

1973

## **Euro-Dollars and United States Monetary Policy.**

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Euro-Dollars and U.S. Monetary Policy

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy

in

The Department of Economics

by

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Finally, the moral and financial support of my wife, to whom the author attempted an explanation of long-run profit maximization, is both acknowledged and cheerfully accepted.

In spite of the vigilance of the committee members, there is a high probability that errors remain in this study. For these, unfortunately, the author alone must accept responsibility.

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## ABSTRACT

Euro-dollars are dollar denominated bank deposits in non-U.S. banks. These deposits are located primarily in European commercial banks and are owned by a wide variety of individuals, corporations, and governmental bodies. A Euro-dollar deposit comes into existence when a holder of dollars exchanges them for a Euro-dollar deposit. The issuing bank then becomes the owner of the dollars which normally take the form of claims on U.S. bank demand deposits.

This dissertaion is concerned with this process of conversion from dollars to Euro-dollars and with the effects the existence of Euro-dollars may have on domestic monetary policies and on international financial relations. It is especially concerned with the practice of U.S. banks of borrowing Euro-dollars during times of tight money in the United States and the effects such borrowings have on the efficiency and impact of U.S. monetary policy.

The dissertation describes the development and mechanisms of the Euro-dollar monetary system. It shows that Euro-dollars are money and that this money may be created by the Eurobanks. Further, it presents estimates of the amount of money that has been created. A money multiplier is developed and illustrations of its operation

are given. Of greatest importance to the operation of this multiplier is the existence of large leakages out of the Euro-dollar system.

One of the major leakages, and that with which this study primarily deals, occurs when U.S. banks borrow Euro-dollars from the Eurobanks. The decline in Euro-dollar system reserves that results from this U.S. bank borrowing restricts credit creation in the Euro-dollar system. Further, the claims on U.S. banks that U.S. Euro-dollar borrowers obtain allows the borrowing banks to increase their reserves and thus their lending. It also allows the entire U.S. banking system to increase loans outstanding. The money supply and total reserves, however, remain generally unaffected by Euro-dollar borrowing. Thus, while deposit levels remain constant, total assets and liabilities of the U.S. banking system increase.

The increase in loans (or the lack of decline in loans) is a leakage in the efficiency of U.S. monetary policy to the extent that one of the Federal Reserve's goals during tight money periods is a reduction in lending by the commercial banks. Further, Euro-dollar borrowing has added an additional destabilizing factor that complicates monetary policy. It increases the variability of impact of a given policy action and makes more difficult precise monetary adjustments. The imposition of reserve requirements on Euro-dollar borrowings has reduced this uncertainty and loss of efficiency.

The study also analyzes the effects of European central bank interference in the Euro-dollar system, concluding that the recycling of dollars obtained in foreign exchange operations back into the Euro-dollar system drastically reduced the leakages from the system and increased the credit creating abilities of the system. It is noted that a form of open market operation could be undertaken by these central banks to control the amount of Euro-dollars in existence. This may be desirable in order to reduce the impact of the system on interest rate levels and liquidity in the various domestic monetary systems.

The dissertation concludes that, with the present reserve requirements on Euro-dollar borrowing in the U.S., such borrowing should not greatly influence the efficiency of U.S. monetary policy in the future. However, it can still abet currency speculation and can influence liquidity levels in various European countries. Thus, unless it is controlled, the Euro-dollar system will continue to present a destabilizing influence in European money markets.

# EURO-DOLLARS AND U.S. MONETARY POLICY

## CHAPTER I

### INTRODUCTION AND PURPOSE OF THE STUDY

#### I. Introduction

Euro-dollars are dollar deposits in European banks.<sup>1</sup> To persons unfamiliar with the areas of monetary economics and international finance, these deposits may not seem particularly exceptional. However, as will be shown in this dissertation, the existence of such deposits is indeed an unusual situation. It derives, generally, from the world-wide acceptability of the dollar (its vehicle currency status, in technical terms).

To illustrate the exceptional nature of such deposits, it is only necessary to draw a parallel to this type of deposit in an American bank. That is, it would be a strange phenomenon to the average American to be offered the opportunity of having his checking account denominated in Dutch Guilders or Italian Lira. Further, to borrow such

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<sup>1</sup>Actually, dollar deposits in any non-American bank are termed Euro-dollars. However, the bulk of such deposits are in Western European banks.



funds and have them credited to his account in terms of Guilders or Lira and to then be able to write checks acceptable to another American in Lira would be a radical change from the norm. Thus, this simple idea, dollar denominated deposits in European banks owned by Europeans (or anyone else, for that matter), contains within it some rather unusual consequences and some challenges to both domestic and international monetary authorities.

Euro-dollar deposits are not only accepted by Eurobanks, so called, but are also created by such banks in a manner quite similar to the creation of dollar deposits by U.S. banks. The point is, the Eurobanks are creating dollar deposits, not their home currency deposits. The reserves for these deposits are kept in U.S. banks. Indeed, the reserves are Eurobank demand deposits in U.S. commercial banks. Again, this is analogous to a U.S. bank creating Lira deposits and keeping reserves on these deposits in Italian commercial banks.

To conclude this catalog of unusual situations, it must be noted that U.S. banks have borrowed Euro-dollars from the Eurobanks. That is, they have borrowed dollars owned by the Eurobanks and kept as reserves on dollar denominated deposits owned by Europeans. These reserves are demand deposits in U.S. banks. U.S. banks therefore borrow ownership of other U.S. bank demand deposits from European banks. Of course, if these Eurobanks do not have

sufficient dollar demand deposits to lend, they may borrow them from other Eurobanks who do or from private citizens and corporations. They may also take domestic currency assets and convert them into dollars in the foreign exchange markets in their countries. This brings into the picture the various central banks of these countries.

As may be obvious from the foregoing, the study of Euro-dollars involves accepting a state of affairs somewhat different from that which normally exists in the realm of monetary and international economics. Further, it involves the analysis of what is an entirely new monetary system, one that is supranational in scope and based on one country's currency. The data available for the study is not particularly voluminous nor is it organized in any systematic fashion.<sup>2</sup> Further, many previous Euro-dollar studies have been heavily institutional in nature. These have lacked much real analysis of the ramifications of the existence of the Euro-dollar system.<sup>3</sup>

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<sup>2</sup>A Quantitative Framework for the Euro-Dollar System, Princeton Studies in International Finance No. 26. (Princeton: International Finance Section, 1970), p. 1.

<sup>3</sup>As Fred Hirsh is reported to have said in "The Money-Machine Magic of Eurodollars," Business Week, No. 2112 (February 21, 1970), p. 114, "... interpretations of the Eurodollar market have become almost de rigueur for monetary economists. If one common thread can be found in their varied offerings it would be: 'In the Eurodollar market, things are not what they seem'; to which is often added the

## II. Purpose of the Study

The limitations of previous Euro-dollar studies noted above have left a fertile area of investigation with which this dissertation proposes to deal. That is, a detailed analysis of the effects the existence of the Euro-dollar market has had upon the implementation and efficiency of U.S. monetary policy is the main purpose of this study. Further, to the extent that the creation of Euro-dollars by Eurobanks may occur and influence U.S. monetary aggregates, an analysis of the possibility of such creation and its impact on U.S. monetary policy will be undertaken. Since U.S. bank Euro-dollar borrowing has played such an important role in these banks' attempts to evade Federal Reserve tight money policies in the past decade, these activities and their resultant influences upon U.S. monetary policy will comprise a major portion of the study.

A second purpose of this dissertation is to show quantitatively, through the use of regression analysis, the various relationships that exist between U.S. bank Euro-dollar borrowing and domestic monetary aggregates. The monetary statistics now available for the latter half

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addendum: 'Nor as they are written in articles preceding this one.'" This dissertation may be de rigueur but it is not intended as a castigation of others' writings. The concern here is with areas of analysis generally overlooked by other writers rather than with the correction of possible errors in previous writers' analyses.

of the 1960's make possible a quantitative explanation of U.S. bank Euro-dollar borrowing and the effect such borrowing had on the U.S. monetary system.

Third, since Euro-dollar borrowing by U.S. banks has aided the transmission of U.S. monetary policy influences to European money markets and has, it is postulated, affected the uniformity and speed with which U.S. monetary policy affects the U.S. banking system, an analysis of the expected and actual impact of Euro-dollar borrowing on these factors will be presented.

The Euro-dollar market may also be responsible for a heightened competition between U.S. banks and European banks and between various European banks themselves. This possibility will be explored in some detail, as will the effects the existence of the Euro-dollar market have had upon the vehicle currency role of the dollar.

Finally, it is the general purpose of this study to add to the understanding of the operation of the Euro-dollar system. To this end, the basic mechanisms and structure of the system will be presented in detail.

## CHAPTER II

### DEVELOPMENT AND MECHANISMS OF THE EURO-DOLLAR SYSTEM

#### I. Introduction

The purpose of this chapter is to briefly describe the development of the Euro-dollar system and to outline the basic mechanics of the system's operation. In addition, a short preliminary discussion defining several of the more important concepts pertaining to the Euro-dollar system will be presented.

#### II. Definitions and Distinctions

##### A. Deposit Characteristics

Euro-dollars are dollar denominated deposits in foreign commercial banks.<sup>1</sup> These deposits may be owned by

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<sup>1</sup>Non-U.S. domiciled banks that accept dollar denominated deposits are today located not only in Europe but in many other parts of the world as well. Originally, only a few European banks accepted such deposits but as the market for such funds developed, major banks throughout the world (including branches of U.S. banks abroad) began to accept and relend dollar denominated deposits. Fritz Machlup, in a recent article, "The Magicians and Their Rabbits," Morgan Guaranty Survey (May, 1971), p. 4n, insists that only dollar denominated deposits in European banks should be called Euro-dollars. Similarly denominated deposits in banks in other parts of the world outside the U.S. should not, according to Machlup,

foreign or U.S. citizens and corporations. The distinctive characteristic of these Euro-dollar deposits is their location in banks outside the United States. Further, these deposits, like dollar deposits in the U.S., are the

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be called Euro-dollars. Call them ". . . external dollars, gypsy dollars, or expatriate dollars, but not Euro-dollars except if they are Euro-dollars." (p. 4n) In spite of Machlup, who is being perhaps a bit too semantic, all dollar denominated deposits in foreign banks will here be called Euro-dollars both for convenience and because it serves no particularly useful purpose to draw such a sharp distinction between European based Euro-dollars and non-European based Euro-dollars. They are all part of the same system and should all be called the same thing.

Recently, for instance, an Asia-dollar market located in Singapore has developed. This is a market in dollar-denominated deposits in Singapore banks and foreign branches located there. As will be evident from later chapters, these deposits are exactly the same as Euro-dollar deposits except that they are located in Asia rather than in Europe. See S.A. Pandit, "The Asian Dollar and Free Gold Markets in Singapore," International Monetary Fund Finance and Development, Vol. 8, No. 2 (June, 1971), pp. 32-36.

Finally, recent discussion concerning controls on the Euro-dollar market to be instituted by European central banks has brought the comment that, "If they start regulating the Euro-dollar market, we'll just open a branch in Kinshasa and call them Congo dollars." "Central Banks Ponder Measures to Restrain Eurodollar Activities," Wall Street Journal (June 11, 1971), pp. 1, 13.

All this indicates that the subject is not European dollar deposits as Machlup would insist, but rather, dollar deposits located anywhere in the world. Perhaps another name is required, but it is an international money that is the concern, not a specifically located deposit. The only requirements are location outside the U.S. and no exchange controls to hinder the movement of this money. For the purposes of this paper, Euro-dollars and Europe

primary money of a distinct monetary system.<sup>2</sup> However, unlike the system prevailing in the United States, Euro-dollar deposits do not have as their basis reserves at an official institution. Rather, Euro-dollar issuing banks maintain reserves at U.S. commercial banks in the form of dollar deposits (either demand or time). Euro-dollar deposits, therefore, are "backed" not by reserve balances at the central bank within the monetary system, but rather are "backed" by balances kept at commercial banks of another monetary system.<sup>3</sup> The amount and proportion of reserves held are determined by the commercial bank issuing the Euro-dollar liability.

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will be used for convenience but Euro-dollars are all such deposits located anywhere outside the United States.

<sup>2</sup>As will be detailed below, the Euro-dollar system appears to be a separate monetary system, external to that of the U.S. or to that of any European country. It may be argued, however, that the Euro-dollar deposit is merely a further manifestation of the adaptability of the U.S. monetary system and is, therefore, merely an extension of the U.S. system.

<sup>3</sup>There is a similarity between this situation and the international monetary system in which some countries maintain their currencies' reserves in the currency of another country. The difference, however, is that the Euro-dollar system is composed of commercial banks within certain countries. They have no national sovereignty.

Since the Euro-dollar deposit reserves are composed of U.S. commercial bank deposits and are held at the discretion of the Euro-dollar issuing bank, the creation of additional Euro-dollar deposits by these Eurobanks is both possible and highly likely. The multiple expansion of deposit liabilities with little control by the Eurobanks' host countries may have far reaching implications for the efficiency of European monetary policy. Further, U.S. bank borrowing of Euro-dollar deposits may have pronounced effects on the impact of U.S. monetary policy. These questions are the primary concern of this dissertation and will be dealt with in detail in Chapters 5 and 6.

Finally, the uses to which Euro-dollar deposits are put are somewhat different or, at least, more restricted than those to which domestic currencies are put. While national currencies are used in all types of transactions, Euro-dollar deposits are used primarily for the payment of large international debts. Since they serve principally as a payments medium for trade, speculation, and financial transactions, the possibility of the conversion of the Euro-dollar deposit into another currency is always present. This introduces into the Euro-dollar system an element of instability that is not present, for the most part, in the



U.S. system. The leakages that conversion causes have a major impact on the multiple expansion of Euro-dollar deposits and, ceterus paribus, will tend to inhibit the growth of Euro-dollar system liabilities.

#### B. Moneyiness

The basic function of any money is its acceptance and use as a medium of exchange. Some types of money are not completely acceptable as payment of a debt (checks drawn on out-of-state banks, for example), but if a substantial segment of a society accepts a particular vehicle as a medium of exchange, that vehicle may be said to be money. While Euro-dollars are not used in most ordinary transactions they may still be considered money. They are accepted by sellers and borrowers in payment of debts in much of the world, especially by international traders, financial institutions, and the like. In addition, Euro-dollars are borrowed by numerous groups for use in payment for goods and services. Therefore, while Euro-dollars are not an acceptable medium of exchange in every instance, they serve that function in a sufficient number of cases to be called money.

#### C. Monetary and Payments Systems

The moneyiness of Euro-dollars may also be illustrated by distinguishing between monetary and payments systems.

A monetary system may be defined as a system made up of institutions that create a unique money, usually within given political boundaries. The dollar monetary system, for instance, consists of those financial institutions in the United States that create dollars, either in the form of currency or deposits. A payments system, on the other hand, is composed of the users of a certain money (or monies). It may be coincident in coverage with a monetary system or it may be broader in coverage than a monetary system. Thus, all the users of U.S. dollars, including financial institutions both within and without the U.S., comprise the dollar payments system. This system is broader in extent than the dollar monetary system since it includes transactors who do not live under the dollar monetary system or institutions that can not create the currency of the system. A monetary system implies money creation; a payments system, money usage.

None of the institutions that utilize dollars but exist outside the United States may create U.S. dollars (i.e., they do not belong to the U.S. monetary system). However, some of these institutions have developed a substitute for the dollar that they can create. The return of convertibility to the major European currencies in 1958 and the reduction of most barriers to the movement of

money between countries allowed these banks (Eurobanks) to develop a monetary system based on the dollar and denominated in dollar units. The Euro-dollar deposits that the banks create may be used in place of U.S. dollar demand deposits within the dollar payments system, broadly defined. Since they are "backed" by U.S. dollars, the Euro-dollars are acceptable substitutes for U.S. dollars and may be used interchangeably with dollars outside the U.S.

The Eurobanks are members of more than one monetary system and create, for instance, both pounds and Euro-dollars. Their participation in more than one monetary system means that they may be able to avoid, at least partly, the control of the domestic monetary authorities. Further, they tend to transmit to their domestic money markets influences felt in the Euro-dollar market. As will be shown in later chapters, the Euro-dollar monetary system has become a mechanism for the transmission of assorted monetary pressures between national systems, and, indeed, a bypass of the various national monetary and capital restrictions imposed by these systems.

To conclude, Euro-dollars are created in the Euro-dollar monetary system. This system is supranational and controllable only with some difficulty since the basis of the credit creation is to be found in the money of another

monetary system over which the various national authorities have little power. The Euro-dollar payment system is also supranational in scope. However, while the Euro-dollar monetary system is unique in that it is the only supranational system that can create money,<sup>4</sup> the scope of the Euro-dollar payment system is not unique. Rather, the Euro-dollar payments system may be viewed either as a part of the dollar payments system or as one of several payments systems that are international in scope.

#### D. Euro-dollar Money and Credit

Fritz Machlup has approached the problem of the moneyiness of Euro-dollars in a fashion somewhat similar to that above.<sup>5</sup> After drawing a distinction between loans and money, Machlup sets the criterion of moneyiness as "immediate availability without loss for use in (the) discharge of debt."<sup>6</sup> Euro-dollar deposits meet this criterion for individuals and nonbank corporations. The transactions demand for these balances derives from the need to undertake

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<sup>4</sup>The only apparent exception is the IMF's creation of Special Drawing Rights.

<sup>5</sup>Fritz Machlup, "Euro-Dollar Creation: A Mystery Story," Banca Nazionale del Lavoro Quarterly Review, No. 94 (September, 1970), pp. 219-260.

<sup>6</sup>Ibid., p. 225. The following derives from Ibid., pp. 224-227.

payments in dollars, the asset demand derives from the level of interest paid on these deposits, and the speculative demand arises from diverse elements including especially exchange rate fluctuations. The demand for Euro-dollar deposits is a demand for money to hold and not, as some have implied, a supply of Euro-dollar loans.<sup>7</sup> That is, individuals and nonbank corporations do not lend dollars to banks but rather purchase or convert these dollars into Euro-dollar deposit money. This process parallels that which occurs in the United States. Individuals do not lend dollars to a bank but rather convert them into deposits.

Some Euro-dollar deposits may merely evidence inter-bank transactions, however, and as such are considered loans. These are the deposits that result when banks within the system lend Euro-dollar funds to each other and record the transaction as a Euro-dollar deposit. These

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<sup>7</sup>Paul Einzig, The Euro-Dollar System, 4th ed. (London: Macmillan and Company, 1970), p. 11; E. Wayne Clendenning, The Euro-Dollar Market (Oxford: Clarendon Press, 1970), pp. 8-9 both imply that this demand is in reality Euro-dollar lending. Deposits are seen by them as merely evidences of debt rather than money per se.

interbank deposits are netted out of the total Euro-dollars outstanding so that an overstatement of the Euro-dollar money supply does not occur.

#### E. Euro-dollars and Dollar Denominated Deposits

Dollar denominated deposits in foreign banks is the standard definition of Euro-dollars. However, the Bank for International Settlements (BIS) and several writers have added qualifications to this definition.<sup>8</sup> For them, a dollar deposit becomes a Euro-dollar only when the proceeds of such a deposit (a claim on U.S. bank deposit) are used either as reserves subject to relending or as a basis for (Euro-) dollar deposit creation.

This distinction is drawn so that account may be taken of dollar denominated deposits that existed prior to the 1958 return to convertibility by the major European countries. Many U.S. firms and others kept dollar deposits in foreign banks for various purposes. The dollar claims gained by the foreign banks were generally used to purchase

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<sup>8</sup>39th Annual Report (Basle: Bank for International Settlements, June, 1969), p. 148; Clendenning, op. cit., pp. 21-22; Ira Scott, The Euro-Dollar Market and Its Public Policy Implications, Economic Policies and Practises, Paper No. 12, U.S. Congress, Joint Economic Committee, Committee Print, 91st Congress, 2nd Session, 1970, p. 3; and Einzig, op. cit., p. 4.

money market instruments in the U.S. or were held for working balances purposes by these banks.<sup>9</sup>

So long as the deposit holders viewed their deposit as a non-money asset similar to a Treasury Bill and the foreign banks employed the proceeds in the U.S., these writers have felt that true Euro-dollars did not exist. However, once the dollar denominated deposits became acceptable as a means of payment and once the banks began to view the U.S. bank deposits they gained as reserves (upon which they could build additional deposit liabilities or which they could lend to other banks), then the Euro-dollar money supply and a Euro-dollar monetary system became reasonable concepts.

For these reasons the BIS measures the net size of the Euro-dollar market by deducting from gross dollar deposit liabilities of non-U.S. banks both interbank transactions and an estimate of the magnitude of these dollar denominated deposits that were held as non-monetary assets.<sup>10</sup>

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<sup>9</sup>39th Annual Report, loc. cit.; Scott, op. cit., pp. 6-7.

<sup>10</sup>39th Annual Report, loc. cit. The logic behind the distinction between dollar denominated deposits and Euro-dollar deposits is not completely sound. Nor is the procedure by which the BIS measures the size of the Euro-dollar money supply.

When the Euro-dollar system was beginning to

## F. Systems and Markets

The prevailing designation of the activities associated with Euro-dollars is the Euro-dollar market. As Fritz Machlup has noted, "A market is a meeting (not necessarily physical) of people who offer something for sale, hire, or rent, with people who are interested in buying,

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develop and Euro-dollar investment vehicles were not numerous, certainly many of the dollar funds gained by the Eurobanks when they accepted dollar deposits were used in the U.S. money market. However, to assume that the portfolio choices made by the banks have remained at the same level to the present day, with the proliferation of European uses of these dollar funds and instruments to convey them, is a tenuous reed upon which to base the deduction of certain amounts from Euro-dollar deposits outstanding.

Further, the effects of the banks' using the funds gained to purchase assets in the U.S. money market and of lending to U.S. bank branches are the same. That is, an outflow of reserves of the Euro-dollar system results in either case. To treat the former use as a deduction from the total deposits in the Euro-dollar system and include the latter as part of the total is inconsistent. There is no reason why the dollar deposit that is finally lent to a U.S. bank should be treated any differently from the dollar deposit that is used as purchasing power in the U.S. money market.

Distinguishing between uses of dollar reserves gained when Eurobanks accept dollar denominated deposits would be valuable, certainly, in determining leakages from the system, but such distinctions are difficult to verify and are no more logical in determining the stock of money in the Euro-dollar system than excluding hand-to-hand currency in the U.S. from the U.S. money supply on the grounds that it is not used to purchase U.S. financial assets.

Finally, excluding a flat amount as an estimate of the funds used in the U.S. money markets is simplistic to say the least. For these reasons, there appears to be little value in adjusting the deposits in the Euro-dollar system for this supposed difference between Euro-dollar deposits and dollar deposits.



hiring, or renting."<sup>11</sup> However, while this type of activity does occur in Euro-dollars, there is much more to the Euro-dollar system than a market per se. There exists, parallel to the money market in the U.S., a market in Europe for loans denominated in Euro-dollars. This credit market function is only part of the total activity referred to as the Euro-dollar market, however. In addition, there are loans outstanding, assets held, deposit liabilities, the creation, velocity, conversion and destruction of this money, various demands for this money and innumerable other things that have little to do with markets as such.

Therefore, measurements of the net size of the Euro-dollar market are highly misleading since in many cases these measurements refer to the stock of or the outstanding amount of Euro-dollar deposit liabilities as of a certain date, exclusive of interbank transactions. As Machlup notes, "Would anybody use the total value of shares of stock held . . . as a measure of the size of the stock market . . . (or) use the sum of deposit claims against American banks as (a measure of) the size of the American

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<sup>11</sup>Machlup, "Euro-Dollar Creation...", op. cit., p. 221. The following two paragraphs derive from this essay, pp. 221-223.

money market?"<sup>12</sup> This illustrates the inconsistency in using the term "market" to denote the various activities associated with Euro-dollars. One refers to the American monetary (i.e., U.S. dollar) system, not the U.S. dollar market when reference is made to the complex of activities involved with dollar deposit creation, loans, and the like. In the same way, a less misleading way of referring to the complex of activities involving Euro-dollars is to use the term "Euro-dollar system."

While there are constant reminders that there is a market aspect to the Euro-dollar system, usage of market to refer to the entire Euro-dollar structure is misleading. There is much more than the operation of a market inherent in the Euro-dollar phenomena.

### III. Development of the System

#### A. Origins

Several excellent delineations of the development and growth of the Euro-dollar system have been published. The institutional aspects of the system are probably best

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<sup>12</sup>Ibid., pp. 221-222.

understood and thus their documentation has been a relatively straight-forward affair.<sup>13</sup> A comparatively brief survey of the development of the system will be undertaken in this section in order to provide the background necessary to an understanding of the credit creation possibilities and monetary policy problems discussed later.

European banks have accepted foreign currency deposits for many years. Prior to World War II, for instance, British pound balances were commonly held in European banks for the purpose of facilitating international trade transactions which were then undertaken primarily in terms of pounds. After World War II, the dollar became the main international currency. However, due to rather strict exchange controls instituted by the majority of European countries, few dollar balances were held in European banks. Nonetheless, some dollar deposits were made primarily by communist bloc countries. These countries wished to hold

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<sup>13</sup>See, for instance, Einzig, op. cit., pp. 1-17; Clendenning, op. cit., pp. 5-35 especially; Scott, op. cit., pp. 3-4; Eric Williams, The Eurodollar Market, Economic Papers (Cleveland: Federal Reserve Bank of Cleveland, June, 1970), pp. 8-12; Joseph Kvasnicka, "Eurodollars-An Important Source of Funds for American Banks," Federal Reserve Bank of Chicago Business Conditions (June, 1969), pp. 10-13; Jane Little, "The Euro-Dollar Market: Its Nature and Impact,"

dollar balances for a variety of reasons but feared that should these balances be held in the U.S. they might be attached by the U.S. government in retaliation for the expropriation of American-owned property in these countries. For this reason, they deposited their dollar balances in Western European banks.<sup>14</sup>

The term Euro-dollar is said to be directly derived from the placement of these funds with European banks. The branch of the Soviet state bank in Paris was quite active in placing these dollar deposits. Its cable code name was Eurobank and cable drafts on this bank bore the bank code name. Thus, dollar drafts on Eurobank came to be called Euro(bank)-dollars. Even after other suppliers of such funds entered the market and displaced this bank as

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Federal Reserve Bank of Boston New England Economic Review (May/June, 1969), pp. 2-7; Oscar Altman, "Euro-Dollars: Some Further Comments," International Monetary Fund Staff Papers, Vol. 12, No. 1 (March, 1965), pp. 1-16; Philip Saunders, "American Banks in London's Eurodollar Market," National Banking Review, Vol. 4, No. 1 (September, 1966), pp. 21-25.

<sup>14</sup>See Einzig, op. cit., pp. 30-31. This is probably the primary source for subsequent writers, all of whom report the same origins of the system. Werner Makowski, "The Euro-Dollar Market: Methods and Prospects," The Challenge of International Finance, Guenter Reimann and Edwin Wiggles, eds. (New York: McGraw-Hill Book Co., 1966), pp. 165-167 also contains a good review of the early Soviet influences on the system.

the primary source of funds, this appellation remained.<sup>15</sup> Whether this is merely a folk tale or has some basis in fact is now probably impossible to determine. Certainly, the term is sufficiently descriptive of the situation and the explanation of its derivation is logical enough. No matter what its derivation, the term "Euro-dollar" is well suited to describe the funds under discussion. They are, in the main, Euro(pean) dollars and make up the deposits of a monetary system based primarily in Europe.

#### B. Growth Factors

While supply considerations were the main determinants of the original development of the system, changes in the foreign exchange structure in Europe and market interferences in the United States in 1957 and 1958 gave major impetus to the growth of the system. In 1957, the combination of Regulation Q ceilings of 1% on time certificates of less than 90 days maturity<sup>16</sup> and the sterling crisis of

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<sup>15</sup>Reported by Kvasnicka, op. cit., p. 10 and subsequently rereported, based on this article, by Williams, op. cit., p. 9 and by others as well.

<sup>16</sup>Clendenning, op. cit., p. 23 and his Appendix A, pp. 186-187. The following four paragraphs rely primarily on Clendennings's account of the developments that affected the growth of the system, as given on pp. 22-24 and upon Kvasnicka, loc. cit. It was not until the end of 1964 that Regulation Q restrictions were modified to allow higher payments on short-term time deposits in U.S. banks.

the same year (which brought about restrictions on the use of sterling in foreign trade financing) generated an increased demand and supply for Euro-dollar deposits and loans. British banks attempted to circumvent the restrictions on the use of pounds in trade financing by utilizing U.S. dollars as an alternative currency. The combination of low interest yields in the U.S. and an awakened demand for dollar deposits in Europe brought about a rapid growth in the system.

In addition, the general return to convertibility in 1958 augmented the supply of dollars flowing into the market. As exchange controls were relaxed, European dollar holders retained dollar balances which they had previously been required to sell upon receipt to their central bank. These retained balances found an investment outlet or a temporary repository in interest earning dollar denominated deposits issued by many European banks. Also, the return to convertibility allowed banks and others to move out of their own currencies and into dollars and, in opposite fashion, gain dollar loans for conversion into their respective currencies. Thus, the increased supply and demand worked together to bring about the development of the system.

Among the other factors that may be cited as giving

impetus to the growth of the market for dollar deposits is the variance in the economic growth rates of the United States and Europe in the 1950's. While the U.S. stagnated economically, Europe experienced an economic boom. High interest rates reflected the great demand for funds in Europe and dollars flowed to Europe in large quantities. Some of these dollars eventually wound up in dollar denominated bank deposits.

Another factor impelling the development of the system was the poorly developed European money markets and lack of investment instruments that were liquid, riskless, and produced a respectable yield. The Euro-dollar instrument met many European investors' requirements as had no other instrument. Finally, Euro-dollar loans met the need for short-term trade financing.

By the early 1960's, a fairly well developed market for dollar denominated deposits existed. It should be noted however, that the intermediary aspects of the Euro-dollar system developed before, and gave impetus to, the growth of the whole complex of activities that may more properly be called the Euro-dollar monetary system. Euro-banks first served as conduits for dollar funds rather than as creators of such funds. Their actions may be compared to those of savings and loan associations in the United

States. When the Euro-dollar system was small, leakages from it were of such magnitude that money creation by the Eurobanks was not possible. These leakages derived both from the uses the Eurobanks made of the funds gained and, when lent rather than invested, the uses the borrowers made of the funds. Both the banks and the borrowers viewed the claims on U.S. banks that they obtained as usable primarily in the United States or as liquidity that could be converted into domestic currency. It was the reserves or backing of the Euro-dollar deposits that the banks and borrowers used in purchasing goods or assets. The deposit itself was viewed merely as a means to an end.

Eurobanks tended to use the dollar deposits they gained to purchase assets in the United States. Borrowers of Euro-dollars converted them into domestic or third currencies or used the U.S. dollars that the Euro-dollar deposits represented. When central banks gained title to these Euro-dollar funds as a result of their operations in the exchange markets, they frequently utilized the dollar deposits they represented in the United States. Only in later years did the central banks begin to recycle within the Euro-dollar system the funds obtained, thereby reducing one of the leakages from the system that had previously halted money creation.



### C. U.S. Banks in the System

In the early 1960's American bank branches in Europe began to accept dollar denominated deposits in some volume and entered into the market for redeposits from other banks. But generally these branches were not a significant factor in the market because they could not or would not operate on the thin interest differentials that satisfied the European banks. There were, however, some depositors in this period who utilized American bank branches for the deposit of dollars. This business was generated in spite of the generally lower rates paid by these branches. The reason for the apparent irrational behavior of these depositors (i.e., non-profit maximizing) may be found in their attitude that the American banks were both safer repositories of dollar funds and the logical place for such deposits (since dollars were the business of U.S. banks).<sup>17</sup> In any case, the dollar deposits at branches of U.S. banks were less than \$2 billion at the beginning of 1964, less than 25% of the total of such deposits in Europe, as reported by the BIS.<sup>18</sup>

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<sup>17</sup>Saunders, op. cit., p. 22.

<sup>18</sup>39th Annual Report, op. cit., p. 141.

Tight money in the U.S. in 1966 and again in 1969 and the discovery by U.S. banks that the Euro-dollar market was an excellent source of supplemental funds with which some of the reserve stringencies instituted by the Federal Reserve could be offset, brought about a dramatic increase in outstanding Euro-dollar deposits. This occurred because American banks were willing to pay high interest rates in order to gain access to dollar funds. They instructed their branches to bid aggressively for Euro-dollar deposits (which the branches had previously not done) and transfer to the home office these claims on other U.S. banks. The real value of these funds and the source of the banks' willingness to pay high interest rates, was that there were no reserve requirements on these resulting liabilities to foreign branches. Further, these funds were valuable because they allowed increased lending and offset, to some extent, the higher average required reserve levels induced by Federal Reserve actions. The development and growth of the market in the mid-1960's is, therefore, largely attributable to U.S. bank activities which were, in large measure, responses to governmental and Federal Reserve money market

interventions.<sup>19</sup> Their demand for funds caused interest rates to rise, pulled additional funds into the system and sparked a phenomenal growth in outstanding Euro-dollar deposits.

Additional factors that may be cited as providing impetus to the development of the system include the increased use made of the Euro-dollar market by multinational corporations based in the United States. These firms entered the market in response to balance of payments restrictions imposed by the U.S. government in the 1960's. These restrictions forced the firms to borrow in non-U.S. money markets, among them the Euro-dollar market.<sup>20</sup>

Finally, the Viet Nam war and the consequent aggravation of the U.S. balance of payments deficit pumped

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<sup>19</sup>This view is widespread and may be found in, among others, "Euro-dollars: A Changing Market," Federal Reserve Bulletin, Vol. 55, No. 10 (October, 1969), pp. 765-766; Kvasnicka, op. cit., pp. 10-13; and Williams, op. cit., pp. 8-13.

<sup>20</sup>The restrictions do not appear to have hampered the growth of the multinational firms. Servan-Schreiber has noted in The American Challenge (New York: Avon Books, 1969), p. 43, that the restrictions merely rechanneled the borrowing of U.S. corporations. Americans borrowed funds from Europeans (including Euro-dollars) in order to purchase European firms. As he says, "We pay them to buy us." (p. 43, emphasis in original text. Nine-tenths of American investment in Europe in 1965 was financed by European sources (pp. 42-43).

additional funds into the market. The uncertain status of the international monetary system and the questionable par values of several European countries also had an effect on the size of the Euro-dollar system. Movement into Euro-dollar deposits was encouraged by these uncertainties and central bank practices of recycling dollar funds gained in foreign exchange dealings resulted in further growth of the system. Nonetheless, it was American bank demand for these funds that was the primary inducement to the growth of the market.

#### D. Recent Developments

In 1970-1971, as U.S. monetary policy became less restrictive, U.S. banks repaid much of their massive borrowings of Euro-dollars. They undertook this action in spite of Federal Reserve attempts to slow these reflows of funds to Europe. Euro-dollars had become a very expensive method of obtaining funds for U.S. banks and they therefore paid at maturity great amounts of these borrowings. (The amount of borrowings outstanding declined from about \$14 billion in late 1969 to about \$3 billion in May, 1971.<sup>21</sup>) Interest rates on Euro-dollar instruments fell drastically as demand

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<sup>21</sup>"Recent Monetary and Bank Credit Developments," Federal Reserve Bank of New York Monthly Review, Vol. 53, No. 5 (May, 1971), pp. 101-102.

collapsed and supply expanded. The decline in rates tended to pull down other European money market rates as well. These rate declines occurred despite efforts by several European central banks to maintain higher interest rate levels. Speculative flights from the dollar in the spring of 1971 further expanded the supply of Euro-dollars. Some offset to this did occur, however, since demand for Euro-dollar loans increased at the same time. This demand was, in reality, for loans of any kind and the funds gained were immediately converted into "stronger" European currencies.<sup>22</sup>

Restrictive actions of various kinds were taken or considered by the European central banks. These actions were designed to moderate Euro-dollar flows, thereby reducing the system's effect on domestic monetary structures.

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<sup>22</sup>Various articles in current periodicals such as the Wall Street Journal and Business Week have chronicled these developments. See for instance, "A Step to Slow Eurodollar Flows," Business Week, No. 2175 (May 15, 1971), pp. 110-114; "The Future of the Dollar," First National City Bank Monthly Economic Letter (November, 1970), pp. 125-126; "The Uneven Retreat in World Interest Rates," First National City Bank Monthly Economic Letter (March, 1971), pp. 12-15; "Eurodollar Banking: Entering a New Phase?" First National City Bank Monthly Economic Letter (July, 1971), pp. 11-15.

Various monetary control procedures similar to open market operations were instituted.<sup>23</sup> By mid-1971, the Euro-dollar system had a much reduced stock of dollar denominated deposits to work with and had to contend with a reduced willingness by investors to remain in dollars. The value of the dollar as a vehicle currency was thus at least temporarily reduced as confidence in its stability declined.<sup>24</sup>

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<sup>23</sup>See, for instance, "Drive for Eurodollar Curbs Aided, Split on Rates Widened at Munich Parley," Wall Street Journal (June 1, 1971), p. 6; "European Bankers Planning to Manipulate Dollar Supplies; Washington Seen Uneasy," Wall Street Journal (April 7, 1971), p. 4; "Continuing Payments Deficits Could Stir Dollar Troubles, New York Reserve Warns," Wall Street Journal (March 1, 1971), p. 5. See also Chapters 5 & 6; "Eurodollar Banking:..." loc. cit.; "Central Banks Ponder..." loc. cit.; "Common Market Panel Adopts Plan to Control Flow of Eurodollars," Wall Street Journal (June 25, 1971), p. 12; "Europe's Central Banks Agree to Withdraw Funds in Bid to Control Eurodollar Market," Wall Street Journal (June 15, 1971), p. 5.

<sup>24</sup>See Swoboda, op. cit., pp. 5-11, 15-19, and 23-29 for an especially lucid and theoretically rigorous explanation of vehicle currencies in general and the effects of the use of the dollar as such a currency in particular. A recent Bank for International Settlements Annual Report notes, as reported in "Eurodollar Banking:..." op. cit., pp. 11-12, that one of the most striking features of the Euro-dollar market today is the slowdown in its growth. A second feature is that Euro-dollar demand again primarily originates in Europe rather than, as in the last several years, in the U.S. Further, "... the demand for Eurodollars in Europe has been so strong that the market has not only found outlets for the funds returned to it from the United States but has actually increased its total lending substantially." (emphasis added) (p. 12)

In summary, the development and growth of the Euro-dollar system derives from several factors. These include the Cold War and Soviet bloc attempts to protect its dollar assets, the growth of international trade, the return to convertibility and the dismantling of exchange controls in Europe, money market interferences by the Federal Reserve, tight money in the U.S., the discovery and subsequent heavy usage of the system by U.S. banks, exchange rate speculation and disequilibriums, and money market imperfections in Europe.

#### IV. Mechanisms of the System

##### A. Introduction

This section contains a fairly concise explanation of the basic mechanics of the Euro-dollar system. The working of the transfer of funds among banks and individuals will be discussed, the reserve basis of the resultant deposits noted, and the dependence of the system on fixed exchange rates, convertibility and foreign exchange markets reviewed. The mechanics of credit creation in the Euro-dollar system and the effects of U.S. bank borrowing on this creation will be outlined. Finally, a comparison to the U.S. monetary system will be included.

## B. The Origination of Euro-dollar Deposits<sup>25</sup>

The simplest transaction that gives rise to the creation of a Euro-dollar deposit is the payment of a debt by a U.S. citizen or corporation to a European citizen or corporation. The payment of this debt can be undertaken in a number of ways. For instance, the U.S. debtor can purchase foreign exchange and pay in this form, he can borrow the foreign currency and then transfer the funds, or he can pay in dollars. It is the payment of dollars that

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<sup>25</sup>As might be expected several publications explain these transactions. Among the best are: Ernest Bloch, "Eurodollars: An Emerging International Money Market," C. J. Devine Institute of Finance, New York University The Bulletin, No. 39 (April, 1966), pp. 6-19; Little, op. cit., pp. 12-18; Machlup, "Euro-Dollar Creation....," op. cit., pp. 234-242; Machlup, "The Magicians....," op. cit., pp. 3-9; Scott, op. cit., pp. 7-12; Williams, op. cit., pp. 13-18; Clendenning, op. cit., pp. 8-20; Fred Klopstock, "Money Creation in the Euro-Dollar Market - A Note On Professor Friedman's Views," Federal Reserve Bank of New York Monthly Review, Vol. 52, No. 1 (January, 1970), pp. 12-15; Milton Friedman, "The Euro-Dollar Market: Some First Principles," Morgan Guaranty Survey (October, 1969), pp. 4-9; John Leimone, "The Euro-Dollar Market: An Element in Monetary Policy," Federal Reserve Bank of Atlanta Monthly Review, Vol. 53, No. 8 (August, 1968), pp. 2-3; Kvasnicka, op. cit., pp. 11-15; Swoboda, op. cit., pp. 30-34.



makes possible the creation of Euro-dollars. However, only if the creditor deposits the dollar check he receives into a dollar denominated account in a European bank (for reasons of risk minimization, transactions requirements, locational advantages, or interest return) does the deposit of the claim on a U.S. bank result in the creation of Euro-dollars.<sup>26</sup> Conversion or redeposit in a U.S. account forestalls this Euro-dollar creation.

No matter what the receiving bank subsequently does with the asset gained by this transaction, a Euro-dollar deposit now exists. Future use of the deposit by its owner may lead to the extinguishing of the Euro-dollars, but at this stage the Euro-dollars created by the transaction form a net addition to the total Euro-dollar supply outstanding. The T-account in Figure 1 traces this transaction.<sup>27</sup> Note that the only change in the U.S. is the transfer of ownership of the U.S. bank deposit. However, in Europe both an

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<sup>26</sup>This ignores the BIS qualifications discussed above.

<sup>27</sup>Only those entries which change are included in the T-accounts.

asset and a liability have been created by the deposit of the dollars.

Thus, one way that a Euro-dollar can come into existence is through the deposit of U.S. funds by a foreign receiver in a dollar denominated deposit in a European bank. Generally, any owner or receiver of dollar funds may deposit dollar claims on U.S. banks into dollar denominated deposits in banks in Europe. Central banks, for example, may transfer their deposits with U.S. banks to European banks. This action may be taken to gain a higher return on the banks' reserve balances, to assist domestic commercial bank earnings, or to influence the foreign exchange market. The Euro-dollar

Figure 1. Euro-dollar Creation

| U.S. Banking System |                                    | Eurobank                           |                         |
|---------------------|------------------------------------|------------------------------------|-------------------------|
|                     | -Demand Deposit<br>of U.S. citizen | +Demand<br>Deposit in<br>U.S. bank | +Euro-dollar<br>Deposit |
|                     | +Demand Deposit<br>of Eurobank     |                                    |                         |

deposits created will remain in existence until such time as the owner withdraws it or uses it to pay a debt of some kind. Upon withdrawal or use, the funds may leak out of the Euro-dollar system or they may remain in it. Figure 2 illustrates the T-accounts for a transaction by a central bank.

Figure 2. Central Bank Generated Euro-dollar Deposit

| U. S. Banking System |  | Eurobank                        |  |
|----------------------|--|---------------------------------|--|
|                      | -Demand Deposit<br>of Central Bank     | +Demand Deposit<br>at U.S. Bank | +Euro-dollar<br>Deposit of<br>Central Bank |
|                      | +Demand Deposit<br>of Eurobank         |                                 |  |
| Central Bank         |  |                                 |  |
| Reserves:            |  |                                 |  |
|                      | -Demand Deposit<br>at U.S. Bank        |                                 |  |
|                      | +Euro-Dollar<br>Deposit at<br>Eurobank |                                 |  |

### C. Pyramiding or the Intermediary Function

The receiving banks in Europe are willing to pay interest on Euro-dollar deposits because they can lend the funds obtained to others, either banks or final users. Eurobanks accept dollar denominated deposits from non-bank depositors even when they have no immediate need for the funds. They do this in order to maintain their competitive position in the market and for interest arbitrage gains.

The funds gained may be lent to a second bank at a slightly higher rate of interest. This interest differential may arise from the added risk a second bank faces due to its smaller resources, the relative weakness of the local

currency, or because the second bank has a more profitable use for the resources than does the first. Whatever the reason, interbank transactions of this type occur in very great numbers.<sup>28</sup>

The lending and relending of dollar claims on U.S. banks by Eurobanks has come to be called pyramiding. This is an unfortunate term since pyramiding normally refers to the erecting or creation of more and more deposits upon a given reserve base as money is lent out and redeposited within the banking system.<sup>29</sup> Pyramiding, then, refers to building more deposit layers (always smaller, since on each

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<sup>28</sup>Scott, op. cit., pp. 8-9. While Euro-dollar transactions between banks occur for reasons similar to those that motivate the lending and borrowing of Federal Funds in the United States, most Euro-dollar transfers are usually undertaken for a considerably longer period of time than the one day which is common in the Federal Funds market. These transfers more closely resemble short-term loans between banks or correspondent balances than they resemble overnight reserve lending.

<sup>29</sup>Machlup, "Euro-Dollar Creation...", op. cit., pp. 229-230; Leland Yeager, International Monetary Relations (New York: Harper and Row, 1966), p. 470 outlines pyramiding on an international scale.

round some funds are sterilized in reserves) on a given base. This is not the case with interbank lending in the Euro-dollar system. Rather, like the Federal Funds market or U.S. savings and loan associations, these interbank activities are really nothing but intermediary activities. Funds are gained from a depositor and channeled through various institutions to a final borrower. There is no money creation here, merely an exchanging of one type of asset for another. Indeed, these are the transactions netted out by the BIS when it measures the stock of deposit liabilities of the Euro-dollar system.

To illustrate this process, Figure 3 indicates a chain of intermediation.<sup>30</sup> Funds originating in the U.S. (for example) are deposited in Eurobank A by a European creditor of the U.S. Eurobank A then lends to Eurobank B who relends to Eurobank C. Eurobank C creates a deposit based on these funds, lending to a final user. These activities typically take place with little or no reserves held back and at slightly higher rates at each stage.

As the consolidated balance sheets in Figure 3 show, the chain of intermediation among the Eurobanks was made possible by the initial dollar deposit in Europe. Depending

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<sup>30</sup>Little, op. cit., p. 13 forms the basis of this example.

Figure 3. Euro-dollar Intermediation<sup>a</sup>

| 1. U.S. Banking System   |  | 2. Eurobank A  |  |
|--|--|--|--|
|  | -Demand Deposit of U.S. citizen<br><u>which becomes</u><br>+Demand Deposit of, <u>first</u> ,<br>a) European Creditor,<br><u>then</u><br>b) Eurobank A,<br>c) Eurobank B,<br>d) Eurobank C | +Demand Deposit at U.S. Bank<br><u>which becomes</u><br>+Euro-dollar (E\$) Deposit at Eurobank B | +Euro-dollar (E\$) Deposit of European Creditor                        |
| 3. Eurobank B <sup>b</sup>   |  | 4. Eurobank C <sup>b</sup>   |  |
| +Demand Deposit at U.S. Bank<br><u>which becomes</u><br>+E\$ Deposit at Eurobank C | +E\$ Deposit of Eurobank A   | +Demand Deposit at U.S. Bank<br><u>and</u><br>+E\$ Loan  | +E\$ Deposit of Eurobank B<br><u>and</u><br>+E\$ Deposit of Final User |
|  |  | 5. Final User  |  |
|  |  | +E\$ Deposit at Eurobank C   | +E\$ Loan Due Eurobank C   |

CONSOLIDATED POSITIONS

| U.S. Banking System  | Eurobanks A, B, C  |   |
|--|--|---|
| +Demand Deposit of Eurobank C<br>-Demand Deposit of U.S. citizen | +Demand Deposit at U.S. Banks<br>(+E\$ Deposit of A at B) <sup>C</sup><br>(+E\$ Deposit of B at C) <sup>C</sup><br>+E\$ Loan to Final User | +E\$ Deposit of European Creditor at Bank A<br>(+E\$ Deposit of A at B) <sup>C</sup><br>(+E\$ Deposit of B at C) <sup>C</sup><br>+E\$ Deposit of Final User |

Figure 3 - continued

| Final User                       |                               |
|----------------------------------|-------------------------------|
| +E\$ Deposit<br>at Eurobank<br>C | +E\$ Loan Due Euro-<br>bank C |

- a) Assumes no reserves maintained by intermediaries A and B.
- b) Ownership of the U.S. deposit may remain in Eurobank A. In this case the entry on the asset side of the balance sheet will be Euro-dollars due from Eurobank A.
- c) These deposits cancel out:

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upon the use of the loan proceeds, either all but the original Euro-dollar deposit will be cancelled (should the borrower demand U.S. dollars or in other ways convert the Euro-dollars into U.S. dollars) or the basis for credit creation will be laid (should the borrower use the Euro-dollar deposit to pay a creditor and the deposit be re-deposited). Each Eurobank receiving title to the demand deposit in the U.S. has merely transformed the asset into a different kind of asset, i.e., a Euro-dollar deposit at (loan to) another Eurobank. These assets and liabilities cancel out when the balance sheets are combined. Thus, a Euro-dollar deposit asset of A at B is cancelled by the Euro-dollar deposit liability of B to A. Note, nonetheless, that the original Euro-dollar deposit does remain in

existence and is offset by the loan extended by Eurobank C to the final user. When the final borrower utilizes his loan funds, the demand deposit at U.S. bank asset and the Euro-dollar deposit of final borrower liability will also be cancelled, unless the funds are redeposited into the Euro-dollar system. The intermediation process has thus transferred the purchasing power held by the European creditor to a final user.

Theoretically, the intermediation chain could be extended infinitely. However, since small reserves are often held at each stage such a result could not occur. While the banks in the Euro-dollar system attempt to maintain a close correspondence between the maturities of their liabilities and their assets, those most active in the market do carry small balances with U.S. banks primarily to compensate the U.S. bank for the costs of clearing the many deposit transfers arising from their activities<sup>31</sup> and also to maintain their credit should they need immediate dollar loans in the face of sudden and unexpected withdrawals.

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<sup>31</sup>Scott, op. cit., p. 9.



Secondly, the required higher interest rate at each subsequent transaction works to limit the number of times the title to the claim on a U.S. bank can be transferred. The limit here is the rate at which the final borrower could alternatively obtain funds.

Pyramiding in the Euro-dollar system, then, does not refer to credit creation as such.<sup>32</sup> Rather, it refers to the intermediation activities of the Eurobanks that make up the system. However, when the final user of the funds utilizes the demand deposit created by his borrowing, the possibility for credit creation does arise. It is at this point that major difficulties for European monetary policy may occur, although intermediation may present some less serious problems.

#### D. U.S. Bank Borrowing

Euro-dollar deposits also form the basis for loans by the Eurobanks to U.S. banks. American banks may obtain loanable funds by borrowing Euro-dollars deposited in their European branches. They may also instruct their branches to borrow Euro-dollars from the Eurobanks and then lend them

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<sup>32</sup>This is a source of confusion for many writers, including Scott, op. cit., pp. 9-10. The Wall Street Journal writers also make this error, speaking of the "multiplier effect" and illustrating it with an example of interbank transactions. See "Central Banks Ponder...", op. cit. p. 1.

to the home office.<sup>33</sup>

As noted earlier, the advantages of borrowing these funds arose primarily from their availability and reserve-free nature. While Euro-dollars were relatively expensive to borrow, they provided a source of loanable funds in 1966 and 1969 when other sources were limited by restrictive Federal Reserve monetary policies. For instance, the Federal Reserve imposed relatively low interest rate ceilings on certificates of deposit in these years. By so doing, and with similar money market instruments yielding high rates, a substantial run-off of CD's occurred as they matured.

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<sup>33</sup>U.S. banks without branches abroad may, of course, obtain dollar loans directly from foreign banks and these loans are also exempt from reserve requirements. However, branch borrowing allows a broader access to the market, is more convenient, and is perhaps cheaper in the long run. Also, "...it allows access to a much larger volume of funds than most banks can or would wish to secure through borrowings abroad. And only the larger banks in the U.S. have the credit standing that would enable them to obtain sizable balances from foreign banks." These are the very banks who have branches in Europe already. Fred Klopstock, "Euro-Dollars in the Liquidity and Reserve Management of United States Banks," in Essays in Domestic and International Finance (New York: Federal Reserve Bank of New York, 1969), p. 80.

The banks, faced with a decline in outstanding time deposits and increased required reserves (as time deposits were transformed into demand deposits), turned to their European branches in an attempt to mitigate the contractionary effects of these changes.

The banks first used the Euro-dollar market as a substantial source of funds in the 1966 tight money period. However, the length of this period was so short that borrowing rose to only a bit more than \$4 billion. In contrast, in 1969, liabilities to foreign branches reached almost \$15 billion as CD's outstanding declined drastically.<sup>34</sup>

As noted above, the value of Euro-dollars to U.S. banks derived partly from the fact that they did not require the maintenance of reserves. Rather than being classified as deposits, the funds obtained from foreign branches and banks

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<sup>34</sup>See "Liabilities of U.S. Banks to Their Foreign Branches," Federal Reserve Bulletin, Vol. 54, No. 5 (May, 1968), p. A-104 and "Assets and Liabilities of Large Commercial Banks, 1969," Federal Reserve Bulletin, Vol. 56, No. 3 (March, 1970), p. A-102.

were classified as non-deposit liabilities. No reserves were required on these liabilities until September, 1969. After this, first a 10% and then a 20% reserve was required on borrowings above a base amount.<sup>35</sup> The 10% marginal reserve requirement was successful in tempering the borrowing by U.S. banks of Euro-dollars. However, the easing of money in 1970 and the consequent decline in domestic interest rates were probably more important determinants of the reduction in Euro-dollar liabilities outstanding at U.S. banks.<sup>36</sup> Indeed, the increase to 20% in

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<sup>35</sup>See Andrew Brimmer, Euro-Dollar Flows and the Efficiency of U.S. Monetary Policy, paper presented before a Conference on Wall Street and the Economy '69 at the New School for Social Research, March 8, 1969, pp. 15-17, for an insight into his thinking prior to the imposition of the marginal reserve requirements.

<sup>36</sup>An excellent review of these developments from the standpoint of U.S. banks may be found in "Eurodollar Banking Today," First National City Bank Monthly Economic Letter (July, 1970), pp. 78-81.

the marginal reserve requirements (in December, 1970) was undertaken in an attempt to moderate the return flows of dollars to Europe. The repayment of Euro-dollar liabilities by U.S. banks had begun to have serious effects on the U.S. balance of payments. By increasing the reserve requirements, the Federal Reserve was attempting to make more attractive the maintenance of a large reserve-free borrowing base. The base declines as Euro-dollar loans are repaid. By encouraging the banks to maintain their Euro-dollar borrowing levels, the Federal Reserve hoped to moderate the outflow of dollars from the United States and thus moderate the effects of such outflows on the balance of payments.<sup>37</sup>

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<sup>37</sup>"Reserve Reduces Discount Rate to 5½% from 5 3/4%; Moves to Slow Banks' Repayment of Eurodollar Loans," Wall Street Journal (December 1, 1970), p. 3; Tilford Gaines, "The Dollar?" Manufacturers Hanover Trust Economic Report (December, 1970), p. 1.

The logic of this action is somewhat obscure. The 10% marginal reserve requirement was instituted to reduce Euro-dollar borrowings, yet the higher 20% requirement was instituted to encourage the maintenance of these borrowings. While the base declines as Euro-dollar borrowings are repaid, the cost of maintaining the base was such that there was little incentive to retain high base levels. Further, added borrowing above the base would be subject to the reserve requirements. Thus, no matter what Euro-dollar borrowing level was maintained, additional borrowing would generally be subject to reserve requirements. This explains the failure of this Federal Reserve policy and also points out the difficulties inherent in attempting to use one policy tool to solve two different problems. The 10% reserve requirement was aimed at solving a domestic monetary policy leakage and

The mechanics of U.S. bank borrowing may be illustrated as follows.<sup>38</sup> A U.S. bank, desiring loanable funds, instructs its London branch to bid for a certain amount of Euro-dollars. While these funds may be gained directly from depositors, the amounts desired may be so large and so immediately required that the branch must enter the inter-bank Euro-dollar market. Amounts transferred in the market are quite sizeable, usually in \$1 million blocks.<sup>39</sup>

The U.S. branch, then, bids in the market for a certain amount of Euro-dollars, frequently through an agent so that the U.S. bank will not get a claim on its own demand deposits.<sup>40</sup> Gaining such a deposit would reduce

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the 20% rate was aimed at solving a conflicting foreign monetary policy goal. If the reserve requirement was successful in solving the domestic problem it certainly couldn't be strengthened and be expected to generate the opposite results.

<sup>38</sup>A particularly comprehensive exposition on U.S. bank borrowing of Euro-dollars may be found in Klopstock, "Euro-Dollars in the Liquidity...", op. cit., pp. 72-80.

<sup>39</sup>Clendenning, op. cit., p. 9.

<sup>40</sup>Bloch, op. cit., p. 21n.

considerably the value of the loan since only the reserves previously held on the demand deposit would then become available to the bank. Paying 10% interest to obtain \$100 of loanable funds, for example, is, in the context of money market rates in the 1960's, an expensive price to pay for funds. To pay this rate on the amount borrowed and obtain the use of only \$17.50 (the amount of reserves freed) would approximate a 60% rate of interest and be, to say the least, a rather expensive source on which to rely.

Once title to the funds is obtained, the branch transfers it to the head office in the United States. The draft is placed in the clearing system and the reserves of the bank borrowing the funds are increased by the amount of the loan. The reserves of the bank on which the draft was drawn are reduced by the same amount. The losing bank finds its deposits and reserves reduced by a certain amount and the gaining bank experiences an increase in its total reserves in that amount. The decline in required reserves of the losing bank is not immediately offset by an increase in the required reserves of the gaining bank. Instead, reserve balances that were previously required because of deposits outstanding have become, temporarily, excess reserves. The deposit on which the reserves were kept has been extinguished, replaced by a liability to a

foreign branch that does not require reserves. Euro-dollar borrowing by large U.S. banks does not increase the total amount of reserves in the U.S. monetary system nor does it generally increase the total money supply. As will be noted later, the borrowing does, however, allow an expansion of the loan portfolio of the borrowing bank by amounts larger than the loans recalled by the losing bank. Euro-dollar borrowing, then, redistributes reserves and loan assets away from those U.S. banks who do not use the market due to cost or information considerations and to banks that do use the market.<sup>41</sup>

Borrowing by U.S. banks reduces the amount of possible credit creation in the Euro-dollar system. This occurs because such borrowing represents a leakage of reserves out of the system. The greater is U.S. bank borrowing, the greater the leakage and the lower the possible money multiplier in the Euro-dollar system.<sup>42</sup> Euro-dollar

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<sup>41</sup>Brimmer, op. cit., pp. 4-6; Leimone, op. cit., p. 4; Klopstock, "Euro-Dollars in the Liquidity...", op. cit., pp. 79-80. Also see note 33.

<sup>42</sup>See Chapter 3 for an explanation of the leakages that affect the Euro-dollar system's ability to create money. The money equation taking into account the various leakages is presented there.



borrowing by U.S. banks, then, has a contractionary effect on the Euro-dollar system. However, the rise in yields associated with the increased demand for Euro-dollars by U.S. banks has brought out greatly increased supplies of dollars and appears to indicate that Euro-dollar supply is fairly price elastic.<sup>43</sup> This means that the contractionary effect of U.S. borrowing may be offset by additional flows of funds into the Euro-dollar system.

Figure 4 illustrates the borrowing of Euro-dollars by Bank A in the United States. In step 1, the Eurobanks accept a dollar deposit and gain a claim on U.S. Bank B. The Eurobanks relend the claim on Bank B to U.S. Bank A's London branch, transforming their asset into a claim on U.S. Bank A's London branch. In step 2, U.S. Bank A's branch lists the Euro-dollar deposit of the Eurobanks as a liability and the claim on U.S. Bank B as an asset. The

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<sup>43</sup>Klopstock, "Euro-Dollars in the Liquidity...", *op. cit.*, p. 73. Swap arrangements between U.S. banks, which will be detailed in later chapters, had the effect of increasing both demand and supply. In these cases, both the demand for Euro-dollar funds and the supply of such funds was artificially inflated. In this sense it can be said that U.S. banks were responsible for the growth in both supply and demand in the Euro-dollar markets. More basically, U.S. bank demand drew additional funds into the system and thus fostered its development.

Figure 4. U.S. Bank Branch Borrowing<sup>a</sup>

| <u>1. Eurobanks</u>                                     |                                    | <u>2. U.S. Bank A London Branch</u>   |  |
|---|------------------------------------|---------------------------------------|--|
| + Deposit at<br>U.S. Bank B                             | +E\$ Deposit                       | +Deposit at<br>U.S. Bank B            | +E\$ Deposit<br>of Euro-<br>banks  |
| <u>which becomes</u>                                    |                                    | <u>which becomes</u>                  |  |
| +E\$ Deposit<br>at U.S.<br>Bank A's<br>London<br>Branch |                                    | +Due from<br>Home Office              |  |
| <u>3. U.S. Bank A</u>                                   |                                    | <u>4. U.S. Bank B</u>                 |  |
| +Deposit at<br>Bank B                                   | +Liability to<br>Foreign<br>Branch | Reserves and<br>Assets                | Deposit due,<br>first Euro-<br>pean, then<br>Eurobanks,<br>then Bank A's<br>branch, then<br>Bank A |
| <u>which becomes</u>                                    |                                    | <u>which becomes</u>                  | <u>which becomes</u>   |
| +Temporary<br>Excess<br>Reserves                        |                                    | -Reserves<br>(17% Req.<br>83% Excess) | -Deposit<br>Liability  |
|   |                                    | or                                    |  |
|   |                                    | -Assets (83%)<br>-Res. (17%)          |  |

a) Prior to reserve requirements or within the reserve-free base.

claim on Bank B is transferred to the home office and its asset is transformed into a loan to home office. In step 3, U.S. Bank A, having obtained title to the claim on Bank B, records the transfer from its branch as a non-deposit liability to its foreign branch. The claim on Bank B is placed in the clearing mechanism and Bank A is credited with the amount of the draft. The reserves gained by this action are initially excess reserves because Bank A need hold no reserves on its liabilities to foreign branches.

The net result of these transactions is that the reserves previously held by Bank B are now held by Bank A. At this point the money supply has contracted by the amount of the Euro-dollar borrowing. However, Bank A may be expected to transform its excess reserves into loans and create a demand deposit. This deposit will be equal to the deposit destroyed at Bank B.

The entire banking system is affected in a somewhat different way. Basically, when the lending bank loses reserves and sells assets to replenish these balances (assuming no excess reserves), it causes a multiple contraction in the amount of deposits outstanding in the banking system. However, the borrowing bank offsets this contraction by lending out the amount of its excess reserves, generating a multiple expansion of deposits in

the system. The net effect on the money supply is zero. The non-deposit liability that is created by the Euro-dollar borrowing adds to the entries on the liabilities side of the ledger. Offsetting this is a net increase in loans outstanding. While loans contract due to Bank B's actions, they expand due to Bank A's actions. As shown in Figure 5, a net increase in loans equal to the amount of the Euro-dollar borrowing has occurred. These loans are balanced by increased non-deposit (non-money) liabilities on the liability side of the bank statement. Thus, Euro-dollar borrowing does not affect the money supply but it does affect the magnitude of loans that the banking system can extend. This result has important implications for credit policy and will be analyzed in later chapters.

Figure 5. U.S. Bank Euro-dollar Borrowing-System Effects

| Source Bank   |                | Receiving Banks |                 |
|---------------|----------------|-----------------|-----------------|
| -100 Reserves | -100 Dem. Dep. | +100 Reserves   | +100 Non-Dep.   |
| -400 Loans    | -400 Dem. Dep. | +500 Loans      | Liability-E\$s  |
|               |                |                 | +500 Dem. Deps. |

$r = 20\%$

Net Increase in Loans = 100  
Net Change in Dem. Deps. = 0

### E. Money Creation and Leakages from the System

Basic to money creation in the United States is the existence of a fractional reserve system and the redeposit of funds lent out by the banks. The greater the leakages from the system (into hand-to-hand currency, for instance) and the higher the required reserve ratio, the less credit creation can occur. In the Euro-dollar system, credit creation may result if the final borrower (omitting intermediation) uses his funds to pay debts to those who re-deposit the funds into the Euro-dollar system. The possibility of payments to those outside the system (i.e., to U.S. creditors or to creditors who convert the funds into domestic currency derived from a central bank that does not return the funds to the Euro-dollar system), means that leakages from the system can occur and credit creation will be halted.

In the U.S. system, leakages are small and, for the most part, identifiable. In the Euro-dollar system, on the other hand, leakages frequently occur on a large scale and are not as easily predicted. In the past, this was due to the fact that the market existed primarily to supply funds to debtors of U.S. creditors or to supply a currency that could be readily converted into the domestic currency required by the borrower. As the system developed, however,

the currency of the system came to be accepted for itself rather than as a vehicle convertible into domestic currency or usable only to pay U.S. debts. Further, as European central banks reached the point where they considered their dollar reserves adequate, these banks followed the policy of returning (or recycling) to the Euro-dollar market dollars gained in foreign exchange market stabilization operations.<sup>44</sup>

Payments have come to be made more and more in Euro-dollars and redeposited as is by receivers. Leakages formerly arising from central bank reserve accumulation have also been reduced drastically. Finally, purchasers of dollars on the foreign exchange markets have frequently placed their funds in Euro-dollar accounts. Thus, while a closed system similar to the U.S. monetary system has not been created, there has certainly developed one where fewer leakages occur.

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<sup>44</sup>The policy of recycling and its effects will be dealt with in later chapters. An indication of the dawning realization that such recycling has expanded Euro-dollar deposits may be found in "European Bankers Planning to Manipulate Dollar Supplies: Washington Seen Uneasy," Wall Street Journal (April 7, 1971), p. 4; "Europe's Central Banks Agree to Withdraw Funds in Bid to Control Eurodollar Market," Wall Street Journal (June 15, 1971), p. 5; "Reserve Board Isn't Studying Added Control Over Eurodollar Market, Daane Asserts," Wall Street Journal (May 27, 1971), p. 7.

Leakages may also be caused by the maintenance of reserves by the Eurobanks. However, since there are few regulations requiring reserves on Euro-dollar deposits, only small levels of reserves for working balances and safety purposes are kept.<sup>45</sup> The existence of foreign exchange markets in which dollars can be obtained with little difficulty obviates the need for the maintenance of reserves (of dollars) in any real amounts. This does not mean, necessarily, that no reserves of any kind are kept but rather that specific dollar reserves are not required for safety.

The process of money creation may be illustrated with a table similar to those used in explaining the credit creation process in the U.S. monetary system. Assume an exporter to the U.S. deposits into a dollar denominated account a claim on a deposit in a U.S. bank. This primary deposit<sup>46</sup> adds to the Eurobank's dollar reserves. The

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<sup>45</sup>Williams, op. cit., pp. 16-17.

<sup>46</sup>A primary deposit is one that increases total deposit liabilities and total cash reserves of the monetary system. A derivative deposit is one that derives from the extension of credit by the banks of the system and increases only total deposit liabilities, not cash reserves. Thus, a primary deposit represents an infusion of reserves into the system, and a derivative deposit evidence of the relending of funds within a fractional reserve system. The distinction, while

Eurobank then creates and lends to a non-bank borrower a Euro-dollar demand deposit equal to 90% of the funds obtained. The bank retains a 10% working and precautionary reserve. The borrower pays a debt to another European by drawing a check on or similarly transferring ownership of the Euro-dollar deposit lent to him. The receiver redeposits the funds in a dollar account, allowing his Eurobank to relend 90% of these funds to another borrower. Thus, credit creation has occurred and, as long as the Euro-dollars are not used to pay a creditor outside the Euro-dollar system, the credit creation chain continues. Even if they do find their way out of the system after three or four circuits, there has still been an expansion in the total supply of Euro-dollars.

As Figure 6 indicates, a primary deposit of \$1,000 results in an addition to the stock of Euro-dollar deposits of E\$3,439, of which E\$1,000 is the original deposit and

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theoretically sound, is empirically extremely difficult to observe. This is one reason why the preponderance of international bankers have been loath to accept the possibility of credit creation in the Euro-dollar market. To them, there are no derivative deposits and evidence to the contrary is not readily available. See Machlup, "Euro-Dollar Creation...", op. cit., p. 237, and Klopstock, "Money Creation in ...," loc. cit.



Figure 6. Euro-dollar Creation

| Bank       | (1)<br>Deposits<br>Received | (2)<br>Reserves<br>Retained<br>(10%) | (3)<br>Loans |
|------------|-----------------------------|--------------------------------------|--------------|
| Eurobank A | E\$ 1,000*                  | E\$ 100                              | E\$ 900      |
| Eurobank B | 900                         | 90                                   | 810          |
| Eurobank C | 810                         | 81                                   | 729          |
| Eurobank D | <u>729</u>                  | <u>73</u>                            | <u>656</u>   |
| Totals     | 3,439                       | 344                                  | 3,095        |

\*Primary Deposit. All further deposits are derivative deposits.

E\$2,439 the new money created based upon the new reserves gained with the initial (primary) deposit. The loan made by Eurobank D is used to pay a debt to the U.S. and thus \$656 of reserves leak out of the system. This halts further Euro-dollar creation. Had there been no payment to receivers outside the system, the money multiplier of 10 would have been operational and for every \$1,000 deposited a total of E\$10,000 of new deposits (E\$9,000 derivative, E\$1,000 original) would have resulted. As it is, the multiplier here is about 3.4. Generally, as long as there is at least one redeposit into the system, a positive amount of Euro-dollars can be created.

Theoretically, the Euro-dollar money multiplier could be infinite, for there are often no official reserve requirements on Euro-dollar deposits in the European

countries. However, it is unrealistic to postulate such a situation because banks will, in prudence, maintain some reserves.<sup>47</sup> Further, substantial leakages out of the system and into other domestic systems will normally occur, reducing the possible multiplier.

Finally, U.S. bank borrowing from the Euro-dollar system generates a leakage from the system. This occurs because funds are taken out of the system for use in another system rather than redeposited within the Euro-dollar system. However, as the demand for Euro-dollars expands (shifts out) due to the added demanders in the market, the resulting increased price (interest rate) induces Euro-banks and others to transform some of their European domestic currency assets into dollar assets via the foreign exchange market. Thus, the European central bank concerned will be required to supply dollars to the system out of their reserves. Taken together, these responses appear to indicate that the Euro-dollar supply curve is fairly price elastic.<sup>48</sup>

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<sup>47</sup>Williams, loc. cit.

<sup>48</sup>Klopstock, "Euro-Dollars in the Liquidity...", loc. cit.

To the extent that the central banks find it necessary to utilize their dollar reserves to fund these asset transformations, the leakage deriving from U.S. bank borrowing is offset by what are essentially new primary deposits from the central banks. U.S. bank Euro-dollar borrowing thus sometimes forces central banks to take actions which they may have preferred not to.

There is little difference between U.S. bank borrowing of Euro-dollars and U.S. bank borrowing of U.S. demand deposits held by European banks. In both instances what is borrowed is European banks' claims on U.S. demand deposits. The difference is the origin of these claims and how they are viewed by the holding bank. Dollar denominated deposits are issued to individuals and non-bank corporations by European banks in exchange for claims on demand deposits of U.S. banks. These deposits in European banks are Euro-dollars and are liabilities of the Eurobanks, the reserves of which are the demand deposits in U.S. banks. When Euro-dollars are then borrowed by U.S. banks, what is really borrowed are the reserves of the Euro-dollar system or the assets obtained in return for the Euro-dollar liability

issued to the depositor.<sup>49</sup> When U.S. bank deposits held by European banks are borrowed by U.S. banks, it is not Eurobank reserves that are borrowed but rather a different category of asset. U.S. banks are borrowing what to them are the same thing but are to the European banks different things. In one case, it is a reserve asset that is borrowed. In the other, it is an investment, working balance asset, or recently transformed U.S. money market asset (Treasury Bills for example) that is borrowed.

To summarize, U.S. bank borrowing of funds in Europe constitutes a leakage from the Euro-dollar system, either actual or potential, and as such, reduces the money creation possibilities in the system. Nonetheless, offsets to this borrowing occur both in the form of direct foreign central bank infusions into the system or indirect central bank infusions through the financing of the conversion of European domestic currency assets into Euro-dollar deposits.

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<sup>49</sup> This situation has caused many to draw a parallel between the Euro-dollar system and the Federal Funds market in the United States. The comparison is questionable. See Scott, op. cit., pp. 7-9. Machlup, "Euro-Dollar Creation ... ," op. cit., pp. 231-234 refutes the comparison.

Other leakages result from the interconnectedness of the Euro-dollar system with domestic monetary systems. Even with the leakages, however, Euro-dollar credit creation can occur.

The creation of Euro-dollars in Europe has no effect on the U.S. monetary system except to the extent that foreign central bank dollar reserves may be pulled into the U.S. monetary system, expanding the reserve base in the United States and, potentially, the money supply. In the U.S. system, the Eurobanks serve only as intermediaries between borrowing American banks and (reluctant) lending American banks. There is no creation by the Eurobanks of U.S. deposits. U.S. banks borrow Eurobanks' reserves (assets) while Europeans and others borrow Eurobank liabilities. Eurobanks can create their liabilities but they can not create their reserve assets. In the same way, U.S. banks can create their liabilities but not their reserves. The Eurobanks can borrow their reserves from their reserve creator (U.S. banks) or from other Eurobanks. They can also convert their assets into these reserves (through the foreign exchange market).

Generally, then, the primary consequences of the existence and operation of the system influence Europe, not the United States, and make much more difficult the

execution there of effective monetary policy contrary to  
U.S. monetary policy.

## CHAPTER III

### SUPPLY AND DEMAND

#### I. Introduction

The purpose of this chapter is to indicate the major theoretical determinants of the demand for and supply of Euro-dollars. Primary emphasis will be placed on the factors that have influenced U.S. bank demand for Euro-dollars but an outline of the major sources of demand in general will also be included. Likewise, the main concern with Euro-dollar supply is the sources of the funds that are lent to U.S. banks. However, a brief discussion of the factors influencing the supply of funds generally will also be undertaken.

Section II discusses the Euro-dollar market and delineates the various factors that influence the demand for Euro-dollars generally and the determinants of U.S. bank demand specifically. Section III presents the determinants of the supply of funds to the Euro-dollar market and concludes with a recapitulation of the main points of the analysis.

## II. Demand in the Euro-dollar Market

### A. The Euro-dollar Market

As detailed in Chapter 2, there is a significant difference between the concept of a market and of a system. A market, recall, is a meeting between those who wish to lend, sell, or otherwise dispose of their goods or purchasing power and those who wish to borrow, buy, or otherwise gain control over goods or purchasing power. A market reflects the supply and demand influences that are manifested in the quotation of prices (including interest rates) and involves measurements of the amount of the good traded over a certain period of time. A system, on the other hand, involves a much broader range of activities and measurements than the trading of goods or purchasing power. As such, it includes, but is not limited to, market activities.

The Euro-dollar system contains within it a market where the money produced by the system and the reserves it utilizes are exchanged.<sup>1</sup> This market for funds plays the

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<sup>1</sup>This market has no physical setting as such. Rather, it is made up of numerous geographically separated suppliers and demanders and their agents who, via various telecommunication devices, remain in constant contact with one another. In the same way, the U.S. money market has no physical trading floor as do the various U.S. stock exchanges, for example. It may be noted that as New York



same role in the Euro-dollar system that the U.S. money market plays in the U.S. monetary system. The Euro-dollar market reflects the various monetary pressures that occur throughout both the Euro-dollar system and many national systems in the same way that pressures arising within the U.S. monetary system are reflected in the U.S. money market. The strong and complex pressures that occur in a multitude of national monetary systems and in the international exchange markets pyramid to and are concentrated in the Euro-dollar market, generating wide fluctuations in the interest rates prevailing there.

The Euro-dollar market has, until recently, been remarkably free of direct governmental interferences. However, governmental intervention and structural rigidities in both national money markets and the international payments system have been responsible for a substantial portion of the increased activity in the market. Thus, while the market itself has been generally free of interferences, governmental intervention in other markets has been felt in this market. The link between national

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is the primary center of the U.S. money market, so is London the main location of the agents through which Euro-dollar funds are channelled. See, among others, Saunders, op. cit., pp. 21-24; Scott, op. cit., p. 3; Clendenning, op. cit., pp. 5-8.

systems that the present exchange rate system provides has facilitated the transmission of demand and supply pressures in one market to the Euro-dollar market and through the Euro-dollar market to other national money markets and systems.<sup>2</sup>

Supply and demand factors operating within the Euro-dollar market are definable and of substantial importance, but the pressures arising outside the system also play a significant role in the operation of the market. One of the external factors that has greatly influenced the Euro-dollar market, both with regard to interest rates and with regard to the amount of activity, has been U.S. bank borrowing and subsequent repayment of dollar balances. Indeed, the entry into the Euro-dollar market by U.S. banks as large scale demanders and their later exit as they undertook massive repayments had profound effects on the market. These effects are delineated below.

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<sup>2</sup>As will be detailed later, it may be said that the Euro-dollar system and the market through which it works have formed a bridge over the barriers that were erected between national systems in order that external occurrences would not influence domestic economies. In other words, the system of fixed exchange rates and the ancillary institutions that were set up after World War II and which were to act as a barrier to the export of recession, for instance, has been overruled by the Euro-dollar system. The operation of the Euro-dollar system, although quite different, has had many of the same effects as those which were associated with the operation of the gold standard in the last century.

To conclude, the Euro-dollar market is unusual in that it is pressures and interferences originating outside the Euro-dollar system that have the most powerful effects on the operation of the market. These factors have, in essence, generated both an increased demand for and an increased supply of loanable funds in the market.

#### B. General Demand Considerations

The demand for any good, including money, is based upon the expected utility to be gained from the possession and use of the good. Given the expected utility, a rational purchaser or borrower determines the quantity of the good he will purchase or borrow based upon the price of the good, the price of complementary and substitutable goods, expectations about future prices, and a host of other considerations. The borrower of Euro-dollars is not particularly distinguishable from the borrower of any other currency or good, as such. He desires to obtain purchasing power and is motivated by the same considerations as other borrowers. Indeed, the Euro-dollar borrower is not concerned with the form that the borrowed purchasing power takes because he may convert the funds obtained in the foreign exchange markets, should he so wish. If this is necessary, transactions costs will be incurred. These costs are then added to the other factors the borrower must take into consideration. The Euro-dollar borrower compares the costs

and benefits associated with borrowing purchasing power in this market with those costs and benefits associated with borrowing in other markets and determines the amount he wishes to demand. He is no different than any other borrower of loanable funds although some of the considerations he must weigh may be.

Euro-dollar borrowing occurs in a market that is generally free of rigidities and imperfections. The market has been available to all entrants (of sufficient credit worthiness<sup>3</sup>) and has been fiercely competitive. It has provided an outlet for demanders whose motivations have ranged from a desire to overcome a scarcity of funds in the domestic country, to bypass the oligopolistic banks of a particular country, or to obtain a supposedly superior form of transactions currency. It would be a mistake to dismiss the market as one that feeds funds to borrowers only when all other sources have vanished. It is not generally a last resort source of funds any more than the commercial paper market in the United States, for example, is a last resort for large U.S. businesses.

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<sup>3</sup>There has been some controversy surrounding the criteria utilized for determining the credit worthiness of Euro-dollar borrowers. See "Easing of Criteria in International Lending Hit by Bankers at Foreign Trade Meeting," Wall Street Journal (April 27, 1971), p. 9; "Eurodollar Banking: ...?" op. cit., pp. 14-15.

Rather, the Euro-dollar market is an alternative source of funds for borrowers. A borrower will consider the Euro-dollar market as one of many possible sources of purchasing power.

### C. Market Participants and Their Motives

The specific demanders who have entered the Euro-dollar market include large non-financial corporations, both with and without operations in other countries, private financial institutions, including commercial banks both in the United States and abroad, importers and exporters in foreign countries, official and international financial institutions, speculators, and securities brokers and dealers. All of these demanders normally have access to various alternative sources of funds and their demand for Euro-dollar balances is influenced by the alternative costs of these different sources and by their concern for the maintenance of these sources.<sup>4</sup>

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<sup>4</sup>This concern was, of course, behind the imposition of marginal reserve requirements on Euro-dollar borrowings by the U.S. banks from their branches (10%) instituted by the Federal Reserve. By creating a base above which reserves were required, the Federal Reserve increased the cost of further borrowings by the banks. At the same time the base acted as a floor, below which the banks would theoretically not want to go since, should they do so, their reserve-free base would decline. However, experience in 1970 and 1971 would seem to indicate that the desire to maintain the base was not as strong an incentive to hold Euro-dollar borrowings as the higher cost associated with maintaining these borrowings was a detriment. Even the imposition of higher marginal reserve requirements (20%)

The primary concern in this study is with the borrowing of Euro-dollars by U.S. banks. This particular group of borrowers entered the Euro-dollar market in the 1960's both because of the limited availability and consequent high cost of funds in the United States at certain stages of the business cycle and because of the technical advantages that such entry (and borrowing) involved for reserve computation.<sup>5</sup>

Limited availability of funds has arisen in boom periods, when the Federal Reserve has attempted through tight money policies to restrict the availability of reserves and deposits to the banks. In these situations and with businesses and others demanding large amount of funds

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in late 1970, and changes in the computation of the base did not halt the rapid decline (pay-off) in Euro-dollar borrowings outstanding. Indeed, the Export-Import Bank and the Treasury were forced in 1971 to issue debt securities to soak up the flow of returning (to Europe) Euro-dollars since this flow was severely affecting the balance of payments. These securities, besides paying an interest return, can be used to satisfy the marginal reserve requirements on Euro-dollar borrowings above the base and, thus, effectively reduce the cost of maintaining a given level of borrowings. See, on this subject, Chapter 6 and "Treasury Slates Offering...", loc. cit.; "The Money and Bond Markets in January," Federal Reserve Bank of New York Monthly Review, Vol. 53, No. 2 (February, 1971), p. 33; "Change in Discount Rate," Federal Reserve Bulletin, Vol. 56, No. 12 (December, 1970), p. 963; Coombs, "Treasury and Federal Reserve Operations," op. cit., p. 47; "The Uneven Retreat in World Interest Rates," First National City Bank Monthly Economic Letter (March, 1971), p. 15; and "Reserve... Moves to Slow Banks' Repayment of Euro-dollar Loans," Wall Street Journal (December 1, 1970), p. 3.

<sup>5</sup>Williams, op. cit., pp. 25-29 includes a comprehensive calculation of the costs of Euro-dollar borrowing by

due to the boom conditions, U.S. banks have looked to non-U.S. sources of loanable funds to offset the reserve stringencies imposed by the Federal Reserve. These sources, of which the Euro-dollar market has been of primary importance, were generally utilized only when U.S. funds were scarce. Only the scarcity of funds and consequent high cost of such funds made it economic for U.S. banks to tap the Euro-dollar market for funds. The Euro-dollar market provides large quantities of loanable funds but only at rather high interest rates, by U.S. standards. Thus, the Euro-dollar market generally becomes a feasible alternative as a source of funds only when rates in the U.S. rise to high levels.

Additional incentives to borrow in the Euro-dollar market also existed prior to August, 1969. While the nominal cost of such funds was high, technical considerations increased the value of borrowing such funds. These factors included the reserve free nature of borrowings from foreign branches and the opportunity afforded by such borrowing to reduce required reserves through increases in cash items in process of collection, a deductible item when computing required reserves. Both these factors

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U.S. banks and non-bank businesses. As will be detailed later, Euro-dollar borrowing reduced required reserves of the borrowing bank because these cash items in process of collection were deductible from required reserves prior to August, 1969. This advantage is different from that gained by borrowing funds from foreign branches and transforming that deposit into a non-reserve liability to foreign branch, again, non-reserve prior to August, 1969.

increased the value of Euro-dollar borrowings and lowered the level to which U.S. rates had to rise before Euro-dollar borrowing became profitable. Indeed, through the judicious use of swap arrangements with other large U.S. banks, a constant reduction in reserve requirements could be obtained at almost no cost to either bank.

The Euro-dollar system provides an escape valve through which U.S. banks have been able to avoid some of the reserve stringencies imposed on them by the Federal Reserve. In these times, Euro-dollar borrowing increased by substantial amounts. The banks have thus been able to maintain or expand their loan portfolios during tight money periods. Banks without access to the Euro-dollar market, of course, have not been as readily able to avoid the effects of tight money.

In addition to the availability and reserves benefits derived from Euro-dollar borrowing, a third motive has impelled U.S. banks to enter the market. They have done so in order to defend themselves from reserve losses to other banks who are borrowing Euro-dollars.<sup>6</sup> Thus, for defensive as well as for simple source reasons numerous

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<sup>6</sup>A redistribution of reserves between U.S. banks with access to the Euro-dollar market and those without such access may have occurred, with effects on the impact of monetary policy within the U.S. and competitive conditions in the financial sector. These effects will be discussed in Chapter 6.



banks have found it necessary and desirable to establish branches in Europe and elsewhere (or to borrow directly from European banks).<sup>7</sup> Table 1 indicates the growth in the number of branches these banks maintain there and the rise in the number of banks having branches.

As more banks have entered the market, demand for Euro-dollars has increased, but much of this increased demand has caused nothing but additional churning of the market with little or no real change in the distribution of bank reserves, at least among large U.S. banks with branches. The result of such defensive borrowings by U.S. banks may then be higher Euro-dollar interest rates due to the increased demand but no real change in the distribution of available reserves in the U.S.<sup>8</sup> There may be, of course, a redistribution of reserves between the large banks with branches and banks that do not have branches or direct foreign lending sources.

The demand for Euro-dollars arising from borrowers

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<sup>7</sup>John Leimone, "The Euro-Dollar Market: An Element in Monetary Policy," Federal Reserve Bank of Atlanta Monthly Review, Vol. 53, No. 8 (August, 1968), pp. 1-2.

<sup>8</sup>This is not the view taken in many Euro-dollar analyses but appears to contain at least a measure of realism. Brimmer, "Euro-Dollar Flows...", op. cit., pp. 3-6 has maintained that this borrowing has caused a redistribution of reserves among U.S. banks. Both possibilities will be explored in Chapter 6.

TABLE I  
FOREIGN BRANCHES OF U.S. FEDERAL RESERVE MEMBER BANKS

| End of Year | Number of U.S. Banks with Foreign Branches | Year to Year Percentage Increase | Number of Branches | Number of Countries in which Branches Occur |
|-------------|--|----------------------------------|--------------------|---|
| 1960        | 8  | -                                | 124                | 33  |
| 1961        | 8  | 0                                | 135                | 35  |
| 1962        | 10   | 25                               | 145                | 39  |
| 1963        | 10   | 0                                | 160                | 42  |
| 1964        | 11   | 10                               | 180                | 45  |
| 1965        | 13   | 18                               | 211                | 50  |
| 1966        | 13   | 0                                | 244                | 53  |
| 1967        | 15   | 15                               | 295                | 54  |
| 1968        | 26   | 73                               | 373                | 57  |
| 1969        | 53   | 96                               | 459                | 60  |
| 1970        | 79   | 50                               | 532                | 66  |

Source: Annual Report (Washington: Board of Governors of the Federal Reserve System, 1960-1970), cited in Williams, op. cit., p. 11.

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other than U.S. banks certainly has significance, for fluctuations in their demand have a good deal to do with the rate that is quoted on these funds. However, for the most part, U.S. bank demand for Euro-dollars has been the overriding factor in the market, at least in the years from 1966 to 1970.<sup>9</sup>

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<sup>9</sup>Scott, op. cit., p. 7; Williams, op. cit., pp. 10-11; "Euro-Dollars: A Changing Market," op. cit., pp. 771-775; and "The Money Machine Magic of Eurodollars, Business Week, No. 2112 (February 21, 1970), p. 114. "Eurodollar Banking: ...?" op. cit., p. 12 has noted that the demand for Euro-dollars now comes from Europe. These European demanders

The net amount of Euro-dollar deposits outstanding (exclusive of interbank transactions) was estimated to be \$37.5 billion at the end of 1969 and U.S. bank borrowings to be \$13.5 billion at the same point in time. Over a third of all Euro-dollar balances at the end of 1969, then, were on loan to U.S. banks. (See Table 2.) As was noted in Chapter 2, Euro-dollar loans to U.S. banks are a leakage out of the Euro-dollar system. Since one third of all Euro-dollar deposits outstanding were lent to U.S. banks, more than one third of the Euro-dollar system's reserves were lent to U.S. banks. If there is credit creation in the Euro-dollar system, the remaining deposits are not backed 100% by reserves. In all likelihood, 50% or more of the system's reserves were on loan to U.S. banks, assuming a money multiplier of only 2.<sup>10</sup>

Subsequent to the surge in borrowing by U.S. banks in 1969, Euro-dollar borrowings by these banks declined drastically. This decline was due primarily to the

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have replaced the withdrawing U.S. banks, who previously constituted the major source of demand in the market.

<sup>10</sup> Assume E\$100 deposits outstanding. If \$33 are lent to U.S. banks, that represents a loss of \$33 in reserves to the Euro-dollar system. With \$66 in deposits remaining in the Euro-dollar system and assuming a money multiplier of 2, this requires \$33 in reserves. Therefore, U.S. banks have borrowed half of the Euro-dollar system's reserves (\$33 U.S. loans + \$33 reserves on other deposits = Total Reserves).

TABLE II

EURO-DOLLAR DEPOSITS OUTSTANDING (NET) AND COMPARISON  
WITH U.S. BANK LIABILITIES TO THEIR BRANCHES<sup>5</sup>

| Cumulative sources<br>and uses of Euro-<br>dollars by area | 1964       | 1965       | 1966       | 1967        | 1968        | 1969        | 1970        |
|--|------------|------------|------------|-------------|-------------|-------------|-------------|
| <hr/>  |            |            |            |             |             |             |             |
| Sources  |            |            |            |             |             |             |             |
| Outside area <sup>1</sup>                                  |            |            |            |             |             |             |             |
| U.S. and<br>Canada <sup>6</sup>                            | 1.5        | 1.3        | 1.7        | 2.6         | 4.5         | 6.7         | 4.2         |
| Japan  | ...        | ...        | ...        | ...         | .1          | .4          | [ 20.8 ]    |
| Eastern Europe   | .3         | .3         | .4         | .5          | .6          | 1.0         |             |
| Other  | 2.8        | 3.3        | 4.0        | 4.8         | 6.6         | 10.6        |             |
| Total  | <u>4.6</u> | <u>4.9</u> | <u>6.1</u> | <u>7.9</u>  | <u>11.8</u> | <u>18.7</u> | <u>25.0</u> |
| Inside area  |            |            |            |             |             |             |             |
| Nonbanks   | 1.8        | 2.2        | 2.8        | 3.9         | 5.2         | 9.4         | 9.7         |
| Banks <sup>2</sup>   | 2.6        | 4.4        | 5.6        | 5.7         | 8.0         | 9.2         | 11.3        |
| Total  | <u>4.4</u> | <u>6.6</u> | <u>8.4</u> | <u>9.6</u>  | <u>13.2</u> | <u>18.8</u> | <u>21.0</u> |
| <u>Total</u>   | 9.0        | 11.5       | 14.5       | 17.5        | 25.0        | 37.5        | 46.0        |
| <hr/>  |            |            |            |             |             |             |             |
| Uses   |            |            |            |             |             |             |             |
| Outside area <sup>1</sup>                                  |            |            |            |             |             |             |             |
| U.S. and<br>Canada <sup>6</sup>                            | 2.2        | 2.7        | 5.0        | 5.8         | 10.2        | 17.8        | 12.7        |
| Japan  | .4         | .5         | .6         | 1.0         | 1.7         | 1.5         | [ 15.9 ]    |
| Eastern Europe   | .5         | .5         | .7         | .8          | .9          | 1.0         |             |
| Other  | .9         | 1.5        | 1.9        | 3.0         | 4.2         | 5.5         |             |
| Total  | <u>4.0</u> | <u>5.2</u> | <u>8.2</u> | <u>10.6</u> | <u>17.0</u> | <u>25.8</u> | <u>28.6</u> |
| Inside Area  |            |            |            |             |             |             |             |
| Nonbanks   | 2.3        | 3.3        | 3.7        | 4.1         | 4.7         | 5.6         | 10.1        |
| Banks <sup>3</sup>   | 2.7        | 3.0        | 2.6        | 2.8         | 3.3         | 6.1         | 7.3         |
| Total  | <u>5.0</u> | <u>6.3</u> | <u>6.3</u> | <u>6.9</u>  | <u>8.0</u>  | <u>11.7</u> | <u>17.4</u> |
| <u>Total</u>   | 9.0        | 11.5       | 14.5       | 17.5        | 25.0        | 37.5        | 46.0        |

TABLE II (continued)

|   |      |      |      |      |      |                   |      |
|---|------|------|------|------|------|-------------------|------|
| Liabilities of U.S.<br>banks to Their<br>Foreign Branches | 1.2  | 1.3  | 4.0  | 4.2  | 6.1  | 13.5 <sup>4</sup> | 7.7  |
| Liabilities as per<br>cent of net Size                    | 13.3 | 11.3 | 27.6 | 24.0 | 24.4 | 36.0              | 16.7 |

<sup>1</sup>Banks and nonbanks in all countries except Belgium-Luxembourg, France, West Germany, Italy, the Netherlands, Sweden, Switzerland, and Great Britain.

<sup>2</sup>Amounts converted from other currencies and used for Euro-dollar-type lending, as estimated by BIS; also includes liabilities to central banks and BIS.

<sup>3</sup>Amounts converted to other currencies, as estimated by BIS, excluding Italian banks' conversions to third currencies for relending to nonbank residents (included in nonbank uses).

<sup>4</sup>Peak borrowings were \$14.8 billion at the end of November, 1969.

<sup>5</sup>Estimated, end of year, in billions of U.S. dollar units.

<sup>6</sup>For 1970, U.S. only. Canada included in all other.

Source: 40th Annual Report (Basle: Bank for International Settlements, 1970), p. 158; 41st Annual Report (Basle: Bank for International Settlements, 1971), p. 164; Federal Reserve Bulletin (May, 1968; May, 1969; May, 1970; May, 1971), pp. A 104, A 102, A 102, and A 86 respectively.

imposition of marginal reserve requirements, restrictions on what items might be deducted from required reserves, relatively higher rates of interest in the Euro-dollar market as opposed to the U.S. money market, and the rapidly easing monetary situation in the United States.

Indeed, by mid-1971, Euro-dollar borrowings of U.S. banks had been reduced to less than \$3 billion.<sup>11</sup>

This rapid reduction had serious repercussions on the U.S. balance of payments and caused the Federal Reserve to increase the marginal reserve requirements on Euro-dollar borrowings by U.S. banks in an attempt to slow the banks' net repayment of loans. This action may be viewed as a contribution to the banks' demand for Euro-dollars since its desired effect was to encourage U.S. banks to maintain their Euro-dollar borrowings.<sup>12</sup> Further,

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<sup>11</sup>Coombs, op. cit., p. 47; Federal Reserve Bulletin, Vol. 57, No. 5 (May, 1971), p. A30; Salomon Brothers Bond Market Roundup (June 18, 1971), p. 2. The equations formulated in the next chapter do not predict this decline particularly well. This may be explained by the changed structure prevailing in 1971 and the exchange rate instability that has distorted the market.

<sup>12</sup>This policy did not work because cost considerations swamped any attraction the maintenance of a larger base might have had. Given the marginal nature of the Euro-dollar market to U.S. banks, they could not be expected to retain high levels of Euro-dollar borrowings in the face of major interest rate declines and increased money availability in the U.S. The value of the Euro-dollar market to the banks lay in the availability of funds in time of need, not as a general source of funds. It was a temporary alternative when U.S. generated funds were unavailable.

The maintenance of a reserve free base would not allow the banks to increase their borrowings when the need arose. See Andrew Brimmer, "Euro-Dollar Flows...", op. cit., pp. 17-21 and Williams, op. cit., pp. 26-28 for an analysis of the costs associated with Euro-dollar borrowing before and after the reserve requirements were instituted. Tilford Gaines has also discussed the entire concept of marginal reserve requirements in "Public Policy Issues," op. cit., pp. 3-4 and in "The Dollar?" op. cit., p. 1.

the Treasury and the Export-Import Bank acted to soak up some of these returning flows through issuance of several billion dollars of securities, usable by the U.S. branches in meeting their reserve requirements.<sup>13</sup>

In addition to the demand originating from U.S. banks, other participants such as multinational and national corporations, importers and exporters, and speculators, foreign central banks, and governments have often entered the market on the demand side as their need for funds or policy requirements dictated. For instance, central banks have purchased Euro-dollars from time to time in order to stabilize the foreign exchange markets.<sup>14</sup> The Swiss and German central banks especially have found this action necessary at the end of each quarter and at the end of the year in order to offset the effects of window dressing operations undertaken by commercial banks under their jurisdiction. Frequently, some type of swap

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<sup>13</sup>See note 5, this chapter. Recently, to soak up excess dollar funds that are not now being placed or recycled in the Euro-dollar market, the U.S. Treasury issued more non-marketable notes to the German Bundesbank. While this note issuance has occurred intermittently over the last decade, these notes were specifically designed to absorb funds that otherwise would have been invested in the Euro-dollar system or redeemed for marks or gold. See "Bundesbank Will Buy U.S. Notes as Treasury Bids to Absorb More Dollars," Wall Street Journal (June 29, 1971), p. 2; "Europe's Central Banks Agree to Withdraw Funds...", loc. cit.

<sup>14</sup>"Euro-dollars: A Changing Market," op. cit., pp. 767-768, 771.

arrangement is entered into, with the transaction being reversed shortly after the statement date passes.<sup>15</sup>

Also, central banks have on occasion entered the market as demanders when they have found it necessary to add dollar balances to their reserves. The first operation (maintaining orderly markets) is an accommodative one while the latter is undertaken because the bank itself needs dollar balances. However, the availability of credit via swap lines with other central banks, IMF drawings, and the like, make it rare for central banks to enter the market to obtain foreign currency reserves.<sup>16</sup>

Governments of various countries have also at times been demanders in the Euro-dollar market due to such factors as advantageous costs (the case of U.K. local authorities), rigid limits on central bank deficit financing (the case of Belgium), state import needs (Eastern European case),<sup>17</sup> or for monetary policy reason (the Italian case).<sup>18</sup>

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<sup>15</sup>Coombs, op. cit., pp. 51, 54, and earlier reports; Williams, op. cit., pp. 10, 31-32; Ibid., pp. 778-779. The BIS also frequently enters the market for purposes of stabilization.

<sup>16</sup>Clendenning, op. cit., pp. 52-53; Williams, op. cit., pp. 10-11.

<sup>17</sup>Clendenning, op. cit., p. 52; Scott, op. cit., p. 5.

<sup>18</sup>Oscar Altman, "Euro-Dollars: Some Further Comments," Inter-National Monetary Fund Staff Papers, Vol. 12, No. 1 (March, 1965), pp. 2-3.



Thus, the participants in the market are many and varied. The motives behind the demand of each of these participants may also be different. Nonetheless, basically all are motivated by considerations of cost or availability. In this respect, Euro-dollar demanders are no different from demanders in any other market.

#### D. Institutional Constraints

Certain institutional constraints have also affected the Euro-dollar market on the demand side. The various investment controls instituted by the Treasury have forced many U.S. corporations into the Euro-dollar market in their quest for financing.<sup>19</sup> Also, foreigners accustomed to borrowing purchasing power in the United States have, since the imposition of the interest equalization tax and other capital export restrictions in the U.S., resorted to the Euro-dollar market for short-dated funds. This occurred whether their needs were for dollars, third currencies, or even for their own currency. Upon obtaining claims on these funds, they may be used as is or converted through the foreign exchange market into any currency required.<sup>20</sup>

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<sup>19</sup>The Financing of Business with Euro-dollars (New York: Morgan Guaranty Trust Co., 1969), p. 4; Williams, op. cit., p. 12; Clendenning, op. cit., pp. 10-11.

<sup>20</sup>Businesses in countries whose money and capital markets are notoriously thin have utilized the market on numerous occasions. Clendenning, op. cit., p. 54; Williams, op. cit., p. 25.

Demand has been reduced by various Federal Reserve restrictions on U.S. banks. Regulations that require the treatment of overnight balances due branches as deposits (and therefore subject to reserve requirements) and the imposition of marginal reserve requirements on liabilities to branches beyond some base level have tended to raise the cost of these funds and to decrease the amounts demanded.<sup>21</sup> In addition, restrictions on the treatment of certain cash items in process of collection have been instituted. Prior to September, 1969, banks borrowing Euro-dollars were allowed to deduct from their required reserves these borrowings since the draft on the U.S. bank giving up the reserves (lending the dollars) was treated as a cash item in process of collection. Thus, for one day the Euro-dollar borrowing reduced the reserves required of the borrowing bank. A good deal of overnight Euro-dollar borrowing that occurred prior to August 1969 was motivated entirely by the technical advantages involved. Indeed, it appears that many banks entered into swap agreements whereby each borrowed, via the Euro-dollar market, funds from the other. Both then were able to

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<sup>21</sup>Gaines, "The Dollar?" op. cit., p. 1. See Bloch, op. cit., pp. 15-22 for an exposition of the overnight borrowing technique and its benefits, prior to Federal Reserve restrictions. This shift may be viewed either as a movement up along the demand line as real costs rise or as a shift to the left of the line, implying a reduced demand at every price.

reduce their required reserves by the amount borrowed (and since both paid interest on the borrowing to the other, there was no cost to the transaction). On the following day, further operations of the same sort were undertaken. The constant reborrowing or rolling over of these Euro-dollar "borrowings" provided the participants with costless excess reserves. This particular game was halted when the Federal Reserve amended Regulation D.<sup>22</sup> Prior to the amendment of Regulation D, however, large amounts of these swaps may have inflated demand figures substantially.

Finally, the political realities involved in restrictive monetary policy within the U.S. almost guaranteed that the demand for Euro-dollar balances deriving from U.S. banks would be of a temporary nature and, with the new reserve requirements on Euro-dollar borrowings, perhaps permanently reduced.<sup>23</sup> This may well cause an

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<sup>22</sup>This technique employed to reduce required reserves has not been documented publicly. However, certain discussions undertaken within the Federal Reserve and the discussion of the changes instituted in Regulation D in "Amendment To Regulation D," Federal Reserve Bulletin, Vol. 55, No. 7 (August, 1969), p. 656 and in "Revision of Money Supply Series," Federal Reserve Bulletin, Vol. 55, No. 10 (October, 1969), pp. 788-789 imply that this activity did occur.

<sup>23</sup>That is, restriction of reserve availability appears to be politically possible only over a short time period. Thus, the demand for Euro-dollars by banks attempting to moderate stringent monetary policy will tend to be of short duration. Evidence of this probability may be seen in the

increase in Euro-dollar deposits outstanding, in the long run, since U.S. bank borrowing has acted as a leakage from the system. As the leakage is reduced, a larger money multiplier may operate.

To conclude, the demand for Euro-dollar balances derives from many different sources. One source that has been of prime importance is the demand arising from U.S. banks during times of tight money in the United States. With the reduction in reserves supplied by the central bank and with the imposition of effective limits on interest rate payments on time deposits,<sup>24</sup> U.S. banks have turned to the Euro-dollar market in force. Availability, defense, and alternative cost considerations have motivated U.S. bank borrowing. In general, the demand for Euro-dollars has arisen both from market imperfections and distortions within countries and from alternative cost and benefit considerations by borrowers.

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sharp decline in outstanding U.S. bank liabilities to their branches in 1970-71 even in the face of various incentives initiated by the Federal Reserve, Treasury, and Export-Import Bank aimed at moderating this return flow. See note 4, this chapter.

<sup>24</sup>These limits are contained in Regulation Q and reduce the ability of banks to sell certificates of deposit and other time deposit instruments when other money market rates rise above the ceiling.

### III. Sources of Supply

#### A. General Supply Considerations

In the same way that demanders of goods or money weigh the alternative costs of obtaining the good and, ceterus paribus, choose that which satisfies their demand at the lowest price, so also do suppliers of goods or funds weigh the alternative prices or yields that different markets and investment vehicles provide, choosing that which best meets their requirements. Suppliers of loanable funds generally wish to obtain the highest yield consistent with the level of risk they are willing to bear. Other factors which influence their choice of vehicle and market include the availability of the investment vehicle, the accessability of the market, the depth of the resale market for these particular debt instruments, the transactions costs that must be incurred, and expectations of future exchange rate values and interest rate levels.

It is not necessary that the supplier's assets be denominated in a particular currency. With fixed exchange rates and convertibility, an investor may choose almost any market in which to place his purchasing power. Ignoring transactions costs, the present exchange rate system allows an investor to transfer his assets to the market with the highest expected yields, after risk differentials

are considered. So-called "hot" money flows are the result of investors moving into and out of various investment vehicles in different currency markets in response to interest differentials or expectations of exchange rate changes. The ownership of purchasing power, not the form in which the purchasing power is denominated, is the determining factor in the supply of funds to any money market.

An asset owner whose calculations of net return after transactions costs indicate that the Euro-dollar market provides the most profitable investment alternative must take into account the existence of certain risks, some of which are unique to the Euro-dollar market and some of which are more general in application. First, the investor with non-dollar denominated assets who converts his funds into Euro-dollars may frequently wish to reconvert the asset and the earned interest into his own currency. The possibility that exchange rates may be altered between the time he makes the investment and the maturity of the investment must be considered. To reduce the risk, the investor may purchase forward cover. This involves the forward sale of dollars for his own currency, timed to coincide with the maturity of his investment. Any non-domestic currency investment involves this risk, unless the investor intends to utilize the non-domestic currency in some further way upon maturity. Of course, should the purchasing power owner expect exchange rates to change in

a way that would make his dollar asset plus interest return worth more in terms of foreign currencies, he might wish to take an uncovered (unprotected) position, waiting until maturity to enter the exchange markets to reconvert his purchasing power.<sup>25</sup>

A second risk that the investor faces, and one that is unique to the Euro-dollar market, is that the Euro-dollar system does not contain an official lender of last resort.<sup>26</sup> This means that a bank which has issued dollar liabilities may not be able to meet its repayment commitments, should it encounter difficulties. This problem, of course, is not as serious as it may seem since the foreign exchange market and other Eurobanks are presumably available to the bank should a shortage of dollar funds occur.<sup>27</sup>

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<sup>25</sup>This and the following paragraphs rely heavily on Williams, op. cit., pp. 23-29 and Clendenning, op. cit., pp. 43-51, 57-62.

<sup>26</sup>Williams, op. cit., pp. 28-29. The BIS has tended towards taking on this function in an indirect way. In the past, it has undertaken operations aimed at stabilizing the market, especially at quarterly and year-end window dressing dates. Thus, to a certain extent, the BIS does act as a lender of last resort but does so through the market rather than directly to the banks who make up the market. See Scott, op. cit., p. 4; Williams, op. cit., p.10; and Clendenning, op. cit., pp. 61, 162-168.

<sup>27</sup>Provided, of course, that the bank has domestic funds that it can utilize and convert, and provided its access to the foreign exchange market is unimpeded.

Finally, with reference to general supply considerations, the source of funds to the Euro-dollar market must take into account the fact that the reserves of the Euro-dollar system are dollar deposits in the United States. Strictly speaking, the supply of Euro-dollars refers to the supply of these Euro-dollar deposits to borrowers. In a broader sense, however, the supply of Euro-dollars refers to the supply of the reserves to the system. Thus, the supply of dollars to Eurobanks may be considered as an integral part of the analysis of Euro-dollar supply. While Eurobanks create all the Euro-dollars subsequently supplied by the deposit owners to Euro-dollar borrowers, the source of the dollars that allow the Eurobanks to create Euro-dollars must be identified and investigated. In the same way that a discussion of the supply of dollar funds to the U.S. money markets must include Federal Reserve actions, so also must the discussion of Euro-dollar supply include the actions of the Euro-dollar system reserve suppliers for it is upon these reserves that the Eurobanks base and create the Euro-dollar currency. Euro-dollar supply therefore involves both the lending of dollar denominated deposits in Eurobanks by asset owners (including the Eurobanks as deposit owners and creators) and the original lending or deposit of dollars by asset holders.



## B. Market Participants and Their Motives

A Euro-dollar supplier must hold a claim on a Eurobank in order to enter the Euro-dollar market as a supplier. But, any owner of dollar denominated deposits in Eurobanks or any owner of dollars themselves who supplies them to the Eurobanks (by depositing them in a dollar denominated account) may be considered a Euro-dollar supplier.

The sources of Euro-dollar deposits and of the dollars that form the basis of these deposits are extremely varied. Eurobanks are large scale suppliers of Euro-dollar deposits to borrowers. They utilize the dollars they obtain from depositors to support a multiple expansion of Euro-dollar deposits. Exporters and importers, U.S. and foreign corporations, U.S. and foreign commercial banks with and without branches, foreign central banks and international financial institutions, and wealthy individuals and speculators supply both reserves and Euro-dollar deposits to the market.<sup>28</sup>

Each of the participants in the market supplies funds for his own particular reasons. As noted above, U.S. corporations, because of U.S. balance of payments restraints that limit the amount of capital they can send abroad, have offered long-term securities in Europe

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<sup>28</sup>Clendenning, op. cit., pp. 43-51.

denominated in dollars. The proceeds of these issues are frequently placed temporarily in dollar denominated deposit accounts in European banks until they are needed for corporate purposes.<sup>29</sup> Also, many corporations, both domestic and foreign, maintain dollar balances in these banks for various purposes. Indeed, the custom of keeping such balances in these banks existed long before any active market for them existed.<sup>30</sup>

In addition, U.S. corporations and individual investors enter the market in order to take advantage of the (relatively) higher rates of return offered and the high degree of liquidity available. An additional impetus to their conversion of assets into Euro-dollars is the payment of interest on what are basically demand deposits, a return that is illegal in the United States. Further, holders of certificates of deposit (CD's) have moved their assets into Euro-dollar deposits when Regulation Q ceilings limited the return that U.S. banks could pay on CD's.

Speculators enter the market as suppliers when there are unsettled conditions in the foreign exchange markets and when expectations of local currency devaluation are

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<sup>29</sup>"Euro-Dollars: A Changing Market," op. cit., pp. 774-775.

<sup>30</sup>See Note 10, Chap. 2 and 39th Annual Report, op. cit., p. 148.

strong. The Euro-dollar market is a haven for "hot" money in these periods, except when the dollar itself is the currency under suspicion. In addition, arbitrage activities can affect supply (and demand) in the market.<sup>31</sup>

Of great importance in the market are the funds placed by official institutions, both at the national and supranational levels. Central banks of many foreign countries have utilized the market for several reasons.<sup>32</sup>

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<sup>31</sup>Clendenning, op. cit., pp. 108-109.

<sup>32</sup>The Federal Reserve has not entered the market directly but has, of course, influenced its growth tremendously, through the use of various controls placed on U.S. commercial banks. An interesting experiment was undertaken, however, in early 1971 by the Federal Reserve in an attempt to influence the flow of funds from the Euro-dollar market into German marks. By selling marks forward, the Federal Reserve was able to increase the cost of (or reduce the incentive for) swapping Euro-dollars for marks. (By driving the forward mark price down, the higher yields associated with German securities was offset.) This action was taken in order to slow the buildup of dollars occurring in official German reserves, reduce the possibility of conversion of these dollars into gold or SDR's by the Germans, and thwart the negation of the German's anti-inflation policy which this flow entailed. The results of this action appeared to be insignificant, at best, for German reserves have continued to increase. Thus, in addition to interest arbitrage, par value speculation has been occurring and affecting the Euro-dollar market. See "New York Reserve Experiment," Wall Street Journal (March 1, 1971), p.5 and Coombs, op. cit., pp. 51-52.

The Federal Reserve has also affected the market indirectly by entering into swap agreements with foreign central banks, the object of these swaps being the soaking up of temporarily (hopefully) excess dollars in the foreign exchange markets. Williams, op. cit., p. 10n.

Recently, it has been reported that a group of European central banks are planning to manipulate the Euro-dollar market in order to reduce the supply of funds and drive up the interest rate in the market. This will be accomplished by the central banks' withholding the

They have found it necessary, at times, to place funds in the Euro-dollar market in order to stabilize it, to stabilize the foreign exchange markets, and to maintain or implement their policy goals.<sup>33</sup> These are basically defensive-type actions in that they maintain the status quo and, although they may be only marginal in amount, they occur after all other market forces have been felt and may thus be quite effective in influencing rates and the flow of funds.

In addition to their stabilization activities, central banks have also entered the market as investors.

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Euro-dollars normally gained in their exchange rate stabilization operations from the market rather than recycling them immediately as they have done in the past. This had the aim of reducing supply, driving up interest rates, and reducing pressure on their domestic interest rate structures which they have been attempting to maintain at high levels for counter-inflation effects. The flow of Euro-dollars returned to Europe by U.S. banks which can now obtain funds inexpensively in the U.S. has driven Euro-dollar rates down. This has caused European investors to sell Euro-dollars, replacing them with mark, franc and other higher earning assets. The central banks then must buy the Euro-dollars and in so doing create more domestic liquidity than they desire. See Chapter 6 and "European Bankers Planning to Manipulate Dollar Supplies: Washington Seen Uneasy," Wall Street Journal (April 7, 1971), p. 4. The similarity between these central bank actions and Federal Reserve open market operations, at least in effect, will be discussed in detail in Chapter 6.

<sup>33</sup>These goals may either be general policy aims, such as restricting credit or short-term capital flows, or they may be aimed at assisting the banks in order that they may finance trade, purchase foreign assets or exchange, or reduce their foreign liabilities. Clendenning, op. cit., p. 44.

They have placed their excess dollar reserves in the market with the purpose of earning an interest return.<sup>34</sup> Whether for stabilization or investment purposes, the central banks have several ways by which they can effect the placement of Euro-dollars. Direct deposits of dollars in banks outside the U.S., including domestic banks, swap or loan arrangements with their domestic banks,<sup>35</sup> or operations in the foreign exchange markets are all methods by which central banks place funds.<sup>36</sup> Indirect methods, such as the placement of dollar deposits with the Bank for International Settlements or the European Investment Bank have also been employed.<sup>37</sup>

It should be noted that the direct deposit and the foreign exchange operation may not affect the Euro-dollar

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<sup>34</sup>As Williams, op. cit., p.11 and others have noted. The latest BIS Annual Report states, as reported in "Eurodollar Banking: ...?" op. cit., p. 13, that European central banks have made official placements in the market for many years. One reason for these placements has been the responsibility placed on the banks "... for 'conserving' the value of their countries' official external monetary assets; and 'in times of mounting inflation, the preservation of this value means securing a reasonable return on them.' Briefly, the central banks seek the highest return on their dollar assets." (p. 13)

<sup>35</sup>These arrangements usually stipulate that the dollars gained must be used in certain restricted ways.

<sup>36</sup>Williams, op. cit., p. 10; Scott, op. cit., p. 4; Clendenning, op. cit., pp. 44-45.

<sup>37</sup>Scott, loc. cit.

market directly.<sup>38</sup> While the commercial bank with which the central bank places dollars may place these funds in the market, the decision to do so is based on the various yields, risks, liquidity, and costs that pertain to other possible uses, such as conversion into domestic currency (which may frustrate the policy of reducing dollar reserves), conversion into a third currency (which may merely shift the reserve adjustment burden to another country), or investment of the funds in the U.S. money market itself (in which case, the dollars are returned to the U.S. but do not affect the Euro-dollar market or the rates there). Operations in the foreign exchange market may also have counter-productive results, at least under certain circumstances.

Finally, as is evident from the above discussion of other participants in the market, foreign commercial banks and foreign branches of U.S. banks play a central and influential role in the market. These banks undoubtedly make up the largest part of the market both on the demand and on the supply sides.<sup>39</sup> This is the case since they act both

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<sup>38</sup>Clendenning, op. cit., p. 45.

<sup>39</sup>Williams, op. cit., p. 10. Swap arrangements between U.S. banks added to both the supply and the demand for Euro-dollar funds. In this case, however, demand created its own supply, or the reverse, and had no effect on true demand and supply pressures operating in the market. Account of such operations should, nonetheless, be taken.

as creators of funds, intermediaries,<sup>40</sup> and users of funds. They are the primary agents through which the other suppliers operate and, in addition, they act for their own account by undertaking the lending of (created) Euro-dollar deposits.

The source of Euro-dollar system reserves has changed over the decade of the 1960's. In the early years of the decade, official institutions and corporations in Europe (the "inside" area, according to Bank for International Settlements classification) were the largest suppliers of reserves to the Eurobanks but in the later years of the decade, the "outside" area (non-European, including the U.S. and Canada) became increasingly important as a supplier of funds.<sup>41</sup> Thus, the Eurobanks' source of reserves has shifted, at least partly, from depositors located within Europe, to those located outside Europe. These non-European sources are generally not financial

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<sup>40</sup>The intermediation process, also incorrectly called pyramiding, can have several steps. Thus, an original deposit may move through several banks before it is lent to a final borrower. The limit to the number of intermediate steps that can occur is the level to which the rate can be raised before the market demand disappears. Since this activity of borrowing and relending is so important in the market, and since the final result is basically the same (i.e., a certain amount lent to a final user), data calculations on the size of the market are net of these transactions. See Chapters 2 and 5 and Machlup, op. cit., p. 230; and "The Euro-Currency Market," 39th Annual Report, op. cit., pp. 146-151.

<sup>41</sup>39th Annual Report and 40th Annual Report, op. cit., pp. 147-150 and pp. 155-159, respectively.

institutions but are rather non-banks, both individuals and corporations.<sup>42</sup> No matter what the source of these funds may be, the increased reserves held by the system have augmented the supply of Euro-dollar deposits by making possible the increased lending of created deposits.

### C. Institutional Constraints

Institutional or structural factors have affected the supply as well as the demand for funds.<sup>43</sup> While basic price, risk, liquidity, and transactions costs determine supply, interferences in the market have acted both to augment and to restrict the supply of reserves.

Increased supply has been encouraged through Federal Reserve imposed Regulation Q ceilings. When effective, this restriction on the rate of return payable on time deposits in the U.S. has made the Euro-dollar market more attractive to investors and has generated an increased supply of Euro-dollars. In addition, the U.S. restriction of payment of interest on deposits of a

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<sup>42</sup>Clendenning, op. cit., p. 51.

<sup>43</sup>The general outline of most of these constraints, but not the analysis, may be found in Williams, op. cit., pp. 11-13.



maturity of less than 30 days would make any market that did provide a return on this type of deposit attractive.

The practice of foreign central banks of placing their dollar reserve balances in the Eurobanks has tended to augment the supply of Euro-dollars both directly and indirectly through the supplying of reserves necessary to the credit creation process. This practice arose from these banks' concern for the stability of the international monetary system and the deleterious effects the alternative action of withdrawing gold or other reserves from the United States would (presumably) have had. It also arose from the desire to obtain higher yields on dollar reserves held.<sup>44</sup> In addition, central banks have shifted their reserve holdings to Euro-dollar deposits for reasons of nationalism, proximity to the deposit, control over the depository banks, and the facilitating of monetary policy. The central banks began to withdraw from the market in 1971 as they came to realize the harm their deposits had caused. Their withdrawal, however, was too slow and too late to halt the impending collapse of the international payments system. The collapse was at least partly due to the

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<sup>44</sup>As will be noted in Chapter 6, this practice in fact led, through a greatly increased supply of Euro-dollars, to the collapse of the international exchange rate system and, prior to that, generated destabilizing influences on their own monetary systems. The policy was, to say the least, ill advised.

growth of the Euro-dollar system which was, in turn, due partly to central bank use of the system.

The relatively high degree of competition among the Eurobanks for Euro-dollar deposits (and reserves) may also have increased the supply of Euro-dollars.<sup>45</sup> The cartel arrangements that exist within most of the domestic European banking systems tend to hold interest yields down. The competitive nature of the Euro-dollar system, however, has brought about high deposit interest rates. The comparatively higher return on Euro-dollar deposits may have generated an increased demand for the deposits by asset holders and, thus, an increased supply of reserves and loanable funds. Redeposits in the system, motivated by the higher interest rates, allowed further increases in the supply through multiple credit creation.

Increased supply also occurs temporarily due to window dressing activities by foreign banks at quarterly and year-end bank statement dates. As statement dates approach, Euro-dollar supply increases and, after the date has passed, demand for Euro-dollars increases. Central banks enter the market to offset these influences.<sup>46</sup>

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<sup>45</sup>"Euro-dollars: A Changing Market," op. cit., p. 774.

<sup>46</sup>Coombs, op. cit., pp. 51, 54, and earlier reports; Williams, op. cit., pp. 10, 31-32; "Euro-dollars: A Changing Market," op. cit., pp. 767-768, 771. The BIS also frequently enters the market for purposes of stabilization.

Restrictions on supply derive primarily from official activity or interference. For instance, Regulation Q limits do not apply to foreign official deposits in U.S. banks. Had these limits applied, a greater flow of funds than actually occurred might have moved into the Euro-dollar market from official sources. The magnitude of this negative effect on supply is difficult to gauge. Also, the restrictions placed on U.S. businesses and banks by the Treasury and the Federal Reserve for balance of payments purposes have tended to reduce the (visible, but not necessarily actual) supply of dollars flowing into the market from the United States. However, while this set of restrictions may have reduced the supply of reserves to the Euro-dollar system and thus the supply of Euro-dollars, its impact was probably felt primarily on the demand side of the market. The demand for Euro-dollars has certainly been increased by the imposition of these restrictions. To the extent that the flow of funds from the U.S. to the Euro-dollar market might have risen as interest rates rose in that market, it can be said that these balance of payments restrictions negatively influenced supply as well. In the same way that Regulation Q restrictions were plausible in their effects on the supply so also might these balance of payments restrictions be important. Nonetheless, the practical significance of the controls appears to be quite limited.

Finally, there have been some rather significant institutional restraints on the growth of (or, perhaps, maintenance of) the size of the Euro-dollar market.<sup>47</sup> These restraints are the controls placed on lending and borrowing activities of Eurobanks by their home central banks. As the demand for Euro-dollars began to grow in 1968 and due to various circumstances in several of the countries, restrictions on dealings in Euro-dollars were placed on the banks. France, Italy, Belgium, the Netherlands, and Canada all instituted restraints on the flow of funds into and out of the market in 1969.<sup>48</sup> In most cases, balance of payments considerations were the principle cause of these limits but the effects of the fund flows on the efficacy of monetary policy were also important.<sup>49</sup> Germany especially found that the Euro-dollar market made it more difficult to implement an effective

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<sup>47</sup>A fairly complete discussion of these restraints may be found in "Euro-dollars: A Changing Market," op. cit., pp. 779-784.

<sup>48</sup>Ibid.

<sup>49</sup>Indeed, quite recently several foreign central banks have begun to explore the possibility of reducing the supply of Euro-dollars by failing to recycle such funds gained in the exchange stabilization activities they normally undertake. "European Bankers Planning to Manipulate...", loc.cit. See Chapters 6 and 7 for a more detailed discussion.

monetary policy in 1970 and 1971.<sup>50</sup> The effect of these restraints is difficult to evaluate, but it would appear that at least the supply of funds originating in the countries in question was reduced. However, the increase in the flow of funds from the "outside" area may have negated the effectiveness of these restraints. Further, the intermediary functions performed by these banks were probably little affected. Certainly, the British banks have long experienced controls but their intermediary activities have been affected not at all.<sup>51</sup>

To conclude, supply has been increased by the development of the market, through various institutional influences, through the increased availability and usage of the dollar in the international monetary system, and most important, through the redeposit of Euro-dollar loans within the system, allowing credit creation to occur. Redeposit of dollar funds gained in foreign exchange market stabilization activities by central banks has also generated an increased supply of reserves to the Euro-dollar system.

Basically, then, supply refers to the flow of reserves (dollar deposits in U.S. banks) into the system and the redeposit of Euro-dollar deposits originally borrowed and used

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<sup>50</sup>Coombs, op. cit., pp. 45-47, 50-52.

<sup>51</sup>Clendenning, op. cit., pp. 22-24.

as payment of debts into the system. A decline in the influx of primary deposits (reserves) may be offset by the reduced leakages out of the system and consequent increased money multiplier.

CHAPTER IV  
EMPIRICAL DETERMINATION OF THE DEMAND  
FOR EURO-DOLLARS BY U. S. BANKS

I. Introduction

The preceding chapter discussed the general determinants of the supply and demand for Euro-dollars. The analysis was nonquantitative and focused on those factors that might logically be expected to affect demand and supply. In this chapter, a quantitative test of some of the influences postulated in Chapter 3 will be outlined. The results of a regression analysis of the determinants of Euro-dollar demand by U.S. banks will be reported and the implications for U.S. monetary policy of these results will be discussed.

II. Hypotheses

A. General Demand Considerations

The actions of the Federal Reserve appear to contribute significantly to determining the amounts of Euro-dollar borrowing undertaken by U.S. banks. Therefore, the analysis of the determinants of U.S. bank borrowing of Euro-dollars in the 1960's must logically begin with the influence of tight money on U.S. banks. The availability of reserves and other factors imposed by the Federal Reserve compose one set of influences that must be included in a quantitative study. Secondly, an allowance for cost factors must be made, since

the purchase or borrowing of anything is theoretically influenced by the price required to gain the use of the good. Thirdly, the demand for Euro-dollar funds is a derived demand, derived from the demand by borrowers from U.S. banks for loanable funds. Therefore, some measures of the original demand may be useful in explaining Euro-dollar borrowing by U.S. banks. Fourth, seasonal factors should normally be taken into account, and fifth, changes in the environment in which the banks operate (including, for instance, the imposition of marginal reserve requirements on liabilities to foreign banks and branches) must be specified.

Taken together, the determinants of U.S. bank Euro-dollar borrowing are a complex of interrelated factors. In order to determine which factors may influence this borrowing most significantly, regression analysis may be employed. By analyzing quantitatively the relationships postulated to exist between U.S. bank borrowing and various independent variables, it becomes possible to isolate the specific determinants that most influence Euro-dollar borrowing by U.S. banks.

Prior to an analysis of this type, it is useful to postulate or hypothesize the relationships that are expected. Given the analysis presented in Chapters 2 and 3, the following hypothesis is made. The amount of Euro-dollar borrowing undertaken by U.S. banks in the mid-to-late 1960's was primarily determined by U.S. monetary policy and the



resultant contraction in the availability of reserves to U.S. banks. That is to say, a combination of factors, all influenced or imposed by the Federal Reserve, caused U.S. banks to turn to the Euro-dollar market for loanable funds. Reserve stringencies and high U.S. interest rates were direct results of the implementation of restrictive monetary policy by the Federal Reserve. The decline in time deposits outstanding at U.S. banks was due to Regulation Q interest payment limitations that became effective (and restrictive) as U.S. market rates rose. Finally, the method by which cash items in process of collection and liabilities to foreign branches were treated was stipulated by the Federal Reserve in its Regulations D and M. Taken together, these factors motivated U.S. banks to borrow in the Euro-dollar market. The market provided the least cost alternative source of funds in the tight money periods of the 1960's.<sup>1</sup>

The nominal price of Euro-dollars may not have a significant effect on the amount of U.S. bank borrowing because the advantages of this borrowing, even at relatively high interest rates, outweighed the nominal costs. Further, the differential between Euro-dollar interest rates and domestic (U.S.) interest rate levels remained relatively constant throughout these periods. It was non-price factors

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<sup>1</sup>Some part of the cost of maintaining foreign branches should be included in the determination of the total cost of borrowing Euro-dollars. However, no data is available on these expenses. It must be assumed that these costs were not large enough to deter Euro-dollar borrowing or, indeed, that they may actually have motivated increased borrowing in order to reduce the per-dollar cost of such borrowing.

from which U.S. banks derived the cost benefits. In addition, the increased price of Euro-dollars in these periods may well have been the result of, rather than the cause of, increased U.S. bank Euro-dollar borrowing.

It is expected that, beyond some measure(s) of availability or reserve losses, the demand for loans from which the demand for Euro-dollars is derived will have some influence on Euro-dollar borrowing. Commercial and industrial loans by large banks may serve as an indication of the demand for loans and, as these loans increase during tight money periods, so also may Euro-dollar borrowing increase in order to fund such loans. Seasonal factors and changes in the structure under which U.S. banks operate may also have some influence on U.S. bank borrowing of Euro-dollars.

It is expected, therefore, that U.S. bank Euro-dollar liabilities will be a function of CD's outstanding at U.S. banks (negatively), some interest rate differentials between Regulation Q ceilings and various U.S. money market investment vehicles such as Treasury Bills or commercial paper, commercial and industrial loans (positively), and seasonal and structural factors of some type.

#### B. Specific Possible Demand Determinants

This section outlines in some detail the possible determinants that may have affected or influenced Euro-dollar borrowing by U.S. banks in the 1960's. Each variable specified and the logical basis for its inclusion in the regression analysis is stated.

The hypothesized determinants are:

1. The interest rate on three month Euro-dollar deposits.

The interest rate is the nominal price of Euro-dollars and may be expected to influence the quantity of Euro-dollars demanded by U.S. banks. It is the rate paid by the U.S. banks' branches for these funds. Theoretically, as the price (interest rate) rises, the amount of borrowings should fall.<sup>2</sup> Although the rate is not expected to be a

<sup>2</sup>The three month rate is utilized because the three month deposit has been one of the more popular maturity lengths, the rate is available, and is closest to the average maturity of Euro-dollar deposits at U.S. bank foreign branches. (See Release G. 17 issued monthly by the Federal Reserve. The April 1, 1971 release is reproduced below.) In addition, this rate is easily compared to many other U.S. money market rates.

MATURITY OF EURO-DOLLAR DEPOSITS IN FOREIGN  
BRANCHES OF U.S. BANKS  
(end of month)

| Maturity of Liability  | Amounts in          |       |       | Cumulative |       |       |
|--|---------------------|-------|-------|------------|-------|-------|
|  | billions of dollars |       |       | percentage |       |       |
|  | 1970                | 1971  |       | 1970       | 1971  |       |
|  | Nov.                | Dec.  | Jan.  | Nov.       | Dec.  | Jan.  |
| Overnight  | 1.30                | 1.37  | 1.51  | 4.8        | 4.9   | 5.4   |
| Call   | 2.07                | 1.78  | 1.77  | 12.4       | 11.2  | 11.8  |
| Other liabilities,<br>maturing in following<br>months after report date: |                     |       |       |            |       |       |
| First calendar month   | 9.07                | 10.69 | 8.85  | 45.9       | 49.3  | 43.5  |
| Second   | 5.32                | 4.46  | 5.00  | 65.5       | 65.1  | 61.5  |
| Third  | 3.23                | 3.75  | 3.91  | 77.4       | 78.5  | 75.6  |
| Fourth   | 1.58                | 1.57  | 1.51  | 83.2       | 84.0  | 81.0  |
| Fifth  | 1.39                | 1.33  | 2.03  | 88.4       | 88.8  | 88.3  |
| Sixth  | 1.29                | 1.46  | 1.48  | 93.1       | 94.0  | 93.6  |
| Seventh  | .34                 | .26   | .23   | 94.4       | 94.9  | 94.4  |
| Eighth   | .25                 | .19   | .20   | 95.3       | 95.6  | 95.1  |
| Ninth  | .18                 | .16   | .18   | 95.9       | 96.2  | 95.8  |
| Tenth  | .14                 | .14   | .23   | 96.5       | 96.7  | 96.6  |
| Eleventh   | .15                 | .20   | .24   | 97.0       | 97.4  | 97.5  |
| Twelfth  | .21                 | .20   | .14   | 97.8       | 98.1  | 98.0  |
| Maturities of more<br>than 1 year  | .60                 | .53   | .54   | 100.0      | 100.0 | 100.0 |
| Total  | 27.11               | 28.10 | 27.83 |            |       |       |

significant explanatory variable, a test of the influence of price on quantity demanded should normally be attempted.

2. The Federal Funds rate and the Discount Rate. These two variables are indicative both of availability and of alternative costs. As these rates rise as a result of restrictive monetary policy, Euro-dollars become a relatively less expensive source of liquidity, ceterus paribus.

Thus, a direct relationship may exist between either rate and Euro-dollar liabilities. In actuality, of course, the increased demand for Euro-dollar funds will drive up Euro-dollar rates too, but perhaps not by the same amount, given the depth of the possible Euro-dollar supply. That is, the elasticity of the supply of Euro-dollars is relatively high.<sup>3</sup> Indeed, the availability of the various types of funds may well be the determining factor,<sup>4</sup> rather than the

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Average Maturity at end of January: 2.3 months.

Note: Details may not add to totals due to rounding.

Source: Release G.17 (Washington: Board of Governors of the Federal Reserve System, April, 1971). Abridged version also published monthly in the Federal Reserve Bulletin, Table No. 22, "International Capital Transactions of the U.S." section.

<sup>3</sup>Klopstock, "Euro-dollars in the...", op. cit., p. 79.

<sup>4</sup>The literature on the availability doctrine is substantial. For a good summary see Mayer, op. cit., pp. 127-137 and Joseph Aschheim, Techniques of Monetary Control (Baltimore: Johns Hopkins Press, 1961), pp. 12-16.

rate charged, since all rates have tended to move together.<sup>5</sup>

3. Two interest rate spread variables. These are, first, the interest rate spreads between three month Treasury bills and the Regulation Q ceiling rate on CD's and, second, the yield spread between 4 to 6 month commercial paper and the Q ceiling rate on CD's. Both the Treasury Bill rate and the commercial paper rate indicate the state of monetary policy. That is, a restrictive monetary policy means that the spread between these rates and the Q ceiling rate becomes positive and larger. In response, banks would, it is assumed, increase their borrowings of Euro-dollars. Further, as yields rise on Bills and paper, these debt instruments become more attractive as investment vehicles, both to former CD holders and to the banks themselves.

4. Large certificates of deposit (CD's) outstanding at large banks. The amount of CD's issued by U.S. banks may be expected to have a strong influence on Euro-dollar liabilities.<sup>6</sup> CD's outstanding is a measure of the availability of funds and, more important, is an indication of

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<sup>5</sup>Rates tend to move together unless interferences of some type impede the adjustment of a particular rate, i.e., Regulation Q and CD rates.

<sup>6</sup>Indeed, one would expect this variable to be of overriding significance, for it is Regulation Q and its effects on CD's outstanding that is generally conceded to have given impetus to the growth and development of the Euro-dollar market. This expectation is not disappointed in the results.

the loss of competitiveness of U.S. banks in the short-term money markets in times of tight money and Regulation Q restrictions.<sup>7</sup> U.S. banks appear to have resorted to the Euro-dollar source as CD runoffs reduced time deposits, increased average required reserves, and reduced the banks' ability to lend funds. A negative relationship between CD's outstanding and Euro-dollar liabilities of U.S. banks is expected.

5. Commercial and industrial loans by large banks. This is a measure of the underlying demand for Euro-dollars. Should these loans increase at large banks with access to Euro-dollar funds during restrictive monetary policy periods, rising as Euro-dollar liabilities rise, a direct relationship will exist and the assumption that Euro-dollars are financing at least part of these loans may be made. Further, as noted in Chapter 2, Euro-dollar borrowing allows an increase in loans outstanding, ceterus paribus.

However, since commercial and industrial loans will rise in periods of easy money as well, and since Euro-dollar

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<sup>7</sup>The values utilized are for large (\$100,000 or more) negotiable time CD's outstanding at large commercial banks. The data was readily available (in contrast to other CD data) and applied to large banks, the institutions that have access to the Euro-dollar market and, further, who feel the impact of Regulation Q first and most severely. Brimmer, Euro-Dollar Flows..., op. cit., p. 5.

liabilities will decline,<sup>8</sup> given their "high" cost, the relationship between the changes in loans and in Euro-dollar liabilities may be more informative. As the amount of change in these loans declines, indicating restrictive monetary policy, the amount of increase in Euro-dollar

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<sup>8</sup>Witness the 1970-71 experience, as recounted in "Banking and Monetary Developments in the Fourth Quarter of 1970," Federal Reserve Bank of New York Monthly Review, Vol. 53, No. 2 (February, 1971), pp. 30-34; "The Money and Bond Markets in November," Federal Reserve Bank of New York Monthly Review, Vol. 52, No. 12 (December, 1970), pp. 277-278; and "Eurodollar Banking Today," First National City Bank Monthly Economic Letter (July, 1970), pp. 78-80.

It is interesting to note the predictions made by Henry Wallich in "What Ever Became of the Balance of Payments," Morgan Guaranty Survey (March, 1970), pp. 13-14. Wallich notes that should the demand for Euro-dollars subside appreciably because of cheaper funds in the U.S., United States banks might substantially reduce their Euro-dollar liabilities. This decline "would be self-limiting, for as such repayments were made, Eurodollar rates . . . would decline (which) would tend to keep such rates in line with interest rates in the United States, thereby minimizing American bank motivation to make further (Euro-dollar) repayments." (p. 13) Further, such repayments as do occur may not end up in official reserves since other foreign rates would also decline, reducing any incentive to move out of Euro-dollars. (pp. 13-14) Experience in the last year and a half has shown the danger in forecasting movements based on assumptions of non-interference by official institutions. Wallich is correct in his analysis, as far as it goes. However, since it appears that official intervention can not be ruled out and since U.S. banks view Euro-dollars not as alternative fund sources but as marginal fund sources, it is questionable to conclude that these banks will continue to draw on the Euro-dollar system in the face of equally cheap and readily available funds at home. The market interferences in Europe by central banks attempting to maintain high domestic rates for inflation fighting purposes and in the U.S. by the Federal Reserve in the form of marginal reserve requirements on Euro-dollar borrowings, combine to make Euro-dollar borrowing a great deal more costly than comparable U.S. borrowing. Thus, the run down of

borrowings is expected to increase, and vice versa. An indirect relationship is therefore expected in these first differences.<sup>9</sup>

Any relationships that occur between the stock variables will indicate either trend (rather than determination), the inviolability of these loans, the effect of Euro-dollar borrowing on loans, or a combination of all these factors. The sanctity of commercial and industrial lending means that this is the last type of lending activity to be reduced in periods of restricted reserve growth.<sup>10</sup> The lines of credit previously negotiated, the profitability of business loans, and the need to maintain market position all dictate that these loans be made if at all possible. Thus, in spite of the supposed "lock-in" effect that the banks experience<sup>11</sup> with respect to government and other securities during tight money periods, loans, not securities,

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Euro-dollar borrowings by U.S. banks has occurred in spite of Wallich's theoretically sound analysis.

<sup>9</sup>These loans, of course, depend on Euro-dollar borrowing during "tight" money periods since they are financed from this source. The reverse relationship postulated in the text is intended to measure the impact of tight money on Euro-dollar borrowing.

<sup>10</sup>Brimmer, Euro-Dollar Flows..., op. cit., pp. 5-6, 8.

<sup>11</sup>Basically, it is thought that in periods of "tight" money, when interest rates are high, banks will find themselves "stuck" with bonds bought in boom periods at high prices. In the subsequent period, bond prices decline and the capital loss that would result should the bond be sold is thought to deter the banks from liquidating their securities holdings. Thus they are considered "locked-in" to holding the securities.



appear to be the last asset to be reduced, at least at these large banks.<sup>12</sup>

6. Free Reserves at member banks.<sup>13</sup> This is an additional availability variable that may be related to movements in Euro-dollar liabilities of U.S. banks. While free reserves may be an imprecise or incorrect measure of monetary ease or tightness, the Federal Reserve has apparently used the measure as a target.<sup>14</sup> Therefore, when free reserves

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Thomas Mayer, Monetary Policy in the United States (New York: Random House, 1968), pp. 130-134 discusses the "locking-in" effect but doubts its significance. His footnotes 21 and 22, pp. 133-134 refer to the literature on the effect and the empirical evidence cited to support or condemn it. The term derives from Robert Roosa and J. H. Williams' development of the availability thesis approach to monetary policy. Mayer, op. cit., pp. 127-128.

<sup>12</sup>Brimmer, Euro-Dollar Flows..., op. cit., pp. 5-15.

<sup>13</sup>Free reserves at all member banks are used because it is assumed that the Federal Funds market in particular and the U.S. money market in general are perfect enough to allow the transmission of ease or tightness with little friction throughout the system. Alternatively, it may be assumed that, while the effects of monetary policy hit large money market banks first, their relationships with banks throughout the country are such that they can utilize the excess reserves that exist there to offset some of the impact of this policy. Funds will flow to those willing to pay the highest rates for them.

<sup>14</sup>See, for instance, William Dewald, "Free Reserves, Total Reserves, and Monetary Control," Journal of Political Economy, Vol. 71, No. 2 (April, 1963), pp. 141-153; Jack Guttentag, "The Strategy of Open-Market Operations," Quarterly Journal of Economics, Vol. 80 (February, 1966), pp. 1-30; and Mayer, op. cit., pp. 100-104 and his footnotes 27, 29-34 on these pages.

decline or become negative, monetary policy is restrictive, at least as far as the Federal Reserve is concerned. Since it appears that Euro-dollar liabilities increase in response to stringencies of various types imposed by the Federal Reserve, it may be postulated that an inverse relationship exists between the level of free reserves and Euro-dollar liabilities.

7. The adjusted money supply. This variable is another that indicates reserve availability and it may influence the movements of Euro-dollar liabilities. An increase in the money supply generally indicates that monetary policy is not stringent, the amount or rate of increase (above some minimum level) being an indicator of the amount of ease.

Since banks have borrowed Euro-dollars primarily to offset tight money, an increase in the money supply would imply a decrease in (the need to incur) Euro-dollar liabilities. It is probable that the change in the money supply (i.e., the first differences) may be the most valuable form for this variable. Since banks borrow Euro-dollars in order to continue making loans, any relationship obtained between the money supply and Euro-dollar liabilities will require cautious explanation. Further, since a decline in CD's (a non-money supply item) increases demand deposit levels and since Federal Reserve policy in 1966 and 1969 was specifically aimed at a reduction in outstanding CD's, a rise in the money supply may be

associated with a rise in Euro-dollar borrowings, both variables reflecting "tight" money.

8. U.S. Government securities held by large banks. This variable should also indicate the direction of monetary policy and is expected to move inversely to Euro-dollar borrowings. Security holdings are traditionally reduced by banks during tight money periods and since, as noted above, large banks are least influenced by any "lock-in" effect,<sup>15</sup> they may be expected not only to increase Euro-dollar liabilities but also to decrease their holdings of government securities during tight money periods.<sup>16</sup>

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<sup>15</sup>See note 11, this chapter. This assumes that large banks are more concerned than smaller banks with employing their assets as profitably as possible. See D. R. Cawthorne, "Reserve Adjustments of City Banks," Essays on Commercial Banking (Kansas City: Federal Reserve Bank of Kansas City, 1962), p. 31; Stuart Greenbaum, "Competition and Efficiency in the Banking System," Journal of Political Economy, Vol. 75, No. 4, Pt. II (August, 1967), pp. 461-479; and Jack Guttentag and Edward Herman, Banking Structure and Performance (New York: Institute of Finance of the Schools of Business, New York University, 1967), pp. 15-19, 21-29.

<sup>16</sup>Valuation problems are present in this variable. Should the securities held by the banks be valued at market prices, the value of these holdings would decline in tight money periods. Should the more likely method of valuing at par be followed, the value of such holdings would still decline (without any sale of securities) if the funds deriving from maturing issues are not reinvested. Whichever, government securities were sold off by the large banks as they adjusted to tight money in 1969. See Brimmer, The Euro-Dollar Market..., op. cit., pp. 8-9ff; "The Economy in 1969," Survey of Current Business, Vol. 50, No. 1 (January, 1970), p. 20.

9. Two sets of seasonal dummy variables. These variables are entered to take account of possible seasonal influences. One dummy was postulated for the summer months (June, July, and August). An alternative set of dummies was included in order to test the influence of each month separately.<sup>17</sup>

The summer dummy was included for two reasons. The summer months typically cause a decline in business activity generally and financial activity specifically.<sup>18</sup> Second, preliminary tests of the 1969 weekly demand model indicated that there was some type of summer influence on Euro-dollar liabilities, unexplained by any other variable. The monthly dummies allow the months which had the greatest effect on the dependent variable to be precisely determined. As such, they allow a greater degree of precision in analyzing seasonal impact.

10. A dummy variable representing structural change.

The imposition of marginal reserve requirements on Euro-dollar borrowings from foreign branches and the redefinition of cash items in process of collection by the

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<sup>17</sup>Ronald Wonnacott and Thomas Wonnacott, Econometrics (New York; John Wiley and Sons, 1970), pp. 68-77 explain the use of dummy variables.

<sup>18</sup>This is evident in the financial press. See also Stanley Black, "An Econometric Study of Euro-Dollar Borrowing by New York Banks and The Rate of Interest on Euro-Dollars," Journal of Finance, Vol. 26, No. 1 (March, 1971), pp. 87-88.

Federal Reserve in September 1969 changed the environment in which Euro-dollar borrowing occurred. Presumably, by making Euro-dollar borrowings more expensive, the demand for these liabilities would decline. This, at least, was the reasoning the Federal Reserve used in imposing the requirements in response to the massive increases in such borrowing in 1969.<sup>19</sup> Thus, when the dummy is coded 1 (reserves required and cash items redefined) Euro-dollar liabilities should decline, and when coded 0 (no reserve requirements and cash items defined as before) these liabilities should increase.

### III. Estimating Procedure and Sources of Data

#### A. Estimating Procedures

Regression analysis requires the statement of a dependent variable and one or more independent variables. The movements in the independent variable(s) are hypothesized to influence the movements of the dependent variable. By analyzing the contribution that each independent variable makes toward the explanation of the

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<sup>19</sup>See, among others, "Euro-dollars: A Changing Market," op. cit., p. 766; Gaines, op. cit., p. 1; Williams, op. cit., pp. 12, 25-28; "Eurodollar Banking Today," op. cit., p. 78; Coombs, op. cit., (March, 1970), p. 64; and Andrew Brimmer, The Euro-dollar Market and the United States Balance of Payments, paper presented at the London School of Economics, London, November, 1969.

dependent variable's movements, an equation can be constructed that explains or predicts the value the dependent variable will take depending on the values that the independent variables take. This equation is an estimate of the true relationships that exist between the dependent and independent variables.

This section outlines briefly the procedure used in estimating the demand equations for Euro-dollars by U.S. banks. The following section indicates the sources of the data used in the analysis. With this basis, the results of the regression analysis and an interpretation of the results will be provided.

The dependent variable specified in the analysis is the amount of Euro-dollar borrowings by U.S. banks. This value can be approximated by the data compiled by the Federal Reserve and titled, "Liabilities of U.S. Banks to Their Foreign Branches."<sup>20</sup> The measure omits the amount of direct borrowing by U.S. banks of dollar balances held by European banks, such data being unavailable. However, it seems logical to assume that such direct borrowing, while perhaps less profitable, was motivated by the same

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<sup>20</sup>See, for instance, Table 21, Federal Reserve Bulletin, Vol. 56, No. 12 (December, 1970), p. A86.

factors as impelled the borrowing of Euro-dollars through European branches. Further, the effects of such borrowing on the efficiency of U.S. monetary policy are generally similar to those that result from borrowing from overseas branches.

The time period considered is January, 1966 through December, 1970. Monthly data was collected for each of the hypothesized determinants of demand and, in addition, weekly data for 1966-67 and 1969 (January through August) was compiled and tested. Comparing the results obtained for the weekly subperiods with those obtained from the monthly analysis provides an indication of the explanatory power of certain independent variables in different situations. The 1969 weekly test has the added advantage of being structurally (internally) consistent.<sup>21</sup> That is, the period begins with the imposition by the Federal Reserve of tight money and ends as marginal reserve requirements on Euro-dollar liabilities above the base amount are about to go into effect. Thus, Euro-dollar borrowing in this period occurred under comparatively constant conditions and provides an excellent model in which to test the hypotheses of this

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<sup>21</sup>See J. Johnston, Econometric Methods (New York: McGraw Hill Book Co., 1963), p. 232.

dissertation. Finally, a comparison of the differences between this period and the entire period under review is possible.

A starting date of January 1966 was chosen for the study since it was in this year that banks first actively entered the market on a large scale. Prior to this time, relatively little borrowing from branches occurred and most U.S. banks were, it appears, generally unaware of the advantages the market offered to them.<sup>22</sup> December 1970 is the end point of the analysis because reliable data beyond this date could not be obtained due to research time constraints. In addition, the movement by the Federal Reserve towards encouraging the maintenance of Euro-dollar balances by the banks for balance of payments reasons introduced a change in the structure or environment that made the date seem a logical concluding point.

The procedure used in estimating the predictive or descriptive equations was to postulate the major theoretical determinants of the demand for Euro-dollars by U.S. banks (Chapter 3), approximate these determinants with quantifiable measures (this chapter, Section II,B), collect

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<sup>22</sup>See, for instance, Williams, op. cit., pp. 9-11, and Clendenning, op. cit., pp. 26, 56.



the data describing these factors for the time period under consideration, and utilize a stepwise regression program to sort out the most important factors influencing demand.<sup>23</sup> The stepwise procedure operates, as its name implies, in steps. In the first step, the computation of the simple regression line between the dependent variable and the independent variable that reduces the standard error to its smallest value is undertaken. Thus, the independent variable that explains the most variation in the dependent variable is chosen and the regression equation between it and the dependent variable is calculated. Then, step by step, additional variables are added to the equation one at a time in the order that reduces the unexplained variation by the greatest amount.<sup>24</sup>

The determination of which variable should be added is made by taking that variable, not included in the equation as it stands, which has the highest partial correlation coefficient and adding it to the regression

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<sup>23</sup>Here, the BIOMED 02R canned program was utilized. An outline and explanation of the print out of this program may be found in Donald Harnett, Introduction to Statistical Methods (Reading, Massachusetts: Addison-Wesley Publishing Co., 1970), chapters 9 and 10. The following explanation derives from this discussion.

<sup>24</sup>Ibid., pp. 354-355.

equation. The square of the partial correlation coefficient indicates the proportion of the unexplained variation which is reduced by adding that variable, relative to the variation remaining to be explained. The addition of variables based on this criteria continues until all the specified variables have been added or until the stated number of steps has been reached.

The stepwise procedure becomes somewhat unwieldy when a large number of variables are postulated. This occurs because there often exist several different equations that equally well explain the variation in the dependent variable. Thus, alternative specifications of the variables to be included and excluded from the regression equation must be made. For example, the simple stepwise regression may indicate that one variable is extremely important in the determination of the variation in the dependent equation. However, if this variable is excluded from the equation, it often appears that other variables, whose influence was swamped by the original important variable and were therefore of little or no importance in explaining the variation, become quite important. This frequently indicates that multicollinearity is present. The determination of which variables to include in the final equation, then, rests not merely on the mechanical determination of the explanatory power of each variable and on the observation of multicollinearity,

but on the researcher's intuition as to the proper variables to include. The researcher has available to him, in many instances, several different equations, all explaining remarkably well the variation in the dependent variable. The choice of which equation finally to use then rests on the theoretical basis upon which the model was originally constructed.<sup>25</sup> Also, since both flow and stock analyses were computed, a choice between the particular form the equation will take must be made. The final criterion will be the attainment of the best descriptive equation possible.

No lag structure was specified in the variables for several reasons. Most important, it was assumed that the international and U.S. financial markets are sufficiently well organized and the participants sufficiently well informed that responses to changes in a particular sector of a market are relatively rapid. The communication of pressures from one market to another, and between sectors within a market, was assumed to be quite fast. A second

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<sup>25</sup>Edward Kane, Economic Statistics and Econometrics (New York: Harper and Row, Publishers, 1968), pp. 273-274 makes this warning. He also notes that the testing of so many different hypotheses or combinations of variables increases greatly the probability that at least one "significant" result will be obtained. The solution to these problems, as noted above, involves the specification of the model based upon logical or sound theorization. This will provide insurance against spurious significance. Secondly, careful observation of the effect on the partial correlation coefficient of a dropped variable when other variables are added will insure that the dropped variables are truly of no value.

reason for omitting a lag structure was that the results obtained without specifying such a structure were quite satisfactory. Finally, anticipations play an important role in the money markets and it was therefore assumed that any lags which might exist were offset by the anticipations and resultant discounting of future changes that occur.

#### B. Data Sources

Most of the data used was obtained from the Federal Reserve Bulletin, the Wall Street Journal, and the publications of Salomon Brothers.<sup>26</sup> In some cases, consistent data back to 1966 was not directly available. In these cases, and where possible, reconstruction of the data was undertaken. Where this was not possible, the Federal Reserve Board supplied copies of the records it maintains for its own use.

Monthly data is published as of the end of the month in some cases and as of the first of the month or as of the first Wednesday of the month in others. To maintain consistency, an attempt to convert all data to beginning of the month values was made. Published data as of the end of the month were utilized as a measure of the variable for the following month. While some slight irregularities might result, cross checking indicated that they were very

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<sup>26</sup>Primarily An Analytical Record of Yields and Yield Spreads (New York: Salomon Brothers and Hutzler, 1969(?)), and their weekly Bond Market Roundup and Comments on Credit.

minor. Measures of a variable for June 30, for instance, and July 1 do not normally vary greatly. In the case of a few series of data that were available only for the first Wednesday of the month, no adjustments were possible. These series were used as they were and it is conceded that a slight lag may therefore exist in these series. However, it is a short lag, of less than a week and probably of limited importance. The data used for the weekly models is consistently as of Wednesday of each week. This is the form that such series are issued by the Federal Reserve Board. The source of each data series is noted in Appendix A.

#### IV. Empirical Results and Implications

##### A. The Basic Equations

The use of a stepwise regression program was undertaken in order that an equation with substantial explanatory power might be obtained. This procedure, as noted in section III, entails the specification of a number of theoretically relevant variables. These variables are entered into the analysis, one at a time, and a regression run. Values for the excluded variables are also calculated so that a check may be maintained on the effect that adding (or deleting) a variable has on the power and significance of all the included (and excluded) variables. In this way, a respecified equation including only the significant variables can be obtained. Table 1 indicates the final

TABLE I  
REGRESSION RESULTS --- STOCKS AND FLOWS<sup>1</sup>

| <u>Stock</u>  | <u>Demand-Monthly</u>           | <u>R<sup>2</sup></u> | <u>SEE</u>                     | <u>F</u> |
|---|---------------------------------|----------------------|--------------------------------|----------|
| (1) E\$D = -22,665.2 -.197CD +.112CIL +.13MS +1.17RCP-RQL | (3.7) (18.7) (3.65) (11.05)     | .971                 | 737.7                          | 457.1    |
|   | [-.176] [235] [467] [288]       |                      | d=1.04<br>(+AC)                |          |
| <u>Flow</u>   |                                 |                      |                                |          |
| (2) ΔE\$D = 402.61 -.3ΔCD -.26ΔCIL -.41RRES -847.6JAN     | (4.8) (2.98) (3.07) (5.09)      | .734                 | 362.2                          | 23.9     |
|   | [-.509] [-.424] [-.277] [-.323] |                      | d=1.96<br>(No AC)              |          |
|   | +654.01JUL +451.4ΔRTB-RQL       |                      |                                |          |
|   | (2.88) (2.92)                   |                      |                                |          |
|   | [.276] [.226]                   |                      |                                |          |
| <u>Stock</u> <u>Demand - 1966-67 Weekly</u>               |                                 |                      |                                |          |
| (3) E\$D = -9,850.23 -.2CD +.28CIL -509.21JUNE            | (9.1) (14.4) (4.3)              | .950                 | 207.5                          | 223.5    |
|   | [-.241] [878] [-.154]           |                      | d=1.41<br>(Indeter.<br>Region) |          |
|   | -531.26JULY +339.0RTB-RQL       |                      |                                |          |
|   | (4.01) (3.45)                   |                      |                                |          |
|   | [-.145] [.128]                  |                      |                                |          |

TABLE 1 - CONTINUED

| <u>Flow</u>  | <u>Demand - 1966-67 Weekly</u>                   | <u>R<sup>2</sup></u> | <u>SEE</u>        | <u>F</u> |
|--|--|----------------------|-------------------|----------|
| (4) $\Delta E\$D = 18.98 - .11\Delta SECS + 202.07JUNE^*$              |  | .193                 | 158.2             | 7.3      |
|  | (2.79) (2.47)                                    |                      | d=2.51            |          |
|  | [-.349] [.285]                                   |                      | (Indeter. Region) |          |
| <u>Stock</u>   | <u>Demand-1966 Weekly</u>                        |                      |                   |          |
| (5) $E\$D = 20,755.69 - .61CD + 1,833.05RTB-RQL$                       |  | .967                 | 462.1             | 470.0    |
|  | (22.25) (5.36)                                   |                      | d=1.22            |          |
|  | [-.730] [.294]                                   |                      | (+AC)             |          |
| <u>Flow</u>  |  |                      |                   |          |
| (6) $\Delta E\$D = 65.86 - .57\Delta SECS^* + 2,042.1\Delta RTB-RQL^*$ |  | .500                 | 377.7             | 7.3      |
|  | (2.39) (2.14)                                    |                      | d=1.89            |          |
|  | [-.637] [.574]                                   |                      | (No AC)           |          |
|  | $-2,246.32\Delta RCP-RQL^* + 1,214.23 JUNE$      |                      |                   |          |
|  | (2.29) (2.79)                                    |                      |                   |          |
|  | [-.543] [.793]                                   |                      |                   |          |
| <u>Stock</u>   | <u>Black's 1966-68 Weekly Demand<sup>2</sup></u> |                      |                   |          |
| (7) $E\$D = -.446CD - 1,480E\$RATE + 650RFF + 1,681RTB + 26.0TREND$    |  |                      |                   |          |
|  | (2.2) (4.6) (2.3) (7.7) (44.3)                   |                      |                   |          |

\*Significant at .02 level.

<sup>1</sup>Figures in millions of dollars except interest rate and dummy variables.

<sup>2</sup>Stanley Black, "An Econometric Study of Euro-Dollar Borrowing by New York Banks and the Rate of Interest on Euro-Dollars," Journal of Finance, Vol. 26, No. 1 (March, 1971), pp. 85-88.

stock and flow equations that best explain the fluctuations in Euro-dollar liabilities of U.S. banks for the late 1960's. The particular equations were chosen because of their various attributes, discussed below.

The  $t$  value for each variable is indicated in parentheses directly below the variable and, unless starred, the variable is significant at the .01 level. In addition, the Beta coefficient is noted in brackets below each variable.<sup>27</sup> The summary measures,  $R^2$ , SEE (Standard Error of Estimate), and  $F$  value for the entire equation are indicated for each equation. Table 2 lists the complete variable set used in each analysis and, in addition, indicates the theoretically expected coefficient signs derived from the analysis in Section II.

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<sup>27</sup>The Beta coefficient is obtained by multiplying the regression coefficient by the ratio of the standard deviation of the variable to which the regression coefficient applies and the standard deviation of the dependent variable. The result is sometimes called a standardized or normalized regression coefficient. The usefulness of the measure is that, unlike the regression coefficient, the impact or importance of each variable on the dependent variable is indicated by the relative size of its Beta coefficient. The sign of the coefficient may be positive or negative, depending upon the sign of the original regression coefficient. However, the sign is often omitted since it has no significance in explaining the importance of each variable.

The Beta coefficient is unaffected by the units of measure of each variable. The square of the coefficient is the direct contribution of that particular variable to the  $R^2$  of the entire equation. One drawback of the Beta coefficient is that it becomes less reliable as the degree of multicollinearity increases. See Mordecai Ezekiel and Karl Fox, Methods of Correlation and Regression Analysis (New York: John Wiley and Sons, 1959), p. 197 and Norman Draper and Harry Smith, Applied Regression Analysis (New York: John Wiley and Sons, 1966), Chapters 2 and 4.



TABLE 2  
VARIABLES TESTED AND THEORETICALLY EXPECTED  
COEFFICIENT SIGNS

Monthly Demand

1. Liabilities of U.S. banks to their foreign branches
2. Euro-dollar interest rate on deposits (-)
3. Large CD's outstanding at large banks (-)
4. Commercial and industrial loans at large banks (+)  
(-for flows)
5. Free reserves at all Federal Reserve System member  
banks (open)
6. Dummy for required reserves on Euro-dollar liabilities,  
starts September 1969 (-)
7. U.S. government securities held by large banks (-)
8. Dummy for summer, June, July, and August (-)
9. Money supply, adjusted (open)
10. ---20. Monthly dummy, excluding December (open)
21. Federal Funds rate (+)
22. Discount rate in effect (+)
23. Three month Treasury bill rate versus Regulation Q  
ceiling rate on three month CD's--spread (+)
24. Four-six month commercial paper rate versus Regulation  
Q ceiling rate on three month CD's--spread (+)  
Note: minus value for spread means favor of CD's,  
positive value means spread in favor of bills or  
commercial paper.

Demand-1966-Weekly

1. Liabilities of U.S. banks to their foreign branches
2. Euro-dollar interest rate on deposits (-)
3. Large CD's outstanding at large banks (-)
4. Commercial and industrial loans at large banks (+)
5. Free reserves at all Federal Reserve System member  
banks (open)
6. U.S. government securities held by large banks (-)
7. Dummy for summer, June, July, and August (-)
8. Money supply, adjusted (open)
9. --19. Monthly dummy, excluding December (open)
20. Federal Funds rate (+)
21. Three month Treasury bill rate versus Regulation Q  
ceiling rate on three month CD's--spread (+)
22. Four-six month commercial paper rate versus Regulation  
Q ceiling rate on three month CD's--spread (+)  
Note: signs as in Monthly Demand.

TABLE 2 CONTINUED

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Demand-1969-Weekly

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1. Liabilities of U.S. banks to their foreign branches
  2. Euro-dollar interest rate on deposits (-)
  3. Large CD's outstanding at large banks (-)
  4. Commercial and industrial loans at large banks (+)
  5. Basic deficit at 5 Chicago and 8 New York banks  
(-means surplus) (+)
  6. Free reserves at all Federal Reserve System member  
banks (open)
  7. Dummy for summer, June, July, and August (open)
  8. Money supply, adjusted (open)
  9. U.S. government securities held at large banks (-)
  10. Federal Funds rate (+)
  11. Discount rate in effect (+)
  12. Three month Treasury bill rate versus Regulation Q  
ceiling rate on three month CD's--spread (+)
  13. Four-six month commercial paper rate versus Regu-  
lation Q ceiling rate on three month CD's --spread (+)
  - 14-20. Monthly dummy, excluding January (open)
- Note: Signs as in Monthly Demand.

There are several general points that should be made concerning the analysis. First, stock equations may be expected to exhibit autocorrelation since this is a time series analysis and since the omission of variables, both known and unknown, may be important in some combination. Also, these disturbances may affect more than one week or month.<sup>28</sup> As the table shows, the Durban-Watson d statistic indicates the presence of autocorrelation in the stock equations. Autocorrelation is not indicated in the flow equations, however, which confirms that here, at least, first differences analysis solves this problem.

Second, multicollinearity is expected in at least some cases and does occur in the stock analysis. For example, the preliminary regressions indicated that the various interest rate spreads were correlated with each other, as well as with the dependent variable. The final equation contains only one such spread, however, which negates the problem. The correlation between interest rate spreads is to be expected if the assumption of interrelated money markets and interrelated rates within markets is valid. The flow analyses are basically free of multicollinearity because all but one of the related variables is dropped in the final equations.

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<sup>28</sup>Black, op. cit., pp. 85-86.

Third, the variables that were found to be significant in the stock analysis are generally so in the flow analysis although, as can be noted, the use of first differences reduces the number of significant variables (and generates a somewhat lower  $R^2$ ).

Fourth, the signs of the coefficients are generally as expected with one or two exceptions. The most glaring abnormality was a positive coefficient attached to the Euro-dollar rate in several equations of monthly demand. None of these preliminary equations was finally selected. They indicated that as Euro-dollar rates rose, demand for these funds increased. One explanation for this is that the rate rises as a result of the increased demand. Government securities also tended, in some cases, to be positively related to Euro-dollar liabilities, a somewhat unexpected result but one that valuation problems may explain.<sup>29</sup> Again, the final equations did not include this variable.

Fifth, the multiple  $R^2$  measures indicate a high explanatory power for both the stock and flow equations. Exceptions to this include the flow weekly demand for the two subperiods. In the 1969 case, the equation explains about half of the variation in Euro-dollar liabilities. For the 1966 weekly flow analysis, less than one-fifth of the variation is explained by the best equation. Flow

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<sup>29</sup>Brimmer, Euro-Dollar Market..., op. cit., pp. 8-9ff.

analysis of these subperiods is therefore of marginal usefulness. Whether the equations are misspecified or merely confirm the suspicion that the weekly data is affected by transitory forces of a truly random character is unknown. However, since the variables specified did allow the formulation of several good monthly equations, both stock and flow, it seems likely that it is transitory forces rather than misspecification that is responsible.

Sixth, the Beta coefficients indicate the wide variability in the explanatory power of the significant independent variables. In some cases, one variable clearly contributes more to the explanation of the variation than any of the others while in other cases each independent variable has relatively the same power of explanation. As stated in note 27, the Beta coefficient indicates, by its relative size, the impact of each independent variable on the dependent variable. Since it is stated in absolute numbers, the units of measure do not bias the interpretation of the contribution of each determinant, assuming that there is little or no multicollinearity. The sign of the Beta coefficient indicates the sign of the particular variable's coefficient and the variable's contribution to the slope of the final regression line.

Overall, the flow analysis of monthly demand may be

considered the most satisfactory equation. While the high multiple  $R^2$  measures associated with the stock equation indicates a better explanatory power, the flow or first difference analysis avoids several of the problems associated with stock time series analyses and has a sufficiently high  $R^2$  to be both useful and acceptable.

The standard error associated with all of the equations is relatively small. It varies from about \$150 million to slightly above \$700 million. Given the magnitudes being considered (billions of dollars), these error ranges seem acceptable. The F values associated with each equation are, in all cases, significant at the .01 level.

Finally, the equation that Stanley Black has derived to explain weekly Euro-dollar demand<sup>30</sup> (reproduced in Table 1) is similar to the equation derived here for 1966-1967. Black's equation is distinguished by the importance of a trend component and several interest rates. Neither it nor the weekly equation derived here predict well the 1969-70 experience.

## B. Interpretation of the Generated Equations

### Introductory

The equations finally chosen as the best descriptions of the demand for Euro-dollars by U.S. banks generally

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<sup>30</sup>Black, op. cit., pp. 86-88.

verify the hypotheses made prior to the regression analysis. As was expected, the monthly demand for Euro-dollars was influenced primarily by monetary policy or the effects of such policy. Thus, CD's outstanding and an interest rate spread (in this case, between the commercial paper rate and the CD ceiling rate) have substantial effects on the amount of Euro-dollar borrowing undertaken by U.S. banks. In addition, the demand for commercial and industrial loans at large banks in the U.S., as indicated by the amount of such loans outstanding, affected Euro-dollar borrowing. The basis of the demand for loanable funds by banks (i.e., Euro-dollar borrowing) derived from the demand by their customers for such funds and from the pressures restrictive monetary policy placed on the banks.

#### Monthly Demand

The stock monthly demand equation 1 indicates that U.S. monetary policy affected the demand for Euro-dollars by U.S. banks. Based on the Beta coefficients, the money supply variable (MS) is the most important determinant of Euro-dollar borrowing. An increase in money is associated with an increase in Euro-dollar liabilities. This direct relationship was not expected since Euro-dollar borrowing appears to rise during tight money periods and one of the characteristics of tight money is a halt or decline in the growth of the money stock.

Several explanations of the strong direct relationship are possible. First, the money supply rarely stops growing completely, even in tight money periods. There is, therefore, an upward trend in the money supply series. In the time period tested, Euro-dollar borrowing also rose fairly steadily. Thus, since both series trend upwards, a direct relationship results in the regression analysis. This trend explanation is reinforced by Stanley Black's results (Table 1, equation 7). He found a positive weekly trend of \$26 million affecting Euro-dollar demand. This variable was the most important influence on Euro-dollar demand. The other independent variables were regarded by Black as " . . . determining deviations around the unexplained trend increase of \$26 million per week."<sup>31</sup> Equation 1 presented here may be viewed as utilizing the money supply as a proxy for the trend evident in the Euro-dollar liabilities series. Money supply rose less than \$1 billion a month over the tested time period. This means that the money supply variable "explained" something less than \$13 million a month of the total rise in Euro-dollar liabilities. While this is only 1/8th the effect that Black's trend variable has, the negative impact of rising Euro-dollar rates in Black's equation, taken together with the trend, generates a total effect roughly similar to that postulated by the money supply in equation 1.

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<sup>31</sup>Ibid., p. 88.



A second possible explanation of the direct relationship between money supply and Euro-dollar liabilities relies on the analysis presented in Chapter 2. Euro-dollar borrowing was undertaken by U.S. banks as they lost CD's in 1966 and 1969 due to effective Regulation Q limits. These time deposits became demand deposits as former CD holders channeled their funds into more profitable investment vehicles. Time deposits are not included in the money supply but demand deposits are. Therefore, a direct relationship between money supply and Euro-dollar liabilities of U.S. banks derives from the purely mechanical fact that the shift from time deposits to demand deposits occurred at the same time that banks were increasing their Euro-dollar liabilities, i.e., during tight money periods.

Neither of the above explanations implies any real affect of money supply on Euro-dollar liabilities. The inclusion of a money supply series in such an equation, therefore, must be based on the usefulness of the variable as a proxy for trend, monetary policy or economic activity, or as an indicator of the impact of monetary policy on the composition of bank deposits and thus on the banks' desire to borrow Euro-dollars.

It should also be noted that multicollinearity reduces the value of the Beta coefficient. Since multicollinearity was present in the analysis, the Beta value may be giving false significance to the money supply variable.

The other variables that contribute to the explanation of the monthly variation in Euro-dollar liabilities are also associated with monetary policy. As hypothesized, outstanding CD's are negatively related to these liabilities, but not in the magnitude expected. Commercial and industrial loans at large banks (CIL) are positively related to Euro-dollar borrowings. The lessened availability of U.S. funds and higher domestic interest rates associated with tight money thus did not choke off these loans but merely redirected the lending banks' search for funds to finance them. As noted in Chapter 2, Euro-dollar borrowing allows the banking system to increase its loans even though the money supply remains constant. This, combined with the upward trend of both Euro-dollar liabilities and loans, generates the direct relationship observed.

Finally, the positive relationship between Euro-dollar liabilities and the yield spread advantage of commercial paper over CD's indicates that monetary policy, by restricting rates payable on time deposits, causing other market rates to rise, and increasing the proportion of demand deposits and thus average reserves, provided a further incentive to U.S. banks to borrow in the Euro-dollar market. Taken together, the explanatory variables of Euro-dollar borrowing reflect the impact of monetary policy in the United States.

Both multicollinearity and autocorrelation appear in the stock equation. Multicollinearity was expected because money supply and commercial and industrial loans are interrelated. Since both variables contribute appreciably to the explanation of Euro-dollar borrowing, however, they are both included in the final equation.<sup>32</sup> The presence of autocorrelation, as indicated by the Durban-Watson d statistic, implies that there is some unexplained correlation between Euro-dollar liabilities and the residuals.

To solve the autocorrelation and multicollinearity problems, first differences analysis of the monthly demand data was undertaken.<sup>33</sup> In this flow analysis (equation 2) the same types of variables that were significant in the stock analysis are significant except that the influence of seasonality (January and July), the imposition of marginal reserve requirements (a dummy, RRE\$), and the lack of significance of changes in the money supply are evident. The  $R^2$  is lower in equation 2 indicating a lower explanatory power for the flow equation. The benefits derived from the reduction of autocorrelation

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<sup>32</sup>Tests excluding each of the variables in turn indicated that both variables had significant explanatory power. In addition, both retained the signs obtained when utilized together.

<sup>33</sup>Wonnacott and Wonnacott, op. cit., p. 140.

and multicollinearity and the achievement of correctly signed coefficients outweigh the loss implicit in this reduced explanatory power.

In addition to the seasonal factors, the marginal reserve requirements dummy is significant in the flow analysis. Euro-dollar demand falls substantially when reserve requirements go into effect. But, the month of July brings out large upward changes in Euro-dollar borrowings. This may be due to pure seasonality or to some other unspecified factor. The suspicion is that the unwinding of mid-year window dressing by Eurobanks increases Euro-dollar demand. But this would not explain the greatly increased demand for borrowings by U.S. banks in these particular months. The explanation is elusive.

Changes in CD's outstanding ( $\Delta CD$ ) is the most important variable in the flow equation. These changes are negatively related to changes in Euro-dollar liabilities, an expected result. Large commercial and industrial bank loans ( $\Delta CIL$ ) are also negatively related to the dependent variable. This result also conforms to the postulated relationships previously noted. While Euro-dollar borrowings are directly associated with loans, the change in loans outstanding is inversely related to changes in the dependent variable. Thus, smaller and smaller increases in loans occur in tight money periods while the change in Euro-dollar borrowings is increasing, a logical and expected result.

A yield spread between the rate on Treasury Bills and on CD's is significant, as is a similar spread in the stock analysis. Thus, except for the seasonal and structural components in the flow analysis, and the money supply in the stock analysis, the two monthly demand equations and Black's weekly equation covering the same general period are quite similar. They indicate that Euro-dollar borrowing by U.S. banks is affected by monetary policy, as measured by the different variables included. Further, access to the Euro-dollar market negates, in some sense, the efficiency of monetary policy.

#### Demand-Tight Money Periods

The 1966 weekly demand-stock analysis (equation 3) includes the same basic factors as did the monthly demand. CD's outstanding (CD), commercial and industrial loans (CIL), a rate spread between Treasury Bills and the Regulation Q ceiling (RTB-RQC), and early summer seasonal factors are the significant variables. All have the expected sign and are significant at the .01 level.

The most important determinants are CD's and commercial and industrial loans. Note the pervading influence of loans, CD's, seasonal factors and a yield spread on demand, whether in the monthly or in the 1966 weekly sub-period. The flow analysis of weekly 1966 demand (equation 4) is of little value, indicating only that May had a positive influence on changes in Euro-dollar borrowings

and changes in government securities held by large banks had a negative influence.

Weekly demand, stock, for 1969 (equation 5), includes the variables for CD's and the Treasury Bill-Regulation Q ceiling spread. The equation is significant at the .01 level and explains 97% of the 1969 variation in Euro-dollar borrowings. The flow equation (equation 6), explaining half the variation in Euro-dollar liabilities, includes government securities holdings ( $\Delta$ SECS), the Treasury Bill-Regulation Q ceiling spread, commercial paper-Regulation Q ceiling spread, with the wrong sign ( $\Delta$ RCP-RQL), and the June dummy. Only the June variable was significant at the .01 level.

The 1966 and 1969 demand tight money subperiods tested generally support the entire period demand analysis conclusions. All include in some form reference to CD's outstanding and spreads between the Q ceiling and either Treasury Bills or commercial paper. In addition, some include a seasonal factor and a factor measuring bank assets, either loans, government securities, or the like. All have substantial explanatory power.

### Conclusions

Demand equations can be constructed to explain almost all of the variation in Euro-dollar liabilities of U.S. banks for the 1966-70 period. While the problem of the independence of the variables does exist, the predictive power of the equation is substantial. By using

first differences some of the predictive power is foregone but the problems of multicollinearity and autocorrelation are solved.

The 1970 and 1971 experience with U.S. bank borrowing of Euro-dollars alters the structure of the model used in this dissertation. The increased marginal reserve requirements, the change in the definition of cash items in process of collection, the lifting of the CD rate ceiling, and the influence of tight money in Europe on Euro-dollar rates have all combined to make the equations, as presently constituted, somewhat less than reliable as predictors of future Euro-dollar demand by U.S. banks. Prediction, however, was not the primary aim of the regression analysis presented here. Rather, explanation was the goal. The determination, quantitatively, of the major factors that influenced U.S. bank Euro-dollar borrowing in the period considered was undertaken. The results were, for the most part, as expected. Generally, the monthly flow equations explain somewhat less of the variation but overcome some of the disadvantages inherent in the stock equations. The weekly flow demand equations on the other hand, were unacceptable primarily because weekly changes were so erratic. Here the stock equations were of more value. All the equations, stock and flow, point to the impact of monetary policy on Euro-dollar borrowing and, in reverse, the leakage from the effectiveness of such policy due to bank access to the Euro-dollar funds market.

Further analysis could be undertaken combining the best stock and flow variables. In addition, an extension of the time period and the specification of an easy money subperiod could be undertaken. Whether Euro-dollar borrowing, at the considerably lower level now prevailing, is affected by the same determinants in the same magnitude is questionable. Also, whether this low level of borrowing has any appreciable impact on monetary policy in the United States is debatable. It would appear, however, that the decline in U.S. bank Euro-dollar liabilities in 1971 is added proof of the marginal nature of Euro-dollar borrowing to U.S. banks and of the importance of monetary policy on such borrowing. It may be that the flurry of Euro-dollar borrowing in the last half of the 1960's was a temporary aberration. Only further experience will verify or negate this.



## CHAPTER V

### CREDIT CREATION AND MONETARY POLICY

#### I. Introduction

The last chapter verified empirically that U.S. monetary policy was the primary determinant of Euro-dollar borrowing by U.S. banks. As measures of this policy, the amount of CD's outstanding and interest rate differentials served as the best proxies. Previously, in Chapter 2, a discussion of the Euro-dollar system mechanism was undertaken and a description of the basic process by which credit creation can occur in the system was given.

In this chapter, a more extensive discussion of Euro-dollar credit creation, the Euro-dollar money multiplier, and the effects on U.S. and European monetary policy of such credit creation will be presented. Of primary interest will be an investigation of the effects of Euro-dollar credit creation on U.S. bank borrowing and thus on U.S. monetary policy. It is through such borrowing of Euro-dollars that the Euro-dollar monetary system impinges directly on the U.S.

monetary system. Further, the substantial intervention by central banks and official institutions has influenced credit creation in the Euro-dollar system and, through U.S. bank borrowing from the system, has affected the efficiency of U.S. monetary policy. The effects of this intervention on credit creation in the Euro-dollar system and a comparison between Federal Reserve open market operations and the evolving open market-type operations by European central banks and official institutions in the Euro-dollar system will conclude the chapter.

## II. Credit Creation

### A. The Money Multiplier in the Euro-dollar System

Two distinctive differences between the U.S. and the Euro-dollar monetary systems with regard to credit creation were noted in Chapter 2. First, leakages of unpredictable magnitude may occur in the Euro-dollar system while such leakages in the U.S. system are small and usually predictable. Second, the reserves of the Euro-dollar system are the created money of another monetary system rather than the created money of the Euro-dollar system. Thus, credit creation in the system depends upon two factors, neither of which is completely controllable by the Euro-dollar system itself. To a certain extent, these factors can be overcome. Reserves may be obtained by exchanging domestic currency assets for dollars in the foreign exchange markets and by making Euro-dollar deposits more attractive to dollar holders. Leakages may be reduced by increasing the value to the user of holding Euro-dollar deposits. This can be achieved by higher interest rates on deposits and by measures designed to increase the availability and acceptability of the currency produced. Nonetheless,

leakages and reserves present the two greatest problems to credit creation in the Euro-dollar system.

Theoretically, multiple credit creation in the Euro-dollar system,<sup>1</sup> with a given level of reserves, depends on the percentage of reserves required or optionally held on each deposit and upon the loan retention ratio.<sup>2</sup> The amount of reserves held will vary depending on the number of intermediaries that are used before final disposition of the funds is made. Interbank lending of Euro-dollars may appreciably increase the proportion of the original dollar deposit held as reserves and, as such, represents a leakage that reduces possible credit creation levels. Basically, the credit creation multiplier is equal to the inverse of leakages

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<sup>1</sup>The following credit multiplier was developed by Swoboda, op. cit., pp. 31-33, 41, and his basic idea and notation is used below. His analysis has been considerably expanded here.

<sup>2</sup>The loan retention ratio represents the proportion of a loan that is redeposited within the system, on average.

out of the system and into other currency assets or withheld from circulation in reserves.<sup>3</sup>

If the primary deposit is denoted  $x$ , the reserve ratio  $a$  (assumed, for simplicity, to be the same for all intermediaries, including the final lender), and the ratio related as  $b=1-a$ , then the total amount of Euro-dollar deposits (original, intermediary, and final loan), i.e., gross deposits, are:

$$(1) \quad D_G = \sum_{i=0}^m x b^i$$

where  $m$  is the number of bank intermediaries able to

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<sup>3</sup> Machlup, "Euro-Dollar Creation:....," op. cit., pp. 239-242 also discusses the Euro-dollar system multiplier, noting the leakages that can occur and the fact that a statistical reserve multiplier, based on the keeping of reserves of less than 100% of deposit liabilities, does not prove that a positive credit multiplier exists. What does prove it, for Machlup (p. 241), is that Euro-dollar deposits do not equal, but rather exceed, the total of net transfers of balances from U.S. to European banks plus other dollar payments to European banks.

operate on the lending-borrowing interest spread.<sup>4</sup> Net deposits after intermediation is netted out are:

$$(2) \quad D_N = x + xb^m .$$

Both (1) and (2) apply before the loan proceeds are utilized.

When the borrower utilizes the proceeds of his loan either he or the receiver may convert the funds into domestic currency. In this case, after clearing, all that remains is the original primary Euro-dollar deposit. No credit creation has resulted and  $D_N = x$ .

Should the creditor redeposit some or all of the Euro-dollar funds received (or reconvert the domestic currency into dollars and deposit the dollars) into a Eurobank, multiple credit creation can occur. Denote the proportion of the loan redeposited by the payee as  $\underline{d}$ .

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<sup>4</sup>Swoboda, loc. cit., refers to gross lending rather than to gross deposits. However, only if the original deposit is considered a loan would this be gross lending. As Machlup correctly notes, original Euro-dollar deposits are no more to be considered loans than are dollar deposits in U.S. banks. Ibid., pp. 223-225. Gross lending including intermediation would be

$$LG = \sum_{i=1}^m xb^i .$$

The loan based on the original deposit  $\underline{x}$  has induced a further deposit of  $x(b^m d)$  and the creation, after intermediation, of the loan deposit  $x(b^m)^2 d$ . Upon use, should the proceeds of the loan be redeposited, the amount  $x(b^m d)^2$  would begin the next cycle and the final loan deposit created would be  $x(b^m)^3 d^2$ . Thus, net deposits within the Euro-dollar system<sup>5</sup> may be stated as

$$(3) \quad D_N = \sum_{i=0}^n x (b^m d)^i$$

where  $\underline{n}$  is the number of times redeposits of loan funds occur. Net loans are

$$(4) \quad L_N = \sum_{i=1}^{n+1} x (b^m d^{-1})^i$$

Total Euro-dollar deposits, excluding intermediation accounts between banks, may expand by various amounts, depending upon the leakages caused by the combination of reserve holdings,  $\underline{a}$ , intermediation stages,

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<sup>5</sup> This presumes that the Euro-dollar deposit created by the final loan clears against the system.

$\underline{m}$ , and redeposits rates,  $\underline{d}$ . The greater is  $\underline{a}$ , the lower the amount  $\underline{b}$  that can be lent out. The greater the system's loan retention ratio, or redeposit rate,  $\underline{d}$ , the more that can be lent. Finally, the higher is  $\underline{m}$ , the smaller the amount reaching a final borrower.

Generally, the lower the reserves held, the fewer the intermediation steps (which compound the reserve leakage), and the higher the loan retention ratio, the greater the amount of Euro-dollars that can be created.

The credit creation or money multiplier<sup>6</sup> can be approximated by

$$(5) \quad M = \frac{1}{1 - b^m d} .$$

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<sup>6</sup>This is the multiplier obtained by Swoboda, *op. cit.*, p. 41. He takes the limit of the series

$$(6) \quad \sum_{i=0}^n (b^m d)^i = 1 + b^m d + (b^m d)^2 + (b^m d)^3 + \dots + (b^m d)^n$$

as  $n \longrightarrow \infty$ , for  $b^m d < 1$ .



Table 1 provides an example of Euro-dollar lending and redeposits for two stages, after which the funds are lost to the system. It also presents net deposits, net loans, and the value of the money multiplier. Note in the T-accounts and  $D_N$  calculation that the E\$64 loan deposit becomes a E\$51 redeposit. Since the loan retention ratio is .8, 20% of the funds are not recycled but rather represent a leakage from the system.

The credit creation multiplier depends on the leakages from the system in the same way as do net deposits. In reality, the reserves kept by banks on Euro-dollar deposits are very low, frequently approaching zero. The Eurobanks are able to maintain these low reserves because they generally equalize the maturities of their Euro-dollar deposits and of their Euro-dollar loans or redeposits. Nonetheless, small amounts of reserves are kept for working balances purposes and to recompense the New York banks for the paperwork involved with large volumes of Euro-dollar transfers.<sup>7</sup>

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<sup>7</sup>Williams, op. cit., p. 16; Scott, op. cit., p. 10; Little, op. cit., pp. 14-16; Klopstock, The Euro-Dollar Market...., op. cit., pp. 6-7; Klopstock, "Money Creation ....," op. cit., p. 14.

TABLE 1

## T-ACCOUNTS AND CALCULATIONS

| Eurobank A   |                                  | Eurobank B  |  |
|--|----------------------------------|---|--|
| \$100 U.S.<br>deposit  | <u>E\$100</u> primary<br>deposit | \$80 U.S.<br>deposit                                    | E\$80 deposit of<br>Eurobank A   |
| <u>which</u><br><u>becomes</u>                                       |                                  | <u>which</u><br><u>becomes</u>                          |  |
| \$20 U.S.<br>deposit<br>(reserves)<br>E\$80 deposit<br>at Eurobank B |                                  | \$16 U.S.<br>deposit<br>(reserves)<br><u>E\$64</u> Loan | +E\$64 deposit<br>(loan)<br>-E\$64 deposit<br>(upon use and<br>clearing) |
| Eurobank C   |                                  | Eurobank D  |  |
| \$51 U.S.<br>deposit   | <u>E\$51</u> deposit<br>(payee)  | \$41 U.S.<br>deposit                                    | E\$41 deposit of<br>Eurobank C   |
| <u>which</u><br><u>becomes</u>                                       |                                  | <u>which</u><br><u>becomes</u>                          |  |
| \$10 U.S.<br>deposit<br>(reserves)<br>E\$41 deposit at<br>Eurobank D |                                  | \$8 U.S.<br>deposit<br>(reserves)<br><u>E\$33</u> Loan  | +E\$33 deposit<br>(loan)<br>-E\$33 deposit<br>(upon use and<br>clearing) |
| Eurobank E   |                                  | Eurobank F  |  |
| \$26 U.S.<br>deposit   | <u>E\$26</u> deposit<br>(payee)  | \$21 U.S.<br>deposit                                    | E\$21 deposit of<br>Eurobank E   |
| <u>which</u><br><u>becomes</u>                                       |                                  | <u>which</u><br><u>becomes</u>                          |  |
| \$5 U.S. deposit<br>(reserves)<br>E\$21 deposit at<br>Eurobank F     |                                  | \$4 U.S.<br>deposit<br>(reserves)<br><u>E\$17</u> Loan  | +E\$17 deposit<br>(loan)<br>-E\$17 deposit<br>(upon use and<br>clearing) |

TABLE 1 continued

$$a = 20\%$$

$$b = 80\%$$

$$d = 80\%$$

$$m = 2$$

$$x = \text{E}\$100$$

### Net Deposits

$$D_N = \sum_{i=0}^n x(b^m d)^i$$

$$D_N = 100 + 100(.8^2 \cdot .8) + 100(.8^4 \cdot .8^2)$$

$$D_N = 100 + 51 + 26 = \text{E}\$177$$

### Multiplier

$$M = \frac{1}{1-b^m d}$$

$$M = \frac{1}{1 - .8^2 \cdot .8}$$

$$M = \frac{1}{1 - .51} = \frac{1}{.49}$$

$$M = 2.04$$

### Net Loans

$$L_N = \sum_{i=1}^{n+1} x(b^m d^{-1})^i$$

$$L_N = 100(.8^2 \cdot .8^{1-1}) + 100(.8^4 \cdot .8^{2-1}) + 100(.8^6 \cdot .8^{3-1})$$

$$L_N = 64 + 33 + 17 = \text{E}\$114$$

The reserve ratio that prevailed in the last half of the 1960's has been estimated to have been between one and five percent.<sup>8</sup>

With regard to the number of intermediaries that can exist on the rate spread between borrowing and lending interest rates, little information is available. It has been reported that spreads of 1/8 percent or less were sufficient to induce intermediation by some London Euro-banks.<sup>9</sup> Given the normal 1/2 point spread between bid and offer rates quoted in the press,<sup>10</sup> three intermediations could occur before a new deposit is relent to a final borrower (assuming the final borrower pays the offer rate). With a 50% redeposit

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<sup>8</sup>Williams, op. cit., p. 16; Scott, op. cit., pp. 10-11.

<sup>9</sup>Saunders, op. cit., p. 23; Einzig, op. cit., p. 73.

<sup>10</sup>"Money Rates," The Economist, last page, each issue.

rate,<sup>11</sup> the money multiplier,  $M = \frac{1}{1-b^m d}$ , equals about 1.8.

For every new primary deposit of \$1 placed in the Euro-dollar system, an original deposit of E\$1 plus a further E\$.80 was created. The Euro-dollar system has, then, been able to approximately double its size by credit creation. It is an example of a fractional reserve system, holding reserves of 50% on its deposit liabilities (based on the ratios assumed here).

Various writers have attempted to estimate the value of the multiplier at work in the Euro-dollar system. Klopstock has stated (without supporting calculations) that the multiplier varies from 1.5 to

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<sup>11</sup>The rate assumed may be low since the European central banks have practised recycling of Euro-dollar funds gained in the foreign exchange market. Machlup, "The Magicians....," op. cit., p. 6, discusses the probability of redepositing. The lowest probability is assigned to the redeposit of loans made to U.S. citizens. A somewhat higher probability of redeposit attaches to loans to, or investments in debt instruments of, non-U.S. non-financial Europe parties. The greatest chance of redeposit derives from loans to financial Europe individuals. Taken together, the 50% redeposit assumed is probably not completely unrealistic. Indeed, in 1970 and 1971 the greatest part of Euro-dollar loans have been made to financial Europe individuals. See "Euro-dollar Banking:....?" op. cit., pp. 12-13.

1.9.<sup>12</sup> He maintains that the redeposit cycle terminates at a very early phase since the high level of U.S. bank borrowing has drained large quantities of funds from the system. However, Klopstock does not take into account the recycling activities of the central banks (halted in mid-1971 in an attempt to slow the growth of the market). In addition, the repayment by U.S. banks of over \$10 billion of borrowings of what were Euro-dollar system reserves in 1970-71 and the increased demand and use of Euro-dollar deposits by Europeans in 1971 have served, theoretically, to increase the multiplier above that postulated by Klopstock.<sup>13</sup> A redeposit rate of .8 (rather than the .5 postulated above) would increase the credit creation multiplier to 3.3 or more, ceterus paribus.

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<sup>12</sup>Fred Klopstock, The Eurodollar Market: Some Unresolved Issues, Essays in International Finance, No. 65 (Princeton: Princeton University Press, 1968), p. 8. Multiplier values restated to conform to those used above.

<sup>13</sup>These events occurred after Klopstock published his study. See "Eurodollar Banking:....?" op. cit., pp. 11-12.

In contrast to Klopstock, Geoffrey Bell<sup>14</sup> and Milton Friedman<sup>15</sup> have argued that the multiplier operating in the Euro-dollar system may be a good deal larger than 2. That is, for every dollar primary deposit, more than one additional Euro-dollar is generated. Friedman sees the possibility of an almost infinite multiplier while Bell limits his to less than 10. Friedman bases his thesis on the premise that there are few if any reserves kept on Euro-dollar deposits and that redeposits are substantial. Bell is less sanguine about the redeposit rate but still assumes that there is a large reflow into the system.

Most other writers lean to the view that the multiplier is quite small but only Klopstock has clearly indicated an alternative explanation for the rise in Euro-dollar deposits outstanding over the last decade,<sup>16</sup>

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<sup>14</sup>Geoffrey Bell, "Credit Creation Through Euro-dollars?" The Banker, Vol. 114 (August, 1964), pp. 497-498. Multiplier restated.

<sup>15</sup>Friedman, op. cit., pp. 9-10.

<sup>16</sup>In his "Money Creation....," op. cit., pp. 14-15. Klopstock accuses Friedman of confusing what is possible with what actually occurs. (p. 12)

pointed to by Friedman as partial proof of his thesis. Klopstock attributes the rise in Euro-dollar deposits not to credit creation but to the attractiveness of the Euro-dollar investment vehicle. Funds have flowed to the Euro-dollar market, and, " . . . in recent years (Eurobanks) have drained huge balances from major foreign money and loan markets."<sup>17</sup> Also, the placement of funds in the market by foreign central banks has been sizeable. These funds have derived from U.S. balance of payments deficits which have placed more dollars in the hands of central banks than they have desired to keep for reserve purposes.<sup>18</sup>

The dispute between Friedman and Klopstock over the amount of ink in the Euro-dollar bookkeeper's pen (to use Friedman's expression) is an empty dialogue. Both men are correct in their different frames of reference.

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<sup>17</sup>Ibid., p. 14.

<sup>18</sup>The deficit has caused the supply of dollars to exceed the demand for dollars at the fixed rates maintained in the foreign exchange markets by the European central banks. They have, therefore, had to purchase these "excess" dollars. Ibid.



Klopstock views the Euro-dollar system from the vantage point of reserve flows while Friedman views it primarily from the point of reflows. The supply of reserves is a necessary condition for the expansion of Euro-dollar deposits but to view all such deposits, as Klopstock appears to do, as primary deposits is clearly incorrect. By the same token, to presume that the overwhelming majority of such deposits may be secondary deposits (redeposits), as Friedman does, is to ignore the fact that leakages of some magnitude do occur and that there is some basis required upon which to build Euro-dollar deposits. Friedman is persuasive, however, in showing that the \$9 billion U.S. liquidity deficit over the past five years and the less than \$5 billion decline in central bank dollar holdings do not in any sense equal the E\$30 billion in deposits outstanding (1969) plus the Eurobond issues placed over this period. The difference is clearly the result of credit creation within the Euro-dollar system.<sup>19</sup>

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<sup>19</sup>Friedman, op. cit., p. 4. This ignores, of course, the creation of official dollar reserves by the BIS, as noted by Machlup, "The Magicians...", op. cit.,

It appears likely that the magnitude of the multiplier has increased dramatically in the last few years. While U.S. bank borrowing drained reserves from the system in the late 1960's and held down credit creation,<sup>20</sup> the decline in U.S. bank borrowing in 1970-71 and the increased European demand for Euro-dollar deposits allowed greater credit creation and raised the multiplier to higher levels. Future credit creation by the system may be smaller than that which occurred in the past, however. European central banks have stopped recycling

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pp. 12-14. The inclusion of these created dollars in official reserves thus causes an understatement of the decline in central bank dollar holdings. See also Machlup's article referred to above, pp. 8-11, for a discussion of the discovery by analysts that the difference between U.S. liquid liabilities to official foreign and foreign exchange holdings of foreign monetary authorities was growing larger and larger in the mid- to late 1960's. No plausible explanation except Euro-dollar-creation appeared possible.

<sup>20</sup>The sensitivity of supply to interest rate changes may have offset much of this leakage, however.

dollars gained in foreign exchange operations<sup>21</sup> and uniform higher reserve requirements, taxes, and other discouragements have been under consideration as well. These actions will undoubtedly reduce the flow and re-flow of funds into the Euro-dollar system. Further, until the international monetary system is reconstructed, capital controls will continue to impede the flow of funds across national boundaries. Even with these restraints, however, it is doubtful that the supply of ink in the bookkeeper's pen will run completely dry.<sup>22</sup>

#### B. U.S. Bank Borrowing and Credit Creation

In the last half of the 1960's, U.S. banks steadily increased their borrowings of Euro-dollars. Much of this increased activity was attributable to tight money policies imposed by the Federal Reserve. Euro-dollar

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<sup>21</sup>The dollars gained now are either sold to the U.S., exchanged for various Treasury issues, or not purchased in the first place (the German floating mark case). See "Eurodollar Banking:..." op. cit., pp. 11-13; "Common Market Panel...", loc. cit.; "Europe's Central Banks...", loc. cit.; "Bundesbank Will Buy...", loc. cit.; "Central Banks Ponder...", loc. cit.

<sup>22</sup>"Eurodollar Banking:..." op. cit., pp. 14-15; "Central Banks Ponder...", op. cit., p. 13.

borrowing was a valuable source of funds to individual banks but did not bring about any appreciable increase in the total U.S. money supply or in total reserves. The borrowing did, however, allow an expansion of loans by U.S. banks at times when Federal Reserve pressures were working to restrict such loans. Beyond the maintenance or increase in loan portfolios allowed by Euro-dollar borrowing, U.S. banks were able to reduce for one day their required reserves by the amount of the borrowing. This was allowed, until September, 1969, under Regulation D. The draft used to collect the borrowed funds was treated as a cash item in process of collection.

Thus, the short term advantage in borrowing Euro- dollars was the reduction in required reserves. The long term advantage derived from obtaining funds upon which reserves were not required. Both these advantages were reduced by Federal Reserve amendment of the relevant regulations in 1969.

Euro-dollar borrowing by U.S. banks has had major effects on the Euro-dollar system. On its face, this major leakage of reserves must reduce severely the amount of credit that can be created in the Euro-dollar

system. However, to the extent that the additional credit created in the U.S. as a result of these borrowings generates higher U.S. incomes and thus higher U.S. imports, some of the dollars will flow back into the Euro-dollar system. In addition, the higher Euro-dollar interest rates generated by the increased U.S. bank borrowing have drawn more funds into the Euro-dollar market. While it is likely that a complete offset to the leakage caused by U.S. bank borrowing did not occur in past years, nonetheless, U.S. credit creation based on these borrowings may have had some positive effect (as well as the direct negative effect) on Euro-dollar system reserves.

Mention must also be made of the effect that money creation by the Euro-dollar system has on U.S. banks. This may seem quite obvious. Credit creation in the system has no effect on U.S. banks since it is not Euro-dollar deposits that U.S. banks borrow but rather Euro-dollar system reserves, and Eurobanks can not "create" these reserves. Yet, if they can not "create" reserves, they can, as a group and individually, obtain more of them. While U.S. banks individually can obtain

reserves by selling assets and thereby altering the composition of their asset structures, U.S. banks as a group can not "create" more reserves. One bank gains reserves at the expense of another. Eurobanks individually can also alter their asset structures to gain more reserves. But no Eurobank need lose reserves as a consequence of this alteration.

The Eurobank desiring more U.S. bank deposits (Euro-dollar system reserves) may sell non-deposit dollar assets in the United States. This will provide additional dollar deposits in U.S. banks. However, since these dollar assets may be minimal, Eurobanks may also sell domestic currency assets at home. The domestic reserves gained may then be converted into dollars (U.S. bank deposits) in the foreign exchange market. Neither of these actions (sale of dollar assets or of domestic assets and conversion) adversely affects either U.S. banks or other Eurobanks. They merely transfer ownership of the deposit previously held by a U.S. citizen or by the foreign central bank to the Eurobank. Indeed, if the central bank sells dollars it holds with the Federal Reserve, the deposit is

transferred to a U.S. commercial bank with ownership to the Eurobank. This increases U.S. bank reserves.

Eurobank activity, then, may increase U.S. system reserves. Whether this occurs or not, the Eurobank has obtained more reserves. While the Eurobanks do not create these reserves they do gain the use of them. The Federal Reserve can control the absolute amount of dollar system reserves and the various European central banks can control, equally, the volume of domestic currency reserves in their systems. However, neither has directly controlled the amount of Euro-dollar system reserves. The limits on Eurobank reserve gains are therefore set by strictures placed on asset composition, the actual magnitude of these assets, and the price they are willing to pay for such reserves.

Credit creation by the Euro-dollar system has presented U.S. banks with competition in the provision of a transactions medium and in the provision of new loans.<sup>23</sup>

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<sup>23</sup>Some extensive discussions of the competitive effects of the development of the Euro-dollar system have been published. This particular topic is beyond the scope of the present paper, except tangentially. See, for an exceptionally clear and original exposition,

The competitive aspects of the production of a new dollar asset by less regulated non-U.S. banks can not be underestimated. While credit creation by the Euro-dollar system may have no direct effect on U.S. banks (or, at most a temporarily positive one), indirectly Euro-dollar credit creation has meant the growth of a very competitive source of dollar denominated bank deposits and loans.

Euro-dollar credit creation has also affected individual U.S. banks. They find themselves in a more competitive atmosphere and, in addition, the deposits they have issued to foreigners are generally more volatile than domestically held deposits. The shifting of ownership of the deposit and the movement of the deposit into and out of

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Swoboda, op. cit., pp. 11-14, 17-22. Also see Helmut Mayer, Some Theoretical Problems Relating to the Euro-Dollar Market, Essays in International Finance, No. 79 (Princeton: Princeton University Press, 1970), pp. 26-31; Williams, op. cit., pp. 27-29; Bloch, op. cit., pp. 22-24; Machlup, "Euro-Dollar Creation:....," op. cit., p. 243; and Makowski, op. cit., p. 182.



particular banks may require the banks to hold an increased level of reserves.<sup>24</sup> The higher reserve ratio reduces credit creation possibilities in the U.S. system and represents a leakage from the system. This is one of the penalties borne by a system whose currency serves as an international money.

The effects on European banks individually and collectively of credit creation in the Euro-dollar system are quite varied. The existence of the Euro-dollar system presents to the banking institutions of these countries competitive problems similar to those faced by U.S. banks. Borrowers and depositors now have an alternative monetary system available to them. Its currency is accepted by creditors and convertible into other currencies on demand. The Eurobanks generate both dollar denominated and home currency loans and deposits. They appear to be in a more favorable position than their counterparts in the United States since they offer a broader product line than U.S. banks. However, this difference is more apparent than

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<sup>24</sup>This is, at least, the normal assumption made. Greater volatility requires a higher safety margin of reserves. John Leimone, "The Euro-dollar Market: An Element in Monetary Policy," Federal Reserve Bank of Atlanta Monthly Review, Vol. 53, No. 8 (August, 1968), p.4, notes that increased Euro-dollar transactions tend to substitute more volatile demand deposits for less volatile time deposits.

real for large U.S. banks have international facilities and can lend any currency desired (or they can lend dollars that can be converted into the desired currency).

The development of the Euro-dollar system has reduced the market power of the banks in particular countries. Cartel arrangements among national banks in Europe had tended to reduce competition in the money markets.<sup>25</sup> The Euro-dollar system, however, makes available to prospective borrowers and depositors a wide range of institutions and its international character has tended to undermine the cartel arrangements that previously existed.<sup>26</sup> The Euro-banks face competition from other Eurobanks and also from banks in the United States.

The effect of Euro-dollar credit creation on European monetary systems is substantial. Borrowers of Euro-dollars may, at their option, convert loan proceeds

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<sup>25</sup>Bloch, loc. cit.; Swoboda, loc. cit.

<sup>26</sup>Ronald McKinnon, Private and Official International Money: The Case for the Dollar, Essays in International Finance, No. 74 (Princeton: Princeton University Press, 1969), p. 21.

into domestic currency in the foreign exchange markets. The central bank must supply the home currency in order to maintain the par value of its currency. Therefore, without offsetting monetary policy, the existence of the Euro-dollar system and the availability of funds from it (and through the foreign exchange markets the availability of domestic currency) will increase the money supply in the home country. The lack of control over the creation of Euro-dollars combined with foreign exchange market requirements means that an additional uncontrollable source of domestic liquidity is available to home citizens.

The central banks can, of course, reduce Euro-dollar system reserves by holding the dollars gained in these transactions. Further, they can offset the inflow of domestic purchasing power by restrictive monetary policy. These actions may not be desirable to the central bank forced to take them, however. In addition, they may be counterproductive, attracting greater amounts of foreign purchasing power due to high interest rates.

U.S. bank borrowing of Euro-dollars has had several effects on the European countries. Since such borrowing reduces the reserves of the system, it reduces

the credit creating power of the system and thus the possible impact on European domestic liquidity. On the other hand, U.S. bank borrowing has driven up Euro-dollar interest rates and has tended to draw funds into the system.<sup>27</sup> This flow of funds transmits the high rates prevailing in the Euro-dollar system to the various national systems and may offset easy money policies being pursued by the central banks. Also, the flow of funds replenishes Euro-dollar system reserves lost due to U.S. bank borrowing and allows continued credit creation to occur. The net result of these forces may be a continued flow of liquidity into the national systems, since the credit creating power of the Euro-dollar system remains substantial.

To summarize, U.S. bank borrowing reduces the reserves and the credit creation capabilities of the Euro-dollar system. It also tends to transmit to other national money markets high interest rates prevailing in the U.S. during times of tight money. Finally, it tends

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<sup>27</sup>Klopstock, "Euro-Dollars in the Liquidity...", op. cit., p. 73.

to draw funds from these money markets into the Euro-dollar system (and then to the U.S.) depleting fund supplies in these countries.

Credit creation in the Euro-dollar system has little direct effect on U.S. banks since these banks borrow, ultimately, the reserves of the Euro-dollar system and these reserves are limited in magnitude. Indirectly, credit creation assists the Eurobanks to compete in the production of dollar denominated assets with U.S. banks. However, while Euro-dollar credit creation has made it easier for these banks to compete with U.S. banks, it has also introduced competition into the European banking system. Finally, credit creation in the Euro-dollar system introduces into the various European monetary systems both leakages and injections of funds over which the central banks have exerted less than full control.

The following section is concerned with the various actions central banks can take to offset the effects of Euro-dollar credit creation. It concludes with a brief discussion of the similarity between Federal Reserve open market operations and the evolving policy of

the European central banks with regard to the Euro-dollar system.

### III. Official Intervention and Credit Creation

#### A. Central Bank Investment Operations<sup>28</sup>

Until fairly recently, European central banks entered the Euro-dollar market primarily for investment purposes and for domestic stabilization reasons. The actions of these banks were generally uncoordinated and were aimed at solving specific national problems. The banks have found, however, that the multinational scope of the Euro-dollar system makes it quite difficult to exert any control over the system.

From the return to convertibility in 1958 until the surge of Euro-dollar borrowing by the U.S. banks in 1969, there were few controls on the operation of the

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<sup>28</sup>Clendenning, op. cit., pp. 44-45 indicates that investment activities did not play a major role in central bank intervention or participation in the market. Others, however, note the use of the market for such purposes and indicate the investment was a primary reason for these banks' entry. The fact of recycling, which was undertaken constantly over several years, implies investment as well as stabilization goals. See, on this point, "Eurodollar Banking:....?" op. cit., p. 13 and the various Wall Street Journal articles referred to in this chapter. Williams, op. cit., p. 10 also supports this view.

Euro-dollar market.<sup>29</sup> This is not to say that central banks did not enter the market during this time but rather that it was basically a free market with few real restrictions. The central banks operated within the market structure and did not attempt to change it. As noted in Chapter 3, central banks have been active suppliers of Euro-dollar funds and, in a few cases, they have been demanders of funds as well. They have supplied funds both in order to gain a high interest return and also in an attempt to control domestic liquidity or offset the effects of window dressing activities by their commercial banks.<sup>30</sup>

The investment activities of the European central banks eventually generated difficulties which they had not anticipated. The stabilization policies were less disruptive, in the long term, than were the investment activities since the former were temporary in nature.

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<sup>29</sup>"Euro-dollars: A Changing Market," op. cit., pp. 779-784; Donald Hodgman, Euro-Dollars and National Monetary Policies, Irving Economic Study (New York: Irving Trust Co., 1971 (?)), pp. 13-24.

<sup>30</sup>Williams, op. cit., pp. 10-11.

Central banks have kept dollars as international reserves for many years. Many of these reserves were placed in various money market instruments in the United States or in deposit balances at the Federal Reserve or commercial banks. As the Euro-dollar market developed it was a logical extension of these banks' basic investment policies to place dollar funds in the investment vehicles offered in this market.<sup>31</sup> Placement of funds in the system gave the central banks an opportunity to keep the funds closer to home, allowed them to assist their banks in competing with U.S. banks, and perhaps most important, enabled them to earn a higher return on their reserves than was available in the U.S.

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<sup>31</sup>The facilities of the BIS offer an alternative to the direct placement of these excess dollar reserves. Central banks may deposit dollars with the BIS and the BIS then invests the dollars gained in Euro-dollar instruments. Thus, whether the central banks or the BIS redeposit the dollars in the Euro-dollar market, the system becomes more closed and leakages from it are reduced. Machlup, "The Magicians...", *op. cit.*, pp. 11-13 illustrates this process and notes not only the Euro-dollar credit creation that can result from this activity but also the reserve dollar creation occurring through BIS issuance of dollar deposit liabilities.



In addition, as the basic U.S. balance of payments continued to worsen, an ever increasing amount of dollars flowed into these central banks. These became excess international reserves but, given the precarious condition of the gold exchange standard, all the dollars could not be converted into gold or own currencies at the U.S. Treasury. Further, there was little reason to wish to convert the excess dollars into sterile non-yielding gold balances.<sup>32</sup> Thus, the dollars were placed in the Euro-dollar system for the return they could bring.

It appears that the central banks did not realize the consequences that could result from their investment activities. The flow of funds into the Euro-dollar system that these banks originated was a flow of Euro-dollar system reserves. These primary deposits allowed the creation of additional Euro-dollar deposits (derivative deposits) and thus assisted in the growth of the Euro-dollar system.

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<sup>32</sup>That is, there was no reason to obtain non-yielding gold except the feeling that ultimate value rested in gold and that there were/are risks involved in maintaining a position in national currencies, especially ones that may be devalued.

The effects of this central bank supported expansion of Euro-dollar deposits were several. First, the Euro-dollar deposit expansion allowed the Euro-dollar system to develop into a strong and mature monetary system able to engage in a great many financial operations. Further, this development fed upon itself, making the Euro-dollar an acceptable currency for more and more kinds of transactions. Also, the market's strength and breadth attracted additional funds suppliers, further increasing its reserve base.

Second, the expansion allowed the system to extend ever larger amounts of loans. These loans were sometimes converted to domestic currencies and were sometimes used in the form in which they were received. As noted above, the conversion of Euro-dollar loans/deposits into domestic currency increases the liquidity of the particular economy involved.<sup>33</sup> The central bank must supply the funds for this expansion if it is to maintain the

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<sup>33</sup>Williams, op. cit., pp. 39-40 discusses the effects of Euro-dollar lending on other countries. He notes the implications of this lending on interest rate policy, on credit policy, on central banks, and on the attempts by these banks to deal with speculative flows.

par value of its currency vis-a-vis the dollar. The receiving central bank, having added to its dollar reserves, normally reinvested (recycled) the funds by purchasing Euro-dollar system instruments, i.e., by placing the dollars in Euro-dollar deposits. The potential leakage from the Euro-dollar system represented by the conversion of Euro-dollar deposits into domestic currency was halted and a further expansion of Euro-dollar deposits was made possible by the central bank redeposits.

Third, the expansion greatly sensitized the European money markets to various international pressures, especially those emanating from the United States.<sup>34</sup> A restricted availability of funds in the United States, such as the 1969 experience, tends to drive up interest rates both in the U.S. and, as demand

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<sup>34</sup>Scott, op. cit., pp. 17-27 has an especially complete discussion of this integration of national money markets. See also C.P. Kindleberger, "The Euro-Dollar and the Internationalization of United States Monetary Policy," Banca Nazionale Del Lavoro Quarterly Review, No. 88 (March, 1969), pp. 13-15.

is diverted from the U.S. money market to the Euro-dollar market, in the Euro-dollar market as well. Funds from various European money markets are then drawn into the Euro-dollar market and, as supply drops in the national money markets, domestic interest rates are driven up. The rise in rates may contradict the monetary authorities' policy goals.

A rise in rates in the national money market can be countered by an increased supply of reserves to the banks, provided by the central bank. This response may not have the desired effect of lowering interest rates, however, because the funds may leak out of the national system and into the Euro-dollar system as rapidly as they are supplied. Unless the central bank is able and willing to supply sufficient funds to offset the restricted availability of funds in the U.S., there appears to be little that can be done to keep domestic rates down without resorting to various capital controls to staunch the outflow.

When reserves become more readily available in the United States, as they did in 1970, a reduced demand for Euro-dollars by U.S. banks results. This occurs because Euro-dollars are a relatively

expensive alternative source of funds to the banks.<sup>35</sup> The reduced demand will tend to pull down Euro-dollar market rates and national money market rates. While the pressure on those countries attempting to maintain easy money may abate, the pressures deriving from the Euro-dollar system on those countries implementing tight money will become severe. The 1970-71 German case illustrates this dilemma.<sup>36</sup> As U.S. reserve availability increased, U.S. banks reduced their Euro-dollar borrowing and paid off those liabilities outstanding. This reduced demand drove interest rates down in the Euro-dollar market. The reduced cost of funds drew German borrowers into the market and discouraged

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<sup>35</sup>Wallach, op. cit., pp. 13-14 has written that Euro-dollar borrowing would not decline with the easing of money in the United States because interest rates would move down in the Euro-dollar market in sequence with U.S. rates. However, the availability of funds from U.S. sources in amounts in excess of those desired by U.S. banks has meant a reduction in, rather than the maintenance of, Euro-dollar borrowing by the banks.

<sup>36</sup>See Coombs, op. cit. (March, 1971 and September, 1970), and Hodgman, loc. cit.

German suppliers from entering it. The combination of increased loanable funds supplies in Germany and reduced borrowing in Germany tended to push interest rates down and increased the liquidity of the German economy. The Bundesbank could have reinforced its tight money policy by further restrictive actions but, again, it would have been necessary to reduce reserve availability by some proportion of the incoming funds and increased domestic supplies.

As is evident, the Euro-dollar system and credit creation therein has served as a conduit for the transmission of monetary pressures from the United States to European countries. Only if all these countries, including the United States, were "in phase" would this problem be minimized.<sup>37</sup> The pressures flow primarily from the U.S. to the European countries, a situation not unlike pre-Euro-dollar system days. The development of

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<sup>37</sup>"Eurodollar Banking:....?" op. cit., p. 12. But as Hodgman, op. cit., p. 14 notes, the impact of the operation of the Euro-dollar market can not be completely eliminated even when the business cycle phases in various countries coincide.

this system has merely intensified and quickened the transmission of the pressures.<sup>38</sup> The size of the U.S. economy, the importance of the dollar in world trade generally and as the reserve currency of the Euro-dollar system in particular, and the present system of precariously fixed exchange rates have combined to make conditions prevailing in the U.S. felt in the European countries quite rapidly.

Reverse pressures do not seem to be particularly important except during periods of exchange rate speculation. Even then the U.S. is relatively isolated from these pressures. Euro-dollar borrowing

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<sup>38</sup>Hodgman, op. cit., p. 29; Kindleberger, op. cit., pp. 12-14; "The Future of the Dollar," First National City Bank Monthly Economic Letter (November, 1970), p. 125.

by U.S. banks in times of tight money may, as noted, ease reserve stringencies but the Federal Reserve can offset these inflows more easily than can their counterparts in European countries. Euro-dollar inflows contribute a smaller proportion to U.S. liquidity than they do to European liquidity.<sup>39</sup> Further, the reserve status of the dollar under the international exchange standard does not require an open end commitment to support its value in the foreign exchange markets as is the case with other countries' currencies.

To conclude, the investment activities of the European central banks have been aimed at maximizing the return on reserves that could not readily be transformed

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<sup>39</sup>Williams, op. cit., pp. 43-45.



into gold or domestic currency. These operations fed the growth of the Euro-dollar system and allowed increased credit creation to occur. This resulted in the central banks' loss of complete control over the liquidity of the domestic system and sensitized the money markets to conditions prevailing in the United States. These problems have until recently been attacked by piecemeal responses that have been of limited effectiveness. Section C will discuss these responses and those which have been contemplated.

#### B. Central Bank Stabilization Activities

European central banks and official institutions have also entered the Euro-dollar market for domestic stabilization purposes. To maintain interest rate structures, for instance, these central banks have frequently bought Euro-dollars at quarterly bank statement dates as commercial banks attempted to temporarily convert their dollar assets into domestic currency for window dressing purposes. After the statement date, the central banks have resupplied these Euro-dollars to the banks. Swap arrangements and repurchase agreements have also been used, in addition to outright purchases and later resales. Central banks have also entered the Euro-dollar market to

control domestic liquidity levels, especially during times of exchange rate speculation when "hot" money flows have threatened to dry up or flood the domestic money markets.<sup>40</sup>

Any action by a central bank which supplies funds to the Euro-dollar system will, as with investment actions, supply reserves to the system and support credit expansion by the system. However, these stabilization activities may not be particularly important over the long term since they are relatively temporary in nature and are reversed when the pressures they are designed to offset subside. Only to the extent that there may be trends at work for which there must be constant compensations will these activities have a long term effect. Under- or over-valued

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<sup>40</sup>The above and following paragraphs are based upon the descriptions of stabilization activities in Williams, op. cit., pp. 10-11 as well as on Clendenning, op. cit., pp. 43-45; Kvasnicka, op. cit., p. 12; Klopstock, The Euro-Dollar Market..., op. cit., pp. 2-3; Helmut Mayer, op. cit., pp. 12-15.

exchange rates, for instance, may require fairly constant stabilization activities.

The following section discusses recent European central bank operations in the Euro-dollar system. It draws a parallel between these operations and Federal Reserve open market operations in the U.S. money markets.

#### C. Open Market Operations<sup>41</sup>

In 1970 and 1971 European central banks, together with the BIS, realized that their activities in the Euro-dollar market were at least partially responsible

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<sup>41</sup> The first use of the term open market operations to describe official intervention in the Euro-dollar market with the aim of influencing credit creation in that system was made in "Eurodollar Banking:..." op. cit. (July, 1971), p. 13. Previously, mention of multipliers and the like appeared in the Wall Street Journal. Gaines, "Public Policy Issues," op. cit., pp. 2-4 has applauded the Treasury's decision to issue bonds to soak up the excess Euro-dollars. Its acceptance of its ultimate responsibility for the supply of dollars in the world markets is commended by Gaines. There is some question as to the logic of this. Why, for instance, should Euro-dollar borrowing by U.S. banks be viewed as undesirable but Treasury borrowing of these same Euro-dollars be commended? A distinction between the effects of the borrowing by the two types of institution may be drawn (especially with reference to the efficiency of monetary policy) but if the goal is the control of the world supply of dollars, then it makes no difference what U.S. institution does the borrowing. Indeed, it may be more desirable to have the banks do the borrowing.

for that system's remarkable growth.<sup>42</sup> They had become more and more concerned with the effects the Euro-dollar system was having on their own particular monetary systems, especially with regard to the frequent contradiction by the system of monetary policy goals of the central banks. The various currency crises, particularly that in the spring of 1971 when the mark came under extraordinary pressure, and in which the Euro-dollar market played a major role in facilitating the destabilizing money movements, crystallized the central banks' determination to take measures to counteract the influence of the Euro-dollar system.

In 1969 various controls were instituted by some of the central banks in an attempt to limit the movements of funds into and out of their countries.<sup>43</sup> Primarily,

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<sup>42</sup>This realization has been evident from the reports on various meetings held by European central banks. See, on this topic, "Europe's Central Banks Agree....," loc. cit.; "Drive for Eurodollar Curbs Called Aided....," loc. cit.; "Central Banks Ponder....," loc. cit.

<sup>43</sup>"Euro-dollars: A Changing Market," loc. cit.; Hodgman, op. cit., pp. 13-24.

the desire then was to reduce the flow of funds being drawn into the Euro-dollar system by the high rates prevailing there. These flows adversely affected the balance of payments of the countries experiencing the outflows. These controls were placed on the domestic banks and were only mildly successful since British banks were still free of these controls and were the center of the market. Further, the movement of funds by individuals was not particularly restricted.

The combination of events in 1969 was quite dissimilar to the situation which prevailed in late 1970 and in early 1971. In 1969 U.S. banks borrowed heavily in the market at a time when tight money policies were in effect in both the U.S. and in Germany. There were, therefore, no contradictory pressures existing between these two systems. Other European countries, however, were attempting to maintain somewhat easier monetary policies than those prevailing in the U.S. and Germany. They were generally able to offset the pressures toward higher rates emanating from the Euro-dollar system

by continued increases in the liquidity of their systems.<sup>44</sup>

In the more recent period (1970-71), U.S. banks paid back much of their massive Euro-dollar liabilities. This tended to drive interest rates down in the Euro-dollar market. In addition, upward revaluation of several European currencies was expected by many currency speculators. Thus, the pressures arising from the Euro-dollar market were substantially different from those of 1969.

While funds were being drawn out of the national systems, in 1969, funds were flowing into the systems in 1970-71. Germany, continuing its attempt to maintain tight money and facing large balance of payments surpluses which placed its currency under upward valuation pressures, was presented with Euro-dollar system influences that were completely inimical to its requirements. Other countries, including Switzerland, Belgium, Austria, and the Netherlands also were experiencing revaluation pressures and consequent

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<sup>44</sup>For a comprehensive report on these developments see the articles by Coombs, op. cit. (March and September of each year), various pages.

inflows of funds.<sup>45</sup> The U.S., with a continuing massive balance of payments problem, supplied additional dollars to the system.

The Euro-dollar system provided a convenient source of funds to speculators. Once borrowed, the Euro-dollar funds could be converted into the currencies that were likely candidates for revaluation. This, of course, forced more unwanted dollars into the central banks which, if recycled, would wind up right back in their reserves on the next circuit. In 1969 several European currencies were under speculative attack as candidates for devaluation. Hot money flowed from these currencies into the Euro-dollar system. In contrast, in 1970 and 1971, the dollar came under speculative attack and hot money flowed into these currencies. These tremendous flows of very volatile

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<sup>45</sup>Ibid.

funds at last brought action from the central banks. This action is remarkably similar in effect to that generated by open market operations of the Federal Reserve in the United States.

Federal Reserve open market operations involve the sale or purchase of bonds and the consequent reduction or increase in bank reserve levels. The Euro-dollar system, however, operates in a manner slightly different from the U.S. monetary system. Eurobonds do not play a major role in the availability of reserves in this system.<sup>46</sup> Further,

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<sup>46</sup>This is not to say that such bonds could not play an important role in the future. Should a sufficient quantity of these Eurobonds be outstanding and a portion be held by the central banks or other official authorities, this vehicle could be used to control reserve levels.



the reserves of the Euro-dollar system are not created by European central banks but rather are merely U.S. bank deposits. To affect these reserves and thereby credit creation by the system requires adding or withdrawing U.S. bank deposits from the system.

The Euro-dollar open market is a market for dollar deposits. Bids for and offers of deposits are made in a manner similar to bids and offers in the U.S. (bond) open market or in the Federal Funds market. The central banks may, therefore, supply reserves to the market or drain them from the market by offering or bidding for Euro-dollar deposits. In this way they may influence reserve availability in the system.

In addition to the difference in the type of open market and instruments used, the goals of the authorities vary somewhat. In the Euro-dollar system, the central banks attempt to influence reserves and credit creation not to affect national income, directly, but rather to alter or lessen the impact of the system on foreign exchange markets, central bank reserves, domestic money markets, and domestic monetary policy efficiency. Certainly, the final impact is on national income unless compensatory actions are taken, but the goals supporting interference are different from those in the U.S. In Europe, the direct effect of the

Euro-dollar system on the exchange rate and central bank reserves may often be the primary causal factor behind these central bank open market operations. Rarely is this the goal of open market operations in the United States.

While the type of market is somewhat different and the immediate goals of the operations may vary between the Federal Reserve and European central banks, the same basic tool or measure (bank reserves) is utilized in both cases. Control of reserve balances brings a measure of control of the credit creating abilities of the system involved. In the U.S., the control of credit creation is undertaken for domestic stabilization. Within the Euro-dollar system, control is desired in order to moderate the effects of Euro-dollar flows on the various national systems and upon exchange rate fluctuations. The "hot" money flows that upset exchange rate relationships and the flow of funds into and out of the national systems in search of maximum safety or interest returns involves the transmission of monetary pressures between the U.S. and Europe. These open market operations by the European central banks may influence to some degree the impact of these flows on the national systems.

The operations at present consist of attempts by

major European central banks to cooperate in their deposit policies. In the spring of 1971 these banks first agreed to withhold new deposits from the Euro-dollar system.<sup>47</sup> That is, they decided that for the present they would not recycle dollar funds gained in their foreign exchange market operations. Later, they further agreed that, in addition to withholding "new" deposits, they would withdraw selectively some of the funds already placed in the Euro-dollar system.<sup>48</sup> These actions, of course, reduce the reserves and thus the credit creating potential of the system and its impact on the various national economies.

The BIS has also been active in placing funds in the Euro-dollar system over the years and has gained a wide knowledge of the operations and mechanics of the Euro-dollar system. It appears to be developing into

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<sup>47</sup>"Europe's Central Banks....," loc. cit.; "Central Banks Ponder....," loc. cit.; "A Step to Slow Eurodollar Flows," Business Week, No. 2175 (May 15, 1971), pp. 110-111.

<sup>48</sup>Ibid.

the primary coordinator of European central bank actions to influence the Euro-dollar system's reserves.<sup>49</sup> The U.S. Treasury has been cooperating in these attempts to control the Euro-dollar system. Since withholding and withdrawing funds from the system means that large amounts of dollar funds accumulate in central bank reserves, the U.S. has moved to provide alternative investment vehicles to these banks to soak up their excess dollars. It has issued large amounts of bonds to the central banks providing a relatively high rate of interest.<sup>50</sup> In addition, in order to moderate the return flow of funds from U.S. banks to the Euro-dollar system, the Treasury and the Export-Import Bank have issued special securities to U.S. bank foreign

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<sup>49</sup>"A First Step to Curb the Eurodollar Market," Business Week, No. 2181 (June 19, 1971), p. 35.

<sup>50</sup>Ibid.; "Bundesbank Will Buy...", loc. cit.; "Euro-dollar Banking:..." op. cit., pp. 13-14.

branches to soak up some of these funds (and Euro-dollar system reserves as well).<sup>51</sup> These actions have immobilized large quantities of Euro-dollar reserves and have limited the expansion of credit by the system.

Finally, the New York Federal Reserve Bank, as the operating arm of the Federal Reserve System, has experimented with intervention in the forward market for marks in order to decrease the incentive that has existed to swap Euro-dollars for marks.<sup>52</sup> That is, it has attempted to reduce the gains possible from interest arbitrage and thus slow the flow of dollar funds to the Bundesbank. This action, of course, really reduces leakages from the Euro-dollar system and encourages credit creation. In any case, it was not particularly successful and was halted.

The first conscious effort to influence credit creation by the Euro-dollar system has been undertaken

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<sup>51</sup>"Treasury, Seeking to Sop Up Eurodollars, Offers New Issue to U.S. Banks Abroad," Wall Street Journal (July 20, 1971), p. 6; Gaines, "Public Policy Issues," loc. cit.; "Treasury Slates...", loc. cit. These issues were allowed to mature in late 1971 during the floating exchange rates period that existed then.

<sup>52</sup>"New York Reserve Experiment," loc. cit.

by these institutions. Previously, all these groups had influenced the system, but in a haphazard manner. Each had its own motives and goals and these frequently conflicted with the goals of the others. As with the operation of the present international monetary standard, cooperation is essential to the operation of any effective controls on the Euro-dollar system. The Federal Reserve does not follow the goal of yield maximization and the official institutions that are attempting to affect the Euro-dollar system will have to do likewise. They must subordinate their desire to maximize income in order to develop effective stabilization or credit creation control policies for the Euro-dollar system.

The United States has provided alternative investment vehicles to alleviate the loss of income this subordination entails and to moderate returning dollar flows to the Euro-dollar system from U.S. banks. Further, the dollars gained by the Treasury through the sale of bonds to the European central banks has had the side effect of reducing the demands made on the U.S. money markets by Treasury deficit financing. This, of

course, has had the effect of reducing interest rates in U.S. money markets and driving more funds into the Euro-dollar system, reducing rates there.

It appears that the situation created by central bank investment and recycling activities in the Euro-dollar system may be brought under control through the coordinated efforts of the various official institutions involved. Direct controls, such as the institution of uniform reserve requirements are also under consideration.<sup>53</sup> They will probably be necessary in order to domesticate the Euro-dollar system fully. These measures may well be less than completely effective in controlling the market, however, since the Euro-dollar system is not tied to a particular country or area. As one U.S. banker said, in response to the contemplated regulation of the Euro-dollar system, "If they start regulating the Eurodollar market, we'll

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<sup>53</sup> "Drive for Eurodollar Curbs Called Aided....," loc. cit.; "Common Market Panel....," loc. cit.; "Central Banks Ponder....," loc. cit.

just open a branch in Kinshasa and call them Congo dollars."<sup>54</sup> Cooperation or coordination of policies, thus, is a primary requirement for any effective control of the system<sup>55</sup> but may not be sufficient for such control. Capital controls may also be necessary to gain complete control.

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<sup>54</sup>"Central Banks Ponder....," op. cit., p. 13.

<sup>55</sup>Such coordination was suggested by former Federal Reserve Board chairman, William M. Martin, in September, 1970. See "International Control of Euro-dollar Market Suggested by Former Reserve Board Chief," Wall Street Journal (September 15, 1970), p. 5. Some form of open market operations utilizing the BIS as an international central bank was suggested by Kindleberger, loc. cit. The foresight of this suggestion was a rare insight in an otherwise superficial article.



To the extent that the major European central banks control a significant part of the reserves of the system, however, open market operations may be effective in moderating credit creation by the system no matter where it is physically located. Should this be the case, the destabilizing effects of such creation on monetary conditions and exchange rate structures may be lessened appreciably and capital controls may not be required.

The following chapter is concerned specifically with the effects of U.S. bank borrowing on the efficiency of U.S. monetary policy. Credit creation as such by the Euro-dollar system will not be important since reserves rather than deposits are borrowed by U.S. banks. However, flows of new funds into the system in response to this borrowing will be important.

## CHAPTER VI

### EURO-DOLLAR BORROWING AND U.S. MONETARY POLICY

#### I. Introduction

More has been written about the impact of U.S. bank Euro-dollar borrowing on U.S. monetary policy than on any other aspect of the Euro-dollar phenomenon. This relative profusion has not, however, been accompanied by any agreement on the complex interactions that occur between Euro-dollar borrowing and U.S. monetary policy. The purpose of this chapter is to outline the major effects of U.S. bank Euro-dollar borrowing on the efficiency of U.S. monetary policy. In addition, some mention of Federal Reserve controls on this borrowing will be made and the future effect of Euro-dollar borrowing on monetary policy will be postulated.

Basically, this chapter concludes that the effectiveness of a given degree of monetary tightness in the U.S. is influenced both positively and negatively by Euro-dollar borrowing. The positive aspects occur through the transmission of monetary policy to all the banks in the system more rapidly than was the case prior to the existence of Euro-dollar borrowing. Additionally,

a more even impact on the various classes of banks of a given monetary policy is postulated. The availability of Euro-dollars to U.S. banks has apparently reduced the discriminatory impact of monetary policy on certain U.S. money market banks.

Negatively, Euro-dollar borrowing has offset, to some unquantifiable degree, the impact of a given amount of monetary tightness. It has also added an additional factor to those that the Federal Reserve must take into consideration when implementing monetary policy. Finally, it may have promoted a feeling of loan availability during tight money periods, an atmosphere directly contrary to that being fostered by the Federal Reserve.<sup>1</sup> Thus, Euro-dollar availability has introduced a leakage (and an additional variable) into U.S. monetary policy. In the absence of the positive effects postulated above, these factors may require a greater effort by the Federal Reserve than was previously necessary in order to achieve a given level of tightness in the U.S. monetary system. Further, the variation in the results attained by a given Federal Reserve action may have been increased.

This chapter will explore in some detail these positive and negative effects of U.S. bank Euro-dollar borrowing and will attempt to reach some conclusions on the

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<sup>1</sup>Brimmer, Euro-Dollar Flows..., op. cit., p. 4.

net effect of these influences on the efficiency of U.S. monetary policy.

## II. Reserves, Credit Creation, and Euro-Dollar Borrowing

Euro-dollar borrowing is undertaken by U.S. banks primarily to offset reserve stringencies imposed by the Federal Reserve in its implementation of tight money. As noted in Chapters 3 and 4, Euro-dollar borrowing is a direct response to tight money conditions and is relatively unimportant in times of easy money.<sup>2</sup> Euro-dollars represent an expensive alternative source of funds and, as such, U.S. banks have turned to the Euro-dollar system

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<sup>2</sup>However, in 1967, during an easy money period, Euro-dollar liabilities of U.S. banks continued to grow and exceeded the levels attained during the short 1966 tight money experience. This appeared to indicate that U.S. banks had come to view the Euro-dollar system as a permanent addition to their sources of liquidity. Further experience and increased borrowing costs, however, caused a decline in Euro-dollar borrowings and verified the marginal nature of the system to U.S. banks, as did the analysis undertaken in Chapter 4. Also, the use of Euro-dollar borrowings to reduce required reserves via the cash items in process of collection method, and tacit agreements among banks on one day trades to effect this result, may explain the increased borrowing levels experienced in these years. See, on this subject, Federal Reserve Bank of New York Office Correspondence, "Revision of Money Supply," op. cit., pp. 787-789; Little, op. cit., p. 13; Kvasnicka, op. cit., pp. 14-15; Wallich, op. cit., p. 13; and Leimone, op. cit., p. 3.

for funds primarily when domestic funds were either not available or were more expensive than Euro-dollars. When money has become available, the banks have deserted the Euro-dollar market in spite of the erosion of their reserve-free base that occurs when they do so.<sup>3</sup>

Euro-dollar borrowing allows individual banks to increase their loan portfolios during times when the Federal Reserve is pursuing tight money policies. This is accomplished, as noted in Chapter 2, by obtaining a claim on a deposit in another U.S. bank, converting the claim into reserves at the Federal Reserve, and exchanging a created demand deposit in the amount of the reserves gained for a debt instrument. Thus, one bank loses reserves, loans, and demand deposits and another gains reserves, loans, and demand deposits. The net result, then, is a redistribution of assets and liabilities between the gaining and losing banks.

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<sup>3</sup>While the Federal Reserve originally instituted the 10% reserve requirement on all liabilities outstanding above a given base to moderate the banks' borrowing of Euro-dollars, it subsequently attempted to use this tool to reduce the reflows of funds to Europe. This was undertaken in order to alleviate the effects of these repayments on the U.S. balance of payments. By raising to 20% (in January 1971) the reserves required on all liabilities outstanding above the base and specifying that the computation of the reserve-free base would be based on the current level of Euro-dollar liabilities outstanding, the Federal Reserve hoped to induce the banks to maintain their Euro-dollar borrowing levels, and thus their bases, even though the immediate comparative costs of so doing

However, in addition to the redistribution that occurs, the use of the Euro-dollar vehicle creates a liability to foreign branches on the borrowing bank's balance sheet. This liability represents a net addition to the gaining bank's balance sheet and is offset by the increased reserves it temporarily holds. After the bank creates a demand deposit and lists the debtor's IOU as an asset, and after the demand deposit so created is used and clears against the bank, the bank is left with a loan asset and a liability to foreign branch. Succeeding banks gain reserves and demand deposits and in turn create additional demand deposits by lending out their excess reserves. The net result, as shown in Table 1, is an increase in loan assets and total liabilities of the banking system but no increase in the money supply. The money supply has remained constant because the deposit expansion generated by the lending activities of the gaining

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were high. The Federal Reserve was spectacularly unsuccessful in its attempt. See "Change in Discount Rate," Federal Reserve Bulletin, Vol. 56, No. 12 (December, 1970) p. 963; "Banking and Monetary Developments in the Fourth Quarter of 1970," Federal Reserve Bank of New York Monthly Review, Vol. 53, No. 2 (February, 1971), p. 33; "Recent Monetary and Bank Credit Developments," Federal Reserve Bank of New York Monthly Review, Vol. 53, No. 5 (May, 1971), p. 101. The Federal Reserve also wished to halt the reduction in required reserves that short-term Euro-dollar borrowing allowed (through the cash items in process of collection vehicle) and amended Regulation D in September 1969 to do so.

Table 1. The Effect of Euro-dollar Borrowing

| <u>Gaining Banks</u>                                    |  | <u>Losing Banks</u>  |   |
|---|--|--|---|
| Step 1. The Euro-dollar Borrowing                       |  |  |   |
| <u>Bank A</u>   |  | <u>Bank B</u>  |   |
| +100 Claim on Bank B                                    | +100 Liability to foreign branch   | 20 Reserves<br>80 Loans  | 100 Demand Deposit due Eurobank and then Bank A |
| Step 2. Collection of Claim and Use of Reserves         |  |  |   |
| <u>Bank A</u>   |  | <u>Bank B</u>  |   |
| -100 Claim on Bank B<br>+100 Reserves<br>+100 Loans     | 100 Liability to foreign branch<br>+100 Demand Deposit                       | -20 Reserves to bank A<br>-80 Loans<br>+80 Reserves from other banks<br>-80 Reserves to Bank A | -100 Demand Deposit                             |
|   |  | <u>Other Banks</u>   |   |
|   |  | -80 Reserves to Bank B<br>-320 Loans   | -400 Demand Deposits                            |
| Step 3. Use of Loan Proceeds and Clearing and Relending |  |  |   |
| <u>Bank A</u>   |  |  |   |
| 100 Reserves<br>100 Loans<br>-100 Reserves              | 100 Liability to foreign branch<br>100 Demand Deposit<br>-100 Demand Deposit |  |   |
| <u>Other Gaining Banks</u>                              |  |  |   |
| +100 Reserves<br>+400 Loans                             | +500 Demand Deposits   |  |   |
| Step 4. Net Results                                     |  |  |   |
| <u>All Gaining Banks</u>                                |  | <u>All Losing Banks</u>  |   |
| +100 Reserves<br>+500 Loans                             | +100 Liability to Foreign Branch<br>+500 Demand Deps.                        | -100 Reserves<br>-400 Loans  | -500 Demand Deposits                            |

Table 1. Continued.

Reserve ratio: is 20%. Assumes Losing Banks are fully loaned up and no reserves required on Liabilities to Foreign Branches.

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banks is exactly offset by the contraction caused by the loss of reserves of the losing bank(s). To obtain the necessary reserves, the losing banks must contract their reserves by the amount due Bank A. In so doing, a contraction of loans and deposits occurs.

The results of the simple case outlined above may differ in several ways, depending on the conditions prevailing at the time. For instance, the type of deposit that is extinguished may influence the final results. Should the Euro-dollar borrowing involve a claim on a time deposit, the transfer of reserves will involve a greater contraction by the losing banks. This will occur because the reserves held on time deposits are much smaller than those held on demand deposits. Thus, should the \$100 deposit that Bank B loses be a time deposit with 5% reserves, \$95 of loans will be retired instead of the \$80 as shown in Table 1. This means that a \$475 demand deposit contraction (versus \$400) will occur in the other losing banks. Presuming all other deposits are of the demand variety, a greater reduction in loans by the losing banks or a smaller net increase in loans of the entire banking system will result. However, while total deposits will



also decline, the money supply will rise since the lost time deposits were not included in the money supply but the newly created demand deposits are. Demand deposits decline by \$475 but rise by \$500. (See Table 2.)

Table 2. The Effect of a Loss of Time Deposits

| <u>Gaining Banks</u>                     |             | <u>Losing Banks</u> |             |
|--|-------------|---------------------|-------------|
| Net Results-Same as<br>in Table 1, i.e., |             | Bank B              |             |
|  |             | -5 Reserves         | -100 Time   |
|  |             | -95 Loans           | Deposits    |
|  |             | Other Banks         |             |
| +100 Reserves                            | +100 Lia-   | -95 Reserves        | -475 Demand |
| +500 Loans                               | bility to   |                     | Deposits    |
|  | Foreign     | -380 Loans          |             |
|  | Branch      |                     |             |
|  | +500 Demand |                     |             |
|  | Deposits    |                     |             |

A second variation of the basic case occurs when monetary policy forces a change in the composition of total deposits. Thus, Regulation Q restrictions cause the conversion of many low reserve time deposits to higher reserve demand deposits. This change requires additional reserves and, while the money supply rises due to this conversion, total deposits and loans are reduced through the multiple contraction of demand or time deposits. Euro-dollar borrowing in this case may offset the loan decline but will, as in the simple case, have no further impact on the money supply. (See Table 3.)

Table 3. The Effect of Changed Composition of Deposits

| Bank A                                 |  |
|--|--|
| 5 Reserves<br>95 Loans                 | 100 Time Deposits                          |
| which becomes                          |  |
| 20 Reserves<br>80 Loans                | 100 Demand Deposits                        |
| Other Banks                            |  |
| -15 Reserves to<br>Bank A<br>-60 Loans | -75 Demand Deposits                        |
| Net Results-All Banks                  |  |
| -75 Loans                              | -100 Time Deposits<br>+ 25 Demand Deposits |

Reserve ratios:   5% on Time Deposits  
                  20% on Demand Deposits

Generally speaking, Regulation Q and a restriction on reserve growth in 1969 and 1966 brought about a change from time to demand deposits, a reduction in the lending capabilities of the banks and in total deposits, and a slight increase in the money supply. Euro-dollar borrowing offset the loan declines that were taking place and, to the extent that such borrowing caused further shifts from time to demand deposits, caused some rise in the money supply. Reserve stringencies, however, held

money supply growth to quite low levels during these periods.<sup>4</sup>

To conclude, it appears that access to the Euro-dollar market allows banks to at least offset loan declines brought about by tight money policies but is incapable of having any large scale effect on the money supply. Since monetary policy is geared to interest rates, money supply, and reserve levels, Euro-dollar borrowing does not impinge to an appreciable degree on the effectiveness of such policies. However, since lending activity may be maintained through Euro-dollar borrowing, it seems evident that in a broader sense Euro-dollar accessibility does interfere with the goals of monetary policy. Further, this accessibility adds another dimension to the environment in which the Federal Reserve must operate.

The introduction of marginal reserve requirements on Euro-dollar borrowings, first of 10% in September 1969 and then of 20% in January 1971, creates an interesting variation on the cases outlined above. As Table 4 indicates, a 20% reserve requirement on Euro-dollar borrowings of \$100 effectively destroys the credit creation (loan) increases previously possible. Not only does the money supply actually decline, but loans remain at the same levels previously existing. The 10% marginal reserve

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<sup>4</sup>"The Money and Bond Markets," Federal Reserve Bank of New York Monthly Review, various months, 1966 and 1969.

requirement partly destroys the lending ability of the banks. However, since the reserve requirement applies only on borrowings above a base amount (assumed in Table 4), the impact of the reserve requirements is substantially reduced.

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Table 4. The Effect of a 20% Marginal Reserve Requirement

| <u>Gaining Banks</u>         |                                  | <u>Losing Banks</u>              |                      |
|------------------------------|----------------------------------|----------------------------------|----------------------|
| Bank A                       |                                  | Net Results (as before)          |                      |
| +20 Reserves                 | +100 Liability to foreign branch | -100 Reserves                    | -500 Demand Deposits |
| +80 Loans                    |                                  | -400 Loans                       |                      |
| Other Banks                  |                                  |                                  |                      |
| +80 Reserves                 | +400 Demand Deposits             |                                  |                      |
| +320 Loans                   |                                  |                                  |                      |
| <u>All Banks-Net Results</u> |                                  |                                  |                      |
|                              |                                  | -100 Demand Deposits             |                      |
|                              |                                  | +100 Liability to foreign branch |                      |

The original 10% marginal reserve requirement was instituted to reduce the advantages gained from borrowing in the Euro-dollar market. The increase to a 20% marginal reserve requirement, however, was not imposed to reinforce tight money implementation. Rather, the reserves required

above the base amount were increased in an attempt to slow the repayment by U.S. banks of their Euro-dollar liabilities. By encouraging banks to maintain their Euro-dollar borrowing levels and thus the reserve-free base, it was hoped that the negative effect of these massive repayments on the U.S. balance of payments would be reduced. Given the enormous decline in Euro-dollar liabilities both prior to and after the increase in marginal reserve requirements, it is doubtful that any significant amount of borrowing was ever subject to either the 10% or the 20% reserve requirements. While future tight money periods might see a resurgence in U.S. bank borrowing, it is unlikely that this case of reserve absorption has yet occurred.<sup>5</sup>

The initiation of the 10% reserve requirement had a definite impact on U.S. banks and altered their borrowing activities. Euro-dollars borrowed reached a peak prior to the effective date of marginal reserve requirements, remained at a high level for the rest of 1969, and began to decline in 1970. While renewal borrowing within the reserve-free base could continue, increased

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<sup>5</sup>The Federal Reserve has promised that this higher reserve requirement will be maintained. If it were not, the "good" banks that maintained their bases would be penalized while the "bad" banks would gain. Gaines, "The Dollar?" op. cit., p. 1; Gaines, "Public Policy Issues," op. cit., pp. 3-4.

borrowing levels were subject to the marginal reserve requirements.

The source of the borrowed Euro-dollar may affect the impact of Euro-dollar borrowing. If the source is private or officially held U.S. bank deposits, no additional analysis is necessary. However, should the source of the Euro-dollars be officially held (i.e., foreign government and central bank) dollar reserves at the Federal Reserve,<sup>6</sup> then an expansionary effect may occur and Federal Reserve actions will have to be of a greater magnitude in order to achieve a given degree of tightness. The process may be simply illustrated. U.S. banks borrow Euro-dollars in the market. These funds may be supplied by a European central bank for any of the several reasons noted in Chapter 3. The central bank transfers its funds from its account at the Federal Reserve Bank to a commercial bank and ownership of the funds to the borrowing bank. The reserves of the particular borrowing U.S. bank and of the U.S. banking system are thereby increased by the amount of the borrowing and credit creation within the U.S., based upon these new

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<sup>6</sup>Or, should the source be special non-marketable Treasury securities issued to the central banks and redeemed by them at the Treasury in return for Federal Reserve balances, such an expansionary effect may also occur.

reserves, can occur. To offset this increase in reserves, the Federal Reserve must enter the bond markets, selling bonds to soak up (neutralize) the newly acquired reserves. This action must be supplemental to the normal actions being undertaken to restrict reserve availability.

It should be noted that, as far as U.S. bank reserves are concerned, the source of the privately or officially held bank deposits that supply Euro-dollar borrowers is unimportant, except in the case outlined above. Thus, a central bank may hold U.S. money market instruments and sell them in order to obtain the necessary funds to deliver to the Euro-dollar borrower. The sale of the instrument does not, however, create more U.S. bank reserves. Rather, it merely redistributes the ownership of assets and reserves among all the participants in the U.S. markets. Only if foreign held Treasury debt or Federal Reserve deposits are monetized will there be an effect on reserve levels in the U.S. system.<sup>7</sup>

Finally, the treatment of Euro-dollar borrowings

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<sup>7</sup>The sale of gold or drawings on the swap network by foreign central banks have been ignored here as sources of Euro-dollar funds. Both may certainly occur and may have the same expansionary effect on U.S. bank reserves as does the shifting of foreign held Federal Reserve balances. See H. Mayer, op. cit., p. 28; Leimone, op. cit., p. 5.

as cash items in process of collection when the drafts evidencing the borrowing are placed in the clearing mechanism tend to increase the banks' ability to lend and create demand deposits. To the extent that swap arrangements between banks existed, the possibility of increased lending and reduced required reserve levels was further increased. This avenue of evasion was closed in 1969 and no longer presents a problem to analysis.

The following section reports the results of a regression analysis devised to determine the actual influences affecting average reserve levels of U.S. banks in general and New York banks in particular. As such, it attempts to verify empirically the impacts theorized in this section.

### III. Average Reserves and Euro-dollars

Average required reserves held by U.S. banks may be influenced by many factors. It was noted above that Euro-dollar borrowing by U.S. banks reduced required reserves only to the extent that the evidence of such borrowing (a draft on the deposit-losing bank), when placed in the clearing mechanism, became part of the gaining bank's cash items in process of collection. These cash items were subtracted from deposits subject to reserve requirements under Regulation D provisions. In September, 1969, the regulation was amended to exclude the drafts arising from Euro-dollar borrowing from



consideration as cash items in process. Prior to September, 1969, there was at least one force acting to reduce required reserve levels. Other forces, such as the conversion of time deposits to demand deposits and the imposition of marginal reserve requirements on Euro-dollar borrowings tended to increase required reserve levels.

To test whether these forces actually did influence average reserve levels, resort may be made to regression analysis. The dependent variable, the average percentage of required reserves held by U.S. banks ( $X_{AR}$ ), is stated.<sup>8</sup> Possible influences on this variable include those noted above, i.e., access to Euro-dollar funds ( $X_{EDD}$ ),<sup>9</sup> the amount of such funds actually borrowed ( $X_{EL}$ ), and the imposition of marginal reserve requirements on Euro-dollar borrowings and the amendment of Regulation D ( $X_{RRE}$ ).<sup>10</sup> Other possible influences include the actual

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<sup>8</sup>The average was obtained by adding gross demand deposits, unadjusted for cash items in process of collection, and time deposits. This total deposit value was then divided into the amount of required reserves held by the banks in the same time period. The resulting percentage represents the proportion of total deposits held as reserves.

<sup>9</sup>A dummy variable, coded 0 for 1962 through 1965 and 1 for 1966 through 1970, indicates the discovery of the Euro-dollar source by U.S. banks in the 1966 tight money period.

<sup>10</sup>A dummy variable, coded 0 for 1962 through August, 1969 and 1 for the months thereafter, indicates the

required reserve ratio on deposits ( $X_{RRR}$ ),<sup>11</sup> the proportion of time deposits to total deposits ( $X_{Tp}$ ), and free reserve levels ( $S_{FR}$ ).

Taken together, these factors might reasonably be expected to explain the variation observed in the percentage of required reserves held by U.S. banks. Should the Euro-dollar factors prove to assist in the explanation of this variation (with the correct coefficient signs), empirical proof of the value of Euro-dollar borrowing to U.S. banks and of the impact of such borrowing on U.S. monetary policy will be obtained. That is, should the proportion of required reserves be indirectly (negatively) related to the Euro-dollar borrowing variables, cash items will be shown to have been a significant factor in determining the impact of Euro-dollar availability on the U.S. banking system.

~~The variation~~ The variation in average reserves may also be explained by monetary policy. The proportion of time

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presence or absence of marginal reserve requirements on Euro-dollar borrowings and changes in Regulation D.

<sup>11</sup>The ratio used was the percentage required on demand deposits. While a weighted ratio including time deposit requirements could have been used, there seemed no reason to undertake these essentially sterile calculations. It is the change in the ratio that affects the average reserves percentage and time and demand required reserve ratios changed at the same times and by like amounts.

deposits to total deposits will indicate Regulation Q influences (among others) and the changes in required reserve ratios and the imposition of Euro-dollar marginal reserve requirements (and changes in Regulation D) will also indicate monetary policy. Open market operations designed to augment or reduce reserve levels should not be reflected in average required reserve proportions but free reserves, used as a measure by the Federal Reserve of the impact of monetary policy, may serve as a proxy for this type of monetary policy.

The time period chosen was 1962 through 1970. Monthly data for each year was collected and a test of both the U.S. member bank average reserves proportion and New York City banks required reserves proportion was undertaken.

The results of these tests are shown in Table 5. Unless otherwise noted the included variables were significant at the .05 level or better. First difference analysis proved generally useless and those results are not reported here.

The following points may be noted. With regard to all member banks, the most important explanatory variable was the proportion of time deposits to total deposits, a not unexpected result. This proportion was negatively related to required reserves. As the proportion of time deposits declines (and demand deposits proportion increases),

Table 5. Average Required Reserves EquationsAll Member Banks

$$X_{AR} = .065 - .141X_{TP} + .004X_{EDD} + .498X_{RRR}$$

|         |       |       |
|---------|-------|-------|
| (-10.5) | (3.6) | (2.3) |
| [-1.09] | [.50] | [.46] |

$$R^2 = .937 \quad SEE = .001$$

New York Banks

$$X_{ARNY} = .109 - .012X_{EDD} - .020X^*_{TP}$$

|        |        |
|--------|--------|
| (-6.6) | (-1.4) |
| [-.16] | [-.80] |

$$R^2 = .620 \quad SEE = .004$$

\*significant at .10 level  
 t values in parentheses  
 Beta values in brackets

$X_{TP}$ : Proportion of time to total deposits

$X_{EDD}$ : Euro-dollar access dummy

$X_{RRR}$ : Required Reserve Ratio on Demand Deposits

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the average required reserves proportion increases (decreases). Similarly, as the required reserve ratio increases, so also does average required reserves. The discovery of Euro-dollars as a source of funds in 1966 generated a very slight positive effect on the average required reserve ratio. This result may support the hypothesis that Euro-dollar borrowing by the large money market banks drew time deposits from other U.S. banks,

increasing average required reserve levels for all banks taken together. It does not support the hypothesis that Euro-dollar borrowing generally affected average required reserve levels. The explanatory power of the equation is quite high.

Of greater interest are the results obtained for the New York banks. Here, only the time deposit proportion and Euro-dollar access dummy variables were at all significant. In this case, as in the case for all member banks, the proportion of time deposits was the most important explanatory variable and was negatively related to the dependent variable. However, the decline in time deposits as a percentage of total deposits had less impact on average required reserves than the same variable had on all member banks (.02 for New York as opposed to .141 for all members).

Secondly, the Euro-dollar discovery or access dummy acted as expected. The discovery of Euro-dollars and their use by the large New York banks acted to reduce by over 1% the average required reserve proportion for the New York banks. These two variables explained 62% of the variation in the dependent variable. The existence of massive and diverse pressures acting on the New York banks explains the relatively low  $R^2$  that this equation generates.

The conclusions that can be drawn from this analysis

are several. First, Euro-dollar availability had little impact on total reserves of all U.S. banks. However, this availability did influence required reserve levels for New York money market banks. Second, monetary policy, in the form of free reserves and marginal reserve requirements on Euro-dollar liabilities had no appreciable impact on average reserve proportions. However, time deposits as a percent of total deposits did affect reserve levels. While part of this effect may be ascribed to the fact that required reserve ratios are lower for time than they are for demand deposits, it is nonetheless possible to note that monetary policy aimed at reducing time deposit levels (via Regulation Q ceilings) did affect the percentage of required reserves held.

Euro-dollar availability reduced average required reserves for the borrowers of Euro-dollars. These borrowers were primarily New York banks. The availability of Euro-dollars had little impact on the entire banking system or, at least, the contradictory forces put in motion by the development of Euro-dollar borrowing (and perhaps Federal Reserve responses to this development) had a minimal impact. Nonetheless, the results do indicate that the treatment of Euro-dollar borrowing claims as cash items did significantly affect average reserve levels.

#### IV. Euro-dollar Borrowing and U.S. Interest Rates

Monetary policy works through several channels.

Reserve levels, money supply, and loan creation were discussed above. The adjustment of interest rate levels is also used by the Federal Reserve in its attempts to influence the economy. Generally, it is only in periods of tight money that U.S. bank Euro-dollar borrowing has any significant impact on the implementation of interest rate policy.

In tight money periods, interest rates are pushed up by the Federal Reserve through the sale of government securities and the resultant restriction of reserve availability. The rise in interest rates is designed to reduce the quantity demanded of loanable funds (the demand being determined in part by the price of such funds). As demand for funds declines, investment also declines. This slows the growth of national income and reduces price pressures. Whether this chain of events occurs in fact is open to question. However, interest rate levels are used by the Federal Reserve to implement its policies. To the extent that Euro-dollar borrowing affects these levels, such borrowing may be said to interfere with monetary policy.

The direct effect of Euro-dollar borrowing on interest rate levels in the United States has been to keep rates

lower than they would be in the absence of such borrowing.<sup>12</sup> The availability of Euro-dollars to banks has meant that final borrowers have been able to obtain greater amounts of funds from the banks than would otherwise have been possible. The greater availability of loans tends to hold down interest rate levels in the money and bond markets, contradicting Federal Reserve intentions. Further, the psychological effects to which Andrew Brimmer has referred<sup>13</sup> have tended to offset Federal Reserve goals. As Brimmer has noted, Euro-dollar borrowing banks

. . . have found it less urgent to adopt more restrictive. . . lending standards or to limit their new (loan) commitments. . . (in the face of tight money. They thus) transmit to the (money) market and to their own customers an impression that the degree of monetary restraint in general is less substantial than the monetary authorities say (it is) . . . .<sup>14</sup>

The transmission of a general feeling of ease, or at

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<sup>12</sup>H. Mayer, op. cit., pp. 26-28 obliquely refers to the various interest rate effects. Leimone, op. cit., p. 4 is concerned primarily with the interest differentials that exist between countries and the resultant flows of capital. The increased interest sensitivity of international capital that the Euro-dollar market has brought about means that the balance of payments effects must be dealt with by the Federal Reserve.

<sup>13</sup>Brimmer, Euro-Dollar Flows..., op. cit., p. 4.

<sup>14</sup>Ibid.



least of lessened tightness, to business borrowers tends to frustrate the Federal Reserve's aims. High interest rates and a restricted availability of funds are used by the Federal Reserve as a signal to business that investment should be curtailed. The goal, of course, is the reduction of investment expenditures and thereby the reduction of price and demand pressures. Euro-dollar borrowing, however, reduces the effectiveness of this signal.<sup>15</sup>

The indirect effects of U.S. Euro-dollar borrowing may offset the direct effects noted above. While the direct effect of such borrowing reduces the upward pressures on interest rates in the United States by making a greater amount of loans available, the source of the Euro-dollar funds determines the magnitude of the impact of the borrowing on interest rate levels. In some cases, the net result of Euro-dollar borrowing is to leave interest rate structures unaffected. If the funds lent by the Euro-dollar suppliers are on deposit in U.S. commercial banks, there is a redistribution of loanable funds among the banks and a net increase in loans. Interest rate levels, thus, decline or rise by less than they would in the absence of Euro-dollar borrowing. If the Euro-dollar supplier converts U.S. money market instruments into loanable funds,

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<sup>15</sup>Ibid.

the sale of these securities will tend to drive money market prices down and interest rates up.<sup>16</sup> The net effect in this case will be less than if the source of funds were commercial bank deposits since opposing forces will be at work. The increased availability of loans will tend to reduce interest rates but the sale of securities will tend to raise them.

Euro-dollar suppliers may be official institutions. If they draw on their balances in commercial banks or sell their U.S. money market securities, the net result on interest levels in the United States will be similar to the cases outlined above. If they redeem the special non-marketable debt issues sold to them by the Treasury for their "excess" dollar reserves, their action will draw down Treasury balances at the Federal Reserve, pumping reserves into the banking system. This will tend to increase the availability of loanable funds and reduce interest levels. However, if U.S. government expenditures remain constant and receipts do not increase, the Treasury will be required to sell additional bonds or bills in the U.S. money market. Such sales will tend to drive up interest rates, offsetting the negative influence the Euro-dollar borrowing and increased reserve availability will have on these rates.

While the majority of foreign central bank assets

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<sup>16</sup>H. Mayer, op. cit., p. 27.

are held in U.S. Treasury bills,<sup>17</sup> both private and official conversion of other market instruments may also occur. For instance, should the source of Euro-dollar funds be the sale or attrition of U.S. commercial paper holdings, the commercial paper issuer would, ceterus paribus, be required to increase his bank borrowing or reduce his expenditures. This increased borrowing would tend to increase interest rates, offsetting to some degree the impact of Euro-dollar borrowing.

Finally, should the official Euro-dollar supplier draw on his balances at the Federal Reserve, the reserves of the commercial banking system will be increased. This will reinforce the downward pressure on interest rates generated by the Euro-dollar borrowing. The Federal Reserve offsets these reserve changes arising from foreign official transactions as part of its normal activities. Nonetheless, the pressures generated in this case will tend to reinforce the downward movement of interest rates unless offset by the Federal Reserve.

To conclude, interest rate levels in the U.S. may be affected by U.S. bank Euro-dollar borrowing in a manner contrary to Federal Reserve policy. However, in some cases offsets to these pressures occur through the sale or

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<sup>17</sup>Klopstock, "Euro-Dollars in the Liquidity....", op. cit., p. 79.

disposition of U.S. assets owned by the Euro-dollar suppliers. In general, it appears that Euro-dollar borrowing by U.S. banks will tend to exert downward pressures on interest rate levels in the United States. Thus, Federal Reserve policy must respond to these pressures if effective restrictive monetary policies are to be successfully pursued.

#### V. The Money Supply

One of the policy variables that the Federal Reserve uses in essaying the impact of its actions on the economy is the rate of growth in the money supply. In Section II of this chapter, it was noted that money supply changes deriving from Euro-dollar borrowing would be nil except to the extent that restrictive monetary policy forced changes in the composition of total deposits or in cases where reserves were increased due to cash items factors or the movement of official funds into the banking system. Euro-dollar borrowing is not the cause of the changing composition of deposits, except minimally, but rather is the result of such changes. The effect of Euro-dollar borrowing on the money supply, then, is relatively insignificant. However, the actual measurement of the money supply may be influenced by Euro-dollar borrowing and, if such borrowing does cause the under- or overstatement of the money supply or of changes in it, Federal Reserve policy decisions may be based on erroneous information.

It has been said that the borrowing of Euro-dollars by U.S. banks understates the actual money supply in the United States and overstates the published money supply.<sup>18</sup> The proposition is supported as follows. When Euro-dollars are first borrowed, the published money stock tends to fall since foreign branches hold their dollar balances in U.S. demand deposits until they are "lent" to the home office and take the form of "liabilities to foreign branches." These liabilities are not included in the money supply but, according to Little, these funds are included in the published money supply figures when they are held as demand deposits.<sup>19</sup> Thus, to the point where the funds become "liabilities to foreign branches" the published money supply overstates the "real" figure since these funds, unless borrowed by U.S. residents, are not part of the stock of transactions medium available to U.S. residents, even though they are counted as such.<sup>20</sup> To this point, then, the published money stock has been overstated. When the funds are borrowed by U.S. banks,

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<sup>18</sup>The following is based upon Little, op. cit., pp. 26-28.

<sup>19</sup>Ibid., p. 27

<sup>20</sup>Ibid.

the published figure falls, approaching the actual or real money stock values.<sup>21</sup>

As reserves are released through Euro-dollar borrowing, according to Little, new loans are made and the published and real money supply, i.e., demand deposits plus currency used for investment and consumption in the United States, increase, approaching the level that the published data indicated before the borrowing. But, as Euro-dollar rates rise, an incentive to substitute U.S. demand deposits due to a foreign bank or U.S. foreign branch for previously held CD's appears. This occurs because asset holders switch from CD's to Euro-dollar

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<sup>21</sup>The following discussion pertains to the long-run effects of Euro-dollar borrowing on the calculation of money supply values. Short-run effects also occur. When banks borrow Euro-dollars, they place in the collection system a draft on the bank giving up the deposit. This draft was considered part of cash items in process of collection until September, 1969, and as such was a deductible item from demand deposits upon which reserves had to be held. Since the money supply is calculated from net deposit values, after cash items in process are subtracted, Euro-dollar borrowing may be said to reduce the measured money supply. The real money supply, as noted below, does not change immediately. The demand deposit previously held by a foreigner (bank) becomes a liability of a U.S. bank to its branch. Both these categories are excluded from consideration as part of the real money supply. However, since the purpose of borrowing Euro-dollars is to obtain loanable funds, such borrowing will eventually increase both the measured and real money supplies.

Should the banks engage in swap arrangements whereby they borrow Euro-dollars from each other on a daily basis for the specific purpose of reducing their deposit levels and thus their reserve requirements, then it may be said that the published money supply figures understate the real figures. The deposits that are offset by the cash item in process of collection does not change. It remains part of the transactions medium of the United States.

deposits and in so doing, CD's are transformed into U.S. demand deposits. Since CD's are not included in the narrowly defined money supply but these demand deposits are, the effect of such rises in Euro-dollar rates will be to generate this substitution by U.S. and foreign asset holders and thus to increase the published money supply figures. In the meantime, the real or effective money supply will drop to the level existing before the Euro-dollar borrowing occurred (due to the decline in money available for consumption and investment use in the U.S.).

Finally, the transfer from low reserves CD's to high reserves demand deposits (according to Little) will cause the somewhat overstated published and real money supplies to fall. When all these forces have been worked out, the final published money supply values will likely be somewhat higher than before the borrowing and the effective money supply somewhat lower than before.<sup>22</sup>

Thus, Euro-dollar borrowing by U.S. banks actually reduces the real money supply in the U.S. If such were the case, and assuming that Euro-dollar borrowing occurs in response to tight money policies in the U.S., it can be stated that Euro-dollar borrowing reinforces rather than thwarts these policies.

Unfortunately, there appear to be several flaws in

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<sup>22</sup>Ibid., pp. 27-28.

the above argument. First, as noted by the Federal Reserve in its explanation of the latest revision of the money supply figures,<sup>23</sup> the basic money stock concept (i.e., the public's stock of the means of payment) covers demand deposits, currency, and coin liabilities of the U.S. banking system held by all transactors, foreign and domestic, except the U.S. government, Federal Reserve, and U.S. commercial banks. This system includes U.S. commercial banks, the Federal Reserve, and the Treasury but excludes the liabilities of banks in U.S. territories and possessions and, most important here, liabilities of foreign branches and territorial branches of U.S. banks.<sup>24</sup>

It therefore appears that demand deposits at foreign branches of U.S. banks are not included in the published money stock. The conversion of CD's for these deposits then does not overstate the money stock figures. The substitution of assets occurs completely outside the money stock. Further, the conversion, when U.S. banks borrow their branches' deposits of the funds, from deposits to liabilities due foreign branches also takes place outside

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<sup>23</sup>"Revision of the Money Stock," Federal Reserve Bulletin, Vol. 56, No. 12 (December, 1970), p. 889.

<sup>24</sup>Ibid.



the money stock calculations and an overstatement of the published stock does not occur here either.

In addition, Euro-dollar borrowing does not increase, generally, the total reserves available to the banking system. Therefore, as noted earlier, no increase in the money supply is forthcoming.

The transfer from low reserve certificates of deposit to high reserve demand deposits at foreign branches was postulated by Little to cause the published and real money supplies to fall since more reserves are required to support a given amount of money. This is doubtful, however, since few if any reserves are held on Euro-dollar deposits by these branches.

In one sense Little's contention is correct, however. The conversion from CD to Euro-dollar deposit may involve the deposit by the Euro-dollar account owner of a U.S. demand deposit. That is, the asset holder may convert his U.S. bank CD to a U.S. bank demand deposit and exchange this deposit for a Euro-dollar deposit. In this case, a greater level of reserves are required and assuming that the conversion was undertaken due to higher interest rate incentives in the Euro-dollar market deriving from U.S. bank borrowing there, the U.S. money supply may be reduced. However, the conversion itself will increase the money supply, narrowly defined. The net result may then be some marginal increase in the U.S. money supply.

occasioned by Euro-dollar borrowing. The magnitude of the change would appear to be relatively small, however.

Generally, then, the money supply figures published by the Federal Reserve are more accurate than postulated by Little. Nonetheless, some revision of the money supply figures has been necessary because of an understatement of demand deposits that occurred prior to September, 1969. As noted in footnote 21 of this chapter, the cash items in process of collection that were deducted from demand deposit levels included Euro-dollar transactions. Since actual deposit levels were not affected by Euro-dollar borrowing, such borrowing tended to understate the true level of deposits. Thus, the Federal Reserve adjusted its money supply measurements to exclude this deduction and revised Regulation D to exclude Euro-dollar drafts from inclusion in cash items.<sup>25</sup>

Despite the problem considered above, the original postulate that Euro-dollar borrowing by U.S. banks makes the imposition of tight money policies more difficult remains valid. The money supply, as well as "excess" reserves, both rose as a result of the treatment of Euro-dollar borrowing claims as cash items in process. The neutralization of these increases is necessary if a given

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<sup>25</sup>See Ibid., pp. 887-893 and "Revision of Money Supply Series," Federal Reserve Bulletin, Vol. 55, No. 10 (October, 1969), pp. 787-789.

degree of monetary tightness is to be maintained. Generally, money supply considerations are of limited importance as far as Euro-dollar borrowing is concerned.

#### VI. Foreign Exchange, Balance of Payments, and Gold Policies

Euro-dollar borrowing by U.S. banks has had some fairly complex effects on U.S. monetary policy as it relates to this country's foreign economic relations.<sup>26</sup> Basically, such borrowing has given to the U.S. balance of payments a healthier prospect than the underlying position warranted. By the same token, the repayment of Euro-dollar liabilities by U.S. banks has given the balance of payments a more bleak aspect than in reality was the case.

Euro-dollar borrowing has affected U.S. foreign exchange operations in several ways. Upward and downward pressures on the par values of several countries' currencies have been intensified by Euro-dollar borrowing. The Federal Reserve has, therefore, found it necessary to supply dollars to European central banks or, more frequently,

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<sup>26</sup>Leimone, op. cit., pp. 5-6 develops a partial outline of the effects the Euro-dollar market in general has upon these factors. The specific impact of U.S. bank Euro-dollar borrowing is not, however, dealt with in any detail. Scott, op. cit., pp. 27-28, 31 has dealt with the impact of the Euro-dollar market on the U.S. balance of payments as have other writers, including Kvasnicka, op. cit., pp.16-17; Williams, op. cit., pp. 40-45; Klopstock, The Euro-Dollar Market:..., op. cit., pp. 13-17.

has been required to soak up excess accumulations of dollars in these central banks.

In addition, Euro-dollar borrowing by U.S. banks has, in the process of strengthening the (short-term) position of the dollar internationally, required fewer gold-dollar redemptions and has thus allowed the United States to maintain a status quo position vis a vis the international monetary system and gold values. The repayment of Euro-dollar liabilities by the banks has, as noted, worsened the balance of payments, requiring foreign exchange operations to support the dollar and measures to protect the gold stock remaining in this country.<sup>27</sup>

Euro-dollar borrowing has had the effect of temporarily improving the U.S. balance of payments because such borrowing represents an inflow of capital into the United States. In addition, the demand for Euro-dollar funds has drawn dollars out of foreign central bank reserves. This has improved the balance of payments on the official

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<sup>27</sup>The unsettled conditions that have prevailed in the foreign exchange markets since the suspension of the gold convertibility of the dollar in August, 1971, have presented difficulties to the foreign central banks and, to a lesser degree, to the Federal Reserve. Obviously, while the fundamental weakness of the dollar is not attributable to Euro-dollar borrowing, such borrowing and more important, the repayment of these liabilities, in conjunction with a severely eroding balance of trade position, have made these conditions inevitable.

settlements basis because this balance counts as deficit items only those dollars held by official institutions. The reversal of these flows causes a capital outflow and, further, increases dollar balances in official hands. When Euro-dollar borrowings are repaid, the U.S. balance of payments is forced into a (more severe) deficit position.

Federal Reserve balance of payments policy has generally had as its goal the reduction of the U.S. deficit. High interest rates (especially on short-term debt instruments) have been used to encourage foreign flows of capital into the United States. High interest rates are normally associated with tight money policies aimed at slowing down an overheated economy. In such periods, the balance of payments tends to weaken (move into a deficit position or move into a deeper deficit position) since greater amounts of imports are pulled into the country due to the boom conditions. Thus, high interest rates are used not only to dampen an overactive economy but also to improve the balance of payments. In this case, the two goals may be obtained through the use of only one policy tool, i.e., monetary policy.<sup>28</sup>

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<sup>28</sup>See Robert Mundell, "The Appropriate Use of Monetary and Fiscal Policy for Internal and External Stability," International Monetary Fund Staff Papers, Vol. 9 (March, 1962), pp. 70-79, for a discussion of the difficulties inherent in attempting to use one policy tool to achieve two goals. Mundell concludes that monetary policy is best

As noted, Euro-dollar borrowing by U.S. banks generally occurs in response to the imposition of tight money in the U.S. Since this borrowing also benefits the balance of payments, Euro-dollar borrowing tends to reinforce Federal Reserve balance of payments policy. However, to the extent that such borrowing prolongs boom conditions (and thus high import levels) in the U.S., the benefit derived from capital inflows to the balance of payments is offset to some degree by the continued high levels of imports. In addition, Euro-dollar borrowing tends to push up interest rates in the Euro-dollar market, offsetting the attraction to foreign asset holders of high rates in the United States. A Federal Reserve policy of high interest rates may therefore be neutralized by high interest rates in the Euro-dollar market, at least with respect to international capital flows. However, if the high rates in the market arise from the demand by U.S. banks for funds (as they have in the past), the same results are forthcoming. That is, capital flows into the

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suited for international equilibrium and fiscal policy for domestic stability. In the happy event that one tool solves two problems, the other tool may be used to reinforce the effects of the first or it may play a neutral role. This presumes, of course, that these tools are truly controllable. Leland Yeager in op. cit., pp. 109-110 notes some of the problems in utilizing Mundell's policy prescriptions.

United States directly, due to the attraction of high interest rates here, or it flows in indirectly, through the intermediation of U.S. banks.

In summary, the effectiveness of Federal Reserve balance of payments policy may be reinforced by U.S. bank borrowing of Euro-dollars. High interest rates attract capital into the country either directly or through the agency of the banks. However, the leakage in domestic monetary policy implied by U.S. bank induced flows means that the restriction of reserve availability and credit that monetary policy intends is not fully effective. The beneficial results accruing from Euro-dollar borrowing on the balance of payments are offset to some extent by a continued high level of economic activity and the consequent high level of imports. The net effect of Euro-dollar borrowing is a smaller assist to the balance of payments than might otherwise be the case.

Finally, the reverse flow of funds that occurs when Euro-dollar liabilities are repaid worsens the balance of payments. Since this reflow occurs at a time of easy money, when the Federal Reserve is attempting to stimulate the economy with low interest rates and unrestricted reserve availability, the repayment of Euro-dollar liabilities worsens the balance of payments and reinforces the outflow of capital that low interest rates involve. Generally, then, Euro-dollar borrowing and repayment tends to offset some of the positive balance of payments effects of high interest

rates and reinforces the negative effects of low interest rates.

With respect to foreign exchange policies of the Federal Reserve, Euro-dollar borrowing lessens the need for intervention by the Federal Reserve or its foreign central bank agents to support the value of the dollar.<sup>29</sup> Rather, the borrowing tends to put pressure on foreign currencies and merely requires the lending of dollars by the Federal Reserve to other central banks. When Euro-dollar borrowings are repaid, however, during easy money periods, the Federal Reserve must draw on its swap lines in order to support the dollar. This support becomes necessary because the dollar comes under pressure due to the influx of the repaid dollars on the foreign exchange markets. Thus, the Federal Reserve goal of stability in the foreign exchange markets is strained by the effects of Euro-dollar borrowing and repayments but, with the mechanisms set up to promote international financial stability, Euro-dollar activity does not appear to have added an unbearable burden to the implementation of this policy.

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<sup>29</sup>See Coombs, op. cit. (especially March and September 1969-71), various pages, for a fairly detailed description of the support operations undertaken by the Federal Reserve, Treasury, and foreign central banks. Kvasnicka, op. cit., pp. 17-18 discusses the effect of the Euro-dollar system on exchange rates generally.



With respect to gold flows, the borrowing of Euro-dollars has tended to lessen the outflow of gold reserves from the United States and their repayment has tended to increase these outflows. However, given the weakness of the international payments system prior to the suspension of gold convertibility of the dollar, only small gold flows were possible. Any sizeable outflows threatened the viability of the entire system. Thus, gold policy basically was aimed at maintaining the status quo and searching for temporary palliatives for the problem.<sup>30</sup>

To conclude, the Federal Reserve's international policies have been challenged by Euro-dollar borrowing by U.S. banks, but since these policies were developed to meet the growing strains on the international monetary system generally, the development of Euro-dollar borrowing has merely added some incremental strains to the system. The difference has been one of degree, not of kind and, indeed, the borrowing itself tended to ease the strains, temporarily.

## VII. Equity Among Banks

One of the primary concerns voiced by several

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<sup>30</sup>One solution may be the creation of SDR's. See Williams, op. cit., pp. 46-48 for a discussion of the relationship between the gold market and the Euro-dollar market.

writers, beyond the monetary policy leakage aspect of Euro-dollar borrowing, has been the effect that the access to Euro-dollar funds by a few large U.S. banks may have had on the equal impact of monetary policy on various classes of banks and on the distribution of reserves among the banks.<sup>31</sup> Andrew Brimmer has noted that since the few large banks with access to the Euro-dollar market have been able to sustain their lending activities, the Federal Reserve has had to exert a greater degree of pressure to achieve a given amount of restraint on the banking system than it otherwise would have found necessary. A disproportionate share of this pressure has fallen on the banks without access to the Euro-dollar market because these banks are not as able to deflect the impact of tight money as are the large banks. Eventually, all banks must reduce their expansion of credit but in order to obtain this reduction, the Federal Reserve must press harder on reserve availability than it otherwise would have had to.<sup>32</sup>

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<sup>31</sup>Brimmer, Euro-Dollar Flows..., op. cit., pp. 4-6; Klopstock, "Euro-Dollars in the Liquidity...", op. cit., pp. 79-80; Klopstock, The Euro-Dollar Market:..., op. cit., pp. 11-12.

<sup>32</sup>Brimmer, Euro-Dollar Flows..., op. cit., p. 4.

Additionally, Klopstock has noted that access to the Euro-dollar market tends to concentrate the dollar reserves of foreign central banks in these large U.S. banks. Without the Euro-dollar market, these central banks would have invested their funds in U.S. money market instruments and the resulting reserves would have been widely dispersed throughout the U.S. banking system. But, with the advent of the Euro-dollar deposit, central banks have placed their reserves in this investment vehicle. These funds are then borrowed by the few large U.S. banks with access to the market and the concentration of these funds at these banks occurs.<sup>33</sup>

While both Brimmer's and Klopstock's analyses may be true, there exist offsets and explanations that tend to reduce the seriousness of the problems raised. Klopstock himself notes that to the extent that foreign central banks place a proportion of their dollar reserves in time deposits in U.S. banks (which they did prior to the development of the Euro-dollar system), the same banks that now gain these funds through Euro-dollar borrowing would have been (were) the depositories for these time deposits before the Euro-dollar system came to prominence.<sup>34</sup>

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<sup>33</sup>Klopstock, "Euro-Dollars in the Liquidity....," op. cit., pp. 79-80.

<sup>34</sup>Ibid., p. 80.

Thus, at least some proportion of the funds now being borrowed by the U.S. banks with foreign branches were previously held in these same banks anyway. Further, foreign reserves were also placed in Treasury bills, purchased in New York. At least some of these funds, also, wound up in the large New York banks that are now active in the Euro-dollar market.<sup>35</sup> This is not to deny that prior to the development of the Euro-dollar market the central bank reserves were probably more widely dispersed, ultimately, than since its development. However, given the increase in these foreign dollar holdings and the general concentration of them even before the Euro-dollar system evolved, it is likely that this particular portion of the problem has not had a significant impact on U.S. bank equity.

Brimmer's thesis that Euro-dollar borrowing has a discriminatory impact is a more involved argument than Klopstock's. Whether it is correct or not, however, is not important since, if it is correct, the effects may not be what they seem and, if it is incorrect, little damage results from Euro-dollar borrowing per se. Indeed, it is the thesis of this section that the existence of the Euro-dollar system and the availability of funds from it has provided a positive influence on the impact of U.S. monetary policy.

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<sup>35</sup>Ibid., p. 79.

If it is true that a discriminatory impact does indeed occur, a good case can be made that this impact merely offsets the previous discriminatory impact of monetary policy that operated in the other direction, i.e., against the large banks. And, further, such an impact hastens the transmission of monetary pressures throughout the economy. In addition, Brimmer's thesis may be incorrect. That is, there may not be a discriminatory impact of Euro-dollar borrowing. In this event, this particular aspect of monetary policy is not of concern vis a vis Euro-dollars, although it may be in a more general context.

Taking first the view that Brimmer's thesis is incorrect, several writers have indicated that there is no discriminatory impact with Euro-dollar borrowing.<sup>36</sup> The basis of this statement is that the borrowing of Euro-dollars by large banks in reality merely transfers reserves among the big banks themselves. That is, the dollar balances that foreigners hold are kept primarily at large international-type banks in the major money markets in the United States. When one of these banks borrows Euro-dollars, it more than likely obtains a claim on another large U.S. bank. The losing bank then can protect itself from such losses by itself borrowing in the Euro-dollar

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<sup>36</sup>See, for instance, Little, op. cit., pp. 28-30.

market (defensive borrowing). As Carl Beige has noted,<sup>37</sup> Euro-dollar borrowing is similar to the gasoline contest games. When one company starts such a game, all the others begin their own in self-defense. It is not the hope of increased sales that motivates these entrants but rather the fear of sales losses if they do not participate that impels them to enter the competition. Thus, in the Euro-dollar borrowing situation, when one bank enters the market, the others must as well, to protect themselves from reserve losses.

The main point here is that the dollar deposits that are the reserves of the Euro-dollar system are kept primarily at the large money market banks in the U.S. When a large U.S. bank borrows these reserves, it may not obtain a claim on a smaller bank but rather on another large bank in the U.S. Thus, there is no discriminatory impact of Euro-dollar borrowing but merely a reshuffling or churning of reserves between the large banks.

If this is the case, some difficulty is encountered in explaining how these large banks can continue to make loans in tight money periods when they are merely protecting the reserves they own rather than gaining new reserves. Certainly, the fact that required reserves

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<sup>37</sup>In a speech to the Boston Economic Club, April 30, 1969, as quoted in Ibid., p. 28.

decrease due to the cash items factor when Euro-dollars are borrowed explains some of the continued lending. In addition, the earlier analysis in this chapter indicates that loans may be increased by Euro-dollar borrowing even though the total reserves and deposits of the banking system remain constant. Thus, Euro-dollar borrowing involves both an increase in available reserves due to the cash items factor (which allows an increase in loans) and an increase in loans due to increased liabilities to foreign branches.

Finally, Brimmer's thesis may be at least partly correct. There may well be some redistribution of reserves to the large banks. This is indicated by the increase in the number of foreign branches established by banks outside the large financial centers (usually considered to be New York, Chicago, and San Francisco).<sup>38</sup> The establishment of these branches indicates that the reserve losses being experienced by these banks were of sufficient magnitude to encourage the placing of branches in the European countries. Were these banks insulated from the effects of Euro-dollar borrowing, there would have been much less pressure on them to establish costly foreign branches (although certainly the access to funds must play some role in these decisions). It is also

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<sup>38</sup>See Chapter 3 and Williams, op. cit., p. 11.

indicated by the uses to which large and small banks put their available funds in the tight money periods. Large banks increased their business loans in these periods (1966 and 1969) while smaller banks did not. These large international banks also increased their percentage share of such loans. Since they were experiencing heavy CD attrition rates, it seems evident that some reserves were being gained at the expense of the smaller banks, especially since their use of the Federal Funds market decreased in these periods.<sup>39</sup> For these reasons, it appears that some redistribution of reserves did indeed occur.

Assuming that redistribution did occur, the question of the equity of impact among banks of tight monetary policy must be faced. However, the explanation of the equity problem contains hints of the answer to the problem. Presuming that it is the desire of the Federal Reserve that monetary pressures hit all banks equally and, further, that such pressures be distributed throughout the economy as rapidly as possible, it can be argued that the large banks' access to the Euro-dollar market has actually worked in favor of equality of pressure and in favor of a more rapid dissemination of the pressures throughout the country and the economy.

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<sup>39</sup>Brimmer, op. cit., pp. 8, 10-15. The decrease arose from the decline in lendable reserves, brought about by Federal Reserve imposed reserve stringencies.



The imposition of tight money, it has often been argued, hits the large money market banks first and hardest.<sup>40</sup> Since open market operations take place in New York, the large banks here are the first to feel reserve stringencies.<sup>41</sup> In addition, these large banks have come to rely on CD's for large quantities of loanable funds.<sup>42</sup> The use of Regulation Q to restrict the competitiveness of the banks in bidding for interest sensitive funds has meant that the large banks have faced high

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<sup>40</sup>While the literature on the subject is limited, some analysis of this impact has been undertaken. See, for instance, Tilford Gaines, "Financial Innovations and the Efficiency of Federal Reserve Policy," in George Horwich, ed., Monetary Process and Policy: A Symposium, Purdue University Monograph Series (Homewood, Illinois: Richard Irwin, 1967), pp. 99-118; T. Mayer, op. cit., pp. 29; Ira Scott, "The Regional Impact of Monetary Policy," Quarterly Journal of Economics, Vol. 69 (May, 1955), pp. 269-284 (this is the classic article on the problem); Ray Ruffin, "An Econometric Model of the Impact of Open Market Operations on Various Bank Classes," Journal of Finance, Vol. 23 (September, 1968), pp. 625-637; Warren Smith, "The Instruments of General Monetary Control," National Banking Review, Vol. 1 (September, 1963), pp. 47-76; Sam Petzman, "The Banking Structure and the Transmission of Monetary Policy," Journal of Finance, Vol. 24 (June, 1969), pp. 387-411; Vittorio Bonomo and Charles Schotta, The Regional Impact of Monetary Policy (Blacksburg, Virginia: Virginia Polytechnic Institute, Department of Economics, 1970); William Yohe, Comments on Bonomo and Schotta "The Regional Impact of Monetary Policy" presented at the Southern Economic Association's convention November, 1970.

<sup>41</sup>T. Mayer, loc. cit.; Scott, "The Regional Impact . . .," loc. cit. But Bonomo and Schotta, op. cit., p. 21, have found that there is no differential impact. Their work has been questioned by Yohe, loc. cit. and the subject appears to require further analysis.

<sup>42</sup>Brimmer, loc. cit.

attrition of their outstanding CD's as interest rates rose above the rates they were allowed to pay on such deposits. As Brimmer has noted, the large banks depended more heavily on CD's for loanable funds than did the smaller banks and, tending to draw on more interest sensitive fund sources, lost large amounts of CD's more quickly than smaller banks as interest rates rose.<sup>43</sup> Further, the increased proportion of demand deposits at these large banks tended to increase average required reserves.

Given the situation described above, it is perhaps not incorrect to state that there is a discriminatory impact of tight monetary policy on large money market banks. Thus, any activities which they undertake that may offset some of this impact would, assuming the desirability of equality of impact, be acceptable. Euro-dollar borrowing has provided an outlet whereby these large banks may deflect some of the pressures bearing on them. This deflection, by neutralizing some of the discriminatory pressures, leads to a more equal impact of monetary tightness.

In addition, to the extent that Euro-dollar borrowing generates a redistribution of reserves away from the smaller banks, there may be a tendency for a more rapid

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<sup>43</sup>Ibid.

transmission to the entire banking system of Federal Reserve pressures. When the larger banks begin to feel these pressures, they normally enter the Federal Funds market to bid for reserves. Their increased demand causes interest rates in the market to rise and these higher rates draw funds from reserve suppliers. However, the smaller banks that traditionally supply these funds are not forced to do so. Thus, they can maintain their reserve positions even while the larger banks are feeling the impact of tight money policies. However, while the surplus banks may or may not participate in the Federal Funds market, they must relinquish reserves when the larger banks borrow Euro-dollars. They have no choice in this case since they are presented with drafts on their reserves which they must honor. Therefore, to the extent that reserves do flow from the smaller banks to the larger banks as a result of Euro-dollar borrowing, tight money, which motivates Euro-dollar borrowing, affects the smaller banks sooner than it would otherwise.

Concluding, it appears that the monetary policy problem of discrimination or equity of policy impact may not be worsened by Euro-dollar borrowing. As Klopstock has noted, the funds previously held in the larger banks by foreign central banks still wind up in these depositories.<sup>44</sup>

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<sup>44</sup>Klopstock, "Euro-Dollars in the Liquidity...",  
op. cit., p. 80.

The only difference is that the route taken is a bit more indirect (and perhaps more expensive to the receiving bank). Brimmer's thesis that a discriminatory impact of Euro-dollar borrowing harms the smaller banks appears to be generally incorrect. If there is such an impact, it may merely offset the more stringent impact of monetary policy on large banks that results from open market operations. If there is not such an impact, i.e., if Brimmer's thesis is incorrect and reserves are merely transferred back and forth between the big banks, then there is no discrimination problem attributable to Euro-dollar borrowing.

It appears that there may be, on balance, some shifting of reserves between small and large U.S. banks as a result of the latter's Euro-dollar borrowing. However, this redistribution may merely make less severe the discriminatory impact of Federal Reserve actions. Finally, the redistribution that does occur communicates more quickly Federal Reserve policy throughout the banking system and thus, hopefully, throughout the economy.

#### VIII. Summary

Monetary policy is concerned with reserve availability, interest rates, money supply, international financial relations, and the equity of policy impact. As noted in the preceding sections, Euro-dollar borrowing has affected reserve availability, making it necessary for the Federal Reserve to apply a greater degree of contractionary

pressure to the money markets than would have been necessary without this leakage.

However, the direct effect appears to be confined to the New York money market banks rather than applying to the entire banking system. Further, the increased loans made possible by Euro-dollar borrowing means that monetary policy must take into account this change.

Bank borrowing of Euro-dollars has also added an extra dimension to the atmosphere in which the Federal Reserve operates. This factor means that the Federal Reserve must contend with additional (and often unknown) variation in the money markets. Thus, not only must the Federal Reserve frequently apply a greater degree of pressure to obtain its goals but it must be prepared to face a greater variation in the results it obtains.

Euro-dollar borrowing affects interest rate levels in several ways. While this borrowing may hold interest rates down due to the greater supply of loans that Euro-dollar availability allows, it is probable that the suppliers of such funds obtain them, at least in part, through the sale of U.S. assets, reinforcing the upward movement of interest rates.

Euro-dollar borrowing affects the money supply through facilitating credit creation by the borrowers. The possible mismeasurement of the money supply and thus the misdirection of policy, is not, contrary to some views, particularly aggravated by Euro-dollar borrowing. With

regard to international financial relations, Euro-dollar borrowing has had the effect of requiring swap transactions of various kinds between the U.S. and European central banks. Euro-dollar borrowing and repayment has temporarily alleviated and worsened the U.S. balance of payments and has required offsetting actions in the foreign exchange markets and among central banks.

Finally, the equality of the impact of monetary policy and the redistribution of reserves that may result from Euro-dollar borrowing does not appear to be a major problem. Indeed, any such redistribution may reinforce monetary policy and hasten its transmission to the economy.

Thus, Euro-dollar borrowing by U.S. banks has created difficulties for monetary policy mainly in the sphere of loan availability. This difficulty can be offset by a greater degree of pressure applied by the Federal Reserve. Whether this is necessary, given the postulated more rapid dissemination of pressures throughout the system which Euro-dollar borrowing facilitates, is open to question. In any event, the leakage that Euro-dollar borrowing introduced into the operations of U.S. monetary policy has been partially alleviated by the imposition of marginal reserve requirements on Euro-dollar liabilities. The computation of the reserve-free base and the rapid and near total repayment of the 1969-incurred Euro-dollar liabilities of U.S. banks means that in the next tight

money period, all or nearly all Euro-dollars borrowed will be subject to reserve requirements. While the leakage from monetary policy may not be entirely halted, the reserve requirement will increase the cost of such funds to the point that Euro-dollar borrowing will, in all probability, never again approach the magnitude that it did in 1969-70. Thus, the challenge to monetary policy presented by Euro-dollar borrowing appears to be past. However, changes in the reserve requirements and, more broadly, in the monetary system, may again bring such borrowing to prominence.

## CHAPTER VII

### CONCLUSIONS

#### I. Recapitulation

The purposes of this study were several. They embraced, first, a description of the Euro-dollar system, including both its development and its operations. Second, emphasis was placed on the similarity between the Euro-dollar system and the U.S. monetary system and on the development of policies akin to open market operations by the European central banks. Third, the determinants of Euro-dollar borrowing by U.S. banks were investigated and, finally, the possibilities of multiple credit creation and the effects of U.S. bank Euro-dollar borrowing on U.S. monetary policy effectiveness were analyzed. As noted in the introductory chapter, the overriding concern of this study has been the various effects generated by the borrowing by U.S. banks of Euro-dollars. In order to analyze this successfully, however, some coverage of the history and mechanisms of the system was required. A secondary emphasis throughout the study was the fact that Euro-dollars were the product of a unique monetary system. This product has taken on many of the characteristics of money and was dealt with in these terms.



The Euro-dollar system developed in three basic stages. It began as a result of the political tensions existing between East and West in the post-World War II years. Following the return to general convertibility in 1958, a considerable expansion of the system occurred. Tight money in the United States in 1966 and again in 1969 brought U.S. banks into the market for Euro-dollar funds, adding a further dimension to the system. A fourth stage, which was preceded by the repayment of a significant portion of the previous borrowings of U.S. banks, began in 1970. This stage may be dated either from the turn to easy money in the U.S. in 1970 or may be considered as starting with the withdrawal of the gold convertibility of the dollar in August, 1971. It is marked by the withdrawal of U.S. banks from the system (as borrowers) and by the decline in the vehicle currency status of the dollar.

As noted in Chapter 2, Euro-dollars may be considered a medium of exchange. They are, thus, money. This money is produced by a monetary system that is unique, for it is supranational in scope and essentially unregulated by any particular national central bank. The money is based upon commercial bank deposits in the United States but the creation of these reserves is not controlled by the system or by the Federal Reserve, except tangentially. The Euro-dollar is one of the currencies utilized in the international

payments system and may also be utilized within a country as a payments medium.

Euro-dollars are dollar denominated deposits in non-U.S. banks. Their issuance is not restricted to European banks, although these banks do produce the bulk of such deposits. These deposits are the money of a monetary system. To call the entire complex of transactions and activities that take place using the Euro-dollar a market is highly misleading. While the Euro-dollar market (the trading of deposits) does bulk large within the complex of transactions, the Euro-dollar monetary system, including all the various activities that a system implies, has been the subject of this dissertation.

The mechanisms of the system were also discussed in Chapter 2. In essence, the explanation of the Euro-dollar system parallels closely the explanation of the U.S. monetary system, with several important differences. There is no central bank in the Euro-dollar system. Rather, the reserves of the system are produced and held by another monetary system. Trading of these reserves, creation and lending of deposits based on these reserves, and multiple credit creation based upon the redeposit of these deposits are all parts of the system's operations. Leakages from the system have been substantial, unlike the U.S. monetary system. The leakages have occurred as a result of low re-deposit ratios and as a result of U.S. bank borrowing. In both cases, the reserves of the system filter out of it

and enter another monetary system. But, beyond the leakages and the absence of a central bank to provide reserves (and to act as a lender of last resort), the differences in the basic operation of the Euro-dollar system and of the U.S. monetary system are minimal. Only the international character of the system and the consequent lack of regulation of the system really set it apart.

Supply and demand factors in the Euro-dollar market, i.e., those influences operating on or in the system which find their expression in the market for Euro-dollar funds, were delineated in Chapter 3. These influences proved to be quite diverse and the participants in the market were motivated by a significant number of factors. Of particular interest were the causes of U.S. bank Euro-dollar borrowing. Chapter 4 attempted a determination of the major influences on this bank borrowing, concluding that, basically, the restriction of reserves by the Federal Reserve, as mirrored in CD levels outstanding, motivated U.S. banks to enter the Euro-dollar markets. It was further concluded that the Euro-dollar system was a marginal or alternative source of funds to the banks, and one which was abandoned when U.S. fund sources again became plentiful. Finally, the regression analysis indicated that the availability of Euro-dollars to some U.S. banks did create a leakage from the effectiveness of U.S. monetary policy.

Chapters 5 and 6 dealt with credit creation by the Euro-dollar system and with the effects of Euro-dollar borrowing on U.S. monetary policy. These subjects are best summarized in the following section, since they involve more tentative analyses and might best be indicated as conclusions based on the more institutional and factual coverage of the earlier chapters.

## II. Conclusions

The basic conclusions deriving from this study were that multiple credit creation by the Euro-dollar system was not only theoretically possible but also quite probable in a real sense. U.S. bank borrowing of Euro-dollars inhibits such creation by draining reserves from the system. But various actions taken by the European central banks in pursuit of profit and stabilization have funneled large amounts of funds into the system and have offset to some degree the leakage deriving from U.S. bank borrowing.

The redeposit of Euro-dollar funds into the system, either directly or through the agency of central banks, gives rise to multiple credit creation by the Euro-dollar system. A multiplier can be postulated, taking into account the redeposit ratio and, also, the degree of intermediation (and reserve base sterilization) that occurs. Should the reserves held to back created deposits rise, or intermediation increase, or the redeposit ratio fall, or should such factors act in combination, Euro-dollar

credit creation will be restricted. Should these factors operate in the opposite fashion, Euro-dollar credit creation may expand. As the Euro-dollar system has developed, it appears that the multiplier has increased. The negative influence of U.S. bank Euro-dollar borrowing has been offset by the deposit by the central banks of their dollar reserves, both for stabilization and investment purposes. Further, the growth of the system and of the acceptability of its money has reduced leakages from the system. Thus, given the magnitudes reported by Friedman, Klopstock, Machlup, and the BIS, one conclusion of this study is that multiple credit creation has occurred in the Euro-dollar system, despite the significant leakages that can occur from the system.

A second conclusion of the study is that the credit creation of the system can be affected by coordinated central bank action akin to that taken by the Federal Reserve in the U.S. money markets. By withholding deposits from the Euro-dollar system, or withdrawing already placed deposits, Euro-dollar system reserves can be reduced, thus affecting a multiple reduction of Euro-dollar deposits (the Euro-dollar money supply). As noted, these operations have begun to be undertaken.

The goals of this intervention in the Euro-dollar market are not exactly similar to those of the Federal Reserve. While the Federal Reserve attempts through open

market operations (and other actions) to influence the U.S. economy, the operations of the central banks in the Euro-dollar market are aimed more at controlling flows of funds into and out of their systems from the Euro-dollar system. These flows have had the effect of offsetting to a serious degree the monetary policies being pursued in some of the countries. In addition, these flows have tended to put pressure on exchange rates which then required central bank intervention. While the ultimate goals of the European central banks and of the Federal Reserve are the same, i.e., influencing the course of the domestic economy, the operations in the Euro-dollar market have as their immediate purpose the reduction of credit creation by the system. This reduction will be associated with less disruption of domestic credit markets and foreign exchange markets and thus domestic monetary policy may be more effective.

A third set of conclusions deal with the effects of the existence of the Euro-dollar system on the U.S. monetary system and on U.S. monetary policy efficiency. Generally, the Euro-dollar system can affect the U.S. system and the effectiveness of U.S. monetary policy only through U.S. bank Euro-dollar borrowing. While the Euro-dollar system's emergence has introduced a greater degree of competition into the lending of dollar denominated funds, the only major effect on the U.S. has been through this borrowing. As noted in Chapter 6, it appears that loan

creation by the banks has been facilitated by Euro-dollar borrowing. Equity among banks, interest rate structures, and the international aspects of U.S. monetary policy have not been adversely affected to any great degree. However, prior to September 1969, U.S. bank Euro-dollar borrowing freed reserves (through the cash items vehicle), allowed a rise in loans by banks and some expansion of the money supply, and created a leakage in the impact of tight money policies of the Federal Reserve, at least as they impinged on the New York banks. In addition, this borrowing broadened the variability of impact of a given degree of monetary policy. The Federal Reserve, thus, faced an additional destabilizing factor that increased its area of uncertainty with respect to the magnitude of impact of a particular policy action. However, the imposition of marginal reserve requirements on Euro-dollar borrowing has reduced the leakage from monetary policy and the variability of its impact. Indeed, it appears that should Euro-dollar borrowing reoccur in the next tight money period, such borrowing will actually augment rather than offset the impact of tight money.

The equity among banks issue has been of some concern to Andrew Brimmer, among others. As Chapter 6 indicated, this issue is not as significant as it first appeared to be. Whether the view that Euro-dollar borrowing merely represented a reshuffling of reserves among the large

money market banks or whether it implied some transfer of reserves from smaller to large banks, the force with which monetary policy strikes each class of bank is not really important (with respect to Euro-dollars). If there is some transfer of reserves, Euro-dollar borrowing merely transmits monetary pressures more quickly to all banks and, in addition, offsets the greater impact of open market operations on the large banks.

To conclude, the development of the Euro-dollar system has involved credit creation on a fairly sizable scale. It has brought interferences to the implementation of monetary policy both in the U.S. and abroad. However, it may have made more equitable the incidence of U.S. monetary policy. Further, with the new reserve requirements, such borrowing may reinforce U.S. monetary policy.

The future of the Euro-dollar system has been brought into question by recent U.S. actions designed to cope with the undervaluation of several other countries' currencies. These actions have, however, merely reaffirmed a fact which has been obscured in the last decade. That is, the U.S. dollar represents purchasing power in the most powerful economy of the world. When persuasion fails, U.S. action can obtain by force the desired goals. There is only one major currency, as the London Times is reported to have said, and that is the dollar. Given this situation, the vehicle currency status of the dollar may have been reduced



over the short term by the recent actions. But, in the longer term, based on the power of the dollar, the vehicle currency status of the dollar will be generally undiminished. As a component of the dollar payments system, the Euro-dollar system will undoubtedly survive the present period of uncertainty, barring extensive capital controls and the like.

While Euro-dollars may never again play a major role in U.S. bank liquidity, it seems certain that, in the absence of the complete collapse of the international financial system, the Euro-dollar system will continue to play a central and perhaps disruptive role in the financial relations of the nations of the world. The system's existence presents the possibility of good as well as ill. The development of open market operations in the system by the central banks presents opportunities similar to those that result from Federal Reserve operations in the U.S. money markets. Properly executed, such operations may solve many problems currently besetting the international financial system while, at the same time, allowing the continued flow of capital between countries. The Euro-dollar system will continue to deserve careful scrutiny in the future.

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## VITA

Cort B. Schlichting was born May 20, 1942 in Hackensack, New Jersey. He attended the public schools in his home town, Rutherford, New Jersey and completed the undergraduate B.A. in economics at the College of William and Mary in 1964. After obtaining the M.A. at Duke University in 1966, he taught economics for two years at Augustana College, Rock Island, Illinois. During this time, he attended the University of Iowa as a part-time student.

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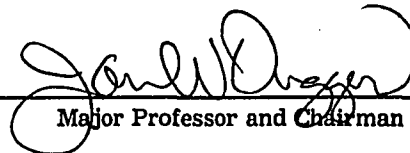
## EXAMINATION AND THESIS REPORT

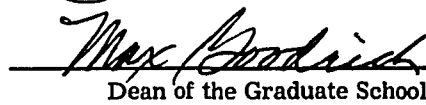
Candidate: Cort Burk Schlichting

Major Field: Economics

Title of Thesis: Euro-Dollars and U.S. Monetary Policy

Approved:

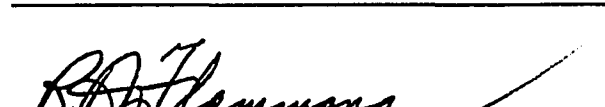
  
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Date of Examination:

November 7, 1972