

## The Euro-Currency System \*

The Euro-currency markets — “Euro-markets” for short — have, especially since 1966, expanded very rapidly. According to statistics given by the Bank for International Settlements (BIS) in Basle in its latest report (June 1974) the foreign currency liabilities vis-à-vis non-residents of the banks of eight European countries reporting to the BIS grew from 22.5 milliard dollars at the end of 1967 to 191.4 milliard at the end of 1973. These figures are inclusive of all interbank liabilities. Of the total of 191.4 milliard dollars, 130.5 milliard were denominated in dollars, and out of the remainder denominated in other currencies, those in D-Marks (accounting for slightly more than one half) were the largest item. This rapid development of the Euro-markets has drawn the attention not only of those who are responsible for monetary policy at both the national and the international level, but also of economists who, however, are by no means in agreement concerning the interpretation of what takes place on the market for Euro-loans.

As a necessary prelude to an analysis of the Euro-market I must first describe how Euro-markets function. For this purpose I shall limit myself to the Euro-dollar market as being the most important of the Euro-markets.

### I. Description of the Euro-dollar Market

A multi-national firm transfers a demand deposit at an American bank by check to a “Eurobank” in London, which opens in the firm’s name a time deposit denominated in dollars. The Eurobank

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\* This is the text, revised, when necessary to take account of the latest available figures, of one of the author’s Horowitz Lectures, delivered in Israel in the spring of 1973.

now has under its assets the demand deposit at the American bank, and under its liabilities the dollar time deposit. In order to profit from an interest-rate differential, the Eurobank now transfers the demand deposit to another Eurobank, say, in Paris, in exchange again for a time deposit, but perhaps with a different term or period of notice from that of the deposit held with it by the multinational firm. The Paris Eurobank may now transfer the demand deposit at the American bank to a third Eurobank which, by a lending operation, puts it at the disposal of an "end-user", for example, a French importer who draws on it to finance imports from the United States. Thus the demand deposit at the American bank finally ends up in the hands of the American exporter from whom the Frenchman has bought his goods.

Up to this point the process has been one in which the dollar time deposits created, except for the first one in the chain, have been interbank deposits. And it is quite possible that the chain of interbank deposits becomes still larger than the one I have just described. In the series of time deposits which are thus created at one bank after another, each successive item will usually be smaller than the one preceding it, since every bank will, as a rule, hold back as reserves a part of the dollars deposited with it. However, according to operators in this market, the amount thus retained is a small percentage of the dollars received.

Now, in the American banking system all that has happened as a result of the events so far described, is that the demand deposit from which the whole process started has changed hands a number of times, and may also have passed from one American bank to another. But the American banking system as a whole has suffered no loss of funds.

By far the major part of the Euro-dollar deposits consist of time deposits. The remainder takes the form of "call money", or "sight deposits", which may be drawn on either without notice or else with 24 hours notice. But even this "day to day" money must, as a rule, be converted into demand deposits before it can be used for making payments.<sup>1</sup>

In the usual presentation the "mechanism" of the Euro-dollar market does not reach its completion with the loan to the end-user.

<sup>1</sup> See HELMUT MAYER, « Multiplier Effects and Credit Creation in the Euro-dollar Market », in this *Review*, Sept. 1971, page 242.

The American exporter in our example may perhaps put part of the dollars coming into his possession on an account at a Eurobank, in which case a new chain of interbank deposits is started, and once again continues until the relevant amount, minus what the banks have held back as reserves, comes into the hands of an end-user — whose supplier, of course, may once more place dollars at a Eurobank.

According to the usual presentation, then, there occurs a process of multiple expansion of Euro-dollar deposits held by non-banks, and a simultaneous process of multiple expansion of loans to end-users. Assuming that we count the Euro-dollar deposits of non-banks as part of the money supply, as is logical if we include in the latter domestic time deposits held by the public, we must conclude that the money supply has increased. Those who use the more limited definition of "money", so as to include only demand deposits, describe the same event by saying that the velocity of circulation of money has increased.

Our example lends itself to a number of variations in as much as we may introduce different assumptions concerning the identity of the initial depositor of dollars or of the end-user.

The initial Euro-dollar depositor may be any firm (not necessarily multinational) owning dollars, or a non-American commercial bank or Central Bank. The European Central Banks have frequently placed dollars on the Euro-dollar market, usually via the BIS. In the middle of 1971, however, they came to an agreement to discontinue this practice. As regards the end-user, we may suppose that he, instead of using the dollars, as did the Frenchman in our previous example, to finance imports from the United States, uses them to pay for imports from Japan. And we may further suppose that the Japanese exporter changes the dollars into yen, so that they come into the hands of the Japanese Central Bank. If we also assume that the initial Euro-dollar depositor was a European Central Bank, then the relevant demand deposit in the American banking system serves as dollar reserves twice. The European Central Bank counts the related Euro-dollar deposits as reserves, and the Japanese Central Bank counts as such the demand deposit in America.

A very different case is that where the end-users are American commercial banks. In fact, when, as happened especially in 1969, holders of Certificates of Deposit (CD's) issued by American banks let them run off, and transferred the proceeds to Eurobanks, the

American banks borrowed the dollars back from the Euro-dollar market. The corresponding item "Borrowings" appearing on the liabilities side of the American banks' balance sheets made good for the decline in the CD's. The latter decreased in 1969, for example, by 9.5 milliard dollars while American banks borrowed 7.3 milliard dollars from their foreign branches.

## II. Analogies at the National Level

### 1. *The Euro-dollar market as an international money market*

The Euro-dollar market is primarily a market among Eurobanks for short-term money in the form of dollars. This characteristic makes it analogous to a money market in the sense of a market among commercial banks for Central Bank money.

On the national money market a bank which acquires additional deposits at the Central Bank (because, say, it has sold to the latter foreign exchange paid in by customers) and which cannot at once expand loans to customers correspondingly, lends the surplus cash out at short-term to banks which are in the opposite situation of being short of cash. When there is a tendency for the banking system as a whole to lose cash, interest rates on the money market will rise. And they will fall in the opposite circumstances.

Now, we may regard the Eurobanks as a special kind of banking system in which dollar deposits at American banks play a role equivalent to that of the Central Bank money in the national banking system. A Eurobank which is in receipt of dollars can and will use them, in the case that there is no immediate opportunity to lend them to end-users, for making loans to other banks which do have such an opportunity. The American demand deposits are lost by the Eurobank system as soon as loans are made to end-users and the latter draw on those deposits. And when these out-payments of dollars tend to exceed the in-payments, the interest rates on inter-bank Euro-dollar deposits will rise in exactly the same way as money rates rise on national money markets when the inflow of Central Bank money lags behind the outflow. And the interest rates will tend to fall in the opposite case.

### 2. *The Euro-dollar multiplier*

The process to which I have already referred of the multiplication of the Euro-dollar deposits in the hands of the economic agents — and here we abstract from interbank deposits — on the basis of an initial deposit of dollars has drawn more attention in the literature than any of the other problems which the Euro-dollar market raises. It has frequently been likened to the familiar process of monetary expansion in the national banking system. Before enquiring how well-founded such a comparison is, it is necessary to observe that, what is meant by the multiplier in the literature, is not always the same. There seem to be several different concepts.

The first of these is based on the following series: the first item is the original dollar deposit in Eurobank A; the second item is the deposit made at Eurobank B by the supplier of the borrower from Bank A; the third is the deposit in Eurobank C arising in a similar fashion and so on, each successive item in the series being always smaller than the preceding one. This is the series which Milton Friedman<sup>2</sup> for example uses.

The second multiplier concept is based on an entirely different series. Here, too, the first item in the series is the initial dollar deposit in Eurobank A; the next item is also the same as before; it again represents the amount which the supplier of the borrower deposits in some Eurobank. But the third item represents the amount which the supplier of the supplier deposits in some Eurobank. And all subsequent items in the series similarly represent payment made by a succession of suppliers one to the other. This sort of multiplier process is evidently that which Machlup has in mind, although he does not use the term multiplier, when he writes: "If the holder of a demand or time deposit in New York transfers it to a dollar account with a bank in Europe... both the dollar deposit liabilities and the dollar cash reserves of the European banks will be increased... The increase is therefore regarded as due to a primary deposit. If... the Eurobank with its newly acquired dollar cash reserve extends a dollar loan, it is possible that the borrower and those to whom he pays and those to whom they pay, keep some or all of their receipts on dollar accounts with some banks in Europe... This second increase

<sup>2</sup> See MILTON FRIEDMAN, « The Euro-Dollar Market: Some First Principles » in *The Morgan Guaranty Survey*, October, 1969.

in dollar deposit liabilities of European banks will be regarded as derivative".<sup>3</sup>

Still another conception is that of Helmut Mayer who says: "... all that is necessary for a multiplier effect to exist... is that the Euro-dollar credits add on a worldwide basis to aggregate demand and income circulation and that part of this increased income circulation be reflected in increased current account balances with the Euro-dollar banks themselves..."<sup>4</sup>

If my interpretation is correct, this last conception is derived from the familiar investment multiplier process. Starting from an investment financed by the initial Euro-dollar deposit, it obtains the series on which the Euro-dollar multiplier is based by taking not the positive items in the investment multiplier process but the negative ones, namely the so called "leakages", but of course only those which take the form of Euro-dollar deposits.

In the literature a large part of the argument has been concerned with attempts to estimate the magnitude of the Euro-dollar multiplier. And even though most of the estimates have been made using one and the same definition — that which I have associated with the name of Friedman — the figures given vary greatly. I shall not go into these estimates here, for a reason to which I shall come in a moment.

It is clear that, if any of these multipliers can be considered as analogous to the money multiplier in a closed national banking system, it can only be the first. For in the national banking system this sort of multiplier arises from the fact that Central Bank money paid in to a given commercial bank spills over in drops of diminishing size from bank to bank, in the same way as in the Euro-dollar case the demand deposit in the American bank spills over from Eurobank to Eurobank (I continue, of course, to exclude interbank deposits). Thus just as the initial accretion of cash in the national banking system leads to the creation of additional bank money several times as big as that accretion, so — according to the generally accepted theory — does the initial Euro-dollar deposit in a Eurobank lead to the creation of further Euro-dollar deposits.

<sup>3</sup> See FRITZ MACHLUP, « Euro-Dollar Creation: A Mystery Story », in this *Review*, Sept. 1970, p. 237-38.

<sup>4</sup> See HELMUT MAYER, *op. cit.* p. 237.

It is this theory of an exact analogy between the two cases which I am now going to challenge.

If we consider what happens in the national banking system, we see that each and every supplier of the series of borrowers who are accommodated by one or another of the successive banks in the chain, has no other choice, if we exclude withdrawals in cash, but to pay the check he receives into his bank. If we now consider the Euro-dollar case, we see that the same is not true. There is indeed nothing in the payments mechanism which obliges the supplier of a borrower from a Eurobank to pay the check drawn on the American demand deposit into that or any other Eurobank. If he does in fact deposit all or part of the amount with a Eurobank, this will be the consequence not of a decision necessitated by the form of payment (check) but of a decision made in consideration of his own liquidity position, and of the structure of interest rates as between the national and the Euro-dollar money markets. His decision is totally unconnected with the fact that part or all of his receipts are due to sales to somebody who has borrowed on the Euro-dollar market. His decision would be exactly the same if none of his receipts came from somebody who had borrowed from a Eurobank. The so-called chain of Euro-dollar deposits, implying a causally connected succession of deposits in Eurobanks comparable to the chain which we find at the level of the national banking system, does not exist.

Our objections apply equally well, of course, to the multiplier process as conceived by Machlup. What he calls "primary deposits" are not in any way bound to give rise to his "derived deposits". And the other way round: what he considers derived deposits cannot truly be said to be derived from a primary deposit.

If we want to draw a true analogy between what happens on the Euro-dollar market and what happens within a closed national banking system, we must put the case as follows. Somebody who disposes over a demand deposit at a commercial bank transfers this to a savings bank because of the higher interest rate. This bank draws on the demand deposit, now in its name, in order to make a loan, say to a construction firm. This construction firm, out of the net income resulting from its activity, saves a certain amount which it transfers to a savings bank. This bank will consequently be enabled, in its turn, to extend a loan to some business firm: and this process may continue. In this way a series of savings accounts may be built up, while the level of demand deposits at the commercial

banks remains unchanged. It has not so far been customary to describe this building up of savings accounts in terms of a multiplier process set going by the first savings account opened and the loan which this enables the savings bank to extend. Indeed, each savings account has been considered as "primary", and as being related to the general income situation of the saver, and not simply to some particular part of his gross receipts, namely that part which could be traced back to funds borrowed from a savings bank. In just the same way, when we are considering the reason why Euro-dollar deposits come into existence, we ought, I suggest, to start from the entire liquidity position of the person who makes a Euro-dollar deposit, and not from a specially separated-out part of his gross receipts.

### III. Effect of the Euro-dollar Market on the Volume of Credit

The problem to which I now turn concerns the effect which the existence of the Euro-dollar market (and of the Euro-market in other currencies) has on the total world volume of credit and, if we regard Euro-currency deposits as money, on the total world money supply. Here we must emphasize the expression "world volume of credit" since the Euro-currency loans find their end-users in almost all parts of the world. And when we consider them from the standpoint of their effect on the money supply, we are unable to label this or that part of the Euro-currency deposits as belonging to this or that national money supply.

At first sight the answer to the question we are here posing seems clear and unambiguous. If, on the basis of a given volume of deposits in American commercial banks, which, let us suppose, are fully loaned up, there is built up a credit "pyramid", as it has been called, via the Euro-dollar market, then it seems necessarily to follow that the existence of this market increases the total volume of credit granted and correspondingly the money supply. And this is the view that is in fact held by most writers on the subject.

However, the matter is not quite so simple as it seems. In order to examine the problem more closely, let us assume that on a certain day the Euro-dollar market is "opened". We must here make some assumption as to the form in which non-American banks and (mostly) multi-national firms are holding their liquid assets at that moment.

I shall suppose that, out of whatever liquid balances they hold in the United States, that part which consists of minimum necessary working balances is in the form of demand deposits with American banks, and that that part which is regarded as secondary liquidity reserves is in the form of time deposits or CD's or American Treasury bills.

Let us first consider the time deposits, or alternatively the CD's. If either of these are converted into demand deposits, and if the latter are turned over to a Eurobank, then the Eurobank can indeed expand its loans, but the American banks must reduce theirs, since the reserve requirements are higher against demand, than against time deposits. In consequence the total world volume of credit will increase by less than the Euro-dollar credit granted by the Eurobank. If, however, the Federal Reserve System intervenes in order to fill the reserve-gap which has appeared in the American banking system, then the increase in the total world volume of credit will be just equal to the Euro-dollar credit. I shall proceed on this latter assumption, which seems to me the more realistic.

The next step is to see what is done with the Euro-dollar loans. We have to distinguish between three main cases.

In the *first* case the American banks themselves are the borrowers from the Euro-dollar banks. In this case there is an increase in the world volume of loans outstanding, but not in the category of loans which is really significant. For there is not additional lending to the "economy". Of course so long as the borrowings by the American banks were not subject to any reserve requirements, they did put those banks in a position to expand credit to the economy. But since the introduction of such reserve requirements in 1969, this source of credit expansion has lost its importance.

In our *second* case the borrower (American or non-American) uses the dollars to settle his debt to an American supplier. Here the demand deposit at the American bank that was transferred to the borrower by the Eurobank, finds its way back into an American account. The world volume of lending will have increased by the amount of the Euro-dollar loan. We must, however, add a further point. The effect of the operations, which started with the opening of an account in the Eurobank and ended with the acquisition of a demand deposit by the American supplier, has been to bring about a shift from time deposits to demand deposits within the American banking system. This means that the American banks must reduce their loans for two reasons; first, because demand deposits require

larger reserves than time deposits, and, secondly, because, assuming no change in the ratio of bank notes held by the public to demand deposits, bank notes will be withdrawn by the public. But here again we may suppose that the reserve-gap will be filled by compensating action on the part of the Federal Reserve System.

In our *third* case the non-American borrower converts the dollars into his own currency. They thus come into the hands of "his" Central Bank. This is a case where the world volume of lending to the economy increases first of all by the amount of the Euro-dollar loan, but where there also is another source of increase. For the purchase of the dollars by the Central Bank makes the domestic banking system concerned more liquid thus enabling it to expand credit — unless of course the Central Bank intervenes to prevent this.

To ascribe this secondary effect to the existence of the Euro-dollar market, however, would mean assuming that the borrower could not have obtained the dollar loan through other channels (i.e. directly from American banks). And this assumption is not necessarily valid. A direct dollar loan might have been obtained by the foreigner in competition with some potential domestic borrower. And this is true even under our assumption that the banks are continually loaned up.

Now let us suppose that in the initial situation foreign banks or multinational firms have been holding all or parts of their secondary liquidity in American Treasury bills (instead of CD's or time deposits). And let us assume that they now sell these bills and deposit the proceeds at Eurobanks, which then grant a corresponding volume of Euro-dollar loans. If the Treasury bills are taken over by the public and if in the initial situation there is, as we continue to assume, no significant volume of idle demand deposits, then what must have happened is that time deposits have been turned into demand deposits with which the Treasury bills have been bought. We have here arrived at the same situation as that from which we started out when we assumed that the asset converted into Euro-dollar deposits was an American time deposit; and the subsequent developments will be the same. There is nothing to add unless we suppose that the American monetary authorities put additional Central Bank money at the disposal of the commercial banks in order to prevent the interest rate on Treasury bills from rising, in which case the total world volume of credit will be increased still further.

The results of my analysis up to this point may be summarised as follows: Assuming that the monetary authorities of the various countries follow a policy of offsetting the effects of the Euro-dollar operations on the liquidity of the commercial banking system, then the loan by a Eurobank, based on the transfer of an American demand deposit to that Bank, will increase the volume of credit available to the world economy by the same amount unless the end-user is an American commercial bank. Suppose alternatively that the Central Banks, when acquiring dollars from the Euro-dollar market, refrain from offsetting the corresponding increase in the liquidity of the commercial banks, but that they do intervene in the opposite case to prevent a decline in liquidity and a consequent contraction in the volume of credit; here the world volume of credit will be increased by the existence of the Euro-dollar market to a greater extent than under the first assumption.

A final point to which I would like to call attention under the heading of credit creation in the Euro-dollar market is the tendency in the literature to regard the *whole* "pyramid" of Euro-dollar credit outstanding at any time as necessarily forming a net addition to the world volume of credit, as though the world banking system would have granted just the same, and no larger an amount of non-Euro-dollar credit, had the Euro-dollar market not existed. This seems to me a false assumption, leading to an exaggerated notion of how big a role the coming into existence of the Euro-dollar market has played in the process of world inflation.

#### IV. The American Balance of Payments and Euro-dollar Loans

Under this heading two questions have to be asked.

*First*, is an American balance of payments deficit a prerequisite for the development of a Euro-dollar market?

*Secondly*, how do the operations on the Euro-dollar market affect the American balance of payments?

The first question is quickly answered. Since the Euro-dollar market is supplied mainly by non-Americans, and since the accumulation of dollars in the hands of these can only come about if there is an American balance of payments deficit, such a deficit was in fact a condition for the development of a sizable Euro-dollar market. This does not, however, imply that the movement in the volume of Euro-dollar deposits must always be parallel to that in the American

balance of payments, so as to increase so long as a deficit continues and to decrease when a surplus appears. Indeed the facts show that there is no such parallelism. Once a large volume of Euro-dollars has come into existence, the volume of Euro-dollar deposits may increase even at a time when the American balance of payments shows a surplus.

In order to answer the second question I shall consider what happens in each of the three cases already mentioned, and corresponding to the different uses to which the Euro-dollar credit may be put.

Our *first* case is that where the borrowers are American banks. The parties converting American bank deposits into Euro-dollar deposits are American or foreign individuals or firms, or foreign commercial banks, but, let us suppose for the moment, not foreign Central Banks. In this case over against the capital export there is a capital import. And the American official settlements balance of payments, which is defined as being equal to the accumulation of dollars by foreign monetary authorities (gold at present playing no role), is thus unaffected. On the other hand, the so-called liquidity balance, where the measure is the movement in total short-term indebtedness, deteriorates, provided the depositor in the Euro-dollar market is an American, since the short-term indebtedness of the United States in this case increases.

Our *second* case is that where the borrower uses the Euro-dollar credit to finance imports from the United States, so that there takes place a capital export in the form of a transfer of American demand deposits to a Eurobank, accompanied by an equivalent American export of goods. If the transfer of the American demand deposit to the Eurobank is made by a foreigner, the liquidity balance improves, but the official settlements balance remains unchanged.

Our *third* case is that where the dollars borrowed from the Eurobank come into the hands of a Central Bank (not the American). Here America's official settlements balance deteriorates, unless the initial depositor happens to be such a Central Bank. If he is an American, the liquidity balance also deteriorates.

## V. The Determination of Interest Rates on the Euro-dollar Market

On the assumption that there were no restrictions, imposed by any of the authorities, on the international transfer of funds, we should expect that interest rates on the Euro-dollar market would

be very closely geared to the American rates, both on the deposit and on the loan side. I shall now present a brief analysis of the factors behind this link-up.

The holder of a demand deposit at an American bank who wants to acquire a somewhat longer-term asset has three options open to him. He may put the funds on time deposit (or CD's); he may buy American Treasury bills or similar paper; or he may pay the dollars into an account at a Eurobank. He will choose this last course provided it gives him an interest rate somewhat higher than that which he would obtain from either of the other two uses for his funds. It might seem that there ought to be a movement into Eurobank deposits until the interest rate on them had fallen to equality with the rates paid by American banks on time deposits (or CD's) of like term. However, such an exact equality cannot be expected to be reached. For some slight difference must evidently exist to compensate for the greater risk which owners of funds will regard as attaching to deposits in institutions of a character with which they are as yet relatively unfamiliar.

As regards the loan rates charged to the end-users of Euro-dollar loans, we must suppose that, in order for the borrower to turn to a Eurobank, there must be an advantage in the form of a lower interest rate than he would have to pay to an American bank. However, the Euro-dollar rate is unlikely to be pushed up to full equality with the American rate. This is because even among those firms which are large enough and well enough known to be eligible for Euro-dollar loans, there are doubtless many of which the managements are either not well enough acquainted with the Euro-dollar market, or else see an advantage in dealing with a bank that is located near at hand, an advantage which they regard as offsetting that of the interest-rate differential.

On the basis of these theoretical considerations we might conclude that the interest rates paid on deposit of dollars at Eurobanks will be higher, and the rates charged for loans by them will be lower, than the corresponding rates prevailing at American banks, but that the Euro-dollar and the American rates will move up and down together. This last point implies that the decisive factor in the determination of the level of the Euro-dollar interest rates is American monetary policy, since it is this which sets the level of American short-term interest rates.

When we try to test our theory empirically, we are confronted

with the problem of deciding which loan rate we should take, from among the many such rates that exist in the American banking system, as our standard of comparison. The best we can do is to start out from the "prime rate", i.e. the rate which American banks charge to first-class customers; but we must add something to this rate to allow for the fact that the American banks oblige the borrowers to keep on demand deposit a certain percentage of the funds lent. For this condition implies that the interest rate actually paid exceeds the nominal rate.

Two of the three conclusions we have just drawn are clearly borne out by the facts. *First*, the interest rate granted by the Euro-banks on three months' deposits (and we take the example of three months' money as being typical) have regularly lain above the rate for (three months') CD's, and above the rate for American Treasury bills. *Secondly*, the movement in the rate on Euro-dollar deposits has usually been parallel to that in the American rates. On the remaining point, however, the facts contradict our theory. The rate on Euro-dollar deposits, and surely therefore also that on Euro-dollar loans, has over considerable periods been not below but substantially above the "prime rate". In the month of May 1969 the rate on Euro-dollar deposits reached approximately 12 per cent, while the "prime rate" stood at 8.5 per cent.

An essential assumption of our theory was, however, as we may recall, that funds were perfectly free to move between the two markets, the American and the Euro-dollar. And what actually happened was that lending abroad by the American banks was officially restricted, under regulations introduced by the Johnson Administration in 1968, so that it became difficult or impossible for borrowers in the Euro-dollar market to switch to the American domestic market. When such restrictions exist, American monetary policy does not any longer fully determine the level of Euro-dollar interest rates. What it does still do is to set lower limits for the Euro-dollar deposit rates on the one side and the Euro-dollar loan rates on the other. For the former cannot fall below the American deposit rates, and the latter cannot fall, by more than a small amount, below the American loan rates. This link remains since, on the one hand, depositors can always shift from Eurobanks to American banks, and, on the other hand, borrowers can always shift from American banks to Eurobanks, even if they are not free to shift in the opposite direction. Above the lower limits, however, the interest rates on the Euro-dollar

market will be free to move in response to demand and supply conditions, practically uninfluenced by competition from the American banking system.

I am now going to refer briefly to another problem which is of interest both to the theoretical economist and to the professional operator on the foreign exchange market.

Let us look at the Euro-interest rates for two different currencies on a day selected at random: November 30th 1972. On that day the three months' deposit rate for Euro-dollar was 6 per cent and the corresponding rate for Euro Swiss-francs was 5.25 per cent. (The rates refer to interbank deposits). At the same time on the three months' forward market the dollar was quoted at a discount with respect to the Swiss franc of 0.8 per cent. Thus the interest rate on Euro Swiss-francs fell short of the interest rate on Euro-dollars by almost exactly the amount of the discount on the forward dollar. A similar relationship existed at other dates. The figures in our example mean that if a bank with dollar balances changed these into Swiss francs and deposited the francs at a London Eurobank, but at the same time covered itself against the exchange risk, it earned an interest rate of 6.05 per cent, or only very little more than it would have earned in the Euro-dollar market. In other words, the interest arbitrage which, according to a familiar theory, brings about equality between the *net* interest rates of two countries, i.e. the interest rates adjusted for the premium or discount at which one currency stands with respect to the other on the forward market, here works at the level of the Euro-currency interest rates and not at the level of the relevant national interest rates. It is easy to find corresponding examples relating to other currencies.

There are many other problems connected with the structure of Euro-currency interest rates, problems, into which I cannot enter in this paper, except to point out that most of them have not so far been sufficiently analysed. Indeed, it is no easy matter to make clear the complicated relationships of interdependence which exist between different Euro-currency interest rates, between these and the national-currency interest rates, and between both sets of rates and the cost of covering exchange risks. Doubtless it would be relatively easy to work out a consistent theory of the entire international structure of interest rates on the assumption that there were no obstacles to the perfectly free movement of funds. At the present time, however, many such obstacles exist. And the relationships between the rates



on the various Euro-currency deposits and loans are the only ones for which the development of the theory presents no insuperable difficulties, simply because these interest rates are determined on a market which is entirely free from restrictions.

## VI. Controlling the Euro-dollar Market

Whereas national money markets are subject to control by the respective monetary authorities, the Euro-markets are free from any such control. And it is not surprising that some monetary authorities have urged that controls should be introduced. One of their main reasons for so urging is that the existence of the Euro-markets increases the volume of funds which is lying in wait ready to move to the countries with higher interest rates and/or to those whose currencies are expected to be revalued upwards.

The opinion has sometimes been voiced that if all restrictions on the free flow of funds from one country to another were removed, the Euro-markets would disappear. If this were true, it would be possible to put an end to those markets by removing the present obstacles to the free flow of funds. However, it seems to me highly doubtful whether getting rid of the Euro-markets would greatly reduce the international movement of funds. For interest rate differentials, and rumours about approaching changes in currency parities, would continue to be factors causing such movements. And I see no possibility of demonstrating conclusively that the magnitude of these would decline. But even the contention that the Euro-markets would cease to exist in the absence of restrictions, seems to me unwarranted. If it is true, as many banking experts maintain, that there exists a permanent factor, of a cost nature, enabling the Eurobanks to carry out their operations in the Euro-markets with smaller margins between the interest rates on deposits and loans respectively than the domestic banks need to exact in their domestic operations, then the Euro-markets would continue to exist. The only obvious difference with respect to the present situation would be that the interest rates on the Euro-dollar market would move closely in step with the American interest rates instead of having a considerable degree of independence. What means do Central Banks have of influencing the level of interest rates in the Euro-markets? For simplicity I shall confine my remarks to the Euro-dollar market.

So far as the American monetary authorities are concerned, we have already seen that through their monetary policy, which determines the level of domestic interest rates, they set a lower limit to the Euro-dollar rates. But they can also exert an influence on the absolute level of these rates, when they lie above the lower limit. This influence may be illustrated by an example. As we have noticed earlier, when the American commercial banks exercised a demand for Euro-dollar loans, as they did during 1969, this demand caused the Euro-dollar rates to rise sharply. And we may add that, when in 1970 to 1971 the banks were able to repay these loans, the Euro-dollar interest rates *fell* sharply. Indeed the rate on three months' Euro-dollar deposits, after having reached a maximum of nearly 12 per cent in 1969, had fallen to 5 per cent by the beginning of 1971. Now, it would be possible for the American monetary authorities to influence the demand for Euro-dollars, and therefore the interest rates on these, in much the same way as the commercial banks did in the example just given. The monetary authorities could, that is to say, conduct a kind of open-market policy in the Euro-dollar market by, say, selling suitable short-term paper when they wanted to drive the Euro-dollar rates up, and by letting the relevant bills or certificates run off when they wanted to drive the interest rates down.

Non-American monetary authorities also have the power to influence Euro-dollar interest rates. By lending dollar reserves, either directly or via the BIS, to the market they can bring the Euro-dollar interest rates down. And by refraining from renewing loans to the market they can bring the rates up again. The measures taken by the various monetary authorities to regulate the Euro-dollar market would of course need to be coordinated in order to ensure that they do not conflict with one another.

Another possible method of regulating the Euro-dollar market would be to institute compulsory reserve requirements. It could be ruled that such reserves be held either against Euro-dollar deposits (excluding interbank deposits), or against Euro-dollar loans granted by the Eurobanks to non-bank customers. The Eurobanks would then have to place a certain percentage either of their dollar deposits, or of their dollar loans, in a dollar account at their Central Bank. And the authorities would be able to push the Euro-dollar interest rates up by raising, or to drive them down by lowering, the reserve requirements. The resort to this method of regulation would again require, of course, close cooperation among the various monetary

authorities. Thus a condition for effective action would be that at least the European monetary authorities should coordinate their policy decisions.

Hence two types of intervention on the Euro-dollar market by the countries mainly concerned with this market are conceivable. The first are what we may call "open-market operations" on the Euro-dollar market, and the second are changes in the level of compulsory reserves. Both of them correspond to methods already used by the monetary authorities in the regulation of their own national markets. So far, however, these means of regulating the Euro-dollar market have not been the dominant ones. The first has been used only once, and the second not at all. Recourse has mostly been had to much cruder methods, such as: the rule that interest rate on deposits held by non-residents should be zero or even negative; the obligation for borrowers abroad to place a certain percentage of the funds borrowed on deposit at the Central Bank; direct control over capital imports; the division of the foreign exchange market into two sectors, financial and commercial, respectively, on the first of which the exchange rate is allowed to fluctuate freely; and so on.

In conclusion, I want to repeat, but in another connection, my previous remark that we must not exaggerate the role played by the Euro-dollar market. Earlier on I was concerned with its contribution to world-wide inflation. I am thinking now of its part in the recurrent international currency crises of recent years. The primary cause of these crises has been the persistent deficit in the American balance of payments, leading to a lack of confidence in the dollar, and a flight from this into other currencies. The Euro-dollar market is however, only one of the channels by which such a flight can take place. The channel of straight transfers into other currencies, which is familiar to us from the international currency crises of earlier times, is still open and is still used. It follows that even if the Euro-dollar market had not existed, the movement of funds would still have been large, though perhaps not so large. And this means that there are no grounds for expecting that the regulation of the Euro-dollar market would by itself get rid of the international currency crises. It could at best make these somewhat less severe.

*Zurich*

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