other historical episodes.

Knowledge of the broader historical record could be instrumental in preventing the repetition of past mistakes and could be justified by George Santayana's famous dictum according to which "those who cannot remember the past are condemned to repeat it." Unfortunately, when applying this dictum to the study of the relation between two macroeconomic variables like budget deficits and the real exchange rate one faces significant difficulties since it is frequently observed that "the past is not what it used to be." Furthermore, and in contrast with many of the experimental sciences, when forecasts of the impact of policies on the behavior of individuals are made on the basis of past experience one may frequently observe that also "the future is not what it used to be." The inherent difference between social and physical sciences reflects the impact of experience and memories on individual behavior. It renders the study of past records somewhat less useful since once we go through an experience (as individuals or as a society) we cannot ignore it and start all over again. Therefore, it can only be expected that statistical correlations which prevailed at some point in time may not remain intact under different circumstances. The present (and the future) are likely to differ from the past not because "people and governments have never learned anything from history" as argued by Wilhelm Friedrich Hegel but rather because the present has the benefit of hindsight whereas the past did not have the benefit of foresight. In view of these considerations, and in recognition of the fact that the recent episode represents a narrow segment of U.S. and other countries' experience, I would be a bit 'more cautious in drawing far reaching conclusions concerning the singular role of the budget deficit.

The role of foreign economics

The second factor that could be usefully added to Branson's analysis of the causes for the evolution of the U.S. dollar concerns fiscal policies in the rest of the world. In this context it is relevant to note that during the same period that the United States followed expansionary fiscal policies, the U.K., West Germany, and Japan adopted a relatively contractionary fiscal stance. The real appreciation of the dollar owes a great deal to the ***combination*** of tight fiscal policy abroad and loose fiscal policy at home. Further, the pace of economic recovery in Europe has been much slower than the U.S. pace—a lack of synchronization that has also contributed to the real appreciation of the dollar.

In addition to helping to account for the evolution of the dollar, the incorporation of the foreign economies into the analysis may also serve another useful role—it may contribute to the reduction of the pressures for protectionism. It is hard to recall another period in which sentiments for protection have been so widespread in the United States as they are at the present. An excessive emphasis on the U.S. budget deficit as the sole cause for the dollar strength and the growing frustration with the efforts to reduce the U.S. fiscal deficit by conventional measures have brought about new desperate arguments for the adoption of protectionist measures like import surcharges. The danger with such recommendations is that they might receive the political support of two otherwise unrelated groups. They are likely to gain the support of the traditional advocates of protectionism who claim to defend local industry and workers from foreign unfair competition. But, more dangerously, they may gain the support of those whose exclusive concern with the budget deficit leads them to support almost any policy that raises fiscal revenue. Import surcharges, once in place (even those surcharges that are adopted as "temporary measures") are hard to remove since, as George Stigler once remarked "a sustained policy that has real effects has many good friends." At the present there are very few measures whose long-term costs to the interdependent world economy may be as high as protectionist measures. Taxes on trade will hurt exports, and will restore inward looking economic isolationism instead of outward looking economic coordination. Protectionist measures will transmit the wrong signals to those developing countries that are still attempting to resist domestically popular pressures to default on their debt, and, further, they may ignite trade war. Therefore, in analyzing the causes for the evolution of the U.S. dollar it is useful to recall that out there, there are other economies whose own fiscal stance has contributed to the dollar's strength and who are likely to retaliate and open up a trade war if the United States attempts to "solve" its budgetary difficulties by means of import tariffs.

The safe-haven argument

Following his analysis of the mechanism by which the value of the dollar and the real rates of interest have been related to the path of the budget deficit, Branson mentions several additional explanations that have been advanced at one point or another. Among these explanations is the "safe haven" argument according to which the dollar strength can be explained in terms of portfolio shifts towards the relatively safe dollar-denominated assets. There are at least two interpretations of the safe-haven argument. The first emphasizes the *political* stability of the U.S. relatively to other parts of the world in which the risks of exproportions and defaults are higher. The difficulty with this interpretation is that, except for special situations associated with the Iranian revolution and with some of the Latin-American crises, it is hard to associate the periods of sharp rises in the value of the dollar with corresponding deteriorations in political stability abroad. Further, we have not observed a corresponding decline in stock-market indexes in Europe and Japan (a drop that should have taken place if indeed foreign investors divested themselves from other assets in order to purchase U.S. assets), nor did we observe a significant differential between rates of return on dollar-denominated assets issued in New York and other dollar-denominated assets issued in the Euro-currency markets.

The second interpretation of the safe-haven argument emphasizes the confidence that asset holders have in the overall course of U.S. macroeconomic policies. Thus, it focuses on the *economic* stability that is implied by U.S. policies. Accordingly, the successful disinflation and the economic recovery have made dollar-denominated assets attractive. The difficulty with this argument is that, as with the previous one, it is hard to identify those developments in recent U.S. macroeconomic policies that have contributed to enhance confidence by market participants exactly during periods corresponding to dollar appreciation. This difficulty is magnified once we recall that, on the whole, during the period of the dollar appreciation the market interpreted the sustained record budget deficits as bad news concerning the stabilizing effects of U.S. macroeconomic policies.

In principle, the short phase of dollar depreciation following its peak level in February 1985 could also be interpreted in terms of the safe-haven argument. Accordingly, the rise in external U.S. liabilities consequent on the cumulative current-account deficit changed the ratio of the outstanding supply of U.S. to foreign bonds. This change raised the risk premium on dollar-denominated assets and reduced their attractiveness. The difficulty with this argument (as well as with Branson's own interpretation of the depreciation) is that, as an empirical matter, various studies have found that the quantitative magnitude of the risk premium is extremely small. Futhermore, as a theoretical matter, by ignoring the role of stocks and other real assets the

specification of the risk premium as depending exclusively on the relative. supplies of bonds of different currency denominations focuses on a very narrow segment of asset holders portfolios. On the basis of these considerations, I share Branson's skepticism concerning the force of the safe-haven argument.

Crash landing?

One of the great attractions of Branson's approach is his attempt to explain the evolution of the dollar in terms of fundamentals. My own comments attempted to supplement his choice of fundamental (the U.S. budget deficit) with two additional ones—U.S. monetary policy and foreign fiscal policies. The virtues of the "fundamentals-approach to the analysis of the dollar" are that once we identify the relevant list'of fundamentals, we may proceed in making concrete policy recommendation as well as in making reasonable forecasts of the prospects for the dollar (based, of course, on forecasts of the likely course that will be followed by the fundamentals). These characteristics are not shared by other approaches like the "bubble approach" that has gained popularity in recent years in spite of the mounting evidence against it.

If the fundamentals approach is to be taken seriously then forecasts of the path of the dollar must be conditional on forecasts of the paths of the fundamentals. Since all the evidence suggest that at least for the medium run the U.S. budget deficit is there to stay, and since by all indications the Federal Reserve Board is unlikely to depart to a significant extent from its anti-inflationary posture, it is difficult to rationalize forecasts of dollar collapse and crash landing as long as these policies remain (and are expected to continue to remain) in place. Can expectations behave erratically and in so doing lead to a collapse of the entire house of cards? Of course they can. But, as long as expectations are based on the model whose outcomes they are purport to be forecasting, it is unlikely that they will behave in a manner that is entirely divorced from the implications of the actual changes in the fundamentals. Thus, I conclude that a crash landing is unlikely.

Exchange-rate volatility

In addition to dealing with the secular bends of the dollar, Branson points out that volatility is an intrinsic part of flexible exchange-rate regimes. As it were, volatility comes with the territory. In this context Branson notes that the fact that volatility is normal, does not imply that it is good. Thus he concludes without amplification that "policy regarding this volatility is rightly an urgent matter."

I definitely agree with Branson's statement that under a flexible

exchange-rateregime exchange rates are likely to be volatile especially if the underlying factors (including, of course, the underlying policies) are volatile. I also share Branson's judgment that volatility is an urgent matter. I am concerned, however, that such pronouncements, unless they specify how and whether we should act on that urgency, may lead (even unwillingly) towards the adoption of undesirable policies. They may result in the adoption of various intervention rules that may reduce the volatility of exchange rates at great cost. The key point to realize is that ***volatility*** of exchange rates is not the likely source of the difficulties but rather a ***manifestation*** of the prevailing package of macroeconomic policies. Fixing or manipulating the rates without introducing a significant change into the conduct of policies may not improve matters at all. It may amount to breaking the thermometer of a patient suffering from high fever instead of providing him with proper medication. The absence of the thermometer will only confuse matters and will reduce the information essential for policymaking. If volatile events and macropolicies are not allowed to be reflected in the foreign exchange market, they are likely to be transferred to, and reflected in, other markets (such as labor markets) where they cannot be dealt with in as efficient a manner.

The preceding argument ignored, however, one of the important characteristics of the gold-dollar system which various proposals for reduced flexibility of exchange rates attempt to promote, i.e., the characteristics of the "discipline of the exchange." Accordingly, it could be argued that the obligation to peg the rate or to follow a predetermined intervention rule would alter fundamentally the conduct of policy by introducing discipline. Experience seems to suggest, however, that national governments are unlikely to adjust the conduct of domestic policies so as to be disciplined by the exchange-rate regime. Rather, it is more reasonable to assume that the exchange-rate regime is more likely to adjust to whatever discipline national governments choose to have. It may be noted in passing that this is indeed one of the more potent arguments against the restoration of the gold standard. If governments were willing to follow policies consistent with the maintenance of a gold standard, then the standard itself would not be necessary; if however, governments are not willing to follow such policies, then the introduction of the gold standard per se will not restore stability since, before long, the standard will have to be abandoned. It short, no exchange-rate system can protect us from bad policies.

On international monetary reform

In view of the disruptive effects exerted by the strong and the highly volatile dollar, various proposals for reform of the international monetary system have been put forward. Is this the time for reform? I believe not! If

indeed the root cause for the current difficulties lies in the fiscal positions of the United States, Europe, and Japan, then the solution for the problems does ***not*** call for a monetary reform, for tariff and protectionism, for taxes on capital flows (or for other measures which throw sand in the wheels), nor does it call for intervention rules. Rather, it calls for a restoration of fiscal order in which the United States adopts more contractionary fiscal stance while Europe and Japan adopt a more expansionary stance. I believe that the central difficulties with the current regime do not rest with the exchange-rate system or with the exchange-rate policies; rather, they rest with the overall mix of the uncoordinated macroeconomic policies. It is unlikely, therefore, that the introduction of exchange-rate targets or other superficial measures dealing only with the symptoms of the disease can do any good unless they are accompanied by drastic changes in the way in which macropolicies are being designed. In fact, the adoption of policies that deal with anything but the ultimate root cause may do more harm than good. Placing excessive weight on the role of exchange rates may divert attention from the more central role that global macroeconomic policies play in the interdependent world economy.

In general, in assessing various plans for reform it is pertinent to recall that a critical feature of any operational monetary system must be a formal resolution of the so-called (n-1) problem. We have n currencies and only n-1 independent exchange rates. We thus have one degree of freedom and its disposal must be explicitly specified. It takes two to tango and it takes one for intervention. The original Bretton Woods system allocated the degree of freedom to the United States which obligated itself to peg the price of gold at $35 an ounce; the other n-1 countries then committed themselves to peg their currencies to the U.S. dollar. A design of the international monetary system is not complete unless it provides a resolution of this (n-1) problem. Therefore, in evaluating the alternative proposals my question would be how do these alternative systems deal with the extra degree of freedom. A reform of the international monetary system should be viewed as a constitutional change that occurs once in a lifetime. It ought to be viewed as the "step of last resort." It ought to be thought of as the last bullet which should be used properly and which, once being fired, should better not miss. If the international monetary system needs to be reformed it should better wait until the world fiscal system gets its act together.

3
Effects of the Strong Dollar

Robert Solomon

This paper focuses on the effects, in the United States and abroad, of the sizable appreciation of the dollar since 1980. The magnitude of the rise in the real value of the dollar relative to the currencies of other industrial countries has been unprecedented in modern history. Its effects therefore deserve attention. Although this paper is devoted mainly to the consequences of the sustained upswing of the dollar, it recognizes that what goes up may also come down and takes a brief look at the major effects of a dollar depreciation.

Two preliminary questions

If one is to discuss in a meaningful way the effects of exchange-rate variability—and in particular the large appreciation of the dollar between 1980 and 1985--one must be able to answer two preliminary questions: 1) "compared with what?" and 2) "in what context?"

The first question—"compared with what?'—signifies the need to specify a counterfactual path for exchange rates and, equally important, the counterfactual policies that could have brought about the different exchange rates. In the absence of such counterfactual scenarios, what is the meaning of "the effects of exchange rate variability?" What one wants to do is to compare the world as it has been with what it might have been. But what it might have been has to be credible. This means, among other things, that one has to be able to describe the policies that would have produced the might-have-been world.

I shall not spend a lot of time on this question. The conventional wisdom has it that much, even if not all, of the appreciation of the dollar since 1980 is attributable to high interest rates in the United States, and these high interest rates are, in turn, thought to be the result of the large budget deficit in combination with the Federal Reserve's monetary pol-

icy. It is widely believed that if the mix of fiscal and monetary policies in the United States had been less lopsided, the dollar would have risen much less. This, then, is the counterfactual scenario.

It is worth noting, parenthetically, that if one were trying to assess the benefits and costs of exchange-rate movements—which I am not doing in this paper—one would want to take account of the costs or benefits of the policies that would be required to dampen or prevent the movements of exchange rates.

This brings me to the second question—"in what context?" The counterfactual policies that would have produced different exchange-rate paths would have had effects on variables other than exchange rates. In other words, we have to treat exchange rates as endogenous variables. They are determined in a general equilibrium system. We know that much even if we do not—as yet—understand very well how exchange rates are determined.

For this reason, it is not valid to look at a change in exchange rates and ask, what have been the effects of that change? We also have to ask, what have been the general effects of the policies that were responsible for the change in exchange rates? Otherwise we may attribute to exchange-rate movements consequences that in fact follow from the policies that generated those exchange-rate movements. Let me give an example that anticipates some of what I shall have to say later. Roughly half of the decline in the real GNP of the United States in 1981-82 shows up in a drop in exports of goods and services. Much of this falloff in exports can be attributed to the appreciation of the dollar in 1981 and 1982. Does it follow that the recession would have been only half as deep if the dollar had not appreciated?

That would not be a valid inference. Suppose that the counterfactual policies that would have kept the dollar from rising were tighter monetary policies and higher interest rates in Europe and Japan. This is another answer to the "compared with what?" question. Tighter monetary policies in Europe and Japan would have caused more severe recessions in those countries and therefore weaker demand for U.S. exports. We also have to recognize that, if we assume that American fiscal and monetary policies had been as they actually were in 1981-82 but the dollar had not risen, some other components of aggregate demand in the United States would have fallen more as exports declined less. The policies that produced the exchange-rate appreciation affected other variables too.

With that introduction, I turn to the specific effects of the substantial appreciation of the dollar since 1980.

U.S. current-account deficit, domestic demand, and imports

The U.S. balance on current account was very strong in 1980—much stronger than the bare statistics suggest. The depreciation of the dollar in 1977-78 led to a large increase in American exports and in the share of those exports in world markets. While the current-account balance of OECD countries as a group shifted toward deficit by $80 billion in 1979-80, the U.S. current account moved toward surplus. This change was masked by the impact of the sharp rise in the price of oil in 1979-80.

The change shows up in the non-oil current account of the United States, which moved from a surplus of $25.3 billion in 1978 to a surplus of $76.7 billion in 1980, while the full current account moved only from a deficit of $15.4 billion in 1978 to a surplus of $0.4 billion in 1980.

The U.S. current account changed from a near-zero balance in 1980 to a deficit of more than $100 billion in 1984. Most of this shift has occurred since 1982. Although the dollar appreciated during 1981—by more than 15 percent—and in the first half of 1982—by 11 percent—its impact on the current account was largely offset by the effect on imports of the 1981-82 recession.[1] Imports of goods and services, in current prices, fell more than ten percent from the second quarter of 1981 through the first quarter of 1983.[2] Almost all of this import decline was in petroleum imports, which are priced in dollars and therefore were unaffected by the appreciation.

The near-constancy of non-oil imports during the recession of 1981-82 reflected the offsetting influences of the appreciating dollar and the fall in aggregate demand in the United States.

From the fourth quarter of 1982 through the second quarter of 1985, gross domestic demand[3] increased 17.2 percent while imports of goods and services rose 52.8 percent, both measured in real terms. Merchandise imports increased 66 percent. If we assume that the income elasticity of demand for imports is 2.5 in a period of cyclical recovery[4], we would have expected merchandise imports to grow by 43 percent as the

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[1] Unless otherwise indicated, trade-weighted average exchange rates are those computed by the Federal Reserve Board.

[2] Trade and balance of payments data in current prices are from the balance of payments accounts. Data on exports and imports of goods and services in constant prices are from the national income and product accounts. The major difference is that the latter exclude nonmonetary gold from merchandise trade and interest on U.S. government debt from service payments.

[3] GNP minus exports plus imports of goods and services, which equals the sum of domestic consumption, gross investment, and government expenditures.

[4] Stevens, Guy V.G., and others, The *U.S.* Economy in *an Interdependent World: A Multicountry* Model, Board of Governors of the Federal Reserve System, 1984, p. 131.

result of the economic expansion. Thus, something like two-thirds of the increase in imports of goods since late 1982 might have been expected if the dollar had been stable, and one-third can be attributed to the appreciation of the dollar.

Meanwhile, the merchandise exports of the United States increased by six percent, in real terms, from the fourth quarter of 1982 through the second quarter of 1985. Exports have clearly been affected by the appreciation of the dollar. In the second quarter of 1985, they were lower in nominal terms than in 1980, and in real terms were down by more than 14 percent although total demand in other industrial countries was up. In the case of trade in manufactures, the OECD shows that in each of the years 1981 through 1984 U.S. exports lost market share; that is, the volume of U.S. exports of manufactured goods either declined more or rose less than the imports of manufactures by its trade partners. Over the four-year period, U.S. exports of manufactures rose 30.7 percent less than the imports of manufactures in its markets abroad. (OECD, 1985).

Taking account of the decline in exports as well as the growth in imports, we have reason to accept the Federal Reserve estimate that something like two-thirds of the increase in the U.S. current-account deficit is attributable to the appreciation of the dollar (Wallich, 1985).

It may be noted that we have related the import expansion to the increase in gross domestic demand rather than to GNP. Domestic demand is the appropriate variable but income elasticities have normally been computed in relation to changes in GNP. GNP and gross domestic demand have usually moved in close enough conformity that it made little difference which variable was used. That is not so for the period under consideration. From 1982:Q4 to 1985:Q2, real GNP increased 13.0 percent while real gross domestic demand went up by 17.2 percent. Thus, almost one-fourth of the expansion of domestic demand leaked abroad (in the form of enlarged imports and depressed exports) rather than being reflected in growth of GNP.

Until mid-1984, the economic recovery proceeded at a rapid pace. Real GNP increased at an annual rate of more than 6 percent in the seven quarters from the summer of 1982 to the spring of 1984, despite the widening external deficit. Even if the current-account deficit had not been increasing, it is doubtful that one could have expected the economy to expand faster. Federal Reserve policy is unlikely to have permitted that. Thus, those who ascribe loss of jobs to the growing trade deficit and the high dollar in that period of rapid recovery are probably wrong. If there had been a smaller external deficit, other components of aggregate demand would have grown less rapidly.

The story changes after mid-1984. From the second quarter of 1984 through the second quarter of 1985, real GNP increased two percent. It

cannot be argued that the Federal Reserve would have prevented faster growth of GNP during that period.

The slowdown of the economy after the second quarter of 1984 owes something to the weaker expansion of gross domestic demand. It advanced 3.3 percent from then through the second quarter of 1985. If the current-account deficit had increased no further after mid-1984 and therefore GNP had advanced at the same rate as gross domestic demand, GNP growth would have slackened from the pace of 1983 and the first half of 1984. But that was probably inevitable. Capacity utilization in industry had increased from a low point of 67.6 percent in late 1982 to 82.4 percent in the third quarter of 1984. Over the preceding year, capacity had expanded by 2.4 percent. Since GNP and industrial production have tended to grow at about the same rate, as is discussed below, we can conclude that there was scope for GNP growth of little more than three percent after mid-1984. This would have permitted a further upcreep of capacity utilization and a further reduction of unemployment.

While domestic-demand expansion slowed, the gap between domestic demand and GNP widened after mid-1984. In the following year, almost two-fifths of the increase in domestic demand leaked abroad.

The structure of U.S. output

As GNP growth slowed in 1984-85, a considerably amount of anecdotal evidence appeared suggesting that, because of the effects of the strong dollar on tradable goods, the U.S. economy has become "two-tiered." (This analysis is based on data that does not incorporate the benchmark revisions of December 1985.) The manufacturing sector is said to be languishing while services and construction continue to flourish.[5] One of the aspects of this development is the transfer abroad of American production facilities. Numerous examples have been cited of the creation or expansion of overseas facilities.[6] The Commerce Department has estimated that majority-owned affiliates of American companies will increase capital outlays by 13 percent this year, compared with four percent in 1984; in manufacturing, the planned investment increase is 22 percent.[7]

Despite these reports, the aggregate data on the composition of U.S. output indicate very little, if any, weakening of manufacturing relative to total output. We present three types of statistical evidence: two measures of output from the national income and product accounts and a regression of industrial production on GNP.

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[5] *The New York Times*, May 21, 1985, p. D1.

[6] *The Wall Street Journal*, April 9, 1985, p. 1.

[7] *Survey of Current Business*, March 1985, pp. 23-28.

Table 1 shows both goods output and value added in manufacturing as a proportion of GNP (the value-added data are published only on an annual basis). Goods output measures the flow of final products, in the form of goods, of the U.S. economy; total GNP is the sum of final outputs of goods, services, and structures. Value added (or income originating) in manufacturing measures the gross output of the manufacturing sector minus materials and services purchases from other sectors, which is equal to income earned in the manufacturing sector (Department of Commerce, 1985). In both cases, the economic activity is measured net of imports.

TABLE 1

Goods Output and Manufacturing as a Share of Total Output in the United States
($ billions in 1972 prices; seasonally-adjusted annual rates; percent)

	Goods Output	Manufacturing value added	GNP	1 ÷ 3	2 ÷ 3
	(1)	(2)	(3)	(4)	(5)
1950	261.5	131.1	534.8	48.9	24.5
1960	335.8	171.8	737.2	45.6	23.3
1965	422.6	236.7	929.3	45.5	25.5
1970	486.9	261.2	1085.6	44.9	24.1
1978	662.0	357.2	1438.6	46.0	24.8
1980	668.1	351.0	1475.0	45.3	23.8
1981	693.1	359.7	1512.2	45.8	23.8
1982	660.6	336.6	1480.0	44.6	22.7
1983	688.6	354.1	1534.7	44.9	23.1
1984	764.5	391.2	1639.3	46.6	23.9
1982Q1	669.0	n.a.	1483.5	45.1	n.a.
Q2	662.0		1480.5	44.7	
Q3	657.9		1477.1	44.5	
Q4	653.6		1478.8	44.2	
1983Q1	658.9		1491.0	44.2	
Q2	681.6		1534.8	44.7	
Q3	698.1		1550.2	45.0	
Q4	715.5		1572.7	45.5	
1984Q1	744.9		1610.9	46.2	
Q2	767.4		1638.8	46.8	
Q3	766.8		1645.2	46.6	
Q4	778.8		1662.4	46.8	
1985Q1	773.0		1663.5	46.5	
Q2	770.8		1671.6	46.1	

Source: U.S. Department of Commerce, *Survey of Current Business*, various issues.

It may be seen in Table 1 that goods output and manufacturing activity, in constant dollars, have been remarkably stable as a proportion of GNP over the years. What is relevant for the purposes of this paper is that neither measure has decreased since 1980 despite the appreciation of the dollar. The small decline in the proportion in 1985 looks normal for a period of slow GNP expansion.

While goods output and manufacturing activity show no significant decrease relative to total output between 1980 and 1984, the appreciation of the dollar, and possibly other influences, have no doubt held down both the prices of goods and the profits of producers. This shows up when goods output and manufacturing value added are measured in current dollars. On this basis, goods output as a proportion of GNP fell from 43.3 percent in 1980 to 42.1 percent in 1984; manufacturing value added fell from 22.1 percent of GNP in 1980 to 21.2 percent in 1984.

We turn now to the relationship of industrial production to GNP. Industrial production moves closely with GNP over long periods but is more volatile cyclically. The relationship is captured in the following regression (Lawrence, 1984, p. 21):

$$IP = \underset{(-4.8)}{-0.0342} + \underset{(12.6)}{2.18}GNP$$

where IP and GNP are the annual percentage changes in industrial production and real GNP, respectively, and the numbers in parentheses are t-statistics. The regression was estimated with annual data from 1951 to 1981.

According to this relationship, industrial production rises at the same rate as GNP when the latter is increasing at an annual rate of 2.9 percent. When GNP increases more slowly than 2.9 percent, industrial production advances less than GNP and when GNP expands faster than 2.9 percent, industrial production increases faster than GNP. When GNP increases 1.6 percent annually, industrial production is constant.

Over the period from 1980 to the second quarter of 1985, industrial production rose 13.1 percent and GNP 13.3 percent. The annual rate of advance was about 2.8 percent. This is consistent with the regression for the period through 1981. From the second quarter of 1984 through the second quarter of 1985, industrial production increased at an annual rate of 2.4 percent and GNP increased 2.0 percent. This is a faster advance in industrial production than would have been expected from its relation to GNP in the period from 1951 to 1981.

Thus, neither goods output, manufacturing value-added, nor industrial production shows a significant slowing relative to the total output of the American economy during the period of dollar appreciation. Of

course, employment in goods-producing industries has fallen as a proportion of total employment. This ratio declined from almost 45 percent in 1960 to 31.1 percent in the first quarter of 1985. The reports on employment may well have created the impression that the goods-producing sector of the economy is shrinking, whereas what has actually happened is that productivity has risen faster in this sector.

It is well known that individual industries—textiles, shoes, and primary metals, for example—have indeed experienced slow or falling production. While total industrial production in the second quarter of 1985 was 13.1 percent above the 1980 level, iron and steel was up only 3.9 percent, non-durable consumer goods were up 10.6 percent, and textile mill products were down 2.6 percent. But the poor performance of these industries was offset by electrical machinery—up 24 percent; motor vehicles and parts—up 43.8 percent; and defense and space equipment—up 50.3 percent.

It appears that the effects of foreign competition and import penetration were offset by the capital goods boom-especially in computers, trucks, and automobiles—and the build-up of defense spending since 1980.

Impact abroad of U.S. current-account deficit

It is clear from the analysis thus far that, even in the absence of an appreciation of the dollar, the United States would have exerted a positive influence on the growth of the rest of the world in the period since 1982. But the combined effect of rapidly-growing domestic demand *and* the appreciating dollar led to a much larger expansion of U.S. imports than in previous cyclical recoveries. U.S. imports of goods and services, in current dollars, increased about $125 billion from the fourth quarter of 1982 through the first quarter of 1985. A rough measure of the impact on other countries is suggested by the observation that this constitutes 2.7 percent of the 1982 GNP of OECD countries other than the United States. Applying our earlier analysis, we can say that one-third of this boost to aggregate demand abroad was the result of the appreciation of the dollar.

How to measure the impact of the United States on other countries raises analytical questions. Changes in the current-account positions of other countries reflect not only the initial impulse—the increase in imports of the United States, which is mirrored in the increase in exports of other countries—but also the induced reaction to that impulse in the form of enlarged imports by those countries. Countries whose GNP growth was stimulated by larger exports to the United States absorbed more imports from their trade partners, including the United States, and

those imports are reflected in current-account positions.

A better measure of the impact of the United States on other countries would therefore seem to be the increase in U.S. imports and the increase in other countries' exports.

The change in exports of goods and services as a percentage of GNP (or in some countries GDP) in the previous year is shown in Table 2 for the major industrial countries.

On the basis of these data, it appears that in 1984 all of the increase of the GNP of France and Germany was attributable to export expansion. Of course, elements of domestic demand also expanded, but they were offset by the increase in imports.

In terms of absolute stimulus to real output, the export expansion was largest for Japan and Canada, especially in 1984. This is consistent with the fact that the United States accounts for relatively large fractions of the exports of these two countries. Yet, in Japan in 1984 and in Canada in both years, domestic demand increased faster than in other industrial countries except for the United States. It is not surprising that Japan and Canada enjoyed a superior economic performance in those years.

While Germany appears to have benefited from export-led growth in 1984, the increase in German exports as a proportion of GNP was no larger in 1983-84 then in the first two years of earlier cyclical recoveries. This is true also for other large European countries (BIS, 1985, p. 17). But for all these countries except the United Kingdom, the growth of GNP in the latest recovery was considerably smaller than in earlier recoveries. The obvious explanation is that domestic demand expanded much less this time, no doubt reflecting the austere fiscal policies being pursued by these countries. It is striking to observe that the structural budget balance in Germany, as a percent of GNP, has moved toward sur-

TABLE 2

Growth of Exports of Goods and Services and of GNP, 1983 and 1984

	1983		1984	
	Exports*	GNP	Exports*	GNP
Japan	1.0	3.4	3.6	5.8
Germany	-0.4	1.3	2.6	2.6
France	0.9	0.7	1.7	1.7
UK	0.3	3.1	1.7	2.4
Italy	1.1	-0.4	1.7	2.6
Canada	1.6	3.3	5.2	4.7

*Increase as a percent of GNP in previous year.
Source: OECD, *Economic Outlook*, December 1984, (p. 48), June 1985, (p. 21).

plus since 1981 by more than the U.S. structural budget has moved toward deficit (OECD, 1985, p. 4).

In general, therefore, the combination of U.S. economic growth and the appreciating dollar has given a boost to the economies of other industrial countries. In some of these countries, restrictive policies restrained domestic demand, which held back economic growth.

As for developing countries, economic activity in the industrial world eased the plight they were in in 1982, when the debt crisis and world recession forced severe retrenchment of output. This shows up in a cut by 20 percent in the value of imports by non-oil developing countries from early 1981 to late 1982 (IMF, 1985, p. 52). From the fourth quarter of 1982 to the fourth quarter of 1984, the exports of non-oil developing countries increased, at annual rates, from $318 billion to $369 billion. Of this increase of $51 billion, about $21 billion—more than 40 percent—went to the United States.

In 1983 and 1984, the export volume of "non-fuel" exporters among developing countries increased 6 and 12 percent (fuel exporters comprise members of OPEC, some smaller oil-exporting nations in the Middle East and Africa, and Mexico). Although the unit .value of their exports fell further in these two years, by 2.6 percent, the unit value of their imports fell by more—5.5 percent. As a result, they were able to increase imports by 7.5 percent in the two years 1983-84 and to expand real GNP by 2.7 percent in 1983 and 4.4 percent in 1984. Non-oil exporters, a category that includes Mexico, increased GNP 1.9 percent in 1983 and 4.2 percent in 1984 (IMF, 1985, p. 210).

It is unlikely that much of the increased exports of developing countries can be attributed to the appreciation of the dollar. To a large degree, the currency relationships of these countries to the dollar depend on their own exchange-rate policies. Although an increasing proportion of their exports has become price-sensitive as they have industrialized, most of the expansion of their exports is probably the result of economic recovery in industrial countries and of their own efforts to make their exports more competitive.

Impact of capital flows

We turn now to the effects of capital flows to the United States. By way of introduction, it may be noted that the swing in current and capital account positions was relatively greater for the United States than for other industrial countries. The U.S. current account moved from a deficit of $11 billion in 1982 to $102 billion in 1984. The counterpart of this shift shows up only partly in the accounts of other industrial countries, which moved from a current-account deficit of $17 billion in 1982 to a

surplus of $36 billion in 1984. At the same time, the non-oil developing countries reduced their combined deficit from $64 billion to $24 billion.

Thus, while the U.S. deficit on current account increased from 0.3 percent of GNP in 1982 to 2.8 percent of GNP in 1984, the current account of OECD countries other than the United States went from a deficit equal to 0.4 percent of GNP to a surplus of 0.8 percent of GNP. The swing toward surplus was about half as large, relative to GNP, for other industrial countries as was the swing to larger deficit for the United States.

Countries with current-account surpluses necessarily experience net outflows of capital equal to those surpluses. Those capital outflows absorb savings that might have been utilized at home to finance investment. Or, to put the point another way, in the absence of these capital outflows, the countries would have had lower interest rates, which might have stimulated domestic investment.

Some observers in Europe have focused on this aspect of the economic and financial relationship of Europe with the United States, and they have consequently looked upon the U.S. current-account deficit and related capital inflow as exerting a depressive effect abroad.

The problem is analogous to the financing of a budget deficit within a country. If tax rates are reduced or expenditure is increased so as to enlarge the budget deficit, aggregate demand will expand faster. But the *financing* of the larger budget deficit, assuming that the central bank does not provide the funds, works in the opposite direction. The issuance of additional securities by the Treasury absorbs funds that would otherwise have been available to finance private expenditure and in this way tends to depress aggregate demand. In most circumstances, the demand-increasing effect of the enlarged budget deficit is thought to be considerably greater than the demand-reducing effect of financing it. In fact, if an economy is operating below its potential, fiscal stimulus will lead to growth of output and income, which normally generates more savings. This will contribute to the financing of the budget deficit and domestic investment.

If we view the increased exports and current-account surpluses of Europe and Japan as having imparted a stimulus to economies that were rather depressed, we are entitled to assume that this stimulus probably outweighed the depressive effect of the additional capital outflows.

Interest rates in some industrial countries were affected not only by the capital outflows that necessarily accompanied current-account surpluses but also by monetary policies that were designed to dampen depreciation of their currencies. These tighter-than-desired monetary policies may be viewed as a direct result of the dollar appreciation--or, more correctly, of the belief by monetary authorities in other countries that the dollar

would continue to be under upward pressure. These monetary authorities sought, through higher interest rates than they would have preferred on the basis of the condition of their domestic economies, to minimize the extent to which their currencies depreciated against the dollar. Although such depreciation brought a benefit in the form of larger exports, it also raised the prices of imports--especially oil—that are denominated in dollars. There is no way to quantify the effect of these tighter monetary policies where they prevailed.

Capital flows to the United States have been, as noted, more important as a proportion of GNP. Accordingly, the impact of such flows on interest rates has been larger in the United States.

The role of capital inflows in supplementing American saving has often been pointed out and does not call for extended treatment here.

In 1984, net domestic investment was equal to 7.2 percent of net national product (NNP) and the budget deficit (on income and product account) was equal to 5.4 percent of NNP. Net saving, including surpluses of state and local governments, came to ten percent of NNP. The shortfall of domestic saving—about three percent of NNP—was made up by the inflow of foreign funds. Thus, about 23 percent of the sum of net investment and the Federal budget deficit was financed from abroad.

As was observed earlier, not all of the external deficit of the United States is the result of the appreciation of the dollar. The more rapid growth of the U.S. economy in 1983-84 and the cutback in imports by developing countries would have enlarged the current-account deficit in any event. But, that deficit would have been less than half as large, in 1984, if the dollar had not appreciated.

If the dollar appreciation had been held down by a different mix of fiscal and monetary policies in the United States—a smaller budget deficit and a more expansive monetary policy—American interest rates need not have risen despite the smaller supply of foreign savings. On the other hand, if the dollar appreciation had been kept in bounds by market forces while U.S. macroeconomic policies were as they actually have been, American interest rates would have had to be high enough to keep domestic investment and domestic saving in balance with a smaller supplement from foreign saving. One could use an investment demand equation to estimate how much interest rates would have had to rise to reduce ex ante net investment to, say, 5-1/2 percent of the national product instead of the actual 7.2 percent in 1984. But there is little to be learned from such a computation. The point is that the higher U.S. interest rates—in the absence of dollar appreciation but in the presence of the existing mix of fiscal and monetary polices—need not have depressed the American economy. Rather they would have served to crowd out enough domestic investment outlays to match the smaller current-

account deficit. Thus, larger exports and smaller imports would have offset the lower investment outlays with little or no effect on growth in the short run. In the longer run, of course, lower net investment would have meant slower growth of potential GNP; but a smaller current-account deficit would mean a smaller decline in the net foreign assets of the United States.

If we ask what would have happened to the economies of other industrial countries if the dollar had not appreciated in the presence of the actual fiscal-monetary mix in the United States, the answer seems to be that they would have been worse off. Although smaller capital outflow would have tended to reduce interest rates, other forces—the need to keep interest rates in line with the higher rates in the United States—would have raised them. Moreover, exports to the United States would have increased less.

Impact on prices

An appreciating currency is expected to reduce the prices of tradable goods relative to those of non-tradable goods and thereby to lower the average price level, compared with what it otherwise would have been. The opposite effects are expected to occur in countries whose currencies depreciate. It is the changes in the relative prices of tradable goods that lead to alterations in trade and current-account balances.

Movements in exchange rates can have further effects on average price levels if, by influencing consumer prices, they have an impact on the rate at which wages advance.

The direct effects on domestic prices come through two channels. Import prices tend to fall in countries with appreciating currencies and to rise in countries with depreciating currencies. Changes in import prices show up directly in price measures insofar as imports of finished products are part of the basket of goods purchased by consumers or businesses. Beyond that, changes in the prices of imported inputs to the production process affect the price level. The indirect effects of changes in the prices of imports show up as increases or decreases in the prices of import-competing goods produced in the home country; this is sometimes referred to as the competitive or umbrella effect.

Export prices are also influenced by exchange-rate changes; these prices are not reflected in consumer-price measures but they do affect GNP implicit price deflators. Import prices have indirect, but not direct, effects on these deflators.

Since the principal impacts of exchange-rate changes on domestic prices come through movements in import prices, there is something to be said for using an exchange-rate measure to which import prices are

closely related. The exchange-rate measure used earlier in this paper—the Federal Reserve trade-weighted average values of currencies—weights countries' currencies by the total value of their trade with other industrial countries. The IMF measure—MERM, calculated from the Funds' multilateral exchange-rate model—is based on a model designed to measure the effect of exchange-rate changes on trade balances. In order to gauge the effect of exchange-rate changes on U.S. prices, we utilize here an average weighted by the share of countries in American imports; the weights reflect countries' bilateral trade with the United States[8] (Woo, 1985, p. 512).

As may be seen in Table 3, the import-weighted average value of the dollar increased much less in the 1980s than the other measures. From the fourth quarter of 1980 to the fourth quarter of 1984, the import-

TABLE 3

Measures of U.S. Inflation and of Dollar Appreciation
(percent)

	1980		1981		1982		1983		1984	
	A	B	A	B	A	B	A	B	A	B
Consumer prices	13.5	12.4	10.4	8.9	6.1	3.9	3.2	3.8	4.3	4.0
GNP implicit price deflator	9.2	10.2	9.6	8.9	6.0	4.3	3.8	3.8	3.8	3.6
GNP fixed-weight index	9.8	10.1	9.6	8.9	6.4	5.2	4.2	4.0	4.3	4.2
PCE implicit price deflator	10.2	10.2	8.7	7.8	5.9	4.9	3.7	3.1	3.2	3.1
PCE fixed-weight index	11.2	10.9	9.4	8.3	5.9	5.2	4.0	3.4	3.9	4.0
Federal Reserve dollar index	-0.8	1.8	17.8	18.4	13.2	16.0	7.5	6.5	10.3	13.1
MERM	0.1	0.3	12.7	13.6	11.7	14.8	5.8	3.9	7.9	10.6
Import-weighted dollar index	0.1	-1.4	8.2	9.4	8.9	10.8	2.5	1.3	6.5	9.3

Note: A: year-to-year changes; B: December to December for consumer prices and fourth quarter to fourth quarter for other series. PCE: personal consumption expenditures. MERM: IMF index based on multilateral exchange-rate model.

Sources: U.S. Bureau of Labor Statistics, *Monthly Labor Review*; U.S. Dept. of Commerce, *Survey of Current Business;* Federal Reserve *Bulletin;* IMF, *International Financial Statistics.*

[8] This exchange-rate measure was constructed, at the Brookings Institution, in a manner similar to the Federal Reserve index except that the weights are countries' shares in U.S. imports.

weighted bilateral dollar index rose 34 percent while the Federal Reserve multilateral index went up 65 percent. The reason is that Japan and Canada, whose currencies depreciated much less against the dollar than those of other countries, account for a larger share of U.S. imports than of world trade.

The gain from using the bilateral import-weighted index is impressionistic rather than statistical. When an exchange-rate measure with multilateral trade weights is used in econometric work, the past relationship of prices to the exchange rate displays smaller coefficients than appear if a bilaterally-weighted average is used (Hooper and Lowrey, 1979, p. 15).

The appreciation of the dollar is generally credited with contributing to the decline in U.S. inflation, although there is no consensus on how large that contribution has been. A substantial part of the disinflation is the result of the recession of the early 1980s. Inflation has also come down in other industrial countries despite the fact that their currencies have depreciated against the dollar. In those countries, recessions have also occurred, recoveries have been much weaker than in the United States, and unemployment is, relatively, at very high levels.

We attempt in what follows to throw light on the effects of exchange rates on the observed changes in rates of inflation in industrial countries.

Inflation in the United States

U.S. inflation, as measured by consumer prices, was rising even before the second oil shock in 197.9-80. But the price advance accelerated in those years to "double digit" levels. In 1980, consumer prices increased 13.5 percent on a year-over-year basis and 12.4 percent from December to December. In 1976, consumer prices had risen 5.8 and 4.8 percent, respectively, on these two bases.

Various measures of the change in U.S. prices after 1980 are presented in Table 3. It may be seen that much of the reduction in inflation took place in 1981 and 1982, a period of recession. Most price measures in the table show a further lowering of the inflation rate in 1983 and 1984 but by considerably less than in the two previous years. It has to be remembered, however, that real GNP increased at an annual rate of about six percent from late 1982 to late 1984. In some earlier periods of GNP expansion at about this rate, inflation tended to accelerate rather than decelerate, as is indicated in Table 4. In both the mid-1950s and the mid-1960s, inflation picked up significantly when the economy expanded rapidly. In 1970-72, price controls held down inflation; in the second quarter of 1973, before the oil shock, prices were advancing at an annual rate of 7.2 percent. In the first quarter of 1975, prices were still

reacting to the quadrupling of OPEC's oil price that occurred in 1973. This inflation was temporary, as is discussed below; it subsided to less than four percent in the first half of 1976 and then advanced again. The recent period does, therefore, stand out as unusual in showing a reduction of inflation in the face of rapid growth.

TABLE 4

GNP Growth and Inflation in First Two Years of U.S. Recoveries
(percent; seasonally-adjusted annual rates)

	GNP Growth	Inflation	
		Trough	Two years later
1982-Q:4 to 1984-Q:4	6.0	3.4	2.8
1975-Q:1 to 1977-Q:I	5.1	10.7	5.5
1970-Q:4 to 1972-Q:4	5.8	5.5	5.2
1964-Q:4 to 1966-Q:4	6.0	1.0	4.0
1954-Q:2 to 1956-Q:2	5.0	1.4	3.4

Note: Inflation is measured by GNP implicit price deflator in the quarters indicated. Source: U. S. Department of Commerce, *Survey of Current Business*

Another point is worth making. Much of the inflation of 1980 (Table 3) was undoubtedly the result of the 150 percent rise in the price of oil that occurred from 1978 to the first quarter of 1981. The 1980 inflation rate was temporary. The price level rose sharply but there is no reason to think it would have continued to rise at the 1980 rate. There would have been some subsidence of inflation in any event, especially since wages did not rise fully with prices; while consumer prices advanced 13.5 percent in 1980, average hourly earnings went up nine percent and total compensation per hour rose 10.6 percent.

Since inflation would have diminished of its own accord after 1980, one would expect the appreciation of the dollar to explain only a fraction of the total falloff in the rate of price advance. Beyond that, other forces were at work pushing down inflation. If these other forces—notably high unemployment—and dollar appreciation accounted for all of the decline in inflation, they would be over-explaining it.

There is still a question as to how much of the lowering of inflation is attributable to the appreciation of the dollar. We turn now to recent attempts to measure this effect.

The classic study of the effect of changes in dollar exchange rates on U.S. prices is by Peter Hooper and Barbara Lowrey (1979), who surveyed the literature and came up with consensus estimates of the impact

of a ten percent real dollar depreciation as measured by the Federal Reserve multilateral trade-weighted dollar index: if oil prices are not affected, the consumer price level will rise 1-1/2 percent; if oil prices rise by the same proportion as non-oil prices, consumer prices will rise 1-3/4 percent. Half of the price impact is estimated to take place within one year of the depreciation and the remainder within two to three years. These estimates assume that domestic economic policies "roughly offset any tendency for the path of real aggregate demand to change as a result of the depreciation."

On the assumption that these estimates would hold symmetrically for an appreciation of the dollar, we apply them in Table 5 to the years 1981-84. We assume that the full effect on consumer prices of each year's appreciation (.875 for each 11 percent increase in the price-adjusted dollar value) is felt by the end of the second year. As may be seen, on this basis prices in 1981-84 were about one-fifth lower than they would have been if the dollar had not risen. From 1980, 15 percent of the slowdown in inflation by 1984 was attributable to the appreciation of the dollar.

These results are about the same as those Jeffrey Sachs (1985, p. 128) derived from the Hooper-Lowrey coefficients, although our methods differ. Sachs used the MERM rather than the Federal Reserve index, on which Hooper and Lowrey based their estimates. This tends to give him

TABLE 5

Effects of Dollar Appreciation on U.S. Prices
(percent)

	1980	1981	1982	1983	1984 average	1981-84
Change in CPI*	13.5	10.4	6.1	3.2	4.3	6.0
Change in price-adjusted dollar		19.1	10.7	4.8	9.8	
Effects of 1981 appreciation		1.5	1.5			
Effects of 1982 appreciation			0.9	0.9		
Effects of 1983 appreciation				0.4	0.4	
Effects of 1984 appreciation					0.8	
Total price effect		1.5	2.4	1.3	1.2	1.6
Inflation without appreciation	13.5	11.9	8.5	4.5	5.5	7.6

*Consumer price index.
Source: Federal Reserve Board.

a smaller exchange-rate effect on prices. On the other hand, he added to Hooper and Lowrey's consensus estimate a third year price effect equal to 0.3 percent for each ten percent exchange-rate change.

Peter Hooper (1984) has presented a simulation, carried out on the Federal Reserve multicountry model, of the effects of holding the dollar at its level of the fourth quarter of 1980. Through 1983, he finds that the consumer price level would have been, on average, one percent higher. This is slightly less than the impact derived from application of the Hooper-Lowrey coefficients.

Sachs' paper (1985) also includes a structural model which he uses to measure the effect of dollar appreciation on U.S. inflation. In a version of the model that allows prices to be reflected fully in wage behavior, Sachs finds that 45 percent of the falloff in inflation (measured by the personal consumption deflator) from 1980 to January-September 1984 was the result of the appreciation of the dollar. He attributes 55 percent of the inflation slowdown to unemployment.

Although we cannot offer definitive conclusions on the effect of dollar appreciation on U.S. inflation, it is evident that the effect was significant. The rise of the dollar probably accounted for more than one-sixth and less than one-half of the diminution of inflation from 1980 to 1984.

Inflation in other industrial countries

What is noteworthy about those industrial countries whose exchange rates depreciated against the dollar is that, not only did inflation come down after 1980, it came down substantially (Table 6). The challenge is to explain how this happened. What we seek to do here is not to explore an effect of the rising dollar but to understand why what might have been the effect—higher inflation—did not occur..

As was observed above, it was to be expected that the 1980 inflation rates would subside to some extent. In Europe and Japan, as in the United States, the jump in the price level in 1980 was in large part a result of the rise in oil prices. It did not represent a sustained rate of inflation.

Still, we know that dollar exchange rates depreciated and that the domestic currency value of dollar-denominated imports increased. We also know that one of the complaints heard in Europe in recent years is that the increased cost of dollar-based imports, especially oil, was putting unwanted upward pressure on price levels.

Several influences were working in the other direction.

It should be noted, first, that a very large share of the imports of European countries comes from other European countries. For the members of the European Community (EC) as a group, half of total imports in 1984 were from other members of the Community. Almost two-thirds of

TABLE 6

Changes in Consumer Prices in Major Industrial Countries
(percent)

	1980	1981	1982	1983	1984	4th Q 1984*
Canada	10.2	12.5	10.8	5.8	4.4	3.7
France	13.8	13.4	11.8	9.6	7.4	6.5
Germany	5.4	6.3	5.3	3.3	2.4	2.0
Italy	21.2	18.7	16.3	15.1	10.7	9.9
Japan	8.1	4.9	2.6	1.8	2.2	2.5
United Kingdom	·18.0	11.9	8.6	4.7	5.0	4.8
United States	13.5	10.4	6.1	3.2	4.3	4.0

*From fourth quarter of 1983.
Source: IMF, *World Economic Report,* April 1985, p. 213.

the imports of EC members came from industrial countries other than the United States and Canada—that is, from countries against which there was little if any depreciation of EC currencies. Only eight percent of the imports of the EC came from OPEC nations.

Japan's import composition is different. Twenty-three percent of its imports came from the United States and Canada in 1984. Imports from OPEC comprised 32 percent of total imports and those from non-oil developing countries were about 25 percent of the total. Although Japan is much more dependent than Europe on imports that are either denominated in dollars or are from countries with exchange rates pegged to the dollar, the fact is that the yen depreciated much less than European currencies from 1980 to 1984. In that period the yen value of the dollar rose less than five percent while the Deutsche mark (DM) value of the dollar went up 57 percent. This compensated for Japan's greater exposure to dollar imports. Europe's larger dollar depreciation was compensated for by the fact that a relatively small fraction of its imports are priced in dollars or in currencies pegged to the dollar.

These facts show up in trade-weighted exchange rates where the weights represent bilateral trade. Table 7 presents multilaterally-weighted exchange rates as computed by the International Monetary Fund (MERM) and bilaterally-weighted exchange rates computed by Morgan Guaranty Trust Company. It may be seen that both the DM and the yen ***appreciated*** from 1980 to 1984 when their exchange rates are weighted by their bilateral trade. The DM appreciated against the other EC currencies, with which so much of its trade is conducted, and this outweighed its sizable depreciation against the dollar. The yen depreciated much less against the dollar than the currencies of most of its non-U.S. trade partners.

TABLE 7

Bilateral and Multilateral Trade-Weighted Exchange Rates
(1980 = 100)

	1981		1982		1983		1984	
	MERM	MG	MERM	MG	MERM	MG	MERM	MG
Canada	102.9	99.8	104.9	99.0	108.3	100.4	106.3	96.9
France	89.4	94.3	81.3	87.4	74.2	82.0	69.7	79.2
Germany	92.7	97.2	96.5	102.8	98.8	107.6	96.1	107.4
Italy	86.7	91.1	80.2	85.6	76.1	83.3	71.1	80.1
Japan	113.1	110.8	106.6	103.2	117.4	112.9	124.1	118.3
United Kingdom	98.9	102.3	94.2	98.3	86.7	91.8	81.9	88.3
United States	112.7	109.7	125.9	121.1	133.2	125.9	143.7	135.0

Sources: IMF, ***International Financial Statistics***, July ***1985;*** Morgan Guaranty Trust Co., ***World Financial Markets,*** June ***1985.***

Another perspective comes from an examination of import prices, displayed in Table 8. Import prices in domestic currencies reflect both the movement of prices in exporting countries and exchange rates between importing countries and their suppliers. As Table 8 shows, Germany's import prices jumped more than 13 percent in 1981. The average price of Saudi Arabian oil was 13 percent higher in 1981 than in 1980, but non-oil commodity prices fell 15 percent. The value of the DM, bilaterally-weighted, depreciated more than seven percent that year. Although we cannot fully explain the recorded rise in Germany's import prices in 1981, it is significant that from 1981 to 1984 import prices rose only 8.1 percent, or at an annual rate of 2.6 percent. During this period, the price of oil fell more than 12 percent and the average prices of non-oil com-

TABLE 8

Import Prices in Major Industrial Countries
(1980 = 100)

	1981	1982	1983	1984
Canada*	110.6	113.0	108.6	114.3
France*	118.5	132.9	143.2	158.0
Germany	113.6	116.2	115.8	122.8
Italy*	136.6	148.3	153.2**	167.5***
Japan	101.6	109.6	101.0	97.6
United Kingdom*	107.7	116.8	127.7	139.3
United States	105.5	103.8	99.5	101.3

*Unit-value series
** Break in series
January-September. Source: IMF, ***International Financial Statistics.

modities declined a further three percent. Thus, import prices did not put much upward pressure on the German price level, either directly or indirectly, after 1981.

The OECD (1985, p. 47) notes that European import prices are "running somewhat below what would be implied by aggregate indices of world trade prices in dollars converted at current exchange rates, assuming historical trade patterns." It is suggested that the explanation may be "the readiness of exporters to a national market to take cuts in margins in order to keep prices in line with domestic competitors and so retain market shares." This observation is consistent with anecdotal evidence about pricing by American exporters.

In the case of Japan, import prices increased and fell with the exchange rate in 1981 and 1982. On balance, however, import prices declined slightly from 1980 to 1984 as commodity prices, including oil, fell after 1981 and the bilaterally-weighted exchange rate appreciated. In fact, the yen appreciated from 1981 also on the basis of a multilaterally-weighted exchange rate.

As to other industrial countries, the movements of import prices largely reflect what happened to their exchange rates. Both the French franc and the Italian lira have been devalued in the exchange-rate grid of the European Monetary System. From 1980 to 1984, for example, the French franc value of the DM increased by more than 18 percent.

We have focused on the international influences on prices in Europe and Japan. In Europe, at any rate, the high level of unemployment and slow-growing economies must have had a substantial effect in reducing inflation. The advance of average hourly earnings and, more broadly, unit labor costs has slackened markedly in Europe and Japan. By 1984, four of the seven largest industrial countries were experiencing a decline in unit labor costs in manufacturing (Table 9). This does not tell us what

TABLE 9

Changes in Unit Labor Costs in Manufacturing in Major Industrial Countries
(percent)

	1980	1981	1982	1983	1984
Canada	10.6	11.6	11.7	-0.1	-4.6
France	12.4	13.3	10.4	5.9	1.8
Germany	7.6	4.9	4.1	-1.1	-0.3
Italy	12.4	18.0	18.2	13.8	3.8
Japan	3.5	5.1	5.2	1.1	-2.9
United Kingdom	21.5	9.7	5.4	2.1	3.6
United States	11.6	6.0	6.6	-0.8	-0.3

Source: IMF, *World Economic Outlook*, April 1985.

was happening to costs in other parts of these economies, so we cannot quite conclude that what inflation exists in Europe and Japan is fully attributable to the depreciation of their currencies against the dollar.

Impact on debt burden of developing countries

It was observed earlier that little, if any, of the'increased demand for exports of developing countries can be attributed to the appreciation of the dollar as distinguished from the expansion of aggregate demand in the United States. The point was made that the exchange rates of developing countries in terms of the dollar depend on their exchange-rate policies. What matters is whether they peg to the dollar, another currency, or a basket of currencies and how they go about adjusting either the peg or an otherwise-established rate over time.

Unless the appreciation of the dollar altered the growth of gross domestic demand in all industrial countries taken together, there is little reason to believe that the volume of exports of the developing countries was affected. Other channels by which exchange-rate changes among industrial countries may have had an effect on developing countries are through interest rates and prices of imports and exports.

Taking the fiscal and monetary policies of the United States as given, the appreciation of the dollar enlarged its current-account deficit and net capital inflow. This in turn made U.S. interest rates lower than they would have been in the absence of dollar appreciation. It is true that, on balance, interest rates were higher in other industrial countries. But, most of the debt of developing countries is denominated in dollars and bears interest rates related to those on dollar obligations. Therefore, developing-country debtors benefited.

Expressed in dollars, both the export and the import prices of developing countries tend to decline as the dollar appreciates. What happens to their terms of trade is uncertain. In 1981-84, the terms of trade of all developing countries, including fuel exporters, fell 2-1/2 percent (IMF, 1985, p. **234).**

Among the commonly-used indicators of debt burden is the ratio of debt to exports. Since developing-country export prices fall in dollar terms when the dollar appreciates, this ratio tends to suggest an increase in the burden of debt. But this is misleading, since the dollar value of imports of developing countries also declines with import prices as the dollar appreciates. This letter effect is not picked up in the debt-export ratio.

All in all, the debt burden of developing countries may have been eased somewhat by the appreciation of the dollar—given the U.S. policy

mix—since dollar interest rates were lower and the terms of trade were little affected.

Effects of dollar depreciation

As these words are written, the dollar has depreciated significantly from its highs of late February 1985. Forecasting the course of the dollar is a hazardous enterprise. Nevertheless, the probability of a further, though not necessarily a continuous, depreciation is large enough to warrant brief consideration of its effects.

The impact on the U.S. economy will depend crucially on whether action is taken to reduce the budget deficit. In the absence of such action, the narrowing of the current-account deficit, when it occurs after the usual lags, will tend to raise interest rates in the United States. The extent to which this happens will depend on where the economy is operating relative to its potential.

The rates of growth of other industrial countries will tend to decrease with the slower expansion of U.S. imports resulting from the depreciation of the dollar. The restrictive stance of fiscal policy in much of Europe and in Japan will become more salient and the need to alter fiscal policy will become more compelling. Once expectations in financial-markets are attuned to a depreciating dollar--or, at least, a stable dollar—industrial countries that have maintained tighter-than-desired monetary policies will be able to relax those policies. It is hard to predict how widespread and how large those monetary-policy changes will be. In the case of Germany, whose economic performance to a large degree sets the tone for Continental Europe, one would not expect monetary policy to change dramatically, if at all.

Since the price effects of depreciation against the dollar have been surprisingly moderate in Europe and Japan, one should not expect the opposite exchange-rate movement to alter inflation markedly in those countries. The trend toward falling inflation would continue, perhaps a bit more strongly.

Only when Europe brings its unemployment down is inflation likely to pick up, but that would have no connection with dollar exchange rates. If anything, the depreciation of the dollar will, as is implied above, slow the expansion of the European economies.

One of the more interesting questions is, will the United States experience a significantly higher inflation rate-or a larger jump in its price level, which is not necessarily the same thing. From our consideration of the price effects of dollar appreciation, we have reason to expect a larger jump in prices as the dollar goes down. Since we do not have conclusive evidence for the contribution of the appreciation to lower inflation, we

cannot make confident quantitative predictions about the price-raising impact of dollar depreciation.

Whatever the initial price effect, the important matter for the longer run is whether it gets translated into higher inflation. That depends on how wages react to the jump in prices.

Wage behavior in the United States has been remarkably moderate during the recovery since 1982. It is beyond the scope of this paper to examine the reasons or to forecast wage behavior. It is not beyond hope that the inevitable upward price pressures that will accompany a dollar depreciation will be a one-time phenomenon rather than a continuing higher rate of inflation.

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Commentary on "Effects of the Strong Dollar"

John S. Flemming

Sitting as I usually do in Threadneedle Street, it is natural for me to comment on this paper not only from a foreign viewpoint but also from that of someone close to policy—particularly monetary policy. This I shall do despite the fact that I prepared these comments while enjoying the hospitality of, and playing the academic at, the National Bureau of Economic Research in Cambridge, Massachusetts.

Robert Solomon starts his analysis from the proposition that the exchange rate is one of many endogenous variables in a general equilibrium system. To consider alternatives to recent history we must specify alternative courses for some exogenous variables and recognize that endogenous variables, other than the exchange rate, will also be affected. Typically there will be many alternative scenarios associated with, for example, a lower dollar, so that the effects of a strong dollar are not uniquely defined.

I sympathize with this approach. The counterfactual scenarios are said to consist of a tighter fiscal and looser monetary policy. Solomon also considers another alternative: "the dollar appreciation (might have) been kept in bounds by market forces while U.S. macroeconomic policies were as they actually have been." In its context this seems to relate to a world in which the supply of funds from other countries was less sensitive to Rlative interest rates than has in fact been the case.

If the supply of capital to the U.S. were less elastic, interest rates in the U.S. would have been higher and elsewhere lower; with lower capital imports the U.S. would probably have invested less and had a smaller current deficit. It would have been more competitive and the real exchange rate lower; What that would have done for aggregate demand in other countries depends crucially on the strength of the boost from lower interest rates there on expenditures—which is disputed.

There is, moreover, a third possibility which does not fit Solomon's general equilibrium argument so well. What if the height of the dollar is not an equilibrium phenomenon? Paul Krugman's paper suggests that the market

has made one, or a series, of mistakes. If they had not, the world would have been different: the set of exogenous variables must include as independent variables, the expectations, or fears, which underlie such potential errors.

Absent such "mistakes" it seems that the dollar could (should?) have been lower without any change in relative interest rates, implying greater U.S. competitiveness and a loss of demand elsewhere not directly offset, even partially, by an interest rate stimulus. There could, however, still be a stimulus if the lower dollar reduced inflation pressures elsewhere and thus facilitated an effective relaxation of currently restrictive policies.

When considering the impact of capital inflows to the U.S., Solomon suggests that they may have inhibited investment in other countries. I have two difficulties with this argument. The first is that the multiplier effects of exports to the U.S. almost certainly have profit and accelerator effects on investment which outweigh any interest rate effect. This is indeed Solomon's own conclusion but he, like William Branson, does not, for my taste, adequately emphasize that the global flow of savings is yet another endogenous variable so that the charge that the U.S. is taking too much of Europe's savings may be misleading. This is particularly important in the context of the U.K. where our capital exports owe as much to Mrs. Thatcher's dismantling of exchange controls as to Mr. Reagan's need for funds to finance his deficit. (The fact that investment has remained somewhat sluggish reflects the fact that despite the strong dollar the U.K. remains uncompetitive).

Reduced obstacles to capital outflow from the U.K. certainly lead to larger outflows, and possibly slightly higher interest rates, but also to a lower exchange rate, more domestic activity, higher profits, and, almost certainly, more domestic saving and investment. We cannot take savings as given and then allocate them to domestic or foreign investment by manipulating interest and exchange rates even hypothetically.

The most direct effect on other countries of the strong dollar is on trade account. Solomon makes the point that Canada and Japan have experienced the largest growth of exports as a result of the expansion of demand in the U.S. since 1982 and "yet" that their domestic demand increased faster than in other industrial countries except for the U.S. He also notes that growth in "some countries" (Germany seems to be referred to) has been held back by "restrictive policies." For any given policy stance, Keynes/Harrod multipliers would tend to make export and domestic demand move together. Or is the suggestion that policy was less resmctive in Canada and Japan? If so, how is this related to their currencies' relatively small depreciation against the U.S. dollar and thus perhaps a smaller perceived threat of imported inflation? Or does the causality run from tight German fiscal policy to a weak DM just as the strength of the dollar is due to the U.S. deficit? I notice that Dr. Emminger finds this implausible.

An aspect of the strong dollar which can easily be overlooked by someone

in a polar country like the U.S. is what an extreme exchange rate misalignment looks like to a third country such as the U.K. which attaches high weight to both the U.S. dollar and the DM in its effective exchange rate. (Incidentially we have no trouble with the MERM weights as opposed to bilateral weights--the importance of competition in third markets and the role of dollar influence on commodity. prices makes it appropriate that its weight in £'s EER be about twice that of our bilateral trade.)

When we "take the exchange rate into account" along with the monetary aggregates and other asset prices in assessing monetary conditions, we (nearly always) use the effective rate rather than any particular rate. (Indeed on as many occasions the dollar has been excluded from the basket as the dollar parity overweighted.) This is consistent with our finding the MERM weighted EER a good explanatory variable for both prices and net trade.

This does not, however, imply that all sets of rates generating a given £ EER have identical effects on U.K. inflation and output. If an already high dollar rises, and an already low DM falls, leaving the £ EER unchanged, I would expect the volume of the U.K.'s net exports to decline. This is because the dollar rate in particular is perceived to be too good to last; capacity will not be enlarged to take a transient opportunity; rather the sterling price of U.K. exports to the U.S. will be raised with effects, for example, on London hotel prices. On the other side, German import volumes to the U.K. will probably rise and our sales to and in competition with, them fall. The German supply response is greater than the U.K.'s because it is more competitive overall even if the dollar is overvalued relative to sterling by a similar amount to that of sterling relative to the DM.

The argument is similar to one that used to be popular amongst regional economists. Given a non-linear short-run regional or industrial Phillips curve, a greater regional or industrial dispersion of unemployment rates raises inflation for a given average unemployment rate. Non-linearities in price and quantity responses to bilateral exchange rates mean that the dispersion of deviations of other countries' exchange rates from equilibrium may have adverse implications. To the extent that currency misalignments worsen the short-run trade-off governments with consistent preferences will choose policies leading to lower average levels of activity.

Solomon includes the ultimate fall of the dollar among the effects of its having earlier been strong and in his brief discussion refers to the reaction of monetary policymakers in other countries. It certainly matters to all the parties whether the adjustment is taken on exchange rates, with consequent upward pressure on U.S. interest rates, or whether, for example, European countries react to dollar weakness by lowering their own interest rates thus facilitating a move towards less misaligned currencies at a lower structure of world real interest rates.

Solomon suggests that Germany, at least, would be unlikely to change its

monetary policy much, if at all. The U.K. would certainly like to see a lower structure of interest rates but its monetary policy has not formally been conditioned on movements in the £/$ exchange rate; any adjustment of U.K. monetary policy would have to be consistent with the maintenance of downward pressure on inflation through restrained growth of monetary aggregates and a satisfactory path of the effective exchange rate. The contribution of these factors changes from time to time as things go better or worse than had previously been expected, but the probability of a general favorable shift is not very high, and any one country's failure to respond would diminish the response likely from others.

When considering effects on LDC's, Solomon concentrates on the alternative of a lower interest elasticity of capital flows so that the real appreciation of the dollar is associated with lower dollar interest rates than otherwise. He concludes that this has benefited LDC's, although the cost of other currencies they might have borrowed must have been raised. If he had considered an alternative policy mix in this context his conclusion that LDC's have benefited from the strong dollar might have been changed. Moreover, as was pointed out in discussion, he does not address the "political economy" consequences of the strong dollar—U.S. protectionism and greater sympathy for interference with international capital movements. These may be the most adverse and lasting consequences of all.

4
The International Role of the Dollar

Otmar Emminger

The dollar is certainly the most frequently discussed economic phenomenon of our times. Wherever I go I am asked (because in the past I had for many years a lot to do with the dollar): what about the dollar? Will it continue to fall? Will it rise again? And if it should continue to fall, will it be a gentle slide towards a soft landing, or will it end in a crash landing? Why is there so much discussion about the dollar? There are three reasons:

The dollar value — The most important price in the world economy

First, the dollar's exchange rate is at present the most important price in the world economy (while ten years ago one would probably have attributed this role to the oil price). The high dollar — even at the present DM 2.80 exchange rate it is still quite high (higher than at the end of 1983) — has had an enormous impact on the world economy. It has affected the competitive position of other industrial countries versus the United States, the U.S. trade balance, the structure and development of world trade, the prices of commodities and other internationally traded goods, and price inflation both in the United States and elsewhere. More recently the high dollar has been called the major drag on the American economy. And it has certainly been the foremost cause of protectionist pressures which threaten to undermine our trading system. No wonder that the high dollar has been a subject of discussion and complaints at several economic summit meetings; although in my view the complaints of other countries have since 1984 assumed more the character of a habitual rite, since most industrial countries have learned to live with a high dollar and have drawn from it more benefits than disadvantages.

A second reason why the dollar is so ardently discussed is because it is such a controversial subject. Its behavior has seemed to defy dl conven-

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tional wisdom. At least until the beginning of 1985, we could watch a rather paradoxical, if not "perverse," spectacle: the more the American budget deficit and trade deficit increased, the higher rose the dollar.[1] What would have made all other currencies weak seems to have strengthened the dollar. We have already heard at this conference some interesting views about this strange connection between high budget deficits and a strong dollar.

A third reason for the worldwide keen interest in the dollar is concern about the future. What will happen to the world economy if and when a definitive reversal of the dollar trend should lead to a much lower level of the dollar's exchange rate? This concern is, of course, based on the belief that the present external position of the U.S. economy is in the longer run unsustainable, and that sooner or later the budget deficit chicken and its consequences will come home to roost — and that this may severely hit the dollar and, in its consequence, also American interest rates. I don't think one can get around the fact that the present external payments position is fragile and represents a "high risk situation." It makes the dollar and the U.S. economy dependent on the unpredictable and uncontrollable whims of international capital flows. The dollar is performing a circus act, and there is no net under it. My view has been for a long time that the uncertain future of the dollar is becoming much more an American problem than a problem for the other countries — although they, and particularly the high-debt countries, may be greatly affected, too.

The topic assigned to me is the international role of the dollar. So I shall first make a few general remarks on how this role has evolved over recent years. Second, I will discuss the international impact of the high dollar, and third, venture a bit into the foggy area of future prospects.

General remarks on the international role of the dollar

The powerful position of the dollar is not only based on its being the currency of the largest and most powerful economy. It goes beyond that because the dollar fulfills a unique role as a world currency.

This role has undergone some changes over the last 15 years. Until 1971 we had the gold-dollar standard which gave the dollar a key role, as the system's official link to gold and as the anchor for other countries' parities. When President Nixon suspended the gold convertibility of the dollar in August 1971, many experts — both inside and outside America — expected that this had finished the key role of the dollar in the world monetary system. They believed that the dollar had become a normal currency like all the oth-

[1] The height of absurdity was reached when a leading European financial newspaper (Financial Times, July 20) wrote: "This week's news that Congressional talks about cutting the U.S. deficit have broken down may have been the best news for the dollar in months... The budget deficit both keeps rates high...and it discourages the Fed from easing further."

ers, and that the United States now had lost what deGaulle had called the "exorbitant privilege" of financing its external deficits with its own domestic currency.

These assumptions have proved thoroughly wrong. The dollar has not only maintained its special position, it has in some fields even enlarged it. Although we no longer have an official dollar-exchange standard, we are living de *facto* in a largely dollar-based international financial system.

First, the dollar has remained by far the most important reserve and intervention currency. Since August 1971, central banks have nearly quadrupled their reserves of inconvertible dollars: And the international banking system has built up even much larger dollar holdings since the beginning of the 1970s. Thus the dollar has remained the main provider of international liquidity — contrary to the well-known predictions of Professor Triffin and others — and has carried this role even to excess. Even without gold convertibility, the United States enjoyed until recently the "exorbitant privilege" of seeming to have no external financing problem, so that it could afford–and many believe it can still afford—the luxury of a passive balance-of-payments strategy (or "benign neglect.") This phase is now over.

Second, the dollar has remained the main currency for trade and financial transactions. More than 50 percent of world trade is priced in dollars, and that comprises most of the internationally traded commodities including oil. Thus the ups and downs of the dollar in the exchange markets have a much more than proprotionate effect on the import prices in other currencies. In Germany nearly 30 percent of total imports are priced in dollars (while d i i t imports from the United States are only about seven percent), and in France about 40 percent.

The dollar's position is even more pronounced in the financial sphere. It has become the dominating currency in the international financial markets, and this position has been built up particularly during the 1970s. As a consequence, 80 percent or more of the external debt of the Third World is expressed in dollars. A large part of this debt bears variable interest rates tied to dollar interest rates. Thus, large movements of the dollar exchange rate and, in particular, of dollar interest rates, have a big impact on the international debt situation. We witnessed the effects a few years ago.

Third, high dollar interest rates have not only been a heavy burden on the high-debt countries, but also an attraction for foreign investors, and thus an important reason for the high dollar. It was certainly not the only factor; in the period between 1982 and 1984, when net annual capital imports into the United States soared by the tremendous amount of $90 billion, a large contribution came also from the decline in American lending abroad; this was to a large extent due to other causes than high American interest rates (debt crisis, stricter banking regulations, etc.) But taking everything together, dollar interest rates and their changes are a major factor in the world payments sys-

tem, mainly because of the key position of the dollar in the world's financial markets and as an international investment asset.

Fourth, a further distinctive feature of the dollar is the predominant role which capital movements play, both in the U.S. balance of payments and for the dollar's exchange rate. There is no other currency with a similar predominance of capital movements over the so-called "traditional fundamentals" (like inflation differences or the trend of the current account balance.) Capital movements may vary quickly under the influence of changing expectations or shifting confidence. This makes the exchange rate of the dollar so volatile and unpredictable, like a "Russian roulette." The fact that in the case of the dollar, the key currency, the capital balance completely overwhelms trade and current account flows is a major problem and a weak point in the present international monetary system for it is bound to lead not only to great volatility, but to long-lasting misalignments measured against cost and price differences.

The overwhelming influence of capital movements and the huge amount of liquid dollar holdings in the world explain another unique feature of the dollar: it is the only currency for which it can be said with certainty that under conditions of capital mobility it can function only as a fully floating currency. Any fixed dollar rate, or even a mere target zone for the dollar, would sooner or later be toppled by irresistible capital flows and the enormous amount of volatile dollar holdings. As a counterpart against that, compare the European currency situation. Here we have a group of countries for which the potential for disturbing mutual capital flows is much smaller, and among which the payments flows are mainly dominated by inflation differences and current account trends. Just look at the history of the European Monetary System (EMS) over the last six years. Exchange rate adjustments have always been made so as to offset inflation differentials and untenable current account trends. Therefore the deviations of real exchange rates against the other member currencies have never been more than five to eight percent (against up to 50 percent or more for several currencies against the dollar.) This explains why inside Europe an adjustable peg system, a "mini-Bretton Woods," has functioned while it could never function again in relation to the dollar.

A currency which is the leading reserve and intervention currency, the dominating currency in the financial markets, and is itself largely dominated by capital movements, cannot be subjected to the same rules for exchange rate policies, for intervention in the exchange markets, etc., which may be appropriate for other currencies. I have always considered it a great mistake that in reviewing our exchange rate system, both economists and government officials, including the most recent Report of the Group of Ten, nearly always try to offer uniform rules for exchange rate policies and do not sufficiently differentiate between currency relations with the dollar on the one

hand, and the relations among other currencies. Intervention, for instance, functions reasonably well among the EMS currencies, but it is a very controversial subject — rightly or wrongly — in relation to the dollar. I repeat: there are good reasons for this difference.

The impact of the "misaligned" dollar

Let me add a few remarks on the international impact of the high dollar. When I spoke about the "strong" or the "high" dollar, I might as well have called it the "misaligned" dollar for the value of the dollar has over the last few years been completely out of line with international cost and price relationships, and also out of line with the trend of the American trade and current account. I am reluctant to use the word "overvalued" (if fundamental factors of the capital balance are properly taken into account.) I also think one should use the word "misaligned" only if it is accompanied by a clarification against which measure (or standard) the dollar is misaligned, and against which basis period. Used in that sense, a statistically verified "misalignment" may be a useful indicator for a change in competitiveness, etc. For the sake of brevity, however, I shall refrain from quoting figures here.

But there can be no doubt that we have never before had a currency whose "real" exchange rate — the nominal exchange rate compared with price or cost differentials — has risen so much and for so long as has the dollar over the past few years. Inevitably, the prolonged misalignment of the world's key currency has produced distortions and deformations. Let me first look at the U.S. economy because its reactions to the high dollar are so important for the whole world economy. The impact of the high dollar on the U.S. economy was at first mainly positive; in 1983-84 it helped to prevent an overheating by deflecting excessive demand abroad. In addition, it has held the inflation rate down and helped to overcome the inflationary psychology, it has kept interest rates lower than they otherwise would have been, and it has exerted pressures to rationalize production. But the longer the misalignment has lasted, the more the balance has shifted to the disadvantage of the U.S. economy. I note the growing drag on the economy, in particular manufacturing, mining, and farming, and the ensuing distortion in the structure of the U.S. economy; the building up of a large external debt the service of which will severely burden the U.S. payments balance on current account for a long time ahead; and the increasing risk that an unsustainably high dollar exchange rate could reverse itself too sharply. This may in the near term become a greater risk for U.S. economic stability than the budget deficit. Paul Volcker said recently that a precipitous decline in the dollar "is the greatest risk we have on the inflation front."

The impact on other industrial countries has developed in the reverse order. At first the negative influences clearly prevailed, with the high dollar

and the high U.S. interest rates behind it forcing overly high interest rates on the rest of the world. But the picture has changed. In a number of countries, especially Japan and West Germany, monetary policy has since 1984 been largely (although perhaps not entirely) "uncoupled" from the high dollar. The price-raising effect of the high dollar on import prices was temporarily, especially in 1981, quite disturbing. But since 1983 it has been partly offset by the fall in the dollar prices of commodities — particularly oil — and partly by lower domestic cost increases. Thus, in Japan and Germany the domestic inflation rate declined in 1984 towards 2 to 2-112 percent, despite the weakness of their currencies against the dollar, and is now on its way to somewhere below two percent.

Between the United States and a group of other industrial countries (and some outlying countries) a queer kind of mutual interdependence has developed over the last few years. These other countries have supplied large amounts of capital to the United States, while the United States has in exchange supplied additional demand to them, which these countries have so badly needed (and did not dare to create themselves because they shied away from an increase in their indebtedness.) Is this going to be a new structure of the world economy — a big capital gap in the United States standing opposite a capital surplus in Japan and other countries? This is, of course, in part simply a reflection of the contrasting policy mixes—a very expansive budget policy here, a restrictive budget policy there. But there lies more behind it, namely deepseated structural differences in the net savings ratio in the private sector. The most striking examples are the United States with its low private savings ratio and Japan with its very high ratio. The Japanese capital surplus appears to be a structural and lasting one, but not necessarily on its present huge scale which is partly a consequence of very high profits on its dollar exports; and it should not go so one-sidely into dollar assets. As concerns other countries it is, in my view, an unreliable structure. At any rate, it is not very satisfactory that the richest country is drawing huge amounts of capital from the rest of the world—more than twice the amount of the net capital imports of the whole Third World! This cannot possibly remain a durable position.

At any rate, it is important to know that many industrial countries have learned to live with a high dollar. More and more the stimulating effects on Japan and Europe due to the combination of American expansion with the high dollar have outweighed the initial negative effects. This external stimulus came just at the right time, namely when domestic demand in Europe and Japan was languishing because of restrictive fiscal policies and other reasons. Without this helpful stimulus from the outside it might not have been possible for some European countries and Japan to carry through the budgetary corrections so badly needed for longer-term structural reasons. Now the export-led recoveries of some of these countries have begun to

spread also to the domestic field, particularly in Japan, but less so in Europe.

But these other countries, too, live under the shadow of risks arising from the misaligned dollar. A prime risk is that a perpetuation of the distorted competitive positions would lead to very harmful protectionist reactions in the United States. This risk is particularly acute for Japan with its very distorted bilateral trade position vis-a-vis the United States. Another risk is that a continuing drag on the U.S. economy from the misaligned dollar might over time lead to an externally generated recession in the United States; this would certainly have a dampening effect on the world economy and would aggravate the situation of debtor countries. A third risk is an abrupt and exaggerated decline of the dollar which would unsettle established trade relationships and might provoke interest rate increases in the United States. The worst scenario, particularly for the international debt situation, would, of course, be a continued weakness of the U.S. economy, accompanied by an excessive dollar fall due to a loss of foreign confidence which might force the Federal Reserve to keep interest rates high in spite of the weaker economy.

Future prospects

These various risks for the world economy let it appear useful to form at least a tentative opinion on what we may expect from the dollar in the near future. I shall not be so presumptuous as to forecast the short-run evolution of the dollar. As I said: forecasting the dollar in the short run is a "Russian roulette."

What we can, however, say with some assurance is that the overpriced dollar will sooner or later have to decline to a more normal level. The crucial question is whether this will become a "soft landing" or a "crash landing." Many experts believe that the external balance of the United States is so much out of joint that its correction will inevitably lead to an abrupt and exaggerated fall of the dollar. I believe, however, that there are also some good reasons for expecting a soft landing. First, there is the unexpectedly low inflation rate in the United States and also the foreign confidence in the Federal Reserve. Second, other countries which are greatly interested, too, in softening an eventual dollar fall, will probably help by lowering their own interest rates; the dampening influence of a lower dollar on their export and their prices will push them towards such a policy anyway. Third, it is in my opinion wrong to assume that the dollar would have to decline until the U.S. current account is in full balance; there may well remain a continuing net capital inflow over the next few years, although at a reduced scale. And finally, one cannot exclude that Congressional action may still lead to a confidence-inspiring cut in the budget deficit. This is a crucial point. It makes all the difference in the world whether the dollar falls because foreign inves-

tors lose confidence in it, or whether it declines because the U.S. capital gap is diminished by budgetary action. In the first case, U.S. interest rates will be forced up in order to attract enough foreign capital, and the budget deficit will crowd out private investment, leading to an economic downturn. In the second case, U.S. interest rates will decline and this will lead to a lower dollar.

Up to now, the decline of the dollar can be considered to have been rather moderate and not precipitous (one commentator called it a decline "at a dignified and tolerable pace"), even though it has fallen by about 17 percent (on a weighted basis) against its peak at the end of last February. But this peak was so clearly an exotic aberration that it was an easy goal for a fully justified, massive (and successful) central bank intervention. The present level of the dollar was considered very high, when it was first reached in 1984. Nobody can say precisely what the "right" exchange rate of the dollar should be. But one can at least say that a further modest downward movement would be in place. This is not a forecast; it remains to be seen whether the dollar, with its exchange rate being a "riddle inside an enigma," will oblige. We should, however, not overlook that even a stronger fall of the dollar would probably have a significant effect on the trade balance only after a considerable time lag. This is one reason why one cannot exclude an overshooting on the downswing.

The dollar as a major risk factor for the American economy

I hope it has become clear that the exchange rate of the dollar, and the huge external deficit which is in part due to the high dollar,[2] have now become acute problems also for the U.S. economy. About a dozen years ago a Secretary of the Treasury said to the Europeans: "The dollar is our currency, but your problem." Now the dollar problem has returned home to the United States, particularly if we look ahead to the somber eventualities for the future.

It corresponds to this new situation that recently the level and trend of the dollar's exchange rate have become an important criterion or indicator for the monetary policy of the Federal Reserve (which seems at present to be "the only guy in town" as concerns U.S. economic policy). Henry Wallich has said: "The exchange rate of the dollar has gained weight as a factor in monetary policy formulation." This is a far cry from "benign neglect."

When the Federal Reserve last May lowered its discount rate, to 7-1/2 percent, it made clear that its main concern at the time was the weakness in the

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[2] The deterioration of the U.S. trade deficit (with equivalent benefit to other countries) over the last three years is estimated to have been due to about half to the high dollar, and for the rest mainly to the relatively stronger expansion in the United States.

U.S. economy as well as the continued strength of the dollar, which had partly caused that weakness. When two months later Paul Volcker explained the Fed's newly rebased monetary targets, he indicated that the Fed was not interested in a further appreciable decline of the dollar, except if it were accompanied by a considerable cut in the budget deficit.

Thus, there seems to be a rather narrow path between what the Fed considers an excessively strong dollar and a dangerously low dollar. After all, the dollar was around DM 3.08 when the discount rate was lowered in May, and around DM 2.85 when Paul Volcker recently showed himself concerned about a further decline. But he may have been looking less at the then existing level than at the apparent speed of the downward trend.

At any rate, one conclusion seems to be warranted. The Fed may find itself before a difficult dilemma: on the one hand, to keep interest rates high enough to attract sufficient funds from abroad and prevent a too steep fall of the dollar and on the other hand, to keep interest rates low enough in order to prevent the domestic economy from falling into stagnation or recession. Isn't it a strange reversal of fate that now the Federal Reserve may be more dependent on external factors, while central banks of several other industrial countries are less dependent than before.

There is perhaps one relieving factor. The impact of a further decline of the dollar on U.S. prices may be less than is commonly assumed: First, most commodities traded in world markets are priced in dollars and some, particularly oil, are declining even in dollar terms. Second, many foreign exporters will probably lower their prices for the U.S. market because they are enjoying high profit margins thanks to the high dollar. Third, we have seen in Japan and West Germany that moderate increases in wages and other domestic costs are in the medium term much more important for the inflation rate than movements in import prices; after all, the share of imports in total GNP is much lower in the United States than in Germany, for example, which has shrugged off the price-raising effects of the high dollar fairly quickly.

But one cannot exclude that the external deficit and its possible effect on the dollar may become a critical factor for the U.S. economy, more so and sooner than other offshoots of the big budget deficit. The only reliable way out of this risk situation would, of course, be a gradual improvement in the U.S. budget situation. This would give the Fed more freedom to maneuver. Another possible way out would be a vigorous recovery in other industrial countries, which would lead to a significant improvement in the U.S. trade balance even without a sharp fall in the dollar. Unfortunately, this latter way out does not look very likely at present, even though there are some modest improvements in other industrial countries on the horizon. Even with a further decline in interest rates, a sufficient domestic demand response in these countries will take a lot of time.

Why have I intruded into the field of U.S. monetary policy, about which you understand probably more than I? For the simple reason that the rest of the world is so much dependent on how the United States will cope with the problem of its twin deficits. The exchange rate of the dollar, American interest rates, and the growth rate of the American economy are three of the most powerful influences on the world's economic and financial evolution. To mention just one obvious example: the solution to the international debt crisis is critically dependent on a further steady expansion of the U.S. economy and on moderate dollar interest rates. This puts a heavy international responsibility on the United States. But no country can escape the responsibility arising out of its importance.

Is the Strong Dollar Sustainable?

Paul R. Krugman

The strong and strengthening dollar of the past five years has been a source of surprise and puzzlement to many observers, who had grown accustomed during the 1970s to the fact of a weakened dollar and the prospect of further depreciation. As recently as 1980 some of the world's leading international economists pointed to reasons which they believed ensured a secularly weak dollar: competition from Japan and the newly industrializing countries, slow productivity growth, and an inflation-biased economy. Since then the trade-weighted dollar has risen more than 40 percent. As the dollar has risen ever higher, economists (and others) have split between those who argue that the dollar's new-found strength represents a speculative bubble soon to burst, and those who argue that the changed exchange rate represents a fundamental shift in the situation which will reverse itself gradually if at all.

The purpose of this paper is to provide a framework for discussing the sustainability of the strong dollar, and to use that framework to make an assessment. Along the way the paper also attempts to clarify some related issues which have been the source of considerable confusion.

The paper is based on a particular interpretation of what we mean by asking whether the dollar is sustainable. The issue, I will argue, is not whether the dollar can continue indefinitely at its present level; most if not all commentators agree that over the long run market forces must eventually drive the dollar down to a level consistent with something approximating current account balance. Nor is the issue one of "hard landing" versus "soft landing." Few would dispute that new information such as a sharp change in U.S. fiscal policy could lead to an abrupt change in exchange rates. Instead, the question is whether a reasonable future path for the exchange rate, given what we now know, requires that the dollar decline ***more steeply than the market now expects.*** If this is the case, then even without new information, market participants will at some point be forced into a revision of their expectations, leading to a plunge in the dollar's value. (This might, for

example, occur immediately following the presentation of this paper.)

To assess the sustainability of the strong dollar, then, we need to ask three questions. First, what expectations about the future course of the exchange rate lie behind the current value of the dollar? Second, what would be the consequences for U.S. foreign trade and investment if the exchange rate were in fact to follow these expectations? Third, are these consequences possible--or will a plunge in the dollar happen at some point instead?

What I will show in this paper is that we can give fairly definite answers to the first two questions, and a less definite answer to the third. The essential conclusions can be summarized as follows:

(a) The current strength of the dollar, given that there are only modest differences between real interest rates in the U.S. and in other industrial countries, amounts to an implicit forecast on the part of international investors that the dollar will decline only slowly, at a rate averaging less than three percent per year for the indefinite future.

(b) A dollar decline this slow would ensure huge U.S. current account deficits for more than two decades. As a ratio to exports or GNP, U.S. indebtedness to foreign countries would reach a level comparable to that of Brazil or Mexico.

(c) Whether one believes the strong dollar is sustainable depends on whether one views this level of U.S. external indebtedness as feasible. If, as 1 believe, such a level of debt is not feasible, at some point the market will realize that the dollar must fall more rapidly than it now expects. When this happens, by the usual logic of asset markets, the dollar will fall immediately.

The bulk of this paper is concerned with putting some analytical and statistical flesh on this skeleton argument. In addition I consider some important counter-arguments and qualifications. The paper is in five parts. The first part asks what we mean by questioning the sustainability of the strong dollar, and sketches out the major reasons which may place limits on the persistence of a high exchange rate. The second part sets out a framework for testing the consistency of the market's expectations. In the third part numbers are placed into this framework, yielding the results to which I have already alluded, namely, that the implicit exchange rate expectations of the market would require massive U.S. accumulation of external debt. The fourth part examines the implications of uncertainty. Finally, the fifth part of the paper asks what might set off a plunge in the dollar, and how far the dollar might fall.

General considerations

In spite of the heated debate engendered by the strong dollar, many issues remain surprisingly confused. There is no general agreement on what it

means to say that the exchange rate is or is not sustainable; nor is there any agreement on .the nature of the constraints which may eventually force the dollar down. As a preliminary step, then, it is important to get our minds clear on these questions. First, we need a clear statement of what we mean when we talk of the dollar's sustainability. Second, we need a clear idea of the constraints on exchange rate.

The meaning of sustainability

The question of the sustainability of the dollar may be broken into a series of smaller questions. First, is the strength of the dollar a permanent or temporary phenomenon? Second, if the exchange rate is only temporarily high, is this a reflection of market fundamentals or a speculative bubble? Third, when the dollar comes down, will it be a gradual "soft landing" or a sudden "hard landing?" I will argue that the second question, the possibility that the dollar is at least in part floating on a speculative bubble, is in fact the crucial and controversial question.

Is *the strong dollar permanent?* Almost nobody who has seriously studied the issue believes that the U.S. real exchange rate can remain indefinitely at its present level. A permanently higher real dollar could only be the result of some shift in the world economy which increased the relative demand for U.S.-produced goods and services. There is no evidence of any such shift; the rise in the dollar has been associated with a rise in the U.S. current account deficit roughly consistent with what one would have expected from econometric estimates which pre-date that rise. There have been some attempts to argue that the actual rise in the U.S. current account deficit is not as large as the measured rise, due to unreported service export earnings; but these arguments have not received wide acceptance, and in any case the possible measurement error has been swamped by the size of the deficit.

In the absence of a shift of world demand toward U.S. goods, a permanently high dollar would mean a permanent U.S. trade deficit and, because of interest payments on accumulated debt, an ever-growing U.S. current account deficit. Nobody believes this is possible forever; thus any serious analysis of the exchange rate must presume that the dollar will eventually come down.

The next question then becomes whether the temporary strength of the dollar represents an appropriate market reaction to the current economic situation, given the forces which must eventually push the dollar down again; or whether the rise in the dollar at least to some extent constitutes a speculative bubble—by which we mean that it is based on market expectations which are inconsistent with the long-run constraints on the balance of payments.

Is the strong dollar a bubble? If there is a bubble component to the strength of the dollar, it is not of the same order as tulipmania or South Sea shares. The desire of international investors to hold increasing claims on U.S. residents need not be explained by an expectation that the dollar will continue to rise, because dollar-denominated assets offer both nominal and real yields higher than securities denominated in the currencies of other industrial countries. As documented below, at the time of writing the long-term real interest rate in the United States was about two and a half percentage points higher than the rate in a weighted average of U.S. trading partners.

If the strength of the dollar does in part represent a speculative bubble, then, it is not a case of wild speculative fever. The case for a bubble, on the contrary, is in fact the argument that there is ***insufficient*** speculation. The argument runs as follows: the huge trade deficits engendered by the strong dollar will eventually push the dollar down. If international investors recognized this, the expected future depreciation of the dollar would act as a deterrent to holding of dollar-denominated assets, and the dollar would be weaker now. However, market participants are myopic, and pay more attention to the higher yield on dollar securities than to the forces which must eventually weaken the dollar. Thus the dollar is high because investors pay too little attention to the prospect of future exchange rate changes, not too much.

One way to make this point is to consider the inconsistency between what econometric forecasters typically assume about the future path of the exchange rate and the behavior of international investors. Shortly before this paper was written, DRI released its medium-term world economic forecast. In that forecast it was assumed that the dollar will decline by eight percentage points per year over the next five years; DRI believed that such a decline was needed to avoid implausible U.S. accumulation of external debt. But suppose international investors were to agree. Then the less than three percent higher yield on dollar-denominated securities as opposed to other industrial country currencies would be more than offset by the expected depreciation, and the dollar would not be as strong as it is.

Turning this around, what we can say is that the strength of the dollar given only modest interest differentials in favor of the U.S. amounts to an implicit forecast on the part of the market that the dollar will decline only slowly. If you believe, like the forecasters at DRI, that the exchange rate must in fact fall faster than this, you must conclude that the dollar has overreacted to the interest differential due to insufficiently forward-looking expectations. It is this overreaction, if it exists, which is the "speculative bubble" component of the dollar's strength.

Speculative bubbles eventually burst. In this case, what would have to happen is that at some point international investors see that the dollar cannot actually remain as strong for as long as they had thought. As soon as they

realize this and try to shift out of dollar assets, the dollar will in fact fall. Thus the argument that the dollar is supported in part by a speculative bubble is also an argument that the dollar must at some point plunge.

It is tempting to argue that the reverse is also true—that predicting an eventual sharp drop in the dollar is equivalent to arguing for a failure or irrationality of market expectations. This equivalence, if valid, would make the issue of a speculative bubble the same as the issue of whether the dollar will decline gradually or suddenly--the issue of a "soft landing" versus a "hard landing."

In fact, however, while there is a relationship between the view that the dollar has overshot its appropriate level and the view that it is likely to come down with a bump, these are not quite the same. To see why, we need to discuss the hard landing versus soft landing distinction on its own.

Soft versus hard landings. Two recent discussions of the prospects for the dollar, by Steckler and Isard (1985) and Marris (1985), have laid considerable stress on the issue of whether the dollar can decline gradually over time or must fall sharply (arriving at opposite conclusions.) In each case the issue is seen as whether a gradually declining path is actually feasible.

The problem with this interpretation is that one could easily believe that the current exchange rate represents a rational market interpretation of a situation which includes some probability of a sharp fall in the dollar. Suppose, for example, that investors see a small probability in any given year that the U.S. and other OECD countries will agree on a joint program of fiscal reform-contraction in the U.S., and expansion in Japan, Germany, and the U.K.

The announcement of such a program would almost surely lead to an immediate sharp decline in the dollar. It is fully conceivable, however, that the probability of this happening in any one year is small enough that the expected loss from a dollar plunge is offset by higher interest rates on dollar assets, so that the possibility of an abrupt fall in the exchange rate need not be inconsistent with rational market behavior. Further, a rational market could produce a strong dollar even if the cumulative probability of a dollar crash over time is large enough that the strong dollar is more likely to end with a bang than a whimper—so long as the likelihood of a bang in any given year is not too high.

The point is that if "news" is likely to amve in large lumps rather than a steady stream, a sharp fall in the dollar will eventually happen whether or not the current level represents a bubble. In fact, large pieces of news can lead to sudden exchange rate changes whether or not the current exchange rate is far from equilibrium. The view that when the dollar falls, it will fall fast, could be a statement about how information arrives rather than a statement that the dollar is currently overvalued.

We should note, however, that if the market believes that there is always

some possibility of a sharp fall in the dollar, the burden of arguing that the market's implicit forecast is reasonable becomes considerably harder. The market must believe that if the dollar does not fall sharply, it will fall even more gradually than the interest differential. As I will argue at greater length in the fourth section of this paper, "Allowing for uncertainty," in this case the market's forecast makes sense only if this more gradual decline is itself feasible. Even if news leading to a sudden fall of the dollar is likely to come in at some point, the market must also have a consistent view of what happens if this news does not come in. As I will show below, even a modest probability of a plunge raises sharply the level of U.S. indebtedness which we must regard as feasible if we are to discount the argument for a speculative bubble.

What is the issue? We have broken the question of sustainability into three sub-questions: permanent versus temporary sustainability, rational markets versus speculative bubble, and hard versus soft landing. All three are important for a proper understanding of the situation, and all are important for policy. As Sachs (1985) has pointed out, the conclusion that the exchange rate must come down means that the inflation benefits of a strong dollar must eventually be repaid; if the descent is rapid, policymakers had better be prepared to deal with an inflation bulge somewhere down the line. All this is true whether or not the dollar's current strength reflects myopic behavior on the part of international investors.

Nonetheless, for the remainder of this paper I will focus on the question of whether the dollar is riding on a speculative bubble. The reason for emphasizing this question is not that it is necessarily the most important issue, but simply that the other issues are not, or should not be, controversial. There is no reasonable case for arguing that there has been a major permanent improvement in U.S. competitiveness, so that there is (among reasonable observers) a consensus that the strength of the dollar is a sometime thing. There is also no question that major changes in the underlying policy environment could produce a sharp fall in the dollar. The controversial issue is whether an eventual dollar plunge will occur even without such changes. The resolution of this issue depends on whether the market's implicit exchange rate forecast is in fact feasible. This is a quantitative question. As a preliminary step, however, we need some idea of criteria for feasibility.

Constraints on the exchange rate

The argument that the dollar is stronger than fundamentals warrant depends, as we have seen, on a judgment that the implicit market forecast of the future course of the dollar is not feasible. That is, this forecast violates some constraint on the dollar's path. What we need to know to make this judgment are the nature and position of these constraints. As will become

clear, the real dispute about the dollar's future is largely about these constraints.

We can roughly categorize possible constraints on the exchange rate into three types. F i t are ***flow*** constraints: sustaining the strong dollar might require U.S. trade deficits or capital inflows larger than feasible. Second are ***stock*** constraints: the eventual level of U.S. external indebtedness implied by a slowly declining dollar might be more than foreign investors are willing to hold. Finally (not wholly distinct from the first two) are ***political*** constraints: the consequences of a sustained strong dollar might be politically unacceptable, leading to government action which if properly foreseen would have brought the dollar down already.

Flow constraints. The argument for a flow constraint on the dollar was for obvious reasons more popular two or three years ago than it is now. The argument was that the strength of the dollar reflected a failure of international investors to believe what economic forecasters were telling them about the eventual consequences of the exchange rate for U.S. competitiveness. Once triple-digit trade deficits became a reality, the argument went, the markets would be surprised into a run on the dollar. In particular it was argued that the United States could not in fact attract capital inflow at the rates necessary to sustain the dollar in the face of current account deficits exceeding 100 billion dollars.

This simple view of a flow constraint has clearly been falsified by events. Perhaps there is a maximum rate of capital inflow which can be attracted to the U.S., but it is higher than the levels we have seen. And this constraint is not likely to be tested. If the dollar declines gradually from this point on, the trade deficit as a share of GNP can also be expected to decline (though it may first rise somewhat due to lagged effects.) So if a flow constraint has not yet been binding on the dollar, it is unlikely to become binding in the future.

The one way in which the idea of a flow constraint could be sustained is by arguing for what we might call an "average" flow constraint. This might say that, for example, one year of tripledigit deficits is all right, but five years is not. It is hard, however, to see how such a constraint might be justified, other than as either a stock constraint in disguise or a political constraint.

Stock constraints. In contrast to a flow argument which stresses the size of required annual capital flows to the United States, a stock argument that the exchange rate is unsustainable would stress the size of the external indebtedness the U.S. must eventually acquire if the dollar declines only gradually. The question then is why some level of debt would be "too much."

An extreme possibility would be one of actual U.S. insolvency. In the current context this possibility might be stated as follows. Suppose that the

implicit forecast of the market turns out to be for a dollar decline so slow that the burden of interest payments on accumulating U.S. debt rises more rapidly than the trade deficit declines. In that case the market would implicitly be forecasting an explosion of U.S. debt which would eventually become impossible to service. We will see later that a rather simple criterion can be constructed to test whether this will happen. The U.S. appears to lie well inside this point, although uncertainty about the future policy environment could make solvency an issue (see "Allowing for uncertainty.")

If solvency is not the problem, we must ask what would limit accumulation of U.S. external debt short of this point. One possibility is that foreign investors would be unwilling to hold as large a proportion of their wealth in the form of claims on the U.S. as would be required to allow a slow dollar decline. Steckler and Isard (1985) posed the question this way, arriving at a projection that foreign countries will eventually have to hold ten percent of their net worth as claims on the U.S. The projections reported below yield higher debt accumulations, but the difference is probably not crucial. What is crucial is whether there are strong portfolio preferences over the national composition of asset holdings.

It is hard to see why there should be. Attempts to apply capital-asset-pricing-model type calculations suggest that securities in different currencies ought to be very good substitutes (Krugman 1980, Frankel 1984.) At the same time, empirical tests for effects of relative asset supplies and wealth distribution on the exchange rate have turned up negative (Frankel 1982.) So we can tentatively dismiss the suggestion that foreign investors would be unwilling to put so much of their wealth in the U.S.—although their governments may be unwilling to allow them to do so.

This does not eliminate the possibility of a stock constraint, however. Even if claims on the U.S. remain an acceptably low fraction of foreign wealth, they might become an unacceptably high fraction of U.S. income. This is the kind of constraint which provoked the third-world debt crisis. That is, the problem was not that Brazil's debt became too large a proportion of OECD portfolios; it was that it began to be perceived as too large relative to Brazil's earning capacity.

What makes some debt/GNP or debt/export ratio too large? The usual argument is that once external debt becomes large enough there is a temptation on the part of the debtor country government to interfere with debt service. Thus the constraint once again becomes political, requiring us now to turn to the issue of political constraints.

Political constraints; In the end, the sustainability issue seems to come down to politics. Given our lack of a good analytical framework for thinking about political decisions, we can safely be quite confident in pronouncing on political constraints, since we need have no fear of contradiction. Basically there seem to be three main ways in which political constraints could

make the strong dollar unsustainable.

First is the possibility that the consequences of the dollar for U.S. international competitiveness will eventually lead to a change in U.S. monetary and fiscal policies which drives the dollar down. At the time of writing there seems to be a long-delayed surge in political awareness of the extent of the effects of a sustained high dollar, suggesting that action may actually be coming. On the other hand, as suggested in "Allowing for uncertainty," if the political response is protectionist it may validate the strong dollar rather than drive it down.

The second possibility is that foreign governments will limit their export of capital to the U.S. They might do this for several reasons. To name only two, those nations might be concerned about the export of savings they would prefer to see invested at home; or they might be concerned about the protectionist sentiment generated in the U.S. by the trade deficit..

Finally, U.S. policy toward foreign investors might change once the U.S. becomes a massive debtor country which must run a trade surplus to service its foreign debt. This kind of concern is at the heart of the modern theory of international debt, as argued in the seminal work of Eaton and Gersovitz (1981.) The Eaton-Gersovitz theory is, in short, that governments have an incentive to repudiate foreign debt when it becomes large, and that they cannot credibly renounce this option. Since lenders are aware of the possibility of debt repudiation, they will attempt to ration loans to a level where the cost of repudiation to a country exceeds the benefits. A debt crisis arises when lenders decide that the level they have already lent is in fact too large (Sachs 1984, Krugman 1985.)

Could the United States be the subject of a debt crisis? At first one might dismiss the idea—the U.S. is not Brazil: As we will see shortly, however, the implicit market forecast of the exchange rate implies that in time the U.S. will in effect become Brazil, at least as far as quantitative measures go. A decline of the dollar gradual enough to justify the current level of the exchange rate would lead to U.S. debt/GNP and debt/export ratios comparable to those of Brazil or Mexico.

It might still be argued that the U.S. is too stable politically and too much the guardian of the market system to be an unreliable haven for funds. I am skeptical about this assertion. The U.S. is, we know, fully capable of adopting policies toward foreign goods which are both nationalistic and self-destructive. If the U.S. can be xenophobic about foreign goods, why should we expect it to be more solicitous toward foreign capital? If we turn to a calculation of costs and benefits, we might note that the U.S., by virtue of its size, is less vulnerable to sanctions and retaliation than LDC debtors. So we cannot dismiss the possibility of a U.S. debt crisis out of hand.

Summary

In this part of the paper I have attempted a clarification of the basic issues involved in the question of the sustainability of the strong dollar. The following conclusions emerged:

—The issue is not whether the dollar can remain indefinitely at current levels. Any reasonable analysis must allow for an eventual return of the exchange rate to a level consistent with something like current account balance.

—The issue is instead whether the current exchange rate is too high given the underlying economic situation, so that part of the dollar's strength represents a speculative bubble which will eventually burst. We can conclude that this is the case if we can show that the current exchange rate is implicitly based on an infeasible forecast for the future exchange rate.

—The constraints on feasibility are essentially political. How much of their savings will foreign governments be willing to see converted into claims on the U.S. rather than domestic investment? How much external debt can the U.S. acquire before nationalistic policies toward foreign investors become a temptation?

A framework for assessing sustainability

In our discussion of the meaning of sustainability, we argued that the key issue is whether the current strength of the dollar is excessive given the underlying economic situation. We can make this assessment in principle in two stages. First, we can look at the current exchange rate, interest rates, and other data to infer the market's implicit forecast for the future path of the exchange rate. Second, we can then examine the consequences of the forecast path for the U.S. balance of payments and external indebtedness, and ask whether these seem feasible.

Of course in practice the procedure is not quite as straightforward as it may sound. Questionable assumptions are needed to carry out both stages. Let us consider each stage in turn.

The market's implicit forecast. At first sight, determining what the market expects may seem simple; just look at the forward rate. Because covered interest parity holds, this is equivalent to using the interest differential as the forecast of the exchange rate.

There are three basic problems which complicate the task of assessing market expectations. First, for balance of payments and indebtedness calculations what matters is not the nominal but the real exchange rate, implying that we should use real rather than nominal interest differentials. This poses

a problem because inflation expectations are not so easily measurable. Second, the task is complicated by consideration of risk aversion and portfolio balance. Finally, we need to realize that the market's expectations are presumably probabilistic rather than deterministic.

Using real interest differentials. If international investors are close enough to risk neutrality, and if concerns about exproportion are not an issue (see later discussion of the safe haven argument), the real interest differential will be the market's forecast of the future change in the real exchange rate.

The problem here is in identifying inflation expectations. Ordinarily we proxy for these by using recent past rates of inflation. This is reasonable if we are looking only a short distance ahead, but not if we are looking at a longer term. Unfortunately, the long-term expectations of the market are what we need for our sustainability analysis.

What gives this problem special salience is that the nominal long-term interest differential between the U.S. and Germany or Japan is substantially higher than the short-term differential. Does this reflect expectations about real rates or about inflation? I find it hard to understand why the market should expect either a further rise in the U.S. real interest rates or a fall in real rates in other industrial countries, so a tentative conclusion might be that inflation expectations are the culprit. The point, however, is that we really don't know.

For the purpose of this paper I will adopt a less than satisfactory solution. This is to construct an estimate of the implicit market forecast by using long-term bond rates and recent inflation rates. If the excess of U.S. long-term over short-term rates actually reflects market fears of renewed inflation, this gives a lower bound to the market's real exchange rate forecast—which is what we want to test for sustainability.

Portfolio balance. If risk aversion leads to low sustainability among assets denominated in different currencies, the procedure of taking the interest differential as the market's forecast of the change in the exchange rate will not be valid. We can argue, however, that the bias is probably not large and, furthermore, that it biases us toward finding the exchange rate sustainable.

We have already noted that such quantitative evidence as there is does not support the view either that international investors should view securities denominated in different currencies as poor substitutes or that shifts in relative asset supplies or wealth distribution have noticeable exchange rate effects. If this evidence is right, we should not be too concerned about using the interest differential as a proxy for exchange rate expectations.

To the extent that portfolio balance is a consideration, note that as foreigners are required to hold increasing claims on the U.S., they will want higher relative returns on these claims. This means that if we think that cur-

rently the interest differential is equal to the expected rate of exchange rate change, as **U.S.** indebtedness grows it will become an ***overestimate*** of expected dollar depreciation, and projecting interest differentials forward will again yield a lower bound to the implicit market forecast. The only way to avoid this conclusion is to assert that international investors are currently willing to hold dollar assets with a lower expected yield than other assets. To argue this, we must assert that there has been a substantial shift in portfolio preferences in the last few years. This brings us to the "safe haven" argument, which is part of the general issue of uncertainty.

Uncertainty and diffuse forecasts. Nobody pretends to have an exact exchange rate forecast. The current value of the dollar reflects not a point expectation but a probability distribution.

Discussions about the exchange rate seem to point out two major sources of uncertainty in market expectations. The first is concern that political developments outside the **U.S.** could lead to at least partial expropriation of assets. This is presumably a low-probability event, but not much probability need be attached to drastic events to make them potent for asset markets. The other is the prospect that eventually OECD governments will do something about the underlying causes of the strong dollar, widely believed to be the divergence in fiscal policies.

These sources of uncertainty cannot be neglected. However it will be useful to postpone their consideration until the fourth section of this paper, "Allowing for uncertainty." There we will see that the safe haven argument works in favor of dollar sustainability, but can be discounted on empirical grounds. The prospect of a policy change, on the other hand, actually makes it harder to believe that the dollar's strength is appropriate given the fundamentals.

A model of the balance of payments and external indebtedness

The upshot of our discussion so far has been that as a first pass it makes sense to proxy for market expectations by assuming that the real exchange rate will depreciate steadily at the current real interest differential. What we need next is a framework for converting this exchange rate forecast into a forecast of the **U.S.** balance of payments and exchange rate. What we will develop here is a simplified model which lends itself easily to manipulation and analysis.

Assumptions of the model. Let E be the natural logarithm of the **U.S.** real exchange rate, measured against some appropriately weighted basket of foreign currencies. Then the assumption of our analysis will be that the implicit market forecast of E is that it will decline at a rate equal to the differential between **U.S.** and foreign rates of return:

(1) $\dot{E} = -(r-r^*)$

The U.S. balance of payments will depend on E. Let us define B as the current account deficit exclusive of interest payments, measured as a *fraction of* GNP. (Loosely, we can call this the trade deficit as a share of GNP.) We will assume that B is a linear function of E. There will be some level of $E = \bar{E}$, for which $B = 0$; thus we can write

(2) $B = (E - \bar{E})$

That is, the trade deficit as a share of GNP is proportional to the percentage "overvaluation" of the dollar $E - \bar{E}$.

Let CA be the inflation-adjusted U.S. current account deficit as a share of GNP; this may be written

(3) $CA = B + rD$

where D is the ratio of external debt to GNP.

Finally, the growth of the debt-GNP ratio will reflect both the current account deficit and the growth of GNP itself:

(4) $\dot{D} = CA - gD \doteq B + (r-g)D$

It is important to stress once again that the purpose of this model is not to make a forecast. Rather, it is to draw out the implications of the exchange rate forecast implicit in the current value of the dollar. If these implications turn out to be implausible, we must argue that the market is wrong and substitute some other forecast.

Dynamics of the model. The model just described has two sources of change over time. First is the "extrinsic" dynamics of exchange depreciation. Second is the "intrinsic" dynamics of debt accumulation.

The joint impact of these dynamics can most easily be understood by focusing on the debt/GNP ratio D. This may be analyzed as follows. First, suppose that a trade deficit of B_t is incurred in period t. How much will this contribute to the debt/GNP ratio in a later period T? The answer depends on two components. The deficit compounds at a rate r, increasing the numerator of the ratio; but the growth of the economy raises the denominator at the rate g. The result then is that the contribution of the deficit B_t to D_T is

$B_t e^{(r-g)(T-t)}$

Suppose that the economy starts with net debt D_0. It then follows that

$$(5)\ D_T = \int_0^T B_t e^{(r-g)T-t} + D_0 e^{(r-g)T}$$

At the same time, the market's implicit forecast (1) implies that the exchange rate is determined by

$$(6)\ E_t = E_0 - (r-r^*)t$$

and thus that the trade balance is

$$(7)\ B_t = (E_0-\bar{E}) - \gamma(r-r^*)t$$

This may be substituted back into (5) and the result integrated. A closed-form solution can be derived by integrating by parts: it is'

$$(8)\ D_T = \frac{\gamma}{r-g} e^{(r-g)T} \left\{ [1-e^{-(r-g)T}] [E_0 - \bar{E} - \frac{r-r^*}{r-g}] + \frac{r-r^*}{r-g} Te^{-(r-g)T} \right\} + D_0 e^{(r-g)T}$$

Equation (8) is fairly nasty-looking, but having this closed-form solution is helpful as a way of isolating several key variables.

One question we might ask is whether the decline in the exchange rate is rapid enough to eventually balance U.S. accounts, or whether growing interest payments on accumulated debt will outpace the improvement in the trade balance. Suppose that we believe that the U.S. currently has roughly zero net debt. By inspecting (8), we can then see that D_T will explode upward if $E_0 - \bar{E} > \frac{r-r^*}{r-g}$. Thus this in effect becomes a test of whether the market's expectations are consistent with solvency. Note that $E_0 - \bar{E}$ is the percentage (logarithmically measured) by which the exchange rate initially exceeds the level which would yield trade balance. This suggests that our discussion should focus on the extent of dollar "overvaluation" in this sense, on the real interest differential, and on the extent to which the real interest rate exceeds the growth rate.

If the exchange rate passes the solvency test, we would still like to know how much debt the U.S. would have to accumulate if market expectations are to be confirmed. As it turns out, the same three variables play a crucial role. To see this, note that (8) gives us D_T as a function of time T. If the solvency test is passed, the debt-GNP ratio eventually reaches a maximum, then turns down. How long does it take to reach

this maximum? If $D_0 = 0$, the time of maximum D, T_{max}, can be shown to be

$$(9)\ T_{max} = \frac{1}{r-g} \ln \left[\frac{r-r^*}{r-r^* - (E_0 - E)(r-g)} \right]$$

T_{max} is positive if and only if our solvency criterion is satisfied, which should not be surprising.

Once we know T_{max}, we can plug it in to get D_{max}, the maximum debt-export ratio implied by market expectations.

All (all!) that we need to do to assess the feasibility of the exchange rate expectations implicit in the current exchange rate is to derive estimates of four variables. These are the real interest differential r-r*; the real interest-growth differential r-g; the overvaluation of the exchange rate relative to its trade-balance level $E - E_0$; and a fourth variable which we have not yet emphasized, the responsiveness of the trade balance to the exchange rate, ∂. Once we have these variables we can plus them in, determine the path of debt, and ask whether it looks possible.

The market's implicit forecast (May 1985)

We have now seen how to use a few pieces of data plus a lot of assumptions to derive the balance of payments and debt consequences of the exchange rate forecast which implicitly underlies the current strength of the dollar. The next step is to fill in the data--or more accurately, to discuss some-alternative proxies for the data we would like to have. Then we can solve for the implied path of debt and the balance of payments, and ask whether it is feasible.

Data

We have seen that the dynamics of the debt-export ratio given the market's implicit forecast depend on four parameters: the overvaluation of the dollar relative to the level which would produce trade balance, the real interest differential, the difference between the real interest rate and growth, and the sensitivity of the trade balance to the real exchange rate: None of these is as well-defined a number in practice as in our model, but we can provide some reasonable estimates.

Dollar overvaluation. By dollar overvaluation we mean the excess of the exchange rate over the level which would produce current account balance. This should not be taken either as a statement about market failure or about desirable policy. We want to test whether the dollar's overvaluation is reasonable given other data, not assert that any

overvaluation in this sense is unreasonable or undesirable:

The procedure I will use for measuring overvaluation is the simple one of assuming that in a base period E - E was equal to zero. The base period I will use is 1980, a year in which the U.S. in fact had an approximately zero current account.

This choice is subject to three main objections. First, although 1980 was a year of current balance, at the time many observers believed that if the dollar had remained at that level the U.S. would over time have moved into substantial current surplus—i.e., that in a longer run sense the dollar was undervalued in that year. Second, and working in the opposite direction, the world economic environment has shifted since 1980 in such a way as to reduce the demand for U.S. exports. Sluggish growth in Europe and the third-world debt crisis would, other things equal, require a depreciation in the dollar to leave the U.S. current account unchanged. Third, in 1980 the U.S. current account was in part sustained by earnings on foreign assets; the cumulative current account deficit since then is widely believed to have eliminated the U.S. net creditor position.

On balance, my guess is that the second and third factors outweigh the first. That is, the real dollar appreciation since 1980 represents a minimum estimate of the real depreciation which would be necessary to restore current account balance.

This still leaves the problem of measuring the real appreciation. As Table 1 shows, real appreciation has been very uneven vis-a-vis different countries, posing a serious index number problem. Roughly speaking, we can think of this as a three-part problem. Against Canada, which because of geography and trade agreements is a disproportionately important U.S. trading partner, the U.S. has had only a mild real appreciation. Against Japan the U.S. has had what until recently we would have considered a massive real appreciation. Even this, however, is dwarfed by the rise of the dollar against European countries.

There are several widely used exchange rate indexes which assign weights to countries based either on bilateral or multilateral trade. For the purposes of the paper, however, it is crucial to be sure that we are consistent in our measurement of exchange rates and interest differentials (see below.) Thus it is useful to "roll our own" real exchange rate index.

The estimate of $E - E_0$ in Table 2 weights the data in Table 1 by 1980 bilateral trade weights, yielding an estimated dollar "overvaluation" of .33.

The real interest differential. The first major problem in measuring the real interest differential is that of finding a proxy for expected inflation. A variety of measures have been compared by Blanchard and Sum-

TABLE 1

Real Depreciation and Real Interest Differentials

	Real depreciation against U.S. dollar 1980-May 1985[a]	Real interest differential against U.S., May 1985[b]
Canada	7.7	-0.2
Japan	27.3	-1.97
Belgium	101.8	-1.9
France	90.0	-3.5
Germany	86.3	-3.0
Italy	63.6	-3.4
Netherlands	90.6	-2.5
U.K.	78.4	-2.4

Change in exchange rate from 1980 average to May 10,1985, deflated by change in consumer prices from 1980 average to February 1985.

Sources: International Financial Statistics, The *Economist.*

[b] Difference in long term government bond rates, May 10,1985 minus difference in CPI inflation, year ending February 1985.

Sources: Ibid.

TABLE 2

Parameter estimates and simulation results

Parameter estimates

$E_0 - E : 0.33$

$r - r^* : 0.024$

$r - g : 0.05$

$\gamma : 0.1$

Simulation results

Number of years before debt/GNP ratio stabilizes:	23.3
Maximum debt/GNP ratio:	45.7

mers (1984) and Frankel (1985); unfortunately the results are quite sensitive to the measure chosen. For the purposes of this paper the real interest rate will be measured by the difference between the government bond rate and the one-year rate of consumer price inflation. The problems with this measure are obvious, but it is not clear that we can do much better.

Beyond this problem, we also have an index number problem, as Table 1 shows. The U.S. appears to have approximately the same real interest rate as Canada, but substantially higher rates than Germany and Japan. Thus as in the case of overvaluation it is necessary to choose weights.

What are the appropriate weights? It should be apparent on reflection that if we take the real interest differential as the market expectation of real depreciation, and we want to estimate the consequences of market expectations for the trade balance, then national interest rates should be weighted according to the same scheme as real exchange rates. It may at first sight seem reasonable to use some alternative weighting, oriented toward financial as opposed to trade importance, but in fact this makes no sense.

Table 2, then, reports an estimate of the real interest differential which uses the same weights as are used to compute dollar overvaluation.

The interest-growth differential. This applies purely to domestic U.S. data and thus poses no index number problems. The major concerns are how to measure the real interest rate—a problem which we have already considered, if not solved—and how to estimate the long-run U.S. real growth rate. In Table 2, the number reported uses the U.S. real interest rate as computed for the interest differential, and assume a long-run growth rate of three percent.

The sensitivity of the trade balance to the exchange rate. This parameter could be derived from econometric estimation. However, such estimates are sensitive to the choice of exchange rate index. Furthermore, there is an implied consistency between the estimate of overvaluation, the current trade deficit, and the assumed sensitivity of trade to exchange rates. That is, according to the model, we should have $(E_0 - E) = B_0$, where B_0 is the current trade deficit as a share of GNP.

This suggests that we can simply invert the relationship and estimate $= B_0/(E_0 - E)$. Essentially this is what I do, but with a modification to take account of lags in trade balance adjustment.

In 1984 the current account deficit was 2.6 percent of GNP, but this gap could be expected to widen: the May 1985 exchange rate was higher than the 1984 average, and the 1984 deficit surely did not reflect the full effects of that year's rate. What I will assume, somewhat arbitrarily, is that a persistence of the May 1985 rate would eventually lead to a non-factor-service deficit of 3.3 percent of GNP. It is arguable that owing to

long-term substitution effects even this number is a serious understatement.

Simulating U.S. debt

We can now use the data in Table 2, together with Equations (8) and (9), to calculate the path of U.S. external debt resulting from the market's implicit forecast of the exchange rate. It is possible to calculate the entire path, but the essential numbers we need to know are only two: how many years does it take before the debt/GNP ratio stabilizes, and how high does this ratio go?

These numbers are reported on the last two lines of Table 2. The calculation finds that the debt to GNP ratio will not stabilize for 23 years, and that the implied ratio is nearly one-half.

These are clearly striking numbers. They imply an extremely persistent U.S. external deficit, and an eventual level of U.S. external indebtedness relative to GNP comparable to that of Mexico or Brazil. Two questions immediately present themselves. First, how sensitive are the calculations to possible source of error? Second, if we accept the calculations, is this a feasible outcome? The calculations reported in Table 2 could be wrong for two reasons: the parameters could be badly estimated, or the whole approach could be wrong.

TABLE 3

Sensitivity tests

		Number of years until debt/ GNP ratio stabilizes	Maximum debt/GNP ratio
$r - r^*$:	.034	13	24.3
	.024*	23	45.7
	.019	41	88.1
	.014		
$E_0 - E$:	.23	13	23.9
	.33*	23	45.7
	.43	45	100.6

*Baseline estimates

Thanks to the simplicity of the analytical framework, assessing sensitivity to parameters is quite straightforward. Table 3 reports some sensitivity tests. (Note that in these tests the initial deficit B_0 is held fixed, and

the estimate of the sensitivity of the deficit to the exchange rate ∂ is adjusted as necessary.) The most distressing feature of the table is the high sensitivity of the results to the estimate of the real interest differential. A one percentage point increase in our estimate of this differential substantially reduces the time until the debt ratio stabilizes and the level at which it stabilizes. On the other hand, a one percentage point reduction in our estimate pushes us over the boundary of the solvency test: interest payments rise faster than the trade deficit falls, and the debt ratio rises without limit. Since we have emphasized the uncertainty of our real interest rate estimates, this is alarming.

The question is which way an estimate of the expected inflation differential between the U.S. and Germany or Japan based on recent inflation experience is likely to be biased. Many businessmen in the U.S. seem to place at least some weight on the possibility of a resurgence of inflation; suggesting that the real interest differential is smaller, not larger, than the estimate.

More important than questions about the parameters, however, are doubts about whether the framework is right. Most economists, presented with calculations like these, reply by arguing that it is unlikely that things will get this far—something will be done to bring the dollar down long before debt reaches such levels. As I will argue below, this argument actually reinforces the case for viewing the dollar's strength as a speculative bubble. ,

The remaining question is whether the paths of debt described above are in fact feasible. There is no way to settle this definitively. Essentially one must ask whether the presumed political stability of the U.S. exempts it from Latin-style crises of confidence, or whether on the contrary the size of the U.S. makes it impossible for it to engage in Latin-level external borrowing. At least we should recognize that the level of the dollar does imply a forecast of an eventual accumulation of immense debt—and that it is unlikely that many international investors have thought this through.

Allowing foruncertainty

A decline of the dollar slow enough to justify its current strength would lead in the long run to a huge U.S. foreign debt. In the long run, however, we are all... When the unacceptable consequences of the strong dollar lie many years in the future, it seems natural to discount them on the grounds that something will happen long before we reach that point.

It is certainly true that we should allow for uncertainty in assessing the sustainability of the strong dollar. However, it is important to be careful

in specifying the nature of the uncertainty. Uncertainty about the security of foreign assets—the safe haven argument—does mitigate the consequences of the calculations reported above. The expectation that sometime in the next 25 years something will be done about the dollar, on the other hand, reinforces the argument.

The safe haven argument

The safe haven argument holds that capital flows into the U.S. are motivated not merely by interest differentials but also by a perception that the U.S. is a more secure place in which to invest. In principle this is a reasonable argument. It is usually, however, stated loosely in a way which fails to show its limitations.

First, we must bear in mind that what needs explaining is the strength of the dollar vis-a-vis other industrial country currencies not vis-a-vis cruzeiros or pesos. A useful safe haven argument must explain why an international investor would hold dollar securities rather than mark securities even if the expected rate of dollar depreciation exceeds the interest differential.

Second, the relevant margin of choice is between interest-bearing securities. This means that the general consideration which safe haven advocates often invoke, such as differences in national growth prospects, are relevant only if they affect the prospects for repayment on these securities. An investor may feel that America is reinvigorated while Europe is stagnant, but this only affects our calculations in the last section if European stagnation translates into an increased probability that bonds issued by European governments will not be honored.

To put it bluntly: the safe haven argument, to help explain the strength of the dollar, must be an argument that the market attaches a significant probability to the prospect that claims on Europeans or Japanese will at some point be repudiated or expropriated.

If we grant this argument, it is a powerful one. Suppose that there is a perceived three percent chance in any given year that the Red Army will overrun Europe and the Red Navy overrun Japan. Then international investors would be willing to hold U.S. assets even at an expected return differential of minus three percentage points. Turning this around,' the market's implicit forecast for the real exchange rate if Russia does *not* attack is for a decline at 5.4 percent per year, rather than 2.4 percent—sharply reducing the implied debt accumulation.

We could argue about whether this scenario is plausible. The important question, however, is whether the market believes that claims on European countries are really subject to more political risk than claims on the United States. Here there is a major piece of counter-evidence:

Eurodollar interest rates do not significantly differ from U.S. rates. This constitutes ***prima facie*** evidence that the role of political risk does not allow us to dismiss calculations that suggest that a sustained high dollar will lead to heavy debt accumulation.

Possibility of a dollar stabilization

The most common argument against long-term calculations of the kind reported in the third part of this paper, "The market's implicit forecast (May 1985)," is that given the uncertainty in the world we will never see that long run, and that it should therefore not be a source of concern. As we have just seen, one type of uncertainty, fears of expropriation, does in principle allow us to downplay the importance of long-run issues. We have rejected the safe haven argument for the dollar's strength; but it may seem plausible to imagine that other forms of uncertainty will be similar in their implications.

One particularly common argument is that long-term forecasts of the effects of a strong dollar are irrelevant because government policy will not in fact allow the strong dollar to go on indefinitely. On this argument, in any given year there is some probability that the underlying causes of the strong dollar will be eliminated. The U.S. will finally deal with its budget deficit, other industrial countries will adopt more expansionary fiscal policies, and so on. If this probability is high enough in each year, the likelihood that the strong dollar will go on long enough to produce the results described above will be small—and the argument is that therefore the long run can be disregarded.

Although this argument may seem plausible, however, it is in fact wrong. Indeed, 'the possibility that something will be done about the exchange rate makes it more likely, not less, that the current strength of the dollar represents in part a speculative bubble.

One way to get some intuition on this is to imagine first that there were no possibility of a change in policy that would bring the dollar down. In the absence of a speculative bubble the market's implicit forecast, as constructed earlier, would have to imply feasible paths for deficits and external debt. Now suppose that we add to this situation the possibility of a sudden fall in the dollar due to changes in policy. Surely the effect of this addition, given rational expectations, would be to ***lower*** the exchange rate. This makes it very peculiar to turn around and argue that an exchange rate which seems to imply infeasible debt accumulation does not represent a bubble because there is a possibility of a plunge in the exchange rate somewhere along the way.

To see the right way to think about this issue, it is useful to draw an analogy with a somewhat similar issue, the pricing of gold. In a classic

analysis of the pricing of gold under rational expectations, Salant and Henderson (1978) pointed out that the market is always facing some probability of a gold auction by governments, which would depress the price. What they showed was that with rational expectations, the price of gold between auctions must obey the following rules: (a) the price must rise at a rate exceeding the interest rate by an amount which just compensates investors for the risk of capital loss if an auction occurs; and (b) given this rate of price increase, the level of the price must be such that the path of prices if ***no auction occurs*** is just feasible—in their context, the consumption of gold over time must just exhaust the initial stock of gold.

How does this analogy apply to the dollar? If there is a probability of sudden decline in the dollar due to a change in policy, and we have rational expectations, then (a) the market must expect that if the dollar does not plunge it will decline at a rate which is ***less*** than the interest differential, by an amount which compensates investors for the expected capital loss from a plunge, and (b) this path must itself be feasible.

Suppose, for example, that the real interest differential is three percentage points, and that the market believes that there is a five percent chance that in any given year the dollar will plunge by 40 percent. Then investors must expect that during years in which the dollar does not plunge it will fall at only one percent per year, so that they are compensated for the expected two percent capital loss. And if the investors are behaving appropriately, they must believe that a path on which the dollar declines only one percent per year is itself feasible.

We have already seen evidence to suggest that it will be hard to reconcile any significant probability of action to bring the dollar down with a feasible path for U.S. external debt. Even if the dollar declines by the full amount of the interest differential, the accumulation of debt will be extremely large, and we have seen that the eventual accumulation is very sensitive to the expected rate of decline. At the same time, the dollar is sufficiently above the level that would produce current account balance that a fall to that level would impose a very large capital loss on holders of dollar securities. What this means is that even a small probability of such a fall will require a much more gradual decline or even a rise in the dollar until the decline takes place, implying rapid accumulation of debt.

The market's implicit forecast when dollar stabilization is a possibility

We have just argued that introducing a significant probability of a dollar stabilization means that the market is implicitly forecasting very rapid debt accumulation until this stabilization occurs. The purpose of this section is to confirm this argument with illustrative simulation exercises.

Unfortunately it is not possible to state this problem in a way that leads to a closed-form expression like that in "A framework for assessing sustainability.'' Thus we will shift here to a discrete-time framework. This means that the results do not correspond exactly with the results in "The market's implicit forecast (May 1985)", although they are quite close.

The discrete-time model is set up as follows. First, we have a debt accumulation equation,

$$(10)\quad D_t = (E_t - \bar{E}) + (1 + r - g)\, D_{t-1}$$

where D and E are defined as before.

On the exchange rate side, we now allow for the possibility of a dollar stabilization. It is assumed that there is a constant probability that policy actions will bring the dollar down to a level which stabilizes the debt/GNP ratio D. Let $\tilde{E}_t$ be this exchange rate; it is clearly defined by

$$(11)\quad \tilde{E}_t = \bar{E} - \frac{r-g}{\gamma} D_{t-1}$$

Our equation for exchange rate dynamics must have the expected capital loss from dollar decline just equal the interest differentials. If the dollar is not stabilized, the capital loss is $E_{t-1} - E_t$. If the dollar is stabilized, it is $E_{t-1} - E_t$. Thus until stabilization takes place we must have

$$(12)\quad (1-\pi)(E_{t-1} - E_t) + \pi (E_{t-1} - \tilde{E}_t) = r = r^*$$

which may be rearranged to yield

$$(13)\quad E_t - \bar{E} = \frac{\pi}{1-\pi}\,\frac{r-g}{\gamma}\, D_{t-1} + \frac{1}{1-\pi}(E_{t-1} - \bar{E}) - \frac{1}{1-\pi}(r-r^*)$$

Equations (10) and (13) define an easily simulated system in E and D.

We can now turn to the issue we raised: what are the effects of introducing some risk of a dollar stabilization? Table 4 reports the results of two simulations. In the first simulation π is set equal to 0.067, implying a 50 percent chance of dollar stabilization within 10 years; in the second simulation it is set at 0.129, implying a 50 percent chance of dollar stabilization within five years.

The right way to read the table is as a series of statements of the following kind: "If I believe that there is a 50 percent probability that something will be done about the dollar in the next five years, and if I also

TABLE 4

Debt/GNP ratios under uncertainty

	50% probability of dollar stabilization within:	
	10 years	5 years
Debt/GNP ratio after 10 years if no stabilization:	43	71
Debt/GNP ratio after 20 years if no stabilization:	135	460

believe that the current value of the dollar is justified, then I must believe that it is feasible for **U.S.** external debt to grow to 71 percent of GNP within ten years, since there is a 25 percent chance that nothing will be done about the dollar over that time.''

The results are clearly striking. To understand them, note that if there is a substantial probability that the dollar will fall sharply, investors will hold dollar securities only if they otherwise yield a substantial premium over foreign assets. Even in the low Π case, this turns out to require an actual rise in the dollar as long as the stabilization does not occur; and this rise takes place at an accelerating rate. The result is snowballing **U.S.** external debt.

The point of this exercise should be made clear. Once again, the exercise is not an actual forecast. Instead, it aims to draw out the necessary implications of beliefs about the exchange rate. In this case, what the exercise says is that if you believe that the probability of dollar stabilization is high enough that we need not worry about very long run forecasts, you must either believe that expected capital losses from a declining dollar exceed the interest differential—i.e., that the market has got it wrong--or that it is possible for the **U.S.** to have a very rapid growth of external debt.

Protectionism as a policy response

We have now seen that introducing the possibility of action to correct the exchange rate makes it harder to argue that the market is justified in valuing the dollar as high as it does. To conclude this part of the paper, however, it might be useful to point out that ''doing something about the

dollar" might involve treating symptoms rather than causes—and that this might in a peculiar way help justify the dollar's strength.

Suppose that governments are not in fact willing to address what most economists regard as the causes of the strong dollar, but instead try to insulate their economists from the consequences of the exchange rate. Suppose, for example, that the U.S. imposes import tariffs and export subsidies, or that other countries impose exchange controls which give rise to a divergence between commercial and financial rates of exchange. Then the result would be to break the link between the market's implicit exchange rate forecast and any necessary balance of payments consequences.

What this amounts to saying is that it is possible to justify the strong dollar if one believes that market participants expect the overvalued exchange rate to be validated by protectionism.

There is no simple way to test whether this is true. All that one can say is that the idea of a protectionist validation for the dollar is not common currency among businessmen. Strong proponents of efficient markets may argue that investors act as if they knew things they do not appear consciously to understand; against this argument there is no defense except that of plausibility.

Prospects for the dollar

"The market's implicit forecast (May 1985)," presented earlier in this paper offered evidence that the dollar is stronger than warranted by the interest differential between the United States and other industrial countries. "Allowing for uncertainty" went on to argue that the nature of the uncertainty facing international investors is such as to reinforce the conclusion that the strength of the dollar in some degree represents a speculative bubble. The obvious next questions are when the bubble will burst, and how far the dollar will fall.

Inevitably the answers to these questions are both for the most part the disappointing one that we don't know. This paper will not yield any hot tips to be used for immediate speculative purposes. The best we can do is, first, to explain ***why*** no definite answer can be given, and second, to provide at least some bounds on the extent of the plunge.

When will the bubble burst?

The method used in this paper is by nature ill-suited to predicting the actual future path of the dollar. We began by adopting as the maintained hypothesis the assumption that the market is in fact making a rational forecast, then argued that the market's implicit forecast is not feasible.

This shows that rational expectations is not the right model, but gives us no clue to what the right model is.

The point is that we have very little idea of how to model asset markets other than via the assumption of rational expectations. The historical record has been described by such authors as Kindleberger (1978), and vivid literary discussions such as the famous essay of Keynes (1937) may be found, but these are not as helpful as we might like.

All that we can say with any assurance is that when the dollar does decline it will reveal its speculative component either by plunging for no apparent reason or by reacting disproportionately to whatever change in the fundamentals appears to set it off.

How much will the dollar decline?

As a preliminary to asking how much the dollar will decline when it finally does, it seems natural to ask how much of the dollar's current strength represents a speculative bubble. As we will *argue* in a *moment*, this is not necessarily a good indicator of what will happen when the bubble bursts. Nonetheless, it is surely an interesting question in its own right.

What we have argued is that given the combination of a fairly small interest differential and some probability of a sharp decline in the dollar when policy is changed, the current value of the dollar would lead to an infeasible level of U.S. indebtedness. To estimate the "bubble component" of the exchange rate, then, what we need to do is to decide how high a debt level is feasible and how high a probability of a policy change there is in any given year, then find the level of the exchange rate which would keep debt within this bound while offering investors compensation for the expected capital loss.

Of course we do not in fact know what level of debt is too much or how likely a policy shift is. The best we can do is to present a menu. This is done in Table 5.

The table asks how much the exchange rate would have to depreciate given several different estimates of the probability of policy change, measured by the probability of something being done within the next five years, and for several different estimates of the maximum sustainable U.S. debt/GNP ratio. As in Table 4 it is assumed that the effect of a policy change would be to lower the dollar to precisely the point at which the debt/GNP ratio stabilizes.

Two important points can be learned from this table. The first is that for plausible values the speculative bubble component of the dollar's strength is substantial. If one believes that there is a 50 percent chance that the dollar will be brought down over the next five years, and that the

TABLE 5

Speculative bubble component of dollar

	Maximum allowable debt/GNP ratio		
	20	40	60
Zero probability of dollar stabilization	.06	—	—
50% probability of dollar stabilization within 10 years	.14	.12	.
50% probability of dollar stabilization within 5 years	.19	.19	.

U.S. cannot accumulate an external debt of more than 20 percent of GNP, the dollar should be 19 percent lower than it now is.

The second lesson, however, is that there is still a substantial justified component to the dollar's strength. For the same case, even if the speculative bubble were eliminated, the dollar would still be at a level 14 percent above the level which would produce a balanced current account.

It is tempting to argue from this that when the dollar falls it will fall only part of the way, and that therefore fears of a plunge to below 1980 levels are unjustified. The problem is that if one accepts the argument of this paper, the market has not been behaving as if it makes a rational assessment of long-term prospects. What will happen when the market revises its opinion is unlikely to be a sudden access of rational expectations. Rather, the market will simply go make a new set of mistakes. These mistakes could, though they need not be, in the opposite direction, leading to an excessively weak dollar rather than an excessively strong one. Thus it is possible, though not certain, that we will see an abrupt shift from an overvalued to an undervalued dollar.

What we can say with greater certainty is that the longer the strong dollar persists, the farther it is likely to fall. The reason is simply growing indebtedness. The formula for E, the exchange rate which would stabilize the debt-GNP ratio, makes this clear: every percentage point added to the debt-GNP ratio reduces E by half a percentage point. Since a continuation of the current'exchange rate would imply a debt-GNP ratio of nearly 20 percent by 1990, this is not a negligible factor.

Conclusions

This paper has committed what is usually regarded as a cardinal sin in economics. It has argued that a major financial market has simply made a mistake, failing to make proper use of information available to it. I have attempted to demonstrate that given the relatively modest incentives to hold dollars, and especially given the possibility of an eventual exchange rate stabilization which brings the dollar down, the willingness of international investors to acquire growing claims on the U.S. is misguided. It appears that the market has simply not done its arithmetic, and has failed to realize that its expectations about continued dollar strength are not feasible.

Making a pronouncement like this violates the normal practice of economics. It is a well-established rule in economics that one should always assume that the participants in a market understand it better than you do—after all, they have both more resources and stronger incentives. To second-guess investors with so much at stake is a gross violation of this rule. Yet perhaps we can offer some support for breaking the rule this one time.

First, we should notice that the strong dollar lies well outside the range of experience of anyone in the marketplace. No matter how much experience an exchange trader or portfolio manager has had, he/she has never seen anything like this. The assumption of market efficiency is often justified on an evolutionary basis: over time market participants develop instincts or rules of thumb which enable them to act "as if" they were solving optimal forecasting problems. When the event lies outside previous experience, this evolutionary argument will not work.

Second, the type of analysis required to assess the sustainability of the dollar is economic analysis. The important things to consider are macro variables such as deficits and debt, not details of the financial markets. In other words, the necessary talents required are those of a professional economist rather than an exchange trader or a portfolio manager.

All of this brings us to the final point. Some economists must sometimes be willing to say that the market is wrong. If the market has nothing to go on but economic analysis—which is the case here—and economists always assume that the market is right, we have a circularity which allows the exchange rate to drift at will. And perhaps that is just what has happened.

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Commentary on "Is the Strong Dollar Sustainable?"

Michael L. Mussa

It is a pleasure to discuss Paul Krugman's stimulating paper, "Is the Strong Dollar Sustainable?" and to comment more generally on the factors responsible for the dollar's recent remarkable strength and on the prospects for the future course of the dollar. The organizers of this conference are to be congratulated for selecting an especially appropriate locale for consideration of these issues. Our plane ride through the turbulent air currents prior to landing at Jackson Hole, our raft trip down the rapids of the Snake River, and the jagged profile of the Tetons should remind all of us of the dominant facts of our experience with floating exchange rates. Exchange rates fluctuate, sometimes by large amounts over relatively brief periods, causing at least occasional discomfort to many whose prosperity is linked directly or indirectly to international trade and finance.[1]

As a member of the Business Forecast Panel of the University of Chicago's Graduate School of Business, I occasionally hazard predictions of the future behavior of key macroeconomic variables. In my forecast of November 29, 1984, I suggested that the foreign exchange value of the dollar was likely to decline by eight or ten percent over the coming year and a half. At least since March, this forecast has proved accurate. Before claiming excessive prescience, however, I should note that in December 1983, I forecast a similar decline in the foreign exchange value of the dollar—a forecast that has not proved remarkably accurate.

I mention these forecasts for two reasons. First, they illustrate that any forecast of the behavior of exchange rates needs to be taken with a substantial grain of salt. The fact is that most exchange rate changes are essentially random. They are difficult to forecast in advance. In most cases, they are difficult to explain even after they have occurred. Second, and more impor-

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[1] Of course, fixed exchange rate systems also have their problems. The purpose here, however, is not to discuss the relative merits of fixed and floating exchange rate systems.

tant for the purposes of the present discussion, these forecasts indicate a view I share with Paul Krugman and with many other economists at this conference and elsewhere that the foreign exchange value of the dollar is presently above its sustainable long-run equilibrium level and that it is likely to decline (probably over a jagged and erratic course) during the next few years. Moreover, I share the view of many economists and policymakers that such a downward adjustment in the foreign exchange value of the dollar, provided it is not too large, would be generally beneficial from the perspective of the United States and of other countries.

In this context, the foreign exchange value of the dollar means the "real exchange rate of the dollar" defined as an appropriate weighted average of nominal exchange rates of the dollar, adjusted for the ratio of U.S. prices to an appropriate weighted average of the prices of our major trading partners. The sustainable long-run equilibrium value of the dollar refers to the real exchange rate of the dollar that is consistent with a sustainable level of our current account under normal economic conditions. For reasons to be discussed later, the sustainable level of our current account balance (on average over a ten or 20-year horizon) might not be zero, but it is almost surely not a deficit of about three percent of GNP that now appears likely for 1985. Absent a dramatic and unanticipated exogenous ,shift of world demand toward U.S. products, a significant decline in the real foreign exchange value of the dollar (which would make U.S. products more competitive in our markets and in foreign markets) appears essential if this current account deficit is to be reduced to a sustainable level in the longer run.[2]

Thus, I have no disagreement with Paul Krugrnan concerning the necessity and desirability of some significant downward adjustment in the foreign exchange value of the dollar. I do disagree, however, with Krugman's analysis of what is responsible for the present strength of the dollar, and I question Krugrnan's estimates of the extent of real depreciation of the dollar that is required to establish a sustainable level of the current account balance. Using a simple formal model, Krugman argues that the current value of the dollar exceeds any reasonable estimate of what can be accounted for by rational evaluation of economic determinants of the dollar's value. He concludes that the overvaluation of the dollar (above the level that can be rationally accounted for in his model) must be due to an irrational "speculative bubble" that may be expected to burst at some unspecified future time. He estimates that a 33 percent real depreciation would be required to reach equi-

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[2] If there were rapid improvement of technical efficiency in U.S. tradable goods industries, then adjustment could be achieved through real depreciation of the dollar measured using production cost indices. In this case, the real value of the dollar measured using consumer price indices could remain steady or even rise.

librium if adjustment occurred immediately and that a 56 percent real depreciation would be required if the United States continues expanding its international indebtedness (along the path predicted by Krugman's model) for another 23.3 years before reaching a sustainable equilibrium.[3,4]

I shall argue that the evidence is too weak to justify strong assertions that the dollar's current strength must be at least partly attributable to an irrational "speculative bubble." I shall maintain that under plausible assumptions, the dollar's current value can be explained as a rational economic phenomenon within the context of Krugman's own model. In addition, I shall argue that a real depreciation of 20 percent or less may suffice to achieve a sustainable level of the current account under normal economic conditions.

To develop these arguments, it is first useful to give a brief summary of the analytical basis of Krugrnan's conclusions. (Consideration of some more technical issues relating to Krugrnan's formal analysis is deferred to an appendix.) With this background, I shall then discuss the following points which are relevant in assessing the validity of Krugman's conclusions. First, it is questionable whether the real foreign exchange value of the dollar was at its long-run equilibrium value in 1980 when it was barely above the minimum real value experienced during at least the past 40 years.[5] Rather, it is plausible to suppose that the dollar may have been below the real value consistent with a sustainable level of the current account balance in 1980, and that perhaps a real appreciation of ten or 15 percent was justified as a move toward a sustainable long-run equilibrium. Second, a substantial part of the real appreciation of the dollar since 1980 is probably attributable to factors that play no role in Krugman's analysis but do play an important role in many other analyses of exchange rate behavior; namely, the important shift in the actual and expected monetary policies of the United States and other countries since 1980. The substantial shift in perceptions of Federal Reserve policy from being quite lax in the late 1970s to being quite tight in the early 1980s almost surely, contributed to the remarkable strengthening of

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3 These percentage changes are measured as logarithmic first differences: that is, a 33 percent real depreciation of the dollar means that the natural logarithm of the real exchange rate of the dollar declines by 0.33. This translates into a 39 percent increase (in the normal sense) of the real value of other currencies in terms of the dollar, or a 28 percent reduction (in the normal sense) of the real value of the dollar in terms of other currencies. Logarithmic changes are used because they treat "percentage" increases and decreases symmetrically.

4 A 33 percent real depreciation is required immediately based on Krugman's assumption that the United States now has a zero net foreign debt-our foreign assets exactly offset our foreign obligations. The 56 percent real depreciation takes account of the effect of accumulating foreign debt equal to 45.7 percent of our GNP.

5 Estimates of the real exchange rate are generally available starting around 1970. It is clear that if these series are extended backward, the dollar was stronger in real terms before 1970 than from 1973 through 1980.

the dollar in foreign exchange markets in both nominal and real terms. Third, it is doubtful that projected or actual growth of the federal deficit was the predominant cause of the strengthening of the dollar since 1980. Experience in the United States and other countries does not indicate that government deficits have a uniformly powerful and positive effect on real exchange rates. Fourth, the present current account deficit of the United States is partly the consequence of a variety of temporary disturbances whose gradual abatement should be expected to improve the current account balance even without any significant depreciation in the real foreign exchange value of the dollar. This, in turn, implies a reduction in the estimated extent of real depreciation required to achieve a sustainable level of the current account balance. Fifth, the probable excess of desired saving over desired investment in many of the other industrial countries and the likely impediments to rechanneling this excess saving into investment in developing countries imply that the equilibrium level of the U.S. current account balance is probably one of substantial deficit. The sustainable and desirable level of this deficit is probably not as large (relative to U.S. gross national product) as the deficit we will have in 1985, but any substantial and sustainable deficit implies a smaller real depreciation of the dollar at least in the intermediate term. Sixth, the capacity of the United States to absorb foreign investment (in government bonds, in private securities, or in direct foreign holdings of assets located in the United States) is undoubtedly very large. Hence, we need not be excessively concerned, as Krugman is, that there will be a sudden revolt of foreign investors leading to a precipitous decline in the value of the dollar. Seventh, when we take account of these considerations and make other appropriate adjustments to Krugman's analysis, there is no convincing case that the dollar is irrationally overvalued. For this reason, and for another important reason that I stress in my concluding remarks, I reject Krugman's basic conclusion that the market is necessarily wrong and that we are reduced to "theories" of irrational behavior in which exchange rates are allowed "to drift at will."

Krugman's analytical framework

Krugman's conclusions are based on an admirably simple analytical framework that encompasses five basic elements. First, the current account deficit as a fraction of GNP (exclusive of interest payments on our net foreign debt), B, is assumed to be proportional to the deviation of the logarithm of the real exchange rate, E, from its (trade balance) equilibrium value, $\bar{E}$; that is, $B = \gamma(E-\bar{E})$, where the factor of proportionality, $\gamma = 0.1$, is such that a one percent increase in E relative to $\bar{E}$ implies a one-tenth of one percent deficit relative to GNP. The equilibrium value $\bar{E}$ is assumed to be the logarithm of the real exchange rate that prevailed in 1980. The cur-

rent excess of E over E is estimated to be 0.33, implying a current account deficit (exclusive of interest payments on foreign debt) equal to 3.3 percent of GNP.

Second, the logarithm of the real exchange rate, E, is assumed to decline at a rate equal to the real interest rate differential between the United States and its major trading partners. This real interest rate differential is estimated to be 2.4 percent per year until our foreign debt to GNP ratio stabilizes and the economy achieves a steady state equilibrium.

Third, the declining value of E gradually improves the current account balance, but this is partially offset by increasing real interest payments on our expanding foreign debt. The rate of growth of foreign debt relative to GNP that results from our interest payments is equal to (r-g)D, where r-g is the excess of our real interest rate over our real growth rate (estimated to be a constant five percent per year) and D is the ratio of foreign debt to GNP (assumed to be zero in 1985). Together, the two factors affecting the growth of the ratio of foreign debt to GNP yield Equation (4) in Krugman's paper.

Fourth, from Equation (4) one can calculate the time it takes for the ratio of foreign debt to GNP to stabilize and the ratio of foreign debt to GNP at that time. The results under Krugman's assumptions are 23.3 per year and a ratio of 45.7 percent. With a growth rate of real GNP of three percent per year and a nominal GNP of $4 trillion in 1985, this implies that foreign debt would rise to $3.64 trillion of 1985 dollars in the year 2008.

Fifth, Krugman argues (somewhat tentatively) that this huge level of foreign indebtedness is not achievable. Either foreign investors would revolt and refuse to lend us the money, or we would refuse to accept so large a liability against our future consumption. By considering different limits on the maximum ratio of foreign debt to GNP and prospects for sudden action to stem the growth of foreign indebtedness within five or ten years, Krugman is able to calculate (see Krugman's Table 5) the extent of overvaluation of the dollar beyond that which can be explained by his model. This excess overvaluation he attributes to a "speculative bubble" that must be the consequence of irrational behavior by market participants and that should be expected to collapse at some unpredictable future time.

The equilibrium value of the dollar

The first issue to be addressed in assessing Krugman's analysis and conclusions is his assumption that the real foreign exchange value of the dollar in 1980 represents the relevant estimate of the real value of the dollar that would induce a zero current account balance exclusive of interest payments on foreign debt and receipts of income on our investments abroad. In support of this assumption, it should be noted that the measured current account balance (including $30 billion of net investment income) was almost zero in

1980 and that the current account outcome may have been aided by the brief but sharp recession of the spring of 1980. On the other hand, it should be noted that the current account balance improved during the first half of 1981, despite a substantial increase in the real foreign exchange value of the dollar and despite very strong real growth in the first quarter of 1981. Given the lags typically observed in the response of the current account to exchange rate movements and business cycle developments, it is arguable that some of the improvement of early 1981 was a delayed response to the weak dollar of 1980 (and earlier) that was partially offset by the strengthening dollar and strengthening economy of early 1981. In addition, the sharp upsurge in oil prices occasioned by the Iranian revolution of 1979 was probably exerting a depressive effect on the current account balance in 1980 that would be less significant now because of the weakness of the world oil market.[6]

Another important factor that needs to be taken into account in judging the appropriate equilibrium value of the dollar is the relationship between prices and cost for U.S. industries significantly exposed to international competition and the general level of prices and costs for the whole U.S. economy. 1980 was the end of a long period of weakness of the dollar in foreign exchange markets. This weakness allowed industries subject to significant international competition to remain competitive with relatively high levels of costs (including wage costs) in comparison with other U.S. industries. In contrast, the strong dollar of the past four years has put great pressure on U.S. industries exposed to international competition to improve efficiency and cut costs in order to remain competitive. Thus, if the dollar today fell to the same real foreign exchange value it had in 1980, based on general measures of prices and cost for the whole U.S. economy, industries exposed to significant international competition would probably be in substantially stronger competitive positions than they were in 1980.

Further, in assessing the equilibrium real exchange rate for the dollar, it is relevant to examine the past behavior of the real exchange rate. A variety of measures of the real exchange rate are available, using different weights for different countries and different measures of domestic and foreign prices or costs. Virtually all of these indices show that the real foreign exchange value of the dollar was near its all-time minimum in 1980. In particular, John Williamson's (1983) composite index of the real foreign exchange value of the dollar stood at 97.6 in 1980, only slightly above the minimum average level of 96.3 recorded in 1979, and well below the average level of the index for every other year except 1978. Essentially the same story is told by the graph

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[6] A decline in the dollar would raise oil prices in the United States and reduce them in other countries at a given dollar price of oil. Given the state of the world oil market, it is extremely unlikely that the dollar price of oil would be raised to the point where the real oil import bill of the United States rose to the level of 1980.

of the real effective exchange rate of the U.S. dollar based on the Morgan Guaranty Trust series that is shown as Chart 4 in Richard Levich's paper in this volume.

The question is whether a real foreign exchange value for the dollar that is near the minimum ever experienced and below the average level recorded for every year but three out of the past 40 can be taken as a reasonable estimate of the long-run equilibrium value of the dollar. The answer could possibly be yes, but it also could quite probably be no. As Richard Levich carefully notes in his paper, "Estimates of [equilibrium real exchange rates] could easily be in error by ten percent or more." For Krugman's purpose of demonstrating that the dollar is irrationally overvalued due to some form of speculative bubble, however, it is not appropriate to use an estimate of the equilibrium value of the dollar that may be ten percent or more too low.' It is necessary to use the maximum reasonable estimate of the long-run equilibrium real value of the dollar. This estimate is almost surely ten percent or more above the level of the real exchange rate in 1980.

Monetary policy and the strong dollar

Krugman does not discuss the factors responsible for the remarkable rise in the real foreign exchange value of the dollar since 1980. He focuses instead on whether the current value of the dollar can be rationalized on the basis of expected future economic developments. This is an appropriate analytical strategy for assessing the value of an "asset price" that ought to reflect the expected discounted sum of its underlying future fundamentals.[8] Failure to analyze the factors responsible for the rise of the dollar, however, leaves open the suggestion that a substantial part of this rise was a magical levitation supported by an irrational speculative bubble. It also raises the danger that economic factors relevant in explaining the rise of the dollar will be neglected in attempting to explain why the dollar is now so high. In particular, Krugman's model contains no explicit mechanism through which changes in monetary policy can influence the real exchange rate. In contrast, I believe that changes in actual and perceived monetary policy played an important role in the strengthening of the dollar, in both nominal and real terms, since 1980.

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[7] If one adopts Krugman's theory that the dollar is affected by irrational speculative bubbles, then there ought to be times when such bubbles artificially depress the dollar (and raise the values of other currencies), as well as times when they artificially raise the dollar. The obvious candidate for a bubble depressing the dollar is the period from 1978 to 1980.

[8] This notion of exchange rates as "asset prices" is discussed in Frenkel and Mussa (1980 and 1985) and in Mussa (1979, 1982, and 1984.)

In the long run, of course, monetary policy should have little sustainable effect on real exchange rates. The long run for this purpose, however, might be as long as five years. For example, it was widely believed that Sterling was overvalued when reset on its prewar parity in May 1925. It took more than six years, however, until September 1931, for Sterling to be forced off its parity.[9] During the period of floating exchange rates since 1973, it is apparent that nominal exchange rates between major currencies move much more rapidly than relative nominal price levels, thereby inducing shorter term movements in real exchange rates that parallel rather closely shorter term movements in nominal exchange rates. Here, "shorter term" can refer to anything from a month out to two or three years, especially for large movements in nominal exchange rates. This phenomenon can be explained by noting that nominal exchange rates are "asset prices" that are highly responsive to changes in expectations about the likely future behavior of their economic determinants. In this respect, nominal exchange rates are like common stock prices or prices of other durable assets traded on organized exchanges. In contrast, national price levels (used in computing real exchange rates) are relatively slowly moving variables that appear to respond gradually to, and rarely in anticipation of, changes in underlying economic conditions. Thus, when people become concerned about the prospect that a country's monetary policy will become more inflationary, the impact is first felt as a nominal depreciation of the foreign exchange value of its currency that induces a parallel real depreciation. Later, prices begin to catch up with the depreciation of the nominal exchange rate and the real exchange rate starts to rise. The reverse occurs when people come to expect that monetary policy will be less inflationary than they previously thought. The nominal exchange rate appreciates, perhaps in conjunction with a continuing relatively high domestic inflation rate, and this induces a parallel upward movement in the real exchange rate. Later, as domestic inflation slows against a relatively constant nominal exchange rate, the real exchange rate tends to decline.

I believe that these considerations are important in explaining the remarkable real appreciation of the dollar from its very low level in 1978-80 to its very high recent levels. In 1977-78, as concerns increased about the prospects for a more highly inflationary monetary policy in the United States, the dollar depreciated sharply in nominal terms against other major currencies, especially the Deutsche mark, the Japanese yen, and the Swiss franc. With more slowly moving relative price levels, this sharp nominal depreciation

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[9] A fixed exchange rate regime in the 1920s and 1930s may be different from a floating exchange rate regime in the 1970s and 1980s. In Krugman's analytical model, however, there is no reason why the nominal exchange rate regime or the time period should make an important difference.

translated into a sharp real depreciation.[10] The support measures announced by the Carter administration in early November 1978 helped the dollar to recover modestly in both nominal and real terms But, renewed concerns about the inflationary bias of U.S. monetary policy, especially in the summer of 1979 and the summer of 1980, kept the dollar depressed in both nominal and real terms. The shift to a much tighter monetary policy that began in late 1980 stimulated a considerable rise in the nominal foreign exchange value of the dollar.[11] Continued high domestic inflation in the first half of 1981 contributed to the rise in the real foreign exchange value of thedollar. Further strengthening of the nominal exchange rate, arguably due to increasingly persuasive evidence that the Federal Reserve was serious about its anti-inflation policy, induced further strengthening of the real exchange rate in 1982.

The strengthening of the real value of the dollar since 1982 has also been closely related to further strengthening of the dollar's nominal exchange value. This further strengthening is more difficult to explain in terms of changes in the actual or perceived monetary policy of the Federal Reserve. The objective here, however, is not to attempt to provide a complete explanation of all major movements in the real value of the dollar. (We know that such explanations are exceedingly difficult, if not impossible, for major movements in virtually all asset prices; a point convincingly made in Richard Levich's paper.) Instead, the objective is to emphasize that monetary factors should be allowed a considerable role in explaining intermediate-term movements in real exchange rates, and to reinforce the earlier point that an important part of the real appreciation of the dollar since 1980 is plausibly attributable to a correction of overdepreciation in 1978-80 rather than wholly attributable to excessive over appreciation since 1980.

Fiscal deficits and the dollar

Another factor widely touted as a cause of the strong real appreciation of the dollar since 1980 is the growth of the federal fiscal deficit. Indeed, in this

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10 Throughout the floating rate period, relative national price levels (measured by consumer price indices or national product deflators) have shown much smaller quarter-to-quarter changes than have nominal exchange rates. When there is a large movement in a nominal exchange rate, therefore, this is almost always reflected in a parallel movement of the real exchange rate between two countries.

11 There is some ambiguity about when the move to a tighter monetary policy began, depending on the indicator of monetary policy. Measured by growth rates of monetary aggregates, monetary policy appears loose in early 1981. But this is probably because of an endogenous response of monetary aggregates to strong growth of the economy. Measured by real or nominal interest rates, there is little doubt that monetary policy began to tighten in late 1980, remained quite tight through mid-1982, and (perhaps until recently) has been significantly tighter than it was during the 1970s.

conference, William Branson attributes virtually all of the rise in the real value of the dollar since early or mid-1981 to the prospective and actual growth of the federal fiscal deficit which he argues became predictable with the proposal and passage of President Reagan's tax reduction program in 1981. Specifically with respect to the cause of the dollar's rise, Branson states, "...to this writer the conclusion is clear: the shift in the budget did it!" Krugman does not state such a strong position on the growth of the deficit as the cause of the dollar's rise, but he does argue that announcement of "...a joint program of fiscal reform-contraction in the United States, expansion in Japan, Germany, and the United Kingdo —would almost surely lead to an immediate sharp decline in the dollar."

I am somewhat skeptical both about the growth of the deficit as the dominant cause of the dollar's rise and about the effects of an agreement for substantial deficit reduction in inducing a sharp decline of the dollar. Rather, I share somewhat in the view that Otmar Emminger expressed in his luncheon address that there was something a little strange about the dollar's ability to rise in the face of budget deficits when such deficits appear often to weaken the currencies of other countries. I also share Richard Cooper's view that "...positive action [to reduce] the budget deficit might lead to a strengthening of the dollar in the short run, as foreign confidence in the U.S. ability to manage its affairs increases. . . ."

In assessing the effect of the deficit on the value of the dollar, it is relevant to consider episodes other than the recent strong real appreciation of the dollar. The last time the United State ran a fiscal surplus was in 1969, thanks partly to the tax surcharge in effect that year. In 1969, of course, we were still operating under the Bretton Woods system of fixed exchange rates. But this should make little difference to Branson's or Krugman's analysis since their models are exclusively "real" models that ought to be invariant to the nominal exchange rate regime. If fiscal deficits cause currencies to be strong, then fiscal surpluses ought to cause currencies to be weak. Hence, 1969 should have been a year of weakness for the dollar. However, the official settlements balance, which measures the strength of a currency under a fixed exchange rate regime, showed an unusual surplus for the United States in 1969, indicating a strong rather than a weak dollar.

Another example of a similar sort from the floating rate period is the behavior of Sterling in 1975-76, a period when I was in England on the staff of the International Monetary Research Programme. This was a period in which the value of Sterling sank in both nominal and real terms, with Williamson's composite index of real effective exchange rate of Sterling reaching its all-time minimum (at least up to 1983) during the fourth quarter of 1976. This, however, was not a period in which the government of the United Kingdom was running unprecedented fiscal surpluses. Indeed, the public sector borrowing requirement was probably at a postwar high relative

to gross national product.

These examples clearly do not establish that fiscal deficits are generally correlated with weak currencies. Nor are they meant to suggest that recent fiscal deficit in the United States has played no role (under the circumstances) in strengthening the dollar. There are examples where large fiscal deficits have been associated with strong currencies, especially when governments use extensive foreign borrowing to finance official intervention in support of an overvalued currency. Official intervention'clearly played no role in the recent strengthening of the dollar. However, it is arguable that the combination of a relatively loose fiscal policy (actual and prospective)and a relatively tight monetary policy did help to drive up interest rates or hold them higher than they would otherwise have been, and that the high level of U.S. interest rates helped attract an inflow of foreign capital that contributed to the strength of the dollar. It is also likely that the tax cut stimulated U.S. economic growth (through both supply side and demand side effects), thereby contributing to growth of demand for U.S. money, and also made the United States more attractive to investors throughout the world. These likely or possible effects of U.S. fiscal policy in contributing to the recent strength of the dollar, however, should not be exaggerated to the point where the fiscal deficit is seen as the dominant cause of real dollar appreciation since 1980.

Other causes of current account deterioration

In Krugman's theoretical model, the current account balance (exclusive of net interest payments) is uniquely and proportionately related to the deviation of the real exchange rate from its equilibrium value.[12] Efforts to estimate such a simple empirical relationship between the current account balance and the real exchange rate have not proved remarkably successful. Normally, to obtain a stable statistical relationship it is necessary to include lagged values of dependent and independent variables and to take account of other factors influencing the current account balance. Even then, a substantial fraction of movements in the current account remains unexplained. Thus, it is fair to conclude that a variety of factors other than the real exchange rate must be influencing the current account. In particular, Henry Wallich has suggested that about two-thirds of the U.S. current account deficit is to be explained by the strong dollar and the remaining one-third by

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[12] In principle, it would be possible in Krugman's model to allow for variations in the parameter E that measures the real exchange rate at which the current account balance exclusive of net interest payments is in equilibrium. Krugman's theoretical analysis, however, makes no allowance for changes in Ē .

other factors. It is reasonable to ask whether these other factors that have contributed to the current account deficit might reverse themselves, thereby reducing the extent of real depreciation of the dollar necessary to reach a sustainable level of the current account balance.

One factor that has almost surely contributed to the deterioration of the U.S. current account is the relatively strong economic recovery in the United States, in comparison with economic recoveries in our major industrial trading partners. This is true both of the recovery from the world recession of 1974-75 and the world recession of 1980-82. In comparison with the growth performance of the United States relative to other industrial countries earlier in the postwar period, in the past decade our relative growth rate has increased by about 50 percent. This is apparent in the fact that most Western European countries and Canada now have unemployment rates around ten percent, (versus a U.S. unemployment rate of seven percent), while earlier in the postwar period most Western European countries had unemployment rates two or three percent below the U.S. unemployment rate (with Canada running about the same unemployment rate as the United States.)[13] Stronger real growth in the United States means that at a given real exchange rate our demand for foreign products tends to grow more rapidly than foreign demand for our products, thereby contributing to deterioration of the current account. If one takes the optimistic view that over the next five years or so our major industrial trading partners will resolve some of the problems responsible for their relatively poor recent growth performances, then there is reason to hope that the current account deficit of the United States will decline (but probably not disappear), even without a major real depreciation of the dollar.

Another factor that has contributed to the deterioration of the U.S. current account is sharp recessions in many developing countries that were important customers for U.S. products and efforts of many of these countries to reduce their own trade deficits in order to limit their external borrowing. Economic recoveries in some of these countries, the success of some of these countries in dealing with their debt problems, and the easing of these problems due to the decline in world interest rates may allow some expansion of their demand for U.S. exports. Significant assistance for the U.S. current account from this quarter, however, is probably a few years off. It will require reconstruction of a world financial system that allows developing countries to borrow funds needed to finance worthwhile investment projects in excess of what can be financed out of domestic savings.

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[13] Real growth in Japan has proceeded more rapidly than in the United States, but the excess of Japan's real growth rate over that of the United States has fallen substantially from what it was prior to 1973.

A third factor contributing to the deterioration of the U.S. current account has probably been the growth of the federal fiscal deficit and the rapid growth of investment during the current recovery. Our current account deficit is the excess of our spending over our income. When investment spending grows very rapid as it has during the current recovery, and this is not offset by a growth of domestic saving, the current account deteriorates. Similarly, if the government increases its spending relative to its revenue, and this is not offset by an increase in private saving, the current account deteriorates. In either case, this deterioration can occur with little or no change in the real exchange rate. In the future, if the pace of investment spending recedes to more normal levels and if efforts to reduce the federal fiscal deficit are at least partially successful, this should improve the current account balance, even at a constant level of the real exchange rate.

The sustainable level of the current account deficit

If the United States could not attract foreign funds with which to finance the current account deficit, then the real foreign exchange value of the dollar would probably need to decline and other adjustments would need to be made that would achieve a zero current account balance, or even a current account surplus. There are reasons to believe, however, that a substantial deficit in the U.S. current account balance may be a natural equilibrium phenomenon for some years to come. If so, then the normal equilibrium value of the dollar consistent with equilibrium in the U.S. current account should be higher than it would be if a zero current account balance represented the normal equilibrium.

One reason why a deficit in the U.S. current account might be a natural equilibrium is measurement error. As current account balances are measured and reported, the world as a whole now runs a substantial current account deficit. This indicates that for the world as a whole, the procedures used to measure current account balances have a bias in the direction of showing deficits. If a proportionate share of this bias applies to the United States, then a current account deficit of as much as one-half of one percent of GNP (about $20 billion) might be accounted for simply by measurement error.

Perhaps more important, demographic factors imply that for the next 15 years or so, the natural equilibrium may be one in which there is an excess of savings over investment in other industrial countries which helps to finance an excess of investment over saving in the United States. In most Western European countries and Japan, population is growing very slowly if at all, and there is very little immigration. In contrast, in the United States, population is growing through natural increase, and there is very substantial immigration. Hence, less needs to be invested in Western Europe and Japan than

in the United States in order to equip new members of the labor force with the same amounts of physical capital as used by existing workers. Less also needs to be invested in human capital in Western Europe and Japan than needs to be invested in human capital in the United States. Demographic factors also influence desired savings rates. In Western Europe and Japan, the average age of the population is rising more rapidly than in the United States. Hence, in these other countries there will be in the future relatively fewer younger workers to pay the social security taxes and make other contributions that are needed to support older retired workers. It therefore makes sense for these countries to have relatively high savings rates now in order to acquire assets that will fund retirements in the future. If profitable domestic investment opportunities are growing relatively slowly in these countries because of demographic factors, then it makes sense to channel part of current savings into acquisitions of foreign assets. The reverse proposition presumably applies in the United States with its more rapidly growing population.

Of course, developing countries with expanding populations and good prospects for future economic growth would also be natural repositories for the surplus savings of Western Europe and Japan. The world debt crisis, however, has impaired the operation of the system that channels funds from countries with excess desired savings to countries with excess desired investment. It will probably be some time before many developing countries can resume net real borrowing on a substantial scale. Indeed, for this to happen it may well be necessary to restructure the system in ways that give both greater assurance to creditors that they will be repaid in a timely manner and greater assurance to borrowers that they will not be caught in a sudden credit squeeze. Pending these developments, the United States may well remain the repository of choice for a significant fraction of the excess desired savings of other industrial countries.

It is difficult to quantify the level of the U.S. current account deficit that might be sustained by the equilibrium desired excess of savings over investment in other industrial countries and desired excess of investment over savings in the United States. If we suppose that the excess of the savings rate over the investment rate in other industrial countries is equal to one percent of their GNP, and if we assume that half of this excess savings will be directed toward the United States, then given the relative economic size of the United States, we should have an equilibrium current account deficit of roughly one percent of our GNP. The actual deficit or surplus, of course, should fluctuate from year to year depending on economic conditions; but for the next 15 years or so it should fluctuate around an equilibrium level in which there is a current account deficit of perhaps one percent of GNP. As explained earlier, this implies that the average real foreign exchange value of the dollar should be somewhat higher than if the current account balance

fluctuated around an equilibrium level of zero.

The foreign debt capacity of the United States

Krugman is concerned that under the projections of his model, the foreign debt of the United States will rise to a level (relative to GNP) at which either we will be unwilling to sacrifice the consumption necessary to pay the interest on this debt or foreigners will become so concerned with the possibility of default or so saturated with claims on the United States that they will refuse to expand their lending. In my view, these concerns are exaggerated, even if we believe that the required steady state ratio of foreign debt to GNP is on the order of 50 percent. Moreover, as will be indicated shortly, there is substantial reason suspect that the steady state foreign debt ratio may be well below 50 percent.

In a steady state equilibrium when foreign debt is expanding in real terms at the same rate as real GNP (and hence the ratio of foreign debt to GNP, D in Krugman's formal model, is constant), the amount of debt service we need to pay to foreigners, as a fraction of our GNP, is equal to the excess of the real rate of interest on our foreign debt, r, over the real rate of growth of the U.S. economy, g. Krugman assumes that r-g equals five percent per year.[14] With an assumed real growth rate g = three percent per year (just about the postwar average real growth rate for the United States), this means that the assumed real interest rate on our foreign debt is eight percent per year.

Admittedly, real interest rates have been high in the United States since 1981, but eight percent per year is an excessively high estimate of the real interest rate we should expect to pay on our foreign indebtedness in the long run. In their study of yields on stocks, bonds and bills for the 50 years from, 1926 to 1976, Ibbotson and Sinquefield (1977) found that the real yield on U.S. Treasury bills was zero, the real yield on long-term U.S. government bonds was one percent per year, the real yield on long-term corporate bonds was 1.7 percent per year, and the real yield on common stocks was 6.7 percent per year. Much foreign investment on U.S. assets takes the form of foreign holdings of U.S. government obligations, including large amounts of shorter term government bills, notes, and bonds. Foreigners also hold

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[14] There is a possible problem with Krugman's own analysis on this point. Krugman assumes that when the steady state is reached the real interest rate differential between the United States and the rest of the world, r-r*, falls from 2.4 percent per year to zero. (Or, if he does not make this assumption, then the ratio of foreign debt to U.S. GNP declines and ultimately the United States ends up owning the whole world.) If the gap between r and r* is eliminated wholly or partly by a decline in r, then Krugman's conclusions need to be modified to take account of this. In my view, it is unrealistic to assume that the general level of real interest rates around the world will stabilize at 8 percent per year.

deposits in U.S. banks, corporate stocks and bonds, and direct claims on physical assets located in the United States. All together, I believe that five percent per year is a reasonable (perhaps upward biased) estimate of the long-run real yield on foreign investment in the United States and hence of the long-run real interest rate we must pay on our foreign indebtedness.[15] In this regard, it is interesting to note that five percent per year is the real rate of return that the Board of Trustees of the University of Chicago decided to use, after careful study, in calculating the income earned from the University's endowment which is invested in a diversified portfolio of stocks, bonds, and other assets.

Use of a five percent real interest rate rather than an eight percent real interest rate has a dramatic effect on the estimated reduction in U.S. consumption that is necessary to sustain any substantial level of foreign indebtedness relative to GNP. Specifically, rounding off Krugman's estimate of a 45.7 percent steady state ratio of foreign debt to U.S. GNP at an even 50 percent, U.S. real consumption must be reduced by 2.5 percent of GNP to keep the foreign debt ratio constant when r = eight percent and r-g = five percent. In contrast, when r = five percent and r-g = two percent, the reduction in U.S. consumption required to sustain the ratio of foreign indebtedness is only one percent of U.S. GNP. Of course, one percent of U.S. GNP is a substantial sum (about $40 billion in 1985), but it is equal to only one-third of a year's normal real growth.

If foreign debt of the United States rose to 45 percent or 50 percent of our GNP, we would be relatively as large a foreign debtor as Brazil, but on a much larger absolute scale. Krugman suggests that we might then be subject to a foreign debt crisis similar to those recently experienced by Brazil and other developing countries. I believe this unlikely, even if our ratio of foreign debt to GNP grew to be quite large. Brazil's foreign debt is primarily government debt and is mostly denominated in foreign currencies, especially the U.S. dollar. Actual and prospective foreign claims on the United States are more broadly diversified across types of asset and are either dollar denominated or are direct claims on specific U.S. assets. In comparison with Brazil and other large debtor countries, the United States has had a long history of political, economic, and financial stability that should instill confidence in both domestic and foreign holders of U.S. assets. The fiscal deficit of the U.S. government that has received much attention over the past two years pales in comparison with the fiscal problems of Brazil and other large debtor countries. Canada, which has a somewhat larger fiscal deficit

[15] As Roger Brinner pointed out in the conference session, the United States typically earns a higher real rate of return on its holdings of foreign assets (which include many d i i t investments) than foreigners earn on their holdings of U.S. assets (which m dominated by lower yielding bills, bonds, and bank deposits). If this situation continues, then estimates of significantly less than five percent per year for r and considerably less than two percent per year for r-g would be justified.

than the United States (relative to GNP) but is in other ways similar to the United States, has long maintained a ratio of foreign debt to GNP of around 25 percent to 33 percent. Canadians have occasionally expressed some concern about the extent of foreign investment and its concentration in particular industries. However, there is no indication of imminent revolt by Canada's foreign creditors.

Finally, in assessing the foreign debt capacity of the United States, it is relevant to compare foreign debt with U.S. wealth. Using a five percent real interest rate, the capitalized value of the U.S. economy which sustains current consumption (including consumption of public services) of over $3 trillion and has an expected real growth rate of three percent per year should be in excess of $100 trillion. Thus, a foreign debt of $1 trillion or $2 trillion, which seems like and is a large absolute amount, is still a relatively small fraction of U.S. wealth.

Steady state equilibrium of foreign debt and the dollar

Within Krugman's analytical framework, many of the points that have been discussed so far imply significant modifications in Krugman's conclusions concerning the steady state equilibrium level of U.S. foreign indebtedness (relative to GNP), the time it takes to reach this steady state equilibrium, and the extent of the decline in the real foreign exchange value of the dollar along the path to this equilibrium. Before describing these modifications, however, it is necessary to evaluate Krugman's assumption that the real interest rate in the United States, r, will exceed the real interest rate in our major trading partners, r*, by a constant 2.4 percent per year until a steady state equilibrium is achieved, and then r-r* will be zero.

It is arguable that r-r* is currently greater than 2.4 percent per year. The assumption of a larger constant differential between r and r* would imply a more rapid convergence to steady state equilibrium, a smaller steady state ratio of foreign debt to U.S. GNP, and a smaller decline in the real foreign exchange value of the dollar. However, I do not believe that a constant real interest rate differential of 2.4 percent or larger for a period of 20 years is a reasonable assumption. Whatever the current real interest rate differential is, it is reasonable to expect that this differential will decline over a period of 20 years. Krugman's model could be modified to incorporate a declining real interest rate differential, but this would require redoing Krugman's mathematics and explaining the results. Instead, I shall simply reduce Krugman's estimate of the difference between r and r* from 2.4 percent per year to 1.5 percent per year and, like Krugman, I shall assume that this differential is constant until steady state equilibrium is achieved and then disappears.

With this assumption in mind, consider the following modification of

Krugman's assumptions about parameter values which are broadly justified by the preceding discussion. Suppose that one-third of the increase in the real foreign exchange value of the dollar since 1980 represents a return to equilibrium and that two-thirds of this rise (rather than Krugman's assumption of the whole rise) represents a movement about the value of the dollar that would balance the current account exclusive of interest payments on foreign debt and of receipts of interest on foreign investments. (Formally this means that E-E is assumed to equal 0.22 rather than 0.33.) Following Henry Wallich's estimate, suppose that two-thirds of the present deficit in the current account (which Krugman assumes to equal 3.3 percent of GNP) is attributable to the overly strong dollar and that the remaining one-third of the current account deficit is attributable to temporary disturbances that will rapidly abate. (Together, these assumptions allow us to preserve Krugman's assumption that the parameter γ in his model has a value of $\gamma = 0.1$.) In line with previous discussion, assume that r-g is equal to two percent per year (rather than Krugman's estimate of five percent per year), and assume that r-r* remains constant at 1.5 percent per year until the steady state is reached. Applying these assumptions about parameter values to Krugman's formulas yields the following conclusions. It takes 17.4 years to reach steady state equilibrium, rather than Krugman's result of 23.3 years. The steady state ratio of foreign debt to GNP is 20.0 percent, rather than Krugman's result of 45.7 percent. The decline in the real foreign exchange value of the dollar along the path of convergence to the steady state is 26 percent (measured as a logarithmic change), rather than Krugman's implied result of a 56 percent real decline in the real value of the dollar.[16]

Obviously, it is possible to push these results in either direction with suitable and not unreasonable modifications in the assumed values of the parameters. Krugman's assumptions indicate how the results for the time to reach the steady state, the steady state ratio of foreign debt to GNP, and the extent of decline in the real foreign exchange value of the dollar can be made larger, more dramatic, and more disturbing. To make the results smaller, suppose that half of the real rise in the dollar was a movement toward equilibrium (so E-E is assumed to equal 0.165), suppose that half of the present deficit in the current account is attributable to temporary disturbances that will rapidly abate, suppose that r-g equals one percent per year, and suppose that r-r* averages two percent per year for the next nine years. Under these assumptions, the time to reach the steady state declines to 8.6 years; the steady state ratio of foreign debt to GNP is a modest 7.2 percent; and the real

[16] In calculating these results and the results discussed in the next paragraph, I employed Krugman's assumption that the United States has zero net foreign debt. I also ignored the effect of the temporary factors contributing to the present deficit in the current account on the steady state level of the radio of foreign debt to GNP.

value of the dollar falls by 17.2 percent.

Within Krugman's analytical framework, it is difficult to find reasonable assumptions about the parameter values which imply that the real foreign exchange value of the dollar rises along the path to steady state equilibrium. To induce this result it is necessary to go outside of Krugman's framework and assume something like a strong exogenous shift of world demand toward U.S. products or a substantial and prolonged increase in the rate of productivity growth in the tradeable goods sector of the United States relative to our major trading partners. An increase in productivity growth in tradeable goods in the United States would allow the real foreign exchange value of the dollar measured using general consumer price indices to remain high or even rise while the real foreign value of the dollar measured using unit labor costs for tradeable goods is declining and thereby improving the competitive position of U.S. industries exposed to international competition. This is essentially what has happened in Japan in the postwar period. The real value of the yen measured using consumer prices has been on an upward trend for 30 years, but Japanese industries have remained competitive in international markets because of high productivity gains.

I would regard either a massive shift of world demand toward U.S. products or a substantial and prolonged increase in the relative rate of productivity growth in U.S. tradeable goods industries as "unforeseen events" that would push the dollar above its otherwise expected path of gradual real decline. Of course, "unforeseen events" happen all the time. In my view, they are the reason why exchange rates fluctuate so much and why most of the fluctuations are random and unpredictable. However, while we may all be confident that there will be many surprises that will push the dollar away from its presently expected path, it is hazardous to forecast exactly what these surprises will be or in what direction they will happen to push the dollar.

Conclusion

No useful purpose is served by attempting to summarize what has been said in these already overly long remarks. There are, however, four general points that do deserve emphasis.

First, there is reason to believe that the real foreign exchange value of the dollar is above the level consistent with a sustainable current account position in the intermediate or longer run. Correspondingly, there is reason to expect that the real foreign exchange value of the dollar will decline, probably along an erratic path. Of course, there is no absolute guarantee that this will happen. Unforeseen events could push the dollar even higher than it is now. But, it is a better than even bet that the real foreign exchange value of the dollar will be lower five years from now or ten years from now than it is

today.

Second, the extent of the required decline in the dollar and the amount of foreign debt we *are* likely to accumulate on the path to a sustainable equilibrium *are* difficult to estimate with a high degree of precision. Expected real declines in the value of the dollar of as little as 15 percent or as much as 50 percent cannot be excluded as completely unreasonable. Foreign debt accumulation from five percent of **GNP** to 50 percent of **GNP** also *are* within the bounds of reasonable error. Accordingly, we should not be complacent that the problem of the overvalued dollar is trivial and easily self-correcting. Nor should we despair that we are necessarily on the turnpike to disaster.

Third, there is no firm basis for Krugman's confident assertion that the dollar is irrationally overvalued and supported by some form of speculative bubble that should be expected to burst at some unspecified time in the future. Even the results of Krugman's model with Krugman's assumptions about parameter values do not demonstrate an unsustainable path for the dollar under the hypothesis of rational asset valuation. With what I regard as more reasonable assumptions about parameter values, the case is even less convincing.

Finally, I wish to register a general criticism of undisciplined theories of irrational behavior of exchange rates. By "undisciplined theories," I mean theories that allow exchange rates to be influenced by "speculative bubbles" that appear and disappear, and expand and contract, without any well-defined limitations on their behavior. Such theories are unscientific in the sense that they are incapable of being falsified by evidence. If, for example, the dollar is now within the range that such a theory regards as "rational," then the market is temporarily rational. If the dollar is above the rational range by, say, 20 percent, then it must be supported by some form'of speculative bubble that presumably will collapse (though not necessarily all at once) at some unspecified future date. Suppose that it does drop by 20 percent over the next three years. Would not it be claimed that the theory of irrational overvaluation had been validated? The market had finally, if perhaps only temporarily, come to its senses. Suppose instead that the dollar does not fall, or even strengthens, over the next-three years. Would not this be interpreted as a yet further indication of irrational overvaluation that will need to be corrected some date further in the future? If so, then we have a theory that can rationalize virtually everything and is capable of being contradicted by virtually nothing. Without more specific content that somehow limits the range of potential outcomes, such a theory must be rejected.[17] It must be

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[17] The "theory" that exchange rates are rationally determined asset prices is also without empirical content until something more explicit is said about what rational evaluation implies. Empirical content can also be introduced into models that allow for some specific forms of speculative bubbles. See, in particular, Flood and Garber (1979 and 1980) and Okina (1984 and 1985).

rejected not because it is wrong, but because it is incapable of being wrong.

Appendix

The purpose of this appendix is to point out a technical difficulty in Krugman's formal model of the dynamic interactions among the logarithm of the real exchange rate, E, the net stock of foreign debt relative to GNP, D, the real interest rate differential, r-r*, and the current account deficit relative to GNP, B + rD = γ(E-E) + rD with $\gamma > 0$. The key dynamic equations of this model are given by

(1) $\dot{E} = -(r-r^*)$

(2) $\dot{D} = \gamma(E-\bar{E}) + (r-g)D$

where r-g is the excess of the domestic real interest rate over the real growth rate of GNP and a "dot" superscript indicates differentiation with respect to time.

The problem is that this model does not generally have a stable steady state position; one needs to be imposed by assuming fortuitous behavior of the exogenous variables, in particular the real interest rate differential. To illustrate this problem, consider the parameter values and initial conditions assumed by Krugman; namely, $\gamma = 0.1$, $r-r^* = 0.024$, $r-g = 0.05$, $D(0) = 0$, and $E(0)-\bar{E} = 0.33$. Under these assumptions, D rises to a peak of 0.457 when t = 23.3. Subsequently, if r-r* remains at 0.024 and the other parameters remain unchanged, the current account balance moves into surplus because E continues to decline. As E declines further and further, the current account surplus grows larger and larger. Hence, after reaching its peak, D starts to decline at an ever accelerating rate. Ultimately D tends toward minus infinity which means that the United States ends up owning the world. To stop this from happening and impose a steady state, Krugman must assume that r-r* falls to zero at precisely the moment (t = 23.3) when D = 0. For other assumptions about parameter values and initial conditions, it is also possible to impose a steady state, provided that there is a time when D = 0 and provided that r-r* falls to zero at this time. The time at which r-r* must fall to zero in order to establish a steady state, however, changes with changes in the assumed parameter values and initial conditions.

To deal with this problem in a theoretically more satisfactory manner, it would be desirable to endogenize the determination of the real interest rate differential and make other modifications of Krugman's model that would ensure the existence of a steady state position, at least for a range of values of the parameters of the model. In such a model, it would also be desirable to incorporate relevant monetary elements, including sluggishness in the

adjustment of nominal prices, that might have an important influence on the dynamic behavior of real interest rates and the real exchange rate. A model that incorporates many of these features is described in Mussa (1984).

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6
The U.S. Payments Deficit and the Strong Dollar: Policy Options

Richard N. Cooper

In 1984 the United States ran a current account deficit of $102 billion, seven times larger than the "alarming" deficit of 1978. The United States had to borrow from foreigners an equivalent amount, net of any American investment abroad.

This large deficit can be attributed in part to the fact that the U.S. economy was recovering earlier and more vigorously from the 1982 recession than were other countries, especially those in Europe, and in part to the fact that one of its most important regional markets, Latin America, was still in a period of slump and retrenchment from the debt crisis that started in 1982 and continues. But there is fairly general agreement with Federal Reserve Governor Henry Wallich's recent statement that these and other miscellaneous factors can only account for about one-third of the deficit, and that the exceptionally strong dollar is responsible for about two-thirds.

The U.S. dollar, on a U.S.-trade weighted basis and after correcting for inflation differentials, has appreciated about 40 percent since 1980, a year which already saw substantial appreciation from the low year of 1978. The dollar in mid-1985 is considerably stronger (on a trade-weighted basis) than it was in 1970, before the Smithsonian agreement that devalued the dollar in December 1971.

Is this a problem? U.S. employment has risen, U.S. inflation rates have dropped, and economic recovery continues, albeit at a moderate pace. If the course of economic events is going well, why should the government alter the course of economic policy? If there are no problems, there is no need for solutions.

There are two difficulties with this insouciance. The f i t is that the strong dollar is hurting badly those sectors of the economy that are most exposed to foreign competition, whether at home or abroad. Much of the manufacturing sector is feeling very strong competition, which has depressed manufacturing output even while the economy is growing. Manufacturing output has remained virtually unchanged since the spring of 1984, for instance, despite

rapid (12 percent) growth in the defense industries and a continued growth in demand for manufactured goods, which was satisfied mainly by a ten to 15 percent growth in imports of manufactured goods. Mining output declined. Marketing receipts to fanners continued to stagnate (but net farm income was up sharply from 1983 thanks to government support) as agricultural exports remained below levels reached in 1980 and 1981.

Stagnation in these industries even while the economy is doing reasonably well evokes strong pressures for protection against imports or, as in the case of farmers, pressures for aggressive export promotion and retaliation against those who are or seem to be restricting agricultural imports from the United States. Protectionist pressure in the United States are now stronger than they have been since 1970-71, which ultimately led to the Nixon-Connally import surcharge and a depreciation of the dollar. The sentiments attract broad congressional support not only on the basis of constituency politics, but also because of a feeling that America's future technological bases and its national security are threatened by a decline of such manufacturing activities as steel, machine tools, heavy equipment, and so on. So a consequence of a continued strong dollar may be introduction of many specific import restrictions and possibly even, through emulation abroad, a breakdown in the liberal international trading system, as happened after U.S. adoption of the Hawley-Smoot tariff in 1930.

A second difficulty with current circumstances is that the United States is rapidly building up external debts — at an annual rate that exceeds the *total* external debts of such large debtors as Brazil and Mexico. On Commerce Department figures (which are however subject to large margins of error) the United States in 1985 will become a net external debtor for the first time since 1914. The build-up of external debt imposes a burden on future generations. If the counterpart of the debt were being productively invested in the United States, that would be no problem; future Americans and foreign lenders would both be better off. But as will be made clear below, exceptional external borrowing has not been accompanied by exceptional domestic investment; on the contrary, investment has followed a fairly typical cyclical path. Even if the external debt itself is not repaid, it will have to be serviced out of future income that has not been augmented. Sooner or later a worsening of the U.S. terms of trade will be required to generate the necessary improvement in net exports. So future generations will not be able to enjoy all of their contemporary production. Moreover, given that social security payments are fully indexed to the consumer price index, the burden of this worsening terms of trade, as of servicing the debt directly, will fall mainly on wage-earners, just when they are also being asked to support a growing population of the aged.

So for both these reasons — a threat to the liberal trading system and an unwarranted additional burden being transferred to future generations — the

present configuration of the U.S. economy with its large external trade deficit in goods and services cannot be considered satisfactory. This is so even without mentioning the anomoly, from a global point of view, of a capital-rich nation such as the United States being the world's largest borrower.

Why is the dollar so strong? There is wide agreement that the main explanation is a torrent of foreign investment in the United States, along with some decline in U.S. investment abroad; with flexible exchange rates this flow of funds pushes up the value of the dollar. Three broad, non-competing explanations in turn are given for the inflow of foreign funds. The first focuses on the United States as a political safe haven relative to other leading countries. This explanation might support an outflow from newly socialist France in 1981, or from a Germany stricken with Polish jitters at about the same time. But it hardly can explain a flow of funds from Britain, with its most pro-business government in memory, or from staid, politically conservative Japan.

A second explanation focuses on the "dollar" as a financial asset, and suggests that it has been subject to a psychological "bubble," whereby expectations of a further rise feed on themselves as funds flow in and make the expectations correct. I believe there have been periods when this factor has operated, especially in late 1984 and early 1985, but it cannot begin to explain the sustained rise since 1981 (Frankel, 1985.)

A third factor is interest rates and other yields in the United States, relative to those abroad. Dollar interest rates have been consistently higher than those on comparable DM, yen, and Swiss franc securities (but not those denominated in British pounds or French francs) since 1980. For example, in 1984 the yield on three-month Euro-dollar deposits was 10.9 percent, whereas Euro-yen deposits yielded 6.3 percent and Euro-DM deposits yielded 5.7 percent. Substantial yield differentials in favor of the dollar existed on long-term securities and on equities as well, although most of the foreign funds have gone toward the purchase of fixed interest securities rather than equity.

If the main factor behind the strong dollar and the U.S. trade deficit is high yields on dollar securities, then attention must turn to why those yields have been so high, both relative to some key foreign yields and relative to past U.S. history. Two explanations, both of which undoubtedly have some merit for long-term bonds, concern expectations about higher inflation and uncertainty about future inflation rates. High inflation would raise interest rates, and a higher expected inflation in the future would help explain why long-term rates are higher than short-term rates. Moreover, uncertainty about future inflation, and possible future movements in bond prices, would tend to raise bond yields relative to historical levels. But these two yield-raising factors would hardly recommend U.S. fixed interest securities to foreigners, unless on average they have a more favorable view with respect

to future U.S. inflation, and uncertainty about future inflation, than American investors do.

A third factor that could help explain high U.S. interest rates in the last several years is the tax legislation of 1981 as partially corrected in 1982, which made investment much more attractive because of enlarged investment tax credits and more rapid depreciation of assets for tax purposes. An investment boom would have put upward pressure on interest rates. In fact, investment slumped severely in 1982-83, but picked up strongly in 1984. Table 1 shows that profits after taxes per unit of output of all U.S. non-financial corporations rose by 88 percent between 1978 and 1984, both boom years, even though profits before taxes (per unit of output) rose only 43 percent, as did the largest component of costs, compensation of employees. Looked at another way, profits after taxes rose from 5.6 to 7.6 percent of (value-added) sales during this period, even though profits before taxes declined slightly. If U.S. non-financial corporations have a capital-output ratio of about two, the tax changes in the early 1980s raised the after-tax rate of return to total installed capital in the non-financial corporate sector by about one percentage point between these two boom years.

Despite the higher after-tax rate of return, for the economy as a whole gross domestic investment, at 17.4 percent of GNP, was no stronger in 1984 than it has been in other boom years such as 1979 or 1973, and was modestly lower than the 17.9 percent it reached in 1978. The best one can say is that the favorable tax provisions offset the negative impact of high interest rate on overall investment, and that interest rates might have been lower if investment had been lower. But the point to note here is that 1984 did not see

TABLE 1

Output, Costs, and Projects
U.S. Nonfinancial Corporate Business

	1978	1984	Percent change, 1978-84
Value-added (GDP basis, $bn)	1276	2153	69
Value-added in billion of 1972 dollars	846	977	15
Cost plus profits per unit of output	100.0	100.0	46
Compensation (%)	66.2	64.7	43
Profits (%)	11.1	10.9	43
Profits after tax (%)	5.6	7.6	88

Note: Data here are calculated with adjustments for inventory valuation and capital consumption, i.e. they are calculated as in the GNP accounts rather than in accordance with the tax laws.

Source: *Economic Indicators.*

unusual amounts of investment for a year of vigorous economic activity.

What was unusual for a year of vigorous economic activity was the size of the budget deficit. Budget deficits typically rise in recession, such as 1982; but they typically decline during recovery. The U.S. federal budget deficit, in contrast, has stayed just under $200 billion during 2-½ years of recovery. Legislated tax reductions have offset part of the normal recovery of revenue, and increases in defense spending have more than offset the reductions in non-defense spending. Moreover, a Presidential-Congressional impass has prevented serious steps to reduce the budget deficit in the future, thus offering the prospect of continuing large deficits with the resultant upward pressure on long-term interest rates. At 3.4 percent of GNP in 1984, the government deficit (federal, state and local) absorbed that much private U.S. savings, which did not leave enough left over to finance domestic investment, despite the fact that at 18.4 percent of GNP private (including corporate) savings was exceptionally high during 1984. As a result of the discrepancy, savings had to be imported from abroad, i.e., the United States became a net importer of goods and services. The heavy demands of the federal government, added to those of private investors, pushed up U.S. interest rates. Without the inflow of foreign capital, they would have gone even higher.

A final factor, in my judgment, bears considerable responsibility for high U.S. interest rates. That is the extraordinarily tight monetary policy the United States has had during the past six years. There is considerable controversy over exactly how monetary "tightness" or "ease" should be measured. I start from the theoretical observation that the real short-term rate of interest on an asset free of default risk should be close to zero in a period of deep recession, with high unemployment and excess capacity. Time preference under such circumstances should drop to zero; there is no reason to defer expenditures to the future, since there is no limitation on current production. And so it has been in previous recessions, or even negative (Table 2). But during 1982 the real short-term rate of interest on Treasury bills was over four percent even after monetary policy eased in mid-year and interest rates on low-risk assets fell sharply (to eight percent on Treasury bills) following the Mexican debt crisis. Corporate demands for external funds dropped sharply in 1982, by more than the increase in government borrowing requirements. Such high interest rates during a deep recession can only be explained by tight monetary policy, and could have been avoided if monetary expansion had been greater.[1]

[1] **In principle interest rates should be calculated on an after tax basis both to borrowers and lenders, which is a complicated and uncertain exercise for any particular interest rate. Suffice it to say that few holders of Treasury bills were in a marginal tax bracket of 50 percent, which is what would have been required to lower real after-tax Treasury bill rates to zero in late 1982, and even higher tax rates earlier in the year.**

TABLE 2

Nominal and Real Short-Term Interest Rates

	3-month Treasury bill rate	Dec.-Dec. Change in Consumer Price Index	Real short-term interest rate
		(percent, annual rates)	
1958	1.8	1.8	0.0
1960	2.9	1.5	1.4
1970	6.5	5.5	0.9
1975	5.8	7.0	-1.1
1981	14.0	8.9	4.7
1982	10.7	3.9	6.5
1983	8.6	3.8	4.6
1984	9.6	4.0	5.4
1985*	8.0	3.7	4.1

* First five *months.*
Source: Economic Report of the President: Economic Indicators.

The Fed was understandably reluctant to engage in greater expansion for fear sf rekindling inflationary expectations, even in a deep recession. But the presence of that dilemma does not gainsay the role of tight money in maintaining high short-term U.S. interest rates. The determinants of long-term interest rates are much more complicated, since unlike short-term rates they reflect not only non-observable expectations about inflation rates some years in the future, but as noted above they also reflect uncertainty about bond prices which presumably get reflected as a risk premium in current long-term interest rates. Moreover, long-term rates also presumably reflect expectations about future long-term borrowing (e.g. future budget deficits) relative to the size of the economy. But long-term rates must also reflect current short-term interest rates as well, since (given the uncertainties described) a premium presumably has to be paid in normal times—and especially in times of economic slack—to encourage lenders to lend at long rather than at short-term. So, in general, the higher are short-term rates, the higher long-term rates will be. So once again more responsibility for high interest rates belongs to the Fed than it or others have been willing to acknowledge.

Making a judgment about monetary policy in 1985 is more difficult than for 1982, a year of deep recession. But the American economy still has considerable slack (capacity utilization rates are only 81 percent in manufacturing, and according to OECD estimates the U.S. economy is still operating about five percent below its GNP potential). Real short-term interest rates remained above four percent in the first half of the year despite lower-than-capacity growth, compared with a putative riskless real long-term rate of

interest of around three percent throughout the nineteenth century. Has the rate of time preference, and the real rate of return to capital, increased markedly in recent years? We do not know the answer to that question, except inferentially. As noted above, the 1981-82 tax changes perhaps raised the average after-tax rate of return to capital in the corporate sector by about one percentage point, consequential but not huge. I would judge that monetary policy has been tight since 1982 as well as during 1982.

There has been reason for tight money: to squeeze inflation out of the American economy. Judgments will differ about whether the Fed has applied just the right dose, both in timing and in magnitude. But one lesson of the experience of the early 1980s is that the *modus operandi* of monetary policy in a regime of flexible exchange rates and high international mobility of capital differs substantially from the way it used to affect the economy. Now tight monetary policy appreciates the dollar and squeezes the entire tradable goods sector of the economy—exports as well as import-competing goods, from products as well as manufactured goods—in working its deflationary impact. The strong dollar and the large trade deficit are a direct consequence of an anti-inflation policy that has relied exclusively on monetary measures.

Before we turn to policy options, a final analytical observation needs to be made. When it comes to the determination of exchange rates, all explanations must be put in *relative* terms. Conditions and expectations abroad also influence exchange rates. The main point to note here is that while the United States has engaged in fiscal expansion and tight money since 1981, putting upward pressure on U.S. interest rates, the other major countries—Japan, West Germany, Britain, and, since 1983, France—have engaged in fiscal contraction, thus putting downward pressure on their interest rates.

According to OECD calculations, the structural budget deficit—that is, the deficit corrected for cyclical variation—of the United States shifted in the expansionary direction by 0.9 percent of GNP between 1980 and 1983. During the same period, the structural budget deficit of Japan shifted in the contractionary direction by 1.9 percent of Japanese GNP, Britain's fiscal thrust contracted by 2.7 percent of GNP, and West Germany's fiscal thrust contracted by 3.0 percent of GNP, as each of these countries moved to reduce budget deficits that they considered unacceptably large. Taken together, the six economic summit countries other than the United States contracted by 1.3 percent of GNP (Table 3). While the United States was expanding fiscally, other leading countries were contracting fiscally, and the combination induced capital flows from those countries to the United States and strengthened the dollar. Of course, fiscal expansion can sometimes lead to capital outflow, as it did from France in 1981, but that fiscal expansion was accompanied by expansionary monetary policy and nationalization of banks and other f i s as well.

TABLE 3
Structural Budget Positions
(in percent of GNP)

	1979	1980	1981	1982	1983
United States	1.2	0.7	1.6	0.3	-0.2
Japan	-4.3	-4.1	-3.5	-2.8	-2.2
West Germany	-2.3	-2.5	-2.4	-0.9	0.5
France	-0.8	0.8	-0.2	-0.6	-0.7
United Kingdom	-3.2	-1.1	1.8	3.3	1.6
Major seven, exc. USA	-3.5	-2.9	-2.7	-2.0	-1.6
OECD Europe	-2.9	-2.2	-2.4	-2.1	-1.7

Note: The structural budget position is that which would prevail if the economy were operating at its potential output, defined in terms of peak to peak trend in output.

Source: P. Muller and R.W.R. Price, "Structural Budget Deficits and Fiscal Stance," OECD Working Paper No. 15, July 1984, Annex 1.

Possible policy actions

Often remedies follow from analysis of a problem's causes. But sometimes the remedies that are suggested from this analysis are not feasible, and in any case many other remedies are often put forward. It helps to illuminate the problem to analyze to what extent these suggested remedies would in fact work. In the case of the strong dollar and the large U.S. trade deficit, a number of proposals have been put forward. Some of them involve actions by the United States; some involve actions by other countries. In particular, it has been observed that the United States has a large bilateral trade deficit (equal to about one third of its total trade deficit) with Japan and therefore that a substantial part of any solution to U.S. problems could be undertaken by Japan, by liberalizing its market to imports, by imposing a tax on its exports, or by limiting outflows of capital with a view to strengthening the external value of the yen. More generally, it has been suggested that Japan, alone or in combination with other leading countries, should reverse its present course of fiscal contraction and provide some fiscal stimulus to domestic demand.

With respect to U.S. actions, proposals range from selective import surcharges (aimed at Japanese goods) through a general import surcharge to disincentives to capital inflow (e.g. through a tax on interest payments to foreigners). In addition, it has been suggested that the United States should reduce its large budget deficit, should engage in monetary expansion, and should intervene in the foreign exchange market with a view to depreciating the external value of the dollar.

Actions by other countries

We will first take up the proposals for actions by other countries, and then return to possible actions by the United States. Since so many of the suggestions focus on Japan, it is useful to sketch briefly the nature and origin of the Japanese external surplus on goods and services, or, what comes to the same thing, the nature and origin of Japanese net investment abroad. Japan is a country with an exceptionally high savings rate, with gross private saving (by households and corporations) amounting to about 26 percent of GNP. Until the early 1970s Japan also had a high rate of domestic investment, but that dropped markedly as Japan's growth rate slowed after the first oil shock, and now amounts to about 21 percent of GNP—still high by international standards, but low by historical Japanese standards and in particular low in comparison with Japanese savings rates (Table 4). Where is the excess savings to go? One possibility, in no one's interest, is to dissipate it through a major recession which brings income closer into line with consumption. A second possibility is for the government sector to absorb it through budget deficits as it did in the late 1970s. A third possibility is to invest it abroad. Over the past six years Japan, through fiscal contraction, gradually shifted the absorption of excess Japanese savings from the government sector to the external sector, so that by 1984 each absorbed just over 2-1/2 percentage points of the excess savings, i.e. Japan invested abroad (net) nearly three percent of its GNP.

This relationship, X-M = S-I + (T-G), holds for any country and for any period of time, where X-M is net exports of goods and services (= net foreign investment if foreign aid grants and other unilateral transfers are included in "services"), S = gross private saving, I = gross domestic investment, and T-G is the government budget surplus. Net foreign investment is the difference between private saving and the calls on private saving

TABLE 4

Relation Between Japanese Trade Balance and National Savings and Investment

	1970	1973	1979	1984
		(percent of GNP)		
Net exports	1.0	0.0	-0.9	2.6
−				
Gross private savings	33.1	32.0	28.6	26.1
+				
Government budget surplus	1.8	0.6	-4.8	-2.6
−				
Gross domestic investment	33.9	32.6	24.8	20.9

arising from domestic investment or the need to finance a budget deficit. It must be asked of any proposal for altering the trade balance, X-M, how it will alter the savings-investment balance in the economy. This framework places changes in the overall trade balance directly into a macro-economic context, where it belongs.

The framework is useful in evaluating proposals such as those made above. American officials and journalists have called on Japan to liberalize its import market with a view to reducing its large trade surplus and with it the large U.S. trade deficit, for instance. With respect to this proposal, there is first of all the question of how Japan might liberalize imports as a matter of policy, since apart from agriculture the policy-controlled restrictions on imports are few. Rather, the obstacles to foreign exporters seem to be deeply ingrained habits of thought, in middle-level Japanese bureaucrats both in government and in large firms, something that cannot be altered by simple ministerial decree. But suppose, as a thought experiment, that all the real and fancied obstacles to importing into Japan were swept away. Would that reduce the Japanese current account surplus, running at just under three percent of GNP? To do so, according to the above identity, it would have to reduce Japanese savings or increase Japanese investment. We can assume that, apart from induced changes in GNP, the budget deficit would increase slightly, due to loss of tariff revenues; but average tariffs into Japan are 6.8 percent, and account for only 2.5 percent of government revenue and under 0.7 percent of GNP. How would liberalization alter savings and investment? By increasing competitive pressures within the Japanese economy, it might lead to lower corporate savings, and other things being equal that, like the reduction in governmeht revenue, would reduce the trade surplus. But lower profitability and lower corporate cash flow might also reduce corporate investment, and that would work in the opposite direction.

All in all, complete trade liberalization might lead to a modest reduction in the trade deficit—it would be nothing, like the $10 billion of increased exports that many American groups contend they could sell to Japan under these circumstances when allowance is made for the additional exports from other countries. The main effect would be to change the composition of Japan's imports (toward agricultural products, not manufacturers) and a further depreciation of the yen to keep Japan's net foreign investment in line with its savings-investment balance. Japanese exports would become even more competitive and, paradoxically, some manufactured products whose importation is now inhibited by Japanese practices would actually find greater difficulty gaining access to the Japanese market after total liberalization than before. Of course, if the liberalization depressed Japanese GNP, the trade surplus might actually increase as investment fell by more than the fall in private savings minus the rise in the government deficit.

Moreover, a modest reduction in the Japanese trade surplus would not

necessarily lead to a reduction in the U.S. trade deficit; that would depend on the response in Japan's other trading partners as well as in the United States. Liberalization concentrating on agricultural products would probably benefit the United States disproportionately, but even then the final outcome would depend on the impact on the U.S. savings-investment balance, a topic taken up below.

Another proposal, that Japan impose an export tax, is even less likely to have the desired effect. An export tax would (other things being equal) reduce the Japanese government deficit. It would also undoubtedly reduce corporate savings as Japanese firms cut their prices somewhat to remain competitive abroad. By reducing profitability, it would cut domestic investment in Japan, and that plus the reduction in the budget would probably lead to a reduction in income which would cut investment further. Thus a tax on exports would very likely lead to an increase rather than a reduction in the trade surplus, partly through yen depreciation, partly through economic stagnation.

These results serve to illustrate the point that when one is dealing with the entire trade sector, rather than particular commodities such as citrus or lumber, it is unsafe to assume that other things will remain equal. By the savings-investment identity, something else has to change if the trade balance is to change, and that will typically affect the entire economy. Alternatively, if the savings-investment balance does not change, the overall trade position will not change either, even though the composition and even the level of both exports and imports may (in general, will) be affected by actions that operate on trade.

This observation is not meant to suggest that such import liberalization as the Japanese can take would not be desirable. On the contrary, protectionist pressures are fed by specific actual or perceived grievances about the difficulty of exporting to Japan, and actions to mitigate these grievances and open the market will be helpful in managing U.S. protectionist pressures through a difficult period. But we should not measure their success by the reduction in the U.S. trade deficit, for that is likely to be negligible.

A third suggestion sometimes made is that Japan should introduce a *tax* on capital outflow, analogous to the Interest Equalization Tax (IET) used by the United States in the 1960s, or otherwise restrict the outflow of capital through administrative guidance (Bergsten). Heavy flows of investment abroad by Japan's financial institutions, especially to the United States, have depressed the market value of the yen, and that in turn has contributed to Japan's trade surplus. If the purchase of foreign securities can be restrained, the argument runs, the yen will appreciate and Japanese goods will become less competitive on world markets.

Once again, the proposal must be assessed in terms of its likely impact on the overall balance between savings and investment in Japan. So long as

Japanese savings remain exceptionally high, where will they go? An IET would raise government revenue, thus reducing the government's need to borrow and depriving Japanese financial investors of a source of domestic securities. Market interest rates would therefore fall in Japan. While market interest rates do not play the significant role in Japan that they do in the United States, the decline in interest rates might well stimulate some domestic investment, and the induced rise in income would stimulate more investment, on both counts reducing the trade surplus. Of course, any fall in domestic interest rates would, by itself, enlarge rather than reduce the tendency of institutional investors to buy foreign (especially U.S.) securities. It would also reduce government interest payments on that portion of old and new government debt that is sensitive to market rates, thus reducing further the government deficit and the interest income of bondholders.'

Furthermore, appreciation of the yen might reduce corporate savings, but also would discourage investment to the extent it was being undertaken on the basis of current competitiveness in international markets. All in all, restrictions on capital outflows from Japan would help modestly to reduce the Japanese trade surplus, but it would run strongly against both the domestic and the foreign (especially U.S.) pressures for capital market liberalization over the past decade, and thus would represent a major reversal of structural policy.[3]

A fourth suggestion is that Japan should stimulate domestic demand through greater fiscal stimulus--either.by an increase in government expenditure or by a tax cut. From 1979-1984, Japan contracted fiscally by three percent of GNP so that the "structural" budget deficit now stands at just over one percent. This contraction has contributed, as noted above, to the emergence of a large trade surplus. Fiscal expansion would mark a reversal of the "administrative reform" to which the Nakasone administration, like its Suzuki predecessor, is committed. Fiscal expansion could be made more palatable, however, by concentrating the effort on housing, in which there is underinvestment compared with other countries of comparable per capita income. For instance, Japan could make mortgage interest payments tax deductible and take steps to improve the granting and the marketability of mortgages in Japan, perhaps by creating a secondary mortgage market in the fashion of Fannie Mae. These moves would reduce the Ameri-

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2 Net financial liabilities of the Japanese government are about 27 percent of GNP, close to the ratio of the United States and notably higher than that of France and Germany, but lower than the roughly 50 percent ratio of the United Kingdom. Muller and Price, Table A311.

3 For a history of recent U.S. efforts to persuade Japan to liberalize its financial markets, see Frankel 1984. The impact of this proposal may be discovered soon, since Japanese pension funds and life insurance companies have virtually reached the current limit of 10 percent of their portfolios that can be invested in foreign securities. The practical issues are whether that guideline should be revised upward, or tightened to include foreign-currency denominated securities issued by Japanese firms, now excluded from the restriction.

can "competitive advantage" in producing fixed interest securities and would help reduce gross household savings in Japan by encouraging greater spending on houses and their contents.

A larger budget deficit, augmented by greater household borrowing, would put upward pressure on interest rates, capital outflow would decline, and the yen would appreciate. National savings would decline, and that would reduce the trade surplus, unless the combination of higher interest rates and stronger yen stifled domestic investment. But since the higher rates would be induced by greater domestic spending, the main impact (as in the United States in recent years) would be a shift of investment from the export sector to greater orientation toward the domestic market.

The impact on the United States, to be discussed below, of fiscal stimulus in Japan would be strengthened if such stimulus were also undertaken in Germany and the United Kingdom; and if these countries did so, France could also be less restrictive. As noted above (Table 3), Britain and Germany now maintain structurally tight fiscal policies in the face of high domestic unemployment. Both could relax somewhat in the interests of better internal and external balance. A concerted move by all these countries would also have the advantage of minimizing movements in the exchange rate among their currencies, while helping all to appreciate against the dollar.

One sometimes hears the argument, especially in Germany and to a lesser extent in other European countries, that fiscal expansion would be inflationary despite the high unemployment because of structural rigidities in the economy, which is heavily keyed to export rather than domestic demand. I entertain considerable skepticism about this argument in its extreme forms. But to the extent it has some merit, one form of government expenditure that would not be inflationary is foreign aid, especially if it is untied. Many developing countries are financially strapped at present, and would welcome well-placed funds that could be spent in any of the industrialized countries.

But all of these suggestions rely on actions by other countries, possibly under U.S. prodding. Belated U.S. suggestions at the 1985 Bonn Economic Summit that other countries should engage in fiscal expansion apparently were coolly received, in marked contrast with the concerted program of action agreed at the 1978 Bonn summit.

Actions by the United States

Analogous actions to those suggested for Japan have also been made for the United States, with reverse sign: a surcharge on imports, a tax on capital mflows, and a reduction in the budget deficit. Again, the investment-savings framework will be helpful in analyzing them.

An import surcharge could be selective (on Japanese goods) or general. Both have been proposed, and either could be imposed legislatively or by Presidential action under the Trade Act of 1974. What would be the impact of an import surcharge? It would of course raise some revenue, and thereby work toward reducing the budget deficit. It would raise U.S. prices to the extent that foreign suppliers did not absorb the surcharge fully, and that would permit U.S. firms in competition with imports to raise their margins and/or their volume of sales, thus increasing corporate profits. On both counts there would be some reduction in the trade deficit, unless the surcharge stimulated an offsetting boom in investment. But these two effects in all likelihood would only represent a fraction of the tendency of America consumers to turn away from the taxed imports, leaving a larger incipient improvement in the trade balance than can be supported by the associated increase in tax revenues and corporate profits; in that case the dollar might appreciate to restore the savings-investment balance, so export-oriented firms and farmers will be made *worse off* by the surcharge.[4] Moreover, in a world ridden by external debt and by budget deficits that are almost universally considered too large, a move by the United States to impose a surcharge on imports is likely to be widely emulated, and that could vitiate what gains the United States garnered and leave the world as a whole worse off.

The selective surcharge would run less risk of widespread emulation (except perhaps against Japan), but would generate much less in the way of additional savings and more in the way of yen depreciation against the dollar. The net effect is likely to depress Japanese income and investment, and that would leave both Japan and the rest of the world worse off.

If yield-oriented capital inflow accounts for the strength of the dollar, then one way to weaken the dollar might be to impose a tax on interest and dividend payments to non-resident holders of U.S. securities. To the extent such a measure could be successfully levied, it would reduce the budget deficit by the amount of the revenue. It would also, however, lead to higher domestic interest rates in the United States as the competition for funds within the country drives them up. Higher domestic interest rates (not in principle available to foreign investors, because of the tax) would reduce domestic investment to some extent, a manifestation of the "crowding out" that was extensively predicted before observers realized how globally mobile capital is these days. Lower investment might lead to lower income

[4] What happens depends on the extent to which foreign exporters cut their prices, on the degree of price substitutability between imports and domestic goods, and on the mark-up over incremental costs at which domestic producers can supply the additional goods. The generalization in the text is more likely the more foreigners cut their prices and the higher the substitutability for domestic goods so long as the surcharge exceeds the mark-up, but it will be less likely the higher is the mark-up on domestic goods.

and output. A weaker dollar would permit higher domestic prices, hence corporate savings. On both counts the trade deficit would be reduced. On the other hand, the government deficit would increase by the higher interest payments that would have to be made to the public, and this factor might swamp the revenues raised from the tax itself.

Moreover, there is considerable question how effective a tax of this kind could be, given the multifaceted channels by which capital flows in today's world. Would intra-corporate interest payments be taxed? If so, it would be an administratively complicated tax indeed; if not, corporations could borrow from their subsidiaries abroad, and, via arbitrage, the U.S. market would remain linked to the world market on a tax free basis. Moreover, the purpose of the tax would be to weaken the dollar. Yet the tax would not apply to dollar securities issued outside the United States, and so long as they remained attractive to investors around the world some upward pressure on the dollar would remain.

In practice there are institutional rigidities and arbitrage is incomplete, so a plausibly comprehensive tax on interest payments with coverage for the obvious loopholes would probably lead to some weakening of the dollar and some improvement in the trade balance.

The main obvious impact of these tax measures would be through the revenues they generate for the government. That suggests, as did the analysis at the outset of the paper, that a major measure to weaken the dollar and reduce the trade deficit would be to reduce the budget deficit. Reducing the budget deficit, it is argued, will lead to lower interest rates and less foreign investment in the United States.' That in turn would weaken the dollar and improve the trade balance (e.g., Feldstein.)

The simple starting point for this recommendation is the savings-investment figures mentioned earlier, and shown again in Table 5; U.S. private saving was exceptionally high in 1984, and domestic investment was normal for a boom year. The budget deficit, however, at 3.4 percent of GNP, was exceptionally large for a boom year, and absorbed not only the modest excess of private savings over domestic investment, but drew in substantial foreign saving as well.

Moreover, the budget problem is a problem of the federal budget; state and municipal governments taken together by 1984 were running a substantial surplus of $51 billion.

Virtually everyone now agrees on the need for a reduction in the federal budget deficit. Yet little happens because of political impass over how the reduction should be split between non-defense spending, defense spending, and a tax increase, with President Reagan insisting that the main burden must fall on nori-defense spending and House Democrats insisting that there will be no more squeeze of non-defense spending (which if social security and interest payments are excluded declined in real terms between fiscal

TABLE 5

Relation Between U.S. Trade Balance and National Savings and Investment

	1966	1973	1979	1983	1984*
			(percent of GNP)		
Net exports	0.4	0.5	-0.1	-0.1	-2.6
=					
Gross private savings	17.0	17.2	16.8	17.3	18.4
t					
Government budget surplus**	-0.2	0.6	0.6	-4.1	-3.4
—					
Gross domestic investment	16.6	17.3	17.5	14.3	17.4

*-preliminary
**-Federal, state, and local

Note: Columns may not show equality due to rounding errors and small statistical discrepencies.

Source: Calculated from Council of Economic Advisers, *Economic Report*, 1985.

year 1981 and 1985) without a squeeze on defense spending, which rose $96 billion (61 percent) between 1981 and 1985, by an amount almost equal to the deterioration in the external balance. Many Senators and Representatives argue that a tax increase is also needed to close the gap–realistically speaking, it cannot be done through expenditure reductions alone.[5]

A cut in government spending or a rise in taxes operates directly on the savirlgs-investment balance by reducing the budget deficit. But at a time when the economy is hesitant, a sharp reduction in the budget deficit would certainly send the economy into recession, thereby leading to a reduction in interest rates and an improvement in the trade deficit for undesirable-and non-sustainable—reasons. It would hurt the United States and rest of the world as well. The solution usually and appropriately mentioned to deal with this problem is to pass soon legislation that reduces *future* budget deficits. Given the annual determination of expenditures, gradual reduction in the prospective budget deficit can mainly be achieved by a phased tax increase and/or by a phased elimination of entire programs, or by scaling back multi-year military procurement.

But a program cutting back on the prospective budget deficit will not nec-

[5] Non-defense spending for all programs other than social security and interest payments are estimated at $318 billion in fiscal year 1985, against a budget deficit of $222 billion. Thus 70 percent of all these government programs—law enforcement, foreign affairs, highways and airports, health programs (other than medicare), space, energy, agricultural support, etc.—would have to be eliminated to eliminate the deficit.

essarily lead to a reduction in interest rates, a weakening of the dollar, and a beginning toward reducing the trade deficit. Short-term interest rates are mainly influenced by the actual budget deficit, not much by future deficits; and it is uncertain how soon or how much long-term interest rates would fall following a persuasive reduction in budget deficits starting in FY 1987. Little might happen at once. Indeed, positive action on the budget deficit might lead to a strengthening of the dollar in the short run, as foreign confidence in the U.S. ability to manage its affairs increases and market dynamics rather than changes in fundamental economic factors dominate determination of the exchange rate.

If a sharp cut in the actual budget will generate a recession and a persuasive cut in prospective deficits cannot be certain of effect, what is to be done? The key to a soft landing is to substitute net external demand for budgetary thrust, and, given the response lags, that requires that the exchange rate be brought down more rapidly than the actual budget deficit. Therefore, what is needed is action on the prospective budget deficit combined with an easing of monetary policy.

How does monetary expansion help in the savings-investment framework? First, it lowers short-term interest rates, thereby lowering business costs; net interest payments amounted to 4.1 percent of non-financial corporate business value-added costs in 1984. A decline in average interest rates from 12 to nine percent would reduce costs by one percentage point. Second, it would weaken the dollar and thereby fatten profit margins through some combination of higher sales and higher markups. On both counts, pressure on the manufacturing and agricultural sectors would be relieved. Whether the trade deficit would be reduced is more problematic; it depends on whether lower short-term interest rates and higher profit margins would stimulate investment in excess of the increased corporate and farm savings. If not, the trade balance would improve; if so, it would deteriorate further, though due to higher economic activity rather than to currency appreciation.[6]

Is the United States living beyond its means? In some sense, yes: it is drawing substantial net resources from the rest of the world. But U.S. unemployment is still 7.3 percent and capacity utilization rates are only 81 percent in manufacturing (and 80 percent in materials) even while large volumes of manufactures and materials are being imported from abroad.[7] This configuration suggests a lack of competitiveness rather than a high pressure of demand pulling resources into a fully utilized economy. If U.S. competi-

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[6] There would also be a modest direct effect of lower short-term interest rates on the trade balance, since foreigners are net holders of short-term interest-bearing claims on the United States. That effect would relieve somewhat downward pressure on the dollar.

[7] OECD estimates suggest that the U.S. economy was operating 4 to 5 percent below capacity in 1984.

tiveness could be improved, domestic output would rise and satisfy some of the demand that is now being satisfied by imports. The higher output would generate the additional savings that would, absent an investment boom, permit a decline in net foreign investment in the United States. Thus to the extent that a monetary-policy induced depreciation of the dollar stimulated output, incomes and savings, it would reduce the trade deficit as well.

Of course, the Federal Reserve may understandably hesitate over adopting a policy of greater monetary expansion. It has been successfully engaged in fighting inflationary expectations. Moreover, the policy suggested would actually result in some domestic price increases following depreciation of the dollar. However, price increases from a depreciation of the dollar are inevitable sooner or later, and they are less likely to revive inflationary expectations in the context of a policy that is deliberate, fully explained, and taken in a broader context of economic slowdown and desired fiscal contraction.

The risk of revived inflationary expectations could be reduced further if the Federal Reserve undertook monetary expansion by buying foreign rather than domestic securities, at least beyond its normal monetary targets. Such an action would have three desirable effects. First, it would make the symbolically useful point that the Fed is not simply monetizing the federal deficit. Second, it would signal that the Fed is concerned about the exchange rate of the dollar in terms of other major currencies, and will take it into account in framing monetary policy.[8] Third, the process of selling dollars for yen or German marks would put direct downward pressure on the dollar relative to these currencies. Such a move would be officially welcome by those countries which have occasionally urged the United States to closer cooperation in exchange rate management. Appreciation of their currencies would reduce their trade surpluses, and would provide encouragement to greater fiscal stimulus to take up the slack.

Of course, purchasing foreign securities would put less downward pressure on Treasury bill rates than would purchases of Treasury bills, but the increased bank reserves that would result from Fed purchases of foreign exchange would result in a lowering of short-term interest rates as banks expand their investments and loans.

What is suggested here is that the Federal Reserve should engage in unsterilized exchange market intervention. There is little doubt that such action can influence the exchange rate. It is sometimes suggested that the Fed should intervene in the foreign exchange market to influence the exchange rate *without* altering the path of monetary magnitudes, i.e. that it

[8] Ronald McKinnon (1984) argues that the Fed should go much further and actually key monetary policy to the yen and DM exchange rates, in conjunction with a collaborative effort with the Gennan Bundesbank and Bank of Japan to control the growth of the joint U.S.-Japanese-German money supply.

should engage in sterilized intervention, offsetting the monetary effects of foreign exchange purchases by sales of domestic securities. It has lately become fashionable to assert, citing Fed staff studies, that sterilized intervention does not in fact influence the exchange rate beyond some very short run. Yet the Fed studies I have seen suggest a much more agnostic position than this contention claims, and I consider sterilized intervention useful in certain contexts.[9] However, in present U.S. circumstances, where the dollar is held strong by deficit-driven capital inflows, sterilized intervention would not be helpful beyond a signal of the Fed's interest in the exchange rate (which however itself might be important in shaping exchange market expectations), because it would tend to widen rather than narrow the interest rate differentials that are in large part driving the capital flows. Moreover, it would be premature, before a sustainable budget is reestablished, to adopt a system of target zones for exchange rates.

Concluding observation

In many ways, the problem that the United States faces is similar to that of a developing country in need of a stabilization-cum-devaluation package of policy measures. There are of course some important differences, revolving around the fact that the United States has a floating currency and large capital inflows that are directly responsible for keeping the currency strong. But there are also some important similarities, revolving around a large budget deficit and a currency that (on the arguments given above) is unsustainably strong. So let us pursue the analogy further.

The artful task of stabilization policy is to reduce the budget deficit and improve the trade balance without driving the country into an economic slump. This balancing act is accomplished by cutting the budget deficit and simultaneously devaluing the currency, so that increased (net) export demand can replace the cutback in government demand (or in household demand, if a tax increase is involved.) Even then, for a country with a large trade deficit, the impact of the devaluation may itself be contractionary at first because the public must pay more in home currency for imports before they have a chance to adjust their pattern of expenditures (or before domestic businesses have an opportunity to produce replacements for the imports).[10] The stimulus to exports will be expansionary but not initially by an amount that will offset the contractionary effect of higher expenditures on imports.

This timing factor from currency depreciation suggests another reason

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[9] See the summary in Henderson and Sampson, 1983.

[10] This factor will be less important for the United States to the extent that foreign exporters cut their prices in order to maintain their position in the U.S. market. But that practice has its limits.

why the fiscal contraction should be gradual, and the currency depreciation should be brought about as rapidly as possible, if necessary with policy encouragement. In other words, if the passage of a budget package does not at once lead to an anticipatory decline in interest rates and the dollar (as I suspect it will not), the monetary authorities would be well advised to push interest rates and the dollar exchange rate down.

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Commentary on "The U.S. Payments Deficit and the Strong Dollar: Policy Options

Paul ***Craig Roberts***

I have the feeling that I was invited to this conference as a dissenting voice. I will not disappoint you, but I must begin by acknowledging that I am in agreement with the conclusion of Richard Cooper's paper that the strong dollar and the large trade deficit are a direct consequence of monetary policy. I also believe that Professor Cooper, although he has left the price effects out of his analysis, has done a good job of showing the problems with many of the commonly proposed "solutions" to the U.S. trade deficit. There are some issues where I disagree with Professor Cooper. I believe it will be helpful to this conference if I fold my disagreements into a broader policy context that, I believe, will strengthen Professor Cooper's paper.

Economists generally have misinterpreted Reagan administration policy as a mix of loose fiscal policy and tight monetary policy. I do not know what accounts for this misinterpretation of administration policy other than habitual Keynesian ways of thinking that precluded anyone looking at the administration's own statements of its policy and at the actual facts.

The administration quested and planned on the basis of a different monetary policy than the one that the Fed delivered. The administration was looking for a 50 percent reduction in the rate of M1 growth spread over a six year period. It did not expect 75 percent of this reduction to show up the first year, nor did it expect the volatility that has characterized monetary policy. To quote from the February 18, 1981, report that announced the administration's economic policy: "The economic scenario assumes that the growth rates of money and credit are steadily reduced from the 1980 levels to one-half those levels by 1986."

The administration certainly had no intention of attempting to cure inflation overnight with a recessionary monetary policy. Indeed given the constraints of conventional thinking at the time, such a policy would have had no credibility. Forecasting models such as DRI had a "core rate of inflation" of 10 percent, which established a 10 percent inflation floor even with restrictive monetary and fiscal policies. Moreover, administration policy-

makers wanted to break the roller coaster cycle of fighting inflation with unemployment and vice versa.

The same unexpected monetary policy that produced a sharp and unexpected disinflation produced the large unexpected budget deficits that have been misinterpreted as a loose fiscal policy in Keynesian terms. The administration did not expect these deficit —nor did any other forecaster because no one predicted the sharp and sudden disinflation.' The administration's goals were to reduce federal expenditures and revenues to 19.3 percent of GNP by 1984.

It is perhaps useful to recall how unexpected the disinflation was. In 1981 the Reagan administration projected a 1982 inflation rate of 8.2 percent and was widely ridiculed for its "rosy scenario." That year I had to deal in public forums with large numbers of academic and Wall Street economists who were confident that inflation could not fall as low as 8.2 percent in 1982. The actual figure came in at 3.9 percent.

It is instructive to recall the inflation hysteria to which economists contributed in 1981. I remember a meeting of the Federal Reserve Board with its academic consultants at which prominent economists maintained that monetary policy was a "weak sister." They were convinced that the combination of tax cuts with a double-digit core rate of inflation meant that monetary policy could, at best, conduct a weak rearguard action. Chairman Volcker was concerned that a rise in inflation would be blamed on the Fed. In the time honored Washington way, he acted to protect his institution and simply turned off the money, reasoning that an administration with monetarists in office could not blame the Fed for inflation if there was no growth in M1. There is every indication that Volcker did not anticipate the results of this policy and that he was surprised by the telephone call from the Mexicans in the summer of 1982. He responded to the Mexican crisis by telling the Treasury Secretary that he was going to let interest rates go into a "free fall." And they did, despite massive upward revisions in the deficit forecasts issued by the Congressional Budget Office and Henry Kaufman.

The recession was unexpected also. Literally everyone "knew" that the problem was inflation. When on the advice of my office Secretary Regan warned in the first week of August 1981 that the Fed's monetary policy was leading the economy into recession, he was greeted with incredulity. Two months passed before he was willing to make another public statement. By then the situation was desperate. Regan again called for the Fed to honor its own targets and to loosen the extraordinarily tight monetary reins. The only

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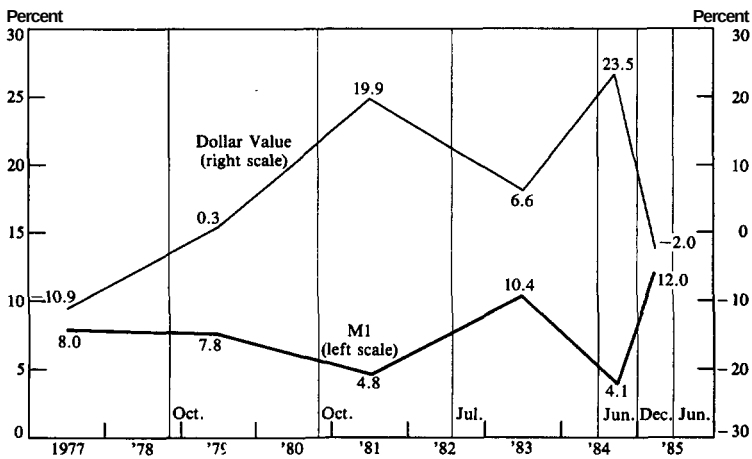
[1] In addition to the cyclical increase in the deficit, the recession contributed to the structural deficit. Because of the rapid fall in inflation relative to economic forecasts, the revenue loss fmm the lower nominal GNP is permanent as long as inflation remains down unless the previous peak nominal *GNP growth* rate can be achieved from real GNP growth.

result was another load of ridicule dumped on the Treasury Secretary.

Economists should understand that the nominal GNP forecast is the key to the deficit forecast. If nominal GNP is far below forecast, the deficit will be far above forecast. The nominal GNP levels have been far below everyone's projections in 1981. It does not serve the purpose of understanding or the interests of sound policy to equate the unexpected results of an unexpected monetary policy with the administration's fiscal policy. The same monetary policy that disinflated and restored the dollar's value (Figure 1) produced the budget and trade deficits.

FIGURE 1
Money Growth Rates and Growth Rates for the Value of the Dollar Over Selected Periods, 1977-Mid-1985



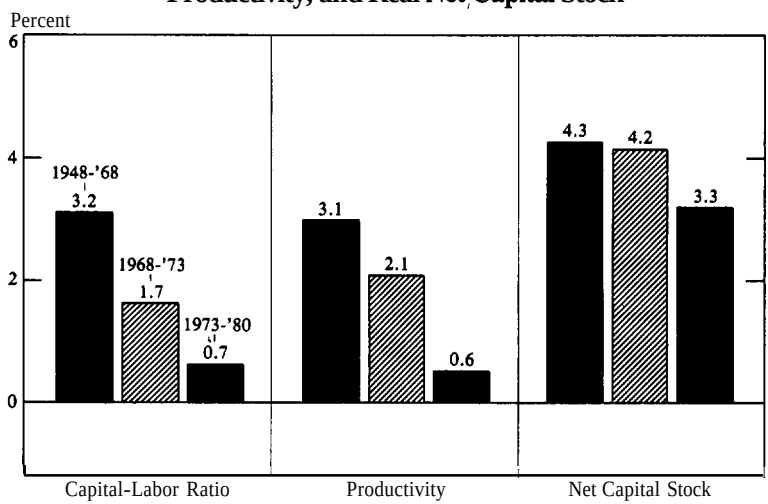
Source: Federal Reserve Board. Dollar value is based on Federal Reserve index of weighted-average exchange value of U.S. dollar against currencies of other G-10 countries plus Switzerland. March 1973 = 100.

It is impossible to believe that the inflation rate could unexpectedly drop from double-digit rates back to the rates of the 1960s and for the dollar not to change in value. Economists, if not journalists and politicians, should understand that the Fed cannot simultaneously make the dollar a more desirable currency in which to hold assets and fail to meet the increased world demand for dollars without the dollar rising in value. Part of the dollar's rise in value is due to lower tax rates including the lower rates resulting from the lower inflation. The trade deficit is a manifestation of an adjustment process that was set in motion by a change in the inflation and investment climate.

This relationship should be self-evident to economists. It makes it difficult to understand the overwhelming emphasis on budget deficits as the key to the dollar's rise in value-especially when the linkage between budget

deficits and interest rates is weak or non-existent over the period of the recent U.S. experience that they are supposed to explain. Equally curious are economists who believed quite strongly in the Phillips curve in 1981 but who write and speak today as if fighting inflation is a free lunch. All of the adjustments (seen as costs in many quarters) associated with lower than expected inflation—a stronger dollar, the trade deficit, budget deficits larger than projected, and the erosion of asset values underlying the world debt structure—have been attributed to tax rate reduction. Perhaps political and ideological opposition on distributional grounds to the supply-side policy have crowded out economic thinking. Or perhaps it is just the self-interest motive at work protecting human capital.

FIGURE 2
Rates of Growth in the Capital-Labor Ratio, Productivity, and Real Net Capital Stock



Note: Capital-labor ratio is real net capital stock (gross stock less replacement requirements and pollution abatement expenditures) in the private business sector divided by the civilian labor force (excluding government).

Productivity is output per hour of all persons in the private business sector.

Concerning the administration's fiscal policy, perhaps never has a policy been so willfully misunderstood. The purpose of the administration's tax and budget policy was to reduce the cost of labor and capital in order both to spur real economic growth and to address the nation's competitiveness problem. As Professor Cooper notes, unemployed U.S. resources indicate a competitiveness problem rather than excess demand from excessive fiscal stimulus. This competitiveness problem predates the dollar's recovery.

In the 1970s despite a weakening dollar, the external position of the U.S. deteriorated. The competitiveness problem has its origin in the collapse in the growth of the capital-labor ratio and labor productivity during the 1970s (Figure 2.) As a result, high priced U.S. labor was no longer shielded from foreign competition by strong productivity growth. The focus on exchange rates alone overlooks the impact of rising total factor costs.

During the late 1960s and the 1970s policymakers trained in the Keynesian tradition focused on the income effects of fiscal policy and overlooked the relative price effects. Consequently, the tax component in the cost of production rose as inflation eroded the real value of depreciation allowances and pushed taxpayers into higher tax brackets. In the Keynesian model, marginal tax rates and the share of GNP collected in revenues are unimportant as long as the government spends the money. In the supply-side model, taxation is the main policy variable affecting the cost of capital and labor.

It would not be fair to Professor Cooper's paper for me to settle these issues here. However, it was necessary for me to raise them in order to properly evaluate Professor Cooper's policy recommendations. He calls for a tighter fiscal policy and a looser monetary policy. I favor the same policy, but I believe that our thinking is quite different. We both want to improve U.S. competitiveness. Professor Cooper is addressing this problem by seeking to lower the exchange value of the dollar. He believes that reducing future budget deficits will lower interest rates and capital inflows, thereby lowering the dollar exchange rate, while the Fed simultaneously achieves the same result by pumping more dollars into the currency market. In Professor Cooper's approach it makes no difference whether the deficit is reduced by cutting spending or by raising taxes, because his goal it to lower interest rates and reduce capital inflows.

In my approach, how the deficit is reduced makes all the difference in the world. Since our competitiveness problem is not one merely of the dollar's exchange value, the approach taken to deficit reduction is the key. Cutting federal spending would free real resources for the private sector and lower the cost of U.S. production, making the U.S. more competitive. On the other hand, higher taxes would reduce the trade deficit by raising the cost of capital (and labor), thereby causing capital outflows. The increased factor costs would raise the cost of production in the U.S. and worsen the basic cause of our competitiveness problem. Similarly, if during 1980-83 other countries achieved the "fiscal contractions" that Professor Cooper mentions through tax increases, we have an overlooked cause of greater capital inflow into the U.S.

In conclusion, I think that Professor Cooper is to be congratulated for recognizing the role played by monetary policy in the dollar's recovery and for demonstrating the simplistic nature of many proposed solutions to "the problem of the high dollar." However, U.S. competitiveness is not merely a

matter of the dollar's exchange value. A Keynesian perspective alone could result in the fiscal side of his recommendation being implemented in a way that would worsen the long-term problem of U.S. competitiveness. For example, recent work shows that investment in equipment is much more sensitive to changes in tax rates than to changes in interest rates.[2] We should note that the several tax increases since 1982 (Table 1) have failed to reduce the domestic and external deficits.

TABLE 1

What is Left of the Tax Cut?
FY 1981 - FY *1989*
($ billions)

			Fiscal Years 1981 through 1989
Tax Cut:	Economic Recovery Tax Act of 1981 (ERTA)		-$1,488
Tax Increases:	Inflation-Induced Bracket Creep	+ $650	
	1977 Social Security Tax Rate Increases	+ $287	
	Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA)	+ $311	
	Gasoline Tax Increase	+ $28	
	1983 Social Security Amendments	+ $90	
	"Downpayment"	+ $101	
	Other	+ $9	
Total Tax Increases			+ $1,476
Net Tax Cut			-$ 12
Nine Year Average Net Tax Cut			-$ 1.4

The linkage necessary to the deficit theory of the dollar's rise in value requires increasing capital outflows in response to higher U.S. interest rates. However, the net capital inflows do not seem to be primarily a response to interest rates. The data indicate that the main source of the net capital inflow is a collapse in U.S. capital outflows from $119 billion annually in 1982 to $21 billion in 1984. This sharp reduction in U.S. capital outflows seems to be due primarily to a portfolio adjustment resulting from U.S. banks reassessing their third world exposure. It is likely to have occurred regardless of

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[2] Aldona E. Robbins, Gary A. Robbins, and Paul Craig Roberts, "The Relative Impact of Taxation and Interest Rates on the Cost of Capital," in Dale Jorgenson and Ralph Landau, eds., ***Technology and Economic Policy,*** (Cambridge, Mass.: Ballinger, 1986.)

the level of **U.S.** interest rates. **If** indeed the capital inflows reflect a portfolio adjustment to lower **U.S.** inflation and tax rates and to over-exposed U.S. bank capital in foreign loans, the dollar should drop once the adjustment is completed, and with the usual lags the trade deficit will correct.

On closer examination economists might find that the current account deficit is explained by international portfolio adjustments. The view that capital inflows passively finance a current account deficit resulting from an overvalued currency is an example of out of date habitual ways of thinking. In a world in which money and capital markets have been internationalized, capital inflows can force countries to run current account deficits. If the initiative lies with capital inflows responding to disinflation, greater economic and political stability, higher after-tax rates of return on real investment, and cutbacks in capital outflows for'sound portfolio reasons, the picture that has been painted by some of the tax cuts launching the **U.S.** on an excess demand consumption binge that is financed by high interest rates sucking in foreign capital is silly in the extreme.

7
Is There a Case for More Managed Exchange Rates?

Jeffrey D. Sachs

The remarkable appreciation of the U.S. dollar after 1980 has been viewed by many observers as a failure of the floating exchange rate system, and has been a major stimulus to calls for a return to a more managed global exchange rate system. Critics of the current international monetary arrangements argue that tighter international "rules of the game" in macroeconomic policymaking would reduce the large swings in exchange rates and in global economic activity that have been experienced since the breakdown of fixed exchange rates in 1973. These critics also suggest that better policy coordination and tighter rules of behavior will be necessary for a smooth adjustment to the immediate problem of a grossly overvalued dollar. Policy recommendations of these critics run across a wide spectrum, ranging from incremental measures such as enhanced consultations among the major economies, and enhanced International Monetary Fund surveillance, to dramatic changes such as a return to fixed exchange rates among the major industrial countries.

This paper looks at the case for a return to tighter international rules of behavior for exchange rates among the industrial economies. Does the exchange rate experience since 1973 provide a clear indictment of floating rates, and more importantly, does the experience suggest new ground rules for a more managed system? Are the shortcomings in macroeconomic management in the global economy due to domestic policy mistakes that could be corrected by improved domestic rules of behavior, or are they mistakes involving the international incentives faced by national policymakers, in which case only a reform of the international rules of the game would suffice?

When economists have analyzed different rules of the game, and especially when they have focused on the choice between fixed and flexible exchange rates, the arguments have centered on two issues. The first issue is how policymakers react to alternative external constraints. For example, do floating rates permit the manipulation of exchange rates by national mone-

tary authorities (the so-called beggar-thy-neighbor issue?) Do fixed exchange rates provide a useful discipline on the inflationary tendencies of politicians? The second issue is how the world economy responds to exogenous shocks, other than those caused by the policymakers themselves. For example, do floating rates help to protect countries from unexpected shifts in demand for the domestic currency? The relative merits of alternative rules of the game clearly depend on both types of issues, the "policy" dimension and the "shock" dimension.

The recent arguments for more managed rates have tended to focus on the policy dimension, with advocates of tighter rules of the game generally making their case along some or all of the following lines'. First, it is argued that macroeconomic policymaking is made difficult today because of the inability of each country's policymakers to predict the actions of policymakers in other countries. Rules of the game would increase predictability, and would thereby enhance global stability. Second, the case is made that floating exchange rates can be manipulated by national authorities to enhance national economic goals at the expense of other countries. International rules of the game would put an end to such beggar-thy-neighbor behavior. Third, some analysts have argued that tighter rules of the game would reduce the ability of national policymakers to misuse macroeconomic instruments for domestic political ends. International pressures would be a sanction against the domestic political business cycle.

Supporters of the current "non-system" of floating rates make several rejoinders. Most importantly, many worry that a global system would merely bring to the international level all of the glaring defects of policy management that are now evident on the national level. They worry that global rules of the game would have forced all countries to opt either for Reaganomics or Mitterandism in recent years, and they take solace in the thought that the unlikelihood of such apolicy consensus stands in the way of global rules. Policy coordination would bring greater predictability, but at the risk of all countries simultaneously choosing the wrong set of policies. In other words, the current international environment invites major mistakes at the national level, but it also allows individual countries to pursue sensible policies even when most others do not.

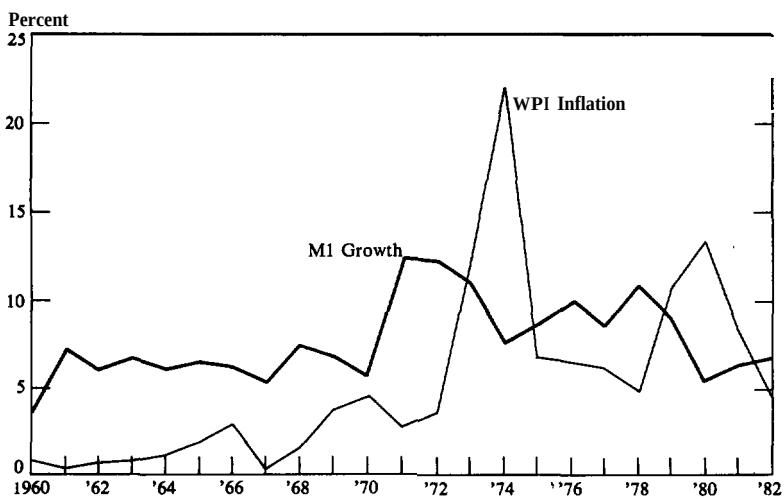
The first half of the paper focuses on the policy-based arguments for managed exchange rates, while the second half of this paper examines how shocks to the world economy are absorbed under alternative rules of exchange rate management. The f i t section reviews some evidence showing that monetary instability has been a major factor in the global business cycle since 1971. The second section discusses the argument that the floating rate system has had an important role in generating that instability. The third section discusses a new methodology for studying the operating characteristics of alternative exchange rate rules. A simulation model is introduced, in

which key behavioral relations are subject to exogenous shocks. Using some techniques introduced later, we are able to measure the fluctuations to output, inflation, etc., that can be expected to arise under different rules for monetary management. Would a fixed rate system of the sort advocated by McKinnon do a good job in stabilizing the world economy? Would a managed float based on monetary targeting at the national level be superior? The answers to these questions depend, we shall see, on the types of shocks hitting the world economy.

One limitation of this paper should be noted at the beginning. This paper focuses on longer-term aspects of the world monetary system, and thus does not discuss in detail the pressing problem of the large fiscal and trade deficits in the U.S. These current problems are indicative of the general shortcomings in the current world system, in which the center country feels free to take actions which greatly destabilize the world economy. In thinking about longer-term reform of the system, however, it is not useful or necessary to dwell on the short-term aberration of U.S. fiscal policy. At some point in the future, more responsible fiscal policy will prevail, and the older and more fundamental problems of monetary coordination will still remain.

FIGURE 1

Global Money Growth and WPI Inflation



Source: McKinnon (1984)

World monetary instability in the floating rate period

In several important papers, Ronald McKinnon (1982, 1983, 1984) has underlined the fact that the large cyclical fluctuations in the world economy since 1971 have had a crucial monetary component. Specifically, McKinnon is persuasive on the following empirical points:

1. The large swings in global activity since 1971 have all involved synchronized shifts in the money supplies of the major countries. Thus the boom of 1972-74, the deep recession of 1974-75, the boom of 1977-79, and the deep recession of 1980-82, all were characterized by large and synchronous shifts in money in the large OECD economies. To summarize these shifts, McKinnon has constructed a "world money stock" measure, which is a weighted average of money supply changes in several OECD economies. As can be seen in Figure 1, changes in the world money stock measure are a good leading indicator of changes in average OECD inflation rates. The two large inflation peaks, of 1973 and 1979, are clearly preceded by jumps in money growth, in 1971-72 and 1977-78. The monetary changes have also been ti good leading indicator of the global swings in real economic activity.

2. The two oil shocks, in 1973 and 1979, can in large part be attributed to preceding bursts of money supplies in the OECD. Partial evidence for this proposition is that almost all primary commodity prices boomed in 1973 and (to a lesser degree) in 1979. The role of OPEC, and particularly of Saudi Arabia, was not to raise prices, but to keep them high even after the money shock was reversed.

3. A major reason for the swings in money supplies in the non-U.S. OECD economies was the reaction in those countries to changes in the exchange value of the U.S. dollar. Thus, in 1971-72, countries intervened in huge amounts to keep the dollar from depreciating, with the result that huge increases in foreign exchange reserves and in national money stocks were recorded. This happened again in 1977-78, when the dollar was again depreciating under the Blumenthal policy of "talking the dollar down." Then, in 1980-81, with the dollar rising, other countries intervened in support of their own currencies, and thus sharply reduced their money stocks.

4. The global implications of the swings in world money were not widely appreciated at the time that they occurred in any of the three episodes. The global booms in 1972-74 and in 1978-79 were severely underestimated by contemporary observers, while the depth of the contraction after 1980 was also not predicted. In general, the problem is that global models and country forecasters have failed to account for the interactive and multiplier effects that occur when several countries all turn their monetary policy in the same direction.

It should be noted that some economists have challenged McKinnon's

claim that "world" money has played a role additional to U.S. money in determining the U.S. inflation rate. In particular, Goldstein and Haynes (1984) have shown that in a reduced-form inflation equation for the U.S., in which U.S. inflation is explained by lagged U.S. money growth, world energy price changes, and lagged world money growth, the last variable does not reach statistical significance. That result is hardly a convincing refutation, however, since it dubiously treats all of the OPEC price increases as exogenous, rather than caused in large part by the preceding growth of world liquidity.

McKinnon's monetary analysis does not help to account for the divergent cyclical experience of the U.S. and the rest of the OECD after 1982, which has been based more on differing fiscal policies than on differences in monetary policy. Nonetheless, we shall argue that some of the factors that contributed to the excessive swings in world money also help to account for recent movements in U.S. fiscal policy.

Reducing monetary instability through managed exchange rates

Assuming that the above empirical analysis is correct, the crucial issue is how best to prevent further excessive, synchronized shifts in the world money stock, while at the same time preserving enough flexibility in monetary management to avoid unnecessary economic instability in individual countries. Much of the answer to this question depends on one's diagnosis as to why the large monetary swings occurred in the first place. McKinnon has stressed one reason, though several additional reasons must also be acknowledged. Each of these differing explanations for monetary instability suggests a different emphasis for reform of the system. (As with most complicated problems, however, probably all of the factors described below played some part in the process.) This section takes up some of these possible causes of monetary instability, and introduces some of the possible cures. The next session analyzes these policy proposals more rigorously.

Currency substitution as a factor in monetary instability

According to McKinnon, each swing in global money has resulted from an autonomous and unobserved shift in private sector portfolio preferences to or away from U.S. dollar holdings. The mechanism, according to McKinnon, is as follows. In 1971 and 1977, wealth holders in the world economy decided autonomously to move away from U.S. money, and towards the monies of other countries. In both cases the dollar tended to weaken, but the Fed ignored the exchange rate signal and failed to reduce the supply of dollars through foreign exchange intervention or open-market operations. Other countries found the demands for their national currencies

to be increasing, with consequent upward pressure on their exchange rates. These countries intervened in the exchange market, basically by selling national monies in exchange for U.S. non-money assets (such as Treasury bills or Eurodollar accounts). Thus the foreign intervention increased the supply of the foreign currencies, but did not decrease the supplies of U.S. money. The overall effect, then, was that the rise in demand for foreign currencies was accommodated, but the fall in demand for U.S. money was not accommodated (i.e. the U.S. money stock was not adequately reduced). In the end, the drop in demand for U.S. money translated directly into an excess supply of U.S. money, with resulting inflationary consequences. According to McKinnon, the same mechanism, in reverse, transpired in 1980-81, when world portfolio holders shifted into U.S. dollars. Since the Fed did not accommodate this shift, while foreign central banks did, the overall global monetary position turned into one of excess demand.

If this mechanism is accurate, then the remedy is straightforward, as McKinnon observes. Portfolio s h i i across national monies should simply be accommodated by both central banks. If demand for dollars falls at the expense of Deutsche marks, then the Fed should contract and the Bundesbank should expand. "Global" money, the average of U.S. and German money stocks, would remain unchanged, as would the dollar-DM exchange rate. One operational way to implement this package is to fix the exchange rate and fix the weighted average stock of world money.

The problem with McKinnon's explanation of the global money shifts is that in each case the shifts were less inadvertent than he portrays. In 1971-72 and 1977-78, for example, monetary policy in the U.S. was expansionary by design. Similarly, the tight monetary policy of the early Volcker era was also part of an explicit anti-inflation program. The dollar shifted in each case, not because of an autonomous portfolio adjustment, but because of the public's accurate perception that U.S. monetary policy had substantially changed. McKinnon is surely correct that the global ramifications of those changes were underestimated, but there is little doubt in each case that the Fed desired a strong movement in the direction that in fact occurred.

Insularity of U.S. monetary policy as a cause of monetary instability

The foregoing observations suggest that it has been swings in U.S. monetary policy, more than swings in private sector portfolio behavior, that stand behind the global fluctuations in money. U.S. monetary policy has long been characterized by lack of attention to international variables, including the exchange rate. Even during the gold-exchange standard of the Bretton Woods era, when concern about U.S. gold stocks should have provided a constraint on monetary actions, the influence of diminishing gold stocks on the rate of growth of money is hard to discern. One plausible reading of the

monetary mistakes in the 1970s is that U.S. inattention to world variables proved devastating precisely because monetary policies abroad paralleled and unduly amplified the swings in U.S. monetary policy. The interesting question is why the policy of "benign neglect" of international factors, that worked so well in the 1950s and 1960s suddenly proved so inadequate in the 1970s.

One answer appears to be that the U.S. fell victim to two conflicting trends in world trade and finance. Throughout the 1960s and 1970s the U.S. share of world trade and income declined, and the U.S. became more open (and vulnerable) to foreign trade. On the other hand, and a bit paradoxically, the dollar remained preeminent in international finance, perhaps even increasing its role after 1970 (see Kenen (1983) for a perspective analysis of the continued strong role of the dollar in international finance.) These conflicting trends had the following powerful results: even as the U.S. role in world commodity markets declined, the U.S. power to influence world financial conditions remained dominant. Shifts in U.S. monetary policy brought immediate echoing responses in monetary policy in Europe and Japan. Ironically, since the U.S. monetary authorities paid little attention to movements in foreign money stocks or in the exchange rate, the U.S. found itself surprised and overwhelmed by the size of the foreign monetary response. When the Fed eased in 1971-72, other OECD economies eased even more, mainly to avoid an appreciation of their currencies. As a result, the U.S. ended up importing the inflation in world commodity prices in 1973-74. Once again, in 1977-78, we were overwhelmed by the echo of our own policy change, as Europe and Japan expanded in line with the U.S. And then in 1981-82, the recession in the U.S. and the rest of the OECD was far deeper than expected, in part because of the simultaneous tightening in OECD money supplies following Volcker's shift to tight money at the end of 1979. In sum, the U.S. has constantly underestimated both the extent to which foreign monetary authorities are led to mimic U.S. policy actions, and the extent to which those parallel foreign actions are likely to amplify the effects of our own policies.

One possible response, therefore, for U.S. monetary policy would be to anticipate the policy reactions of other governments when major changes in our own monetary policy are contemplated, as well as to account for the global macroeconomic implications of simultaneous policy changes in several major economies. This increased sensitivity to the effects of our monetary policy choices on other countries would not require anything as drastic as a return to fixed exchange rates.

A second, and very different, response would be to take measure to decouple foreign monetary policies from our own, by reducing the international role of the dollar. Through such a strategy, U.S. monetary authorities could then continue to focus mainly on the U.S. economy, without having to

TABLE 1

Correlation of Money Growth Rates in the United States, Germany, and Japan

	United States	Germany	Japan
1965-76			
United States	1.0	—	—
Germany	0.3	1.0	—
Japan	0.6	0.1	1.0
1977-84			
United States	1.0	—	
Germany	0.7	1.0	—
Japan	0.1	0.6	1.0

Source: Correlation matrix of annual (year-over-year) growth rates of M1. Data are from the International Financial Statistics of the International Monetary Fund.

worry as much about the policy reactions abroad. This process of decoupling is already evident in the case of Japan. With the emergence of the yen as a *bona fide* international reserve currency, and with the failures of Japanese monetary policy during the early 1970s, monetary policy in Japan has become less and less centered on U.S. financial conditions. In Europe, on the contrary, national monetary policies are still centered squarely on financial conditions in the U.S. financial markets (and in the Eurodollar market). Table 1 gives some evidence of the relatively greater independence now exercised by Japanese monetary policy. Movements in the Japanese money supply since 1977 have been almost uncorrelated with movements in the U.S. money supply, in contrast with the close correlation between the two money supplies in the period 1965-1976. The German money stock, on the other hand, continues to show a very high correlation with the U.S. money stock.

The European Monetary System (EMS) was created, at least in part, to allow the European countries to dissociate their currencies from the dollar. While the operation of the EMS has been relatively successful in stabilizing intra-European exchange rates, and (to a lesser extent) in encouraging the harmonization of macroeconomic policies; the EMS has not yet really served to diminish the importance of the dollar for the monetary policies of the individual European economies. Most importantly, since there is' no common EMS policy for the exchange rate of the ECU vis-a-vis the dollar, the ECU dollar exchange rate is still determined implicitly by the separate actions of the leading central banks in the EMS. Moreover, the ECU has not

yet become an intervention currency or a store of value (it remains mainly a unit of account for official transactions in the EMS). An enhanced role for the ECU could go a long way in breaking the dependence of European financial policies on corresponding U.S. policies.

Beggar-thy-neighborpolicies as a source of monetary instability

The two explanations just examined of the recent fluctuations in world money supplies assume that policymakers were making conceptual mistakes in the implementationof monetary policy. The third and fourth explanations to which we now turn assume, on the other hand, that the policymakers know what they are doing, but that they operate under inappropriate incentives. It has been argued, for example, that the current system, with its absence of clear rule of the game, encourages beggar-thy-neighbor monetary policies that contribute to overly expansionary or overly contractionary policies on the global level. A growing economics literature, beginning with Hamada, and including studies by Canzoneri and Gray, Oudiz and Sachs, and others, describes this possibility.

A simple illustration of how inappropriate incentives can make monetary policy too contractionary is as follows. Consider a group of countries, linked by floating rates, that are all attempting to reduce a high level of inflation (as in the OECD during 1980-82). Policymakers in each country decide on the degree of monetary restraint to pursue in the disinflation process. If the economies were closed economies, each monetary authority would presumably consider the short-run tradeoff of inflation and unemployment in deciding how tight the monetary policy should be. In an open economy, however, there seems—from the point of view of each policymaker—to be another dimension to the problem. Each central bank knows that by having a tighter monetary policy than abroad, the domestic currency will strengthen in value, thereby reducing import prices and domestic inflation. The other countries, of course, will suffer higher inflation on the same account. From the vantage point of each individual central bank, a strong exchange rate seems to be an added anti-inflation "bonus" that comes from tight monetary policy.

Each central bank is therefore led to tighten its monetary policy in the attempt to strengthen its currency, as a way to reduce domestic inflation. However, from a global perspective, it is not possible that each currency appreciates vis-a-vis the others. The tight money policies that each central bank pursues simply cancel each other out, so that nobody's exchange rate ends up appreciating in equilibrium. No country achieves the anti-inflation benefits of lower import prices, but all of the countries suffer from exceedingly tight monetary policies.

When put in the language of game theory, we see that the temptation to

appreciate the exchange rate in order to fight inflation is just like the temptation to confess in the classic prisoners' dilemma. In the prisoners' dilemma, each prisoner is induced to confess to a crime even though both prisoners would be better off by both refusing to confess. In the case of anti-inflation policy, each country can be led to pursue an excessively tight monetary policy even though both countries would be better off if the policies were not so tight.

TABLE 2

Monetary Policy and Social Loss

		Country 2: Loose Money	Country 2: Tight Money
Country 1	Loose Money	$C_1 = 11$ $C_2 = 11$	$C_1 = 14$ $C_2 = 6$
	Tight Money	$C_1 = 6$ $C_2 = 14$	$C_1 = 12$ $C_2 = 12$

Explanation: See text. C_1 is loss for Country 1; C_2 is loss for Country 2.

A simple numerical illustration of this problem is shown in Table 2. Suppose that each country has two options: tight money or loose money. If both pursue tight money, they deliver a deep recession, with unemployment equal to ten percent, and low inflation, with price increases of two percent. If both pursue loose money, there is no recession, so that unemployment remains at five percent, but inflation remains high at six percent. If one country pursues tight money while the other pursues loose money, the loose-money country has a sharp currency depreciation, and thereby suffers a large jump in inflation, while the tight-money country enjoys the anti-inflation benefits of a currency appreciation. Suppose that the loose-money country ends up with ten percent inflation and four percent unemployment, while the tight-money country ends up with zero inflation, and six percent unemployment. Finally, suppose that the "loss" function of each country's policymaker is the Okun Misery Index, equal to the sum of unemployment and inflation. Under these assumptions, the social losses if both pursue tight money are 12 in each country (= 10 + 2); the social losses if both pursue loose money are 11 (= 5 + 6); the social loss from loose money if the other

pursues tight money is 14 (= 4 + 10); and the social loss from tight money if the other pursues loose money is 6 (= 6 + 0). These payoffs are shown in the matrix in Table 2.

Consider, now, the strategic interactions of the two central banks. Suppose first that the central banks can observe each others' actions, but that they do not directly coordinate their policies. From the point of view of the home-country, it is always better (in terms of minimizing the social losses) to pursue tight money, no matter what the other central bank does. If the other central bank also pursues a tight-money policy, then the loss from a tight money policy at home is 12, while the loss from a loose-money policy would be 14. Similarly, if the other country pursues a loose-money policy, then the loss from a tight-money policy at home is six, while the loss from a loose-money policy would be 11. For this reason, both central banks are led to pursue a tight-money policy, and both countries end up with a loss of 12.

It is easy to see that the combination of tight policies is inefficient. If both countries simply loosened up their monetary policy, they would each end up with smaller losses of 11. But in the absence of policy coordination, or adequate rules of the game, each country is induced to be overly restrictive in its monetary policy. How could better rules of the game help here? Suppose that the countries were linked by a fixed exchange rate, with a common monetary policy being set by agreement. Then it would be easy for both countries to assent to the loose-monetary policy, because each country would be confident that its currency would not depreciate relative to its partner's.

The prisoners' dilemma problem is rife in monetary and fiscal management in the global economy. Almost whenever large countries interact with each other in a non-cooperative way, the resulting equilibrium is likely to be "inefficient," in the sense that all countries could potentially be made better off by increased policy coordination (a theorem to the effect is demonstrated in Oudiz and Sachs, 1984, pp. 26-29.) However, it is one thing to establish the general principal that policy coordination or improved rules of the game are desirable, and quite another to identify the specific areas where gains can be achieved.

In earlier studies I have noted two particular ways in which non-cooperative policymaking is likely to be inefficient. One possibility has just been noted: in a floating rate regime, countries attempting disinflation will pursue overly contractionary monetary policy, as each country attempts to maintain a strong currency. Second, and for similar reasons, the policy mix in each country will be biased towards fiscal expansion cum monetary contraction. For any given output target, the policy authorities will attempt to hit the output level with a policy mix that keeps the exchange rate strong, so as not to import inflation from a currency depreciation. Since a tight money, loose-fiscal policy will keep a currency stronger than would the reverse mix, each

country will tilt towards monetary contraction and fiscal expansion. In the aggregate, of course, not all countries will be able to keep their currencies strong relative to the others, so the mutual attempt will largely cancel out, but all of the countries will be left with large budget deficits. The global equilibrium will be characterized by excessive budget deficits, excessively tight money, and excessively high world interest rates.

In Sachs (1985), I have quantified the gains, from the U.S. point of view alone, of disinflating in recent years through a combination of tight money and expansionary fiscal policy. If the U.S. had maintained the same path of unemployment as during 1981-84, but had done so through more expansion-*ary* monetary policy combined with tighter fiscal policy, the result would have been higher inflation in 1984. For example, if the policy mix had been such as to keep the dollar exchange rate constant after 1980 (instead of appreciating by more than 40 percent), inflation in 1984 would have been between two and three percentage points higher in 1984. Each OECD country has faced a similar tradeoff in its policy mix, and so each country has been induced for this reason to tilt in the direction of fiscal expansion and monetary contraction. Of course other factors also affect each country's decision over the extent of fiscal expansion (and indeed fiscal policy has been fairly tight in Japan and Germany in the recent past). Generally speaking, the exchange rate non-system has probably contributed to the global pattern of large fiscal deficits, tight money, and high world interest rates.

In another paper, Warwick McKibbin and I attempted to measure the size of this bias towards fiscal expansion cum monetary contraction. Our methodology was as follows. A dynamic simulation model of the global economy is specified, and the OECD region is divided into the U.S. and ROECD (rest of OECD). The dollar-ROECD exchange rate fluctuates freely in the model, subject to the assumption that the exchange market is efficient (i.e. that the market is competitive, and that all market participants have rational expectations). Policymakers in the U.S. and the ROECD deploy monetary and fiscal policy instruments to minimize an intertemporal loss function. Basically, the policymakers in each region aim for four targets: full employment, zero inflation, current account balance, and domestic budget balance. The policy instruments are tax policy and open market operations.

We assume that both countries inherit an inflation rate of ten percentage points per year, due to past shocks or policy mistakes. The policymakers then attempt to bring that inflation rate down to zero at minimum social cost (as measured by the loss function). Under "non-cooperative" policymaking, policymakers in the U.S. and the ROECD are assumed to choose policy rules that have the following "equilibrium" property: the selected rules are optimal for the given region (i.e. the rule minimizes the loss function), taking as given the rules that the other region is following. The equilibrium is non-cooperative in that each side chooses its macroeconomic strategy sepa-

rately, taking as given the strategy that the other region is pursuing. This leads to a set of rules with the property that I have already described. Each region finds it optimal to fight inflation with over-tight monetary policy, and over-loose fiscal policy.

In the "cooperative" equilibrium, some global rules of behavior are established for monetary and fiscal policy in the two OECD regions. These cooperative rules are selected in order to minimize a weighted average of the social losses of the U.S. and the ROECD. By construction, the cooperative rules of the game take into account the basic fact that it is futile for each country to try to appreciate its currency vis-a-vis the other. Therefore, both regions are led to fight inflation in a more balanced way, with monetary and fiscal policies pointing in the same direction. Naturally, the cooperative equilibrium yields world interest rates that are much lower than in the non-cooperative case.

The model is calibrated to yield magnitudes roughly in line with the actual economies of the OECD. The path of U.S. nominal short-term interest rates under the two types of disinflation are shown below:

Year of Disinflation Policy	**1**	2	**3**	4
Non-cooperative Policies	**21.1**	**16.7**	14.5	**12.7**
Cooperative Policies	**15.4**	**13.6**	**11.9**	**10.6**

In both types of equilibria, the process of disinflation requires a period of high nominal interest rates, until the momentum of inflation is eliminated. But in the non-cooperative equilibrium, the interest rates are much higher, for much longer. This is because the non-cooperative case is characterized by high fiscal deficits in the U.S. and the ROECD, while under optimal cooperative rules of the game, fiscal deficits stay near zero in both countries.

Who are the big losers from the failure to cooperate in the disinflation process? First, the U.S. and the ROECD suffer by choosing to implement over-expansionary fiscal policies. These countries are caught in the prisoners' dilemma. But "third parties" are also victims of the absence of adequate rules of the game. In this case, the LDC debtor countries turn out to be big victims, since they are forced to pay extraordinarily high interest rates on their outstanding debts. We calculated that the LDC savings on interest charges that would result from a move to cooperative policies would be several billion dollars per year.

Political incentives and monetary instability

A fourth explanation of the failures of monetary policy stresses the incentives that face politicians when implementing monetary policy. The phases of over-expansionary monetary policy are blamed, at least in part, on the shortcomings of the political system. Two separate types of political shortcomings have been noted. The first is the so-called time consistency problem, which argues that policymakers are unable to persevere with sensible economic policies because the incentives to persevere change adversely over time. A great burst of monetary expansion, following pronouncements of stable and tight monetary policy, is seen to be the result of this problem. The second is the political business cycle, in which policymakers manipulate the economy for short-run political gain, but at a longer-term economic cost. In both cases, some analysts have seen international rules of the game as a way to restrict the "anti-social" tendencies of domestic politicians. However, many other economists fear that international policy coordination would merely elevate to the global level the shortcomings that are now apparent at the domestic level.

An influential view of the politics of inflation, set forth by Barro and Gordon (1983), holds that the timing of policy decisions imparts an inflationary bias to the economy. Consider the following illustration. Wage setters are assumed to set next year's nominal wage in contracts negotiated at the end of the current year. After the wage is set, it is assumed to be fixed throughout the following year, until the next wage round. The current nominal wage is set in order to guarantee an expected real wage the next year. Thus, the wage is set in constant proportion to the expected price level of the next period. Next year's price in turn depends on next year's monetary policy. Thus, the monetary authority has an incentive to announce that next year's monetary policy will be very restrictive, in order to convince workers that the price level will be low, so that the workers will agree to small nominal wage increases.

The time consistency problem arises because once the wage is fixed by contract, the monetary authority no longer has a strong incentive to pursue the tight monetary policy that it promised. In fact, with a fixed nominal wage, it may have a strong incentive to expand the money supply, to try to get a good short-run expansion of the economy. After a while, wage setters will catch on to the monetary authority's game, and will no longer credit policy pronouncements of tight future monetary policy, knowing that the policymaker has an ex-post incentive to renege on its promise. Wage contracts will be based on high expected inflation, since wage setters will recognize the monetary authority's incentive to inflate the economy after each wage contract is determined. This basic argument has been used as a justification for establishing firm rules for monetary policy, as opposed to relying on the

discretion of the monetary authority.

The argument has then been extended to the international arena, by arguing that international rules of the game will be easier to enforce than national rules. An international gold standard, for example, would completely eliminate national discretion from domestic authorities, and so would eliminate the inflationary bias in domestic economy. Theoretical arguments along these lines may be found in Horn and Persson (1984), though the argument that fixed exchange rate arrangements impose discipline on domestic authorities has a long and venerable tradition.

Skeptics of this line of reasoning argue that international rules are unlikely to restrain domestic policymakers, or even worse, that new international arrangements could actually weaken, rather than strengthen, domestic political will. In his classic defense of flexible exchange rates, Friedman (1953) expressed doubt that the stern rules of a fixed exchange rate system such as the classical gold standard could once again be re-established.

> Governments of "advanced" countries are no longer willing to submit to the harsh discipline of the gold standard or any other standard involving rigid exchange rates. They will evade its discipline by direct controls over trade if that will suffice and will change exchange rates before they will surrender control over domestic monetary policy. Perhaps a few modem inflations will establish a climate in which such behavior does not qualify as "advanced"; in the meantime we had best recognize the necessity of allowing exchange rates to adjust to internal policies rather than the reverse (p. 180).

Perhaps the "few modern inflations" have in fact now established the correct climate for fixed rates. In any event, the assumption that strong international rules would actually be observed remains debatable.

Other authors have argued that fixed rates and greater international cooperation could actually make matters worse with respect to the inflationary bias. This argument, made by Vaubel (1983), and formalized independently in an ingenious paper by Rogoff (1983), runs something like this. Under the current non-system of floating rates, a monetary authority that chooses to expand the money supply faces the inflationary consequences of a currency depreciation. The fear of depreciation weighs against unilateral monetary expansion, and thus helps to mitigate the inflationary bias arising from the time consistency problem. If a group of countries decided instead to coordinate their monetary policies, they might well be emboldened to undertake a joint expansion, because the common action would eliminate the fear that any particular currency would depreciate relative to the others. Thus, the joint action of the various central banks might be to approve a monetary expansion that each individually would be unwilling to undertake. Put sim-

ply, the problem of time consistency imparts an inflationary bias to each country, while the fear of currency depreciation helps keep that bias in check. One result of enhanced policy coordination might be an elimination of the fear of a unilateral depreciation, rather than a reduction in the inflationary bias. For this reason, Vaubel and others have argued that "currency competition" rather than "currency cooperation" is the best check against over-inflationary politicians.

The Vaubel and Rogoff point of view can be related to our discussion of the prisoners' dilemma. Referring back to Table 2, remember that the fear of depreciation imparted a deflationary bias to the system (both countries choose to have tight money, even though both would be better off with a common policy of loose money.) According to Vaubel and Rogoff, that kind of deflationary bias is exactly what is needed in the world economy in order to offset the inflationary bias that comes from the time consistency problem.

The political business cycle arguments are closely related to the time consistency arguments. To the extent that politicians manipulate the economy for electoral purposes, international rules of behavior could help to keep such proclivities in check. However, to the extent that the resulting global rules can be manipulated jointly by all of the politicians of the monetary area, the problem of the political business cycle might be exacerbated rather than diminished. (However, at least one point is relevant here in favor of international rules, and that is that national elections in the major industrial countries are staggered, so that global manipulation for electoral purposes becomes more difficult if not impossible.)

Designing new rules for exchange rate management

Any reforms of the international monetary system must confront the sources of monetary instability that we have just outlined. An improved system should enhance predictability, by allowing the policy authorities in each country to have a better understanding of the likely policy reactions in other countries. Next, the system should recognize the possibilities for beggar-thy-neighbor behavior, and therefore try to establish clear rules for "good citizenship" in monetary and fiscal management. Third, the system should be designed to be operated by real, live politicians, who will have incentives to try to bend the rules for short-run political purposes. Fourth, the system should also help to accomodate the major exogenous (non-policy) shocks that the system is likely to experience, whether they are of the portfolio-switching sort emphasized by McKinnon, or of other sorts, as introduced below.

It is a truism of policy analysis that rules which seem appropriate for certain types of shocks to the economic system are less well suited to other

types of shocks. McKinnon's proposal for a fixed exchange rate and a fixed growth of a global money aggregate, is ideal for the portfolio shift disturbances that McKinnon stresses, but is less appropriate if the dominant disturbances are shifts in demand for goods between countries. (The linking of alternative systems to alternative types of shocks goes back to the optimal currency area debate, to which McKinnon (1963) was a pioneering contributor.)

A few general points can be made about the relationship of rules and exogenous shocks. Fixed exchange rates typically allow financial shocks in one country to be "dissipated" widely in the world financial system. Thus, a rise in money demand in one economy, that is not otherwise accommodated, causes all other countries to supply a small amount of the increased money demand to the country in question. All of the countries in the fixed exchange rate union therefore experience a small amount of monetary contraction, and probably a small decline in GNP. The same type of shock under flexible rates has very different implications: the country whose money demand increases experiences a large contraction (if the money demand shock is unaccommodated), while the others experience little change. If the financial shocks across countries are negatively correlated, as in the McKinnon example, fixed exchange rates are even better. Financial shocks across countries then basically cancel each other out, without causing fluctuations in the real economy. On the other hand, flexible rates are generally better at dissipating shifts in demand in the goods markets. A rise in demand for U.S. goods at the expense of European goods will be satisfied by an appreciation of the dollar, without significant fluctuations in employment. Under fixed rates, however, such a shift will cause a boom in the U.S. and a recession in Europe.

Most discussions of fixed versus flexible rates stop at this point; their goal is to check how alternative currency arrangements handle particular exogenous shocks. We have seen however that another major source of disturbances may be the policymakers themselves. While fixed rates help to distribute any country's exogenous financial shocks throughout the world economy, fixed rates also distribute any mistakes in monetary management throughout the world. Under floating rates, if one country is too expansionary it suffers inflation. If, on the other hand, monetary policy is too inflationary under fixed rates, all countries suffer inflation. It should be remembered, for example, that the burst of liquidity in 1971-72 occurred under the fixed exchange rate rules of the Smithsonian Agreement of December 1971. All countries paid for that mistake in monetary management. Similarly, the Great Depression occurred under the rules of the (collapsing) gold standard; the insufficient supply of gold in the world economy in the 1920s and 1930s was transmitted in the form of deep economic contraction to all countries.

Thus, the recommendation of fixed exchange rates makes sense only if

one is confident that exogenous financial shocks will be more important than policy mistakes as sources of instability in the world economy. Fixed rates provide diversification for exogenous shocks, but provide the opposite with respect to policy mistakes.

I now turn to a formal analysis of how exogenous shocks and exchange rate rules are likely to interact. The basic idea is as follows. A large-scale, five-region model of the world economy is used to compare the operating properties of several alternative rules. The model is a dynamic model of trade and financial interactions among the U.S., Japan, the rest of the OECD (ROECD), OPEC, and the non-oil LDCs. A complete description of the model can be found in Sachs and McKibbin (1984), with further applications in Sachs (1985) and Ishii, McKibbin, and Sachs (1985). The U.S., Japan, and the ROECD economies are managed by monetary and fiscal policies in each of the three regions. The model allows for capital mobility among all five regions, and a floating exchange rate among the three OECD areas. The model has two properties that make it particularly appealing for policy analysis. First, all relevant stock-flow relations are observed in the model. That is, budget deficits cumulate into public debt, and current account deficits cumulate into net foreign external debt. Governments and countries are thereby bound by intertemporal budget constraints. Government deficits today must be serviced by increased taxes or reduced expenditures in the future. Second, the asset markets, and particularly the exchange market is governed by rational expectations among wealth holders. When policy rules change, private sector agents understand that the dynamic behavior of the exchange rate will change accordingly..

Using this framework, we inspect the operating properties of four rules. These rules are, respectively: (1) a pure float, with no changes in domestic money supplies or in fiscal policy, in reaction to shocks in the system; (2) the McKinnon rules, in which the exchange rates among the U.S., Japan, and the ROECD are fixed in expected value (the exchange rate will be allowed to change within each period because of unexpected shocks that occur after the policy instruments are set for the period), with the weighted average of the money stocks in the three regions also fixed; (3) a system of nominal GDP targeting within each country, with the exchange rate among the countries allowed to float freely; and (4) a modified McKinnon plan, in which the exchange rates are fixed in expected value, but in which the weighted average of the world money stocks is allowed to change in order to stabilize a measure of world nominal GDP. This last policy choice is like a rule for global GDP targeting.

The specific methodology for comparing the properties of these alternative rules is described briefly in the Appendix, and is described in full technical detail in McKibbin and Sachs (1986). Here I will merely describe the main idea behind the procedure. Once a rule is selected, the dynamic prop-

erties of the world economy can be described compactly by a set of first-order stochastic difference equations, of the form:

$$(1)\ X_{t+1} = AX_t + DS_t$$

The X vector here is the vector of state variables of the system, i.e., the vector of variables whose current levels are determined by the past historical evolution of the economy. Variables contained in the X vector include: the levels of public debt in each of the economies, the price levels in the economies, the levels of foreign indebtedness, etc. In total, the X vector has 37 elements. The vector S is a set of random shocks that *are* assumed to buffet the world economy. These shocks are assumed to hit several different parts of the global economy. In particular, we allow for random disturbances in the money demand equations of each OECD region (i.e., velocity can rise or fall for purely random reasons), in the price levels in each country (these shocks can be considered as country-specific supply shocks or wage shocks), in the world price of oil, and in the level of aggregate demand in each country (such shocks *are* akin to investment shifts due to "animal spirits".)

Using numerical techniques described in the Appendix and in the technical paper, it is possible to transform Equation (1) in order to calculate the steady-state variances and covariances of the variables in the X vector. In other words, for a given policy rule, it is possible to know how much the price level in each country will fluctuate, on average, over time. This is very valuable information, since another equation exists which links the macroeconomic targets to the values of the state variables and the values of the random shocks:

$$(2)\ T^i_t = KX_t + MS_t$$

In this equation, T^i is the vector of the target variables (inflation, GDP gap, current account, budget deficit) in country i (i = U.S., Japan, or ROECD.) Once the variances of the X's are known, it is possible to use Equation (2) to calculate the variances of the target variables. But such variances are exactly what we would like to know about each rule: does the rule help to stabilize output, inflation, etc., or does it contribute to increased instability? For a given loss function that is a quadratic function of the targets, it is possible to measure the steady-state welfare that each rule delivers for each country, since the steady-state welfare depends only on the variances of the target variables.

Certain key aspects of the simulation exercise and of the rules must be explained in more detail. In the model in Equation (1), the stochastic shocks

are assumed to occur each period only *after* the rules of monetary and fiscal policy are set. In the cases studied here, therefore, the control rules for country i take the form

$$(3)\ U^i_t = \Gamma X_t$$

where U^i is a vector of the policy instruments (usually monetary and fiscal policy) of each country. The key point of Equation (3) is that the policy instruments at time t are not functions of the random shocks at time t. For the McKinnon rule, for example, monetary policies are set so that the bilateral exchange rate in fact varies within the period since money stocks are not readjusted within the period. All market participants, however, hold the rational expectation that the exchange rate will revert to its normal level in the next period. Because of these expectations, actual deviations of the current exchange rate from the target level will tend to be small. In sum, our version of the McKinnon rule is really a "target zone" system rather than a strict fixed exchange rate system.

Consider how the different rules perform with and without exogenous shocks. In the McKinnon plan, the exchange rate is perfectly fixed if no shocks occur, while as just explained, actual exchange rates fluctuate in response to the exogenous disturbances. In the modified McKinnon plan, the exchange rates and global nominal GDP are fixed each period, as long as no exogenous shocks occur. Finally, in national GDP targeting, each country's nominal GDP is fixed in expectation each period, while the exchange rates are allowed to change. Actual GDP's fluctuate, of course, because of the exogenous disturbances.

It is worth spending a moment on the difference of the McKinnon plan, in which the global money stock is fixed, and the modified McKinnon plan, in which the global money stock is allowed to vary in order to fix the expected value of global nominal GDP. The operational differences of the two rules can best be understood with respect to particular shocks.

Suppose a pure velocity shock occurs in the U.S., which reduces the demand for U.S. money for several periods. In the McKinnon plan, the world stock of money would remain constant, but the U.S. money stock would decline while the money supplies in the rest of the OECD would increase. On balance, an excess supply of money, at initial interest rates and prices, will develop in the world economy. The result will be an increase in output and eventually in prices. Under the nominal GDP targeting plan, however, the fall in U.S. money demand will be fully compensated by a fall in the U.S. money supply after one period. There will be no need for a sustained period of higher output or prices. The key distinction is that the GDP targeting rule does not require that the global money stock remain fixed.

The relative performance of these arrangements depends crucially on the

relative importance of the random shocks buffeting the economic system. An exhaustive analysis of the different rules would require a detailed analysis of a large array of random shocks. We have indeed experimented with several types of shocks, but for brevity and simplicity here, I will report the implications of only a few of these disturbances. Specifically, the following table shows the effects of six types of shocks: random shifts in national prices levels (with one shock each in the price equations of the U.S., Japan, and the ROECD), and random shifts in the money demand equations of the three regions. All six types of disturbances *are* assumed to be independent across countries, and independent over time. However, even though the shock to prices is serially uncorrelated, in effect the'shock is persistent because the model builds in the assumption that price shocks enter a wage-price spiral of the standard Phillips curve variety. Similarly, money demand shocks have persistent effects since money demand is specified with a lagged adjustment process, so that money demand in period $t+1$ is a function of the level of real money balances in period t.

Using the numerical and analytical techniques described in the Appendix, it is possible to calculate the standard deviations of key target variables (e.g., output gap, inflation, etc.) as a function of the standard deviations of the underlying shocks and the policy rules that are being pursued. In this way, it can be asked which rules *are* best for stabilizing which types of disturbances to the global economic system. The results of such calculations are shown in Table 3. The table is read as follows. For each type of shock across the top line of the table, we can ask how a one percent standard deviation of the shock affects the steady-state standard deviations of the key variables listed down the side of the table. The standard deviations depend on the particular rule being followed, as shown in the table. For example, a one percent standard deviation in the shock to the U.S. price level causes a a 6.6 percent standard deviation in U.S. real output if the McKinnon rule is being followed; a 3.1 percent standard deviation in real output if the nominal GDP targeting is employed; etc. The standard deviations resulting from the other disturbances may also be read off of the table.

The results of the table show that for domestic price shocks, floating rates (pure float or nominal income targeting) are superior to global, fixed exchange rate rules (McKinnon, global nominal income targeting.) Thus, for example, a one percent standard deviation shock to U.S. prices induces a steady-state standard deviation in U.S. output of 6.6 percent under the McKinnon rule, but only 3.1 percent under national GDP targeting. Among the global rules, the world nominal GDP targeting is superior to the McKinnon rule in this model. The reason is as follows. An output price shock starts a damped wage-price spiral in the model. Under the McKinnon rule, U.S. output falls for several periods after a U.S. price shock, while the U.S. price level rises for several periods. Eventually, the prolonged U.S. recession

TABLE 3

Variance of Targets Under Alternative Rules

Target/Rule	Source of Shock: U.S. Price	ROECD Price	Japan Price	U.S. Money Demand	ROECD Money Demand	Japan Money Demand
U.S. Output						
McKinnon	6.641	2.330	6.359	1.761	0.363	0.571
Global Nominal GDP	3.342	0.815	0.569	1.71	0.268	0.195
Nominal GDP (country by country)	3.078	0.752	0.31	1.685	0.534	0.0
Flexible	2.723	0.664	0.223	1.628	0.292	0.071
U.S. Inflation						
McKinnon	3.558	1.021	3.912	0.672	0.122	0.392
Global Nominal GDP	1.537	0.308	0.219	0.559	0.141	0.063
Nominal GDP (country by country)	1.323	0.385	0.128	0.531	0.118	0.032
Flexible	1.229	0.417	0.161	0.505	0.114	0.032
U.S. Current Account						
McKinnon	1.101	0.586	1.157	0.225	0.077	0.077
Global Nominal GDP	0.526	0.138	0.063	0.192	0.063	0.0
Nominal GDP (country by country)	0.462	0.141	0.055	0.179	0.077	0.0
Flexible	0.377	0.148	0.063	0.161	0.071	0.0

starts to decrease the U.S. price level, and given the dynamics of the model, the price level eventually falls to the point where a U.S. output boom begins. In fact, the overall world economy actually follows a damped oscillation between boom and bust for several years. With the McKinnon rule, the global money stock is not allowed to adjust to stabilize these fluctuations, while under the global nominal GDP targeting, the global money supply is adjusted for this exact purpose. Put simply, given the tendency of the underlying real economy to cycle, it is important that rules contain an "error-correction mechanism" to dampen the inherent fluctuations that result from exogenous shocks.

The fixed exchange rate system appear to be about equivalent to the floating rate systems with respect to money shocks. Here, however, we may have stacked the deck a bit against the fixed-rate systems. The standard

deviations are all based on the assumption that the six types of shocks are statistically independent. McKinnon, of course, has argued (with little direct evidence) that the exogenous shocks in the money equations tend to be negatively correlated. I suspect that with negative correlations in the disturbances, the fixed rate rules would look even better, since under the fixed rate system, negatively correlated money shocks would tend to cancel themselves out, while this is not necessarily the case under floating rates. In a subsequent analysis, McKinnon and I plan to extend the analysis to alternative covariance relationships for the disturbances.

Some key limitations of this analysis should be kept in mind. The computer simulation assumes that the private portfolio holders understand the rules being pursued by monetary authorities, and perhaps more importantly, that the monetary authorities understand the rules being pursued by their counterparts in other countries. Clearly, these are assumptions to be taken with some skepticism! Moreover, the specific rules (e.g., to fix the expected value of nominal GDP) are often complex and might be difficult to implement. Also, the computer simulation cannot adequately treat the issues of the political business cycle and the time consistency issue, so that the exercise does not really answer the question of whether fixed rates would help to provide political discipline against inflationary politicians. Finally, I have made no formal attempt *to* answer the question as to which of the various possible shocks are the ones that a new system should regard as most empirically relevant. The exercise shows only that certain rules are better in some contexts than others, but not which contexts are most likely to be faced.

Conclusions and future analysis

This paper has taken up the classic issue of the appropriate design of the world monetary system. Dissatisfaction with the experience under floating in the past dozen years has led many observers to advocate a return to more managed rates. As we have noted, the arguments for new "rules of the game" are many and varied. Some analysts argue that key random shocks to the world economy would be better handled by an automatic fixed rate system; others.argue that the U.S. monetary policy has been inappropriate for floating rates; many analysts have suggested that rules of the game are necessary to forestall beggar-thy-neighbor attempts at exchange rate manipulation; and still others suggest that rules of the game can help restrain the inflationary proclivities of domestic politicians.

In any event, any concrete proposals for monetary reform must be tested for "robustness" to the variety of shocks that may hit the world economy. Rules which are good for financial shocks might not be particularly salutary for real shocks of various sorts. With this problem in mind; the second part of the paper introduces the result of a large-scale simulation exercise in

which alternative rules are put through the paces. Not surprisingly, it turns out that fixed exchange rate rules are not very adept at handling domestic price shocks; the comparative advantage of such fixed-rate rules is clearly for monetary disturbances of the sort emphasized by McKinnon. In the absence of a satisfactory demonstration that domestic price shocks are unimportant, or that they would go away in a stable fixed-rate system, the results must give pause to those advocating a return to fixed exchange rates. The next round of analysis should focus on realistic national rules in the context of a continued managed float.

Appendix

The McKibbin-Sachs global (MSG) simulation model of the world economy was developed in Sachs and McKibbin (1985). The reader is also referred to recent papers by Ishii, McKibbin and Sachs (1985) and Sachs (1985) for several applications. In the MSG model, the world economy is modelled as five regions consisting of the U.S., Japan; the rest of the OECD (hereafter ROECD), OPEC and the developing countries. Each region is linked via flows of goods and assets. Stock-flow relationships and intertemporal budget constraints are carefully observed. Budget deficits cumulate into a stock of government debt which must eventually be financed, while current account deficits cumulate into a stock of foreign debt. Asset markets are forward looking so the exchange rate and long-term interest rate are conditioned by the entire future path of policy.

There are equations for the internal macroeconomic structure of the three industrialized regions of the U.S., ROECD, and Japan although the OPEC and developing country regions have only their foreign trade and financial structures incorporated. Each region produces a good which is an imperfect substitute in the consumption basket of each other region, where the consumption of each good depends on income and relative prices. Private absorption depends on wealth, disposable income and long and short interest rates along conventional lines. Wages are predetermined in each period where the nominal wage change is a function of consumer price inflation, the output gap and the change in the output gap. With the assumption that the GDP deflator is a fixed markup over wages, we derive a standard Phillips curve. All asset stocks are defined in real terms. Residents in different countries hold their own countries assets as well as foreign assets (except foreign money) based on the relative expected rates of return. Money demand is determined by transactions demand.

The model is parameterized using actual 1983 trade shares and assets

stocks. Behavioral parameters are chosen to be equal to what we consider as an average of the values found in the empirical literature.

The non-linear and linear versions of the model are simulated using numerical techniques which take into account the forward looking variables in the model. The linearized version of the model is amenable to policy optimization exercises and has been used to consider the gains to policy coordination using dynamic game theory techniques [see Sachs and McKibbin (1985)].

In this paper I have examined the stochastic steady state properties of various rules using techniques derived in McKibbin and Sachs (1986, forthcoming). The procedures are quite complex, however, so that this section will give only a simplified description of the key steps.

We incorporate stochastic shocks to demand, prices, velocity of money, and portfolio preferences in the U.S., Japan, and ROECD as well as to OPEC prices. We assume that policy is set before the shock is observed in each period. This enables us to appeal to certainty equivalence in some of the derivations below. The system can be summarized conveniently as follows:

$$\text{(A1)}\ X(t+1) = A\,X(t) + B\,U(t) + C\,e(t) + D\,S(t)$$

$$\text{(A2)}\ e(t+1) = E\,X(t) + F\,U(t) + G\,e(t) + J\,S(t)$$

$$\text{(A3)}\ T(t) = K\,X(t) + L\,U(t) + M\,e(t) + N\,S(t)$$

where X is the vector of state variables, U is a vector of policy instruments (or control variables), e is the vector of forward looking variables (or jumping variables), S is the vector of shocks and T is the vector of target variables.

Using dynamic programming we can solve equations A1 and A2 backwards (required because of the forward looking variables in the' model) for a rule for setting the control variables as a function of the state variables in the model and a rule which links the forward looking variables jumping variables to the state variables. In the case where a rule is given for control variable we only need to solve backwards for the jumping variable rule. The rules are in the form:

$$\text{(A4)}\ U(t) = \Gamma\,X(t)$$

$$\text{(A5)}\ E_t\,[e(t+1)] = H\,X(t+1)$$

With the rule for control variables (A4) and for jumping variables (A5),

we have a system of equations which link the state variables to their previous values and to the stochastic shocks. Using Equations (A4) and (A5) in Equation (A1), we can then find the variance/covariance matrix for the state variables as a function of the variance/covariance matrix of the shocks. Given that we also have a relation between the target variables and the states we can derive the variance/covariance matrix for the targets.

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Commentary on "Is There a Case for More Managed Exchange Rates?"

Ronald I. McKinnon

I am very sympathetic to Jeffrey Sachs' general analysis of instability under the world dollar standard since exchange rates began to float in the early 1970s. His description of worldwide inflation in the 1970s being associated with dollar depreciation and excess money growth abroad—and deflation in the 1980s from dollar appreciation and monetary contraction in other industrial countries—is dear to my heart. (Although as we shall see, this world view is not incorporated in Sachs' specific econometric work in previous papers.)

That said, I must confess to being overwhelmed by the ambitious simulation model in the second half of Sachs' paper—which seems to bear little or no relationship to the nice historical analysis of the international business cycle in the first part. The historical analysis makes empirical judgments about what is important and focuses on key monetary relationships in the world as we know it. Whereas the simulation model is eclectic, complicated, and one in which "disturbances" can come from any direction with no attempt to assess their likelihood or empirical relevance.

Sachs has four possible rules describing monetary policy where governments may target exchange rates, money growth, and nominal GDP either jointly or separately. He then throws in both "real" and financial disturbances and calculates the hypothetical reaction of the economy under each of his rules. I can't easily interpret how economically meaningful the results are.

To impose a rule that the central bank stabilize growth in nominal GDP is not meaningful because the underlying technical problem of how to do it is not yet resolved. There are long lags between financial actions taken today and their effect on goods markets and GDP a year or two hence. Stabilizing growth in nominal GDP could be a (long run) goal of monetary policy — leaving open the question of which short-term rules are appropriate for getting there.

In contrast, operating rules based on stabilizing the nominal exchange

rate or growth in the nominal money supply are economically meaningful. Information on the exchange rate is immediately available, and money supply statistics are known within a month or two. The central bank can intervene in financial markets — for domestic bonds or foreign exchange — to adjust the monetary base and influence the exchange rate or money stock relatively quickly and predictably.

However, what the central bank's goals are, and which operating procedures it should follow to achieve them, should be more sharply focused. As Milton Friedman has taught us (1968), the monetary authority can't have sustained influence over real variables such as GDP growth, the trade balance, or unemployment.

Instead, suppose that the *only* goal of monetary policy is to stabilize the purchasing power of the national money over the long run, while avoiding short-run cycles of inflation or deflation. How much weight, if any, should the Federal Reserve give to the nominal dollar exchange rate — measured against the currencies of other industrial countries — as a leading indicator of future price inflation within the United States?

Limitations of previous econometric work

The basic econometric model of the Federal Reserve Board (Hooper and Lowery, 1979) measures only the direct effects of changes in the dollar exchange rate on the U.S. prices of imports and American-made import-competing goods. Jeffrey Sachs in an earlier paper (1985) and Robert Solomon in his contribution to this conference used this model as the starting point for calculating the impact of the appreciating dollar on the U.S. Consumer Price Index from 1981 to 1984. Table 5 of Solomon's paper shows the impact to be relatively modest: by 1984, inflation had only slowed 1.2 percentage points from the huge dollar appreciation that began in early 1981.

In a modified version, Sachs (1985) adds backward-looking wage adjustment which, somewhat implausibly for our era of rational forward-looking expectations, quickly incorporates any slowdown in domestic price inflation into dollar wage claims. The proportion of U.S. disinflation "explained" by the exchange rate then rises considerably. Skeptical of Sachs' work, Solomon sums up rather cautiously by giving a huge confidence interval: "The rise of the dollar probably accounted for more than one-sixth and less than *one half* of the diminution of inflation from 1980 to 1984". Not much help there for the Federal Reserve's struggling money managers!

However, I submit that the dollar exchange rate-both as an instrument that acts on U.S. prices, and as an indicator of shifts in inflationary expectations — influences the U.S. price level much more strongly than either the Hooper-Lowery model, or the Sachs and Solomon modifications of it, would suggest.

In common with most writers on the subject, these authors ignore the key role of the dollar exchange rate in generating the U.S. and international business cycle. For purposes of calculating the determinants of U.S. price inflation, they treat both the rate of price inflation in the rest of the world, and the level of unemployment in the United States, as if they were independent of what was going on in the foreign exchanges.

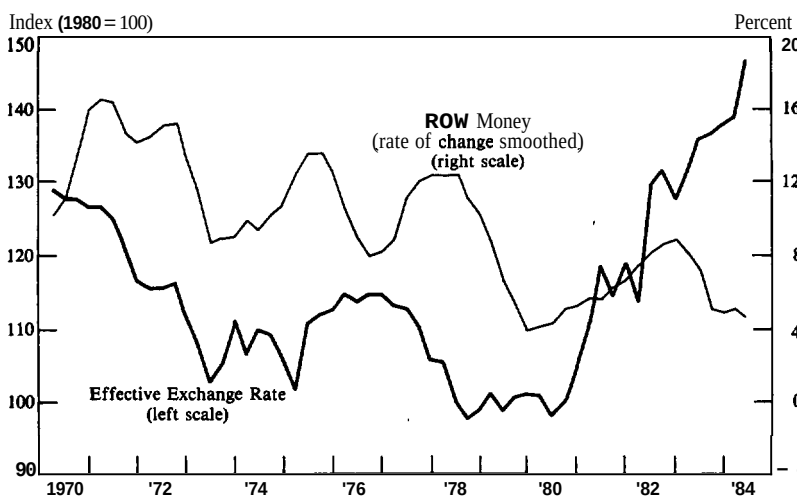
Hooper-Lowery simply assume price inflation in other industrial countries is given as does Sachs, who goes further and takes the level of unemployment to be exogenous in determining U.S. wage inflation. By so divorcing the impact of the business cycle from their exchange rate calculations, they greatly understate the importance of the dollar's international value on domestic U.S. prices.

The asymmetrical position of the United States in the world business cycle

Since the Bretton Woods system of fixed exchange rates began to break down in the early 1970s, waves of speculative pressure against or in favor of

FIGURE 1

U.S. Effective Exchange Rate and the Rest of the World Money



Effective Exchange Rate = IMF definition: MERM (trade) weighted nominal rate against 17 countries.

ROW Money = Percent growth in nominal money in ten industrialized countries other than the U.S. (See Table 2.)

the dollar have reflected shifting expectations of inflation or deflation to come in the United States. If the Federal Reserve remains passive, these are then propagated out into the other industrial countries through the reactions of foreign central banks under the (asymmetrical) operation of the world dollar standard—as Sachs described in the first part of his paper.

When the dollar tended to be very weak as in 1971-73 and again in 1977-78 against all other currencies (Figure 1), this was followed by worldwide inflation a year or two later in 1973-74 and again in 1979-80. Similarly, when the dollar became unexpectedly strong in 1981, disinflation in the United States and in the rest of the industrial world proceeded much more rapidly than anyone had expected.

Elsewhere, I have tried to spell out a complete model of this complex process (McKinnon, 1982 and 1984). In this short comment, let me simply list a few stylized facts and some regression results that seem to fit this hypothesis.

Table 1 shows that one-year to three-year cycles of inflation or deflation have been experienced in common throughout the industrial world as measured by their Wholesale Price Indices (WPI), which approximate movements in the prices of internationally tradeable goods. True, Italy is on a higher trend rate of price inflation than Japan, but cyclical fluctuations in their prices are positively correlated. The right-hand columns show the positive correlation between price inflation in the United States and the rest of the world (ROW)—the ten other principal industrial countries.

Under floating exchange rates countries *are* not necessarily tied to experiencing inflation in common. Can we then identify some common monetary mechanism which links them together? Table 2 shows that, on average since 1970, money growth in ROW has been much less stable than money growth in the United States—although price inflation in the United States has been just as variable or even more so. Moreover, the right-hand column of Table 2 shows that fluctuations in money growth in other industrial countries *are* highly positively correlated.

Figure 2 then shows why. One can see the strong negative correlation between quarterly rates of change in the dollar exchange rate and money growth in ROW. In the lower panel where a five-quarter moving average of both variables is used, the negative correlation is -0.620. In order to smooth their individual dollar exchange rates (although not very successfully), other central banks tend to reduce their money growth collectively when the dollar is rising—reduce it when the dollar is falling.

Because the Federal Reserve has not typically responded to these fluctuations in the dollar exchange rate in an offsetting fashion, the total stock of "world" money has fluctuated cyclically. This fundamental asymmetry in the world dollar standard—where the Federal Reserve fails to respond systematically to the exchange rate while other central banks do respond—is a

TABLE 1
Price inflation in tradeable goods, 11 industrial countries
(percentage change in annual averages of WPIs)

	Belgium	Canada	France	Germany	Italy	Japan	Nether-Lands	Sweden	Switzer-land	United Kingdom	United States	World average	Rest of world[a]
(Weights: GNP 1964)	(.0132)	(.0394)	(.0778)	(.0892)	(.0494)	(.0681)	(.0144)	(.0167)	(.0113)	(.0796)	(.5408)		
1958	-4.4	0.4	5.1	-0.5	-1.7	-6.5	-1.3	4.3	-3.2	0.8	1.5	0.68	-0.30
1959	-0.3	0.8	7.2	-0.8	-2.9	0.9	0.2	0.9	-1.6	0.3	0.2	0.57	1.00
1960	1.2	0.2	3.5	1.3	0.8	1.1	0.0	4.1	0.6	1.3	0.2	0.81	1.54
1961	-0.2	0.2	3.0	1.5	0.0	1.1	-0.2	2.2	0.2	2.6	-0.4	0.47	1.50
1962	0.8	1.1	0.6	0.9	3.2	-1.6	0.3	4.7	3.3	2.3	0.2	0.64	1.16
1963	2.5	1.3	2.9	0.5	5.3	1.6	2.4	2.9	3.9	1.0	-0.4	0.72	2.03
1964	4.7	0.9	3.5	1.0	3.0	0.4	6.1	3.4	1.3	3.1	0.2	1.15	2.27
1965	1.1	1.3	0.7	2.5	1.8	0.7	3.0	5.2	0.6	3.5	2.0	1.98	1.95
1966	2.1	2.9	2.8	1.7	1.5	2.4	5.0	6.4	1.9	2.9	3.4	3.02	2.57
1967	-0.9	1.9	-0.9	-1.0	-0.2	1.7	1.0	4.3	0.3	3.1	0.2	0.45	0.75
1968	0.2	2.2	-1.7	-0.7	0.6	1.0	1.9	2.0	0.1	4.1	2.4	1.68	0.83
1969	5.0	3.7	10.7	1.9	3.6	2.0	-2.5	3.5	2.8	3.7	3.9	3.99	4.09
1970	4.7	2.4	7.5	5.0	7.4	3.7	4.6	6.8	4.2	7.1	3.6	4.54	5.65
(Weights: GNP 1977)	(.0172)	(.0487)	(.0885)	(.1122)	(.0471)	(.1404)	(.0228)	(.0195)	(.0148)	(.0572)	(.4316)		
1971	-0.5	2.0	2.1	4.3	3.3	-0.8	4.5	3.2	2.1	9.1	3.3	2.94	2.67
1972	4.0	4.3	4.7	2.5	4.1	0.8	5.1	4.6	3.6	5.3	4.4	3.74	3.24
1973	12.4	11.2	14.7	6.6	17.2	15.8	6.9	10.3	10 7	7.4	13.1	12.42	11.91
1974	16.8	19.1	29.1	13.5	40.8	31.4	9.6	25.3	163.2	22.6	18.8	22.00	24.436
1975	1.2	11.2	-5.7	4.6	8.5	3.0	6.7	6.4	-2.3	22.2	9.3	6.93	5.12
1976	7.1	5.1	7.4	3.7	23.8	85.0	7.8	9.0	-0.7	17.3	4.6	6.58	8.09
1977	2.4	7.9	5.6	2.7	16.6	1.9	5.8	9.2	0.3	19.8	6.1	6.35	6.55
1978	-1.9	9.3	4.3	1.2	8.4	-2.5	1.3	7.6	-3.4	9.1	7.8	4.99	2.86
1979	6.3	14.4	13.3	4.8	15.5	7.3	2.7	12.5	3.8	12.2	12.5	10.73	9.39
1980	5.8	13.5	8.8	7.5	20.1	17.8	8.2	16.9	5.1	16.3	14.0	13.33	12.82
1981	8.2	10.1	11.0	7.7	16.6	1.7	9.2	11.6	5.8	10.6	9.0	8.50	8.13
1982	7.7	6.0	11.1	5.8	13.9	1.8	6.6	12.6	2.6	8.6	2.1	4.80	6.85
1983	5.2	3.5	11.0	1.5	10.5	-2.2	1.8	11.2	0.5	5.5	1.3[b]	2.73	3.82
1984	7.4	4.1	13.3	2.9	10.4	-0.2	4.2	7.9	3.3	6.2	2.4	3.98	5.18

- Not available.

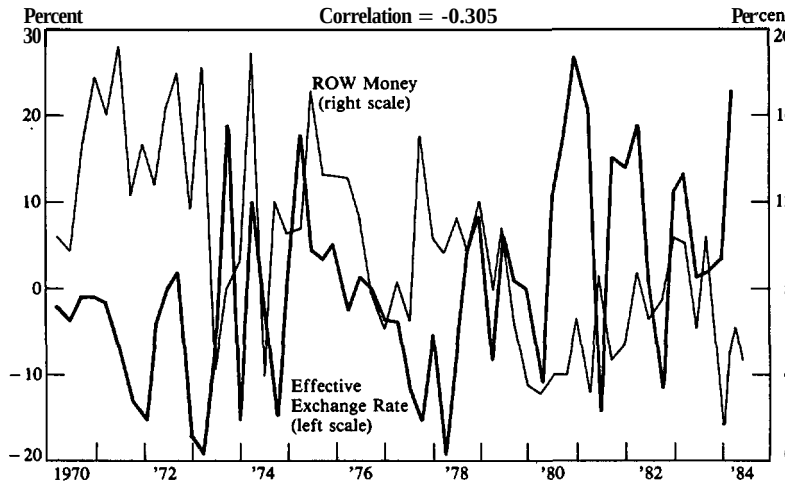
Source: IMF, International Financial Statistics, 1984 Yearbook and July 1985, line 63, wholesale price indices including finished goods and primary products.

[a] United States excluded.

[b] Preliminary.

FIGURE 2

U.S. Effective Exchange Rate and the Rest of the World Money



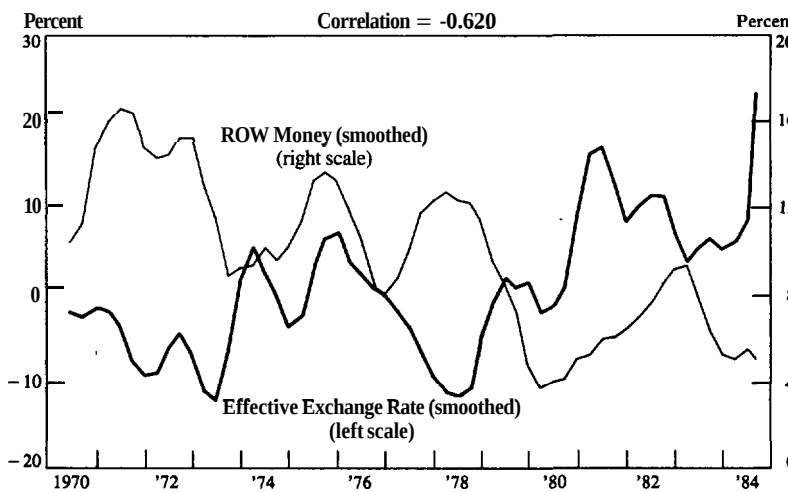


TABLE 2
Money growth in domestic currencies, 11 industrial countries
(percentage change in annual averages of M1)

	Belgium	Canada	France	Germany	Italy	Japan	Netherlands	Sweden	Switzerland	United Kingdom	United States	World average	Rest of world[a]
(Weights: GNP 1964)	(.0132)	(.0394)	(.0778)	(.0892)	(.0494)	(.0681)	(.0144)	(.0167)	(.0113)	(.0796)	(.5408)		
1956	2.9	-1.2	10.3	7.2	8.5	16.4	-3.7	7.4	6.0	1.0	1.1	3.78	6.94
1957	-0.1	4.0	8.6	12.0	6.3	4.1	-2.0	3.4	1.8	2.7	-0.6	2.43	6.01
1958	5.8	12.8	6.4	13.1	9.9	12.8	11.9	1.6	9.2	3.0	4.3	6.47	9.04
1959	3.2	-3.2	11.4	11.8	14.0	16.5	4.5	18.0	6.1	4.6	0.1	4.53	9.74
1960	1.9	5.1	13.0	6.8	13.5	19.1	6.7	-1.2	10.2	-0.8	-0.4	3.72	8.58
1961	7.7	12.4	15.5	14.8	15.7	19.0	7.7	10.7	8.1	3.2	2.9	7.39	12.68
1962	7.2	3.3	18.1	6.6	18.6	17.1	7.5	5.6	16.6	4.4	2.1	6.18	10.99
1963	9.8	5.9	16.7	7.4	16.9	26.3	9.8	8.1	8.9	0.3	2.8	6.86	11.65
1964	5.6	5.1	10.3	8.3	6.7	16.8	8.5	7.7	0.2	5.0	4.1	6.16	8.59
1965	7.4	6.3	9.0	8.9	13.4	16.8	10.9	6.4	12.8	2.7	4.3	6.59	9.30
1966	6.7	7.0	8.9	4.5	15.1	16.3	7.2	9.9	3.1	2.6	4.6	6.31	8.33
1967	4.7	9.5	6.2	3.3	13.6	13.4	7.0	9.8	6.0	3.2	3.9	5.49	7.37
1968	6.8	4.4	5.5	7.6	13.4	14.6	8.8	-1.8	141.5	6.0	7.0	7.51	8.12
1969	2.3	6.9	6.1	8.2	15.0	18.4	9.4	2.0	9.5	0.4	5.9	7.00	8.30
1970	-2.5	2.4	-1.3	6.4	21.7	18.3	10.6	7.3	9.8	6.4	3.8	5.80	8.15
(Weights: GNP 1977)	(.0172)	(.0487)	(.0885)	(.1122)	(.0471)	(.1404)	(.0228)	(.0195)	(.0148)	(.0572)	(.4316)		
1971	10.3	12.7	13.7	12.0	22.9	25.5	16.7	9.0	18.2	11.8	6.8	12.45	16.74
1972	15.0	14.3	13.0	13.6	18.0	22.0	17.7	11.8	13.4	13.1	7.1	12.21	16.10
1973	9.8	14.5	9.9	5.8	21.1	26.2	7.4	9.6	-1.0	8.6	7.3	11.06	13.91
1974	6.8	9.3	12.6	6.0	16.6	13.1	3.1	16.3	-1.7	4.8	5.0	7.78	9.88
1975	12.4	13.8	9.9	13.8	8.3	10.3	18.7	15.2	2.4	15.6	4.7	8.83	11.96
1976	9.6	8.0	15.0	10.4	20.5	14.2	11.8	14.0	7.3	13.8	5.7	9.91	13.10
1977	8.0	8.4	7.5	8.36	19.8	7.0	14.3	8.3	4.7	14.4	7.6	8.72	9.57
1978	6.7	10.0	11.2	13.4	23.7	10.8	5.3	13.6	12.7	20.1	8.2	10.99	13.11
1979	3.5	6.9	12.2	7.4	23.9	9.9	2.7	12.7	7.8	11.5	7.7	9.23	10.39
1980	-0.2	6.3	8.0	2.4	15.9	0.8	4.2	21.1	-5.4	4.9	6.2	5.53	5.01
1981	3.6	4.3	12.3	1.2	11.1	3.7	2.6	12.0	-0.9	10.0	7.2	6.50	5.96
1982	3.4	2.0	14.9	3.5	9.9	7.1	4.9	9.8	3.1	8.3	6.5	6.96	7.31
1983	5.0	10.2	12.1	10.3	17.3	3.0	10.6	11.4	7.6	13.4	11.1	10.1	9.48
1984	3.3	2.3	8.2[b]	3.3	8.4[b]	2.9	4.1	2.4[b]	2.5[b]	14.9[b]	6.9	6.08	5.45

-Not available

Source: Federal Reserve Bank of St. Louis, "International Economic Conditions," June and August 1985
[a] United States excluded.
[b] Preliminary.

TABLE 3

American prices, the dollar exchange rate, and U.S. money growth: historical comparisons
(Quarterly data, t-statistics in parentheses)

Dependent Variable	$\dot{M}^{US}$	$\dot{E}^{US}$	$\bar{R}^2$	SER (Percentage Points)	DW	Time Period
$\dot{DEF}^{US}$	0.98 (8.24)		0.61	0.26	2.03	62.2-73.1
$\dot{WPI}^{US}$	1.62 (5.58)		0.47	0.64	2.07	62.2-73.1
$\dot{DEF}^{US}$	0.44 (1.12)		0.11	0.58	0.78	73.2-84.4
$\dot{WPI}^{US}$	0.81 (0.70)		-0.04	1.73	0.98	73.2-84.4
$\dot{DEF}^{US}$	0.57 (1.91)	-0.34 (-4.87)	0.55	0.41	1.33	73.2-84.4
$\dot{WPI}^{US}$	1.20 (1.35)	-1.07 (-5.17)	0.49	1.12	2.21	73.2-84.4

Note: Variables defined in the text. Data are log differences of quarterly averages. OLS regressions run as a 3rd order polynominal distributed lag on right-hand side variables: 12 lagged observations with *omissison of concurrent observation.* Regression coefficients above are the sum of the 12 estimated coefficients for each lag.

major reason why all countries tend to experience the business cycle in common.

Price inflation in the United States

Besides influencing money growth in the rest of the world, the dollar exchange rate also reflects domestic money-market conditions within the United States. When expected *future* price inflation within the United States changes, the *current* demand for U.S. money is immediately affected. A sudden rise in the (international) demand for dollar assets as signaled by dollar appreciation should indicate to the Federal Reserve that the effective demand for U.S. money has risen and that general deflation will result if it doesn't respond (McKinnon, 1985.)

Thus we can isolate three closely related reasons why the rising dollar from 1981 to 1984 had such a powerful impact on U.S. price inflation.

(i) The effective demand for dollar assets in general, and U.S. money in particular, had increased; and

(ii) Foreign goods became cheaper in dollar terms, putting downward pressure on **U.S.** tradeable goods prices; and
(iii) Money growth in other industrial countries declined—adding to the worldwide deflationary pressure.

Consider the simple regression equations based on quarterly observations presented in Table 3:

$$(1)\ \dot{P}^{US} = C + \sum_{i=1}^{12} a_{-i} \dot{M}^{US}_{-i} + u$$

and

$$(2)\ \dot{P}^{US} = C + \sum_{i=1}^{12} a_{-1} \dot{M}^{US}_{-i} + \sum_{i=1}^{12} b_{-i} \dot{E}^{US}_{-i} + v$$

where dots over the variables indicate percentage rates of change. $\dot{P}^{US}$ is the **U.S.** price level measured alternatively by the WPI and the **GNP** deflator; $\dot{M}^{US}$ is narrow money as defined by **U.S. M1**; and $\dot{E}^{US}$ is the (nominal) effective exchange rate of the dollar measured against the currencies of 17 other industrial countries (MERM weighted) as tabulated by the International Monetary Fund.

Equation (1) shows how well **U.S.** money by itself predicts **U.S.** prices for 12 quarters into the **future** (using a third order **polynominal** distributed lag.) During "fixed" exchange rates from 1962:Q2 to 1973:Q3, this **equation predicted U.S.** price **inflation quite** well: R^2 is of the order of .50 and the regression coefficients on $\dot{M}^{US}$ are significantly positive and close to one.

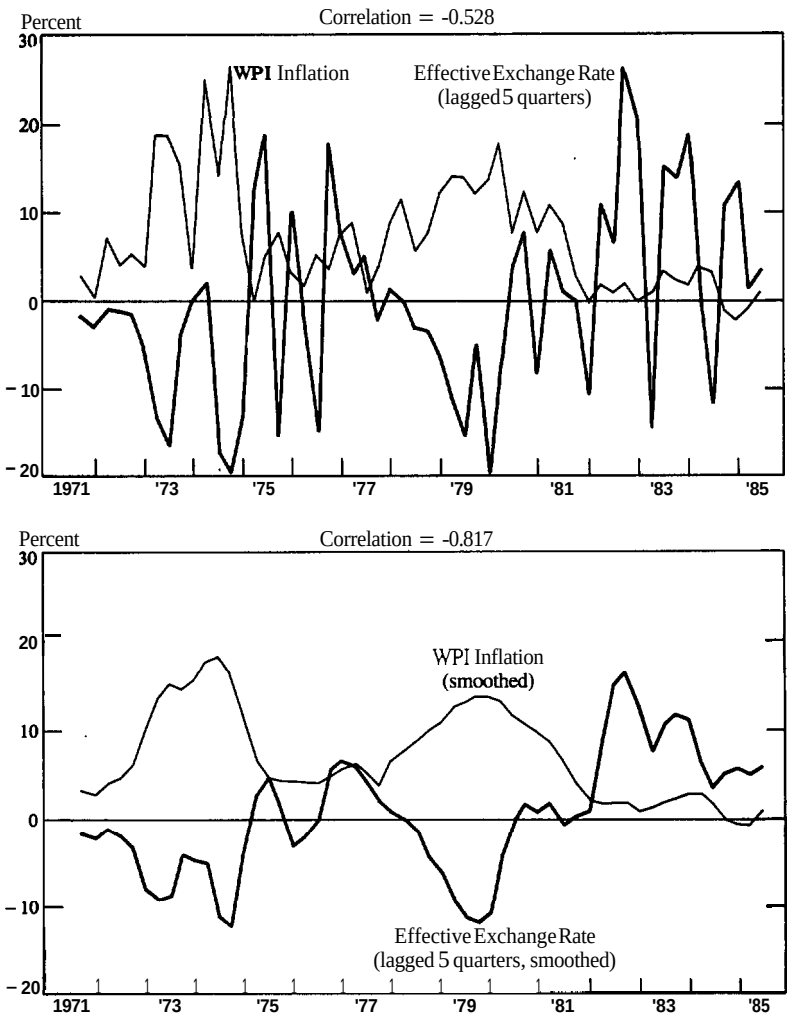
Then, during floating exchange rates from 1973:Q2 to 1984:Q4, this basic monetarist **explanation** of **U.S.** prices breaks down. The R^2 of **Equation** (1) become insignificant as do the regression coefficients on $\dot{M}^{US}$—and serial correlation in the residuals becomes **dominant—as** if some significant explanatory variable had been omitted.

But, as shown in Equation (2), consider adding the dollar exchange rate as an additional explanatory variable to reflect both changes in the demand for **U.S.** money and international inflation or deflation. Then, the statistical significance of the basic equation explaining the **U.S.** price level is restored. R^4 is again about 0.50 and serial correlation is much diminished because of the highly negative effect of the dollar exchange rate on the **U.S.** price level.

Indeed, Table 3 shows that a one percent appreciation of the dollar eventually (after 12 quarters) reduces inflation in **U.S.** tradeable goods (as measured by the WPI) by 1.07 percentage points, and reduces inflation in the

FIGURE 3

U.S. Effective Exchange Rate and WPI



GNP deflator by about 0.34 percentage points. These are big numbers if one remembers that it is not unusual for the dollar to change ten or 20 percent in the course of a year.

Figure 3 gives a more precise idea of the (negative) lagged effect of the dollar exchange rate on the WPI which reaches a maximum five quarters later. The solid line representing changes in the dollar exchange rate is sim-

ply displaced five quarters to the right. One can see that the negative correlation between the WPI and the dollar exchange rate five quarters earlier is very strong. The lower panel of Figure 3, based on fivequarter moving averages of both variables, shows this negative correlation rather vividly. One gets similar negative correlations between the U.S. GNP deflator and dollar exchange rate after about an eightquarter lag.

Implicit versus explicit monetary coordination with other countries: A concluding note

Clearly, the U.S. Federal Reserve System should take a more open-economy approach to the problem of stabilizing the U.S. price level;. But it would be a mistake to completely jettison monetarist rules governing domestic money growth: people still need forward assurance of what the monetary authority plans to do. A more ad *hoc* monetary strategy, even one where the dollar exchange rate was given some (indeterminate) weight, could add to uncertainty about the future and make the current demand for dollar assets—including money—more volatile.

Consider the following simple rules which could be unilaterally announced by the U.S. monetary authorities:

(1) The Federal Reserve would continue for the year ahead to project "normal" noninflationary growth in the major U.S. monetary aggregates—say, four to six percent growth in M1.

(2) However, if the dollar was unusually strong in the foreign exchange markets, U.S. money growth would increase beyond its norm until the dollar came down-and vice versa.

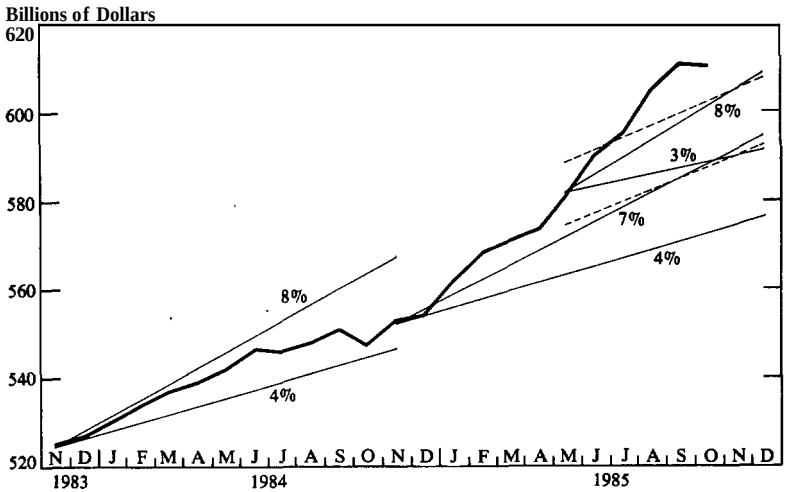
If it had followed such a procedure, the Federal Reserve could have greatly meliorated-perhaps largely avoided-he two great inflations of 1973-74 and 1979-80 by contracting in 1971-72 and again in 1978-79. Similarly, by expanding more in late 1981 and early 1982, the Federal Reserve could have avoided the unusually rapid deflation of 1982-83.

Most recently, by failing to respond to the sharp run-up of the dollar in 1984 by monetary ease, the Federal Reserve imposed undue deflation on U.S. tradeable goods industries and a slowdown in real growth in the U.S. economy in 1985. The Federal Reserve has certainly eased in 1985, as shown in Figure 4, but a bit late given that the exchange rate signal occurred much earlier.

Under Equation (2) above, the Federal Reserve could go one step further. Exchange rate targets against hard foreign moneys could be made more precise through some purchasing power parity calculation. Elsewhere, I and others (McKinnon, 1984, and Williamson, 1983) have suggested "soft" target zones—for example, aiming to keep the dollar within 2.1 to 2.3 marks, and between 200 to 220 yen in 1985.

FIGURE 4

The Elusive Money-Supply Target



Once the dollar moved outside these zones, the Federal Reserve would be obligated to alter its monetary stance. If the Federal Reserve clearly announced its new strategy, private expectations would then more readily coalesce around the exchange rate target—making the rate naturally more stable. Protectionist pressure in the U.S. economy would abate once the "real" price of dollars in terms of foreign currencies was confined to a narrow band which properly aligned the U.S. price level with those prevailing in other industrial countries.

Although I believe that having the Federal Reserve unilaterally key on the dollar exchange rate would better stabilize the U.S. price level (and the world economy more generally), this hypothesis does rest on the assumption that ***implicit*** monetary cooperation by other central banks will continue. That is, when the dollar is unusually strong, other industrial countries would slow their money growth to smooth their exchange rate—and then speed up when the dollar became weak-as Figure 2 indicates they have done in the past.

However, suppose now the Federal Reserve officially adopts our new monetary strategy of keying on the dollar exchange rate ***without any explicit agreement*** on international monetary coordination. Although not necessarily likely, other central banks might now relax and not take symmetrical action to smooth their dollar exchange rates. Let the Federal Reserve do it!

For example, if in 1984 the Federal Reserve had embarked on a major

monetary expansion in response to the strong dollar, other central banks might have expanded in parallel—or at least not contracted as they actually did (Figure 2). Then, not only would the dollar not have come down in the foreign exchange market, but there could have been too much monetary expansion overall—leading to worldwide inflation in 1985-86.

To deal with this dilemma, the Federal Reserve could informally monitor what other central banks are doing. If they (unexpectedly) expanded in parallel with the Federal Reserve when the dollar was strong, the Federal Reserve would be forced to lay off somewhat and give the exchange rate less weight.

Far better to secure an explicit agreement among the Federal Reserve, the Bank of Japan, and the Bundesbank (representing the European bloc) to react symmetrically to pressure on the dollar exchange rate (see McKinnon 1984, Chapter 5.)[1] Under such an agreement, only the Federal Reserve would be forced to substantially revise its operating procedures from an "insular" to an open-economy mode. And, international altruism aside, having the Federal Reserve key on the dollar exchange rate would be very much in the United States' own best interests.

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[1] In Chapter 5 of *An International Standard for Monetary Stabilization* (1984), I have outlined a more complete set of rules as one possible basis for such an agreement. The ultimate objective is to secure the mark/dollar and yen/dollar exchange rates, while stabilizing the three countries' common price level measured in terms of tradeable goods.

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Overview

C. Fred Bergsten

In attempting to provide an overview on the dollar, I shall ask three questions: "Where are we? Where are we going? and What should be done?" In each case, I shall both draw on several of the papers presented to the conference and express ideas of my own and developed by my colleagues at the Institute for International Economics.

Where are we?

Despite its recent depreciation, the dollar remains massively overvalued in terms of the underlying competitive position of the United States. The correction of the last six months has reduced the extent of overvaluation but represents primarily a reversal of the further sharp appreciation in January and February: the dollar remains five percent above its 1984 average on the Morgan Guaranty index, and only one percent below that level on the Federal Reserve index.

Very little net correction has thus occurred. The overvaluation, as defined above, remains in excess of 30 percent as calculated by Williamson[1] and Marris.[2] Branson and Krugman endorse this magnitude in their papers for this symposium.

We are thus on the path described in detail by Marris, and echoed by Krugman, assuming no further change in the real effective exchange rate of the dollar and even with slower economic growth in the United States than in the rest of the world:

- Steady further deterioration of the U.S. current account position to a

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[1] John Williamson, *The Exchange Rate System*, Washington: Institute for International Economics. revised June 1985.

[2] Stephen Marris, *Deficits and the Dollar: The World Economy at Risk*, Washington: Institute for International Economics, December 1985.

level of about $300 billion by 1990 (comprising a merchandise deficit of about $200 billion and net interest payments of about $100 billion.)

- A continuing drag on GNP growth and, as Roosa has put it to this conference, a growing threat of deindustrialization.
- The most rapid plunge into foreign debt ever recorded.
- Accumulation of such debt to about $1 trillion by 1990.
- A resulting debt/export ratio of near 200 percent, the traditional trigger for external debt crises,' by 1988-89.

Roberts'suggested in his commentary on Cooper's paper that the problem of U.S. international competitiveness antedates the appreciation of the dollar, and thereby attempts to downplay the importance of that phenomenon. By contrast, the facts show an enormous burst of U.S. competitiveness in the late 1970s. From 1978 to 1980, U.S. exports grew twice as fast as world trade. The United States recouped market share in almost every sector of manufactured trade, in some cases to levels not seen since the 1960s. Our current account improved by almost $60 billion (excluding the adverse price impact of the second oil shock). In his comment from the floor, Mr. Harring of Motorola—one of the companies expressing the greatest concern about America's current competitive problem-explicitly dated the difficulty from mid-1980. The dollar is the major culprit.

Equally clearly, the current situation is unsustainable—for two reasons. One, cited most frequently (included by Krugman here), is that foreigners at some point will be unwilling *ex ante* to place enough additional investments in dollar assets, at existing interest rates and exchange rates, to finance the huge U.S. current account deficits. Note that no *withdrawal* of previous dollar investments is needed to occasion this result; any such disinvestment would make the situation worse, as would outflows of American funds in search of gains from appreciation of other currencies against the dollar. Marris shows that almost one half of all world savings generated outside the United States would have to be moving into the dollar by the end of this decade to sustain the exchange rate at its current level.

The second source of unsustainability may be even more proximate, if less widely recognized (in this context): the economic and political unsustainability of the impact of the dollar overvaluation within the United

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3 William R. Cline, *International Debt: Systemic Risk and Policy Response*, Washington: Institute for International Economics, 1984, Appendix A.

States.[4] Krugman notes the growing possibility of U.S. expropriation of foreign assets here as the level of such holdings rises; this risk should not be ignored, as President Nixon—in a situation that was the closest postwar parallel to the current overvaluation-did indeed expropriate in a sense in 1971 by ending the convertibility of foreign official dollar holdings into gold. A much greater risk, however, is an extensive outbreak of trade protection.

Historically, the exchange rate of the dollar is perhaps the best "leading indicator" of U.S. trade policy.[5] As Cooper has noted in his paper, an outburst of U.S. protection--whether via an import surcharge or some other devise—is eminently possible in the near future.[6] This could turn out to be the most costly, and most lasting, of all the adverse effects of dollar overvaluation on the United States and world economies.

Indeed, it may already be too late to avert further extensive protectionist actions in this country. A rapid and substantial correction of dollar overvaluation, however, must be an integral part of any package that has a chance of deflecting such pressures.[7] It is true that, even with such a correction, the trade deficit would recede only with a lag. The improvement would be assured and widely understood, however, and the promise of such a turnaround in the fundamental competitive position of the United States should offer at least a reasonable chance of avoiding tragic trade policy mistakes.

Where are we going?

It thus seems clear that a very substantial adjustment in the dollar and the external position of the United States is both inevitable and desirable. Emminger and Mussa may be correct, in their presentations to the symposium, that the United States will not have to totally eliminate its current account deficits. Under any reasonable scenario, however, our merchandise trade position will have to improve by at least $150-200 billion: from a peak deficit in that range (in 1985 and 1986), and to finance the net interest cost of

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[4] C. Fred Bergsten, "The Second Debt Crisis," *Challenge,* May-June 1985.

[5] C. Fred Bergsten and John Williamson, "Exchange Rates and Trade Policy" in William R. Cline, editor, *Trade Policy in the 1980s,* Washiington: Institute for International Economics, 1983.

[6] I disagree with Cooper's suggestion that a surcharge would be "impossible to remove" once implemented. Indeed, not even the proponents of a surcharge advocate it as a permanent measure. However, foreign retaliation and emulation would still produce massive disruption of the international trading system-and, via Third World debt, the financial system as well—if the United States were to initiate such a step.

[7] Several other steps will probably be needed as well, including the launching of a major new international round of trade liberalizing negotiations and the development of an effective program to support domestic adjustment to trade dislocation. On these topics see, respectively, Gray Clyde Hufbauer and Jeffrey J. Schott, *Trading for Growth: The Next Trade Negotiation,* Washington: Institute for International Economics, September 1985, and Hufbauer and Howard F. Rosen, *Trade Policy for Doubled Industries,* Washiington: Institute for International Economics, forthcoming.

the rapidly growing external debt (which cannot fail to reach $400-500 billion before stabilizing and turning down.)

This needed improvement of $150-200 billion in the U.S. external accounts raises two issues, one domestic and one international. Internally, the improvement will have to be generated by precisely those exporting and import-competing firms which have been decimated by dollar overvaluation. A number of these firms, under the pressure of the 1981-82 recession as well as the strong dollar, have demonstrated impressive productivity growth during the past few years and should be able to restore their position fairly rapidly once the burden of dollar overvaluation is lifted; this suggests that the needed dollar correction might be less than suggested above (on the basis of historical relationships). But other firms have scaled back their export efforts or invested abroad or otherwise undergone lasting competitive losses, and may need an even weaker dollar to recoup. The challenge of reversing the massive deterioration of its international competitive position in the last half of the 1980s is one of the greatest ever to face the American economy.

Internationally, the issue is the locus of the trade deterioration which must mirror the American improvement. Japan will have to accept a large part of that adjustment, but even total elimination of its current massive surplus would contribute "only" $50 billion.[8] No other industrial countries are running substantial surpluses, though their aggregate "contributions" could add another $50 billion. The Organization of Petroleum Exporting Counhies is already in deficit, so is unlikely to help in this respect.

This means that an important part of the U.S. adjustment will probably fall on the developing countries, including those with substantial debt burdens, just as these countries have benefitted substantially in their own recent adjustment efforts from the huge increase in the U.S. trade deficit. Indeed, the near-certainty that LDC debtors will experience substantial trade deterioration as a result of the American correction represents one of the most serious threats to their continued solvency—particularly as there is no sign of renewed private capital flows which would finance these larger deficits.[9]

Despite these difficulties, the American adjustment will eventually take place. Some fear the adjustment, however, because of its adverse impact on inflation in this country. Such an adverse impact will in fact encompass an end to the anti-inflationary gains of the dollar appreciation as well as an

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8 "Equilibrium" in the Japanese current account currently translates into a surplus of $20-$25 billion, given underlying structural conditions in that economy, so that its position could not be expected to deteriorate by more than $25-30 billion. See C. Fred Bergsten and William R. Cline, *The United States-Japan Economic Problem,* Washington: Institute for International Economics, October 1985.

9 For an analysis of this issue see Donald Lessard and John Williamson, *Financial Intermediation Beyond the Debt Crisis,* Washington: Institute for International Economics, September 1985.

absolute loss from the postulated depreciation, pushing the recorded inflation numbers from perhaps two percentage points below the core rate to perhaps two percentage points above.

The key point, however, is that the inflationary effect of dollar depreciation will be temporary. It will persist for only as long as the dollar declines, and will then (all other things equal) return to the core level once the exchange-rate correction is completed. There is no reason for the temporarily higher numbers to provoke market expectations of permanently higher inflation, higher wage settlements or any other lasting results. Understanding of this point is essential if the adjustment is to be welcomed *ab initio* and to proceed smoothly once underway.

The required external adjustment will of course levy real costs on the American economy. Some of these costs will occur via expenditure switching, as output is shifted into net exports (primarily via the dollar depreciation), and some may have to occur via expenditure reduction (if the economy slows, albeit temporarily, in response to the higher inflation and possibly—see below—higher interest rates which will accompany that depreciation.) In this sense, the U.S. adjustment is like that of any LDC or other debtor country-although, as Mussa rightly notes in his comments, the ability of the United States to finance its external deficits in its own currency obviates the risk of default and alters the path by which the adjustment occurs (or is forced.)

What should be done?

The key issue for policy is thus how to minimize the costs, for both the United States and the world as a whole, of the inevitable and desirable correction of dollar overvaluation and America's external deficit. Two specific aspects of this issue are worth special note.

First, the correction can occur either with rising U.S. interest rates or with falling U.S. interest rates. One key issue in resolving this question is whether the correction comes before or after the launching of a significant reduction in the government budget deficit. But if we simply wait for foreign investors to "go on strike," which will drive up American interest rates even as the dollar falls, the United States will almost certainly get the worst of all worlds for a time even if budget action has been initiated: inflation (albeit temporary) due to dollar depreciation and declining output due to rising interest rates. On the other hand, initiation of an active program to correct the dollar prior to such a "strike" may avoid the runup in interest rates and thus lessen the adjustment cost substantially.

Second, the correction should occur as early as possible. As just noted, early movement would help head off the risk of a "dollar strike" by foreign investors and a renewed surge of U.S. interest rates (with particularly

adverse affects on Third World debtors as well as on the United States itself). As discussed above, urgent dollar adjustment is needed to help head off the risk of a protectionist outbreak which could disrupt the entire world trading system. And, as elaborated in several of the papers for the symposium, the magnitude of the needed adjustment is rising rapidly over time because of the concomitant buildup in the foreign debt of the United States; early adjustment thus means less adjustment and smaller adjustment costs.

I would advocate a three-part program, adopted as soon as possible, to achieve such adjustment: a substantial reduction in the U.S. budget deficit (by about $150 billion annually by FY 1988, eliminating most of the structural component thereof), a parallel further easing of monetary policy by the Federal Reserve and, crucially important, substantial domestic expansion efforts (preferably via supply-side tax cuts) in Japan, Germany and perhaps the United Kingdom. Unfortunately, I see little possibility of early movement of macroeconomic policy in the needed directions in either the United States or abroad. For the remainder of this discussion, I shall thus assume that the preferred policy course is unavailable and that alternatives must be sought.

One possibility is that the dollar will now correct without further policy action, as suggested by Scott Pardee in his comments at the symposium. As noted at the outset, the dollar has depreciated significantly over the past six months as U.S. interest rates have declined substantially, offset only modestly by similar declines in other major countries. Lower growth prospects for the United States may reduce the appeal of dollar investments.

On the other hand, there have been three or four "false starts" toward dollar correction during its five-year appreciation. In each case, depreciation proved temporary and was more than offset by subsequent upward reversal. I would therefore suggest that five steps be taken in an effort to engineer the full correction needed as promptly as possible.

First, even without meaningful action on the budget deficit, the Federal Reserve should ease monetary policy further. Indeed, without fiscal action, the Fed is the proverbial "only game in town." Its easing over the past six months has contributed importantly to bringing the dollar back from its peaks in early 1985. More is needed, however.

It would appear that such further easing would be fully consistent with overall Fed (and national economic policy) objectives. There are no signs of rising inflation, and the temporary inflationary impact of dollar depreciation itself can be reduced by moving sooner rather than later. There are no signs that the dollar decline of March-July 1985 was producing a bandwagon effect or "free fall" for the dollar, with destablizing effects on interest rates—which, indeed, continued to decline substantially as the dollar declined-or any other economic variables. The economy remains soft. LDC debt and other financial vulnerabilities continue to argue for the lowest

interest rates consistent with the broader economic objectives cited.

Second, top U.S. authorities should make clear that they ***desire*** a correction of the dollar. At least until recently, the markets have believed that leading Administration officials ***liked*** the strong dollar. Over the past couple of months, however, such officials as Secretaries Baker and Baldridge have commendably indicated the need for an adjustment—indeed, in several instances, seeming to try to "talk down the dollar" much more aggressively than Secretary Blumenthal ever did in 1977!

Unfortunately, Chairman Volcker, whose words carry far more weight with the markets than all of the Administration officials combined, appears to have prematurely "talked down the decline" of the dollar in mid-July by indicating his doubts over the desirability of a further correction. One can fully understand the Chairman's concern that an excessively rapid depreciation could push up both inflation and interest rates. But if one agrees that substantial further dollar correction is both essential and inevitable, and that the costs are likely to be less if incurred sooner rather than later, the wiser course may have been to promote rather than retard the movement that was well underway and seemed orderly in every respect.

Third, the major central banks should take advantage of just such occasions—when the markets are already pushing currency relationships in the diition of underlying equilibrium—through joint intervention to promote the needed degree of adjustment. Such "leaning with the wind" would have important signalling as well as substantive effects, complementing the first two types of measures already proposed.[10]

Some observers oppose such a strategy on the grounds that "the wind could become a gale." Again, however, that risk would seem to grow the longer the needed correction is delayed. And the United States would derive a second important advantage from such intervention: by selling dollars now, it would acquire DM and other foreign currencies which could then be used to counter the decline of the dollar if, at some later point, it becomes too rapid or threatens to overshoot on the downside.

Fourth, Japan could assist in this corrective process by using traditional administrative guidance to limit, partially and temporarily, its massive capital outflows into the dollar. These outflows are now averaging $7-8 billion per month, and are an important source of continued dollar strength. Cooper's otherwise excellent analysis of possible capital outflow restraints by Japan, by limiting itself to the impact on Japan itself, misses an important point: such restraints could have an important effect on ***the United States*** by contributing to a dollar decline.

Japan could make such a contribution if it were successful even in cutting

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[10] C. Fred Bergsten, "The Case for Leaning With the Wind," *Financial Times*, October 24, 1984.

its outflows in half, which seems quite plausible. Indeed, this would seem to be by far the most constructive, and least costly, way for Japan to help fight off the protectionist trade pressures in the United States which may otherwise have a substantial effect on both its economy and its (U.S.-oriented) foreign policy.[11] The United States would of course have to endorse such a temporary reversal of policy toward capital flows, rather than urging Japan to invest *more* in the United States and thus exacerbate the currency and trade problems, as it has been doing since 1983.[12]

Fifth, the United States should seek renewed discussions on improving the international monetary system. Secretary Baker's indication of willingness to call a meeting on the topic, voiced at the OECD Ministerial last spring, should be revived. Several other countries indicated their interest in the topic in the report of the Deputies of the Group of Ten released in Tokyo in June. Systemic reform is no substitute for immediate action on the dollar. But a U.S. initiative on the longer-run issues would reinforce and underline the actions and expressions of concern over the present situation proposed here, as well as launching a process to head off the development of new misalignments in the future.[13]

Taken together, these five steps could help promote a prompt correction of the dollar and the external position of the United States. They could thereby reduce the risk of major disruption of the world trading system, and reduce the costs of the inevitable adjustment. To be sure, such a correction in the absence of meaningful action on the budget runs a risk of economic downturn-but the postulated monetary easing and underlying economic weakness reduce the risk of a resulting mnup of interest rates. The dollar correction would increase the recorded rate of inflation, but the weakness of the economy would also limit that effect—which, as noted above, would be temporary in any event. The case for action seems clear.

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[11] Details can be found in Bergsten and Cline, *The United States-Japan Economic Problem.*

[12] Jeffrey Frankel, *The Yen-Dollar Agreement*, Washington: Institute for International Economics, December 1984.

[13] The need for reform and a "target zone" approach are analyzed in Williamson, *The Exchange Rate System.*

Overview

William Poole

I was invited to this conference, I assume, as one who frequently comments on monetary policy. My overview, however, may disappoint our Kansas City Fed hosts—assuming they are looking for some controversy to enliven our proceedings—for I will say nothing nasty about the monetary authorities in the present context. The strong dollar is not primarily a monetary phenomenon.

I will, perhaps, redeem my reputation by saying at the outset that I dissent from the standard view expressed at this conference that the dollar is massively overvalued today and must inevitably depreciate substantially over the years ahead. In my view, there is instead roughly an even change that the dollar will ***appreciate*** rather than depreciate.

As I read the conference papers and hear the discussion, there is considerable agreement that the strong dollar is a real and not a monetary phenomenon. Ron McKinnon emphasized that monetary policy is concerned with nominal magnitudes. But over the past few years we have seen changes in the real exchange rate and in the real rate of interest that are far beyond what we could reasonably expect to occur for purely monetary reasons.

The model

As a first approximation, the appropriate model for exploring these recent exchange and interest rate developments is one that concentrates on real considerations and omits monetary ones. There seems to be general agreement on the characteristics of the appropriate model. Above all, the model must provide an integrated treatment of stocks and flows of assets. The exchange rate is an endogenous variable and we want to use the model to understand how changes in exogenous variables have yielded the strong dollar.

Assume that there was an initial equilibrium in about 1980 with an

approximate current account balance. If we want to be fancy we set up the model so that the initial equilibrium has a slight current account surplus, which means that the United States was investing in foreign assets. With that wrinkle, our initial conditions involve accumulation of net foreign assets at a rate that stabilizes the ratio of those assets to GNP.

Then, in 1981 there was a major change in U.S. fiscal policy, and that change disturbed the initial balance-of-payments and exchange rate equilibrium. I discuss the precise nature of this fiscal policy change shortly--the details are very important. At the moment, though, simply note that the new fiscal policy produced a major increase in the real rate of interest in the United States.

The increase in the real rate of interest led initially to an attempt by foreigners to move capital into the United States and by U.S. residents to reduce capital outflows. That initial effort was unsuccessful, but did have the effect of bidding up the value of the dollar. Over time the higher dollar induced a current account deficit--the current account reacts with a lag to a changed real exchange rate. This current account deficit is the real counterpart of the capital inflow.

After the short-run current account adjustment is complete the dollar has greatly appreciated from its initial level in 1980. There is a large current account deficit and capital account surplus. These conditions are all part of the same phenomenon—the response of the economy to the change in fiscal policy.

Now consider the critical features of the integration of stocks and flows in our model. The capital flow year by year changes the stock of U.S. net foreign assets. A condition for a sustainable situation is that net foreign assets, whether they be positive or negative, cannot go to infinity as a percentage of GNP. So we can make this simple observation: at some point the annual capital flow into the United States must slow and this reduced capital inflow must be accompanied by dollar depreciation. The reason is that there is nothing in the model so far other than dollar depreciation which can change the current account and the corresponding capital inflow.

Rational market participants are, of course, assumed to understand this model. All is in order if dollar depreciation proceeds at a rate equal to the differential between U.S. and foreign interest rates. This gradual depreciation of the real value of the dollar slowly reduces the current account deficit. A new long-run equilibrium is established when the current account deficit has declined to the point where the growth of U.S. net foreign liabilities equals the growth of GNP.

Calculations by Paul Krugman and others suggest that these numbers don't fit together. If the dollar depreciates at a rate given by the interest differential, then the dollar will be too high for too long and the accumulation of U.S. net foreign liabilities relative to the size of the economy will become

unsustainably large. Thus, it is argued that the dollar must for a time depreciate much more rapidly than the rate given by the interest differential.

But there is more to this argument. The fiscal policy change in 1981 is unsustainable because the price tag--the budget deficit--has proven too large. Therefore, when the budget deficit is reduced—as it must be-the initial fiscal disturbance that raised interest rates will be reversed. U.S. real interest rates will fall and that event will cause the dollar to depreciate rapidly. In other words, once the interest rate prop holding up the exchange rate is removed, the dollar will crumble.

These are the considerations that have led almost all participants at this conference, and many other analysts, to believe that the dollar is unsustainably high and must without question fall at a rate much greater than the differential between interest rates in the United States and abroad. The logic is straight-forward and yet the result is troubling. How can the market, which has been demonstrated to pass economists' tests of market efficiency and rational expectations with a grade of at least A-, be committing such a massive and obvious mistake? Perhaps it is the economists, who are not notoriously successful speculators, who are making the massive mistake.

Modifying the model

If the model is yielding the wrong results it is not because the logic is wrong. Something must be left out, or the premises must be wrong or incomplete. To alter the results I will break into the model in two directions, first by examining more fully the nature of the fiscal policy change in 1981, and second by examining the relevance of economic conditions abroad.

Most observers have concentrated on the deficit effects of the 1981 fiscal policy change. At this conference there has been only a little discussion--very much too little-of the effects of the change in the corporate tax laws on the after-tax real rate of return on new business investment. This is an important issue because in our general model there is an equilibrium condition that says that the real rate of return on financial assets, or what may be called the real rate of interest, has to be connected to the real rate of return on physical capital.

The equilibrium condition at the present high level of abstraction is that real rates of return on physical and financial capital must be the same. These rates of return must, of course, both be measured on an after-tax basis. This equilibrium condition is of exactly the same type as the one that the expected rate of depreciation of the dollar has to equal the difference between the real rate of interest in the United States and abroad.

The fiscal policy change in 1981 reduced business taxation by a very large

amount. In addition--and here is my one reference to monetary policy--the lower rate of inflation after 1981, engineered in part by the Federal Reserve, interacted with the depreciation provisions of the corporate tax law to further raise the after-tax real rate of return to new investment. This effect occurs because original cost depreciation is more valuable to firms at lower inflation rates.

In the short run the pre-tax internal rate of return on new investment cannot be affected by changes in the budget deficit or tax policy. Among other things, the pre-tax return is determined by the capital/labor ratio in the economy. The stock of capital initially is what it is. Because the capital stock is very large compared to the annual flow of new investment, the pre-tax rate of return is fixed in the short run by the marginal product of capital at the initial capital stock. The reduction in the tax rate applying to new investment must, therefore, in the short run increase the post-tax real rate of return on new investment. Given an increase in the post-tax rate of return on new physical investment, the after-tax real rate of return on financial assets must also rise.

Most of the increase of the real rate of interest after 1981 is due to this change in taxation of capital. As emphasized already, the tax reduction was due partly to changes in the tax law and partly to the lower rate of inflation. Nevertheless, the question of the relative contributions to the high real rate of interest of the budget deficit per se and of the change in the taxation of capital remains. I don't know the relative contributions and neither does anyone else. But my considered professional judgment—therwise known as a hunch—is that we should be talking about a two-thirds/one-third split, with the tax effect accounting for the two-thirds and the budget deficit for the one-third. That is a good enough guess for present purposes.

The 1981 change in business tax policy is potentially a permanent change in our tax law. The lower rate of inflation is also potentially a permanent change in U.S. policy. My interpretation of the strong dollar is that the market is betting that the necessary reduction in the budget deficit will be accomplished without a major increase in business taxes. If the real rate of return on capital is maintained, then policy adjustments will not have a major effect on the real rate of interest and will not much affect the basic determinants of international capital flows.

Indeed, I challenge anyone to find me an example of a country that has suffered a depreciating currency as a result of putting its fiscal house in order. The likely result of putting our house in order—if we can do it in a constructive way—is that we will find ourselves in a stronger position rather than a weaker one. The dollar will then appreciate further rather than depreciate.

Maintaining an attractive investment climate in the United States will sustain a high ratio of new investment in plant and equipment relative to GNP.

As the U.S. capital stock grows relative to the path it would otherwise follow the marginal product of capital and the real rate of return will gradually fall. However, this process will be a slow one because the annual flow of even a high rate of investment is small relative to the capital stock.

Much of the new investment, however, will be financed from abroad and the returns from the investment will have to be devoted to servicing foreign creditors. There is nothing unsustainable about such a situation. What would be unsustainable would be accumulation of foreign debts to finance current consumption, for in that case there would be no extra capital formation to provide the income to service the debt. The budget deficit matters insofar as it depresses national saving. The evidence is not all in on the effects of recent deficits on saving, but the deficits seem to have reduced national saving to some extent, although not by the full amount of the deficit.

There are several other directions in which we can break into this basic model. The current account balance could change at the present exchange rate. First, European and Latin American economies should recover, raising U.S. exports. Second, the U.S. recovery after 1982 has involved a very high level of domestic investment, and that investment was partly satisfied by imports of capital goods. This component of import demand will fall as the cyclical part of the U.S. investment boom tapers off. Investment might be high in the secular sense but still not as high as experienced in the early stages of recovery.

Third, if countries abroad change their domestic policies to promote growth and capital formation their currencies will strengthen against the dollar as capital flows to these countries instead of to the United States. But it is very unlikely that other countries will all change their policies together. Thus, the dollar on average may depreciate only slowly, first against one currency and then against another. Stronger foreign economies would obviously be highly constructive for the world economy as a whole. But there is little the United States can do to encourage better policies abroad, other than to set a good example.

Fourth, as emphasized in a comment by Roger Brinner, the real return on physical capital may be significantly above the cost of borrowing from abroad. There is nothing unsustainable about borrowing at six percent and earning 12 percent on our physical capital.

These considerations explain why I dissent from the prevailing view at this conference that the real dollar exchange rate is excessively high and will inevitably fall—fall much more rapidly than the slow decline given by the interest parity condition. There is nothing inevitable about the policy changes that would entail such a result. If the United States retains an environment conducive to capital formation, then there is every reason to believe that the dollar will remain strong and perhaps strengthen further.

Additional comments

I have three very short additional comments. First, the macro model appropriate for analyzing inflation is very misleading under present circumstances. There were major changes in relative prices in the early 1980s, and neglecting them introduces major errors into the analysis. Second, I am annoyed by references to the present floating rate system as a "nonsystem." We would not refer to a system of deregulated air travel as a "nonsystem;" central planning is not the only way to organize commercial aviation, and it is not the only way to organize international finance.

Finally, the floating rate system is only about 15 years old. In the past, under both the gold standard and the Bretton Woods system, floating rates were regarded by governments and markets as a temporary phenomenon. In contrast, the present system is regarded as at least semi-permanent. This system is young; governments and markets are still learning how the system works. So also are economists.

Overview

Henry C. Wallich

Looking at the dollar, the principal topic of this symposium, it can be said that, at considerable cost to the American economy, considerable benefits have been achieved. At home, inflation has been cut to one-third or one-quarter of its earlier level. Abroad, the United States has acted as a locomotive, pulling the world economy out of a recession. The costs to foreign countries, in terms of higher interest rates and higher prices, are less than the benefits. Higher interest rates are to some extent in the discretion of these countries since on a floating exchange system they can allow their currencies to go down instead of raising interest rates to prevent this. The price increases resulting from the lower value of the currencies evidently have not prevented an almost universal reduction in inflation rates abroad. The reason for this is that the prices of many of their imports, although invoiced in dollars, are actually determined by world markets. A strong dollar depresses the price of world market commodities, especially oil. As for higher interest rates and the alleged draining of investment funds from foreign countries to the United States, most foreign countries operate with substantial excess capacity, unemployment, and therefore, low utilization of potential. Bringing their economies up to full employment would generate additional savings that could offset the drain to the United States.

For the United States, the benefits of the high dollar are, I think, overmatched by its costs. Inflation has been reduced, but some of this gain may have to be given back if and when the dollar comes down. We have had a good investment performance, but not all that much better than in the past. The ratio of business fixed investment to GNP has increased only moderately over past peaks on a gross basis and is lower on a net basis. Meanwhile, the domestic debt burden has increased substantially and the foreign debt of the United States has increased to the point where we have become a debtor country. We have largely lost the net investment income that used to be a great support of our current account.

Even so, if there were a way of changing course now and stopping a con-

tinuation of the adverse trends I have cited, one might say that we had incurred an affordable cost in return for substantial benefits. The difficulty lies with the future.

Several of the speakers in this symposium have focused on the Fed and, in my way of thinking, done us more honor than we deserve. The Fed is not the only game in town; there are others. But even if it were, that does not mean that we should play them all. Neither can the Fed be held responsible for the inability of the original administration program to deliver all it promised. Rates of growth that would have raised revenues to the point of balancing the budget after massive tax cuts were not prevented by the Fed. In my view, they were unlikely to begin with. I was somewhat startled to hear one speaker say that the Administration was prepared to settle for an eight percent inflation in the near term, instead of the four percent that developed. I had not heard this from my Washington friends who stayed with the Administration. The clear anti-inflationary stance of the Administration, to my thinking, has often been documented.

To underscore my comment that the Fed is not the only game in town, let me draw your attention to some things that are going on with respect to the international monetary system in which the dollar has had such a spectacular career. A study of the areas in which this system could be improved was completed a couple of months ago and will be at the center of discussion at the Seoul meeting of the International Monetary Fund and other bodies hereafter. I am surprised how little attention has been paid at our meeting here to what, after all, constitutes the principal concerted effort of the major industrial countries in the direction of monetary reform. Granted that the results are modest, a fundamental question nevertheless has been put on the table. It is whether the present system of floating rates, which has not performed satisfactorily in the opinion of most observers, is inherently defective, tending to extreme fluctuations, or whether this performance results from inappropriate use made of the system and excessive pressures placed upon it. In the former case, trying to change the system in the direction of greater stability would merely have the effect of pushing some of the inherent instability of the world economy into some area other than exchange rates, for instance, into growth, inflation, and employment. If, on the other hand, the use made of the system was inappropriate, then agreement on better use may be the remedy.

In the report, there is considerable discussion of "convergence" as a means toward more stable exchange rates. The question, not answered very explicitly, is whether this convergence relates to performance or to both performance and policies. While the report was being developed, increasing convergence of performance occurred, especially in the area of inflation control. Almost all major countries were coming below four percent. Nevertheless, as inflation performance converged, the dollar took off. This

seems to suggest that convergence of performance must be supplemented by convergence of policies. This means, unfortunately, that even if the system is not inherently flawed, improvements needed in its use are of very demanding kind.

Let me now turn to the area on which much of the discussion at this meeting has focused—the Federal Reserve's role with respect to the dollar. The great problem that the dollar poses for monetary policy is that the dollar is essentially unpredictable. The papers presented to the conference make clear that we have no reliable theory of exchange-rate determination. In other words, the dollar is a wild card. It is indeed discouraging to find that economics, having demonstrated its inability to predict the stock market and interest rates, now also seems to have failed with regard to exchange rates. The dollar seems to be determined by forces to which perhaps we can give a name, but the workings of which we do not understand.

If we did understand them, it still is not clear in which way policy should seek to influence them. There are risks and costs associated with both a high and a lower dollar. A high dollar, if maintained, would push us toward protectionism. It would increase our foreign debt at an exponential rate, reaching a trillion dollars within very few years. It would continue to erode the core of our economy, manufacturing industry. As for the ultimate level of the dollar, if and when a rate consistent with some sort of equilibrium is reached, that equilibrium rate would have to be lower the longer it takes to reach it, as annual debt service charges build up.

A lower dollar would cause inflation to accelerate. By improving the current account and so reducing capital inflows, it would drive up interest rates unless the budget deficit had been meanwhile materially improved. The negative effects of a decline in the dollar would be the bigger the less orderly a downward movement, and the more severe the loss of confidence and credibility. A substantial rise in interest rates would carry the threat of recession. Even though a rise in interest rates resulting from smaller capital imports should be compensated to some extent by stronger net exports, the timing probably does not match. Markets might anticipate the movement of interest rates, whereas the improvement in the current account would take time. Indeed, we may not have the productive capacity in our weakened manufacturing sector to step up exports very fast without price pressures. For these reasons, an improvement in the budget deficit that would relieve pressure on capital markets is urgently needed as an accompaniment of any decline in the dollar.

It is in light of these considerations that suggestions made in some of the papers and at this symposium that the Federal Reserve should somehow push down the dollar must be examined. I believe that any such deliberate action would be damaging to inflation expectations. It might be damaging to our prospects of getting long-term interest rates down. The markets would

find it difficult to adjust to such a Federal Reserve departure. Unpredictable and possibly disorderly movements in the exchange market could follow. I mention only in passing that a policy of pushing down a falling rate is contrary to IMF rules for floating which to be sure are not very closely observed in practice. It might also bring us in conflict with foreign countries whose views as to the proper dollar rate for their currency might not accord with ours, if we operated so as to make them believe that we had a rate objective.

Other speakers have commented on and, to some extent, criticized the proposal by Ron McKinnon. By this proposal, the Federal Reserve and the central banks of Germany and Japan should coordinate their policies. When one of them found its money supply contracting, the others should expand, and vice versa, keeping the "world money supply" approximately stable. There may be situations in which such a procedure was feasible and desirable. But just to give a contrary example at this time, now that the U.S. money supply has expanded strongly in the middle of 1985, should we urge the central banks of the two other countries to engage in countervailing contraction? Would this not completely ignore the situation of the world economy, which is one of slowing expansion both here and abroad, with inflation still relatively modest? McKinnon's suggestion to give attention to the exchange rate as an indicator of the stance of monetary policy is a good one. It is already being followed by the Federal Reserve, as Federal Reserve policy records and Congressional testimony make clear. But the level of the dollar can only be one indicator among others, although one of growing importance. Targeting on the dollar, especially with a downward bias, would require giving up the existing money-supply targets and risk provoking a new burst of inflation.

Monetary policy, now as on many occasions, is in the difficult position of having to pursue several targets with only one instrument. Except on rare occasions where something is seriously amiss, such as the weak dollar in the fall of 1978, and the acceleration of inflation in late 1979, policy cannot ignore the multiplicity of objectives. It can and must, however, bear in mind that by its nature it can be fully effective only in the pursuit of one objective-that of price stability. Its influence on growth and employment is transitory, strong in the short run but with counterproductive side effects in the longer run and eventual washing out of growth and employment effects. Monetary policy will be most effective when it avoids overreaching itself.

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