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REPORT BY THE U.S.

General Accounting Office

Floating Exchange Rates In An Interdependent World: No Simple Solutions To The Problems

The strength of the dollar on foreign exchange markets during 1982 and 1983 had both positive and negative domestic economic consequences. On the positive side, a strong dollar contributed to a reduction in the U.S. inflation rate by reducing the dollar cost of imported goods. Conversely, the strong dollar worsened the 1981-82 recession by increasing the price of U.S. goods in relation to foreign goods, thereby reducing demand for U.S. production.

The strong dollar has been particularly troublesome for U.S. manufacturers competing with Japanese manufacturers. As a result, the yen-dollar exchange rate became an important subject on the list of U.S.-Japan trade disputes. The yen-dollar exchange rate reflects underlying differences between the U.S. and Japanese economies and respective economic policies. GAO found no support for charges that the Japanese government deliberately engineered an undervalued yen to enhance its international competitiveness. GAO did not review other measures taken by Japan to improve its competitiveness.

No simple solutions to the problems of floating exchange rates have emerged. U.S. and foreign economies are now linked by substantial trade flows and the ability of capital to move freely between countries in response to changes in domestic economic policies. Failure to recognize and deal with this interdependence can hurt the U.S. economy and be disruptive to international trade and finance regardless of whether exchange rates are fixed or flexible.



124016

GAO/NSIAD-84-68
APRIL 20, 1984

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-214616

To the Requesting Committees and Subcommittees:

This report was prepared in response to your requests that we analyze the determinants of exchange rates, including the effects of government policies on those rates. As you requested, we focused our attention on the yen-dollar exchange rate to examine the issue of Japanese government influence over that rate.

The report assesses the current state of knowledge about the factors that contribute to exchange rate determination and describes how the yen-dollar rate responded to these factors during the past 10 years. In evaluating exchange rates in general, the report highlights the constraints that international economic integration impose on economic policy formulation regardless of whether exchange rates are fixed or flexible.

Copies of this report will be sent to other interested parties upon request.

A handwritten signature in cursive script that reads "Frank C. Conahan".

Frank C. Conahan
Director

This report was requested by and is provided to the following Committee chairmen and ranking minority members.

The Honorable Charles H. Percy, Chairman
Committee on Foreign Relations
United States Senate

The Honorable Claiborne Pell
Ranking Minority Member
Committee on Foreign Relations
United States Senate

The Honorable John Heinz, Chairman
Subcommittee on International Finance
and Monetary Policy
Committee on Banking, Housing
and Urban Affairs
United States Senate

The Honorable Donald W. Riegle, Jr.
Ranking Minority Member
Committee on Banking, Housing
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United States Senate

The Honorable William Proxmire
Ranking Minority Member
Subcommittee on International Finance
and Monetary Policy
Committee on Banking, Housing
and Urban Affairs
United States Senate

The Honorable Sam M. Gibbons, Chairman
Subcommittee on Trade
Committee on Ways and Means
U.S. House of Representatives

The Honorable John D. Dingell, Chairman
Committee on Energy and Commerce
U.S. House of Representatives

D I G E S T

The dollar's strong performance on foreign exchange markets has mixed consequences for the United States. It has helped to reduce inflation by lowering prices of imported goods, but it also has made American products more expensive and reduced the demand for them. The reduced demand, in turn, contributed to the depth and duration of the recent recession. While the dollar remains strong, trade policy will remain a contentious issue.

This report examines the role of government policy in determining exchange rates and the role of floating exchange rates in an interdependent world economy.

GAO undertook this study at the request of several congressional committees that were concerned about the damage that the strong dollar could do to U.S. industry and employment. According to some analysts, the floating exchange rate system is not an adequate method to facilitate growth of world trade and investment, which ought to be the system's goal. In particular, some governments, especially Japan, are alleged to exert, either by design or as a consequence of other policies, improper influence over exchange rates, while the United States does not exert enough influence. We focused our analysis on the process of exchange rate determination, looking particularly at the yen-dollar rate and the role of Japanese government actions; the constraints that international economic interdependence impose on economic policy; and alternatives to the floating exchange rate system.

COSTS AND BENEFITS OF
THE STRONG DOLLAR

The strong dollar is both largely a consequence of U.S. economic policy and a factor influencing the results of that policy. Floating exchange rates have altered the trade-off between unemployment and inflation in the U.S. economy. Estimates by Data Resources, Incorporated suggest that while appreciation of the dollar from 1980 to July 1983 lowered

the inflation rate, it also reduced first quarter 1983 gross national product by 2.4 percent below what it might otherwise have been, and by early 1983 caused the loss of over a million jobs, mostly in manufacturing. (See pp. 1 and 2.)

NO EVIDENCE OF DELIBERATE UNDERVALUATION OF THE YEN

The yen-dollar exchange rate is an important subject on the list of U.S.-Japan trade disputes. GAO found no support for charges that the Japanese government pursued a policy to deliberately undervalue the yen relative to the dollar. Other trade disputes were not reviewed in this report. The U.S. dollar has been strong relative to the yen and other major currencies in recent years, and this has made it more difficult for American goods to compete on international markets. Increases in the dollar's value against the yen are comparable with its increases against other currencies, such as the West German mark, the British pound, and the Swiss franc. Further, changes in Japan's official foreign exchange holdings throughout 1982 and during late July and early August of 1983 suggest that any intervention undertaken by that government was aimed at strengthening rather than weakening the yen. Over the full period of floating exchange rates, the growth of Japan's official foreign exchange holdings and the size of its current account surplus relative to its economy were not out of line with those of other industrial nations. (See pp. 15 and 16.)

Japan could do more to facilitate greater international use of the yen, however. Some analysts believe that greater "internationalization" could lead, in the long run, to some increase in the yen's value. (See pp. 26 to 26.)

EXCHANGE RATES DEPEND ON A VARIETY OF FACTORS

Exchange rates in general are affected not only by the international balance of trade, but also by capital flows among nations, differences between countries' national economic policies and economic conditions, and perceived political risks and expectations. (See pp. 5 and 6.)

One source of the dollar's recent strength, for instance, appears to be the level of real interest rates in the United States, which have been higher

than in other nations. These relatively high U.S. real rates, which are at least partly attributable to U.S. macroeconomic policy, have attracted capital from other nations, increasing the demand for dollars and bidding up the exchange rate. Risks associated with the international "debt crisis" also increased the demand for dollars as international investors sought a "safe haven" for their investment capital.

The yen-dollar exchange rate further reflects differences between the Japanese and American economies. Since Japan's savings exceed domestic demand for capital, Japan is a "natural" capital exporter. Liberalization of capital flow restrictions in Japan also contributed to capital outflows as Japanese investors sought opportunities to diversify their portfolio holdings. (See pp. 16 to 18.)

HOW WELL HAVE FLOATING EXCHANGE RATES PERFORMED?

Some lessons are clear from the history of exchange rates since the breakup of the Bretton Woods system. Most importantly, flexible exchange rates have not permitted nations to pursue domestic economic policies without regard to the international consequences. Domestic considerations may outweigh these consequences, but they cannot be avoided. Costs can include reduced employment and income because of the effects of economic policy on exchange rates and imports and exports, as the recent recession demonstrated. (See pp. 27 to 30.)

A second lesson of the floating rate experience is that a market-determined rate can adversely affect firms that engage in international trade. Because exchange rates react to many variables, the market-determined rate can diverge from a hypothetical exchange rate that depends only on relative trade flows and national inflation rates. (See pp. 1, 2, 9, and 10.)

NO CONSENSUS FOR A CHANGE IN EXCHANGE RATE POLICY

The reduced U.S. output and employment attributable to the strong dollar have produced calls to modify the floating exchange rate system that was adopted after the Bretton Woods system of fixed exchange rates disintegrated.

Many international economic problems that are popularly attributed to flaws of the floating exchange rate system result from greater interdependence among the major industrial economies. Regardless of the exchange rate system in place, differences in economic policies between nations will influence international trade and capital flows. "Fixed" exchange rates that diverge from the market level could be sustained only for a short period of time. The unavoidable complications of interdependence and the limits to current understanding of exchange rate behavior prevent a consensus on changing the current system. For example, many analysts point to the potential benefits of coordinated intervention, such as reduced exchange rate volatility or misalignment. Others, however, noting that exchange rates adjust more rapidly than policy can change, contend that intervention is unlikely to succeed. (See pp. 30 to 36.)

A decision whether or not to manage exchange rates requires weighing the potential benefits against the associated risks and costs. What is clear, however, is that the integration and interdependence of national economies--their greater "openness"--constrain the range of domestic economic policies that the United States can adopt. Not recognizing these constraints can hurt the U.S. economy and be disruptive to international trade and finance.

C o n t e n t s

		Page
DIGEST		1
CHAPTER		
1	INTRODUCTION	1
	Background	1
	Objectives of review	2
	Scope and methodology	3
2	FLOATING EXCHANGE RATES: WHAT DETERMINES THEM AND HOW WELL ARE THEY WORKING?	5
	Exchange rate determination	5
	Flexible exchange rates: How are they working?	9
	Floating exchange rate variability and international trade	12
	Economic policy, interdependence, and floating exchange rates	13
3	JAPANESE EXCHANGE RATE POLICY AND YEN-DOLLAR FLUCTUATIONS DURING THE 1970S AND 1980S	15
	Yen-dollar movements since 1973	16
	How has Japan influenced the yen's value?	18
	Greater international use of the yen: A continuing issue	23
4	CONSTRAINTS ON MACROECONOMIC POLICIES AND ALTERNATIVE EXCHANGE RATE MANAGEMENT POLICIES	27
	Exchange rate and macroeconomic policies: Constraints in an open economy	27
	Alternative exchange rate management policies	30
APPENDIX		
I	Letters from Chairman and Ranking Minority Member, Senate Committee on Foreign Relations, dated Oct. 14, 1982; Chairman of the Senate Subcommittee on International Finance and Monetary Policy, dated Oct. 28, 1982; Ranking Minority Members, Committee on Banking, Housing, and Urban Affairs and Subcommittee on International Finance and Monetary Policy, dated Nov. 22, 1982; Chairman, House Subcommittee on Trade, dated Dec. 6, 1982; and Chairman, House Committee on Energy and Commerce, dated Dec. 20, 1982.	37

II	Exchange rate systems and management policies	43
III	Japanese government role in foreign exchange, international investment, and capital markets	48
IV	Econometric models of exchange rate determination	54
V	Econometric studies of the impact of exchange rate variability on international trade	79

ABBREVIATIONS

DRI	Data Resources, Inc.
GDP	gross domestic product
GNP	gross national product
IMF	International Monetary Fund
OECD	Organization for Economic Cooperation and Development
PPP	purchasing power parity
SDR	special drawing right

CHAPTER 1

INTRODUCTION

Charges that an artificially low foreign exchange value of the Japanese yen adversely affected U.S. businesses caused concerned congressional committees to ask us to analyze the determinants of exchange rates, particularly the yen-dollar rate. (See app. I.) We focused our analysis on (1) the determinants of floating exchange rates and how they are working, (2) Japanese exchange rate policies and yen-dollar fluctuations, and (3) alternatives to floating exchange rates and constraints on policies.

BACKGROUND

The strength of the dollar on foreign exchange markets during 1982 and 1983 has helped to lower the inflation rate in the United States, but it also contributed to the severity of the recession by increasing the prices of U.S. products relative to the prices of foreign products. This has made it more difficult for American firms to compete with foreign firms. The Council of Economic Advisors predicts that the consequences of the strong dollar will be felt into 1984, with the appreciation of the dollar potentially contributing as much as \$54 billion to the predicted \$110 billion 1984 trade deficit.¹ It is not possible to determine whether the trade-off between inflation and employment was better or worse because of the strong dollar, however, since there is no political consensus on such an issue.

Because foreign trade is now an important component of the U.S. economy, the consequences of this deficit have been serious. Although it is impossible to tell exactly what the economy would have been like had the dollar not been as strong, all indications are that the 1982 recession would have been less painful than it was. For example, Data Resources, Inc. (DRI) estimated the costs and benefits of the dollar's appreciation by simulating the course of the economy from the 3rd quarter of 1980 to early 1983--holding the dollar stable at its summer 1980 value. In the 1st quarter of 1983, the simulated level of real (inflation adjusted) gross national product was 2.4 percent above the actual value and the peak unemployment rate (in the final quarter of 1982) was 9.9 percent, almost 1 percent lower than the actual rate of 10.7 percent in that quarter. The simulation concludes that by early 1983, over 1 million jobs were lost because of the strong dollar; unemployment can include

¹Council of Economic Advisors, "Annual Report," in the Economic Report of the President (Washington, D.C.: Government Printing Office, 1984), pp. 43 and 47.

layoffs, firings, and plant closings or canceled or postponed new hiring.²

The strong dollar and U. S. economic policy reinforced each other during 1981 and 1982. The strong dollar helped to accomplish one goal of macroeconomic policy--lowering the domestic inflation rate. According to one study, the price level in the United States could have been 3 or 4 percent lower in 1983 because of the strong dollar.³ At the same time, U.S. economic policy explains much of the dollar's strength. U.S. monetary policy was tight during much of the early 1980s while fiscal deficits were high, resulting in high real and nominal interest rates which, in turn, attracted capital flows to the United States and strengthened the dollar.

Some industries and firms have borne a greater share of the losses from the strong dollar than have others. According to DRI, manufacturing in general was hardest hit; output fell an estimated 5.8 percent and nearly 800,000 manufacturing jobs were lost. Ford Motor Company, for instance, estimated that the recent changes in the yen dollar rate gave its Japanese competitors a \$900 per car price advantage. The dollar played some role in the problems that the auto industry has faced, particularly in 1982. Between 1980 and 1982, the imports' share of final car sales rose from 26.7 percent of units sold to 27.8 percent, a development that is at least partly caused by the foreign price advantage caused by the strong dollar. This growth in import share happened despite a voluntary export restraint program that limited imports from Japan since 1981.

OBJECTIVES OF REVIEW

The immediate objective of this review was to provide an analysis of the yen-dollar exchange rate and thus to assess the charges that the yen is or has been deliberately undervalued, or "manipulated." More generally, we address the functioning of

²Johnson, Sara, "The Costs of a Strong Dollar," Data Resources U.S. Review (July 1983), pp 1.29-1.32. Since there is no way that the dollar exchange rate could have been maintained at its summer 1980 level in the face of its overwhelming strength, this simulation distinguishes and separates the consequences of the dollar's strength from the other factors that led to the 1982 recession.

³Feldman, Robert A., "Dollar Appreciation, Foreign Trade, and the U.S. Economy," Federal Reserve Bank of New York Quarterly Review, Vol. 7, No. 2 (Summer 1982), pp. 1-9.

floating exchange rates over the last decade. We provide background material on the available knowledge about the flexible system and examine the determinants of exchange rates. The large and increasing share of the U.S. economy that is integrally tied to international trade and finance and Japan's growing role in international trade underscore the importance of these issues.

"Yen misalignment"

Charges that Japanese policies lead to a "weak yen" have generally followed one of two arguments. The first contends that Japan attempted to undervalue the yen during 1982 to achieve a competitive trade advantage. It was alleged, for instance, that "reserve manipulation" (the purchase and sale of foreign currencies from official government and central bank holdings) by Japan weakened the yen or that Japan used "hidden reserves" to undervalue the currency. (Hidden reserves are government foreign exchange reserves that are not reported as official holdings. They may be "hidden" as commercial bank deposits, for instance.)

The second argument is that the yen has been consistently undervalued because of systematic biases and barriers in the Japanese economy. The structure of Japan's capital market has been a frequent target of criticism in this area, with allegations that, by biasing the capital market in favor of capital outflows, the financial system contributes to a consistently weak yen.

These concerns about the yen can be most completely addressed through an understanding of how the flexible exchange system works, including an assessment of the costs and adjustment problems of floating exchange rates. Chapter 2 reviews the prevailing explanations of exchange rate behavior. Chapter 3 examines features of the Japanese economy most closely related to exchange rates and addresses the charges of deliberate undervaluation. Chapter 4 outlines several alternatives that have been proposed for the exchange rate system and discusses their potential benefits and costs.

SCOPE AND METHODOLOGY

We pursued our inquiry along several approaches: reviewing published and unpublished studies, interviewing foreign exchange market participants and analysts, conducting econometric analysis of exchange rate determination, and consulting with a panel of recognized exchange rate experts. The review was conducted in Washington, D.C., New York City, and Tokyo between November 1982 and August 1983.

Our review of available studies included selectively reviewing the academic and professional literature on exchange

rate determination as well as studies prepared by U.S. Government agencies. We interviewed private sector foreign exchange traders and analysts and U.S. Government officials. Information was obtained from the Departments of the Treasury, Commerce and State, the Federal Reserve Board of Governors, and the Office of the U.S. Trade Representative. We also met with an official of the International Monetary Fund. In Japan, we met with American and Japanese businessmen and bankers as well as officials in the Ministries of Finance, Foreign Affairs, and International Trade and Investment. We did not audit the operating procedures of any government or international agency. Neither did we address the other issues that make up the full list of U.S.-Japan trade disputes. This review was performed in accordance with generally accepted government auditing standards.

The exchange rate literature, particularly that found in academic journals, contains a wide variety of econometric studies of exchange rate determination. Our econometric work, summarized in appendix IV, applies this work to the yen-dollar rate, updating data when possible and adding refinements and extensions that we found useful.

The diversity of views on what determines exchange rates and the proper role of government in that determination provided an impetus to our convening a panel of noted experts on February 18, 1983. The panel was chaired by Richard Cooper, Professor of International Economics at Harvard University and former Under Secretary of State for Economic Affairs, and included Jacob Frenkel, Professor of Economics at the University of Chicago; Stanley Black, Professor of Economics at the University of North Carolina; Jeffrey Frankel, then Acting Associate Professor of Economics at the University of California at Berkeley; Rolf Sellge, Senior Vice President of Morgan Guaranty Trust Company; and Ralph Bryant, Senior Research Fellow of the Brookings Institution. The formal papers presented at this conference are being published in a companion volume to this report, "Symposium on Floating Exchange Rates in an Interdependent World" (NSIAD-84-68A).

CHAPTER 2

FLOATING EXCHANGE RATES: WHAT DETERMINES THEM AND HOW WELL ARE THEY WORKING?

Since the Bretton Woods system of fixed exchange rates collapsed in the early 1970s, major industrial nations have relied primarily on market forces to set the value of their currencies on foreign exchange markets. Exchange rates float primarily in response to market forces, but governments and central banks will try to influence the movement of their money's exchange rate, so the current system is sometimes called a "managed float."

In this chapter, we begin by describing the process of exchange rate determination. Exchange rates will change in response to a range of economic variables, including unobservable expectations of future conditions.

This chapter also evaluates the experience of floating exchange rates. During the past decade, the world's economies have experienced two oil price shocks, recessions, divergent macroeconomic policies, and expanded international debt. The stress of adjusting to these shocks has affected the level and volatility of exchange rates. While the level of exchange rates has affected world trade, there is less agreement on the effect of exchange rate volatility on trade.

EXCHANGE RATE DETERMINATION

A currency, such as the dollar, appreciates when its value in units of foreign currencies, such as the yen, goes up. The dollar appreciated against the yen when its exchange rate moved from Y 190 in 1978 to Y 278 in 1982. Conversely, a loss in value relative to other currencies is a depreciation.

Currency appreciation or depreciation depends on the demand for the currency and on its supply. An increase in currency demand or a decrease in currency supply each cause appreciation, for instance. The supply and demand for a nation's currency depends on differences between that nation and others in some or all of the following variables:

- Price levels and inflation rates.
- Interest rates.
- National money supplies.
- National incomes.
- Trade and investment flows.
- Government and private debt.
- Political risk, such as risk of government-directed economic changes or exchange controls.

Market observers also generally agree that private sector expectations of future events and policies are at least as important in determining exchange rates as current events. The foreign exchange market is extremely sensitive to events that alter expectations. The prompt reaction of foreign exchange markets to events that change expectations may be one reason why exchange rates are so hard to forecast accurately, particularly in the short term.

Modern theories of exchange rate behavior are based on a realization that exchange rates can be influenced by international capital flows as well as by international trade in goods and services. Factors that may determine the size and direction of capital flows are real and nominal interest rate differentials and differences in the riskiness of investment in different countries. Differences among nations' demand for and supply of savings underlie these capital flows. A nation will be a capital importer when its national savings are less than the sum of its investment and any government budget deficit. Conversely, excess national savings are available for foreign lending, spending, and any government budget deficit. Since such capital flows contribute to the determination of a currency's international value, exchange rates do not necessarily balance a nation's imports and exports of goods, i.e., its merchandise trade account.

Several models or explanations of exchange rate determination have been advanced. The models give different explanations of precisely how changes in the listed variables lead to exchange rate movements, but generally predict that exchange rates will move in the same direction in response to changes in the determinants. In other words, the models often depict a different process but the same outcome. In modern theories of exchange rate behavior, furthermore, many of the determinants of exchange rates are seen to be influenced by economic policies and are determined simultaneously, complicating the task of explaining or forecasting exchange rate movements. Appendix IV reviews and tests two of the modern models. Both consider the exchange rate to be the price of an asset rather than only a mechanism to balance trade flows. The two models are the "monetary" approach and the "portfolio" approach.

Exchange rate behavior: problems with statistical tests

Economists and other researchers have had only limited success in quantitatively establishing the relative importance of the various determinants of exchange rates. As a result, no model or approach to explaining exchange rates emerges as clearly superior to others in depicting the precise relationships explaining exchange rate movements. Most observers are

reasonably certain that an increase in one nation's real interest rate relative to others will lead to an appreciation of its currency (holding all other influences constant), but estimates of how large the appreciation will be vary widely. Furthermore, there is some reason to believe that the relationships that determine exchange rates may not be stable over time, so that the influence of an increase in a nation's interest rate, all else constant, may differ over time, making it more difficult to measure the influence statistically.

Our econometric analysis (see app. IV) demonstrates the problems of measuring the relative importance of the variables that are thought to determine exchange rates. The strength and even the direction of the influence, as measured statistically, changes over time in some cases. In one leading exchange rate determination model that we analyze, the average exchange rate between two currencies during a month is portrayed as a function of interest rates, cumulative current account balances, inflation levels, money supplies, and output levels in two nations.¹ We statistically measured the strength and direction of a change in the exchange rate that would be attributable to a change in each of the variables. The coefficients of the variables are the statistics that estimate strength and direction. The coefficients of the money supply variables, for instance, estimate the exchange rate changes that would result from changes in the money supplies of the two countries. The economic theory indicates that each of the coefficients will have a particular sign (either positive or negative). Empirically, however, the estimated coefficients are often statistically insignificant, preventing any "proof" of a theory's validity. In addition, some have a sign opposite to the one hypothesized by the theory.

One possible explanation for the limited success in modeling exchange rates could be changes over time in the strength and direction of influence that the determining variables have on exchange rates. To produce forecasts of exchange rates, the coefficients should not change, so a given change in a variable such as domestic inflation should have the same effect on exchange rates in one month as in another. Empirically, this does

¹This econometric analysis basically follows the monetary model of exchange rate determination; we also examined a portfolio balance approach.

not appear to be the case. Our analysis demonstrated significant changes in estimated coefficients between different periods analyzed.²

Another possible reason for the limited success of many models is the high degree of correlation among the variables that determine exchange rates. For example, Japanese and American money supply measures were highly correlated over the sample period. This situation (referred to in the econometric literature as multicollinearity) makes it difficult to statistically identify the individual effects of each variable. Tests of statistical significance may be misleading in this case, since it is not possible to tell whether a change in one nation's money supply has no significant effect or whether the data did not include a change in only one nation's money supply.

Government influence on exchange rates

When they adopt floating exchange rates, governments do not try to exert long-term control over the market process by which exchange rates are determined. They may try, however, to manage short-run movements in exchange rates, hoping that more stable and predictable exchange rates will lead to greater economic growth or domestic price stability. Incomplete knowledge of precisely how exchange rates are determined makes it impossible, however, for a government to precisely manage exchange rates with great certainty. The exact response of exchange rates to a change in a nation's money supply cannot precisely be foreseen, for instance, hampering efforts to manage exchange rates after such change.

Governments manage exchange rates with several specific goals in mind. First, they may try to "lean against the wind," i.e., to moderate the movements in exchange rates, hoping that more stable and predictable exchange rates will help to stabilize their domestic economies. Such intervention is acceptable under the International Monetary Fund (IMF) Articles of Agreement. Second, governments may intervene to "buy time" for policy changes to take place without the disruption of the exchange rates overacting. Third, a nation may intervene to counter other "disorderly market conditions," such as unusually large foreign exchange trading which causes exchange rates to rise or fall in a way unjustified by underlying market

²The idea that exchange rate determination equations are not stable over time and that this affects their forecasting power is developed further in app. IV and in Richard Meese and Kenneth Rogoff, "Exchange Rate Models of the Seventies," Journal of International Economics, Vol. 14, No. 1, Feb. 1983, pp.3-24.

conditions. IMF Articles of Agreement also sanction such intervention. Finally, governments may try to devalue their currencies to achieve an artificial trade advantage. This last type of intervention is outside the bounds of actions permitted by the IMF Articles of Agreement.

Several methods are available for managing an exchange rate. First, a government or central bank can intervene directly in the foreign exchange market, buying and selling either its own or another nation's currency. Second, a nation can impose restrictions on the flow of foreign exchange in and out of its borders, regulating access by residents (including businesses) to foreign currency or access to domestic currency by foreign firms and individuals. Third, a government's monetary policy can explicitly target the international value of its currency, as the Federal Reserve Board did to "rescue" the dollar in November 1978.³ (See p. 11.)

FLEXIBLE EXCHANGE RATES: HOW ARE THEY WORKING?

The recent history of flexible exchange rates and macroeconomic policy demonstrates the close ties existing between international and domestic economic conditions. The U.S. economy and its performance in the post-World War II era have had substantial impact on foreign economies because of its dominant size and the importance of the dollar in world finance. The world economy now has a more important influence on the U.S. economy as well.

Since there is only incomplete understanding of exchange rate behavior, no simple solutions emerge to the problems associated with exchange rate movements. Exchange rates can adversely affect trade and employment, but the state of knowledge is not sufficiently advanced to guarantee the exact outcome of

³Appendix II provides a more detailed review of how and why countries intervene on exchange markets, a topic comprehensively reviewed in the report of the Working Group on Exchange Market Intervention that was established at the Versailles Summit of the major industrial nations. For a fuller explanation of exchange rate management, see V. Argy, Exchange-Rate Management in Theory and Practice, (Princeton: International Finance Section, Department of Economics, Princeton University, Oct. 1982). Argy notes that fiscal policy, import and export controls, and non-intervention uses of official reserves are less important methods for managing exchange rates.

any policy. Researchers are unable to forecast exchange rate movements with very much accuracy when policies are unchanged. Nothing suggests that anyone can reliably forecast rates if policies change.

It has become clear, however, that as international trade and investment have become much more important to the United States over the past decade, domestic economic policies and exchange rates have become more dependent on each other. Domestic economic policy decisions affect exchange rates. At the same time, changes in exchange rates affect the policy's success in reaching goals, such as high employment or low inflation. (Chapter 4 addresses this issue in greater detail.)

Floating exchange rates have not prevented or solved many of the problems of the international economic system. Several problems popularly attributed to floating exchange rates are in reality the consequences of the United States being an open economy with internationally integrated goods and capital markets, rather than problems with any particular exchange rate system. Economic integration has provided a range of benefits and costs to the U.S. economy. American exporters can sell their products in foreign markets and thus are affected by economic conditions in other nations, not just by economic conditions at home. American consumers can buy imported products, increasing their range of choices. American investors seek overseas investment opportunities, and overseas investors are attracted by opportunities here. This openness, or interdependence, removes any opportunity that may have once existed to insulate the United States from international economic conditions.

The responses of national economies to the two oil price hikes illustrate how interdependence and floating exchange rates have been major factors in international economies. When the first oil price hike occurred beginning in October 1973, the price of imported crude oil almost quadrupled. Since the major industrial countries forming the Organization for Economic Cooperation and Development (OECD) imported 68 percent of their oil consumption, their costs for imported oil grew tremendously, from roughly \$35 billion in 1972 to just over \$100 billion in 1974. The aggregate current account balance for the OECD countries fell from a \$10-billion surplus to a \$25-billion deficit between 1973 and 1974. Similarly, when the second oil price hike more than doubled oil prices beginning in 1979, the aggregate OECD current account balance deteriorated from a \$10-billion surplus in 1978 to a \$28-billion deficit in 1979 and a \$69-billion deficit in 1980.

Both oil price hikes, at a minimum, contributed to the worldwide recessions of the mid-1970s and early 1980s as well as to the high rates of inflation that occurred. The magnitude of the oil price increases clearly influenced macroeconomic policies in the industrialized nations.⁴ After the first oil price increase, the OECD nations, including the United States, tried to accommodate the oil price hike and lessen the inflationary consequences by following restrictive monetary and fiscal policies during 1974.⁵

Floating exchange rates meant that the industrial nations were not committed to maintaining fixed exchange rates or agreeing on adjusting exchange rates in face of massive current account deficits. Thus they had the flexibility to try to minimize the damage from the oil price increase. However, flexible rates did not permit nations to ignore the higher oil prices in the long run.

The role of floating exchange rates in the second oil crisis is harder to disentangle. In 1979, oil prices increased by roughly 39 percent, turning a \$10-billion OECD current account surplus in 1978 to a \$28-billion deficit in 1979 that grew to \$69 billion in 1980. During 1977 and 1978, however, the dollar was rapidly declining in value, apparently in response to U.S. inflation and current account weakness.

The weakness in the dollar during 1978 led to the "dollar rescue package" jointly announced by the Treasury and Federal Reserve Board on November 1, 1978. The package included tightening monetary policy through a 1 percent increase in the official discount rate and establishment of supplementary reserve requirements for large time deposits, and creating a \$30-billion fund to enable the United States to intervene in foreign exchange markets and purchase dollars. This fund consisted of drawing on U.S. reserves in the IMF, sales of SDRs (Special Drawing Rights), currency swap agreements with the central banks of West Germany, Japan, and Switzerland, and U.S. Treasury issues of foreign currency denominated bonds. Finally, the

⁴A substantial body of recent research has examined how the oil price hikes influenced macroeconomic policy and thus exchange rates. See, for example, papers by Paul Krugman, Jeffrey Sachs, and Willem Buiter and Douglas Purvis in Jagdeep Bhandari and Bluford Putman, eds., Economic Interdependence and Flexible Exchange Rates (Cambridge, Mass.: MIT Press, 1983).

⁵See Edward R. Fried and Charles L. Schultze, Higher Oil Prices and the World Economy (Washington, D.C.: The Brookings Institution, 1975) and W. M. Corden, Inflation, Exchange Rates and the World Economy, 2nd. ed., (Chicago: University of Chicago Press, 1981).

dollar rescue package included an agreement among the United States, West Germany, Switzerland, and Japan to coordinate their foreign exchange interventions to strengthen the dollar.

The Federal Reserve Board also changed its operating procedure in October 1979, concentrating on slowing the growth of monetary aggregates rather than keying its policies to market interest rates. The separate effects on the value of the dollar of the second oil price hike, the dollar rescue, the tighter U.S. monetary policy, and the new Federal Reserve operating procedure cannot be easily or definitively separated.

FLOATING EXCHANGE RATE VARIABILITY AND INTERNATIONAL TRADE

Although floating exchange rates can reach levels that adversely affect a particular nation's international trade performance, the variability of the rates does not appear to be as substantial a problem. Exchange rates have fluctuated widely in the past decade and can vary considerably in daily trading; attempts to predict future exchange rates generally are unsuccessful. Firms that engage in international transactions thus assume different risks than they would if exchange rates were stable or predictable, although exchange rate futures markets enable them to insure against exchange rate losses.

The exchange rate risk must be weighed against the risk of economic policy changes being undertaken to prevent exchange rate movement. For example, exchange rates are more stable and predictable under a crawling peg system than they are under a floating rate system. Since economic policy must be used to maintain the "pegged" exchange rates, however, there can be greater uncertainty about monetary and fiscal policies and the effects that these policies may have on firms engaged in international trade.

The growth of international trade during the floating exchange rate era would seem to prove that exchange rate variability has not imposed a greater cost on international trade than uncertainty about policy moves to limit this variability would have. Such growth as a share of economic output for industrial nations between 1972 and 1982 was widespread and substantial, as the examples in Table 1 indicate.

Table 1
International Trade Transactions as a
Share of Total Output

	<u>1972</u>	(percent)	<u>1982</u>
United States	8.8		14.8
Japan	17.4		25.4
West Germany	33.7		50.3
United Kingdom	32.6		41.0

Source: Calculated from Chase Econometrics "OECD Main Economic Indicators Data Base" using nominal values of imports, exports and total output.

A more relevant question, however, is whether these increases in trade would have been greater had exchange rate variability not been a factor. Econometric studies are not conclusive. Several studies found statistically significant impacts of exchange risk in trade, but the effect was not statistically robust when the specification of the estimating equations was changed. In some cases, the size of the adverse trade effect was large. Other studies, however, either found no significant trade impact or their measurement of the impact was sensitive to the formulation of the model, reducing confidence in the estimates. Appendix V summarizes results from a selection of these studies.

ECONOMIC POLICY, INTERDEPENDENCE,
AND FLOATING EXCHANGE RATES

The international economic system absorbed significant policy-induced shocks in the 1970s and early 1980s. In the late 1970s, for instance, the United States substantially tightened monetary policy to reduce the domestic inflation rate, strengthening the dollar in the process. Japan significantly changed its financial structure, most importantly (for exchange rates) reducing restrictions on capital markets. (See ch. 3 and app. III.) Another policy-induced shock to the system was the 1978 dollar rescue package.

The increasingly close links among the industrial nations' economies means that any disturbances will be transmitted across national borders. This is the cost of integration and interdependence, just as increased international trade and investment opportunities are the benefits. Floating exchange rates have not separated the benefits of integration from the costs. According to one leading economist:

". . . even if they were entirely unmanaged, flexible exchange rates could not alone fulfill two of the functions expected of them by some of their proponents in the late 1960s and early 1970s. That is, exchange rate movements cannot, in a world of high international mobility of capital, insulate a country fully against economic disturbances originating abroad, or, conversely, confer autonomy on national stabilization policies in an interdependent world. Nor do they provide an automatic and painless mechanism of balance-of-payments adjustment, although they play a critically important role in both the buffering and the payments equilibration function."⁶

⁶Whitman, Marina, "A Year of Travail: The United States and the International Economy," Foreign Affairs, Vol. 57, No. 3, (1978), pp. 533-4.

CHAPTER 3

JAPANESE EXCHANGE RATE POLICY AND YEN-DOLLAR FLUCTUATIONS DURING THE 1970s AND 1980s

Available evidence suggests that the Japanese government has followed a short-term policy of moderating exchange rate movements to avoid rapid and possibly destabilizing fluctuations, a policy that is consistent with the IMF Articles of Agreement (see pp. 8 and 9). According to the Working Group on Exchange Market Intervention set up at the Versailles Summit in 1982, this policy, "leaning against the wind," has been followed by all other Summit countries at various times. We found no support for charges that Japan manipulates the yen or has a current deliberate policy of yen undervaluation. No IMF reports have suggested that Japan has exceeded the bounds of the Articles of Agreement.

Furthermore, an artificially cheap yen would itself cause problems for the Japanese economy. Although Japanese exports might increase, imports would become more expensive. About 97 percent of Japanese imports, including virtually all its oil and raw materials, is priced in currencies other than the yen. As a result, Japan would bear the risk of higher domestic prices for imports--and potentially higher inflation--that would result from a deliberately undervalued yen.

During the 1970s, domestic and foreign pressures forced Japan to liberalize its financial system and capital markets, thus linking its economy more closely to world economic developments. While this is a positive long-run development and is encouraged by the United States, these closer economic linkages can cause undesirable yen-dollar exchange rate fluctuations as capital moves more easily between Japan and the rest of the world, including the United States. There is no indication, however, that long-term Japanese domestic financial policies or policies related to international capital markets have been pursued to maintain an undervalued yen for competitive reasons. While liberalization may have contributed to the yen's depreciation by culminating during a period of large interest rate differentials between the United States and Japan, we found no support for charges that such depreciation was a goal of liberalization.

Japan's foreign trade performance has not followed a pattern that would be expected if Japan had undervalued the yen for competitive reasons. From 1971 to 1978, despite yen appreciation of almost 60 percent, Japan's exports as a share of all industrial nations' exports increased from 10.3 percent to 12.1 percent. Yen depreciation after 1978 also did not appear to significantly alter the persistent U.S. trade deficit with Japan. When the yen was particularly strong in 1978, the U.S.

balance-of-trade deficit with Japan was \$11.6 billion, compared with \$16.8 billion in 1982 when the yen was weak. Putting those figures into constant dollars yields comparable levels of real trade deficits in those 2 years.

Further, Japan's current account surplus has not been an unusual percentage of its gross national product (GNP), as we would have expected if the yen were persistently undervalued. Between 1973 and 1981, Japan's current account surplus averaged 0.15 percent of gross national product, compared with 0.11 percent for the United States and 0.47 percent for West Germany.

The weakness of the yen against the dollar since 1979 has been similar to that of other major currencies. During January 1979 to November 1982, the yen fell by 34.1 percent, the British pound 22.8 percent, the West German mark 38.3 percent, and the Swiss franc 31.4 percent.¹ When the data are adjusted for differences in national inflation rates, they showed much the same pattern, with the yen falling 37.9 percent, the pound 8.9 percent, the mark 45.0 percent and the Swiss franc 51.0 percent.

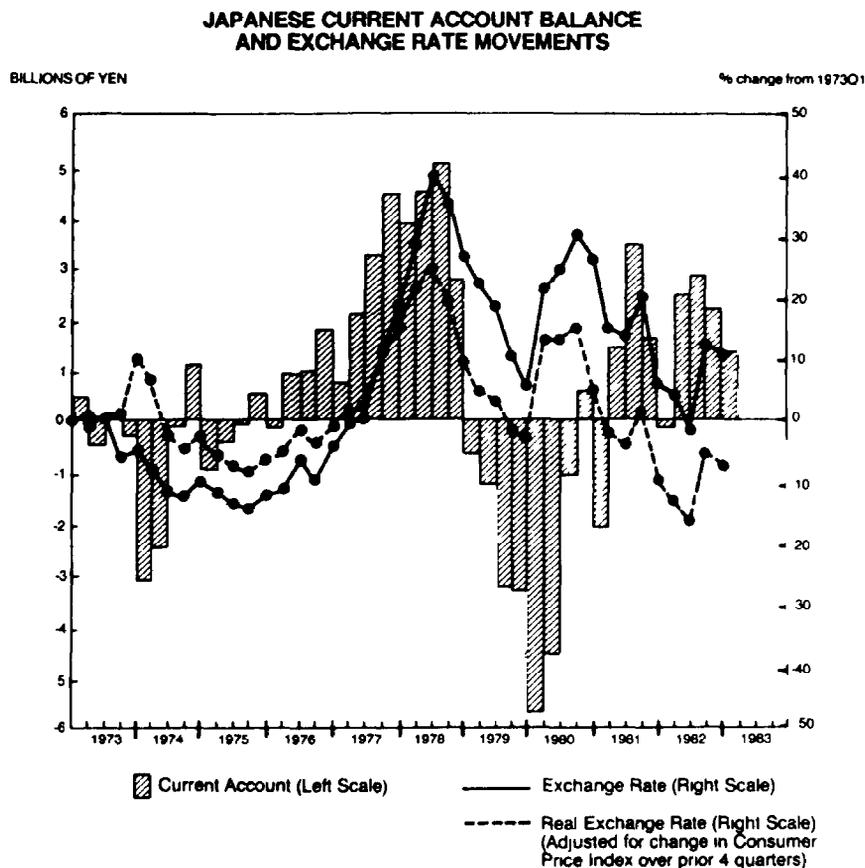
YEN-DOLLAR MOVEMENTS SINCE 1973

Movements in the yen-dollar exchange rate during the floating period may be divided into periods of yen weakness or strength. The yen declined in value (relative to the dollar) after the first oil crisis in October 1973, rose in 1977 and 1978, declined again after the second oil crisis in August 1979, recovered somewhat during late 1980 to early 1981, only to weaken and remain weak for much of the 1981 to 1983 period. Prior to 1981, movements in the yen followed developments in Japan's current account balance, but this trend does not appear as evident after 1981. (See chart 1.)

Several other variables and events have influenced the behavior of the yen-dollar rate during the last 3 years. Differing U.S.-Japan policies have contributed to real interest rate differentials between the two countries and to increased demand for dollars as investments.

¹November 1982 was selected since the lowest recent value for the yen, Y 278 to the dollar, was reached in early November. The yen remained close to Y 240 to the dollar during late July and early August 1983 when the dollar continued to appreciate against European currencies.

Chart 1



Differences in monetary policy have contributed to the yen-dollar exchange rate. In an effort to lower inflation and slow the economy in late 1979, the U.S. Federal Reserve Board tightened monetary policy and set money supply targets in place of interest rate targets. U.S. real interest rates soon reached post-war highs. Japan, on the other hand, did not have the sustained inflation problem of the United States, and so by the third quarter of 1980 Japan was intent on stimulating a stagnant economy. The Japanese government's commitment to reduce budget deficits put the burden for providing this stimulus on monetary policy. The monthly average discount rate was reduced from 9 percent in July 1980, a post-war high, to 5.5 percent by

January 1982.² During the same period, the U.S. discount rate rose from 10 percent to 14 percent in September 1981, falling back to 12 percent by January 1982.

Substantial interest rate differentials may have affected capital flows more than they might have during an earlier period, since Japan gradually liberalized the regulation of its capital markets during the 1970s and linked Japan to international financial developments just as U.S. interest rates rose. This liberalization was codified by the Foreign Exchange and Foreign Trade Control Law that entered into force in 1980. Capital flows in and out of Japan grew over the 1980 to 1982 period; long-term capital inflows in 1980, 1981, and 1982 totaled \$42.0 billion, a 204 percent increase over total capital inflows of the preceding 7 years. Similarly, 1980, 1981, and 1982 long-term capital outflows totaled \$61.1 billion, compared to \$56.9 billion during the previous 7 years.

Japan's savings rate and the excess of domestic savings over domestic demand for savings make Japan a natural capital exporter. The Japanese savings rate was 20.8 percent of disposable income in 1981, exceeding the United States 5.6 percent, West Germany's 13.8 percent, and Britain's 13.7 percent. During 1982, gross savings in Japan were 31.6 percent of gross domestic product, and government receipts were 29.3 percent, which together exceed the sum of the government consumption share of 26.5 percent of GDP and the fixed capital formation share of 29.6 percent of GDP. The excess of domestic savings over domestic demand for these savings was then available for overseas investment and lending.

In addition to the net capital outflows, the yen may also have weakened during 1982 and 1983 in response to other factors. These may have included continuing external threats to restrict Japan's future export earnings, and fears over the international debt crisis, increasing the demand for the dollar as a "safe haven."

HOW HAS JAPAN INFLUENCED THE YEN'S VALUE?

The Japanese government has used domestic monetary policy, capital controls, and foreign exchange intervention to influence the exchange rate. Such policy has been set to moderate short-term fluctuation in the yen-dollar exchange rate. However, in the post-1981 weak yen period, Japan has not been able to rely

²Changes in the official discount rate are important since other rates fluctuate in a narrow range around the rate. For example, banks set their short-term prime rate (for loans running less than 1 year) at 50 basis point (or one-half of one percent) above the discount rate.

as heavily on monetary policy or capital controls to influence exchange rate movements.

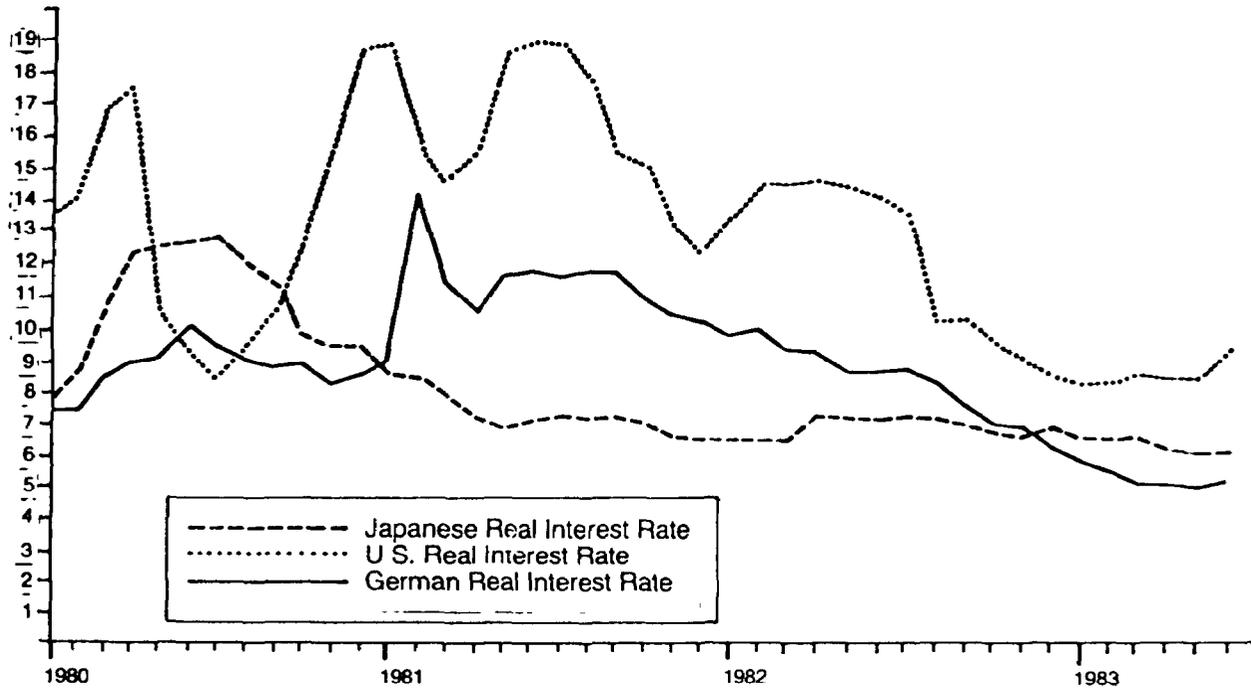
Monetary policy

In the wake of the two oil crises, Japanese monetary policy was tightened to hold down inflation and at the same time to support the yen's value when it became weaker. Shortly after each of the two oil shocks, the central bank discount rate was raised to the post-war high of 9 percent. Because of the importance of the discount rate, other interest rates soon increased. During 1982 and 1983, however, raising interest rates to support the yen was not consistent with Japan's domestic economic objectives, given its current low level of economic growth and inflation. Despite the constraints, Japan tightened monetary policy somewhat during 1982 to bolster the weak yen. Growth in the Japanese money supply slowed during 1982 and early 1983, declining from an annual growth rate of 12.2 and 12.3 percent in January and February 1982 to 7.9 and 6.4 percent in December 1982 and January 1983. Furthermore, the Bank of Japan maintained the discount rate at 5.5 percent until October 1983 despite domestic pressure for a lower rate.³ (The Bank of Japan did lower the discount rate to 5 percent on October 21, 1983 as part of the Japanese government's policy to stimulate the economy.)

Japanese policy of setting regulated interest rates below market levels and administratively rationing credit to selected industries has been criticized as a factor contributing to an undervalued yen. This credit allocation scheme, however, has been breaking down as more investment instruments with market-determined rates have appeared, although some rates (including those on deposits and original sales of government bonds) remain under control. The relevance of the low interest rate policy to exchange rate determination during the current weak yen period is unclear since real interest rates (i.e., inflation adjusted rates) in Japan have been at historically high levels. Recently, they have been comparable to those of other industrialized countries, as shown in chart 2.

³At the same time, the U.S. discount rate fell from 12 percent in December 1981 to 8.5 during the summer of 1983, where it remained until October 21, 1983. Declining differentials between U.S. and Japanese interest rates may be a factor in the recovery of the yen from its November 1982 low of Y 278 to the dollar; increases in U.S. interest rates during the summer of 1983 strengthened the dollar.

Chart 2
ESTIMATED REAL INTEREST RATES



Note. Real interest rates are estimated to be call money rates (Federal funds rate in the United States) minus percent change in Consumer Price Index over prior 12 months.

Notwithstanding the comparability of real interest rates, there are some suggestions that international investors look primarily at nominal interest rates for short-term investments and consider relative levels of domestic inflation only to the extent that they affect exchange risks of an investment. Relatively high U.S. nominal interest rates thus may attract capital, strengthening the dollar relative to the yen.

Capital controls: a weaker policy tool

During an earlier stage of the floating exchange rate period, the Japanese government actively intervened in the capital market to moderate exchange rate movements. After each of

the two oil shocks, for instance, the government tried to increase the yen's value by encouraging capital inflows and discouraging outflows. The measures to encourage inflows included abolishing restrictions on purchases of Japanese securities by non-residents, reducing marginal reserve requirements on free yen accounts, and requiring foreign banks to convert larger amounts of foreign currency into yen. The measures to discourage outflows included limiting resident foreign exchange holdings, restricting banks' offshore lending, and discouraging foreign stock purchases.

After 1980, the Japanese government relaxed controls on the nation's capital markets. This reduced the opportunity for these activist policies and established the principle that, in general, foreign transactions would not be restricted. We found nothing to suggest that the liberalization was "one-sided" to encourage only capital outflows, as has been charged. (See app. III for further discussion.)

The Japanese government, however, continues to practice "administrative guidance," a form of moral suasion over private sector activities, in order to influence capital movements and thus the exchange rate. Available evidence suggests that administrative guidance has been used to support the yen when it was weak as well as to counter the yen during periods of yen strength. During 1982 and 1983, for example, the Ministry of Finance restrained overseas yen lending by banks. This tended to strengthen the yen. IMF's Annual Report on Exchange Restrictions indicates that Japan used administrative guidance after both oil price shocks to discourage capital outflows, strengthening the yen during periods when it was depreciating relative to the dollar.

Foreign exchange market intervention

During the periods of yen weakness, the Bank of Japan sold foreign exchange, usually dollars, from its reserves to support the yen. After the first oil crisis in 1973, official reserves fell by \$1.6 billion between November 1973 and January 1974. Support for the yen was even stronger after the second oil crisis in 1979, as reserves fell by \$12.7 billion during 1979. During 1982, reserves decreased by \$5.1 billion. The government stopped actively intervening in November 1982, after the yen's sharp appreciation, until it participated in the joint intervention during late July and early August 1983, along with the United States, West Germany and Switzerland, to try to limit or prevent the dollar's appreciation.

After November 1982 (but before the July and August 1983 intervention), reserves increased approximately \$100 million to \$331 million a month. During August, reserves declined by \$541 million. We could not determine the precise reasons for these

increases but, according to the New York Federal Reserve Bank, they primarily reflected interest earnings on reserves. Other possible explanations include U.S. government non-market purchases of yen from the Japanese government to fund military expenditures in Japan and yen borrowings by third countries from the IMF which may increase the Japanese government's foreign official assets.

Some analysts have contended that Japan's not selling dollar interest earnings denominated and payable in dollars is a subtle form of government intervention, since selling the dollar earnings would have increased the demand for yen.⁴ The Bank of Japan, however, follows the normal practice of central banks of limiting the sale of foreign exchange to deliberate interventions. Central banks do not automatically sell dollar interest earnings.

Japan has accumulated reserves since the beginning of the floating exchange rate era in early 1973, but not at an exceptional rate. For example, between the 1st quarter of 1973 to year end 1982, Japan's reserves (minus gold) grew 4.1 percent a year compared to a 10.3 percent annual rate for industrial countries as a whole, or a 6.3 percent annual rate for West Germany.

In examining reserve holdings we relied on published data of government-held reserves. We did not empirically examine the possible role of "hidden reserves", i.e., government reserves that are deposited in Japanese commercial banks rather than in the central bank. No data on such reserves are available. The use of hidden reserves was said to have been the Bank of Japan's policy during the 1950s and 1960s to assist cash-short commercial banks. Hidden reserves were also used during the 1977-78 period when the yen was exceptionally strong. A Bank of Japan official told us that these reserves are no longer needed since Japanese banks are no longer cash-short.

Use of Japanese policy tools to counter
the strengthening yen in 1978:
an example of "leaning against the wind"

The Japanese policy of moderating fluctuations in the yen-dollar rate has not been limited to situations when the yen has been weak, such as the early 1980s. During 1977 and 1978, the

⁴Official foreign exchange reserves may increase as interest (in dollars) is earned on dollar-denominated assets held in the reserves, while intervention can increase official reserves by the purchase of dollar-denominated instruments with yen.

situation was the opposite of what it was during the 1981 to 1983 period; the dollar became so weak against the yen and other currencies that nations agreed to help "rescue" the dollar. Japanese exchange rate policy at that time was consistent with a policy of leaning against the wind. Japanese action then to weaken the yen took place under different circumstances than existed during 1981 to 1983, despite charges that Japanese actions in 1977 and 1978 are part of a long-term undervaluation strategy.

During 1978, Japan had an expansionary monetary policy. The discount rate fell to 3.5 percent while a broad measure of the money supply (M2 plus certificates of deposit) grew by 12 percent from the 4th quarter of 1977 to the 4th quarter of 1978, while real growth in the economy measured 6.0 percent. The government encouraged capital outflows and discouraged inflows, as discussed on pages 20 and 21. The government tightened controls on securities purchased by non-residents and raised marginal reserve requirements on free yen accounts, which would tend to reduce the return on these deposits. To encourage capital outflows, banks were given blanket approval for overseas lending by the Ministry of Finance and residents were permitted to hold larger foreign currency deposits in Japan and overseas. These measures were consistent with actions taken by West Germany, Italy, and Switzerland to counter appreciation of their currencies relative to the then weak dollar.

The Bank of Japan also intervened in the foreign exchange market, accumulating approximately \$16.4 billion in international reserves between January 1977 and December 1978. Similarly, West Germany's official reserves increased by approximately \$19 billion in the 2-year period ending December 1978, while Switzerland's more than doubled from November 1976 to December 1978.

This period culminated in the dollar rescue package of November 1978. Responding to continuing declines in the dollar's value the Federal Reserve Board raised the discount rate by one percentage point and joined the central banks of West Germany, Switzerland, and Japan in closely coordinated exchange market intervention. Announcement of the rescue package was followed by a sharp appreciation of the dollar.

GREATER INTERNATIONAL USE OF THE YEN: A CONTINUING ISSUE

Some analysts believe that an increased international role for the yen would increase demand for it and thus its value. This belief has led to calls for greater "internationalization" of the yen. Despite recent growth in use of the yen as a reserve and transaction currency, its international use is less than would be expected given Japan's industrial strength and

international importance. Acceptance of the yen by international financial markets is a prerequisite for internationalization. The Japanese government can facilitate this acceptance.

The internationalization of a currency, however, imposes constraints on domestic economic policy, particularly monetary policy. This is already apparent in the case of Japan, and chapter 4 points to the implications of this fact for the United States. For this reason, many countries prefer not to see more international use of their currencies. Nonetheless, the Japanese government appears to have accepted the inevitability of greater international use of the yen.

Yen-denominated transactions for both exports and imports continue to be low in relation to the use of domestic currency by other industrialized countries. The share of Japan's exports with contracts written in yen has increased, however, largely due to the increased competitiveness of Japanese exporters. As recently as 1970, yen-denominated exports from Japan accounted for less than one percent of total exports. Yen-denominated contracts surpassed 30 percent by the early 1980s, reaching 40 percent during early 1983. Roughly \$45 to \$50 billion worth of Japanese export contracts were written in yen in 1982, up from less than \$500 million in 1970. Despite these gains, however, the share of Japan's exports denominated in yen is still small compared with approximately 98 percent share of U.S. and 82 percent of West German trade contracted in the home currencies.

Unlike the growth in yen-denominated export contracts, however, the percentage of yen-denominated imports has remained virtually stagnant at 2 to 3 percent, which is low compared with the United States at 85 percent and Germany, the United Kingdom, and France at about 36 to 43 percent. Two factors account for this continued low percentage of yen-denominated imports. First, a high proportion of Japan's imports, nearly two-thirds in 1981, consisted of raw materials and fuels, for which payment has traditionally been in dollars. Second, import financing in yen is not fully developed. In particular, the absence of a bankers' acceptance market⁵ in yen forces importers to rely on dollar financing and demonstrates the relative lack of investment opportunities in Japan's short-term money market compared with the United States, where bankers' acceptances are sold as short-term investments. The short-term money market in Japan, however, currently consists only of the call money and bill discount markets (in which participation is limited to financial institutions) and certificates of deposits and Gensaki markets⁶

⁵Bankers' acceptances are self-liquidating credit instruments that are used to finance international trade.

⁶The Gensaki market consists of repurchase agreements on long-term government bonds. Because of the liquidity of the agreements, the Gensaki market is a short-term market.

that are open to individual investors. No short-term government securities market⁷ or commercial paper market exists in Japan. This relative lack of diversity may explain why the size of Japan's short-term money market was about \$77 billion at the end of 1982, compared with a U.S. commercial paper market of \$166.2 billion or a U.S. bankers' acceptance market of \$79.5 billion.

Despite the shortcomings of Japan's short-term money market, the internationalization of the yen as a reserve currency has grown, as shown in table 2. One measure of this is that central bank holdings of yen as reserve assets increased from less than 1 percent of total holdings in 1975 to 4.1 percent in 1981.

Table 2
Reserves held by Monetary Authorities^a

(Composition by Currency as of year-end)

<u>Currency</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>	<u>1981 rank</u>
(percent of total reserve holdings)				
Yen	0.5	3.8	4.1	3
U.S. dollar	79.4	68.3	70.6	1
Sterling pound	3.9	2.9	2.3	5
Deutsche mark	6.3	13.9	12.5	2
French franc	1.2	1.3	1.1	6
Swiss franc	1.6	3.1	1.0	7
Dutch guilder	0.6	0.9	2.8	4

^aExcludes European currency units (ECU)

Source: IMF, International Financial Statistics

This increase represents fairly rapid growth in use of the yen, but its use as a reserve currency remains well below that of the West German and U.S. currencies. It is also far below the yen's international importance as measured by the percentage composition of SDRs, i.e., a reserve asset created by the IMF whose value is determined by the relative worth of a basket of currencies. The weighted composition of the basket of currencies currently making up SDRs is U.S. dollar, 42 percent;

⁷Treasury bills are purchased almost exclusively by the Bank of Japan.

Deutsche mark, 19 percent; and Japanese yen, French franc, and British pound, each, 13 percent.

Reduced capital controls were a factor in generating greater private investment in yen-denominated instruments. The Japanese Ministry of Finance estimates that non-resident private and public holding of yen-denominated instruments exceeded \$70 billion by the end of 1981. Portfolio diversification by foreign investors such as oil-exporting nations, increased international confidence in Japan, and growth in Japanese financial markets were cited as the reasons for this.

While the Ministry of Finance accepts greater international use of the yen as a natural development given Japan's economic importance, the Japanese government does not actively promote or hinder the yen's internationalization. Its view is that promotion would be fruitless, since internationalization depends on the willingness of other countries and non-Japanese investors and traders to use and hold yen-denominated securities.

As Japan's liberalization in the financial area continues, it is inevitable that the yen will become more widely used as a transaction and reserve currency. We agree with the Ministry of Finance that expanded international use of the yen results from the decisions of independent foreign investors and traders, but the Japanese government can facilitate the greater international use of the yen as a transaction and reserve currency in several ways. These include continued interest rate deregulation and further diversification of Japan's short-term money markets, including creation of markets for short-term government debt, bankers' acceptances, and commercial paper.

CHAPTER 4

CONSTRAINTS ON MACROECONOMIC POLICIES AND ALTERNATIVE EXCHANGE RATE MANAGEMENT POLICIES

As recent charges of yen misalignment indicate, the experience with floating exchange rates has been controversial. Exchange rate misalignments or fluctuations have been blamed for a wide range of international economic problems and trade controversies. We believe, however, that many of the problems attributed to floating exchange rates are in reality problems of being part of an interdependent international economic system rather than problems inherent in any exchange rate regime. Many so-called floating exchange rate problems would exist under a fixed exchange rate system.

Although currency fluctuations have created genuine problems and some observers have called for modifying the floating exchange rate system, there is no consensus as to whether changes would be desirable and no agreement on what would constitute a better system. We are aware of no conclusive proof that foreign exchange markets are inherently flawed by inadequate information or other "market failures."

Many variables, including such unmeasurable factors as political risk and expectations, influence exchange rates. A consequence of these complex determinants is that foreign exchange markets can yield exchange rates that have adverse trade and employment consequences for the United States or for other nations at particular times.

A further consequence is that there is no way to be sure whether a particular exchange rate management policy is better or worse than the current U.S. policy of active intervention only in the most extraordinary cases. Exchange rate management policy is naturally limited in its influence and application and cannot remedy fundamental economic problems or avoid differences between the United States and other nations. It cannot counter long-term trends of economic specialization among nations or the effects of divergent macroeconomic policies.

In this chapter we review the constraints that the current state of international economic interdependence and floating exchange rates impose on domestic economic policy and discuss alternatives to the current floating exchange rate system.

EXCHANGE RATE AND MACROECONOMIC POLICIES: CONSTRAINTS IN AN OPEN ECONOMY

Since 1973, the United States has relied primarily on markets to determine exchange rates, although in the past it sought to manage short-run exchange rates through intervention. In recent years, exchange rates have become increasingly important as international trade and financial transactions, which

are influenced by the level of exchange rates, have become a larger share of total economic activity. Moreover, agreements to remove barriers to international trade (such as quotas or other nontariff trade barriers) become harder to reach when exchange rates adversely affect a nation's trade. As long as the dollar remains strong, for instance, pressure for legislation to restrict trade is likely to remain.

Because the U.S. economy is integrated with the rest of the world, domestic economic policy exerts different influences on national income and output than would have been the case if the United States were an economic island. These differences constrain the range of policies that are available for economic stabilization. While the nature of the different reactions to economic policy depends on whether exchange rates float or are fixed, a retreat to fixed rates cannot remove international considerations from policy choices.¹

Monetary policy becomes a more potent tool in an open economy with floating rates than it could be in a closed economy. In either closed or open economies, monetary expansion can increase national income through lower interest rates, although it can also trigger inflation. Because of the economy's ties to the rest of the world, the exchange rate depreciation that accompanies monetary expansion also stimulates the economy as domestic production is substituted for foreign production. Exporters can sell more in foreign markets and domestic consumers will increase spending on relatively less expensive domestic goods.

If the nation were committed to defending a fixed exchange rate, however, monetary policy would become less important. The exchange market intervention necessary to relieve pressure to devalue the currency would offset any policy-directed money supply increase.

Regardless of the exchange rate regime, therefore, international considerations constrain monetary policy. Under flexible exchange rates, however, monetary policy is much more powerful than would be expected looking only at the domestic economy.

¹This discussion is based on Rudiger Dornbusch and Stanley Fischer, Macroeconomics (New York: McGraw-Hill, 1978) and Charles Kindleberger and Peter Lindert, International Economics (sixth ed.) (Homewood, Ill.: Richard D. Irwin, 1979). These references, among others, provide a more detailed description of the process outlined here.

If the strengthening of monetary policy under flexible exchange rates were not taken into account, the economy could be inadvertently "overheated." Under fixed rates, monetary policy can be ineffective.

The effectiveness of stimulative fiscal policy, on the other hand, may be either enhanced or lessened, depending on how the exchange rate responds to the policy. If an expansionary fiscal policy raises interest rates and attracts capital inflows, at least part of a budget deficit is financed by foreigners. If these inflows result in exchange rate appreciation (foreign capital being attracted by high interest rates), the fiscal policy stimulus will be dampened as foreign production becomes less expensive than domestic production and demand shifts from domestic to foreign production. However, if the budget deficit's attraction to foreign capital is not as important a factor as the expanding economy's demand for imports, the exchange rate will depreciate. As domestic production gains at the expense of foreign production, in the latter case, the fiscal policy stimulus can be enhanced.

If the nation were committed to fixed rates, however, monetary policy would have to respond to relieve pressure to revalue the currency. If the exchange rate were under pressure to devalue, the monetary authority would have to purchase domestic currency in its intervention, leading to a reduced money supply and countering the fiscal policy stimulus. Conversely, if there were pressure to increase the currency's exchange rate, the changes in monetary policy would be stimulative. In either case, however, while fixed exchange rates would change the nature of the international constraints on domestic economic policy, they would not provide a way to avoid these constraints.

Recent U.S. macroeconomic policy illustrates these constraints. In a move designed to counter unacceptably high levels of inflation, U.S. monetary policy was restrictive through the first half of 1982.² While the inflation rate has declined substantially, the tight monetary policy and expansionary fiscal policy contributed to high nominal and real interest rates that, in turn, appear to be the most significant cause of the dollar's strength. Higher interest rates helped attract capital inflows which helped to finance the budget deficit. The gains in lower inflation (from both monetary policy effects on

²See GAO An Analysis of Fiscal and Monetary Policies (Aug. 31, 1982) (GAO/PAD-82-45) for full description of monetary policy during the first half of 1982.

the domestic economy and lower import prices following the dollar's appreciation) came at the cost of increasing prices for American goods relative to competing foreign goods that reduced demand for U.S. goods in domestic and international markets, as did the worldwide recession. The resulting losses in output and employment played a major role in the recession.

Although it is a matter of political judgment whether the output and employment losses of the recession were an acceptable price for the lowered U.S. inflation rate, U.S. economic policy has been the target of considerable international criticism. The "imbalance" between tight monetary policy and loose fiscal policy was criticized as the source of the dollar's strength and the ensuing problems. For example, the Group of Thirty, a research organization made up of leading experts in international finance, argued that:

"...the time has come for the United States, in both its own and the common interest, to pay more attention to exchange-rate considerations in framing its domestic policies, and in particular, to avoiding an unbalanced mix of monetary and fiscal policies."³

The Japanese experience demonstrates another way in which open economies constrain policymakers. As chapter 3 notes, the Bank of Japan delayed dropping its official discount rate for fear that this would have further depreciated the yen and led to international criticism of Japan. Apprehension over the "signals" that a discount rate drop would send and over the prospects of retaliation clearly constrained its decision; such apprehension would not have mattered as much in an economy where international trade and capital flows were unimportant.

ALTERNATIVE EXCHANGE RATE MANAGEMENT POLICIES

The persistence of the strong dollar and the worldwide recession in the early 1980s have led to a number of suggestions to modify the international monetary system, either to lessen exchange rate fluctuations or to reduce the sensitivity of economies to international economic disturbances.

No consensus exists on either the need for change or specific types of changes to make. One thing is clear, however: in an open economy having important international trade and capital flows (such as the United States), domestic economic

³The Group of Thirty, "The Problem of Exchange Rates," May 7, 1982, para. 22.

policies will have international ramifications. Similarly, the domestic economy cannot be insulated from economic events elsewhere. Fluctuations in exchange rates are manifestations of differences between national economies. So long as the economy remains open, efforts to "manage" the foreign exchange markets can do no more than moderate the fluctuations. As earlier discussion notes, however, there is a wide recognition and agreement that any exchange rate management policy cannot alone counter the effects that domestic economic policy has over the long term. (See p. 27.)

Capital controls

By restricting capital movements in and out of a country, capital controls are supposed to limit exchange rate fluctuations or to influence the exchange rate. Such controls are designed to lessen the transmission of economic disturbances across national borders by limiting economic interdependence. In doing so, however, a country foregoes some benefits of interdependence such as greater access to overseas investments or to foreign sources of funds.

Capital controls can take several forms and can be established to favor capital inflows or outflows. Restricting outflows or encouraging inflows of capital, for instance, would be strategies to strengthen a nation's currency. Possible techniques include taxing capital outflows (as the United States did with the Interest Equalization Tax in the 1960s), restricting bank loans to foreign borrowers (as Japan has done through informal regulation or administrative guidance), or lessening prior restrictions on foreign purchases of domestic securities (again, as Japan has done). (See ch. 3, pp. 20 and 21.) Other nations, including the United Kingdom, France, and West Germany, have employed capital controls during the floating exchange rate period.⁴

As chapter 3 notes, Japan has not relied heavily on capital controls since beginning the process of financial liberalization. There are suggestions that this move away from controls reflects dissatisfaction with results. Evidence on the effects of capital controls on exchange rates is not conclusive, according to one of the few studies in this area. The effectiveness seems to vary among different nations, suggesting that capital controls alone may not matter as much as controls imposed along with other policies.

⁴See V. Argy, Exchange-Rate Management in Theory and Practice, especially chapter 6, for a description and appraisal of capital controls in Japan, the United Kingdom, and West Germany.

If they are successful and do lessen exchange rate fluctuations and change currency values, capital controls may exact a cost elsewhere in the economy. If capital inflows are restricted without any changes in the domestic demand for and supply of currency, interest rates will tend to rise. Restricting capital outflows, on the other hand, limits the access of domestic investors to international investment opportunities; this can lessen the value of domestic portfolios.

There are some arguments for capital controls that are non-economic in origin, however. Nations frequently restrict or regulate direct foreign investments in several types of industries, such as defense industries or those producing essential products. In such cases, nations decide that the risk of foreign ownership is greater than acceptable, and that the benefits of capital controls are worth the cost.

Increased intervention and targets

Many proposals to manage exchange rates call for government intervention to keep the exchange rates within a particular range. Such intervention has been common since 1973. (See app. II.)

Calls for intervention encounter a number of practical problems. It is generally agreed that coordinated intervention by a group of nations stands a better chance of succeeding than a single nation's intervention, but nothing ensures that governments will agree to coordinate their intervention policies. One problem is the differences in nations' views on what behavior constitutes a "disorderly market" or what criteria defines the proper exchange rate target. Extreme cases of exchange rate overshooting or exchange market disorder may be fairly readily identified, but other cases are not as clear. When the French franc fell rapidly, passing the 8 franc to the dollar barrier in late July and early August 1983, for instance, there was widespread agreement that the market was disorderly, leading to joint intervention by the United States, West Germany, Japan, France, the Netherlands and Switzerland. Such coordination did not take place during the spring of 1983 when the franc traded at 7.25 to 7.60 the dollar, however, despite French displeasure with that range. Following the Williamsburg Summit in May 1983, for instance, a senior U.S. government official was quoted in a published news account as saying that the French desire to limit depreciation of the franc would lead them to "think it is disorderly if it goes suddenly from 7.50 to 7.54. But if it goes from 7.50 to 7.70, we [i.e., the U.S.] would want to know if

that's in line with the trend, or something that should be smoothed out.⁵

Advocates of intervention generally agree with critics that strict rules for intervention or targets are unlikely to work. Instead, they urge that intervention decisions be left to the judgment of policymakers. Looking at the late October and early November 1982 values of the yen-dollar rate (as high as Y 278 to the dollar), for instance, led many observers to conclude that the exchange rate had overshot its proper value and that coordinated intervention might have succeeded.

While agreement over intervention decisions might occur in clear cases of disorderly markets or exchange rates overshooting, disagreement is likely where disorderly or overshooting markets do not appear to be problems or where there is disagreement over the "proper" exchange rate. During virtually the entire first 6 months of 1983, for instance, the yen-dollar rate remained between Y 230 to Y 240 to the dollar. Many analysts still believed that this was not the proper rate but its stability seemed to rule out overshooting.⁶

We are unaware of any practical way to define a "correct" target or target range for exchange rates. Suggestions to change the target according to changes in relative prices ignore the importance of interest-sensitive capital flows in foreign exchange markets. Further, many suggested targets involve only bilateral exchange rates. Since exchange markets permit easy transfers of capital among several currencies, exchange rates cannot be viewed on a purely bilateral basis. The prospect of multilateral agreement on a "correct" set of exchange rates is limited by the large number of nations participating and the high probability of competing goals.

Critics of intervention argue that the odds are strongly against any policy of active intervention succeeding. First, the limited size of government reserves is known, thus setting

⁵Washington Post, June 1, 1983, p. C-7. It is interesting to note that the franc did indeed fall below the level that this official hinted would trigger some exchange market intervention, suggesting that the market discounted either the likelihood or importance of intervention.

⁶As the French franc, West German mark and Italian lira fell during late July and early August 1983, reaching post-war lows for the franc and lira, the yen also depreciated against the dollar, although by a much smaller percentage.

out the limits of intervention. In addition, exchange markets are very sensitive to expectations, particularly in the short run. If exchange market participants believe that government intervention will be short-lived, for instance, the importance of that intervention will be discounted. Intervention, critics hold, is a very inexact and uncertain way for government to try to influence expectations.

Sustained or substantial exchange market intervention, furthermore, may have adverse consequences for domestic economic stabilization. In deciding to intervene, a country essentially ties its monetary policy to an exchange rate goal,⁷ foregoing the opportunity to focus on other traditional goals, such as economic growth or price or interest-rate stability. Nothing can ensure that the exchange rate goal will be consistent and complementary with other potential policy goals, so achieving the exchange rate goal does not indicate that other potential goals can be simultaneously reached.⁸

In short, the decision to intervene is always a calculated risk. Appropriately timed and coordinated intervention may prevent exchange rate overshooting and the potential problems this might entail. However, international consensus on when to intervene is hard to achieve; the chances of successfully preventing overshooting are unknown; and the cost of such intervention, if it prevents achieving other economic stabilization goals, may be high.

Greater IMF surveillance

Another proposal to manage exchange rates is to increase the role of the International Monetary Fund to police national exchange rate policies. Article IV of the IMF Articles of Agreement provides that each member should undertake to collaborate with the IMF and other members to assure orderly exchange arrangements and to promote a stable system of exchange rates. In this context each member is expected to:

⁷This goal may be a particular exchange rate or specified range of rates, or reduced variability in the exchange rates.

⁸The classic statement that economic policy cannot pursue more targets or goals than the number of available instruments is in Jan Tinbergen, On the Theory of Economic Policy (Amsterdam: North Holland, 1952).

1. Endeavor to direct its economic and financial policies to foster orderly economic growth with reasonable price stability.
2. Seek to promote stability by fostering orderly underlying economic and financial conditions and a monetary system that does not tend to produce erratic disruptions.
3. Avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other members.
4. Follow exchange policies compatible with these IMF principles.⁹

To monitor whether members are living up to their obligations, the IMF regularly reviews exchange rate policies and other domestic economic developments of member countries. These reviews take place annually for larger industrialized countries, including the United States, Japan, and West Germany, and somewhat less frequently for other countries. The results of the reviews are compiled and discussed by the Executive Directors, who represent the member nations. This form of surveillance, which concentrates solely on aspects of member countries' economic policies, such as monetary and fiscal policies, foreign exchange intervention, and trade and exchange liberalization, was expanded at the 1982 Economic Summit Conference in Versailles.

Under the expanded form of surveillance the IMF staff will be assessing the effect of policies of the seven Economic Summit participants on other countries. According to the IMF Managing Director, this surveillance will concentrate on the "repercussions of the policies of the major industrial countries on themselves, on the other member countries, and on the system." Therefore, a country which is experiencing rapid inflation or a growth rate far below its potential could presumably be criticized for not fulfilling its obligations under Article IV, even though it may not appear to be contributing overtly to exchange market disturbances. It would appear, however, that the IMF, aside from those instances when a country is requesting assistance, must rely primarily on moral suasion to

⁹IMF Articles of Agreement, as amended, effective Apr. 1, 1978 (Washington, D.C.: International Monetary Fund: May 1982), pp. 6-9.

get a country to change domestic policies that have undesirable international side effects.

Coordination of national economic policies

Few observers believe that increased intervention or IMF surveillance alone can resolve the difficulties frequently attributed to exchange rate behavior. Both intervention and surveillance will be short-term and partial answers to what many observers find to be the real problem--uncoordinated national economic policies.

It seems clear that nations could avoid many international economic problems by improved coordination of their economic policies. This has been known for many years, but no one has yet found a way to achieve more effective coordination. Nations pursue policies designed to advance their individual national interests. Even when there is a formal structure for defining common interests, and a stated commitment to coordinated policies, as in the European Economic Community, it is exceedingly difficult for a national government to subordinate domestic concerns in order to achieve common objectives.

Nations do exchange information on current economic conditions and policies. This shared information can be the basis for recognizing the constraints on policies in an interdependent world economy. In the final analysis, however, each nation must define its own long-term political and economic interests and adopt policies designed to promote those interests, recognizing that every other nation has the same responsibility for the welfare of its own citizens.

CHARLES H. PERCY, ILL., CHAIRMAN

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United States Senate
COMMITTEE ON FOREIGN RELATIONS
WASHINGTON, D.C. 20510

October 14, 1982

The Honorable Charles A. Bowsher
Comptroller General
of the United States
General Accounting Office
Washington, D.C. 20548

Dear Mr. Bowsher:

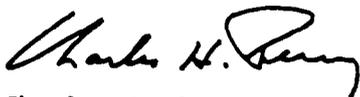
The Senate Committee on Foreign Relations held hearings on September 14 on the issue of U.S.-Japan trade relations. We intend to continue to pursue the topic in hearings at the earliest opportunity either in December or when the new Congress convenes next year.

We would like to request a GAO study on the yen/dollar exchange rate, an issue which was raised in the September 14 hearings. The appreciation of the dollar against the yen has placed U.S. exports to Japan and third country markets at a disadvantage and has enhanced the attractiveness of Japanese products in the United States and elsewhere. The question has been raised in a number of industrial and commercial circles whether Japanese government policies have influenced the yen/dollar relationship.

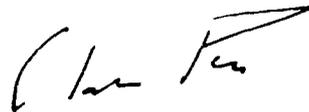
It would be helpful to us in continuing our examination of U.S.-Japan trade issues to have an analysis of the determinants of exchange rates in general, including the effects government policies can have on those rates. The study should include the global situation of the dollar in relation to other foreign currencies, with a particular focus on the unique aspects of the yen/dollar relationship.

We would hope to have the study undertaken as quickly as possible so that it can be used as an important resource in our ongoing hearings. If the study is still underway when we resume the hearings, we would be pleased to have a preliminary report in the form of testimony. We are looking forward to working with you and your staff on this important study and would like to be as helpful as possible. Please feel free to have your staff contact Mary Locke (224-5481), Joel Johnson (224-4194), and Carl Ford (224-4091) of the Committee staff for consultation on the study.

Sincerely,



Charles H. Percy
Chairman



Claiborne Pell
Ranking Minority Member

CHP:aws

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United States Senate

COMMITTEE ON BANKING, HOUSING, AND
URBAN AFFAIRS
WASHINGTON, D.C. 20510

October 28, 1982

The Honorable Charles A. Bowsher
Comptroller General of the United States
General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Bowsher:

During the 97th Congress, the Subcommittee on International Finance and Monetary Policy, which I chair, conducted two hearings on Japan/U.S. trade relations. During the course of those hearings, and during other opportunities which I have had to analyze Japanese trade policy, it became evident to me that there are serious questions about the Japanese Government's foreign exchange policies.

Many critics, including organizations as diverse as the National Association of Manufacturers and the United Auto Workers, have charged that the Japanese have pursued a deliberate policy of currency manipulation resulting in a seriously undervalued Yen. Such critics argue that almost all of the current price advantage of Japanese manufactured goods such as machine tools and automobiles would be eliminated if the Yen were properly valued in the range of 180 to 200 to the dollar rather than the current 260 to the dollar. The Japanese Government response has been to place the entire blame for the current currency misalignment between the Yen and the dollar on the shoulders of the U.S. Government and the Federal Reserve Board.

Clearly, this is a critical issue which deserves serious study. I therefore request that the General Accounting Office undertake a study of Japanese foreign exchange operations over the past 10 years in order to ascertain the credibility of widespread charges of Yen manipulation. I would expect such a study to look at fiscal as well as monetary policy and to analyze whether the Japanese policy of closing their markets to foreign goods and foreign

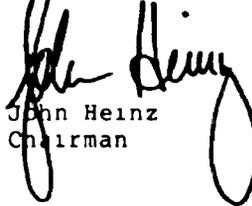
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investment have had a significant effect on the Yen's value. I would also expect you to provide the Committee with recommendations for remedial action which could become a part of the agenda for redressing this problem, should you verify the credibility of the charges.

Your prompt attention to this matter will be very much appreciated. Please contact Dr. Paul Freedenberg, the Subcommittee Economist, if you wish to obtain more details on this project.

I look forward to seeing a timely report on this issue of critical import to our nation's economic health.

Sincerely,



John Heinz
Chairman

JH:pfj

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United States Senate

COMMITTEE ON BANKING, HOUSING, AND
URBAN AFFAIRS
WASHINGTON, D.C. 20510

November 22, 1982

The Honorable Charles A. Bowsher
Comptroller General of the United States
General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Bowsher:

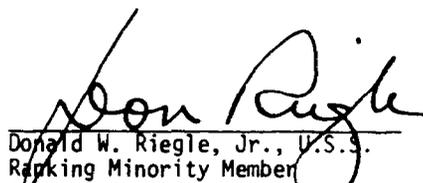
The Subcommittee on International Finance and Monetary Policy has requested that the General Accounting Office undertake a study of Japanese foreign exchange operations over the past ten years in order to ascertain the credibility of allegations of yen manipulation.

We concur with that request. We believe that the GAO's examination into the question of whether the yen has been manipulated should examine the role of the International Monetary Fund in exercising its surveillance functions over the exchange rate policies of its members. More specifically, the IMF Articles of Agreement require each member to "avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other members," and to "follow exchange policies" to assure orderly exchange arrangements and to promote a stable system of exchange rates.

The Articles of Agreement require the IMF to exercise "firm surveillance over the exchange rate policies of its members" in order to assure that its members live up to their obligations.

The IMF, by its charter, is assigned a critical role over worldwide exchange rate policies. The Subcommittee needs to be appraised of how this role works out in practice. We would appreciate your discussing this project with Robert Russell, Minority Staff Director, and Lindy Marinaccio, Minority Counsel.

Sincerely,


Donald W. Riegle, Jr., U.S.S.
Ranking Minority Member
Committee on Banking, Housing,
and Urban Affairs


William Proxmire, U.S.S.
Ranking Minority Member
Subcommittee on International Finance
and Monetary Policy

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COMMITTEE ON WAYS AND MEANS

U.S. HOUSE OF REPRESENTATIVES

WASHINGTON, D. C. 20515

SUBCOMMITTEE ON TRADE

December 6, 1982

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A. L. SIMBLETON, MINORITY CHIEF OF STAFF

DAVID B. ROHR, STAFF DIRECTOR

Honorable Charles A. Bowsher
Comptroller General
General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Bowsher:

In recent months I have become increasingly concerned about the adverse effects that wide fluctuations in exchange rates have on U.S. businesses. The currency relationship that causes me the greatest alarm is that of the U.S. dollar and the Japanese yen. In September, the Subcommittee on Trade of the Committee on Ways and Means, which I chair, held extensive hearings on domestic content legislation which is currently pending in the House of Representatives. Witnesses from all sectors of our economy cited the current exchange rate relationship of the U.S. dollar and the Japanese yen as a significant factor affecting competitiveness of U.S. products.

I understand that several of my colleagues in the Senate have requested the General Accounting Office to study the yen/dollar exchange rate relationship. I would like to associate myself with that request. I am particularly interested in the causes of wide currency fluctuations and the effects on the international competitiveness of U.S. businesses.

Thank you for your assistance in this request.

Sincerely,


Sam M. Gibbons
Chairman

SMG/AFDC

NINETY SEVENTH CONGRESS

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RALPH M. HALL, TEX.	

FRANK M. POTTER, JR.
CHIEF COUNSEL AND STAFF DIRECTOR

U.S. House of Representatives
Committee on Energy and Commerce
Room 2125, Rayburn House Office Building
Washington, D.C. 20515

December 20, 1982

The Honorable Charles A. Bowsher
Comptroller General of the United States
General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

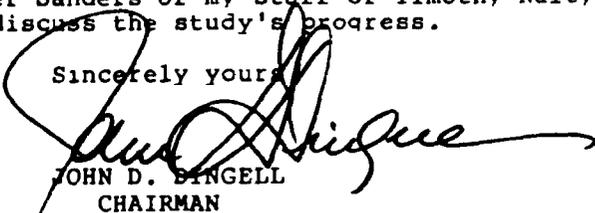
Dear Mr. Bowsher:

Following its September hearings on U.S.-Japan trade relations, the Senate Committee on Foreign Relations requested that the General Accounting Office undertake a study of the yen/dollar exchange rate. I concur with that request. Appreciation of the dollar relative to the yen has seriously affected U.S.-Japan trade relations, as recent hearings held before the Ways and Means Subcommittee on Trade further demonstrate.

This study should undertake a broad and thorough examination of all major factors determining the value of the dollar relative to other foreign currencies and especially to the yen. In particular, I would like to know what role has been played by 1) the policies and actions of the Japanese government; 2) the policies and actions of the Reagan Administration; and 3) the behavior of the new world monetary system of freely floating exchange rate, uncontrolled offshore financial markets, and instantaneous worldwide communications.

I appreciate your attention to this matter. Please have your staff contact Walter Sanders of my staff or Timothy Nulty of the Committee staff to discuss the study's progress.

Sincerely yours,


JOHN D. DINGELL
CHAIRMAN

EXCHANGE RATE SYSTEMS AND MANAGEMENT POLICIES

The substantial level of international trade and capital flows that link economies requires some mechanism to adapt to changes that occur among these economies. Under a flexible or floating exchange rate system, currency values adjust to these changes. Under the Bretton Woods system of fixed rates, official holdings of foreign exchange reserves would go up or down as nations prevented short-term changes in exchange rates, although permanent or structural changes would lead to a revaluation of the currency at a new fixed parity.

The differences between today's floating rate system and the old fixed rate system can be over-emphasized, however. The Bretton Woods system called for revaluation in the face of long-term pressures rather than permanent defense of fixed rates. Although private market forces are the primary determinants of floating exchange rates, nations do engage in exchange rate management policies to influence the value of their currencies.

Intervention---the purchase or sale on exchange markets of foreign currency by a government or central bank---is probably the most common exchange rate management practice. U.S. government purchases of German marks, using dollars, would be an example of intervention.¹ Monetary policy and capital controls are some other available exchange rate management policies.²

Intervention policies are a characteristic that differentiates the various exchange rate systems, ranging from a completely flexible rate system with no intervention to a permanently fixed rate system with substantial intervention. A range of intervention policies extends from the "completely flexible" to the "completely fixed monetary union" with "adjustable peg" and "managed float" systems fitting in between the two extremes.

COMPLETELY FREE AND FLEXIBLE EXCHANGE RATES: ONE END OF THE SPECTRUM

In a completely flexible exchange rate system, no intervention occurs. The private demand and supply for foreign exchange

¹Currency swaps between national monetary authorities or conversion of interest earnings on foreign currency bonds held as official reserves are not forms of intervention under this definition.

²See V. Argy, Exchange Rate Management in Theory and Practice, (Princeton, N.J.: International Finance Section, Department of Economics, Princeton University, 1982), for a more extensive discussion of alternative exchange rate management policies.

are the sole determinants of exchange rates. Although monetary, fiscal, and other policy actions may greatly influence exchange rates in such a system, government policy is not influenced by exchange rate behavior. A pure flexible system is a benchmark to evaluate real world experience.

THE OTHER EXTREME: A MONETARY UNION WITH UNCHANGEABLE RATES

In a monetary union, member nations permanently fix the exchange rates among their currencies and do not set exchange restrictions. For all intents and purposes, currencies within the union are virtually perfect substitutes and might be used exactly as if they were one currency. (Just as a dollar in New York is perfectly substitutable for a dollar in any other state, the currencies of countries in a monetary union with unchangeable rates are highly substitutable.)

Nothing guarantees that the fixed rates can remain set, however, so intervention to fix the exchange rates is necessary. Given the limited supply of international reserves that any country holds, it cannot counter a balance of payment disequilibrium over the long term solely through sterilized intervention.³ If the country instead relies on unsterilized intervention, it gives control of its domestic monetary policy to the monetary union. This polar example of a monetary union is essentially equivalent to the pure gold standard in its operation and implications.

THE MIDDLE OF THE SPECTRUM: EXCHANGE RATE SYSTEMS OF TODAY

Exchange rate regimes that are not as extreme as the two end point examples are the adjustable peg system and managed float. The adjustable peg system is closer to the monetary union while a managed float is closer to the completely flexible system. These are the exchange rate systems seen today.

Adjustable peg system

In an adjustable peg system, countries fix exchange rates and intervene to prevent temporary appreciation or depreciation. Nations may also alter domestic economic policy to maintain the exchange rate. The rates--or pegs--are changed in response to permanent market pressures, however. The Bretton Woods system of fixed rates was an adjustable peg system, as is the current European Monetary System. The fixed rates of the Bretton Woods period were infrequently adjusted.

³Report of the Working Group in Exchange Market Intervention, Mar. 1983, p. 2. (Subsequent references to this work will cite it as Report.)

One advantage of a pegged exchange rate standard over the totally flexible system is that it eliminates short-run exchange rate fluctuations. To the extent such fluctuations created risk, they decreased the incentive to engage in international trade and the level of trade and foreign investment. Nations could employ a more independent monetary policy than a monetary union system would allow, thus lessening the fluctuations of output and unemployment, which can be another advantage. However, the lack of discipline imposed on monetary authorities may allow higher inflation rates.

Managed float system

Countries which intervene in the exchange market while relying primarily on market forces to set exchange rates are under a managed float exchange rate system, which major industrial nations have used since the collapse of Bretton Woods. Of these countries, the United States has intervened the least.

Under a managed float system, exchange rates vary primarily in response to private sector pressures, although governments may intervene or alter domestic economic policy to affect the exchange rate or to moderate the changes in it. Intervention may be either sterilized or unsterilized but is not intended to prevent the exchange rate from responding to persistent private sector pressures.

EXCHANGE RATE INTERVENTION UNDER THE CURRENT MANAGED FLOAT

Intervention in foreign exchange markets, which some analysts consider a component of domestic monetary policy, is one of the most important available exchange rate management instruments. Intervention alone cannot set the level of exchange, but it is frequently advocated as a means of influencing the short-run behavior of exchange rates.

Direct effects of intervention have to be distinguished from the effects of changes in a country's money supply that may accompany the intervention. Monetary authorities may "sterilize" intervention by offsetting its effects on the money supply with open market operations to leave the nation's money supply unchanged. When a nation engages in "unsterilized" intervention, the domestic currency that it sells (or buys) to decrease (or increase) its exchange rate changes the monetary base and thus the money supply.

The major industrialized countries that participated in the 1982 Versailles Summit (Canada, France, Federal Republic of Germany, Italy, Japan, and the United States) have followed a managed float during the past decade. They made a joint study of the uses and methods of foreign exchange intervention prior to the Williamsburg Summit of June 1983. At Williamsburg, these summit nations agreed in principle to improve their coordination

of exchange rate policies. Their report, which we summarize here, presents the consensus on current understanding of foreign exchange intervention. It also notes issues where no consensus exists on the proper role of governmental exchange rate management policies.

The Working Group on Exchange Market Intervention concluded that intervention was unlikely to have any long-run effect on exchange rates and that exchange rates should be "allowed to reflect changes in underlying fundamental determinants".⁴ At the same time, however, "disorderly market conditions" should be countered through market intervention. The Group noted, however, that it is difficult to put these principles in practice, and that different nations have "experimented" with a variety of exchange rate management policies and techniques.

On the more technical question of how a government should intervene, the Group concluded that unsterilized intervention has probably been more effective than sterilized intervention, because the monetary policy changes that accompany unsterilized intervention reinforce the effects of the intervention itself. Further, since inconsistent views of exchange rates may exacerbate exchange rate instability, joint or coordinated intervention was more likely to be effective than intervention by only one nation. The ability of coordinated intervention to affect market psychology increased the effectiveness of this intervention strategy.⁵ The Working Group warned, however, that coordinated intervention is not a substitute for necessary changes in domestic economic policies.

All of the Summit countries have intervened to counteract "disorderly markets." Although members of the Working Group noted the impossibility of devising a general definition of orderly markets, definitions include unusually large price spreads between offers to buy or to sell currency, large movements of the exchange rate within a trading day, perceptions of high uncertainty, or "bandwagon" effects. From time to time all of these countries have intervened against disorderly conditions. For example, the United States, West Germany, Japan,

⁴Report, p. 2.

⁵A further reason for the greater potential success of coordinated intervention is the fact that governments agree not to counteract each other's exchange rate management policies.

Switzerland, France and the Netherlands intervened in late July and early August 1983 because of concern that exchange market behavior had become erratic and disorderly as the French franc dropped to a post-war low against the dollar and other European currencies, most notably the West German mark, depreciated substantially.

Another important short-term objective of intervention has been to moderate exchange rate fluctuations, a policy called leaning against the wind. Such intervention is used to lessen the variability and unpredictable element of exchange rates and to correct "overshooting," which occurs when the spot or daily exchange rate is temporarily greater than a long-run equilibrium exchange rate. This difference from what appears to be the appropriate rate can happen because financial markets, including foreign exchange markets, can react faster to rapidly changing circumstances by financial markets, including foreign exchange markets, than can markets for goods.

Intervention has also been used for other short term objectives such as reassuring market participants, slowing exchange rate movements, protecting psychological benchmarks, sending a signaling of government determination to the market, and testing the strength of market trends. Nations have intervened to "buy time" for policy changes to be made or take effect without disrupting exchange markets.

Summit nations also intervened to resist losing their international competitiveness. When the value of a country's currency increases, its goods and services become more expensive than competitive foreign goods and services.⁶

Finally, the Working Group reported that after exchange market intervention, monetary authorities often intervened again, purchasing foreign currency to replenish the international reserves that they used to prop up the nation's money or to pay back borrowings from other monetary authorities. Nations attempted to do so in a manner that would not depreciate their exchange rates.

⁶In the short run, because exports and imports do not immediately respond to price changes, the nation's balance of trade will improve immediately after an appreciation. The balance of trade will deteriorate because of the greater long-run elasticity of imports and exports, with most of this deterioration occurring within 1 to 3 years.

JAPANESE GOVERNMENT ROLE IN FOREIGN
EXCHANGE, INTERNATIONAL INVESTMENT,
AND CAPITAL MARKETS

During the 1970s, Japan progressively liberalized its tight controls on capital markets, freeing up capital movements in and out of Japan. These changes were enacted into law by the Foreign Exchange and Foreign Trade Control Law that took effect on December 1, 1980. The liberalization measures appear to have been balanced in that, officially, capital is as free to enter Japan as to leave it. However, since features of the Japanese economy favor capital outflows over inflows (see ch. 3), Japan tried to stem the outflow of capital during 1981 and 1982 to support the yen.

Despite the foreign exchange liberalization, Japan's government continues to exert some influence over international capital flows by its use of administrative guidance, a form of influence over private sector activities. Although Japanese law provides the authority for administrative guidance, it is not exercised through the direct legislative and regulatory actions and sanctions as in the United States.

Administrative guidance during 1981-83 was used to try to limit the yen's depreciation. It has been used in the past to weaken the yen, particularly during 1977-78 when the yen was strong. Other major controls still in place limit (1) the total amount of yen denominated bonds per quarter that foreign entities can issue in Japan, i.e., "samurai bonds," and the types of eligible issuing organizations and (2) the amount of foreign currency each foreign and Japanese bank can convert into yen for the purpose of lending in Japan. Limits on this second category, also known as swap-in loans, have not been a factor during the period we reviewed since the banks were not fully using their allotted quotas.

The long and short-term effects of capital controls on exchange rates can be quite different. Initial overseas investments or loans tend to depress the investor's currency relative to the currency of the country where the investment is taking place. However, during the longer term, repatriated earnings, component and parts exports to the affiliate, and other similar transactions must be considered. It is therefore conceivable that, while foreign direct investments in Japan may at first increase the yen's value, the longer term effect could lessen or reverse this appreciation.

There is no consensus on how further liberalization of currently controlled interest rates would affect the overall level of interest rates and the exchange value of the yen. While current nominal rates may appear low compared to those in the United States, real interest rates are at historically high

levels and are comparable to rates in other industrialized countries.

LIBERALIZATION OF
INTERNATIONAL CAPITAL FLOWS

Currently a non-resident may acquire Japanese securities without notifying the Ministry of Finance provided the purchase is made through a designated securities company and that any equity purchases do not exceed 10 percent of the shares outstanding of a listed company. As of 1981, 26 securities firms, including 4 foreign companies, were designated as securities companies.

Although portfolio investments can now be freely made, the government has reserved the right to introduce a licensing requirement on capital transactions in case of (1) balance of payments difficulties, (2) drastic fluctuations in the yen exchange rate, and (3) adverse effect on Japan's money or capital markets due to large transfers of funds between Japan and foreign countries. The government, however, has not used this licensing requirement.

Direct investment is distinguished from portfolio investment by the percent of foreign ownership and is subject to different regulations. For example, an investment by a foreign investor in excess of 10 percent of the outstanding stock issue of a listed company is considered a direct investment and prior notice must be given to the government. The previous law required prior approval by the government. The Foreign Exchange and Foreign Trade Control Law that became effective in 1980 provides for a 30-day period (which may be extended) during which the government may recommend revision or suspension of an investment proposal if it does any of the following:

1. Imperils the national security, disturbs the maintenance of public order, or hampers the protection or the safety of the general public.
2. Seriously or adversely affects either the smooth performance of the national economy, or of Japanese enterprises engaged in similar or related businesses.
3. Offends the principle of reciprocity by permitting the foreign investor to take advantage of favorable legal treatment in Japan unavailable to Japanese investors in the foreign investor's home country.

4. Constitutes a de facto capital transaction deceitfully structured as a direct domestic investment to evade regulations governing capital transactions.¹

Japan restricts total foreign ownership in its agriculture, fisheries, forestry, mining, petroleum, and leather and leather products industries, and in 11 designated firms. Further, establishing a representative office or foreign branch in Japan in banking, securities, insurance, gas, and electric companies is not directly regulated under the foreign exchange control system.

Some U.S. government and industry representatives continue to have several concerns over direct investment in Japan. Some feel that the criteria by which Japan can recommend revisions of an investment proposal or suspend its execution are too vague and allow too much discretionary authority. More fundamentally, many believe that the prior notification system should be abolished since it continues to allow Japan to interfere through a "screening process," and requiring detailed notifications may serve to inhibit direct investment.

The extent to which the current notification process inhibits foreign investment cannot be measured. The Japanese government does not consider the process to be an obstacle. Officially, it welcomes foreign direct investment in Japan.

Although the law stipulates that government intervention is to be the exception and strictly limited to special cases, it may be too early to make a judgment as to the degree of liberalization in the direct investment area, since the new law delegates a high degree of discretion in reviewing investment proposals to the "competent ministers," primarily the Ministries of Finance and of International Trade and Industry. As of July 1983, we have not been able to identify any cases of an investment proposal being modified or prohibited since the Act was passed.

Given the difficulties inherent in starting up operations in Japan, such as the insular nature of the society and the complex distribution system, taking over existing Japanese firms seems to be a good way to enter the Japanese market. The purchase of an existing company largely eliminates many of the obstacles to a new foreign firm and provides a recognizable brand name and established government and community relations. The purchase of established firms in Europe during the 1950s and 1960s was, in fact, one of the preferred ways of entering the

¹U.S. Embassy, Tokyo: "Investment Climate in Japan," October 1982

European market by U.S. firms. In Japan, since there is no history of corporate acquisitions, takeovers, particularly unfriendly takeovers, are rare. This is because most Japanese companies and their employees are anxious to preserve their individual company and group identities and, over the years, have taken care to see that the shares of the corporation are held by investors sympathetic to the objectives of the firm's management. For this reason, unfriendly takeover bids, by domestic or foreign firms, are rarely successful.

Reflecting the importance attached to the interests of an existing company, earlier legislation provided that foreign direct investment in the stock of a company required the consent of the corporation concerned. This requirement was removed by the 1980 amended law. According to the Wall Street Journal, James Abegglen, a private consultant on the Japanese economy, believes that while foreign acquisition of a majority share in a Japanese company will remain uncommon, opportunities for minority ownership are on the rise. For example, in the 25 years prior to 1970 foreign firms acquired at least 20 percent of the equity in existing Japanese firms in only 13 instances. Since 1970, there were 18 such cases, with most occurring since the mid-1970s.

Interest rate liberalization

As with international investment, Japan's domestic capital markets have also been undergoing a rapid transformation. During the immediate post-war period, the government, by maintaining bank deposit rates and lending rates below market clearing levels, was able to effectively ration cheap credit to favored industrial sectors and promote their rapid expansion. For this low interest rate policy to be effective, tight capital controls were also needed, in part, to prevent capital outflows from depreciating the yen. Capital controls were maintained on inflows as well, but they existed to protect Japanese industry from foreign investment.

During this high growth period, Japanese industry was chronically in need of capital, largely provided through bank loans, to finance its ambitious development plans. The large city banks, in turn, relied on borrowings from the Bank of Japan to add to their reserves since their deposit bases were not sufficient to provide for the investment demand. Given this dependence of the private sector upon the Bank of Japan for liquidity, the Bank's lending policy became the major monetary policy instrument. This form of monetary policy was effective only as long as the private sector relied heavily on the central bank for liquidity. This dependence was reduced after the first oil crisis in 1973. As Japan's growth rate slowed, private investment declined and the excess of savings over investment in

the private sector as a whole expanded. At the same time, Japanese industry was increasingly relying on other direct forms of financing such as retained earnings and the issuance of stocks and bonds. The reduced influence of the Bank of Japan's lending policies is shown by the fact that after 1975, city banks' borrowings from the Bank of Japan as a percentage of total city bank liabilities was less than 2 percent per year and this fell below 1 percent in 1981, compared to a high point of 12.3 percent in 1961.

To enhance the effectiveness of monetary policy, Japanese authorities concluded that domestic interest rates should be liberalized by removing controls and allowing the market process to set rates. Another factor responsible for the movement toward unregulated interest rates was the increasing integration of the Japanese economy with the world economy. Japan was less able to insulate its domestic financial markets from international financial developments. By 1979, therefore, the short term money markets, including the call (equivalent to the United States Federal funds market) and bill discount markets, were liberalized and are now the mechanisms by which the Bank of Japan carries out its monetary policy. Market-determined interest rates also exist for negotiable certificates of deposits and "gensaki," or repurchase agreements, on long-term government or corporate bonds.

The Japanese government continues to control bank deposit and loan rates and the issue rate for long-term government bonds. Pressures for liberalization, however, are building in these areas. Unlike in the United States, where government debt instruments are priced at market interest rates in order to sell them in the open market, the Japanese government requires a syndicate of banks and securities firms to absorb government debt at administered interest rates. Prior to 1975, because of the low volume of government debt, this did not result in much of a burden for the banks. Furthermore, to provide liquidity to the banking system, the Bank of Japan agreed to purchase the government debt from the banks after one year.

Starting about 1975, government deficits and financing needs started to mount, and total government debt as a percent of GNP increased from less than 12 percent in 1973 to around 35 percent in 1981. The city banks financed about two-thirds of the total during this period. Given the magnitude of government issues, the central bank could no longer honor its commitment to purchase the government debt after one year because of the inflationary consequences which would result from an expanding money supply. As an alternative, the government began allowing the banks to sell government paper in the secondary market at market determined interest rates. Transactions in the long-term

bond market reached 207.5 trillion yen in 1982. Although the banks were now free to sell government bonds on the secondary market, bonds carrying interest rates below market rates could naturally only be sold at a loss. Despite this fact, trading volume of government bonds on the secondary market increased from 14 trillion yen in 1977 to 163 trillion yen in 1980.

As the amount of government bonds forced upon the banks started to mount, the government had to make some concessions to the banks despite its concerns over mounting interest payments on government debt. Although interest rates on 10-year government bonds, which account for approximately three-fourths of total issuance, continue to be regulated, since 1978 two and three-year bonds have been issued through bidding. In addition, the members of the syndicate of banks and securities firms on a number of occasions have refused to accept government issues because the interest rates were too far below the secondary market rate. This forced the Government to raise the interest rates and yields have, at times, been as close as 10 basis points (one-tenth of one percentage point) between the original issue and secondary markets.

Further pressures toward liberalization will continue as the Ministry of Finance tries to promote the sale of government bonds. In addition, large amounts of 10-year bonds will start coming due in 1985 creating a de-facto, short-term market to compete with regulated bank deposits. It appears that the current system of an open market coexisting with a regulated one will become progressively more difficult to maintain because of increasing opportunities for investors to earn higher yields on unregulated instruments.

ECONOMETRIC MODELS OF
EXCHANGE RATE DETERMINATION

This appendix reviews the theoretical and empirical research on exchange rate determination and assesses the empirical validity of different theories and models. The review is necessarily brief, given the extensive literature of exchange rate research, and points only to the highlights of the research.¹ The empirical analysis presented focuses on the determination of the yen-dollar rate, both as a test of the different theories and as a research tool to examine charges of deliberate yen misalignment. No theory emerges as a clearly superior explanation of exchange rate determination. The empirical weakness of the theories, however, does not suggest yen manipulation.

PURCHASING POWER PARITY AND
THE LAW OF ONE PRICE

Purchasing power parity (PPP), or the law of one price, is one of the simplest explanations of exchange rates and probably the most commonly held theory.

"Under the skin of any international economist lies a deep-seated belief in some variant of the PPP theory of the exchange rate. According to the law of one price, a commodity should sell for the same price (freight and duties apart) in various locations. An exchange rate that leaves an international price discrepancy will soon lead to arbitrage and thereby to an adjustment in prices or the exchange rate or both. Given enough time, therefore, the domestic prices of internationally traded goods will correspond to world prices converted at the going exchange rate."²

¹For a fuller discussion of theoretical and empirical exchange rate models, see Anne Kruger, Exchange Rate Determination (New York; Cambridge University Press, 1983); Charles Kindleberger and Peter Lindert, International Economics, 6th ed. (Homewood, Ill.; Irwin, 1978); Rudiger Dornbusch, "Exchange Rate Economics: Where Do We Stand?" Brookings Papers on Economic Activity, 1980:1, pp. 143-185; R. Dornbusch and Paul Krugman, "Flexible Exchange Rates in the Short Run," Brookings Papers on Economic Activity, 1976:3, pp. 537-575; J. Tempalski, "Floating Exchange Rates and U.S. Competitiveness," United States International Trade Commission Publication 1332, December 1982; and Jagdeep Bhandari and Bluford Putnam, Economic Interdependence and Flexible Exchange Rates, (Cambridge, Mass.: MIT Press, 1983).

²Dornbusch and Krugman, 1976, p. 540.

Despite its appealing simplicity and elegance, the PPP theory has limitations. First, it is not always clear what national prices should be compared. Price indices such as the consumer price index (CPI) or producer price index are based on a collection or "market basket" of goods, including many that are not traded internationally. Housing is an important CPI component that is not traded internationally.

Second, explanations of exchange rates that are based on PPP theory do not necessarily distinguish between an absolute version of the theory, where prices and goods are directly compared, and a relative version which ties movements or changes in prices together with changes in exchange rates. The distinction is important. If there are differences in labor productivity growth between economic sectors engaged in international trade and sectors not engaged in international trade, differences may develop between prices of goods traded internationally and the common price indices, for instance.

When the PPP theory is used to define the "proper" exchange rate, choosing the base period can lead to a third problem. The base period is a benchmark used to define the equilibrium exchange rate between two national currencies. If the average exchange rate during the base period was not the equilibrium rate, however, estimates of the "proper" exchange rate are incorrect. The PPP theory does not provide sufficient guidance to determine when the base period is in equilibrium, however. Consider, for example, the yen-dollar exchange rate and its movement over the floating exchange period. Selecting any particular time as the equilibrium may be challenged, thus challenging the estimate of the equilibrium or "proper" exchange rates.

Empirically, the PPP theory has not been successful in explaining exchange rate movements. Jacob Frenkel has found that the PPP theory has some success in explaining exchange rate fluctuations in the 1920s but little in the 1970s.³

If the PPP theory is inadequate in explaining short-run exchange rate movements, what use is it in analyzing exchange rates today and what explains the "deep-seated belief" in the theory? The inadequacy of the PPP hypothesis does not imply that relative national price levels and price changes do not matter. In fact, if one nation experiences higher inflation

³Jacob Frenkel, "The Collapse of Purchasing Power Parities During the 1970's," 1981, European Economic Review vol. 16, pp.145-165.

than another, its money will depreciate relative to the other's money, holding all else constant. The PPP theory rests on the assumption that nothing else matters. Variables, such as national income, interest rates, or international flows are not considered. However, the PPP theory is in accord with a view that, over the long run, price movements will be the most important determinant of exchange rates.

MONETARY MODELS OF EXCHANGE RATES

The monetary approach, like the portfolio-balance theory reviewed below, is an asset theory of exchange market behavior. The monetary approach to exchange rate determination views exchange rates as the prices paid for different currencies. These models emphasize the importance of the portfolio market in determining exchange rates and de-emphasize the international market for goods and services. In this they are both distinctly different from approaches that emphasize international trade in goods and services in determining exchange rates.

These asset market views of the world assume that international asset markets react more rapidly to events than goods and services markets. Consequently, short-run exchange rate movements are dominated by fast-moving portfolio markets, idealized in an assumption of perfect capital mobility. Perfect capital mobility means there are no substantial transaction costs, capital controls, or other impediments to the international flow of capital, so that bond-holders always hold their desired levels of foreign and domestic bonds.⁴

Jeffrey Frankel has proposed a monetary approach to exchange rates based on real interest rate differentials.⁵ Frankel's model clearly links the theoretical predictions and empirical estimation and is easily generalized.

Two basic assumptions form the basis of Frankel's real interest differential model. First, bonds of different nations are perfect substitutes, so that uncovered interest rate parity

⁴Perfect capital mobility further implies that foreign exchange traders can avoid exchange rate risk by hedging in exchange rate future markets and that the yield in a domestic bond minus the yield on a foreign bond will equal the forward premium (i.e., covered interest rate parity).

⁵See J. Frankel, "On the Mark: A Theory of Floating Exchange Rates Based on Real Interest Rate Differentials," American Economic Review 69(4), Sept. 1979, pp. 610-622, for a full description and derivation of this model.

occurs. Uncovered interest parity states that the expected rate of depreciation in domestic money relative to a foreign currency will be equal to the difference between the yield on domestic bonds and bonds denominated in the foreign currency. The second premise is that the gap between the current spot rate and the long-run equilibrium exchange rate will increase the rate at which the exchange rate between their currencies depreciates (or appreciates), while the rate of currency depreciation will be decreased by the differences between the two country's long-run inflation rates.

These two assumptions, taken together, imply that the spot-rate will be less than the long-run equilibrium rate when the domestic real interest rate is greater than the foreign interest rate:

$$e - \bar{e} = -a [(\bar{r} - \bar{i}) - (\bar{r}^* - \bar{i}^*)] \quad [\text{Eq. 1}]$$

where e and \bar{e} are the natural logarithms of the spot and long-run equilibrium exchange rates (in terms of foreign to domestic currency, such as yen per dollar), \bar{r} and \bar{r}^* are the domestic and foreign (nominal) interest rates, and \bar{i} and \bar{i}^* are the domestic and foreign long-run inflation rates.

This relation points to the possibility of spot exchange rates "overshooting" equilibrium exchange rates.

The exchange rate differs from, or "overshoots," its equilibrium value by an amount which is proportional to the real interest differential, that is, the nominal interest differential minus the expected inflation differential. If the nominal interest differential is high because money is tight, then the exchange rate lies below its equilibrium value. But if the nominal interest differential is high merely because of a high expected inflation differential, then the exchange rate is equal to its equilibrium value, which over time increases at the rate of the inflation differential.⁶

In order to close the model, Frankel assumes that long-run purchasing power parity holds, that is, that relative equilibrium prices define the equilibrium exchange rate, and that the real demand for money in each of the two nations is the same function of the interest rates and income:

⁶Frankel, 1979, pp. 610-611.

$$\bar{m}^* = \bar{p}^* + b \bar{y}^* - c r^* \quad (\text{Eq. 2})$$

$$\bar{m} = \bar{p} + b \bar{y} - c \bar{r} \quad (\text{Eq. 2a})$$

where m , p , y and r represent, respectively, the natural logarithms of the nominal money supply, price level, real income, and nominal interest rates, and the asterisk indicates the home country (i.e., the United States), and a bar over a variable indicates the long-run equilibrium value of that variable.

The monetary theory of exchange rates depends critically on the national money demand equations. Long-run equilibrium is determined by the relative currency demand and supply relationships. In long-run equilibrium, the spot rate is equal to the long-run equilibrium rate and the difference between nominal interest rates in the two countries is equal to the $(r-r^*)$ difference in their long-run inflation rates $(1-i^*)$, so the long-run exchange rate is given by:⁷

$$\bar{e} = \bar{p} - \bar{p}^* \quad (\text{Eq. 3})$$

$$e = \bar{m} - \bar{m}^* - b (\bar{y} - \bar{y}^*) + c (\bar{i} - \bar{i}^*) \quad (\text{Eq. 3a})$$

Equations (3a) and (1) can then be used to produce a final equation for the spot rate assuming that current values of the nominal money supplies, national income, and nominal interest rates are at long-run equilibrium levels:

$$e = (m - m^*) + b (y - y^*) - a (r - r^*) + (a + c) (1 - i^*) \quad (\text{Eq. 4})$$

This is the basic theoretical equation that we tested for e , the spot exchange rate, being the yen-dollar rate and Japan being the "home" nation.

The yen-dollar spot rate then is a function of:

- . relative money supplies of the two nations
- . relative income levels of the two nations (with the negative coefficient sign indicating a prediction that a rise in Japanese income (y) relative to U.S. income (y^*) will lead to a

⁷Equation (3) is the long-run purchasing power relation. Equation (3a) is derived from (3), the difference between Equations (2) and (2a), and the long-run equality of nominal interest and inflation differentials. See Frankel (1979).

decrease in the yen-dollar rate, and appreciation of the yen as Japanese demand for yen increases relative to U.S. demand)

- . differences in interest rates (with the negative coefficient sign indicating an increase in the Japanese interest rates would also lead to appreciation of the yen)
- . differences in long-run inflation rates (with the positive coefficient sign indicating that an increase in Japanese inflation would lead to depreciation of the yen).

The advantage of this theoretical approach over the PPP model is its explicit consideration of variables other than relative prices in determining exchange rates. This reflects a realization that exchange rates must adjust to a wide range of international transactions, not only to merchandise trade.

From a theoretical standpoint, however, the monetary theory does have shortcomings. Domestic and foreign assets are assumed to be perfect substitutes even though the assets of different nations are not equally risky. Assets denominated in U.S. dollars, for instance, are considered to be less risky than assets denominated in virtually any other currency due to the economic size and political stability of the United States. Another problem is the need to assume a long-run equilibrium for many of the variables of interest in the system. Driskill and Sheffrin⁸ contend that Frankel implicitly assumed that the current money supplies follow a random walk around the long-term equilibrium value under rational expectations. Testing this for the the Deutsche mark-dollar exchange rate, Driskill and Sheffrin find this assumption to be inconsistent with the data.

Econometric tests of the monetary theory have been disappointing. While measures of the overall "goodness-of-fit" of the spot rate equation (equation 4) indicate that the model does provide a good explanation of exchange rate determination, closer examination reveals that coefficients are frequently

⁸Driskill, R, and S. Sheffrin, "On the Mark: Comment," American Economic Review, Vol. 71, No.5, Dec. 1981, pp. 1068-74.

either statistically insignificant or of the theoretically wrong sign. Further, the predictive power of the model is weak.⁹

The nature of the data and the underlying model create the possibility of problems in the econometric tests of the monetary theory. First, the data for the explanatory or independent variables are highly correlated; the resulting multicollinearity results in unstable coefficient estimates and potentially misleading hypothesis testing. Since this problem is inherent in the time series data, it is not something that can be neatly "fixed," leaving the problem of disentangling the individual effects of each variable.¹⁰ Imposition of a priori constraints on the coefficients did improve the estimation.

A second problem commonly encountered in econometric work such as this is that some of the variables specified in the theory are not directly measured. The theory focuses on real interest rates and thus on expected inflation rates, a variable that we estimate by using historical inflation. If the expectations differ substantially from the past record, however, this may be a poor proxy for expectations, creating an "errors in variables" problem.

Haynes and Stone¹¹ noted that an econometric estimation of equation (4) contains untested restrictions on the coefficient and that these improper constraints bias the estimates. For

⁹R. Meese and K. Rogoff, "Empirical Exchange Rate Models of the Seventies: Do they Fit Out Of Sample," Journal of International Economics Vol. 14, No. 1, Feb. 1983, pp. 3-24. Driskill and Sheffrin, testing their rational expectations form of Frankel's model, found that the model failed "a direct test...under rational expectations." (p. 1072).

¹⁰While there is no conclusive "test" for the presence or severity of multicollinearity, the high values of the R^2 and corrected R^2 together with high-estimated standard errors for the coefficients is one strong indication. Furthermore, a simple regression of Japanese money supply on U.S. money supply over the sample period demonstrated a close linear relation.

¹¹Stephen E. Haynes and Joe A. Stone, "On the Mark: Comment," American Economic Review Vol. 71, No. 5, Dec. 1981, pp. 1060-1068. Haynes and Stone find an unconstrained version of Frankel's model to be supportive of "the Chicago variant of the model that stresses the significance of secular rates of inflation" (p. 1066).

example, the coefficient for home output is constrained to be equal in magnitude and opposite in sign to the coefficient for foreign output. Haynes and Stone respecify the model to remove these constraints. In a reply to Haynes and Stone, Frankel¹² argues that several of the implicit constraints ought to be maintained to incorporate theoretical information in the model's estimation. We pursued an eclectic approach to the constraints that Frankel maintained in his "Reply," and estimated both constrained and unconstrained forms. One apparent result is that incorporating a constraint on the relative money supplies is some improvement in the problem of multicollinearity discussed above.

A final change in our econometric estimates of the "monetary" approach to exchange rate determination can be seen as a transition between the "monetary" and "portfolio balance" theories. One portfolio balance approach to exchange modelling focuses on the role of the current account in generating changes in the real exchange rate over time. Hooper and Morton¹³ basically follow the monetary approach outlined above, but decompose the log of the spot exchange into its real and price terms:

$$e = (\alpha - p^*) + q \quad [\text{Equation 5}]$$

where α is the long-run or "sustainable" real exchange rate. If this long-run real exchange rate does not change, then an exchange rate determination such as equation (4) above¹⁴ will be the outcome of the model.

Changes in a nation's current account will lead to changes in the real exchange rate, however. The equilibrium real exchange rate, in Hooper and Morton's approach, is the exchange rate that will sustain a long-run current account equilibrium. When there is an unanticipated short-term current account deficit, expectations are created that the equilibrium real interest

¹²Jeffrey Frankel, "On the Mark: Reply," American Economic Review Vol. 71, No. 5, Dec. 1981, pp. 1075-1082.

¹³Peter Hooper and John Morton, "Fluctuations in the Dollar: A Model of Nominal and Real Exchange Rate Determination," Journal of International Money and Finance (1982) Vol. 1, No. 1, pp. 39-56.

¹⁴Again, equation 4 here represents Frankel's real interest rate differential theory.

rate will depreciate, thus shifting the spot exchange rate.¹⁵ The spot exchange rate also may respond to greater perceived risk if this unanticipated, short-term current account deficit is not offset by government intervention. Their approach thus adds two variables to the monetary approach equation. A current account variable picks up the response of the spot rate to the current account and to expectations about changes in the current account. A second variable that measures the accumulation of the current account net of intervention picks up changes in the perceived risk associated with a current account imbalance.

Our econometric estimates incorporate this in the manner suggested by Meese and Rogoff. This adds a cumulative current account variable to the equation, measuring differences in the two nation's cumulative current account balances. (The accumulation started in January 1973.) The difference between cumulative current account balances measures differences in wealth accumulation between the two nations.

Table 1 presents the estimated equations for the monetary model, using monthly data for variables between January 1974 and November 1982. Symbols for variables in the table are the same as those used in the presentation of the monetary theory. Where there was a choice among alternative proxies for unquantifiable variables such as expected inflation, we used the same variables as Frankel (1981). Money supplies (m) are measured by $M1$, output (y) by industrial production indices, interest rates (r) by the call money rate in Japan and the federal funds rate in the United States, and inflation (i) by percentage changes in the consumer price index over the prior 12 months. The cumulative current account balance is denoted as CCA . The superscripts "j" and "us" denote Japan and the United States, respectively.

The overall fit of the equations, measured by the significant F-statistics or by corrected R^2 , is generally good, but the coefficients are frequently statistically insignificant or of the theoretically wrong sign. When the equations are corrected for first order autocorrelation,¹⁶ the overall fit remains good but the coefficients generally are not significantly different from zero. Imposing the constraint on the relative money

¹⁵The substantial drop in Japan's current account surplus below the forecasted level may have had a similar effect of contributing to the yen's depreciation during 1982, as chapter 3 of our report notes.

¹⁶The correction was done using the AUROEG procedure of Chase Econometric's XSIM package.

TABLE 1

Estimates of Equations^a for a Monetary
Approach to the Yen-Dollar Rate,
January 1974 to December 1982

Dependent Variable in the Logarithm of the Yen-dollar Exchange Rate

	Expected Sign	OLS	H-L	OLS	H-L
Constant	?	8.17 (5.05)	7.07 (5.49)	8.55 (6.15)	6.57 (4.92)
m _J (c)	+1	0.22 (3.42)	-0.08 (10.59)	-0.15 (5.61)	-0.08 (10.63)
m _{us} (d)	-1	-0.24 (3.78)	-0.08 (5.25)	0.26 (6.16)	-0.02 (5.71)
y _J	-	0.08 (0.41)	0.02 (0.43)	0.20 (1.31)	0.03 (0.58)
y _{us}	+	-0.82 (4.11)	-0.05 (0.49)	-0.88 (4.87)	-0.06 (0.58)
(τ) - τ_{us}	+	1.24 x 10 ⁻³ (0.36)	-4.98 x 10 ⁻³ (2.26)	1.31 x 10 ⁻³ (0.47)	-4.41 x 10 ⁻³ (2.02)
i _J	+	1.19 (3.15)	0.25 (0.85)	1.42 (3.94)	0.33 (1.13)
i _{us}	-	-1.78 (4.56)	-0.13 (0.20)	0.47 (0.91)	0.14 (0.21)
CCA _J	-			3.52 x 10 ⁻⁶ (1.52)	-1.59 x 10 ⁻⁶ (0.52)
CCA _{us}	+			1.09 x 10 ⁻⁵ (4.69)	6.34 x 10 ⁻⁶ (2.13)
\bar{R}^2		.732	.964	.827	.966
D.W.		0.31	1.29	0.47	1.39
RHO		-	.980	-	.970

TABLE 1
(Continued)
Estimates of Equations^a for a Monetary
Approach to the Yen-Dollar Rate,
January 1974 to December 1982^b

<u>Dependent Variable in the Logarithm of the Yen-Dollar Exchange rate</u>					
	Expected Sign ^b	OLS	H-L	OLS	H-L
Constant	?	5.08 (6.10)	0.77 (1.11)	3.69 (4.44)	0.80 (1.14)
m^j (c)	+	1 (constrained)	1 (constrained)	1 (constrained)	1 (constrained)
m^{us} (d)	-1	-1 (constrained)	-1 (constrained)	-1 (constrained)	-1 (constrained)
y^j	-	0.09 (0.74)	-0.25 (3.72)	0.17 (1.55)	-0.18 (2.42)
y^{us}	+	-1.05 (5.80)	0.18 (1.31)	-0.85 (4.18)	0.12 (0.86)
$(r^j - r^{us})$	+	-3.14×10^{-3} (0.96)	-4.91×10^{-3} (1.57)	-3.2×10^{-3} (1.06)	-4.66×10^{-3} (1.50)
i^j	+	1.76 (8.49)	0.81 (2.01)	1.37 (5.13)	0.87 (2.22)
i^{us}	-	-2.02 (5.28)	-0.38 (0.42)	-1.27 (2.45)	-0.71 (0.82)
OCA^j	-			-4.46×10^{-6} (2.02)	-7.73×10^{-6} (2.00)
OCA^{us}	+			2.41×10^{-6} (1.13)	2.59×10^{-6} (0.69)
\bar{R}^2		.794	.949	.839	.950
D.W		0.53	1.66	0.60	1.62
RHO		-	.965	-	.910

TABLE 1
(continued)
Estimates of Equations^a for a Monetary
Approach to the Yen-Dollar Rate,
January 1974 to December 1982

Dependent Variable in the Logarithm of the Yen Dollar Exchange Rate

	Expected Sign	Fair ^f
Constant	?	6.12 (3.61)
m^j (c)	+1	-0.002 (5.20)
m^{us} (d)	-1	-0.10 (4.14)
y^j	-	0.003 (0.05)
y^{us}	+	-0.01 (0.13)
$(r^j - r^{us})$	+	-0.004 (2.30)
i^j	+	0.20 (0.64)
i^{us}	-	0.18 (.30)
R^2		.963
D.W.		1.25
RHO		.974

Notes to Table 1

- a Absolute values of t-statistic are in parentheses.
- b Expected signs are based on the model developed in this paper; see also Frankel (1979) and Haynes and Stone (1981).
- c Maintained hypothesis is that the coefficient is equal to one.
- d Maintained hypothesis is that the coefficient is equal to negative (-1).
- e Monetary homogeneity imposed on a priori grounds; see Frankel (1981).
- f Due to possible simultaneity of Japanese money supply and the yen-dollar rate and the presence of autocorrelation, the estimating technique is the Fair instrumental variables technique. See Ray Fair, "The Estimation of Simultaneous Equation Models with Lagged Endogenous Variables and First-Order Serially Correlated Errors," Econometrica Vol. 38, No. 3, 1970.

supplies variable does improve the model's performance to some extent, but problems remain. The coefficient for U.S. income, for instance, remains significantly negative in all ordinary least squares equations, while theory predicts a positive coefficient estimate.¹⁷

One further goal of our econometric analysis is an examination of the structural stability of the monetary approach equations. If the theory is a satisfactory explanation of exchange rate behavior, the estimated equation should not shift over time absent any exogenous shocks. In this case, we have reason to believe that there may have been such a shock in October 1979 when the Federal Reserve System changed its operating procedure while tightening its monetary policy. The changes were sufficiently sweeping in scope and effect to question whether they altered the inflationary expectations that are incorporated in the monetary model.

We found that there were significant structural changes in equations comprising the monetary model. In general, the model seems to be a better fit to the pre-1979 period. Examining both pre-and post-1979 equations, however, shows that there are challenges to the model during both periods. Insignificant coefficients and coefficients bearing (theoretically) incorrect signs appeared during both periods. These results, together with the tests for structural stability, are presented in Table 2.

Our finding of structural instability is consistent with other research. Meese and Rogoff¹⁸ compared the ability of the monetary model to forecast spot exchange rates with the ability

¹⁷Following suggestions that Japanese monetary policy reacts at least in part to changes in the yen-dollar exchange rate, we used the Fair technique to correct for autocorrelation and the possible simultaneity. No improvements in the estimated equations were observed. See Fair, Ray, "The Estimation of Simultaneous Equation Models with Lagged Endogenous Variables and First Order Serially Correlated Errors," Econometrica Vol. 38, No. 3, 1970, pp. 507-516.

¹⁸Meese and Rogoff (1983) pp. 3-24.

TABLE 2

Estimates of Equations^a for a Monetary
Approach to the Yen-Dollar Rate,
Stability Test^b

Dependent variable in the logarithm of the yen-dollar exchange rate

	January 1974 to October 1979	November 1979 to December 1982
Constant	4.69 (3.00)	6.71 (1.56)
m _J (c)	-0.05 (9.69)	0.17 (2.91)
m _{us} (d)	0.23 (5.26)	-0.71 (0.81)
y _J	0.09 (0.86)	0.04 (0.20)
y _{us}	0.11 (0.63)	0.21 (0.62)
(r _J - r _{us})	-1.10 x 10 ⁻³ (0.24)	9.17 x 10 ⁻⁴ (0.28)
l _J	0.22 (0.98)	0.09 (0.07)
l _{us}	1.90 (4.01)	-1.93 (1.96)
CCA _J	1.13 x 10 ⁻⁵ (3.87)	1.21 x 10 ⁻⁵ (3.79)
CCA _{us}	5.70 x 10 ⁻⁶ (2.69)	1.01 x 10 ⁻⁷ (0.02)
\bar{R}^2	.961	.683
D.W.	0.59	1.14

Notes to Table 2

- a Absolute values of t-statistics are in parentheses.
- b F-statistic for stability is equal to 20.20; critical value for 10 and 86 degrees of freedom is approximately 2.54 at the 0.01 level.
- c Maintained hypothesis is that the coefficient is equal to one.
- d Maintained hypothesis is that the coefficient is equal to negative one (-1).

of time series models, including a random walk (in which the current spot rate is the predictor of the future spot rate). Meese and Rogoff found that the random walk model performed better than any "structural model of exchange rate determination. One possible explanation for the poor performance of the monetary model that Meese and Rogoff offer, without implying any definite conclusions, is "structural instability due to the oil price shocks and changes in macroeconomic policy regimes, as well as the failure of the models to adequately incorporate other real disturbances."¹⁹

The deterioration in the performance of the monetary model has been documented elsewhere. Frankel²⁰ noted how the model was not successful in analyzing the 1978 weak dollar. Despite higher growth in the German money supply than in the U.S. money supply, the mark appreciated against the dollar. In general, Frankel found that "empirical studies that tried to update the monetary equation to include the events of 1978 and 1979 were quite unsuccessful from the viewpoint of all versions of the model."²¹ Our estimates of the monetary model for the Deutsche mark-dollar and mark-yen exchange rate further suggest the empirical weaknesses of the monetary approach.

PORTFOLIO MODELS OF EXCHANGE RATES

Another "asset" theory of exchange rate determination is the portfolio approach. As in the monetary approach, the models within the portfolio approach differ from one another. Nonetheless, they share some common differences from the monetary approach models as well as certain common similarities.

The principal difference between the portfolio approach and the monetary approach is that the portfolio approach assumes that bonds denominated in domestic and foreign currencies are imperfect substitutes while the monetary approach assumes that these bonds are perfect substitutes.

If domestic and foreign currency-denominated bonds are perfect substitutes, private assetholders desire to hold the bonds with the highest expected rate of return. Coupled with the assumption of perfect capital mobility, the monetary assumption of perfect substitutability implies that the expected rates

¹⁹Meese and Rogoff (1983), p. 21.

²⁰Jeffrey A. Frankel (1983) "Monetary and Portfolio-Balance Models of Exchange Rate Determination," in Jagdeep Bhandari and Bluford Putnam, op. cit., pp. 84-115.

²¹Frankel (1983). p. 93.

of return on domestic bonds equals the expected rate of return on foreign bonds.²² In contrast, the portfolio approach assumes that bondholders are concerned about the currency denomination of the bonds that they hold and compose their portfolios based not only upon the bonds' expected rates of return but on exchange rate risk (i.e., the risk of unexpected exchange rate movements) as well. In short, in the portfolio approach, there are different bonds, not one world bond.

The role of purchasing power parity is another major difference between the monetary approach and the portfolio approach. In all monetary models, purchasing power parity plays a critical role in transferring a theory of the demand for money into a theory of exchange rate determination. In many monetary models PPP is assumed to hold continuously in the long run. In contrast, in most portfolio models, PPP is not assumed.

Other differences between these asset approaches can be the type of money in the money demand equation and the appropriate scale variable. Portfolio approach models often specify the monetary base (which they call reserve money) as the appropriate money type, since in their view the demand by all of the private sector is the appropriate concept, not simply non-bank demand for money. Following in the portfolio approach pioneered by Markowitz and Tobin for closed economies, the portfolio approach frequently specifies nominal wealth of the private sector as the scale variable for this private demand for monetary base. In contrast, non-bank demand for money is the money concept in the monetary approach. Following a transactions school for money demand, the monetary approach postulates that domestic output is the scale variable for non-bank demand for domestic money.

The role of pure (i.e., bond-financed) fiscal policy differs in these two approaches. The difference results from the

²²An equivalent condition is uncovered interest arbitrage discussed earlier. Since the expected appreciation is not observable, econometric tests of uncovered interest parity can only be made jointly with a theory of exchange rate expectations. Testing this joint theory, Frankel assumed rational exchange rate expectations and was unable to reject the null hypothesis using monthly data. However, Baillie, Lippens, and McMahon also rejected the null hypothesis for each of the six dollar exchange rates they studied, using weekly data. See J. Frankel, "A Test of Perfect Substitutability in the Foreign Exchange Market", Southern Economic Journal, Oct. 1982, pp. 406-16 and R. Baillie, R. Lippens, and P. McMahon, "Testing Rational Expectations and Efficiency in the Foreign Exchange Market," Econometrica, May 1983, pp. 553-63.

difference between the models over the substitutability of bonds. In the monetary approach, the stock of government-issued debt is absent from the theoretical formulations. Since asset holders are indifferent as to the currency denomination of the bonds they hold, the relative stocks of these bonds do not directly affect asset holder behavior and are not explicitly modeled. Potential avenues do exist in the monetary model, however. Bond stocks, government expenditures, and taxes can affect domestic and foreign price levels or domestic and foreign output and, through these avenues, the exchange rate. However, at the present time, none of these avenues are explicitly included in any theoretical monetary model we are aware of. In contrast, in the portfolio approach, since currency denomination does matter to private asset holders, the stocks of these bonds play an explicit and important direct role in determining exchange rates.

Bisignano and Hoover²³ present an empirical portfolio balance model following theory developed by Branson, Halttunen and Masson²⁴ and test it on exchange rates between the U.S. dollar and each of four other currencies. While their tests support the portfolio approach, especially for the dollar-yen and dollar-lira exchange rates, our analysis extending data beyond their December 1978 endpoint did not support this portfolio model. Our finding is in line with tests covering recent years for all asset market models of exchange rate determination that we are aware of.

In the model developed by Bisignano and Hoover, equations (6) through (9) specify portfolio behavior of a small "home" country.²⁵

²³Joseph Bisignano and Kevin Hoover, "Alternative Asset Market-Approaches to Exchange Rate Determination," Federal Reserve Bank of San Francisco Working Paper, No. 105, Aug. 1980, and "Monetary and Fiscal Impacts of Exchange Rates," Economic Review of the Federal Reserve Bank of San Francisco Winter 1982, pp. 19-36.

²⁴William, Branson, H. Halttunen and P. Masson, "Exchange Rates in the Short-Run," European Economic Review, (1977).

²⁵The small country assumption allows equations (6), (7) and (8) to be equilibrium conditions rather than private domestic asset demands. This assumption implies that the domestic interest rate, r , is unaffected by private foreign asset behavior and that private domestic holdings have no effect upon the yield of foreign assets, r^* .

$$RM = l(r, r^*)W \quad (\text{Domestic reserve money equilibrium})$$

[Equation 6]

$$B = b(r, r^*)W \quad (\text{Domestic government bond equilibrium})$$

[Equation 7]

$$F/e = f(r, r^*)W \quad (\text{Domestic holding of foreign bonds equilibrium})$$

[Equation 8]

$$W = RM + B + F/e \quad (\text{Domestic private wealth identity})$$

[Equation 9]

where RM is domestically issued reserve money (monetary base), B is privately held domestic government bonds, F is domestic private holdings of foreign denominated assets, W is private domestic wealth measured in domestic currency, e is the spot price of domestic currency, r is the yield on domestic government bonds, r^* is the yield on foreign currency denominated bonds, and l , b and f are percentages of domestic private wealth held by the domestic private sector in domestic reserve money, domestic government bonds, and foreign assets, respectively.

Given the wealth constraint, one equation is necessarily implied by the other two. Assuming that the model depicts the behavior of a small country implies that the foreign interest rate (r^*) is not affected by the actions of investors in the "home country." Consequently, Bisignano and Hoover argue that equations (6), (7), and (8) can be solved for the "quasi-reduced" form:

$$e = g(RM, B, F, r^*) \quad [\text{Equation 10}]$$

Assuming that the asset stocks held by the private sector of the foreign country are the determinants of the foreign interest rates (shown in equation 11), the price of domestic currency can be solved solely in terms of the asset stocks held by each country's private residents, as shown in equation 12:

$$r^* = r^*(RM^*, B^*, F^*) \quad [\text{Equation 11}]$$

$$e = e(RM, B, F, RM^*, B^*, F^*) \quad [\text{Equation 12}]$$

Table 3 presents our estimates for a linear form of equation 12 applied to the yen-dollar exchange rate. These estimates cover two data periods, March 1973 to December 1978 and March 1973 to December 1982. Each equation was estimated using ordinary least squares and an autocorrelation correction procedure (using the Hildreth-Liu method) as well as an instrumental variable technique for the potential simultaneity of

TABLE 3

Estimates of Equation (12) for a Portfolio
Approach to the Yen-Dollar Rate,
March 1973 to December 1978^a

Dependent Variable is the Yen-Dollar Exchange Rate

	Expected Sign ^b	OLS	H-L	Fair ^c
Constant	?	336.0 (14.3)	347.0 (12.9)	357.0 (13.0)
RM _{US}	-	-0.56 (1.93)	-0.52 (1.74)	-0.47 (1.52)
B _{US}	?	1.19 (3.03)	0.63 (1.10)	0.64 (1.11)
F _{US}	+	0.86 (6.74)	0.86 (5.01)	0.84 (4.95)
RM _J	+	5.40 x 10 ⁻⁵ (0.05)	-1.40 x 10 ⁻³ (1.50)	-2.71 x 10 ⁻³ (2.01)
B _J	?	-3.06 x 10 ⁻³ (5.09)	-2.25 x 10 ⁻³ (3.13)	-1.99 x 10 ⁻³ (2.80)
F _J	-	-7.93 x 10 ⁻³ (5.78)	-9.83 x 10 ⁻³ (5.15)	-9.96 x 10 ⁻³ (5.18)
R ²		.955	.963	.964
D.W		1.24	1.88	1.89
RHO		-	0.49	0.52

TABLE 3
(continued)
Estimates of Equation (12) for a Portfolio
Approach to the Yen-Dollar Rate,
March 1973 to December 1978^a

Dependent Variable is the Yen-Dollar Exchange Rate

	Expected Sign ^b	OLS	H-L	Fair ^c
Constant	?	421.9 (11.45)	285.0 (7.84)	292.9 (6.88)
RMUS	-	-1.70 (4.05)	-0.06 (0.28)	-0.05 (0.23)
BUS	-	0.23 (0.45)	-0.45 (.73)	-0.42 (0.68)
FUS	-	0.41 (3.60)	0.09 (0.64)	0.11 (0.77)
RMJ	+	-3.69×10^{-3} (1.92)	-1.48×10^{-3} (2.29)	-2.03×10^{-3} (2.22)
BJ	?	-9.09×10^{-4} (0.99)	-3.76×10^{-4} (0.55)	-3.64×10^{-4} (0.53)
FJ	-	-3.69×10^{-3} (2.56)	-4.02×10^{-3} (1.68)	-3.87×10^{-3} (1.61)
\bar{R}^2		.737	.952	.951
D.W.		0.38	1.78	1.76
RHO		-	0.96	0.96

Notes to Table 3

- a Absolute values of t-statistics are in parentheses.
- b See Bisignano and Hoover (1980) for a full description of the predicted signs.
- c Due to possible simultaneity of Japanese reserve money and the yen-dollar rate, the estimating procedure for this regression is the Fair (1970) instrumental variables technique.

Japanese reserve money and the yen-dollar exchange rate.²⁶ Table 4 presents our estimate of a linear version of equation (10) for March 1973 to December 1978 and March 1973 to December 1982. In the equations presented here, Japan is the small domestic country.²⁷ Variables are denoted in the table using the same symbols as in the presentation of the portfolio theory, with superscripts "j" and "u.s." denoting Japan and the United States, respectively.

While the overall fit of the portfolio model's equation 12 appears to be good, the estimated coefficients are frequently insignificant or of the theoretically incorrect sign, especially during the longest period, March 1973 to December 1982. (See Table 3.) In the short period equation, the estimated coefficient of Japanese reserve money is of the wrong theoretical sign (in all but the OLS regressions). While all other coefficients are statistically significant in the OLS regression, correction for the presence of autocorrelation causes the estimated coefficient of U.S. bonds to become statistically insignificant and the coefficient of Japanese reserve money to be the theoretically incorrect sign. Correcting for the possible endogeneity of Japanese reserve money, the coefficient of U.S. reserve money also becomes insignificant. Despite this, the Fair regression of this earlier period is a qualified success for the portfolio model, especially when judged by the poor performance of other models in regressions of the United States-Japan bilateral exchange rate.

However, when the time period is extended to December 1982, our confidence in the portfolio theory substantially diminishes. OLS estimates of equation 12 in this extended period yield two fewer statistically significant coefficients than in the shorter period, but autocorrelation remains present. After correcting for this and for the possible endogeneity of Japanese reserve money, there are no statistically significant independent variables of the correct theoretical sign. We tested equation (12) for structural stability, dividing the longer period in half. In the OLS estimation procedure, the only results that lend support to the portfolio theory, we rejected the null hypothesis of structural stability. As in the monetary approach, this structural instability casts doubt upon this underlying portfolio theory.

²⁶This is the Fair technique presented in footnote 17.

²⁷Assuming the dollar-yen rate as the dependent variable did not affect the major results.

TABLE 4

Estimates of Equation (10) for a Portfolio
Approach to the Yen-Dollar Rate,
March 1973 to December 1978^a

Dependent Variable is the Yen-Dollar Exchange Rate

	Expected Sign ^b	OLS	H-L	Fair ^c
Constant	?	282.5 (21.57)	208.3 (4.39)	336.7 (10.2)
RMJ	+	-1.51 x 10 ⁻³ (1.21)	-8.82 x 10 ⁻⁴ (1.02)	-83.3 x 10 ⁻⁴ (3.01)
RJ	?	-39.5 x 10 ⁻⁴ (9.07)	9.52 x 10 ⁻⁴ (1.03)	1.56 x 10 ⁻⁴ (1.71)
FJ	-	-12.8 x 10 ⁻³ (824)	-9.36 x 10 ⁻³ (2.63)	-15.0 x 10 ⁻³ (5.01)
μ_{US}	+	-1.34 (1.59)	1.05 (0.68)	-0.05 (0.03)
\bar{R}^2		.915	.961	.958
D.W.		0.74	1.79	1.33
RHO		-	.990	.616

TABLE 4
(continued)
Estimates of Equation (10) for a Portfolio
Approach to the Yen-Dollar Rate,
March 1973 to December 1982^a

	Expected Sign ^b	<u>Dependent Variable is the Yen-Dollar Exchange Rate</u>		
		OLS	H-L	Fair ^c
Constant	?	284. (25.31)	257. (9.51)	284. (7.67)
RMJ	+	1.91 x 10 ⁻³ (1.44)	-1.59 x 10 ⁻³ (2.57)	3.39 x 10 ⁻³ (2.36)
BJ	?	-3.91 x 10 ⁻³ (7.92)	-1.92 x 10 ⁻⁴ (0.30)	8.1 x 10 ⁻⁵ (0.11)
FJ	-	-3.68 x 10 ⁻³ (3.16)	-3.42 x 10 ⁻³ (1.42)	3.07 x 10 ⁻³ (1.21)
1 _{US}	+	-2.47 (4.86)	1.00 (1.57)	1.13 (1.71)
\bar{R}^2		.747	.953	.953
D.W.		0.32	1.77	1.70
RHO		-	.974	.963

Notes to Table 4

a Absolute values of t-statistics are in parentheses.

b See Bisignano and Hoover (1980) for a full description of the predicted signs.

c Due to possible simultaneity of Japanese reserve money and the yen-dollar rate, the estimating procedure for this regression is the Fair (1970) instrumental variables technique.

We estimated equation (10) over the same two periods as equation (12) since there was a possibility that the econometric problems of equation (12) were due to specification problems in equation (11). Our results, in Table 4, indicate only slightly more support for the underlying portfolio theory. The corrected R^2 and F statistics are slightly higher than those of equation (12). During the longer period three of the four OLS coefficient estimates of the independent variables are statistically significant. Correcting for autocorrelation, the coefficient of Japanese reserve money changes to the wrong theoretical sign while no other coefficient is statistically significant. The Fair techniques estimates are similar, except the U.S. interest rate becomes statistically significant. Structural stability tests tell the same story as they do for equation (12).

In summary, although these versions of a portfolio model performed somewhat better than the monetary model, the econometric analysis cannot give us any great confidence in either approach.

This poor econometric performance may well be predictable, however. First, each modeling approach requires simplifying assumptions that may affect the model's explanatory power. The monetary approach, for instance, assumed long-run purchasing power parity and operation of both countries' economies at some long-run equilibrium level; the implications of sustained divergences from PPP or from long-term equilibrium levels of prices and output are difficult to gauge. The portfolio balance focused on the behavior of asset markets. Use of currencies for trade transactions is not explicitly considered, however, except as national wealth is affected by trade. Again, it is difficult to assess whether this simplifying assumption affects the econometric results.

Poor econometric results may be due finally to the fact that an exchange rate is the price of an asset, regardless of whether the currency exchange is motivated by an underlying transaction on the "trade" or "capital" accounts of a nation's balance of payments. Explaining or forecasting the movement of an exchange rate is much like explaining or forecasting the behavior of an index of stock prices. While certain influences clearly are predictable, such as believing that real interest differentials affect exchange rates, the timing and magnitude of these effects depend on the complexities of market expectations. If markets "believe" that real interest rate differentials are a short-term phenomenon, for instance, the effect on exchange rates may be different, in duration or magnitude, than if the differentials are expected to persist for a longer period. In the absence of an operational way to incorporate such expectations into the models, along with the other

determinants, the current models of exchange rate behavior are not going to perform well. The generally poor performance of exchange rate determination models in the 1980s is not yet well understood.

ECONOMETRIC STUDIES OF IMPACT OF EXCHANGE
RATE VARIABILITY ON INTERNATIONAL TRADE

Econometric studies of the trade effects of exchange rate risk have two primary criteria to establish whether exchange risk lessens trade

1. The estimated effect of exchange variability on trade is negative, so that higher variability reduces trade.
2. This estimated effect of exchange rate risk is both statistically significant and robust; i.e., altered model specifications or additional data do not significantly alter the findings.

As chapter 4 notes, some studies have identified an appreciable trade effect of exchange rate variability, but these effects are not statistically robust (i.e., the estimated effect will change if the model is respecified). Other studies find no statistically significant effect of exchange rate risk on trade. This appendix, which is based on work published by David O. Cushman, notes several of these studies.

John H. Makin estimated the import volume demands of Germany, Japan, Canada and the United Kingdom from the 4th quarter of 1960 to the 4th quarter of 1973 and found no statistically significant effect of exchange rate risk on the quantity of their imports.¹

Peter B. Clark and Charles J. Haulk estimated Canadian import and export equations between 1950 and 1962 when Canada was on a flexible exchange rate standard and for the ensuing 8 years when Canada was on a fixed exchange rate standard. Although they estimated that higher exchange rate risk lowered the quantity of Canadian trade, the estimated magnitudes were not statistically significant.²

¹John H. Makin, "The Impact of Exchange Rate Variability on Trade Flows in Four Industrial Countries," in Eurocurrencies and the Financial System, ed. Carl H. Stem, John H. Makin, and Dennis E. Logue (Washington, D.C.: American Enterprise Institute, 1976).

²Peter B. Clark and Charles J. Haulk, "Flexible Exchange Rates and the Level of Trade: A Preliminary Analysis of the Canadian Experience" (Federal Reserve Board, 1972).

Peter Hooper and Steven W. Kohlhagen estimated bilateral quantity trade flows from 1965 to 1975 for the United States, the United Kingdom, Germany, France, Canada, and Japan. They also estimated multilateral trade flows between the United States and other nations. They found no statistically significant effect of exchange rate risk on trade quantities, but they did find statistically significant effect upon trade prices in a number of cases.³

David O. Cushman found some statistically significant effects of higher exchange rate risk reducing bilateral trade quantities when he extended the previous work and data of Hooper and Kohlhagen. The estimated effects of greater exchange risk upon trade volume (quantity) were not statistically robust; for example, they often disappeared when the lag structure was changed. The trade effects did tend to be statistically significant when the other independent variables had statistically significant effects, however, giving increased credibility to his results. He also finds evidence that increases in exchange rate risk increases a country's direct foreign investment abroad.⁴

³Peter B. Hooper and Steven W. Kohlhagen, "The Effects of Exchange Rate Uncertainty on the Prices and Volume Of International Trade," Journal of International Economics (Nov. 1978): 483-511.

⁴David O. Cushman, The Effects of Exchange Rate Risk on International Trade and Direct Investment, Ph.D. thesis, Vanderbilt University, 1980; and "The Effects of Exchange Rate Risk on International Trades," Journal of International Economics (1983), pp. 45-63.

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