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DETERMINANTS OF MARKET CONDITIONS IN THE EURO-CURRENCY MARKET - WHY A "BORROWERS' MARKET"?

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I. Introduction

The doubling of oil prices and the heightened political uncertainty since the end of 1979 have taken much of the heat out of the controversy concerning the Euro-currency market, shifting the focus of attention to the question of whether and how the commercial banks can smoothly recycle the oil surplus which is expected to rise dramatically. However, it would seem worthwhile pursuing some aspects of the debate further, for they are closely associated with the question of how the market mechanism operates and are no less valid even if a change in climate calls for a different rôle for the banks.

A major issue has been whether the banks might have lent too readily to deficit countries, delaying the adjustment process, creating too much international liquidity and making the banks' own position vulnerable in the process. Different answers to these questions have been put forward,[2] but there seems to have been a general consensus that the continuation of the "borrowers' market" was undesirable both because of its macro-economic consequences and because of the prudential concerns to which it gave rise. A "borrowers' market" exists when larger amounts of funds are available on easier terms, as illustrated in Table 1 below for syndicated Euro-loans.

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1 The author is indebted to A. Lamfalussy, M.G. Dealtry, H.W. Mayer, W.A. Allen, P. Isard, B. Brittain, G. Baer and J. Hunter for their helpful comments on the earlier drafts of this paper. Any remaining errors as well as the views expressed are, however, the author's own.

2 See, for example, Bank for International Settlements: "Developments in international liquidity since end-1973 and their implications for world inflation", 31st May 1979 (mimeo).

Table 1

Main characteristics of the syndicated Euro-credit market, 1974-79

	1974	1975	1976	1977	1978 I	1978 II	1979 I	1979 3Q
New loans recorded ($ billion, annual rate)	28.5	20.6	28.4	33.7	60.0	72.1	61.5	108.7
Average size of individual loans ($ million)	60	50	72	75	110	96	83	121
Average maturity (years/months)	8/0	5/6	5/9	6/8	8/1	8/8	9/0	7/9
Typical spread over LIBOR for prime borrowers (percentages; end of period)	1¼	1¼	7⅛-1	5/8	5/8	½	3/8	3/8

Source: OECD

Opinions diverge, however, on the reasons for the recent borrowers' market, and this results in widely different policy prescriptions. In extreme terms, one view holds that the Euro-currency market can grow independently of outside factors because it is largely free from regulatory constraints. According to this view, it is the endogenous nature of the market's growth, coupled with an increased degree of competition among banks, that is responsible for the present borrowers' market. Another view stresses the effect of outside factors, such as world payments imbalances and national monetary policies, on global flow of funds and hence on the international credit market, maintaining that the latter's rôle is simply that of a "messenger".

Thus, the question of why a borrowers' market has emerged is central to an understanding of the mechanism at work, and it is the

purpose of this paper to provide a framework for a qualitative analysis of the factors that influence conditions in the Euro-currency market. Chapter II critically examines the extreme version of the first view stated above, namely that the cause of the borrowers' market should be sought in the market itself, rather than in factors outside the market. Chapters III and IV discuss, respectively, the components and characteristics of the demand for and supply of funds in the Euro-currency market. Chapter V first examines how market conditions are determined, taking the banks' behaviour into account. It is followed by an examination of how recent developments can be expected to have affected various factors already cited, in order to ascertain the cause of the present borrowers' market. While it is beyond the scope of the present paper to evaluate the relative importance of each factor quantitatively, it is hoped that the discussion in this chapter will throw some light on the workings of exogenous as well as endogenous factors on market conditions. Chapter VI briefly discusses the question of the credit-creating potential of the Euro-currency market. Finally, Chapter VII summarises the main findings of the paper. A somewhat more formal treatment of the model is presented in the appendix.

II. The hypothesis of independent growth of the Euro-currency market

It is sometimes argued that the credit-creating capacity of the Euro-currency market is beyond the control of national monetary authorities. Proponents of this view point to the rapid rate of growth of the Euro-currency market, both in absolute terms and in relation to other magnitudes such as world income and trade (Table 2), and often cite the absence of a minimum reserve requirement and the large-scale central-bank depositing of reserves as factors boosting the credit-creating capacity of the market. According to this view, it is this capacity coupled with increased competition among banks for international business that is responsible for the present borrowers' market.

There are a number of difficulties in accepting this view, however. First, although it is true that the absence of a reserve requirement gives Euro-banking a competitive edge over domestic banking, this advantage is more or less a permanent feature and cannot explain

Table 2

Growth of international bank lending, the Euro-currency market and OECD income and trade, 1974-79

	1974	1975	1976	1977	1978	1979	amount outstanding at end-September 1979 ($ billion)
	percentage increase						
1. Total net international bank lending[1]	29.4	18.2	26.9	22.7	25.6	27.0[2]	635
2. Net size of the Euro-currency market narrowly defined[3]	34.1	15.8	20.5	21.5	25.0	29.9[2]	432
(Memorandum item: share of official deposits in the net size of the narrowly defined Euro-currency market)	21.9	23.4	23.4	22.4	20.2	20.8[4]	
3. Nominal OECD GNP (in dollar terms)	10.8	11.7	8.6	11.4	11.6	11.5[5]	
4. OECD trade (value in dollar terms)	37.8	3.5	13.1	13.3	17.8	24.5[5]	

1. External positions of banks in fourteen reporting countries and the United States and of certain offshore branches of US banks, adjusted for interbank redepositing within the reporting area.
2. Year-on-year rate of increase at the end of September 1979.
3. External foreign currency positions of banks in European reporting countries adjusted for redepositing within the area.
4. Based on the figures for the end of September 1979.
5. Estimates.

the recent borrowers' market. It is well known that Euro-dollar interest rates move closely in line with US money-market rates adjusted for the existence of the reserve requirement, and that any significant deviation from the parallel rate is quickly corrected by arbitrage. This applies also to non-dollar Euro-currency rates on a covered basis. It follows then that national monetary authorities, and the US authorities in particular, can exert quite a strong influence on the level of Euro-currency interest rates and, by implication, on the demand for and supply of funds.

Secondly, statistics show that the proportion of central-bank deposits in the total net size of the Euro-currency market has not been increasing in the recent period (Table 2). On the contrary, with the shift in the relative weight of reserve growth since the end of 1976 from the oil-exporting countries to the Group of Ten countries and Switzerland, this proportion has declined somewhat because the latter group of countries have a higher propensity to place their reserves in the United States than the former group. Moreover, since the US market and the Euro-currency market are closely linked by arbitrage flows of funds, it may be argued that it is almost immaterial for the credit-creating capacity of the Euro-currency market where central banks place their reserves. A large-scale shift of official funds from the Euro-dollar market to the US market would be largely offset by an outflow of funds from the United States.* (See also Chapter VI.)

Thirdly, it should be noted that the growth of the narrowly defined Euro-currency market has persistently lagged behind the growth of total net international bank lending since 1975 except in 1979, as shown in Table 2. Although a special factor seems to have been at work in this, namely the rapid increase in the foreign operations of banks in the United States since the removal in January 1974 of controls on such activity, it is obvious that the Euro-currency market cannot be singled out as the villain of the piece.

III. Components of the demand for and supply of funds in the Euro-currency market

If the notion of independent growth of the Euro-currency market is not acceptable, in its extreme version at any rate, as the explanation for the present borrowers' market, we must analyse the factors affecting the demand for and supply of funds in the market. The components of this demand and supply are examined in this chapter, together with their relationships with the US financial market.

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* Statistically, the first shift increases the US official settlements deficit, with the banking capital outflow (a reduction in the banks' liabilities to the Euro-banks) as the counterpart. The second flow of funds is neutral statistically, with the increase in the US external claims matched by an increase in liabilities of the US banks.

Three broad assumptions are made in the following analysis. The first of these is that the US dollar is treated as the sole "international" currency and the United States as the sole reserve centre. This is not as restrictive an assumption as it may seem for the purpose of this analysis, provided that different currency segments of the market are linked by arbitrage operations.* Indeed, if they are not linked, one cannot talk about conditions in "the" international banking market. It is assumed that all external financial transactions have to go through either the Euro-currency market or banks in the United States (or else that arbitrage operations keep conditions in different market segments similar).

Secondly, the long-term asset in the Euro-currency market considered here is assumed to be a less-than-perfect substitute for the long-term asset in the US financial market because of the risk elements. On the other hand, short-term assets in the two markets are assumed to be perfect substitutes for each other, and reserve requirements are ignored.

The third assumption concerns the choice of proxy for market conditions. Since the absolute level of the nominal interest rate is a poor guide, we take the spread over LIBOR (London interbank offered rate) as representing market conditions, ignoring such factors as the average size and maturity of individual loans. It is further assumed that holders of long-term deposits get a premium over the short-term deposit rate equal to this spread for the loss of liquidity. To the extent that there is a sizable volume of fixed rate assets, then, the conclusions of the analysis must be modified because a change in inflationary expectations may cause a shift from one type of asset to another and affect the spread.

Turning to the breakdown of demand and supply, we start by analysing the combined balance sheet of the Euro-banks, the assets and liabilities sides of which represent, respectively, the demand for and supply of funds. Inter-Euro-bank positions are, of course, netted out.

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* A minor modification would be necessary, however, if we take into account the possibility of Germany, Switzerland and Japan behaving as reserve centres, i.e. paying for current deficits or exporting capital in their domestic currencies without offering to convert them into other assets. In this case the payments do not reduce their reserves, and to the extent that this actually takes place, "the United States" should be read in the analysis as "the reserve centres".

The change in a given period in the balance sheet will consist of the changes in the following items:

Assets	Liabilities
(1) Loans to countries other than the United States to finance current deficits	(1) Deposits of countries other than the United States out of current surpluses
(2) Loans to countries other than the United States to refinance past borrowings	(2) Redeposits by countries other than the United States out of the receipts of repayments of past loans
(3) Loans to countries other than the United States which add to the reserve position of the borrower	(3) Deposits from the borrower of (3) on the assets side
(4) Loans to US non-bank residents	(4) Deposits from US non-bank residents
(5) Claims on banks in the United States	(5) Liabilities to banks in the United States

On the assets side, Item (1) represents the only "net" element in the demand for funds, in that it represents a shortage of domestic savings. The United States is excluded because, being the reserve centre, it can finance its deficit by issuing liabilities of its own and needs to be treated separately. The possibility of running down reserves is not considered, because it can be regarded as a negative reserve augmentation discussed under (3) below. Secondly, Item (2), past borrowings, have to be rolled over unless they are repaid from current surpluses or by running down reserves; both possibilities are ignored.

Thirdly, Item (3) includes all borrowings by non-reserve-currency countries other than for the purpose of (1) and (2). These borrowings do not affect the net debtor position of the borrower country because the proceeds are held in the form of claims on the non-resident, regardless of whether they are held by private entities or by official bodies. For simplicity, we assume here that they are all held by official bodies as reserves, but a relaxation of this assumption does not change the outcome of the following argument.

Since banks in the United States may finance part of (1), (2) and (3), the total demand made on the Euro-banks will be less than the total of (1), (2) and (3) by that amount. Finally, (4) and (5) are singled out because these items neither have direct relationship with the US current balance position nor add to the exchange reserves of the United States.

On the liabilities side, namely the supply of funds, Items (1), (2) and (3) are almost mirror images of the corresponding items on the assets side, except that funds from these items can be invested in the Euro-currency market or in the United States. Since short-term assets in the two markets are assumed to be perfect substitutes, we can assume that the amount of official reserves invested in the United States is determined by non-economic factors, which implies that the official settlements deficit of the United States is exogenously given, and that other flows of funds ensure ex post equality of short-term interest rates. Thus, the total supply of funds from (1), (2) and (3) will be the sum of current surpluses of surplus countries (excluding the United States), plus past loans maturing, plus the proceeds of reserve augmenting borrowings, less reserves invested in the United States.

To the sum thus calculated, Items (4) and (5) must be added for the same reason as they appear on the assets side. By netting them out and rearranging, we obtain a revised combined balance sheet of the Euro-banks as follows:

Assets	Liabilities
(1) Combined current deficit of deficit countries (excluding the United States)	(1) Combined current surplus of surplus countries (excluding the United States)
(2) Past borrowings falling due	(2) equal to (2) and (3) on the assets side
(3) Reserve augmenting borrowings	(3)
	(4) Net long-term capital outflow from tne United States
	(5) Net short-term capital outflow from the United States
	Less
	(6) Reserves invested in the United States

Since the difference between Item (1) on the liabilities side and Item (1) on the assets side is the US current balance, this amounts, if we net out (2) and (3), to the US balance-of-payments identity which must always hold. This can be interpreted as follows: all the items except (5) on the liabilities side either change according to market conditions or are given exogenously, as discussed in the next chapter, but Item (5) can automatically balance both sides, as the supply schedule of this item is infinitely elastic with respect to the short-term interest rate differential between the two markets.

The vital link between the Euro-currency market and the US banking sector can be further investigated by an examination of the combined balance sheet of the latter, which is presented below:

(Changes)

Assets	Liabilities
(1) Loans to non-bank residents	(1) Borrowing from the Fed.
(2) Loans to non-bank non-residents	(2) Deposits from non-bank residents
(3) Claims on Euro-banks	(3) Deposits from non-bank non-residents
	(4) Liabilities to Euro-banks

On the assets side, Item (1) equals the total domestic demand for loans minus that part which is financed by Euro-banks. Items (2) and (3) are self-evident. Compulsory reserves and past borrowings are omitted, as are excess reserves and vault cash.

On the liabilities side, Item (1) is assumed here to be short-term and the only route through which high-powered money is supplied. (The essence of the analysis stands unchanged, if, for example, we assume the fiscal deficit of the government to be the only route.) Item (2), deposits from non-bank residents, will be equal to US residents' generation of savings, less the cash leakage, less US non-bank residents' deposits at Euro-banks. Item (3), deposits from non-bank non-residents, includes official reserves placed with banks in the United States. For the purpose of this analysis, we can assume that all official reserves held in the United States are placed with the banks, because any reserves invested in US Government paper reduce the amount of such paper held by US residents and therefore increase the latter's deposits with the banks. Item (4) will be self-evident.

After netting out and rearranging, taking note that the excess of investment over savings is the current balance of payments, this balance sheet can be expressed as:

Assets	Liabilities
(1) US current-account deficit (surplus, -)	(1) Changes in high-powered money
(2) Capital outflow from the United States (inflow, -)	(2) Changes in the public's cash holdings
	(3) Reserves invested in the United States

Since the sum of Items (1) and (2) on the assets side is equal to Item (3) on the liabilities side, equilibrium requires only that the supply of high-powered money be equal to the volume of cash leakage. Flows of funds between the Euro-currency market and the US market do not affect the tightness of the latter because they do not constitute any leakage from the system. (This conclusion has to be modified, of course, if we introduce a reserve requirement on domestic liabilities.) Hence, the absolute level of the short-term interest rate, equal for both markets because of the assumption of perfect substitutability, is determined only by the Federal Reserve Sytem.

IV. Characteristics of demand and supply

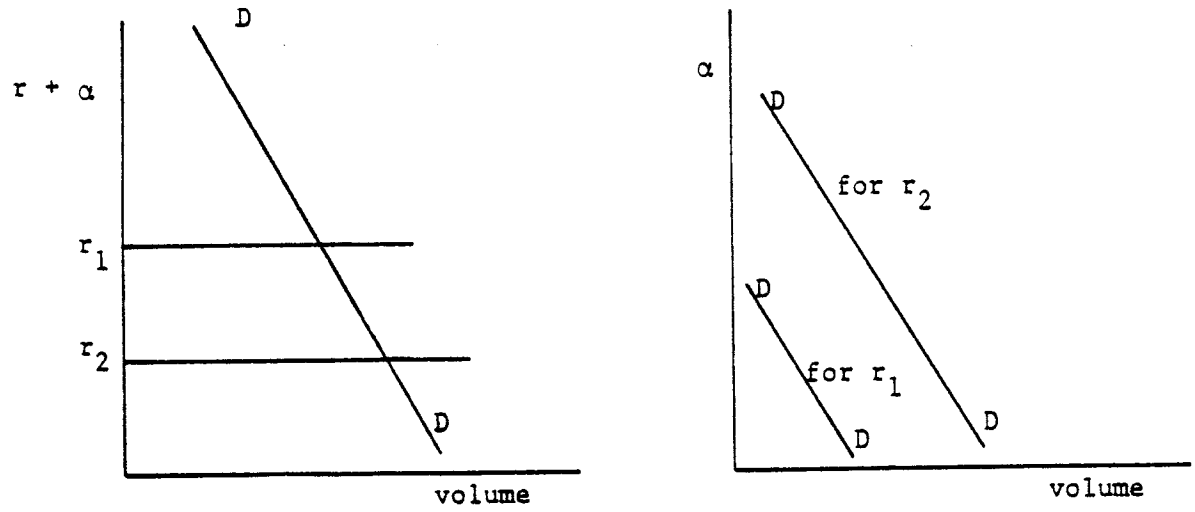
To return to the Euro-currency market, it was shown in the previous chapter that total demand is equal to total supply not only ex post but also ex ante, i.e. regardless of market conditions, owing to the infinitely elastic supply of short-term funds with respect to interest rate differentials. This does not mean, however, that conditions in the market are entirely independent of outside factors, since not all market segments are necessarily in equilibrium. Here, we divide the market into two segments, the short end and the long end, and examine the conditions for equilibrium in each. In order to do so, we need to see the characteristics of each component of demand and supply.

1. Characteristics of the demand for funds

Returning to the components of demand on page 9, Item (1), namely the combined current-account deficit, is given exogenously in the short

run, but is influenced in the medium run by market conditions. This is so because, at a given level of income and foreign demand for its exports, a country will borrow and import, rather than forgo the import, if the cost of borrowing is less than the return (in the broadest sense) on the additional real resource imported.* Assuming, not unrealistically, a declining marginal return from real resources, the schedule depicting (1) will be a declining function with respect to the interest cost, which consists of LIBOR(r) and the spread (α). For a given LIBOR, which must be equal to the US short-term interest rate, then, the schedule will also be a declining function with respect to the spread. Its position will be determined by the level of LIBOR (Figure 1), the aggregate income of the deficit countries, the foreign demand for their exports, etc.

Fig. 1



Item (2), the refinancing requirement in respect of past borrowings, can be taken as given here. Item (3), reserve augmenting borrowings, will be a declining function with respect to the interest rate spread, because a country will borrow and augment its reserves if the marginal gain in comfort is greater than the net cost of such borrowings, the latter being the spread between the interest payable on borrowings and the interest receivable from reserve placement. This schedule will be fairly flat because of the "speculative" element, i.e. a narrow current spread may lead to anticipations of a wider spread in the future, inducing the borrower to borrow more now rather than waiting until later. The horizontal position will depend on such factors as the initial level of reserves, the size of current transactions, and so on.

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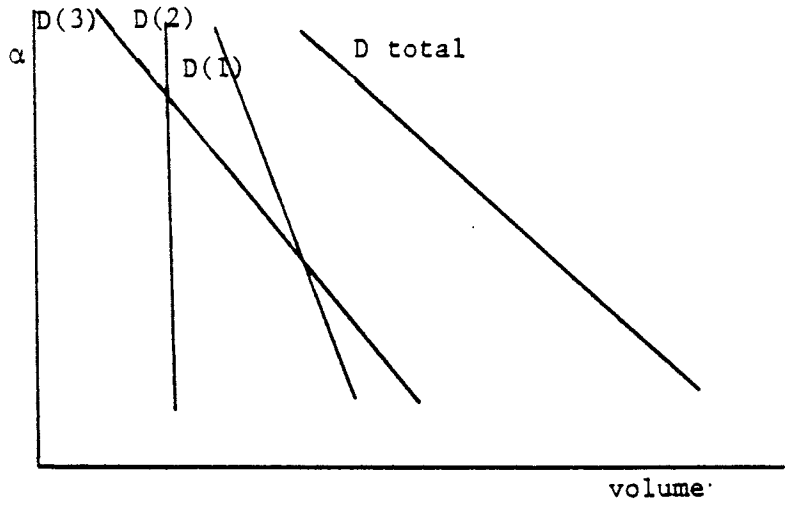
* What this presupposes is, of course, not a rationally behaving government but a perfect market.

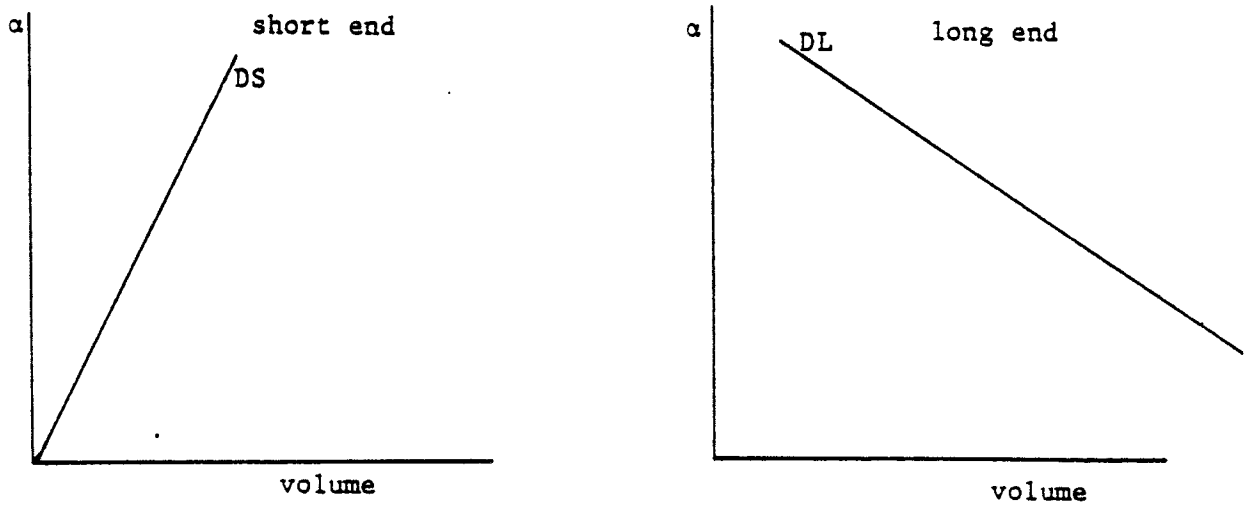
Adding up (1), (2) and (3) horizontally,* we arrive at the total schedule with respect to the interest rate spread, as in the following diagram.

Fig. 2



Next, we break the total demand into two ends of the market, the short end and the long end. It can safely be assumed that borrowers generally prefer to borrow long. However, as the additional cost of borrowing long increases, they will finance an increasingly larger portion of their requirement by rolling over short-term debts, except D(3) which has to be long-term borrowing. Since the additional cost is the spread between long-term and short-term interest rates, the demand schedules in the two markets can be depicted as follows. Needless to say, a horizontal addition of D_S and D_L results in D total.

Fig. 3



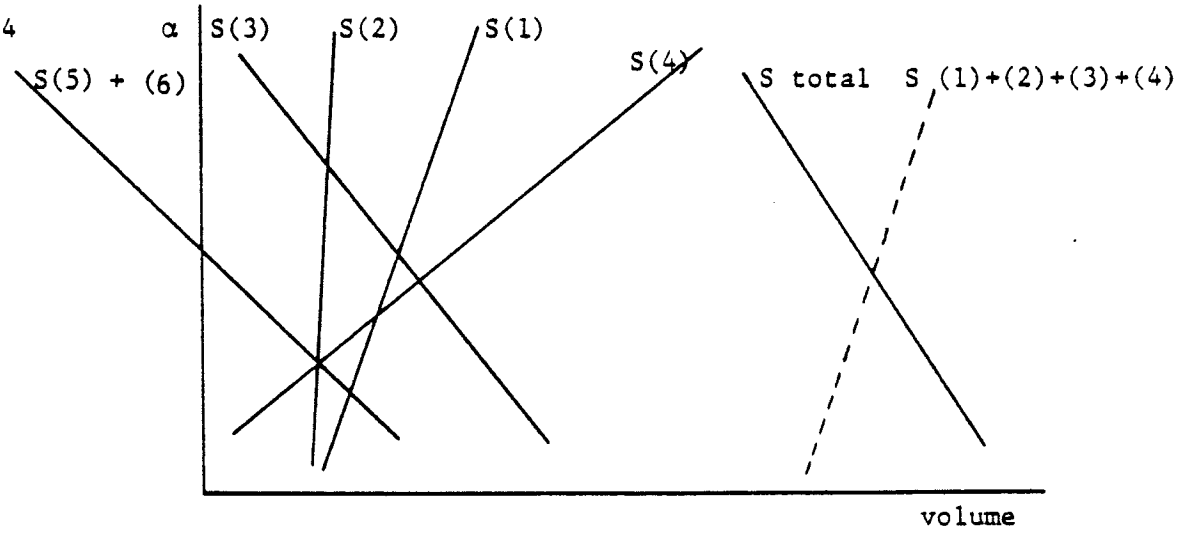
* This addition is not possible, strictly speaking, to the extent that D(1) is other than vertical, because D(3) depicts the schedule at a given level of imports. This question is disregarded here because the only purpose of the analysis is to identify the properties of the demand schedule. See the appendix for a more formal treatment.

2. Characteristics of the supply of funds

Item (1), the combined current surplus, is given in the short run, but may increase in the medium run as the level of the interest rate rises. There are two reasons for this; first, a higher interest rate is generally associated with a lower level of economic activity, and secondly, a country permanently in surplus stops exporting if the return on the financial assets is not sufficient to compensate for the loss of real resources (the OPEC countries are good examples). Since some part of the surplus can be invested in long-term assets, the interest rate spread also affects the combined surplus. Thus, the schedule depicting (1) will be a steep but upward sloping function with respect to the interest rate spread. Items (2) and (3), past loans falling due and the proceeds of reserve augmenting borrowings, are exactly the same as (2) and (3) on the demand side.

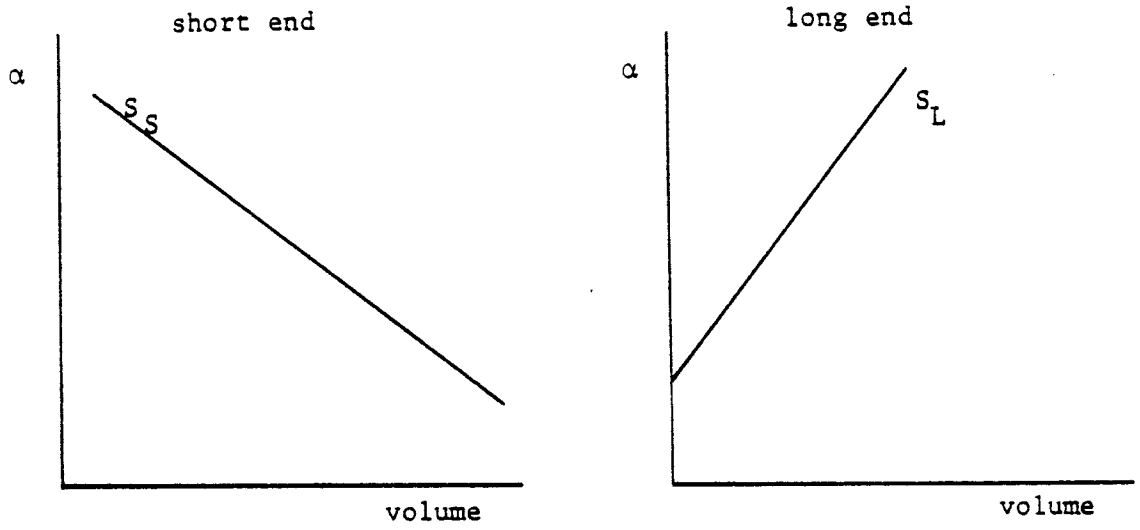
Item (4), net long-term capital outflow from the United States, will be larger when the liquidity and risk premia, i.e. the interest rate spread, in the Euro-market are higher in relation to those in the US market. The schedule depicting (4) will then be an upward sloping function with respect to the interest rate spread, the position being determined by the spread in the US market, and the slope being determined by the degree of substitutability of the long-term assets in the two markets. (In reality, spreads in the two markets are likely to be determined simultaneously. See the appendix.) Item (5) will ensure that the total supply schedule is always indentical with the total demand schedule. Finally, Item (6) is given exogenously. Thus, the total schedule and each component will be as follows (Items (5) and (6) are put together):

Fig. 4



How is this total supply distributed between the two segments of the market? Here, it can be remembered that the whole of S(4) is supplied in the long end of the market and the whole of S(3) and S(5) is supplied in the short end. As for the remainder, S(1) and S(2), the portion supplied in the long end will increase as the liquidity and risk premia increase. Thus, the total supply schedule will be divided into S_S and S_L as in the following diagram.

Fig. 5

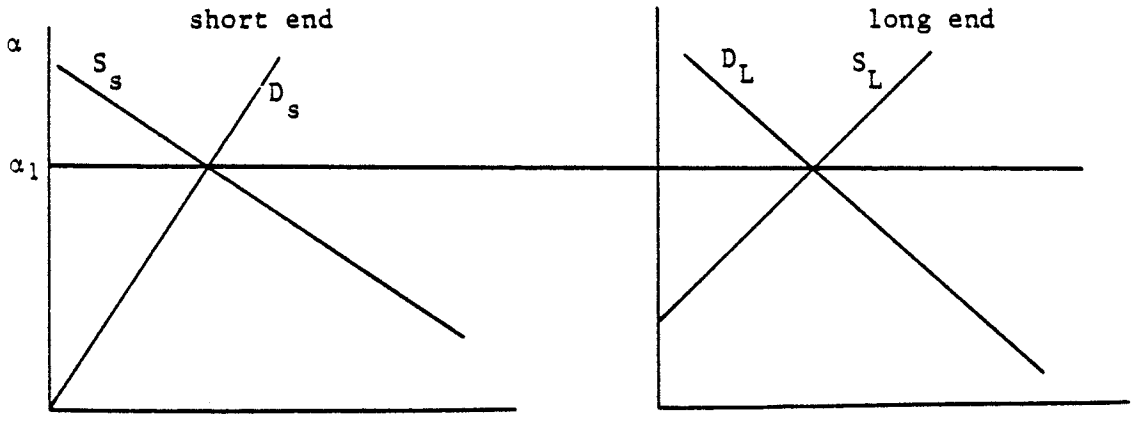


V. The determination of the interest rate spread and the emergence of a borrowers' market

1. The determination of the interest rate spread

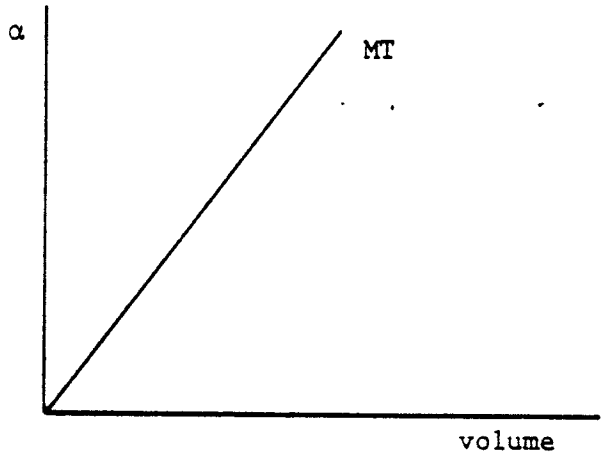
In the absence of maturity transformation on the part of the banks, the equilibrium spread is determined at α_1, as in Figure 6. The identity of the total schedules ensures that there is a level of the spread (α_1) at which both markets are cleared.

Fig. 6



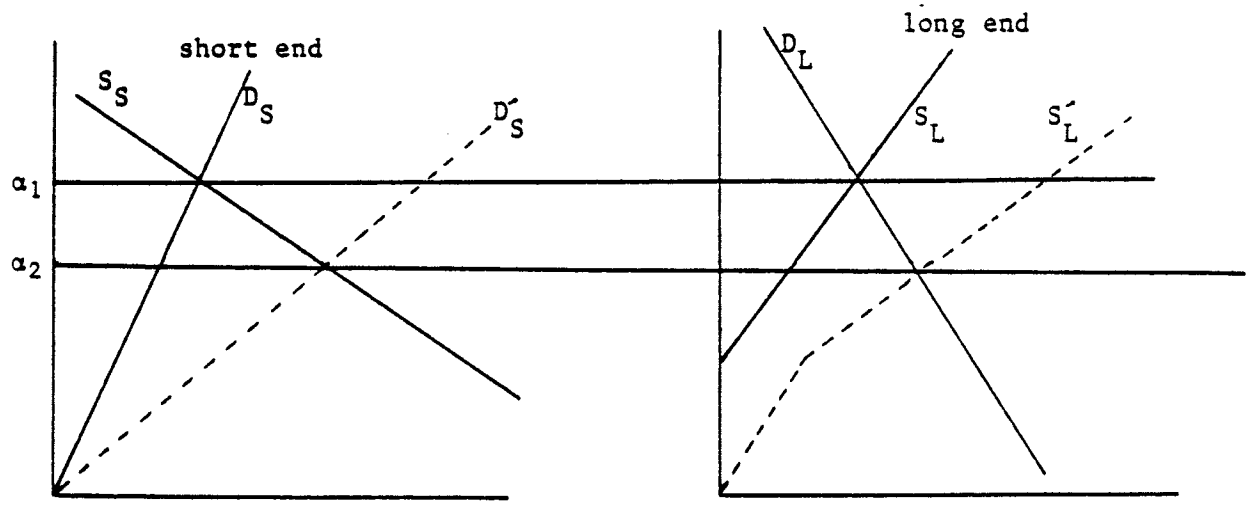
However, the picture changes with the explicit introduction of the banks, since they advance long-term loans on the basis of short-term deposits. The willingness of the banks to engage in this maturity transformation will depend, among other things, on the relationship between the perceived risk of long-term lending and the premium obtainable for assuming that risk. Since a higher premium justifies lending to a less creditworthy customer, the banks' maturity transformation schedule will be an upward sloping function with respect to the interest rate spread (Figure 7), with the slope determined by such factors as the perceived risk associated with long-term external lending, the operating cost and so on.* (There will be a further discussion on the slope of this schedule in the next section.)

Fig. 7



Since the banks' maturity transformation can be taken in this context as a demand by banks for short-term funds and an equal supply of long-term funds, we add this MT schedule horizontally to D_S and S_L respectively in the short and long end of the market, as in Figure 8. Both markets are cleared

Fig. 8



* It seems safe to assume that banks are operating at or beyond the point of minimum marginal cost, so that there is no room for economies of scale to operate. Even if there is some room, it is extremely unlikely that it results in a downward sloping MT schedule.

at a lower level of the spread (α_2) than in the absence of the banks' maturity transformation.

The above analysis has important implications for the determination of the interest rate spread, namely that the spread will become narrower if one or more of the following take place:

(1) D_L shifts to the left;
(2) S_L shifts to the right;
(D_L shifts leftwards relative to S_L)
(3) MT becomes flatter.

It may be noted that the short end of the market has no direct impact on the equilibrium spread, unless it results in shifts in D_L or S_L. This is so because S_S includes S(5), net short-term capital outflow from the United States, which always balances the total supply and demand at any spread.

2. The emergence of a borrowers' market

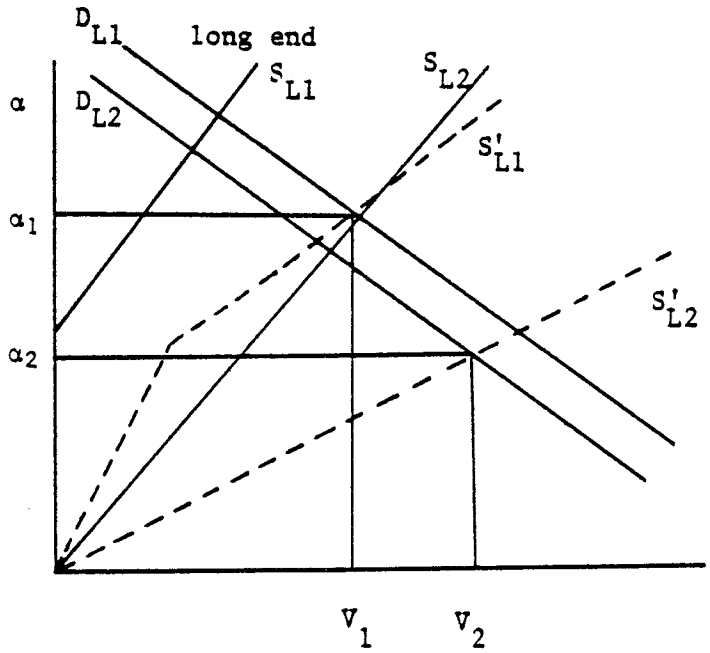
What, then, would have been the effects of recent developments on D_L, S_L and MT, which produced the present borrowers' market? We examine this by comparing the period 1974-76 with the period since then.

To begin with D_L, the first thing to be noted is a significant reduction in the combined current deficit of deficit countries in the latter period, owing to distinct progress made by many countries towards payments adjustment. Strong import demand from the OPEC countries and the United States helped this adjustment. (A reduced ex post deficit at a lower spread must mean a leftward shift in D(1). Nominal short-term interest rates have risen markedly towards the end of the more recent period, surpassing the previous peak in 1974, but this may not have much to do with the reduction in deficit, as the "real" interest rate may not have risen so much.) Secondly, however, D(2) may be expected to have shifted somewhat to the right as the previous borrowings began to fall due. Thirdly, D(3), reserve augmenting borrowings, may have shifted somewhat to the right because the level of reserves for many developing countries was quite low at the end of 1976, although the larger ex post figure probably reflects, mainly, a movement along the schedule. The combined effects of these developments would have kept the D_L schedule more or less the same, or at most slightly to the left.

On the other hand, S_L would have shifted to the right considerably for the following reasons. First, although the combined current surplus of surplus countries also narrowed in the period 1977-78, owing mainly to the much reduced OPEC surplus, it did not shrink by as much as the combined deficit because of the turn-round in the US current account from a surplus of $24.4 billion in 1974-76 to a deficit of $28.0 billion in 1977-78. This has resulted in a large rightward movement of S(1) relative to D(1). Moreover, as the OPEC countries began to invest in long-term assets on a large scale, the component of S_L coming from S(1) may have actually increased in the second period. Secondly, S(2) may have shifted slightly to the right, because the earlier loans began to be repaid and the ex ante proportion redeposited on a long-term basis may also have risen. Thirdly, S(4), net long-term capital outflow, would have shifted very much to the right because the spread between short and long-term interest rates in the United States has narrowed dramatically. Taking Treasury bills and long-term government paper, the spread was about 3 percentage points at the end of 1976 but was nil or even negative in the early part of 1979. (The spread was almost nil in 1974, but it was a year in which the United States had a huge current surplus. See also the appendix.) Taken together, these factors must have shifted S_L very much to the right.

Taking the shifts in D_L and S_L together, it is very natural that a larger amount of long-term lending is being done at present at a lower margin, even with unchanged behaviour on the part of the banks (Figure 9). This means, inter alia, that it is wrong to attribute the present borrowers' market solely to a change in banks' behaviour.

Fig. 9



What, then, would have been the change in MT? There are some who maintain that a reduction in the banks' perception of risk associated with international lending made banks engage more aggressively in international business - a flatter MT schedule in the present model - and that this is the sole reason for the present borrowers' market. The latter part of this argument has just been shown to be incorrect.* But what about the former part?

On the one hand, it may be argued that the banks' perception of risks associated with their external lending may have been reduced since around 1976, as the memory of the Herstatt affair faded and as some non-oil developing countries made distinct progress toward payments adjustment. On the other hand, growing attention has been paid in more recent years to the problem of the mounting debts of non-oil developing countries, probably spurred by the concern expressed by Dr. Burns. It may be noted in this connection that even a reduced current deficit still adds to a country's external indebtedness, unless the country receives a large amount of aid or direct investment. Moreover, with a large increase in the price of oil towards the end of 1978, the current deficits of non-oil developing countries were again expected to increase sharply. Yet there were no signs in the first half of 1979 that conditions in the market would become more favourable for the lender. Taking these factors together, it seems highly unlikely to the present author that the banks perceived less risk in 1979 than, say, in 1975, although this is no more than a tentative statement.

Turning to other factors that may have influenced the slope of the MT schedule, it is sometimes argued that the rise in interest rates relative to the cost of capital and the reduction in the average capital/asset ratio of banks, due partly to the entry into the market of banks with low capital/asset ratios, have both diminished the minimum net earnings that banks have to receive from a unit of lending. They would flatten the MT schedule, and have probably in fact done so, although the effects would be hard to quantify. It is worth noting in this connection that H.C. Wallich of the Federal Reserve calculated, with regard to the first part of the argument, that "at a cost of borrowed money of 10 per cent.

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* A hypothetical test of this argument would be an examination of capital flows into and out of the United States. If the MT schedule becomes flatter when all other schedules are unchanged, the resultant narrower spread will be associated with a smaller long-term and a larger short-term capital outflow from the United States. But the statistics do not give us a meaningful breakdown.

and a pre-tax cost of capital of 40 per cent., a bank with a capital ratio of 5 per cent. still needs a spread of 1.5 per cent. on the loan merely to cover its cost of capital, without any allowance for incremental risk or overhead".[1] There is also an argument which says that increased competition among banks forced them to accept lower margins. If, however, increased competition can cut the margin without a reduction in operating costs - for which there is no clear evidence - it must mean that there was a monopoly profit before. There may indeed have been some element of monopoly profit associated with the banks' external lending before, but those who believe in the market economy can hardly blame competition for removing such profit.

All in all, the change in the banks' behaviour may have amplified the easing of the market, but it does not seem to be the main reason for the present borrowers' market.

VI. Maturity transformation and credit creation

It may be worthwhile at this juncture to point out that the present model does not assume that the rôle of the Euro-banks is limited to one of maturity transformation, which does not involve any element of credit creation. The breakdown of the supply of funds presented in Chapter III only means that, even when banks do "create" credit, the additional savings they generate in the process must be held as their liabilities, in the same manner as savings they "intermediate" to the borrower.

In order to ascertain whether there has been some credit creation, the crucial test is whether the banks extended credit without there being an ex ante savings counterpart, which, through an increase in income, generates demand for their own liabilities (money or near-money) and hence ex post savings.[2] Applying this criterion to the whole

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1 Wallich, H.C.,"Developments in international banking" (a lecture given to the Association of Foreign Banks in Switzerland on 15th June 1979 in Berne).

2 Some authors have cited the "moneyness" of Euro-currency balances as an important criterion. However, this issue seems to have been blown out of proportion because it was often discussed together with the leakage ratio from the Euro-currency market. It seems to the present author that even the leakage ratio is not so important, as the following arguments show.

of the international banking market, including both the Euro-banks and banks in the United States, it is hard to deny that there has been much credit creation by banks. Without the banks' credit extension, the world would have had a much deeper recession since the end of 1973 with a correspondingly lower level of income and money balances.* The oil-exporting countries would have produced much less oil but for the safe outlet for the surplus funds provided by the banking system and many of the oil-importing countries would have deflated their economies more had they been unable to borrow from the banking system.

What, then, can one say about credit creation in the Euro-currency market per se? The question is not a very meaningful one, however, to the extent that the Euro-currency market is an integral part of the wider international market. An example is presented below to illustrate this point. Starting from initial equilibrium, suppose that the Federal Reserve adds reserves to the US banking system, which lowers the interest rate there. This in turn induces a shift of deposits from banks in the United States to Euro-banks, until the same interest rate prevails in the two markets. (This exercise could also begin with the sudden creation of a Euro-currency market. It may be noted, on the other hand, that an autonomous shift of deposits without the Fed's action would, if one starts from the two markets being in equilibrium, induce an offsetting flow in the opposite direction.)

Euro-banks		Banks in the United States	
Claims on banks in the United States +	Deposits +		Deposits -
			Liabilities to Euro-banks +

(Other transactions resulting from the Fed's injection of reserves are omitted.)

Next, suppose that Euro-banks make a fresh loan to customer A, who uses the proceeds to finance his imports from B. B keeps the proceeds from sales first in a Euro-bank but later shifts them to a bank in the United

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* "Money balances" may be interpreted to mean official reserves in the international context. But an increase in reserves is likely to be reflected in a multiple expansion of the domestic money stock as well.

States. (According to the terminology often used to discuss the "Euro-credit multiplier", the leakage ratio is 100 per cent.)

Euro-banks		Banks in the United States	
Claims on banks in the United States +	Deposits +		Deposits -
			Liabilities to Euro-banks +
Loan to A +			Deposits from B +
Claims on banks in the United States -			Liabilities to Euro-banks -

From the balance sheet of the Euro-banks, one might say that they only intermediated a fresh inflow of deposits to a borrower, and from the balance sheet of banks in the United States, one might say that their rôle has been a passive one in the entire process, involving no element of credit extension. Yet, since there was no initial inflow of fresh savings into the combined banking system, credit must have been created by the system as a whole to have increased ex post savings (deposits from B). Incidentally, if B's shift of deposits from a Euro-bank to a bank in the United States tightens the Euro-market and induces the Euro-banks to bid deposits away from banks in the United States, a "multiple" expansion of credit may result. Since this second flow may be regarded as a fresh one, it does not fit into the traditional multiplier analysis. But it does show the limited applicability of the latter to the Euro-currency market. To put it in extreme terms, the concept of the Euro-credit multiplier seems just as valid as the Citibank credit multiplier, since the Euro-currency market is an integral part of the process through which credit is created.*

* This is not to say that the existence of the Euro-currency market makes no difference in the credit multiplier for the whole system with respect to a given injection of fresh reserves. By providing very efficient financial facilities, the Euro-market could increase the value of the multiplier, which means that the average cash leakage ratio for each round of transactions would be lower with the Euro-currency market than without it. Also, if liabilities of banks in the United States to Euro-banks are not subject to the reserve requirement while domestic deposits are, there can be some savings of required reserves if banks ask their large corporate customers to shift their deposits to their overseas branches and borrow the funds back from these branches.

VI. Summary

A model has been developed in this paper which analyses the demand for and supply of funds in the Euro-market, at both its short end and its long end. It shows that market conditions will be more favourable for the borrower if

- the combined current deficit of the deficit countries excluding the United States is smaller and the combined surplus larger, i.e. the US current account is in large deficit;
- less previous borrowings fall due;
- fewer countries find the level of their reserves inadequate, so that they are compelled to borrow in order to add to their reserves;
- the spread between long and short-term interest rates in the United States is smaller;

and

- the banks are willing to engage in maturity transformation at a lower spread.

Thus, conditions in the market are influenced both by factors outside the market and by a factor which can change independently of other factors. Two views on the cause of the present borrowers' market presented in the Introduction are, then, both wrong in their extreme versions. It follows that a careful analysis of the changes in these factors is needed to ascertain the cause, distinguishing between a shift in a function and a movement along the function.

After examining the effects of recent developments on the factors cited above, the paper tentatively concludes that the main reasons for the present borrowers' market seem to be, first, the turnround in the US current account, from a large surplus in 1974-76 to an equally large deficit in 1977-78 and, second, a much narrower (or even reversed) interest rate spread in the US financial market. The increased aggressiveness of the banks in their external lending activity seems to have amplified the squeeze on margins, but the effects of the outside factors seem more important than this "endogenous" factor.

The model can be applied to forecast future developments: if the combined current deficit of deficit countries (excluding the United

States) increases sharply owing both to the higher oil prices and to the expected reduction in the US current deficit, if the yield curve in the United States returns to a more normal pattern, then the market will automatically, i.e. without a change in banks' behaviour, turn less favourable for the borrower, as an increasing amount of past borrowing will have to be refinanced in the years ahead. As for the banks, they may reassess the unpredictability associated with external lending and may well adopt a more cautious approach, turning the market even less favourable for the borrower.

The determination of the interest rate spread in the Euro-currency market - a mathematical treatment*

In this appendix, a somewhat more formal treatment of the subject is presented. In Section 1, the Euro-currency market is assumed to be much smaller in size than the US market, so that conditions in the latter are not affected by those in the former. This assumption is dropped in Section 2. All the relevant assumptions made in the body of the paper also apply here.

1. The special case

Here, we assume the Euro-currency market to be much smaller in size than the US market, so that the level of the short-term interest rate (r) and the interest rate spread in the United States (β) are not influenced by market conditions in the Euro-market. Turning back to the combined balance sheet of the Euro-banks on page 8, the demand for and the supply of funds can be expressed, respectively, as follows:

$$D = f_E^D(r+\alpha) + PB + g(\alpha)$$

$$S = f_E^S(r,\alpha) + PB + g(\alpha) - \Delta RIUS + h(\alpha-\beta) + NSCO$$

where

α : the interest spread in the Euro-market

f_E^D: the demand function for funds to finance the combined current deficit of countries other than the United States. Assuming that borowers borrow all the funds long, the relevant variable is $(r+\alpha)$. (See also footnote 1 to this appendix.)

$$f_E^{D'} < 0$$

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* The author is particularly indebted to W.A. Allen in the preparation of this appendix.

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PB: past borrowings falling due

g: the demand function for reserve augmenting borrowings $g' < 0$

f_E^S: the supply function of funds arising out of the combined current surplus of countries other than the United States. The funds are held usually as short-term assets, but since the amount of the surplus itself can increase when α increases for a given r,

f_E^S is a function of both r and α. $f_{E1}^S > 0$

$f_{E2}^S > 0$

(f_{E1}^S refers to the partial derivative of f_E^S with respect to the first variable.)

RIUS: reserves invested in the United States

h : the function for net long-term capital outflow from the United States $h' > 0$

NSCO: net short-term capital outflow from the United States.

Note that D = S always holds because $f_E^D(r+\alpha) - f_E^S(r,\alpha)$ = US current surplus

$= h(\alpha-\beta) + NSCO - \Delta RIUS$

Next, total demand and supply are broken into two ends of the market. It is assumed here, for simplicity, that borrowers borrow all the funds long and suppliers lend all the funds short except for a portion of the current surplus and the long-term capital outflow from the United States (see footnote 1 for a relaxation of this assumption). The gap is filled by banks' taking of short-term deposits and lending long. Thus,

$$D_L = f_E^D(r+\alpha) + PB + g(\alpha)$$

$$D_S = k_E(\alpha)$$

$$S_L = f_E^{SL}(r,\alpha) + h(\alpha-\beta) + k_E(\alpha)$$

$$S_S = f_E^{SS}(r,\alpha) + PB + g(\alpha) - \Delta RIUS + NSCO$$

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where

k_E: the Euro-banks' maturity transformation schedule $k_E' > 0$

f_E^{SL}: the supply of long-term funds from the combined current surplus

$f_{E1}^{SL} > 0$

$f_{E2}^{SL} > 0$

f_E^{SS}: the supply of short-term funds from the combined current surplus

$f_{E1}^{SS} > 0$

$f_{E2}^{SS} < 0$

$f_E^{SL} + f_E^{SS} = f_E^S$

Equilibrium requires that

$$f_E^D(r+\alpha) + PB + g(\alpha) = f_E^{SL}(r,\alpha) + h(\alpha-\beta) + k_E(\alpha) \quad (1\text{-}1)$$

and

$k_E(\alpha) = f_E^{SS}(r,\alpha) + PB + g(\alpha) - \Delta RIUS + NSCO$, the latter always holding when (1-1) holds.

In order to see the effects of changes in schedules f_E^D, g, f_E^{SL} and k_E, we introduced variables X, Y, Z and T respectively in the functions. It is assumed without loss of generality that the partial derivatives of these functions with respect to these variables are always positive. Then, for a given $\bar{r}$,

$$f_E^D(\bar{r}+\alpha,X) + PB + g(\alpha,Y) = f_E^{SL}(\bar{r},\alpha,Z) + h(\alpha-\beta) + k_E(\alpha,T) \quad (1\text{-}3)$$

Differentiating (1-3) and rearranging, we obtain

$$d\alpha = \frac{f_E^D dX - f_{E3}^{SL} dZ + dPB + g_2 dY + h' d\beta - k_{E2} dT}{f_{E2}^{SL} - f_{E1}^D - g_1 + h' + k_{E1}} \quad (1\text{-}4)$$

Since each component of the denominator is positive if taken together with the sign preceding it, the result means that α will be larger if

(a) the f_E^D function is larger for a given α

(b) the f_E^{SL} function is smaller for a given α

(It may be noted that a large US current deficit tends to result in (a) and/or (b).)

(c) PB is larger

(d) the g function is larger for a given α

(e) $\bar{\beta}$ is larger, or

(f) k_E is smaller for a given α (which means a steeper MT schedule).

These correspond to the conditions stated on page 22 of the main paper.

2. The general case

In this section, we drop the assumption that the Euro-market is much smaller than the US market, and see how conditions in both markets are simultaneously determined. In order to do so, we go back to the combined balance sheet of the US banking sector on page 9.

$$D = f_{US}^D(r+\beta) + h(\alpha-\beta) + NSCO$$

$$S = \Delta HPM + f_{US}^S(r,\beta) - c(r,y) + \Delta RIUS$$

where

f_{US}^D: US residents' demand for borrowing

$f_{US}^{D'} < 0$

HPM: high-powered money, assumed here to be supplied only in the short end of the market.

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f^S_{US}: US residents' generation of savings

$f^S_{US1} > 0$

$f^S_{US2} > 0$

c: cash leakage $c_1 < 0$

$c_2 > 0$

y: aggregate income.

Since $f^D_{US}(r+\beta) - f^S_{US}(r,\beta)$ = US excess domestic investment = US current deficit = $\Delta RIUS - h(\alpha-\beta) - NSCO$, D = S requires only that $c(r,y) = \Delta HPM$. (2 - 1)

For a given level of income,[2] then, the level of "the" short-term interest rate is determined only by the amount of high-powered money supplied to the banking system. Flows of funds between the Euro-market and US market do not affect that level since they do not constitute any leakage from the combined banking system. We denote the level thus determined as $\bar{r}$.

Next we break demand and supply into two segments, short-term funds and long-term funds, as in Section 1 above. Thus,

$$D_L = f^D_{US}(r+\beta) + h(\alpha-\beta)$$

$$D_S = NSCO + k_{US}(\beta)$$

$$S_L = f^{SL}_{US}(r,\beta) + k_{US}(\beta)$$

$$S_S = \Delta HPM + f^{SS}_{US}(r,\beta) - c(r,y) + \Delta RIUS$$

Equilibrium requires that

$$f^D_{US}(r+\beta) + h(\alpha-\beta) = f^{SL}_{US}(r,\beta) + k_{US}(\beta) \quad (2 - 2)$$

and

$NSCO + k_{US}(\beta) = \Delta HPM + f^{SS}_{US}(r,\beta) - c(r,y) + \Delta RIUS$, the latter amounting, after relevant substitutions, to (2 - 1).

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Rewriting (2 - 2) with additional variables U, V and W in the same manner as in Section 1 above, we obtain

$$f^{D}_{US}(\bar{r}+\beta, U) + h(\alpha-\beta) = f^{SL}_{US}(\bar{r}, \beta, V) + k_{US}(\beta, W) \quad (2-3)$$

Differentiating (2 - 3), and rearranging,

$$d\beta = \frac{f^{D}_{US2}dU - f^{SL}_{US3}dV + h'd\alpha - k_{US2}dW}{f^{SL}_{US2} - f^{D}_{US1} + h' + k_{US1}} \quad (2-4)$$

Substituting (2 - 4) for dβ in (1 - 4) and writing

$$M = f^{SL}_{E1} - f^{D}_{E2} - g_1 + k_{E1}$$

and

$$N = f^{SL}_{US1} - f^{D}_{US2} + k_{US1} \quad \text{for simplicity,}$$

we obtain

$$d\alpha = \frac{f^{D}_{E2}dX - f^{SL}_{E3}dZ + dPB + g_2dY + h'\dfrac{f^{D}_{US2}dU - f^{SL}_{US3}dV - k_{US2}dW}{N + h'} - k_{E2}dT}{\dfrac{MN + h'(M + N)}{(M + h')(N + h')}} \quad (2-5)$$

Since M, N and h' are all positive, the denominator is positive. Therefore, α will be larger if

(a) the f^{D}_{E} function is larger for a given α (this can be the result of a smaller $\bar{r}$ which in turn is the result of a larger HPM, since $\frac{df^{D}_{E}}{dr} < 0$),

(b) the f^{SL}_{E} function is smaller for a given α (this can be the result of a smaller $\bar{r}$),

(c) PB is larger,

(d) the g function is larger for a given α,

(e) the f^{D}_{US} function is larger for a given β (a smaller $\bar{r}$),

(f) the f^{SL}_{US} function is smaller for a given β (a smaller $\bar{r}$)[3],

(g) the k_{US} function is smaller for a given β, or

(h) the k_{E} function is smaller for a given α.

It can be shown that the same conditions (a) ∿ (h) apply for a larger β, since

$$d\beta = \frac{f^{D}_{US2}dU - f^{SL}_{US3}dV + h^{-}\dfrac{f^{D}_{E2}dX - f^{SL}_{E3}dZ + dPB + g_{2}dY - k_{E2}dT}{M + h^{-}} - k_{US2}dW}{\dfrac{MN + h^{-}(M + N)}{(N + h^{-})(M + h^{-})}} \qquad (2\text{-}6)$$

Finally, we can use (2 - 5) and (2 - 6) to see the effect of each factor (a) ∿ (h) on the long-term interest rate differential between the Euro-market and the US market, and hence the net long-term capital outflow from the United States. Since,

$$d\alpha - d\beta = \frac{1}{\dfrac{MN + h^{-}(M + N)}{(M + h^{-})(N + h^{-})}}\left\{\left(1 - \frac{h^{-}}{M + h^{-}}\right)\left(f^{D}_{E2}dX - f^{SL}_{E3}dZ + dPB + g_{2}dY - k_{E2}dT\right) - \left(1 - \frac{h^{-}}{N + h^{-}}\right)\left(f^{D}_{US2}dU - f^{SL}_{US3}dV - k_{US2}dW\right)\right\}$$

and

$$\frac{MN + h^{-}(M + N)}{(M + h^{-})(N + h^{-})}, \quad \left(1 - \frac{h^{-}}{M + h^{-}}\right) \text{ and } \left(1 - \frac{h^{-}}{N + h^{-}}\right)$$

are all positive, factors (a), (b), (c), (d) and (h) tend to increase α relative to β and increase the net long-term capital outflow from the United States (which is matched by a smaller net short-term capital outflow). Factors (e), (f) and (g), on the other hand, tend to increase β relative to α. Thus, if

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Euro-banks become more aggressive relative to the domestic lending of banks in the United States, α is squeezed relative to β, resulting in a smaller long-term capital outflow from the United States (see footnote 7 on page 18).

Appendix

Footnotes

1. It is of course possible to assume that borrowers increase the proportion of short-term borrowings to the total of $f_E^D(r+\alpha) + PB$ as α increases. $g(\alpha)$ can be taken to be all long-term, since it would not augment the reserve positions otherwise. Then D_L and D_S can be written respectively as:

$$D_L = \left\{1 - j(\alpha)\right\} \left\{f_E^D(r+\alpha) + PB\right\} + g(\alpha)$$

$$D_S = j(\alpha) \left\{f_E^D(r+\alpha) + PB\right\} + k_E(\alpha)$$

where

$j(\alpha)$ is the proportion of $f_E^D(r+\alpha) + PB$ financed by rolling over short-term loans.

$j' > 0$

$\alpha \to +0$, $j(\alpha) \to +0$

$\alpha \to \infty$, $j(\alpha) \longrightarrow 1$

It can be shown that this does not affect the qualitative nature of the outcome of the analysis but adds another factor for a larger α, namely that the j function is smaller for a given α.

2. It may be possible to enlarge the model so that the level of income is determined endogenously in an IS - LM manner. But that is beyond the scope of this paper.

3. Taking (a), (b), (e) and (f) together, it can be said that a higher short-term interest rate in the United States tends to produce easier market conditions in the Euro-market, as measured by the spread over LIBOR. It should be noted, however, that the volume cannot increase much, if at all, because (a) and (e) tend to reduce it. The tightening of US monetary policy since the beginning of 1978 cannot therefore be the reason for the present squeeze on the spread. It is also open to question how much tighter US monetary policy has become, if we take the "real" interest rate.