

PRINCETON STUDIES IN INTERNATIONAL FINANCE NO. 15

Foreign Exchange, Capital Flows, and Monetary Policy

E. Ray Canterbery

INTERNATIONAL FINANCE SECTION
DEPARTMENT OF ECONOMICS
PRINCETON UNIVERSITY • 1965

PRINCETON STUDIES
IN INTERNATIONAL FINANCE

This is the fifteenth number in the series called PRINCETON STUDIES IN INTERNATIONAL FINANCE, published from time to time under the sponsorship of the International Finance Section of the Department of Economics at Princeton University.

The author, E. Ray Canterbery, is Assistant Professor of Economics at the University of Maryland. His previous work experience includes two years in private business and one year each with the Federal Reserve Bank of St. Louis and Arizona State University. He is the author of several articles and of a book, *The President's Council of Economic Advisers*.

This series is intended to be restricted to meritorious research studies in the general field of international financial problems, both policy and theory, which are too long for the journals and too short to warrant publication as books.

While the Section sponsors the STUDIES, the writers are free to develop their topics as they will. Their ideas and treatment may or may not be shared by the editorial committee of the Section or the members of the Department.

FRITZ MACHLUP
Director

Princeton University
June 1965

PRINCETON STUDIES IN INTERNATIONAL FINANCE NO. 15

Foreign Exchange, Capital Flows, and Monetary Policy

E. Ray Canterbery

INTERNATIONAL FINANCE SECTION
DEPARTMENT OF ECONOMICS
PRINCETON UNIVERSITY • 1965

*Copyright © 1965, by International Finance Section
Department of Economics
Princeton University
L.C. Card 65-21049*

*Printed in the United States of America for Princeton University Press
by the William Byrd Press, Inc., Richmond, Virginia*

TABLE OF CONTENTS

I. INTRODUCTION	1
A. The Payments Deficit and Monetary Policy	1
B. Objectives and Method	5
II. MOTIVATIONS AND CAPITAL MOVEMENTS	7
A. Reappraisal of Traditional Exchange Concepts	7
B. The Participants and their Motives	9
Financing Imports-Exports	10
Simplified Import-Export Equations	11
Speculation	16
Interest-Rate Arbitrage	18
C. Summary	19
III. KEYNES' PARITY VERSUS THE MODERN EXCHANGE MARKET	20
A. The Interest-Rate-Parity Concept	21
B. United States Experience, 1961-1962	25
C. The Unstated Assumptions of Parity	25
The Availability of Arbitrage Funds	26
Exchange Restrictions and the Probability of Devaluation or Revaluation	29
The Concept of Speculative Confidence	30
D. Summary	32
IV. A DYNAMIC THEORY OF FOREIGN EXCHANGE	33
A. Interest-Rate Arbitrage and Speculative Confidence	34
B. The Mathematics of Speculation and Interest-Rate Arbitrage	35
Spot Equations	35
The Forward Market	37
C. Price Determination in the Exchange Market	38
The Normal Period	41
The Abnormal Period	42
The Speculative Abnormal Period	45
D. Summary	47

V. MONETARY POLICY VERSUS THE FORWARD RATE	48
A. The United States and a Practical Policy Demonstration	48
B. The Policy Dilemma	53
VI. CONCLUSION	56
Appendix A. GLOSSARY OF FOREIGN-EXCHANGE TERMS	58
Appendix B. CAPITAL CONTROLS, SOME MAJOR INDUSTRIAL COUNTRIES	60

TABLES AND CHART

1. Short-term Interest-Rate Differentials with Forward Cover, Selected Countries (Per cent per annum)	24
2. Mathematical Symbols	36
3. Foreign-Exchange-Market Adjustments during Balance-of-Payments Deficit and High Foreign Interest Rates, Abnormal Period	43
4. Foreign-Exchange-Market Adjustments during Balance-of-Payments Deficit, with Uncertainty Reduced, Speculative Period	46
5. Mathematical Symbols	49
Figure 1. 90-Day Treasury-Bill Rate	4

I. INTRODUCTION

A. THE PAYMENTS DEFICIT AND MONETARY POLICY

The United States experienced deficits in its international balance of payments in all but one of the fourteen years, 1950-1964. The deficits averaged \$1.5 billion yearly during 1950-1956, and rose to \$3.2 billion annually during 1958-1962. A striking feature of this deficit position since 1950 is that it prevailed in the face of a substantial surplus in the balance of trade. But this excess of merchandise exports over imports has not been sufficient to offset military and foreign-aid expenditures abroad, plus the outflow of both long-term and short-term capital.

When the gold-exchange system was reestablished at Bretton Woods after World War II, its supporters argued that the viability of the new payments mechanism depended upon "timely" exchange-rate adjustments. If a member nation of the newly created International Monetary Fund experienced difficulty in stabilizing its exchange rate over a period of years and was losing foreign-exchange reserves, it could ask the IMF for the privilege of altering its exchange rate by setting a new par value for its currency in terms of gold. If it wished to revalue by more than ten per cent, the nation had to demonstrate that it was enduring a "fundamental disequilibrium."

In the intervening years the United States has become a key-currency nation. During the Kennedy-Johnson administrations, the monetary authorities decided that this status could not be maintained unless the par value of the dollar was kept constant. Thus, because of the key-currency role, Under Secretary of the Treasury for Monetary Affairs Robert V. Roosa, as administration spokesman on the payments problem, ruled out the possibility of devaluation as a solution to the chronic payments deficit, arguing that devaluation would leave the world without a generally acceptable major currency.¹ Hence the United States experienced a predicament not foreseen at Bretton Woods: that is, a nation wishing to maintain its role of a key-currency country is forced to violate the basic tenet of that agreement by re-

¹Robert V. Roosa, "Assuring the Free World's Liquidity," *Factors Affecting the United States Balance of Payments*, compilation of studies prepared for the Subcommittee on International Exchange and Payments, Joint Economic Committee, 87th Cong., 2d Sess., 1962, p. 343.

jecting "timely" exchange-rate adjustments as an instrument of balance-of-payments policy.

The policy options of the United States were narrowed, by the peculiar circumstances of its role as a key-currency country, to two basic long-term approaches. It could reduce the level of its domestic economic activity in order to correct the payments imbalance. Or it might impose direct and indirect constraints on various components of its balance of payments. The orthodox attack would be to apply measures that would tend to dampen economic expansion, thus tending also to reduce merchandise imports and stimulate exports. The alternative would be to establish tariffs and import quotas to curb imports, legislate restrictions on long-term and short-term capital movements, and raise interest rates with a view to slowing short-term capital outflows. The carefully formulated purpose of the Bretton Woods Agreement was to avoid both sets of policies, which were described as the "evils" of the discarded gold standard.

Under either approach, monetary policy can be employed. Variations in the money supply and interest rates can affect the balance of payments in three ways: (a) through the current account; (b) through interest-induced capital movements; and (c) through speculative capital movements. The first of these is the classical adjustment mechanism. Falling income and prices, as possible consequences of the absolute or relative contraction of credit and domestic spending, would tend to dampen imports and improve the balance of trade. However, since 1960 Federal Reserve official publications have stressed the dual objectives of stimulating economic growth *and* reducing the payments deficit.² Also, the Kennedy-Johnson administration's official domestic policy goal was to support economic expansion.

Thus the Democratic administration ostensibly chose the second general set of policies for eliminating the payments problem. The Federal Reserve System was assigned the task of curtailing interest-induced and speculative capital flows abroad. The authorities could work on the first type of outflow by changing relative yields to deter arbitrageurs and certain types of speculators. According to traditional theory, speculation in foreign exchange is a result of expected depreciation or devaluation of the home currency. An interest-rate rise is a signal that the monetary authorities will defend the exchange rate at the sacrifice of domestic employment and growth. Confidence in the currency is

² See Board of Governors of the Federal Reserve System, *Annual Report*, 1960-1963.

sustained if potential speculators know that maintenance of the current rate of exchange is given priority over all other national goals.

To accomplish their objective, the monetary authorities placed a floor under short-term interest rates and eventually pushed them higher in order to reduce the differential between rates here and abroad. This policy was initiated by a changed directive to the Federal Open Market Committee in August 1960. In its *Annual Report* for 1961 the Board of Governors expressed its view that a widening of the differential between domestic and foreign money-market rates "could have led to greater outflow of short-term capital and so worsened the balance of payments." Although other measures have been introduced by both the Federal Reserve and the U. S. Treasury during the Kennedy-Johnson administration, such as currency swaps and foreign-denominated government-security (non-negotiable) issues, this interest-rate increase was the main action taken by the System.

While the objectives of rapidly expanding the money supply and raising interest rates diverge within this context, in their separate effects on the domestic economy they cannot be wholly segregated. For instance, if the coefficient of elasticity of short-term interest rates to changes in the supply of and demand for Treasury bills is very low and the degree of sensitiveness of commercial-loan demand to interest-rate movements is higher, pegging of interest rates during a period of slow business activity results in a moderation or contraction in the growth of bank reserves and ultimately of the money supply. Under these conditions, large net sales of Treasury bills by the Open Market Committee to support interest rates could have an adverse effect on the money supply. Indeed, this has undoubtedly occurred, as there has been no noticeable decline (even seasonal) in the Treasury-bill rate between August 1960 and this writing (January 1965).³

If it is further hypothesized that a faster-growing money supply and lower interest rates are more expansionary for the private economy than a slower rate of growth in money and higher interest rates, the monetary authorities may have been violating their goal of assisting economic growth. This is an argument having substantial support among Federal Reserve and academic economists. Consequently, regardless of whether this payments-motivated policy successfully lessens the payments deficit, it may have undesirable effects on domestic business.

Given the constraint of supporting the domestic economy, a massive

³ See the accompanying chart.

90-Day Treasury Bill Rate

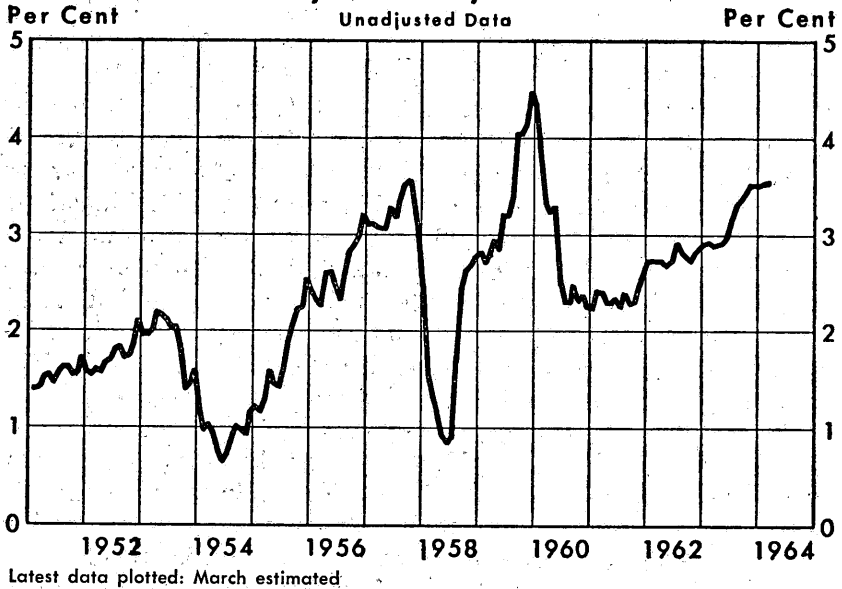


Figure 1

attack by the Federal Reserve could be brought to bear on only one category of payments. Foreign borrowings for trading purposes are related directly to the current account. The restoration of confidence in the dollar (when lacking) through monetary policy could best be accomplished by restrictions that *clearly* forfeit domestic economic expansion.⁴ Prospects for reducing the chronic payments deficit then rested with the expected impact of higher short-term interest rates on arbitrage. Thus, our attention will be focused primarily on these short-term movements and monetary policy.

Academic economists, as well as Federal Reserve officials, were confronted with many unanswered questions regarding these short-term capital movements. Suppose the type of capital movements sensitive to interest-rate differences is relatively insignificant. It is possible, for instance, that portfolio or direct investments abroad represent the main cause of disequilibrium in the U. S. balance of payments. Suppose the capital flows which the Federal Reserve and Treasury can in-

⁴ Even the sharp British Bank-Rate increase from 5 to 7 per cent on November 20, 1964 was not sufficient to stem speculation against the pound sterling that month.

fluence within relevant interest-rate ranges is even less important in the overall payments picture.⁵

What if the arbitrary increase in the short-term domestic interest rate generates forces which tend to cancel its original intent? Or, what if such an advance tends at times to worsen the payments deficit? Even if a great part of capital movement is demonstrably interest-rate sensitive, pegging of short-term rates may well meet with countervailing forces.

The thesis of this inquiry is that domestic monetary policy was *unnecessarily* constrained by a Federal Reserve-Treasury policy of artificially supporting short-term interest rates between late 1960 and early 1965. While United States business might have benefited from a faster-growing supply of money and lower interest rates, the degree of credit restraint exercised was not sufficient to enforce "balance-of-payments discipline" via the current account, nor to reverse speculation. The failure of monetary policy to curb interest-induced arbitrage and speculation becomes the relevant hypothesis to be tested.

B. OBJECTIVES AND METHOD

The task is not a simple one. The main weakness of earlier studies of capital movements is their lack of a cohesive and coherent theory. As the only identifiable data related to short-term flows through *forward* exchange contracts are forward exchange rates, the initial approach is to develop a theory of the forward market. Because the forward and spot markets are inseparable in both a theoretical and practical sense, this requires formulating a theory of the exchange market.

Thus, short-term capital movements are to be traced through the exchange markets, and in this manner identified by type. In doing so, it is also imperative to state a more general theory of foreign exchange, as exchange-rate variations are functions, in part, of trade and long-term capital flows. The institutional framework for such a model is presented in Chapter II. In this discussion, the institutional motives leading to transactions in foreign exchange are summarized, with special emphasis on short-term capital.

Equilibrium conditions in which capital movements are stabilized are specified in Chapter III. The Keynesian concept of interest-rate

⁵ While an average U. S. commercial-loan rate of 20 per cent might seriously discourage borrowing by Canada from the United States, the technical ability of the Federal Reserve and Treasury to raise rates within this "relevant" range is doubtful.

parity is the main tool of analysis. This traditional idea is modernized by bringing its assumptions into closer alignment with the present-day foreign-exchange market. The focus of this section is upon a description of the operation of interest-rate arbitrage and its importance in moderating short-term capital outflows.

With the motivations for capital movements defined and the interest-rate-parity equilibrium updated, the way is clear for the presentation of a dynamic theory of foreign exchange in Chapter IV. The effect of various forms of exchange speculation on exchange rates, including a newly defined concept of "speculative confidence," is contrasted with that of covered interest-rate arbitrage.⁶ Speculation and arbitrage are reduced to mathematics, and spot and forward price-determination equations are generated. In turn, relative price movements in the spot and forward markets distinguish the main forces at work in the forward exchange market. These causes of observed price behavior indicate either continued exchange-rate stability or possible instability.

Monetary policy is described throughout as a possible exogenous influence on exchange-price fluctuations, both in terms of its influence on the availability of arbitrage funds and on interest-rate differentials. In Chapter V, the interrelationship between interest-rate changes, short-term capital flows, and the forward exchange rate is analyzed. In a practical policy demonstration it is discovered that the forward exchange rate is not always "well-behaved" when the monetary authorities peg interest rates. Indeed, rather than discourage the outflow of interest-arbitrage funds, the forward rate may move in the "wrong" direction in the face of higher interest rates.

If it is found that the predominant motivation is speculation, including uncovered interest-rate arbitrage and trade-related transactions, the effects of monetary policy are likely to be quite different from the results of the same policy on covered interest-rate arbitrage. There are certain capital movements which, because of their very nature, are not likely to be altered within relevant interest-rate ranges by monetary policy. This is the case with foreign-trade credits. If an examination of the type of capital upon which monetary policy is most likely to exert a substantial effect yields negative results, the efficacy of monetary policy in coping with short-term capital outflows is put to a severe test.

⁶ These and other exchange-market terms are defined in a "Glossary of Foreign-Exchange Terms." While many of these items have a commonly accepted meaning, the definitions of some had to be modified or originated for the purposes of this study.

II. MOTIVATIONS AND CAPITAL MOVEMENTS

For an explanation of short-term capital movements we examine the foreign-exchange market. It is necessary to show the characteristics of today's exchange market, to specify the types of exchange transactions, and to identify the motivations of those bank and non-bank firms operating in the exchange market. In this manner it is possible to determine monetary policies most likely to be effective in reducing capital outflows. This also provides an institutional framework for a theory of foreign exchange.

A theory of foreign exchange endeavors to identify the forces behind all foreign-exchange transactions, whether or not they come directly to market. A part of the short-term capital entering the market at any particular time may be attracted by interest-rate differentials between one nation and another.

A. REAPPRAISAL OF TRADITIONAL EXCHANGE CONCEPTS

Three major empirical studies—by Professors Philip W. Bell of Haverford College, Peter B. Kenen of Columbia University, and Benjamin J. Cohen of Princeton University—have been conducted in recent years on the responsiveness of U. S. short-term capital movements to changes in interest-rate differentials.⁷ These inquiries have been used as references by policy-makers in the Treasury and the Federal Reserve. While they fail to prove a high elasticity of changes in claims payable in foreign currency to deviations in interest rates, the studies find nonfinancial corporate dollar claims on Canada and Continental Europe to be sensitive to interest differentials. Recorded increases in claims on foreigners comprise short-term capital outflows in the U. S. balance of payments. Conventional theory also supports the view that claims payable in foreign currency are interest-rate sensi-

⁷ Philip W. Bell, "Private Capital Movements and the U. S. Balance of Payments Position," *Factors Affecting the United States Balance of Payments*, compilation of studies prepared for the Subcommittee on International Exchange and Payments, Joint Economic Committee, 87th Cong., 2d Sess., 1962, pp. 395-482; Peter B. Kenen, "Short-term Capital Movements and the U. S. Balance of Payments," *The United States Balance of Payments*, Hearings before the Joint Economic Committee, 88th Cong., 1st Sess. Part I, 1963, pp. 153-191. The Cohen Study was completed at the Federal Reserve Bank of New York, and summarized in a memorandum to the Treasury on January 29, 1963.

tive.⁸ In the years 1957–1962, about 30 per cent of the recorded short-term capital outflow from the United States is attributed to nonfinancial corporate dollar claims on Canada and Continental Europe plus foreign-currency claims. Thus, it is imperative to determine the motivations for such movements.

Mysterious capital movements and the sometimes eccentric behavior of exchange rates in recent years are not adequately explained by available theories. Peter B. Kenen, in his well-known study of the British balance of payments for 1951–1957, seemed puzzled by the contrast between theory and reality regarding the transfer of short-term capital.

Certain authors have argued that these controls, and higher interest rates, sharply curbed overseas speculation in 1952, but their position is not supported by the available data. The statistics on bill finance suggest that monetary policy did not much reduce its volume.⁹

Kenen compared this experience with that of United States investment in the United Kingdom during the same period. But this behavior too contrasted with what one might conclude from accepted theory.

Statistics of United States short-term investment in the United Kingdom are no more satisfying from the standpoint of interest-rate policy. During the first nine months of 1955, interest rates were rising in London. But private traders and banks borrowed \$120 million more in London than they lent.¹⁰

More recently, John H. Auten raised a somewhat different question, but one that again has not been adequately explained by a systematic exchange theory. He observed that a large volume of short-term capital had moved from the United States to the United Kingdom during 1960. If this had been covered interest-rate arbitrage, the forward exchange rate should have declined sharply, under traditional theory. Rather, he argued, "It is generally agreed that, during 1960, movements of capital from New York to London were frequently left uncovered

⁸ See Charles P. Kindleberger, *International Short-term Capital Movements* (New York: Columbia University Press, 1937); A. E. Jasay, "Bank Rate or Forward Exchange Policy," *Banca Nazionale del Lavoro Quarterly Review*, Vol. XLIV (March 1958); J. H. Auten, "Monetary Policy and the Forward Exchange Market," *The Journal of Finance*, Vol. XIV (December 1961); Merlyn N. Trued, "Interest Arbitrage, Exchange Rates and Dollar Reserves," *Journal of Political Economy*, Vol. LXV (October 1957).

⁹ Peter B. Kenen, *British Monetary Policy and the Balance of Payments, 1951–1957* (Cambridge, Mass.: Harvard University Press, 1960), p. 154.

¹⁰ *Ibid.*, p. 155.

against exchange risks." The reason, he suggests, is that "the practice of covering forward may have been abandoned by some investors simply because the likelihood of sterling devaluation in 1960 seemed quite remote."¹¹ This is in contrast with accepted doctrine, according to which an investment in foreign bills or certificates is a riskless transaction only if covered (protected) in the forward market.

That same year the Bank of England had attempted to influence short-term capital transfers by varying the Bank Rate. But the Radcliffe Committee discovered that the Bank did not know the impact of Bank-Rate policy upon the foreign-exchange market and upon capital flows.¹²

These unidentified capital flights and the disorganized state of current exchange-market theory has led me to a reexamination of some basic exchange concepts. This investigation may parallel a reorientation of Federal Reserve-Treasury policy. While the main payments weapon of the monetary authorities during 1961, 1962, and early 1963 was the short-term interest rate, Federal Reserve activity in forward exchange contracts has increased substantially since. This tactical change may foreshadow a growing awareness of the repercussions of arbitrary interest-rate changes upon the forward exchange market. In this discussion, primary emphasis will be placed on United States institutions; that is, the New York money market, American commercial banks, and non-bank firms.

B. THE PARTICIPANTS AND THEIR MOTIVES

First let us consider in detail *who* might move short-term capital through foreign exchange, and their motives. Commercial banks with large foreign-exchange departments and a few foreign-exchange brokers are the risk-bearers in foreign exchange and "make" the foreign-exchange market. The main motive of the 125 U. S. commercial banks engaged in exchange operations is for profits from deposit accounts and loans to firms dealing in foreign exchange. A secondary objective, in the New York money-market center, is profits on large sales of currency. Each of these banks has an inventory of various currencies and maintains at least one account in a bank in the nation of each cur-

¹¹ John H. Auten, "Forward Exchange Rates and Interest-Rate Differentials," *The Journal of Finance*, Vol. XVIII (March 1963), p. 17. See also Bank of England, *Quarterly Bulletin*, Vol. I (December 1960), p. 9; *Federal Reserve Bulletin*, Vol. XLVII (August 1961), pp. 891-892.

¹² Committee on the Working of the Monetary System, *Minutes of Evidence* (London: HMSO, 1960), para. 3215-3219 and 1479-1490.