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Volume Title: Foreign Dollar Balances and the International Role of the Dollar

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Volume Publisher: NBER

Volume ISBN: 0-870-14262-3

Volume URL: <http://www.nber.org/books/mike74-1>

Publication Date: 1974

Chapter Title: The Behavior of Foreign Dollar Holdings

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Chapter URL: <http://www.nber.org/chapters/c3642>

Chapter pages in book: (p. 54 - 84)

The Behavior of Foreign Dollar Holdings

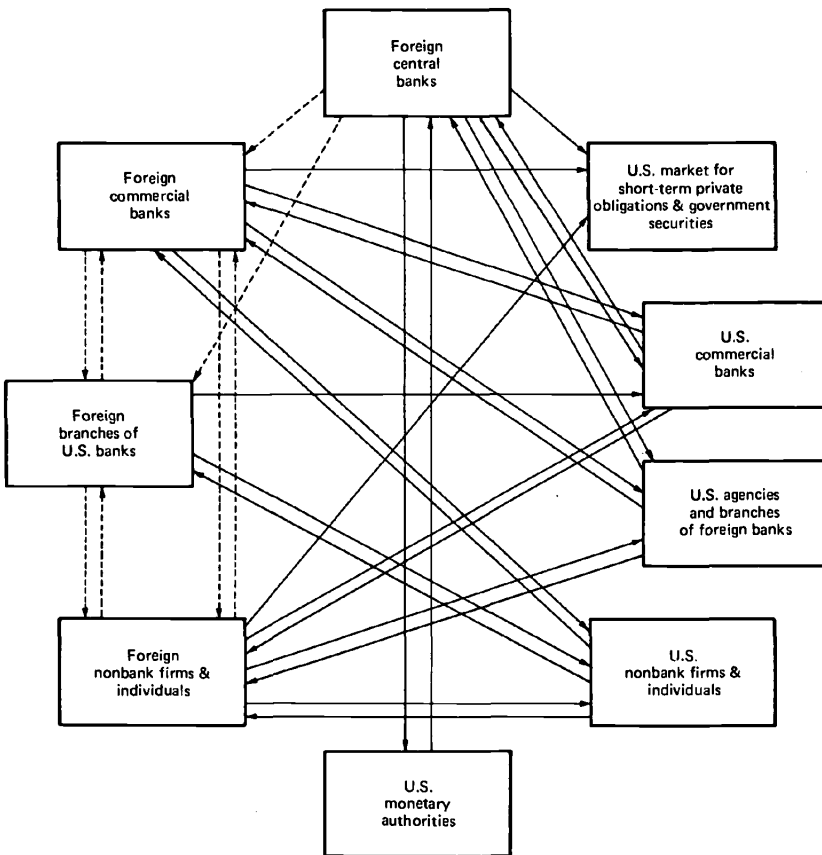
Introduction

OUR analysis of foreign holdings of liquid dollar assets reveals the complex composition of the types of liquid dollar assets and the categories of debtors and creditors having liquid dollar positions. Changes in the volume and composition of foreign liquid dollar holdings can be explained only in terms of the functional relationships among the various categories of transactors involved in these creditor-debtor relationships. Figure 3.1 shows the network of dollar claims between U.S. and foreign residents and among foreign residents confronting the analyst concerned with the demand and supply of foreign liquid dollar balances. Each of the categories and subcategories of foreign liquid dollar holders has a unique asset preference function, and there are special relationships between each of the pairs of categories of liquid dollar creditors and debtors. There are also special markets for particular types of liquid dollar assets, each operating within a unique institutional framework. In addition to the limitations imposed by the inadequacy of the data, our knowledge of these functions, relationships, and institutions is too fragmentary to permit construction of a complete model of the foreign demand and supply of liquid dollar assets. The most we can hope to do is formulate partial models confined to limited sets of relationships among the variables involved.

In this chapter we are concerned with the origins of foreign dollar holdings, including both American dollar and Eurodollar deposits, and with the relationship of changes in these holdings to the U.S. balance of payments. Closely related to the origins and composi-

tion of foreign dollar holdings is the substitutability among foreign holdings of American dollars, Eurodollars, and other currencies. We shall present empirical evidence relating to the degree of substitutability. Also considered here is the influence of the Eurodollar market on the U.S. balance of payments. Finally, we deal briefly with the impact of U.S. and foreign monetary policies and controls on the Eurodollar market.

FIGURE 3.1
Network of Dollar Claims



Arrows point from dollar claimant to debtor. Dotted lines are dollar claims between foreign residents.

*Origins of Foreign Dollar Holdings*U.S. BALANCE OF PAYMENTS AND FOREIGN HOLDINGS
OF U.S. DOLLARS

Total foreign holdings of American dollars are, of course, always a function of the U.S. balance of payments as a whole. However, a distinction should be made between changes in U.S. liquid liabilities to foreigners which are the result of autonomous transactions in the U.S. international accounts and those that are accommodating or causally determined by the sum of all the other transactions. Changes in foreign nonofficial American dollar holdings are (except possibly for very brief periods) always autonomous, while in recent years a large proportion of the American dollar holdings of foreign official institutions have been accommodating in the sense that, given the existing pattern of exchange rates and the existing foreign nonofficial demand for American dollars, foreign official institutions are the residual buyers and sellers of American dollars. Prior to August 15, 1971, the central banks of the major countries were constrained from converting their dollars into gold at the U.S. Treasury by the knowledge that too great a U.S. gold loss would lead the United States to close the gold window. After August 15, 1971, foreign central banks as a group had no choice but to hold whatever dollars were generated by U.S. balance-of-payments deficits, again given the existing pattern of exchange rates. Individual foreign official institutions often sought to reduce their American dollar holdings by redepositing the dollars in the Eurodollar market. However, no amount of foreign central bank depositing in the Eurodollar market could reduce their collective holdings of American dollars, unless such deposits in some way affected either the foreign nonofficial demand for American dollars or U.S. resident borrowing from the Eurodollar market. Otherwise, the dollars loaned by Eurodollar banks from such deposits would tend to be sold for foreign currencies and thus to accrue once more to the reserves of central banks. The result of such depositing would be, therefore, to increase the sum of American dollars and Eurodollar holdings combined in foreign official reserves and to add to the plethora of dollars.

The foreign nonofficial demand for American liquid dollar assets is determined in part by the transactions and precautionary demand for dollars and in part by the investment demand for American liquid dollar assets. This latter demand is a function of the total foreign demand for liquid assets and of such factors as relative rates of return, risk, and legal constraints which determine the composition of liquid asset portfolios. Under present conditions, a reduction in the foreign nonofficial demand for liquid American dollar assets will not reduce total foreign holdings of American dollars; the excess supply of American dollars is simply absorbed by the foreign central banks. This, of course, assumes that other transactions in the U.S. balance of payments are not affected so as to reduce the supply of American dollars in the hands of foreigners.

THE GENERATION OF EURODOLLAR DEPOSITS

While changes in total foreign holdings of American dollars must always be related in some way to the U.S. balance of payments, changes in the volume of Eurodollar deposits held by foreigners need have no relationship to the U.S. balance of payments. Nor does the volume of Eurodollar deposits have any necessary relationship to the volume of American dollars held by foreign banks. A depositor can acquire Eurodollar deposits with any convertible currency. If he does not have American dollars, he can readily acquire them in the foreign exchange market, or the Eurobank receiving the deposit will denominate it in dollars in exchange for whatever currency is tendered. In either instance, will not the purchase in the foreign exchange market of American dollars by either the depositor or by the Eurobank receiving the deposit increase foreign nonofficial holdings of American dollars? Only momentarily, since the American dollars are in most cases quickly lent and then sold by the borrower in the exchange market for other currencies. There are, of course, cases where the borrower decides to increase his holdings of American dollars. In such cases there will be a net increase in the foreign nonofficial demand for American dollars. However, there is nothing in the expansion of Eurodollar deposits and loans per se that will necessarily give rise to a net increase in the foreign nonofficial demand for American dollars. Hence, additional foreign holdings of American dollars need not be generated

by the U.S. balance of payments to support the growth of the Euro-dollar market. This is not to deny, however, that changes in the U.S. balance of payments may affect the Eurodollar market, and activities in the Eurodollar market may have an impact on the U.S. balance of payments. More will be said shortly on these relationships.

It has been argued that the maximum potential growth of Euro-dollar deposits is determined by the volume of American dollars available to the Eurobanks, since the Eurobanks require dollar reserves against Eurodollar deposits. According to this view, the maximum volume of Eurodollar deposits that can be created is some multiple of the volume of American dollar holdings of the Eurodollar banks, analogous to the maximum expansion of commercial bank deposits in a domestic monetary system on the basis of a given volume of commercial bank reserves.¹ Those who reject this view argue that the proportion of Eurodollar loans redeposited in the Eurodollar market is relatively small, and that for most countries there are no legal reserve requirements on Eurodollar deposits as there usually are on domestic currency deposits. Moreover, Eurodollar banks need not maintain precautionary reserves against Eurodollar deposits in U.S. banks; they can just as well keep dollar reserves in the form of deposits with foreign branches of U.S. banks (which themselves are Eurodollar banks). In fact, since 1969 foreign commercial banks have had larger deposits with foreign branches of U.S. banks than holdings of American liquid dollar assets. Foreign branches of U.S. banks require no special reserves against dollar deposits since they can draw on the resources of their parent banks for meeting their deposit obligations. Thus, to a degree, the ultimate reserves against Eurodollar deposits are the reserve assets of the U.S. banking system.

Our approach to the problem of the limits of the generation of

1. For an exposition of this view, see Milton Friedman, "The Eurodollar Market: Some First Principles," *The Morgan Guaranty Survey*, October 1969, pp. 4ff. For a contrary view, see Fred H. Klopstock, "Money Creation in the Eurodollar Market—A Note on Professor Friedman's Views," *Monthly Review*, Vol. 52, Federal Reserve Bank of New York, January 1970, pp. 12-15. For an excellent summary of the various arguments relating to Eurodollar creation, see Fritz Machlup, "The Eurodollar System and Its Control," *Papers and Proceedings of a Conference on International Monetary Problems*, Washington, D.C.: American Enterprise Institute for Public Policy Research, 1972.

Eurodollar deposits is that Eurocurrency deposits constitute a part of the total volume of commercial bank liquidity in the Eurobanking system. The amounts of the particular currencies in which this liquidity is denominated are not subject to any special limitation other than those imposed by governments to control the Eurocurrency operations of their commercial banks. In the absence of controls, depositors can acquire Eurodollars or other Eurocurrencies or the domestic currency of the bank receiving the deposit with any convertible currency. The Eurobanks offer interest rates for various Eurocurrencies in accordance with the demand for loans in these currencies, the rate to individual borrowers reflecting the interbank rate for the individual Eurocurrencies. Interest rate differentials between deposits or loans in different Eurocurrencies reflect both speculative forces in the exchange market and domestic credit conditions in the countries whose currencies are involved. Covered Eurocurrency rates tend to move rather closely together, but interest rates for Eurodollars, Euro-Deutsche marks, Euro-Swiss francs, and Eurosterling will frequently depart rather sharply from interest rates in the domestic market of the countries whose currencies are involved.² Such deviations generally reflect national monetary controls that seek to insulate the domestic money markets from the Eurocurrency markets.

The constraint on the expansion of Eurocurrency deposits and loans comes not from the supply of dollars or any other currency (which currencies the banks can readily acquire in accordance with their need for meeting obligations) but from the constraints on the total creation of deposit liabilities imposed in the aggregate by the individual actions of the world's monetary authorities. Commercial banks are usually required to keep legal reserves against domestic deposit liabilities, but prudent management would seem to determine that they maintain minimum liquid reserves against all deposit liabilities. However, liquid reserves against external liabilities can be held in a variety of forms and in any convertible currency. What is important for banks is that their liabilities and assets in any particular currency be reasonably well matched by maturity dates. This is a primary function of the interbank market for Eurocurren-

2. For a good discussion of these relationships, see BIS, *Forty-Second Annual Report*, Basle, June 1972, pp. 159-164.

cies; the rates in these markets tend to equalize collective demand and supply for each Eurocurrency and for each maturity. In addition, banks operate in the forward markets for each of the currencies in which they deal.

In analyzing the generation of Eurodollar deposits, it is important to note that not only can nonbank depositors acquire Eurodollar deposits with any convertible currency, but also that the volume of Eurodollar loans does not depend upon the volume of nonbank Eurodollar deposits. Thus, we showed in Tables 2.5 and 2.8 that in 1970 Eurodollar loans to foreign nonbanks approximately doubled while foreign nonbank deposits were nearly unchanged, and that in 1971 Eurodollar loans to foreign nonbanks continued to rise while foreign nonbank Eurodollar deposits declined sharply. The repayment of Eurodollar loans by U.S. residents, the substantial increase in Eurodollar deposits of foreign official institutions, and the generation of Eurodollar loan funds by foreign commercial banks through swap agreements with their central banks or by acquiring U.S. dollars in the exchange market all played a role in these developments. Some of the dollars placed in Eurodollar deposits were used by the Eurocurrency banks for switching into other currencies for loans to customers, or the customers themselves frequently switched the dollars into another currency required by the purpose for which the loan was negotiated. All these developments are scarcely in accord with a model that regards the volume of Eurodollar deposits as determined by the redepositing of Eurodollar loans and the expansion of Eurodollar deposits as requiring the acquisition of American dollar reserves.

Continued U.S. dollar deficits have served to increase the supply of funds for deposits in the Eurocurrency market. This is true because, in the absence of restraining actions by the monetary authorities, countries with balance-of-payments surpluses (whether with the United States or other countries) tend to generate internal as well as external liquidity. The surplus liquidity in the hands of foreign private entities tends to flow into the Eurocurrency market, and the growth of reserves of central banks makes them willing to supply dollars to the market. Whether there is an actual loss of reserves for any particular foreign country depends on whether there are net short-term capital transfers out of that country to other

countries. If there were no U.S. borrowing from the Eurodollar market and all of the dollars deposited in the Eurodollar banks by residents of a particular country were loaned to other residents of that country for financing domestic expenditures, there would be no loss of official reserves in that country arising out of the operations of the Eurodollar market. Thus it may be said that, while U.S. deficits are not necessary for the expansion of the Eurodollar market, the fact that they have contributed to the expansion of the reserves of foreign countries has increased the volume of liquidity available for deposit in the market, and has made monetary authorities willing to permit capital transfers to other countries via the mechanism of the market.

In summary, foreign Eurodollar balances are generated as a consequence of a desire on the part of foreigners to hold their liquid assets in the form of Eurodollars in response to the relatively attractive interest rates (adjusted for the cost of covering in the forward exchange market) that the foreign banks are offering; the rates that the banks are able to offer depend upon the demand for Eurodollar loans. In short, Fritz Machlup's characterization of Eurodollar creation as a "mystery story" appears to derive more from the fictions of the economic analysts than from the facts of the market.³

Substitutability Among American Dollars, Eurodollars, and Other Currencies

Liquid asset holders that tend to acquire international (and not simply domestic) assets have the option of holding a variety of short-term assets denominated in various convertible currencies for which there exist international markets. In addition, the Eurocurrency market provides liquid asset holders with an option as to *where* they will hold their liquid assets regardless of the international currency in which the assets are denominated. Thus, sterling deposits may be held in London or in the form of Eurosterling deposits in other countries, just as dollar deposits may be held in the United States or as Eurodollar deposits in foreign countries. There is also a growing market for Euro-Deutsche marks, Euro-Swiss

3. See Fritz Machlup, "Eurodollar Creation: A Mystery Story," *Banca Nazionale del Lavoro Quarterly Review*, No. 94, September 1970.

francs, Euroguilders, etc. There is a fairly high degree of substitutability among all international liquid assets. However, because of the exchange rate risk and cost of conversion associated with the transfer of one currency to another, the degree of substitutability differs between assets denominated in the same currencies but held in different countries from that between assets denominated in different currencies.

Given the necessary data, the analysis of the foreign demand for the several types of liquid assets would be facilitated by the use of a portfolio-adjustment model, according to which asset holders are assumed to hold a certain composition of assets for a given set of yield differentials, risk evaluations, and other preference variables, and to adjust their portfolios with changes in these variables and in the total value of their portfolios. Changes in holdings of any particular asset, say, U.S. CDs, would be related to changes in the variables determining the composition of the asset holdings and to changes in the net worth of the transactor.⁴ Such a model is more realistic than the older short-term capital-flow approach that assumes that, with a given interest differential, investors will continue to shift indefinitely from lower yielding assets to the higher yielding assets.⁵ As will be noted below, on the basis of the limited data

4. Examples of the employment of portfolio-adjustment models include H. G. Grubel, "Internationally Diversified Portfolios," *American Economic Review*, December 1968, pp. 1299-1314; and Ralph C. Bryant and P. H. Hendershott, *Financial Capital Flows and the Balance of Payments of the United States: An Exploratory Empirical Study*, Princeton Essays in International Finance, No. 25, Princeton, N.J.: Princeton University Press, June 1970. For an analysis of the problems relating to the formulation of portfolio-adjustment models and a critical review of models of international capital movements, see Edward E. Leamer and Robert M. Stern, "Problems in the Theory and Empirical Estimation of International Capital Movements," *International Mobility and Movement of Capital*, New York: NBER, U-NB 24, 1972, pp. 171-206.

5. Empirical studies of capital movements based on capital-flow models have tended to yield unsatisfactory and conflicting results. Examples of short-term capital-flow models of this type are found in P. W. Bell, "Private Capital Movements and the U.S. Balance of Payments Position," *Factors Affecting the U.S. Balance of Payments*, Washington, D.C.: Joint Economic Committee Compendium of Papers, 1962; and in P. B. Kenen, "Short-term Capital Movements and the U.S. Balance of Payments," and Benjamin J. Cohen, "A Survey of Capital Movements and Findings Regarding their Sensitivity," both in *The United States Balance of Payments*, Washington, D.C.: Hearings before the Joint Economic Committee, 1963.

available we do not find liquid asset holders to be highly sensitive to shifts in relative yields. Each group of liquid asset portfolio holders or transactors has a unique preference function in terms of rate of return, risk and other preference variables, and a relevant net worth variable. For example, U.S. firms operating abroad tend to have a high preference for Eurodollars over American dollars. Moreover, foreign subsidiaries of U.S. firms may be constrained by the U.S. foreign direct investment control program from shifting funds to their U.S. parents that they expect to use later in their foreign operations. However, they may be led to shift these funds into a nondollar currency which they will require for future expenditures if that currency is expected to appreciate in relation to the dollar. (They may even take an uncovered position in such a currency.) Other groups of liquid asset portfolio holders may have quite different preferences, although all portfolio holders are influenced in some degree by changes in relative yields on different types of assets.

Unfortunately, the data available on non-U.S. resident holdings of American dollars, Eurodollars, and other currencies are not disaggregated by class of transactor in a manner that would permit us to formulate and test portfolio-adjustment functions. Nor are there data on changes in the relevant net worth of various categories of transactors. Therefore, we shall not attempt the construction of a comprehensive model of the foreign demand and supply of liquid dollar assets. We shall, however, explore some of the factors determining the composition of foreign liquid asset holdings which may throw light on the foreign demand for various categories of liquid dollar assets. Keeping in mind our underlying concept of a portfolio-adjustment model, we shall consider the evidence relating to the degree of substitutability among American dollars, Eurodollars, and other currencies.

FOREIGN NONBANK HOLDINGS—AMERICAN DOLLARS AND EURODOLLARS

There is a high degree of substitutability between American liquid dollar assets and Eurodollars, just as there is a high degree

of substitutability among various types of American liquid dollar assets differentiated by yield, maturity, risk, and cost of conversion into transactions media, i.e., demand deposits in a U.S. resident bank. Although Eurodollar deposits are not generally used for transactions purposes, call Eurodollar deposits with the London branch of a U.S. bank must be as liquid as time deposits in the bank's head office in New York. Eurodollar deposits may involve some additional risk in the minds of holders over direct deposits in U.S. banks or other liquid American assets, but this risk varies a great deal with the country in which the Eurodollar deposit is held. The reason, presumably, is that much of the risk arises from the possibility of government exchange controls restricting the right of the Eurodollar depositor to obtain American dollars.⁶ This risk is slight in most Western European countries, even though there are exchange restrictions on the acquisition of Eurodollar deposits by residents in some of these countries.

Foreign holders of liquid dollar assets may find it more convenient to hold Eurodollar deposits with their own bank or with a bank in another European country with which they have close business relations than to hold liquid dollar assets in a bank in the United States which they do not know. They may find it less risky to hold their dollars in a Swiss bank as compared with a U.S. bank if they want to conceal their foreign exchange holdings from domestic authorities. They may even have more confidence in the solvency of a European bank with which they are familiar than in a U.S. bank which they do not know. Thus, it is not always the case that foreigners prefer American dollars over Eurodollars; the preference may be just the opposite. But for U.S. resident liquid asset holders it will nearly always be more convenient and less risky to hold their dollars in the United States, unless, of course, they have tax or other reasons to conceal their assets. However, as noted above, U.S. non-financial corporations are subject to a special constraint on holding Eurodollar deposits or any other foreign assets by reason of U.S. government controls on the outflow of capital.

6. Historically there have been small differences in rates paid by foreign branches of American banks located in different countries. These interest differentials may reflect in part differences in risk in the minds of depositors.

Interest Rate Differentials. Prior to 1969, the differential between U.S. CD rates and Eurodollar deposit rates tended to be well under 1 percent and occasionally less than 0.5 percent in favor of Eurodollar deposits. There was a noticeable exception in the second half of 1966 when tight credit conditions in the United States, coupled with a ceiling of 5.5 percent on CDs (issued under Federal Reserve Regulation Q), led U.S. banks to increase their borrowing from the Eurodollar market by some \$2 billion between the end of June 1966 and the end of December of that year. This resulted in a differential of 150 basis points (i.e., 1.5 percent) between the three-month Eurodollar rate and the three-month (new issue) CD rate, and a differential of over 100 basis points between the three-month Eurodollar rate and the secondary market yield for ninety-day CDs. During 1969 there was a similar but more striking development as large U.S. bank borrowings from the Eurodollar market forced the three-month Eurodollar deposit rate to 11.3 percent in September 1969, some 530 basis points above the 6.0 percent ceiling on new issue CDs and 256 basis points above the U.S. secondary market yield for ninety-day CDs.⁷ By the end of July 1970, the spread between the three-month Eurodollar rate and the U.S. secondary market yield for CDs had narrowed to 40 basis points⁸ (see Table 3.1).

During the periods of monetary crisis in 1971 the spread between the Eurodollar deposit rate and the U.S. secondary market CD rate again widened; it was 244 basis points at the end of May 1971 and 313 basis points at the end of August. These large differentials were evidently associated with a heavy demand for Eurodollar loans, partly for conversion into Deutsche marks and other strong European currencies, while the foreign supply of Eurodollar deposits

7. For a discussion of the relationship between Eurodollar deposit rates and U.S. money market rates during this period, see Ira O. Scott, Jr., *The Eurodollar Market and Its Public Policy Implications*, Washington, D.C.: Joint Economic Committee, Congress of the United States, 1970.

8. Effective June 24, 1970, maximum interest rates on CDs of \$100,000 or more were removed for both U.S. residents and foreign nonofficial residents. Regulation Q has not applied in recent years to CDs in U.S. banks held by foreign official agencies. For this reason, interest rates on official agency CDs (which are subject to negotiation and whose rates are not published) have tended to move within a much narrower range of Eurodollar deposit rates than have CDs available to nonofficial agencies and individuals.

TABLE 3.1

Eurodollar Deposit Rates, U.S. Interest Rates, and Changes
in U.S. Domestic and Foreign Branch Bank
Liabilities to Foreign Nonbanks, June 1968–December 1971
(end of month; millions of dollars)

	Three- Month Euro- dollar Deposit Rate (1)	U.S. Secondary Market Rate for CDs (2)	(1) – (2)	U.S. Interest- Earning Short- Term Liabili- ties to Foreign Non- banks	Change from Previous Month	U.S. Foreign Branch Bank Dollar Liabili- ties to Foreign Non- banks	Change from Previous Month
1968							
June	6.75%	6.03%	.72%	2,478		2,101	
July	6.19	5.88	.31	2,498	20	2,248	147
August	6.13	5.85	.28	2,545	47	2,248	0
September	6.19	5.65	.54	2,562	17	2,280	32
October	6.63	6.03	.60	2,601	39	2,455	175
November	6.88	6.08	.80	2,670	69	2,521	66
December	7.06	6.58	.48	2,647	-23	2,538	17
1969							
January	7.56	6.45	1.11	2,676	29	2,447	-91
February	8.38	6.65	1.73	2,620	-56	2,759	312
March	8.44	6.65	1.79	2,638	18	2,924	165
April	8.44	6.85	1.59	2,618	-20	3,220	296
May	10.25	7.55	2.70	2,613	-5	3,282	62
June	10.50	8.25	2.25	2,498	-115	3,798	516
July	10.38	8.75	1.63	2,457	-41	4,528	730
August	11.13	8.25	2.88	2,417	-40	4,734	206
September	11.31	8.75	2.56	2,290	-127	4,748(4,214)	14
October	9.75	8.50	1.25	2,233	-57	4,625	411
November	10.94	8.75	2.19	2,186	-47	4,504	-121
December	10.13	9.00	1.13	2,230(2,352)	44	4,851	347
1970							
January	9.56	8.70	.86	2,312	-40	5,016	165
February	9.31	8.63	.68	2,226	-86	4,932	-84
March	8.50	6.75	1.75	2,198	-28	4,953	21
April	8.56	7.75	.81	2,189	-9	4,900	-53
May	9.06	8.04	1.02	2,279	90	5,278	378
June	9.00	8.13	.87	2,327	48	4,964	-314
July	8.38	7.98	.40	2,279	-48	4,905	-59
August	8.06	7.73	.33	2,258	-21	5,056	151
September	8.38	7.39	.99	2,260	2	4,936	-120
October	7.63	6.65	.98	2,301	41	4,843	-93
November	7.19	5.92	1.27	2,296	-5	5,177	334
December	6.44	5.59	.85	2,348(2,350)	52	4,874	-303

TABLE 3.1 (cont.)

	Three- Month Euro- dollar Deposit Rate (1)	U.S. Secondary Market Rate for CDs (2)	(1) - (2)	U.S. Interest- Earning Short- Term Liabili- ties to Foreign Non- banks	Change from Previous Month	U.S. Foreign Branch Bank Dollar Liabili- ties to Foreign Non- banks	Change from Previous Month
1971							
January	5.81%	4.84%	.97%	2,349	1	4,513	-361
February	5.44	4.21	1.23	2,376	27	4,749	236
March	5.31	3.83	1.48	2,351	-25	4,794	45
April	6.25	4.72	1.53	2,323	-28	4,612	-182
May	7.56	5.12	2.44	2,304	-19	4,630	18
June	6.50	5.43	1.07	2,197	-107	4,775	145
July	6.69	5.80	.89	2,198	1	4,530	-245
August	8.88	5.75	3.13	2,155	-43	4,956	426
September	7.75	5.66	2.09	2,068	-87	4,752	-204
October	5.94	5.18	.76	2,029	-39	4,878	126
November	6.44	4.89	1.55	2,053	24	4,910	32
December	5.75	4.58	1.17	2,031(2,034)	-22	4,953	43

SOURCES: *Treasury Bulletin*, November 1970; *Federal Reserve Bulletin*, various issues; *U.S. Financial Data*, Federal Reserve Bank of St. Louis, various issues; and Morgan Guaranty Trust Company of New York, *World Financial Markets*, various issues.

NOTE: Figures in parentheses are comparable with those shown for the following dates. Figures not in parentheses are comparable with those shown for previous dates.

was restricted by reason of the expectation of a dollar depreciation.⁹ But by the end of May 1972, the rate differential in favor of Euro-dollar deposits had nearly disappeared.

The effect of these changes in the relative yields on Eurodollar deposits and U.S. CDs on foreign nonbank holdings of American interest-earnings dollar assets and Eurodollar deposits is not readily discernible from the available data. If there were only these two

9. Since there are no legal restrictions on shifting noncorporate funds by U.S. residents to the Eurodollar market (and indeed large amounts of both corporate and noncorporate funds were shifted abroad during 1971), it is somewhat surprising that these rate differentials reached the levels they did. Perhaps large U.S. investors who were able to move their funds around the world moved them into European currencies where their expectations of short-term capital gains were much greater than the gains from shifting funds into Eurodollars.

categories of liquid asset holdings, a priori reasoning would suggest that an increase in the spread between Eurodollar deposit rates and the U.S. CD rate in favor of Eurodollar deposits would be accompanied by a reduction in foreign nonbank holdings of interest-earning American liquid dollar assets in relation to foreign nonbank holdings of Eurodollar deposits. Table 3.1 shows, for the period from June 1968 to December 1971, monthly changes in these holdings, the series on Eurodollar deposits being of necessity limited to the liabilities reported by foreign branches of U.S. banks. Table 3.1 also gives the spread in interest rates at the end of each month over the period. During 1969 the interest rate differential in favor of Eurodollar deposits was substantially greater than in 1968. Over the same period, foreign nonbank deposits in foreign branches of U.S. banks nearly doubled from \$2.5 billion to \$4.9 billion, while short-term interest-earning American dollar assets held by foreign nonbanks declined from \$2.6 billion to \$2.2 billion. During 1970 the interest differential, while much lower than in 1969, remained close to the level reached at the end of that year. There was also little overall change in foreign nonbank holdings of either liquid dollar assets in the United States or of Eurodollar deposits in foreign branches of U.S. banks. During the next seven months, to the end of July 1971, there was a decline in foreign nonbank holdings of both American liquid dollar assets and Eurodollar deposits, though the interest differential in favor of the latter was higher on the average. This development undoubtedly reflected the heavy speculation against the dollar during this period. Foreign nonbank holdings of Eurodollar deposits in foreign branches of U.S. banks then recovered abruptly to approximately the level at the end of 1970 as the interest differential again increased sharply, if only temporarily, while foreign nonbank holdings of American liquid dollar assets declined further. During the first four months of 1972, foreign nonbank holdings of Eurodollar deposits with U.S. branches rose sharply to an all-time high of \$5.9 billion at the end of April 1972, while their holdings of interest-earning American liquid dollar assets remained approximately the same. Yet the spread between U.S. money market rates and Eurodollar deposit rates in favor of the latter narrowed substantially during this period as compared with 1971.

On a month-to-month basis for the period from June 1968 to December 1971, changes in the composition of liquid dollar assets of foreign nonbanks did not occur in accordance with changes in the spread between the Eurodollar deposit rate and the U.S. secondary market rate for CDs. In 42 observations recorded in Table 3.1, the movements were in accordance with a priori expectations in only 10 cases. This may have been due in part to the nature of the data: only month-to-month changes in assets and end-of-the-month interest rates were available. Weekly data on changes in holdings of liquid dollar assets in relation to the average weekly spread between Eurodollar deposit rates and U.S. CD rates might have indicated greater sensitivity. There are also undoubtedly lags in response to changes in interest rate differentials on the part of portfolio holders. More importantly, however, foreign liquid asset portfolio holders have the option of changing their holdings of non-dollar currency assets in response to interest differentials and to expectations with respect to the exchange value of the dollar. The period under examination was one of heavy speculative movements.

Two other factors might be mentioned in connection with the interest sensitivity of liquid asset holdings. The first is that once the Eurodollar deposits have been acquired, say, with a maturity of three to six months, the depositor must pay a penalty to liquidate them and may, therefore, prefer to hold them to maturity unless there are compelling reasons of risk or speculative advantage to shift to another currency. The second point, stressed in the portfolio-adjustment model of capital flows, is that when investors have shifted their funds in response to a change in yield differentials, a further increase in the differential in favor of a particular type of asset may not bring the same type of response since investors may have already shifted those funds that can be readily shifted without penalty or without interference with some other objective in their preference function.

Other Evidence of Substitution. Although there is little evidence of substitution between foreign holdings of American liquid dollar assets and Eurodollar deposits in response to interest rate differentials, the growth of the Eurodollar market may very well have had a retarding effect on the growth of foreign holdings of American

liquid dollar assets. If we consider first foreign commercial banks, satisfactory evidence of such substitution is difficult to uncover because of the large volume of intra-multinational bank balances and the failure of the statistics to distinguish these balances and other foreign commercial bank assets. For foreign nonbank holdings, however, there is a certain amount of indirect evidence of substitution of Eurodollars for American liquid dollar assets. This substitution is probably long run or structural rather than short run in the sense of month-to-month or quarter-to-quarter shifts in holdings between the two types of liquid dollar assets, although we did find a modest inverse correlation between quarter-to-quarter changes in foreign nonbank holdings of American liquid dollar assets and foreign nonbank deposits in foreign branches of U.S. banks over the 1965-70 period.¹⁰

Between the end of 1957 and the end of 1964, American liquid dollar assets of foreign nonbanks rose by 41 percent, while world trade in current dollars increased by about 50 percent. During this same period, total liquid dollar asset holdings of foreign nonbanks, including both American dollars and Eurodollars, increased by nearly 130 percent (Table 3.2). Between the end of 1964 and the end of 1968, American liquid dollar holdings of foreign nonbanks rose by about 32 percent while world trade in current dollars rose by about 40 percent. During this same period, total liquid dollar assets of foreign nonbanks increased by about 95 percent. However, during the 1968-70 period, American liquid dollar asset holdings of foreign nonbanks declined, but world trade increased by about 30 percent in current dollars. It was during this period that foreign nonbank holdings of Eurodollars achieved their maximum growth, rising from \$9.3 billion at the end of 1968 to \$17.6 billion at the end of 1970. Thus, in spite of a decrease in foreign nonbank holdings of American dollars, total liquid dollar holdings of foreign nonbanks increased by 56 percent over the 1968-70 period. In 1971, foreign nonbank holdings of both U.S. dollars

10. When we regressed quarter-to-quarter changes in foreign nonbank holdings of American liquid dollar assets on quarter-to-quarter changes in foreign nonbank dollar deposits with foreign branches of U.S. banks, we obtained a significant inverse correlation but the R^2 was only .19. (Both the slope and coefficient of correlation are significantly different from zero at the 99 percent level of confidence.)

TABLE 3.2
World Trade and Liquid Dollar Holdings
of Foreign Nonbanks
(end of period; billions of dollars)

	1957	1964	1968	1969	1970	1971
World trade (imports, cif) ^a	106.8	161.2	225.0	256.4	294.1	329.0
Foreign nonbanks						
1. U.S. dollars ^b	2.7	3.8	5.0	4.6	4.7	4.2
2. Eurodollars ^c	0.5	3.5	9.3	17.2	17.6	14.5
Subtotal	<u>3.2</u>	<u>7.3</u>	<u>14.3</u>	<u>21.8</u>	<u>22.3</u>	<u>18.7</u>

a. *International Financial Statistics*, various issues.

b. Table 2.1.

c. Table 2.5. The figure for 1964 is based on BIS data. The figure for 1957 is derived from dollar liabilities to nonbanks reported by the Bank of Canada and the Bank of England.

and of Eurodollar deposits declined, probably as a consequence of the uncertainty regarding the future exchange value of the dollar. While by no means conclusive, the above data strongly suggest substitution of Eurodollar deposits for American liquid dollar holdings from the end of 1968 to the end of 1970.

With regard to foreign official holdings of Eurodollar deposits, their rapid growth (especially during 1970 when they rose from \$4.3 billion to \$9.2 billion) suggests that foreign official institutions were substituting Eurodollar deposits for American liquid dollar holdings (Table 2.6). Undoubtedly there was a substantial net substitution on the part of central banks and governments outside of the major Western European countries and Japan. However, as has already been explained, the depositing of American dollars by foreign central banks in the Eurodollar market does not reduce the American dollar holdings of foreign official institutions as a group. Such depositing increases the total liquid dollar holdings of foreign official institutions.

FOREIGN NONBANK HOLDINGS—EURODOLLARS AND NONDOLLAR CURRENCIES

In recent years foreign nonbank holders of liquid asset portfolios have held the bulk of their liquid dollar assets in the form of Euro-

dollar deposits.¹¹ In fact, foreign nonbank holdings of Eurodollar deposits with "inside area" and Canadian banks alone were nearly six times the level of their holdings of short-term, interest-earning U.S. dollar assets at the end of 1969 and at the end of 1970. Foreign nonbank holdings of American short-term, interest-earning dollar assets (the sum of lines IC2 and IC3 in Table 2.1) have been remarkably stable; at least since 1965, ranging between \$2 and \$3 billion, while there have been substantial fluctuations in their holdings of Eurodollars. Thus it is unlikely that the rise in foreign nonbank holdings of Eurodollars from \$7.0 billion at the end of 1966 to \$17.6 billion at the end of 1970 (Table 2.5) occurred mainly at the expense of their holdings of American liquid dollar assets, although it is likely that there was some substitution. Nor can the sharp drop of \$3.1 billion in foreign nonbank Eurodollar holdings between the end of 1970 and the end of 1971 be explained by a shift into American liquid dollar assets (holdings of which also declined). Thus fluctuations in the volume of Eurodollar deposits held by foreign nonbank portfolio holders must be largely explained by substitution between Eurodollars and other currencies rather than between Eurodollars and American dollars.

As we have already observed, prior to 1969 the spread between interest rates on Eurodollar deposits and comparable U.S. money market rates was usually less than 100 basis points. This was also true during 1970. Only during abnormal money market or foreign exchange market conditions has this spread risen above 200 basis points. On the other hand, uncovered interest rate differentials between Eurodollar deposit rates and money market rates in certain countries, e.g., Germany and Switzerland, were continuously in excess of 200 basis points prior to 1969 and differentials of 300–400 basis points have not been uncommon.¹² Moreover, as may be noted in Table 3.3, substantial differentials between *covered* Eurodollar deposit rates and comparable money market rates in Britain, Germany, and Switzerland, ranging well above 300 basis points, have

11. Except for working balances of trading firms, Eurodollar deposits probably constitute half or more of all foreign nonbank liquid asset holdings in currencies other than the domestic currency of the holder.

12. Differentials of over 500 basis points between uncovered three-month Eurodollar deposit rates and Swiss three-month deposit rates occurred in 1969, 1971, and 1972 and between Eurodollar deposit rates and German three-month deposit rates in 1969.

TABLE 3.3
 Quarterly Changes in Foreign Nonbank Dollar Deposits
 in Foreign Branches of U.S. Banks, and Covered
 Eurodollar-Domestic Market Interest Rate Differentials
 (percentages)

Quarters	Quarterly Change in Nonbank Dollar Deposits in Foreign Branches of U.S. Banks		Quarterly Average Covered Eurodollar-Domestic Market Interest Rate Differential		
	All Branches	U.K. Branches	U.K. ^a	Swiss ^b	German ^c
	(1)	(2)	(3)	(4)	(5)
1966					
3rd			.45	1.46	.87
4th	11.24	13.11	.33	2.01	.53
1967					
1st	-4.07	-5.80	-.04	.73	.87
2nd	4.31	.67	.12	.64	.53
3rd	12.13	17.62	.31	.35	.45
4th	13.16	18.68	.95	.95	-.33
1968					
1st	4.96	1.63	1.79	.49	.13
2nd	3.45	4.60	3.38	.94	.29
3rd	8.52	14.67	1.05	.65	.33
4th	11.32	13.03	2.11	1.62	-.47
1969					
1st	15.21	14.44	2.66	1.88	.13
2nd	29.89	31.64	5.40	2.96	-.40
3rd	25.03	23.43	6.37	4.66	.17
4th	15.12	7.48	2.14	2.90	.95
1970					
1st	2.10	2.40	.64	3.44	.37
2nd	.22	-3.22	1.21	1.91	.31
3rd	-.56	-5.60	1.57	.74	-.01
4th	-1.26	-.93	.85	.61	-.32
1971					
1st	-1.64	-5.03	.83	.41	-.27
2nd	-.40	-5.20	1.59	.93	-.23
3rd	-1.15	-.78	1.59	-.05	-1.14
4th	4.23	4.60	.89	-1.09	-1.37

SOURCES: Morgan Guaranty Trust Company of New York, *World Financial Markets*, and IMF, *International Financial Statistics* for interest rates. Foreign branch data from *Federal Reserve Bulletin*, February 1972 and July 1972.

a. Covered Eurodollar three-month deposit rate minus three-month U.K. local authority deposit rate.

b. Covered three-month Eurodollar rate minus three-month Swiss deposit rate.

c. Covered Eurodollar deposit rate minus three-month German deposit rate.

The Behavior of Foreign Dollar Holdings
Regression Analysis of Data from Table 3.3

	R ²	F-test on Cor. Coef.	t-test on Variable	Degrees of Freedom	Durbin- Watson
1. Col. (1) on col. (3)	.50	19.1 ^a	sig. at 1% level	19	1.15
2. Col. (2) on col. (3)	.34	9.6 ^a	sig. at 1% level	19	1.16
3. Col. (1) on col. (4)	.38	11.7 ^a	sig. at 1% level	19	.94
4. Col. (2) on col. (4)	.23	5.5 ^a	sig. at 5% level	19	.91
5. Col. (1) on cols. (3) & (4)	.55	11.2 ^a	(3) sig. at 5% level (4) sig. at 1% level	18	1.2
6. Col. (2) on cols. (3) & (4)	.36	5.0 ^b	(3) sig. at 5% level (4) not sig.	18	1.14
7. Col. (1) on col. (5)	no rel.			19	
8. Col. (2) on col. (5)	no rel.			19	

Cols. (1) + (2) D-W indeterminate at both 5% and 1% levels
 Cols. (3) + (4) D-W significant at 1% level
 Cols. (5) + (5) D-W significant at 5% level

NOTE: Due to the possible presence of autocorrelation, both the values and the significance of the R²s may be greatly overstated.

a. Significant at the 1% level.

b. Significant at the 5% level.

occurred at times in recent years. These differentials reflect the risk of exchange controls, transactions costs, and governmental restrictions on capital movements. Nevertheless, the covered rate differentials in particular appear at times to be surprisingly large. The extent to which foreign nonbank depositors cover their Eurodollar deposits is not known to the authors. Conceivably many liquid asset holders are motivated more by a desire to speculate on a change in exchange rates than by a desire to earn a larger interest yield during certain periods.

The only reasonably reliable monthly or quarterly data on foreign nonbank Eurodollar deposits are those for deposits in foreign branches of U.S. banks. Again there is no breakdown of these deposits by country of origin. Nevertheless, we sought to determine whether there was any relationship between changes in foreign non-

bank deposits and changes in differentials between covered three-month Eurodollar deposit rates and domestic three-month deposit rates in Britain, Switzerland, and Germany, respectively. We regressed month-to-month changes in foreign nonbank deposits in foreign branches of U.S. banks and in U.K. branches alone on the average monthly differentials between covered Eurodollar deposit rates and domestic deposit rates in Britain, Switzerland, and Germany, respectively, over the period June 1966–December 1971. We found significant coefficients for our regressions but rather low R^2 s (on the order of .15). We tried lagging the monthly data but with no better results. We then did the same regressions employing quarterly data for the period June 1966–December 1971 and found some significant relationships (see Table 3.3). For the regression of percentage (quarter-to-quarter) changes in foreign nonbank deposits in all foreign branches of U.S. banks on the covered Eurodollar-U.K. Local Authority deposit rate differential, we obtained an R^2 of .50. For the same regression using the covered Eurodollar-Swiss deposit rate differential, we obtained an R^2 of .38. (In both cases the F-test on the correlation coefficient and the t -test on the variable were significant at the 1 percent level but the DW statistic suggests the possible presence of autocorrelation.) When we regressed percentage (quarter-to-quarter) changes in foreign nonbank deposits in all foreign branches of U.S. banks on the Eurodollar-U.K. Local Authority deposit rate and the Eurodollar-Swiss deposit rate differentials combined, we obtained an R^2 of .55. However, we found no relation using the covered Eurodollar-German deposit rate differentials. We also performed the same regressions using foreign nonbank deposits in U.K. branches of U.S. banks. The results were significant (again except for the covered Eurodollar-German deposit rate differential), but the R^2 s were lower. While this evidence is by no means conclusive, it does point to the existence of a strong influence of interest rate differentials on the behavior of foreign nonbank Eurodollar deposits.

CHANGES IN EURODOLLAR POSITIONS OF FOREIGN COMMERCIAL BANKS

Eurodollar banks usually stand ready to accept all Eurodollar deposits offered, but the rate of interest they are willing to pay de-

positors depends upon the demand for Eurodollar loans from Eurodollar banks as a group. An individual Eurodollar bank can re-deposit with other Eurodollar banks any excess of deposits over the demand for Eurodollar loans. When the demand for loans exceeds Eurodollar deposits, a Eurodollar bank can obtain additional funds in the inter-Eurodollar bank market, or from the foreign exchange market, or from its central bank under a swap arrangement or outright purchase against domestic currency. The demand for Eurodollar loans will depend in considerable measure on the relationship between Eurodollar loan rates and the loan rates in the domestic money markets. Large well-known firms can usually obtain Eurodollar loans from the cheapest source by contacting Eurodollar banks in different countries.

Since the Eurodollar market for both loans and deposits is highly competitive, deposit rates and loan rates tend to be maintained within a rather narrow range within the Eurodollar banking system. Eurodollar loans are in competition with loans from domestic market sources in individual countries, although in some countries local borrowers are restricted by the monetary authorities as to how much and under what conditions they can borrow in the Eurodollar market. Borrowers requiring local currency for working capital must bear the exchange risk of repaying dollars or other borrowed Eurocurrencies unless they cover their position in the forward market. Alternatively, the Eurocurrency banks may convert dollars or other currencies obtained from Eurocurrency deposits into domestic or third currencies for making loans. In this case, the banks must either cover their positions in the same currencies or bear the exchange risk if their Eurocurrency liabilities exceed their Eurocurrency assets in a particular currency.

Ultimately the interest paid on Eurodollar deposits is determined by the demand for Eurodollar loans. During 1968 and 1969, when U.S. banks were borrowing heavily in the Eurodollar market, the U.S. demand determined in large measure the interest rates on Eurodollar deposits. However, since the repayment of U.S. resident indebtedness in 1970 and 1971, the rates of interest that Eurodollar banks have been willing to offer for Eurodollar deposits have been governed largely by the foreign demand for loans, which demand in turn is affected by domestic money market rates together with

government regulations on borrowing from the Eurodollar market.

In a recent study, Rodney H. Mills¹³ examined the relationship between net Eurodollar positions of commercial banks in Belgium, the Netherlands, France, and Germany on the one hand, and covered differentials between three-month Eurodollar rates and selected domestic money rates on the other. Using quarterly BIS data for the period September 1963–June 1969, Mills formulated a model for explaining changes in the net Eurodollar positions of the commercial banks in each of these four countries with nonresidents of the countries in which the banks were located. His independent variables were (1) the average covered differential between the three-month Eurodollar rate and a selected domestic money market rate in the quarter or in the month preceding the end of the quarter; (2) bank loans to private domestic borrowers; and (3) for Belgium and Germany, certain other variables. His multiple regression analysis shows that changes in covered interest differentials were closely associated with changes in commercial bank net Eurodollar positions vis-à-vis nonresidents, excluding U.S. residents, for each of the four countries. One explanation for his results is that commercial banks find it profitable to borrow in the Eurodollar market for expanding loans to their customers when the covered Eurodollar interest rate is lower than the domestic market rate, and to lend to the Eurodollar market (through depositing dollars in other Eurodollar banks) when the covered Eurodollar rate exceeds the domestic market rate. This explanation reflects a close relationship between domestic lending and the Eurodollar market when there is no substantial interference by government regulations. Since such regulations existed during the period under examination in the United Kingdom and Italy, these countries had to be excluded from his analysis. Also, since the large BIS operations are included in the BIS data on the dollar position of Swiss banks vis-à-vis nonresidents, Mills found it necessary to exclude Switzerland from his analysis.

Mills' study constitutes an important contribution to the explanation of changes in net dollar positions vis-à-vis nonresidents

13. See Rodney H. Mills, Jr., *Explaining Changes in Eurodollar Positions: A Study of Banks in Four European Countries*, Discussion Paper No. 1, Washington, D.C.: Federal Reserve Board, Division of International Finance, August 27, 1971.

(excluding U.S. residents) for the commercial banks of the four countries covered. However, the task of explaining the aggregate demand and supply of funds for the Eurodollar market as a whole and of devising a satisfactory model for the determination of interest rates in the market remains a complex and formidable undertaking for which the statistical data available so far are seriously inadequate.

*Influence of the Eurodollar Market
on the U.S. Balance of Payments*

While we have stressed that the Eurodollar market can expand or contract independently of the U.S. balance of payments, there is in practice an interaction between developments in the Eurodollar market and changes in the U.S. balance of payments. As has already been noted, U.S. balance-of-payments deficits may increase the volume of liquidity in the rest of the world, which in turn may expand the volume of Eurodollar deposits. The Eurodollar market has attracted large U.S. private short-term capital flows to the market, which tend to add to the dollar holdings of foreign central banks and thus to have an adverse effect on the U.S. balance on official reserve transactions account. Conversely, when U.S. residents borrow from the Eurodollar market, the U.S. balance on official reserve transactions account will tend to improve. More broadly viewed, however, both the flow of U.S. resident funds to the market and U.S. borrowings from the market may serve to expand the Eurodollar market. Thus the large borrowing by U.S. banks was a major factor in the rapid expansion of the Eurodollar market during 1968 and 1969; the higher Eurodollar deposit rates relative to domestic money market rates abroad attracted foreign depositors, as did also the promotional activities of foreign branches of U.S. banks seeking Eurodollar funds for their parent banks. When the U.S. borrowings were repaid during 1970 and 1971, Eurobanks, including foreign branches of U.S. banks, sought new foreign loan markets in which to place funds flowing from the United States. The "net size of the market" as measured by the BIS continued to expand, although at a somewhat slower pace than in 1968 and 1969.

Over the 1965-70 period, U.S. resident borrowings from and

repayments to the Eurodollar market through foreign branches of U.S. banks were responsible for a substantial portion of the quarter-to-quarter changes in net foreign nonofficial claims on U.S. residents.¹⁴ Since to a substantial degree the dollars flowing out of the Eurodollar market to U.S. residents either came from foreign central banks or served to reduce additions to their American dollar holdings, and since the American dollars repaid to the Eurodollar market tended to flow into foreign central banks, there was also a strong association between changes in net U.S. resident borrowing from the Eurodollar market and changes in the U.S. balance on official reserve transactions account over the 1965-70 period. Thus during the first three quarters of 1968 and the first and second quarters of 1969, when U.S. resident borrowing from the Eurodollar market was quite heavy, the U.S. balance on official reserve transactions account was in surplus in each of these quarters. On the other hand, in 1970 when U.S. residents were making large repayments to the Eurodollar market, the U.S. balance on official reserve transactions account was in substantial deficit in every quarter.¹⁵ In this way, borrowings from the Eurodollar market by U.S. banks served for a time to hide the deterioration in the U.S. balance of payments as far as the effects on foreign official holdings are concerned and then, when the borrowings were repaid, to increase the redundancy of dollars in foreign reserves.

While these U.S. short-term capital movements are directly related to the operations of the Eurodollar market, it has been suggested that, in the absence of the Eurodollar market, foreign short-term capital might have flowed to the United States during 1968 and 1969 in the presence of a tight U.S. money market, with much the same consequences for the U.S. balance of payments. We doubt

14. The results of regression analysis of the relationship between quarterly changes in net foreign nonofficial liquid claims on U.S. residents and in changes in the U.S. official reserve transactions balance, on the one hand, and in the net claims of foreign branches of U.S. banks on U.S. residents, on the other, are presented in an article by Raymond F. Mikesell entitled "The Eurodollar Market and the Foreign Demand for Liquid Dollar Assets," *Journal of Money, Credit and Banking*, August 1972, pp. 643-683.

15. In the second quarter of 1970 there was a small increase in net claims of foreign branches of U.S. banks on U.S. residents (\$218 million), but this was not sufficient to offset other factors in the U.S. balance of payments making for a deficit on the U.S. official reserve transactions account.

very much that these flows would have occurred in anything like the same volume. In the first place, Regulation Q, which limited the rates of interest U.S. commercial banks could pay on time deposits and CDs, applied to foreign nonofficial entities as well as to U.S. residents. Hence, to a considerable degree, U.S. commercial bank borrowing from abroad through their foreign branches was a means of circumventing Regulation Q as applied to foreigners. Second, prior to October 1969, U.S. banks were not required to maintain reserves on liabilities to their foreign branches. More broadly, however, we believe that the Eurodollar market provided a mechanism for international financial intermediation for the mobilization of large amounts of foreign liquid funds that would never have been placed directly in the United States even in the absence of Regulation Q.

EFFECTS ON THE BASIC BALANCE

Perhaps a more significant question is whether the growth of the Eurodollar market has had any impact on the U.S. basic balance, either the goods and services component or the long-term capital component. It is impossible to provide satisfactory evidence either way; we can only speculate as to what the causal relationships might be, if any. At the most general level, there have been allegations in earlier postwar years that the growth of world trade was being impaired by a shortage of international liquidity. The argument was usually made with respect to the rate of growth of official reserve assets rather than private international liquidity. The Eurodollar market made a modest contribution to foreign official reserve assets as a consequence of foreign official depositing in the Eurodollar market. This did not become very significant until after 1967, however, and few would argue that during this period world trade had been constrained by a lack of dollar liquidity generally, or by a lack of official reserves.

The expansion of international credit facilities provided by the Eurodollar market may have induced some increase in world trade, but such an expansion would not necessarily contribute to an improvement in the U.S. trade balance. It is possible for U.S. exports to benefit from a redistribution of international liquidity. In the absence of the Eurodollar market, an increase in foreign dollar

liquidity generated by a U.S. payments deficit would flow into the reserves of the surplus countries. With the market, some of these dollar funds may flow in the form of credits to deficit countries where they become available for increased imports from the United States and elsewhere. This flow would reduce the volume of domestic credit in the capital exporting countries. In the absence of these flows, the capital exporting countries might have contracted credit as an anti-inflationary measure.

The U.S. current account and the long-term capital account may be affected by the ability of U.S. firms or their foreign affiliates to borrow Eurodollars for financing working capital requirements or for financing capital projects in foreign countries. The latter type of investment frequently takes place under a Eurodollar revolving commitment whereby a Eurodollar bank or a consortium of banks makes a commitment for a period of from, say, three to five years to lend the borrower up to a specified amount. Although actual borrowings are usually evidenced by notes of maturities of less than twelve months, the notes can be renewed during the overall period of commitment, provided agreement is reached on the interest rate for each renewal.¹⁶ Given the U.S. capital export control program, it is quite likely that some U.S. direct foreign investment would not have been made in the absence of the Eurodollar market. On the other hand, some of these investments might have been made by means of direct capital flows from the United States, which flows would have affected the U.S. balance on basic transactions account. To the extent Eurodollar credits have permitted a higher level of U.S. direct investments, such investments may have tended both to increase U.S. exports to U.S. affiliates abroad and to provide substitutes for U.S. exports to other customers.¹⁷

16. See Morgan Guaranty Trust Company, *The Financing of Business with Eurodollars*, New York, 1967, p. 8.

17. The increase might be expected to come in the form of capital goods during the investment phase and thereafter in the form of materials and components. The substitution effect would come when the affiliate's production displaces goods previously supplied by the parent company. The relationship between U.S. exports and imports and U.S. foreign investment is, however, a controversial issue with which we shall not be further concerned in this book. See G. C. Hufbauer and F. M. Adler, *Overseas Manufacturing Investments and the Balance of Payments*, Washington, D.C.: U.S. Treasury Department, 1968; and Jack N. Behrman, *Direct Manufacturing Investment, Exports, and the Balance of Payments*, New York: National Foreign Trade Council, 1968.

A final consideration with respect to the impact on the U.S. balance of payments has to do with the effects of the Eurodollar market on the international financial intermediation function of the United States. The carrying out of this function has meant that the United States has tended to make extensive loans and direct investments abroad, financed to a substantial degree by the foreign acquisition of liquid dollar balances. The extension of the U.S. banking system abroad has, to a degree, changed this financial intermediation process. Instead of loans being made by the transfer of American dollars from the United States, the loans are made by U.S. banks operating abroad out of funds deposited by foreigners in U.S. branches or in other Eurodollar banks that redeposit the funds with U.S. branches. Insofar as the financing is shifted in this way to foreign-owned dollars, in place of newly provided funds from the United States, the deficit in the U.S. international accounts is reduced. This transfer of the U.S. intermediation function is further facilitated by the development of the Eurobond market, also promoted by U.S. financial institutions, whereby long-term funds required by U.S. firms operating outside the United States are raised abroad. To what extent there has been a transfer of foreign loan financing from parent banks in the United States to their foreign branches is not known to the authors, but the amount must have been considerable. The course of this process has been greatly facilitated by the existence of the U.S. Voluntary Foreign Credit Restriction Program (VFCR), so that it is difficult to determine what the effect of the increased foreign financing by foreign branches of U.S. banks would have been in the absence of those restrictions.

*National Monetary Policies and Controls
in Relation to the Eurodollar Market*

As just indicated, the rapid development of the Eurodollar market after 1963 was in considerable measure a consequence of U.S. credit and capital export controls, including the limits imposed by Regulation Q on the rate of interest U.S. commercial banks could pay on time deposits and CDs, the VFCR program, and the con-

trols on U.S. direct foreign investment. These controls led to a partial insulation of the U.S. capital market from that of the rest of the world, which in turn promoted a market for time deposits denominated in dollars outside the United States and a very large expansion of U.S. foreign branches of U.S. banks to participate in this market. However, while the U.S. domestic money market was to a degree insulated from the Eurodollar market, the Eurodollar market was strongly influenced by U.S. monetary policy and became a channel for the transmission of U.S. domestic monetary conditions to money markets abroad. One effect of the Eurodollar market was to narrow interest rate differentials and to equalize credit conditions among foreign money markets. If a particular country desired to tighten credit, say, by increasing reserve requirements on domestic deposits, the banking system could acquire funds for loans to domestic borrowers by attracting Eurocurrency deposits from abroad. When, in 1971, some European countries began requiring their commercial banks to maintain reserves, or marginal reserves, on liabilities to foreigners, many large domestic corporations simply bypassed the domestic banking system and borrowed abroad. Likewise, when the monetary authorities of a particular country wanted to ease credit conditions, say, by reducing reserve requirements, both commercial banks and nonbanks sought higher yields abroad, particularly through the Eurocurrency market. In addition to interfering with domestic credit objectives, the capital outflow tended to reduce central bank reserves.

Throughout the 1960s some European countries limited direct access to the Eurodollar market by their own residents. This has been true of Britain, France, and Italy, among others. Frequently, as in the case of Britain, residents were limited by exchange control regulations with respect to the acquisition of foreign currencies, and commercial banks were limited in the amount of net foreign assets they could acquire. In recent years, however, regulations have been imposed by countries such as Germany and Switzerland, not for the purpose of preventing short-term capital outflow, but rather for limiting the inflow. The imposition of these controls has arisen in part from the desire to limit the influx of dollars into the central banks and in part from the desire to avoid the credit-expanding

effects of the acquisition of additional reserves by domestic banks.¹⁸ For example, the German government imposed marginal reserve requirements on nonresident liabilities of commercial banks in 1971, and in February 1972 it announced a 40 percent deposit requirement on foreign borrowings of nonbanking corporations. Switzerland introduced a 100 percent reserve requirement on net foreign liabilities of banks, banned the sale of domestic securities and certain other financial assets to foreigners, and imposed a 2 percent quarterly tax on foreign deposits held in Swiss banks in excess of amounts held on June 30, 1972.¹⁹

The effect of these capital import restriction measures by European countries has been to limit the demand for Eurodollar funds arising from firms operating in these countries seeking to obtain credit and from speculators throughout the world that have borrowed Eurodollars for the purpose of converting them into strong European currencies. However, the demand for Eurodollar loans has expanded in other parts of the world, particularly in the developing areas and Eastern Europe.²⁰ So long as there is sufficient demand for Eurodollars to provide banks and nonbank depositors with rates of return higher than those available in their domestic money markets, funds will flow into the market from Western Europe, the United States, and other areas where banks and other liquid asset holders are permitted to place funds in the market.

18. The question of the ability of domestic monetary authorities to offset the effects of capital inflow on the monetary system has been the subject of a number of studies. See, for example, Manfred Willms, "Controlling Money in an Open Economy: The German Case," *Federal Reserve Bank of St. Louis Review*, April 1971; and Michael G. Porter, "Capital Flows as an Offset to Monetary Policy: The German Experience," *IMF Staff Papers*, July 1972, pp. 395-424. Some analysts have sought to show that capital inflows have not contributed to a net expansion of domestic credit, largely on the grounds that domestic reserves have increased by more than could be accounted for by capital inflows. Others have agreed with monetary authorities of Germany and certain other countries who have held that, in the absence of direct controls over capital inflows, there are severe limits to preventing such flows from increasing the monetary base.

19. For a review of recent monetary controls in European countries and Japan, see Charles A. Coombs, "Treasury and Federal Reserve Foreign Exchange Operations," *Monthly Review*, Federal Reserve Bank of New York, September 1972, pp. 210-232.

20. *Ibid.*, pp. 230-232.