Eurobanks and the inter-bank market

This article, which has been prepared mainly by J G Ellis of the Bank's International Division, describes and analyses the eurocurrency inter-bank market.[1]

- *The inter-bank portion of the euromarkets is now worth several hundred billion dollars and represents two thirds of the total market. It performs a necessary and valuable role in linking non-bank depositors and borrowers.*
- *This inter-bank market is important to all eurobanks and vital to many of them. Some smaller banks tend to rely almost completely on this market to fund their offshore operations.*
- *The characteristics of different categories of banks affect their involvement in the market. In the UK segment of the market, for example, American banks are significant suppliers of inter-bank funds, while the consortium banks are net borrowers.*
- *Fluctuations in inter-bank activity do not appear to be closely related to external influences such as the strength of the dollar or the level of interest rates.*
- *Some features of the market could in some circumstances cause difficulty, but there is no evidence that they exercise a destabilising influence.*

Introduction

A banking system provides financial intermediation by bringing together potential depositors and potential borrowers. Within a national economy, especially if there is a branch banking system, surplus funds placed with a particular bank will often be lent to a customer of the same bank. If each bank can match the volume of its deposits with effective loan demand there will be little need for a significant inter-bank market. If, on the other hand, certain banks frequently find themselves being offered more deposits than they can profitably use while others find themselves unable to fund all their attractive lending opportunities, there will be a clear incentive to arrange inter-bank transactions.

This latter case is applicable to international banking. Many lenders and borrowers tend to concentrate their activities with a limited number of banks, partly on a geographical basis; but inter-bank flows make it possible for initial suppliers to one group of banks to be matched with final users who deal with different banks. In general it would be expected that those banks which find it relatively easy to attract non-bank deposits—in practice, usually the larger banks—would be net suppliers of funds to the inter-bank market, while other banks could fund their lending opportunities only by being net borrowers from deposit-rich banks.

With a developed inter-bank market there is no need for a bank with surplus funds to deposit them directly with a bank needing funds for non-bank customers. Instead the surplus funds can pass through a chain of banks, each of which on-lends them to another bank until they reach a bank with a potential non-bank borrower. In the euromarkets—where trading is in currencies outside domestic markets—such inter-bank chains are common, and any particular bank involved in one is not necessarily aware of the initial source or final use of the relevant funds. Nevertheless a mature inter-bank market allows the euromarket to approach international homogeneity. Channels provided by the inter-bank market allow funds to flow easily across national boundaries and between banking systems so that no segment of the euromarket becomes isolated.

Despite its importance, the inter-bank element in the euromarkets has frequently been regarded by observers as little more than a minor irritant which confuses statistics by introducing double-counting. But this element is now worth several hundred billion dollars and deserves attention in its own right. It prompts a number of questions: How similar is the market to domestic inter-bank markets? Do banks active in the euromarkets ('eurobanks') use it as a major source of funds or just as a last resort when loan demand is strong? Do different banks use the inter-bank market in different ways? Linked with these issues are questions about the speed with which the market has grown, its currency composition, and the factors that influence fluctuations in its size. This leads on to considering what kinds of concern the inter-bank market might hold for supervisory authorities.

(1) This study has benefited from consultations with a number of bankers, whose co-operation is gratefully acknowledged.

The statistics used in this study are mostly based on data collected by the Bank for International Settlements and the Bank of England. Dealings with central banks are generally excluded from the definition of the inter-bank market: it could be misleading to treat these institutions as equivalent to commercial banks as their reasons for placing funds with eurobanks are often quite different. On the other hand, several types of transaction which do not conform to what is usually meant by 'inter-bank activity' are included because it is impossible to segregate them. These include movements across national boundaries between branches of the same bank. In addition, some deposits which are recorded as being placed by other banks may be more closely equivalent to non-bank deposits than inter-bank ones. Swiss banks, for example, channel a substantial volume of trustee funds into the euromarket while acting simply as agents, and a number of large banks acquire deposits through correspondent banks operating in the non-bank market-place on their behalf. A similar statistical problem arises when banks in certain countries borrow inter-bank money principally in response to official encouragement to help finance balance of payments deficits or to meet other economic targets.

While these caveats suggest that the statistics should be treated with caution and may somewhat exaggerate the size of the inter-bank market, they are unlikely to affect significantly the broad conclusions provided by the figures.

The individual eurobank

A bank with eurocurrency funds in excess of its immediate needs could sell them for domestic currency and employ the proceeds in the domestic market, and then reverse the process when short of funds. But the inter-bank market in eurocurrencies provides an alternative mechanism: it offers a convenient channel for lending funds quickly and thus allows precautionary balances to be minimised and unexpected opportunities to be exploited. The market is also used for various transactions related to the exchange markets, such as providing cover for forward positions. Increased interest rate volatility has enhanced the importance of the inter-bank market to the larger banks. They may be willing to exploit very temporary arbitrage opportunities but can obtain large amounts of funds quickly only by approaching the inter-bank market. As a result of all these factors inter-bank transactions are the most frequent form of trading in the euromarket. Nevertheless, interest rate volatility can cause considerable confusion and there have been occasions when for a few hours even very good names have found it impossible either to place or to borrow funds in the inter-bank market.

When a eurobank receives a large deposit from a non-bank it may typically place it immediately in the inter-bank market and will probably earn a turn of $\frac{1}{32}\%$. Symmetrically, loans to customers are in many cases funded initially from inter-bank borrowing because the market is a ready source of funds. Before being on-lent to a final user, however, a deposit is likely to pass between several banks, although these inter-bank deals are normally much less profitable than transactions with non-banks. Maturity transformation within the inter-bank market appears to be limited (see below), so significant profits are only likely to be made by lending to banks of relatively low quality which are willing to pay risk premia. Consequently the majority of banks make little or no profit on most inter-bank transactions. Large banks, however, can usually obtain funds at rates below LIBOR[1] and so they will expect to earn a significant turn on inter-bank deals.

Although not often a major source of profit in itself, the inter-bank market offers less tangible advantages to regular participants in addition to its value as a liquidity cushion. As the euromarkets' 'clearing house' it provides participants with a feel for how the markets are moving: one banker has described it as his barometer. This function is particularly important when trading would otherwise be thin. In addition, participation in inter-bank business helps a new bank to establish itself, while a continuing presence in the inter-bank market allows a bank to maintain useful relationships with other eurobanks, and to encourage these it will wish to be seen to be a lender as well as a borrower in the market. There is a general view that those smaller banks which were known only as borrowers suffered most in the general euromarket crisis of confidence which followed the collapse of the Herstatt Bank, following imprudent foreign exchange dealings, in June 1974. While small banks hope that this two-way presence will ensure that they will be able to obtain funds if difficulties arise, not all the large banks would necessarily accept this assumption.

Acting as both lender and borrower brings other advantages. It makes it harder for a bank's overall position to be deduced by outsiders and in particular prevents a bank which is asked to quote rates from knowing which side of the market the enquiring bank is interested in and then adjusting the quotation accordingly. One implication of banks trading for reasons other than profit is, of course, that the chains in the inter-bank market can be longer than they would otherwise be.

The importance of the inter-bank market is underlined in the case of the smaller eurobank because, although it may bid slightly higher rates for deposits than its larger competitors, central banks, corporations and other non-banks are often reluctant to place deposits with it. Depositors naturally give a high priority to the security of their funds and are reluctant to move to lesser known banks. As a consequence, some smaller euromarket participants tend to rely almost completely on the inter-bank market for funds for their offshore operations.

This dependence is in contrast to experience in some domestic banking systems. In the UK domestic market the share of the clearing banks' sterling deposits obtained from

(1) London inter-bank offer rate—the dominant offer rate in the euromarkets. An offer rate is the rate at which banks say they are willing to make loans; the (lower) bid rate is the rate they are willing to pay on deposits placed with them.

domestic inter-bank sources is consistently small, being less than 4% in March 1981. Their subsidiaries rely on inter-bank funding for around two fifths of their deposits (this includes borrowing from their parents) but other British banks have been expanding their customer deposit base and now rely on the inter-bank market for less than a quarter of their sterling funds (compared with over a half in 1975). In the United States the Federal funds market is, *inter alia*, one significant inter-bank source of funds, but its total size is only about one eighth of the aggregate liabilities of US member banks and the position is broadly similar in European countries. The use made of the domestic inter-bank market by West German and Swiss banks varies considerably, for example, between different types of banks and credit institutions; nevertheless inter-bank activity is proportionately much less than in the euromarkets.

In eurobanking the reliance of the smaller banks on inter-bank money has sometimes led the leading eurobanks to complain that they are funding the whole market themselves. They do, however, gain certain advantages from this. Many banks offered deposits by non-banks are reluctant to refuse them because the customers' business may be very welcome in less liquid periods, while those banks that receive significant non-bank deposits are able to pass on funds surplus to their own needs to the smaller banks.

The general picture of the larger and better known banks tending to be net suppliers to the eurocurrency inter-bank market is supported by figures for the London banks (Table A and Chart A). As would be expected in a major financial centre, the aggregated series for all reporting institutions indicate consistent net lending to banks in other centres. Within the total, American banks provide substantial funds to the inter-bank market, reflecting the dominance of major American eurobanks with well established London operations. The net contribution of American banks appears to show a significant trend increase both in absolute terms and as a percentage of their total inter-bank claims. The contribution of all British banks taken together has also been rising but, like that of the Japanese and other overseas banks, it is on a smaller scale than the American banks' aggregate lending. The consortium banks, in contrast, are regular net borrowers.

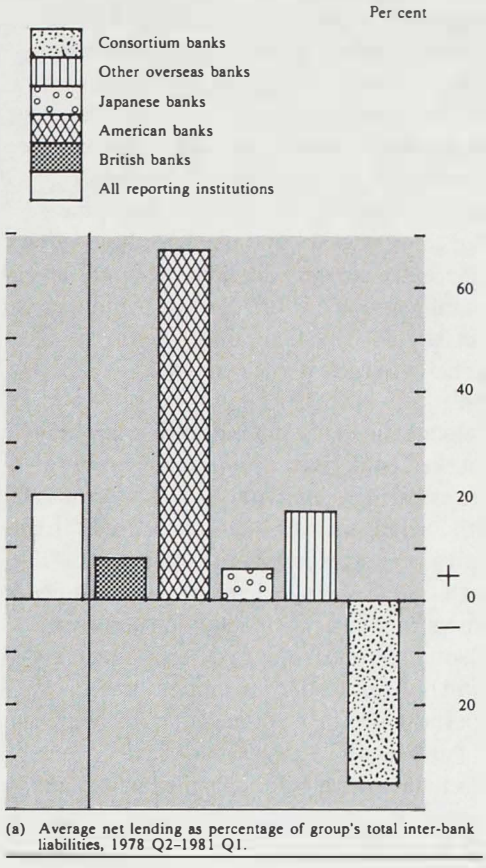
Table A
Net foreign currency lending to the inter-bank market by banks in the UK[a]

$ billions

	Net lending to inter-bank market of:					
	All reporting institutions	British banks	American banks	Japanese banks	Other overseas banks	Consortium banks
End-period[b]						
1978 June	23.8	1.3	21.6	1.5	4.3	−4.8
Dec.	22.5	2.0	18.6	0.8	5.9	−4.9
1979 June	38.0	0.7	30.4	1.7	10.4	−5.2
Dec.	57.6	3.6	42.3	4.0	12.9	−5.1
1980 June	58.2	4.5	40.3	3.3	15.8	−5.7
Dec.	60.8	8.1	38.5	3.6	17.5	−6.9

(a) Definitions are given in the appendix.
(b) Figures are available at mid and end-quarters; statistics for intervening dates present a similar picture to that given by the table.

Chart A
Net foreign currency lending to the inter-bank market by banks in the UK[a]



(a) Average net lending as percentage of group's total inter-bank liabilities, 1978 Q2–1981 Q1.

An interesting qualification to the above emerges if the inter-bank positions of certain market participants are examined individually. Net lending by a few large American banks has been significantly smaller than would have been expected on the basis of bank size and reputation. The main factor behind this would seem to be the importance attached to the return on total assets (ROTA) by American bank analysts. Some of the largest banks enjoy strong retail bases and are prepared to be less heavily capitalised than their smaller competitors. The corollary of this attitude, however, is that their ROTA figures are in danger of looking embarrassingly poor if they are large net inter-bank lenders, and so balance sheets are expanded only if the relevant business promises a relatively high return. Consequently these banks will be particularly keen to find non-bank outlets for their deposits, and for them the attraction of the small profit on inter-bank lending is often outweighed by the prospect of reducing the average rate of return on total assets.

Before the crisis of confidence precipitated by the Herstatt collapse in 1974, some eurobanks paid little attention to the details of their inter-bank involvement and were certainly far less particular as to which banks they lent to than as to which corporations borrowed from them. The aftermath of Herstatt caused particular difficulties for small and non-dollar-based eurobanks, and as a result a number of them considered changing their policies. On the liabilities side some contemplated building a much larger customer

deposit base and a few made significant progress after bidding actively for the funds of multinational corporations. In fact, banks which were heavily reliant on inter-bank funding could reduce that reliance only to the extent that other banks were prepared either to accept an increase in the proportion of their balance sheets funded from the inter-bank market or to accept a reduced balance sheet. In general, however, this concern faded and balance sheets have grown rapidly without a redistribution of non-bank deposits towards smaller banks. While some eurobanks remain concerned about the deposit base, others believe that the increased size and depth of the inter-bank market justifies confidence in it. Furthermore, a number of major international banks have the support of strong domestic deposit bases in their home countries.

Although the Herstatt shock has not reduced reliance on the inter-bank market, banks now devote considerably more resources to assessing their activity in it. A eurobank will establish both formal and informal lines of credit in the market, often with a very large number of other banks. The bank will ensure that such arrangements are underpinned by personal contacts, and its assessment of the quality of management will often be one factor in determining the maximum that will be borrowed from another bank. Eurobanks watch the percentage of their funds drawn from particular banks fairly closely, to avoid too great a dependence on a small number of inter-bank participants, and certain banks are willing to borrow only from banks to which they would be prepared to lend.

As in any other market, participants in the inter-bank market will also limit the amounts they are willing to lend to particular borrowers. Again the quality of management will be considered and when dealing with small banks the lending bank may have regular consultations about the borrower's balance sheet. In calculating appropriate bilateral lending ceilings, eurobanks will commonly use information on the relevant bank's capital base and reserves; and in certain instances a eurobank may try to discover for what purpose another bank is seeking its funds. When a bank is closely linked with its national government, it can be particularly difficult to distinguish between different motives for seeking inter-bank funds and this can affect the lending bank's assessment of risk.

The size and structure of the market

This section presents estimates of the overall size of the international inter-bank market and its growth in recent years. On the basis of data on the portion of the euromarket based in London, the influences of the nationalities, growth rates and size of banks on the structure of the market are investigated. The currency composition of the market and the role of interest rate tiering are also discussed.

Statistics

Series for the aggregate size of the inter-bank market have been constructed as part of this study (Table B and Chart B). Some important qualifications are outlined in the footnotes to the table and in the appendix. The basic series

Table B
Size of the inter-bank market[a]

$ billions
Percentages in italics

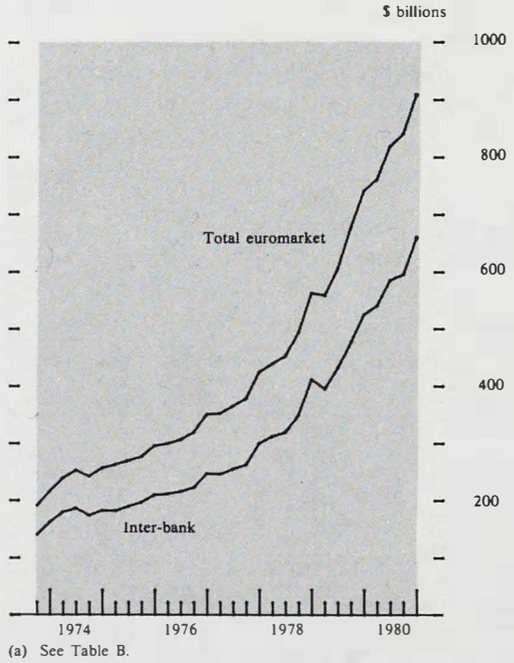
	Broader definition: international banking market		Narrower definition: euromarket			
	Total cross-border liabilities in domestic and foreign currencies	*of which, inter-bank*	Total cross-border liabilities in foreign currencies	*of which, inter-bank*	Total liabilities in foreign currencies including intra-centre transactions	*of which, inter-bank*
End-period						
1973 Q1	192	*71*	161	..	..	..
Q2	204	*70*	172	..	..	..
Q3	223	*71*	191	*73*	..	..
Q4	250	*71*	216	*75*	..	..
1974 Q1	273	*71*	239	*75*	..	..
Q2	290	*71*	253	*74*	..	..
Q3	278	*70*	242	*72*	..	..
Q4	298	*68*	257	*71*	..	..
1975 Q1	307	*69*	263	*69*	..	..
Q2	314	*69*	270	*70*	..	..
Q3(b)	318 / 413	*70* / *63*	277	*71*	..	..
Q4	440	*63*	296	*71*	387	*72*
1976 Q1	454	*63*	300	*71*	395	*71*
Q2	467	*64*	307	*71*	400	*71*
Q3	488	*63*	320	*70*	416	*70*
Q4	535	*62*	352	*70*	456	*71*
1977 Q1	539	*63*	353	*70*	458	*70*
Q2	564	*63*	366	*70*	473	*71*
Q3	584	*63*	379	*69*	490	*70*
Q4(b)	655 / 672	*63* / *64*	425	*71*	547	*72*
1978 Q1	686	*63*	440	*71*	568	*72*
Q2	701	*63*	453	*71*	588	*71*
Q3	765	*63*	494	*71*	642	*71*
Q4	855	*65*	563	*73*	723	*73*
1979 Q1	861	*64*	559	*71*	720	*72*
Q2	934	*65*	606	*71*	777	*72*
Q3	1,035	*65*	678	*70*	865	*71*
Q4	1,120	*65*	742	*71*	947	*72*
1980 Q1	1,137	*66*	762	*71*	977	*73*
Q2	1,222	*66*	819	*72*	1,048	*73*
Q3	1,260	*65*	841	*71*	1,081	*73*
Q4	1,335	*67*	909	*73*	1,169	*74*

.. not available.

(a) For details of the sources and methods used in compiling this table, see the appendix. The data are drawn from a number of different series, some of which are only available for recent quarters; for this reason, the estimates of the inter-bank position for 1973–77 are especially approximate.

(b) There were significant breaks in the series at these dates.

Chart B
Cross-border liabilities in foreign currencies[a]



(a) See Table B.

in the first four columns of the table only cover transactions across national boundaries. Consequently a deposit passed from a centre abroad to a London bank would be included in both the total and inter-bank series, but if the deposit was then passed between several London banks these further movements would not be recorded. But the final two columns of the table do take account of intra-centre activity and, for the limited period for which figures are available, they suggest convincingly that the results based on cross-border transactions are still valid. This seems quite plausible as, to the extent that the international inter-bank market is fully integrated, only time zone factors and possible differences in the attitudes of the authorities make dealing with a bank abroad significantly different from dealing with one in the same centre.

While these statistical complications mean that the precise figures are subject to margins of error, the main conclusions implied by the table are likely to be robust. In the international banking market as a whole, inter-bank activity increased from under $150 billion at the start of 1973 to almost $900 billion by the end of 1980.[1] For the euromarkets, but including intra-centre activity, the total inter-bank size is also nearly $900 billion. This rapid growth has, however, been no faster than for the market as a whole, with the inter-bank share remaining at around 70 per cent.

This apparent constancy of the inter-bank share of the total market is not necessarily an expected result. Indeed, in recent years some commentators have suggested that inter-bank activity has been growing more rapidly than the rest of the market; but this does not seem to be the case. If the ratio of inter-bank to non-bank transactions is as stable as these data imply, then the best guide to the size of the inter-bank market at any particular time is the volume of transactions with non-banks, and other possible influences appear unimportant. Before considering further the influences on the scale of inter-bank activity, however, it is useful to examine some disaggregated figures on the market.

Such figures can be obtained for the London portion of the euromarket and they include intra-centre inter-bank activity. Table C summarises an analysis of London banks' dependence on the eurocurrency inter-bank market, including a disaggregation by nationality of bank. The same result as suggested by the BIS figures for the whole market emerges, although behind the overall stability of the inter-bank share there are some variations over time for different groups of banks, as well as cross-sectional differences. Although the ratios are not strictly comparable, the lower inter-bank share in the London figures may imply that banks in a highly developed financial centre typically find it easier to attract deposits from outside the banking sector than banks elsewhere. This seems plausible and is consistent with the finding that London is a net lender to the international inter-bank market.

Variations between groups of banks

Within the UK portion of the euromarket the American banks have the smallest proportionate dependence on inter-bank funds. The share of inter-bank funds in total liabilities for the British banks is only slightly smaller than for the market as a whole, but is in marked contrast to their funding in the domestic market. The grouping 'other overseas banks' derives about two thirds of its deposits from other banks, while Japanese banks display a higher and rising proportionate dependence on inter-bank funds. The consortium banks regularly take four fifths of their total liabilities from this source, probably mostly from their shareholder banks.

One reason for the differences between the groups could be that the nationality of a bank has a direct bearing on its behaviour in the inter-bank market. American banks may have a comparative advantage in attracting non-bank deposits through being dollar-based and so having potential recourse to ample dollar funds. A large number of multinational corporations which have funds to deposit are based in the United States and may turn most naturally to American banks. Also, the figures in Table C relate to the London market, where depositors see the authorities' most direct responsibility as being towards British banks. This may partially explain the relatively high percentage of non-bank deposits obtained by British banks; in another euromarket centre, local factors would probably favour different groups of banks. In addition, there is anecdotal evidence that head offices exercise a considerable influence on the extent to which a bank uses the inter-bank market: if, for example, American managements were to prefer less involvement than British ones, that might explain the figures. Different strategies might result from different degrees of concern about, for example, capital adequacy but there is no direct evidence for this.

Table C
Liabilities in foreign currencies of banks in the United Kingdom[a]
$ billions
Percentages in italics

	All reporting institutions		British banks		American banks		Japanese banks		Other overseas banks		Consortium banks	
	Total	Inter-bank	Total	Inter-bank	Total	Inter-bank	Total	Inter-bank	Total	Inter-bank	Total	Inter-bank
End-June												
1978	247.3	*60*	49.7	*57*	83.2	*49*	31.1	*65*	68.3	*68*	15.1	*81*
1979	317.0	*59*	64.3	*59*	99.5	*46*	47.3	*69*	87.1	*64*	18.9	*82*
1980	433.7	*60*	91.5	*59*	122.8	*43*	79.7	*75*	117.6	*64*	22.2	*79*

(a) An expanded version of this table appears in the appendix.

(1) As noted above, these figures include lending between directly related institutions, for example different arms of the same banking group. It is not possible to distinguish these deals in the aggregate figures, but for American banks about 50% of liabilities are intra-institutional. If this holds true in the market as a whole, the 'net' inter-bank market would be worth $400–500 billion (end-1980).

An alternative explanation is that the division by nationality coincides with and masks a division by size of bank: larger international banks rely less on inter-bank money than smaller ones and if the American and British groups are dominated by the largest eurobanks then a lower inter-bank percentage of liabilities would be expected for these groups. An examination of the individual positions of a small sample of banks provides general support for this hypothesis. The size of a bank does appear to be a significant factor in its degree of dependence on inter-bank funds.

The data summarised in Table C support another possible explanation for variations in the inter-bank share of total liabilities. There is a close rank correlation between the average rate of growth of the total liabilities of the different groupings and the rate of increase of the inter-bank share of them. At one extreme the Japanese banks more than trebled their total liabilities between mid-1978 and March 1981 and their proportionate dependence on inter-bank funds increased from two thirds to over three quarters. At the other extreme, American banks increased their total liabilities by only 28% over the same period and display not only the smallest inter-bank usage but one that has been gradually declining. It would be reasonable to argue that the faster a bank expands its balance sheet the less likely that its non-bank customer deposit base will grow at the same speed, and hence the greater its relative need for funds from other banks. This result is consistent with newly established banks relying particularly heavily on inter-bank funds to finance their initial growth. It also suggests that fast growing banks are asset-dominated in the sense that they have lending opportunities to be funded rather than a flow of non-bank deposits which need to be employed.

These conclusions, like those on net positions in London *vis-à-vis* the inter-bank market, are qualified by different results for a few large American banks. Over the last few years, these banks have on average derived a greater proportion of their liabilities from inter-bank sources than would have been expected from considerations of size, nationality and growth rates, although the difference has been declining. This may partly reflect their rapid growth in the past, but two additional factors may also be at work. First, probably only the largest banks are willing to take up mismatched positions aimed at exploiting expected interest rate movements, and to do this they will sometimes require substantial funds of a certain maturity at short notice. These can only be acquired from inter-bank market and some of these banks might therefore tend to take a relatively large share of total liabilities from inter-bank sources. Second, some of the largest banks are willing to quote rates for and accept deposits from certain small banks primarily in order to maintain traditional relationships. This is in contrast to their more selective competitors. Increasing concern about ROTA is probably weakening the effect of each of these factors, however, and this may explain why their proportion of inter-bank funds is moving closer to what would have been expected on the basis of other factors.

Currency denomination

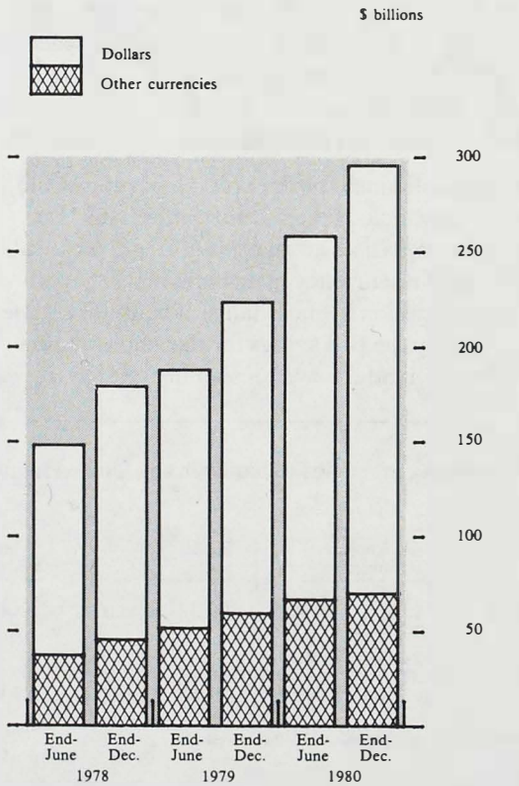
About three quarters of the inter-bank market is denominated in dollars, which is a slightly higher proportion than in the euromarket as a whole. Some figures for the London market are presented in the first half of Table D and in Chart C; probably at least half of the 'other currencies' figures represent deutschemark liabilities.

If the division between dollar and other currency liabilities is examined for the various groups of banks, it seems that most groups maintain a similar split to the market generally. The exceptions are the Japanese banks, with a smaller proportion of inter-bank liabilities in non-dollar currencies (although the proportion increased over the period examined) and the 'other overseas banks' category, with a higher proportion. As the non-dollar currencies are predominantly the major Continental ones, this probably reflects concentration of their use in Continental banks.

Table D and Chart C
Currency composition of the UK eurocurrency market

$ billions
Percentages in italics

	Inter-bank liabilities		As share of total liabilities in the respective currencies	
Denominated in:	Dollars	Other currencies(a)	Dollars	Other currencies(a)
End-period(b)				
1978 June	110.9	37.2	*57*	*70*
Dec.	133.7	45.5	*60*	*70*
1979 June	136.2	51.7	*56*	*70*
Dec.	164.0	59.6	*56*	*68*
1980 June	191.6	66.9	*57*	*70*
Dec.	225.6	70.1	*59*	*70*



(a) No detailed figures are available for individual non-dollar currencies.
(b) Statistics for intervening dates present a similar picture.

For London banks the inter-bank share of total non-dollar liabilities is consistently greater than the inter-bank share of total dollar liabilities (Table D). This is presumably not the case in all other centres as the relatively high proportion of dollars in the inter-bank market as a whole implies the opposite result for the euromarket worldwide. The figures suggest, however, that for London banks the average length of inter-bank chains for non-dollar funds may be rather longer than for dollar funds. The thinness of the market in the minor currencies may explain this, as at least two factors could tend to increase usage of inter-bank facilities. First, there is less chance of a bank being able to match a new deposit with a new loan immediately and so it is more likely to place the counterpart in the inter-bank market. Second, a thin market may appear more precarious and so encourage more inter-bank trading, both in order to gauge market sentiment and to show a regular presence on both sides of the market.

Interest rate tiering

Tiering of interest rates is a normal feature of the inter-bank market.[1] There are several tiers to reflect different bank quality ratings but the usual range of rates is only around $\frac{1}{4}\%$ overall. Some concern has been expressed at the narrowness of this range and it has been suggested that recent market liquidity has produced some abnormal compression. Immediately after the Herstatt crisis in 1974, the number of tiers increased and the range of rates expanded to exceed 1%. Before the end of 1975, however, a certain stigma had become attached to paying a large margin over the rate for prime names and now a bank thought to be a poor risk is more likely to be told that no deal is possible if it seeks to borrow than to be offered markedly higher interest rates. Certain eurobanks avoid offering a range of different rates by deliberately restricting their dealings to top class names only.

Most inter-bank deals are for periods of up to six months, and second-tier banks do not often obtain loans with longer maturities. A much more limited market exists for up to one year and some eurobanks have been able to obtain funds for as long as five years. The longest maturities are, however, usually on loans obtained by banks acting on behalf of their governments, and so these are not wholly comparable with other inter-bank deals.

Fluctuations in the size of the market

In the long run, the international inter-bank market appears to grow in line with the remainder of the market but quarterly changes are much less closely correlated. Statistical work (described in the appendix) suggests that in this context it is desirable to distinguish between central banks and those other depositors which are not commercial banks. It seems that a given increase in non-bank liabilities is accompanied by very roughly three times as large an increase in inter-bank liabilities, but the size of the inter-bank market appears unresponsive to variations in central bank deposits. Correlation does not prove causation, but this evidence is compatible with the inter-bank market being a lubricant servicing other euromarket activity and hence needing to expand in line with the use made of eurobanking by non-bank depositors and final users. Nevertheless, it is still unclear why the relation is so stable and it might be useful to explore the impact of other possible influences on inter-bank activity.

An examination of 'levels' may indicate how the use of inter-bank facilities adjusts in the long term to the stock of non-bank liabilities; quarterly changes in the levels may give a clearer impression of banks' short-term behaviour. Simple regression equations seeking to 'explain' fluctuations in the inter-bank aggregate in terms of fluctuations in non-bank and central bank deposits give a poor fit and only the variable reflecting non-bank fluctuations emerges as statistically significant. Equations using only changes in non-bank deposits to account for fluctuations in the inter-bank aggregate are considerably more successful and imply that between half and three quarters of the variation in the latter can be accounted for by variation in the former. Nevertheless these equations are not wholly satisfactory. It seems probable that there are other influences on inter-bank growth and its fluctuations in the short term, and it may be that fluctuations in non-bank deposits are acting as a proxy for more fundamental influences. The evidence of serial correlation in the equations also suggests that significant variables may have been omitted.

One hypothesis is that the inter-bank market is essentially a residual source of funds within the euromarkets when non-bank deposits are inadequate to meet growth targets or customer loan demand. The inter-bank market is not usually the final recourse, as a bank can normally transfer domestic liabilities into the euromarket; but the eurocurrency inter-bank market may be a preferred source of funds. If this hypothesis is correct, fluctuations in inter-bank funds would probably display an inverse correlation with fluctuations in other deposits. But in every regression equation tested, non-bank variables emerge with a positive coefficient, implying that they move in the same direction as the inter-bank aggregate. This work can only offer tentative conclusions but it provides no evidence to support the residual theory.[2]

Several other factors have been suggested as significant in determining fluctuations in the size of the inter-bank market. One is that inter-bank activity grows when the dollar strengthens and diminishes when it weakens. A strong dollar is likely to be accompanied by demand for the currency outside the United States, and to the extent that banks convert non-dollar funds held in domestic markets into dollars that they place in the eurocurrency inter-bank market, then the net supply of funds to the market will increase. Simple econometrics do not, however, suggest that the dollar effective exchange rate has any significant

(1) 'Tiering' occurs when, instead of having uniform interest rates applicable to all participants, different rates apply to different participants according to the market's assessment of their quality.

(2) These doubts about the 'residual' theory complement findings reported in the article 'Conditions in the syndicated medium-term euro-credit market' that suggest that eurobanks are not pure liability managers. (September 1980 *Bulletin*, page 317).

influence, and the equations are not significantly better than those which ignore this factor.[1] If the exchange rate is treated as the sole explanation of inter-bank fluctuations, the equations are predictably poor, and although the exchange rate appears significant its coefficient is negative, suggesting that, if anything, inter-bank activity declines as the dollar strengthens.

An alternative explanation of short-term changes in the size of the inter-bank market relates them to the shape of the yield curve. When the curve becomes inverted, the higher yields on short-term money might encourage more depositing by banks in the inter-bank market than in longer-term securities. If, asymmetrically, demand for inter-bank funds to finance bond portfolios was less responsive to an inversion of the yield curve, then overall inter-bank activity could increase. It is not obvious why such an asymmetry should exist, and when a proxy for the shape of the yield curve was incorporated into the statistical work there was no improvement in the proportion of inter-bank variation that was explained.

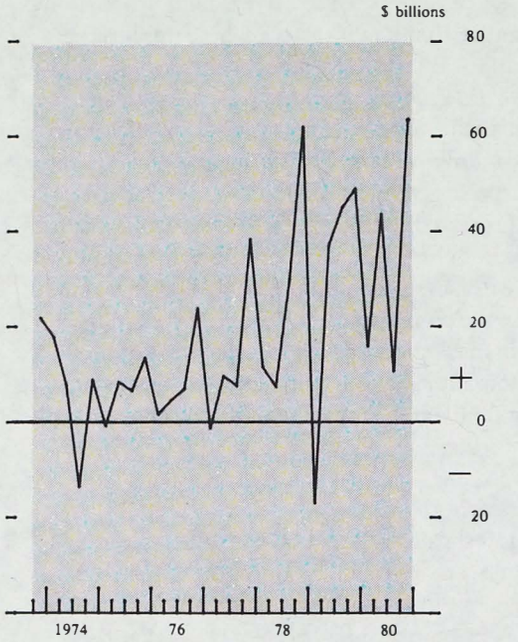
It is difficult to identify how variations in interest rates would be expected to influence inter-bank volume changes. In any case, interest rate factors which affected bank portfolio decisions would be likely to influence non-bank behaviour too, making it difficult to distinguish any separate interest rate influence on bank behaviour. Such statistical work as has been done confirms these problems and fails to uncover any systematic independent influence of interest rates on the size of the inter-bank market.

Terms in the international credit markets might have some discernible influence on inter-bank activity. Particularly if there is any validity in the 'residual' theory of inter-bank use (see above), easy terms in the credit markets, stimulating loan volumes, could result in increased inter-bank borrowing to meet the extra demand. If, for example, certain banks made substantial contributions to a number of very large loans, their need for inter-bank funds might increase significantly. Preliminary statistical work does not, however, suggest that credit terms, represented by indices of spreads and maturities on medium-term loans, are at all significant, which casts further doubt on the 'residual' hypothesis. Nevertheless, lending in the medium-term credit market is only a part of total eurobank lending so this result should be treated with particular caution.

Another influence may be the result of banks in several countries having domestic incentives to expand their balance sheets at year-ends. For a brief period they probably borrow significant extra amounts from the inter-bank market, and Chart D seems to confirm this seasonal pattern. This is not, however, a sufficiently strong influence for the overall inter-bank share of the market to rise substantially.

The very limited success of the simple regressions raises the question of whether it would be possible to expand them into a more complete model of the eurobanks' behaviour

Chart D
Increases in the eurocurrency inter-bank market[a]



(a) Quarterly increases in cross-border inter-bank liabilities in foreign currencies for BIS reporting area (See Table B).

vis-à-vis the inter-bank market. This would require, *inter alia,* series for the asset side of the balance sheet to link with those already constructed for the liabilities side, but the period for which full information is available would again be short. It seems highly likely that the number of reliable data observations obtained would be far too small to test a general model of inter-bank behaviour. Furthermore, aggregated data may anyway be of limited value as the amount of inter-bank business undertaken by an individual bank could be greatly influenced by factors peculiar to that bank.

Discussions with bankers have produced hints that short-term fluctuations in their use of the inter-bank market may not be attributable to theoretically rational economic factors, in which case it may be difficult to find an adequate testable model. Some eurobanks probably do have internal guidelines on what ratio of inter-bank to non-bank liabilities they should maintain, but the majority do not appear to aim for any particular relationship and some argue that in practice the difference between banks and non-banks is very slight. They profess to seek a wider (non-bank) customer deposit base, but admit that when the markets are liquid and many banks have surplus funds they are quite content to take an unusually large proportion of inter-bank money. They suspect that in a wholesale market a customer deposit base is not necessarily more stable. At least in the short term, therefore, growth in the inter-bank portion of a bank's liabilities may be erratic.

Possible causes for concern

This section considers the main anxieties that have been expressed concerning the development of the inter-bank market. Firstly, there is the common view that its growth

(1) See the appendix.

has been dangerously rapid, but this has to be seen in the broader perspective of total euromarket growth. The second area of concern is whether the inter-bank chains contribute towards a worrying degree of maturity transformation.

While inter-bank growth is in line with the market as a whole, it does not seem to warrant particular concern, but any general anxieties about the growth of the euromarkets must also apply to inter-bank expansion. Of these, the most important may relate simply to the size that the inter-bank market has now reached. Its growth has increased the funds which would be involved in any euromarket crisis and also the number of transactions with which the banks have to deal. Inter-bank activity has intensified the pressure for more efficient clearing systems and now their very efficiency could result in any ripple effects from a crisis of confidence being transmitted very rapidly through the eurobanking system.

A slightly more subtle concern arises from the impact of inter-bank transactions on the flexibility of the market. If funds pass through chains of banks between depositors and final borrowers, this increases the number of parties which could be affected in the event of a bank facing liquidity difficulties. Any maturity transformation within the chain leaves the banks more exposed should a run on them develop, and the inter-bank market may conceal from an individual bank the degree of transformation being undertaken by banks in aggregate. In addition, most banks taking funds from the inter-bank pool will be unaware of either the original source or ultimate use of the funds they are handling. An active inter-bank market may therefore increase the scope for behaviour which seems prudent at the level of the individual bank, but seems less so when the whole picture is examined. This point applies to inter-bank activity in any market, but it is particularly important in the euromarkets because of the unusually large proportion of inter-bank transactions there.

Maturity mismatching is an important aspect of international banking, which has sometimes given rise to concern. Before looking at the extent to which the inter-bank market contributes to this, it is first necessary to examine the degree of maturity transformation that occurs between the initial deposit and the final borrowing. The results from one method of assessing this are summarised in Table E. These show the net foreign currency liabilities/claims for each maturity range for banks in the United Kingdom as a percentage of total foreign currency liabilities. As this percentage has remained fairly constant in each maturity over the last six years, the figures indicate how far mismatching has changed at each maturity through time. They are only snapshots of the relevant positions on particular days, but at each reporting date the eurobanks were involved in a substantial degree of maturity transformation. As would be expected, they have net liabilities in the shortest maturity ranges. In the six to twelve-months range they show only very slight net liabilities, and for maturities of one year or more they have net claims. These mismatching figures have changed very little through the period for which statistics are available.[1]

Table E
Maturity mismatching by banks in the United Kingdom

Net foreign currency liabilities (−)/claims (+) as percentage of total foreign currency liabilities

Remaining maturity	Less than 1 month	1–3 months	3–6 months	6–12 months	1–3 years	3 years and over
Mid-February						
1975	−6.8	−4.3	−2.7	−0.7	3.7	13.2
1976	−6.2	−4.8	−3.5	−0.3	4.2	12.9
1977	−7.5	−4.9	−2.9	−0.3	5.0	12.3
1978	−7.6	−4.5	−2.8	−0.3	4.9	11.8
1979	−7.8	−3.6	−3.7	−0.5	4.3	12.5
1980	−7.4	−5.3	−2.7	−0.4	3.5	12.8
1981	−7.0	−5.3	−2.8	−0.3	3.4	11.7
Mean of twenty-seven quarters	−6.9	−4.8	−3.0	−0.3	4.2	12.3

Although the important question of the quality of assets has not been considered, the stability of the overall degree of maturity mismatching is reassuring; but the pertinent issue for this study is the contribution of the inter-bank market. In one sense this is impossible to isolate as most mismatched pairs of deals in the euromarket, like other pairings, will involve inter-bank funds in one of the transactions. When three-month funds are lent to a non-bank at six months, for example, the money is normally raised in the inter-bank market. Nevertheless it would be useful to gain some impression of the degree of mismatching for transactions which involve only banks and are thus entirely within the inter-bank market.

Table F
Maturity mismatching within the UK inter-bank market

Average[a] net foreign currency liabilities (−)/claims (+) in inter-bank market as percentage of the group's total foreign currency liabilities in inter-bank market.

Remaining maturity	British banks	American banks	Japanese banks	Other overseas banks	Consortium banks
Less than 8 days	1.2	−5.3	0.9	−2.9	− 2.7
8 days–1 month	−2.9	−0.9	−2.9	0.8	− 9.4
1–3 months	−8.7	3.4	−5.2	−3.3	−17.9
3–6 months	−8.8	4.4	−3.1	−3.3	−14.9
6–12 months	−2.7	1.0	−1.0	−0.7	− 2.8
1–3 years	0.6	0.9	0.4	1.7	2.7
3 years and over	2.8	1.3	2.4	2.2	4.4

(a) For the reporting dates in February and August between February 1974 and February 1981. These are based on the figures published in the *Bulletin*, which include liabilities to CMIs within the inter-bank totals. The figures include the counterparts to transactions with non-banks and so some of the apparent mismatching is offset elsewhere in the banks' balance sheets. These figures therefore overstate the amount of maturity transformation that takes place within the inter-bank market.

Table F summarises the positions of London banks within the eurocurrency inter-bank market. Positions between banks within one of the groupings are inevitably netted out, but positions both with other banks in the United Kingdom and with banks overseas contribute to the figures. Net claims in the one-month to one-year range by American

(1) J S Thornton comes to the same conclusion for the period 1975–79 via a different method. 'Liquidity creation in the euromarkets' *The Business Economist*, Summer 1980.

banks reflect their position as the main net suppliers to the market, while the consortium banks are, relative to their size, the largest net takers of these funds. The detailed statistics[1] indicate that since 1974, when figures were first available, American banks have been increasing their short-term net lending as a proportion of total inter-bank liabilities. The Japanese banks have managed to reduce their dependence on net borrowings over the period. Each of the London bank groups has net claims in the maturity ranges of over one year, reflecting London's position as a supplier of funds to other centres, and the percentage net claims in these ranges have been increasing for each of the five groups of banks.

But the most striking feature of the figures in Table F is that they are almost all small. They overstate the extent of mismatching within the inter-bank market; for example, some net claims at three months are matched by non-bank three-month deposits. Consequently, the degree of maturity mismatching along the inter-bank chains would appear to be very limited. Even though the netting out of positions within bank groups could be distorting the picture, it seems likely that most transformation takes place between the final bank in the chain and its non-bank customer borrowing funds.

Table E confirms that eurobanks do indulge in significant maturity transformation, but that the degree of mismatching has remained stable over time. And although the extent of maturity transformation wholly within the inter-bank portion of the market appears to be growing, it is still relatively minor. These results tend to refute the fear that the growth of inter-bank facilities has led to eurobanks indulging in less prudent maturity mismatching.

Conclusions

As stated previously, conclusions drawn from this study can only be tentative. It is clear, however, that the very large inter-bank segment of the euromarket performs a necessary and valuable role in linking non-bank depositors and lenders in different parts of the world. The banks perceive direct benefits as they can place or borrow funds at short notice and also use the market as a guide to market conditions and an aid to developing relationships. For the smaller eurobanks in particular it is a vital source of funds.

Over the medium to long term the inter-bank market has grown at the same rate as other euromarket business and has consistently accounted for around two thirds of the total market size. The long-term stability of this stock ratio has not been fully explained. Figures for banks in the United Kingdom show some difference in inter-bank use between different categories of banks and suggest that this generally increases with bank size and rate of growth.

The reasons for short-term fluctuations in the size of aggregate inter-bank activity are difficult to discern. Changes in non-bank activity appear to be significant, but the activity of central banks in the euromarkets does not produce a comparable response in the inter-bank sector and no clear influence resulting from interest rate movements has been identified. The results suggest that inter-bank facilities service the activity of original depositors and final users and need to expand in line with this activity.

The existence of the inter-bank market does not in itself increase the likelihood of a euromarket crisis: its rate of growth is no greater than for the market as a whole, and it does not appear to have generated any trend growth in maturity mismatching relative to total balance sheet size. The growth of the inter-bank market does, however, mean that if a crisis should occur, its results could be far-reaching.

Although some of the work in the preparation of this article has proved inconclusive, the inter-bank market has emerged as less worrying than some observers might have feared. Nevertheless it is necessary to bear in mind the enormous size of the inter-bank market and the high degree of interdependence among its participants.

(1) See the appendix.

Appendix

Statistics in the tables and charts are taken from returns made to the Bank of England (for the London market) and from BIS data and the US *Federal Reserve Bulletin* (for the wider international market).

Table A

Inter-bank foreign currency liabilities are defined as liabilities to banks in the United Kingdom *plus* liabilities to overseas banks *less* liabilities to central monetary institutions (CMIs). Inter-bank claims are defined similarly. Net lending is then inter-bank claims less inter-bank liabilities.

The disaggregation by group of bank is the same as that used in the statistical annex (e.g. Table 14.2).

Table B

Various definitions of the international markets could have been used for this table: figures based on two of the options are shown. The caveats in the footnotes are important. In addition, the inter-bank series in this table have had to be constructed by subtracting identified deposits by non-banks and central banks from total liabilities. As the bank/non-bank breakdown in the component series is imperfect, the residual after subtraction probably includes liabilities to institutions which should more properly be classified as non-banks, together with certain other balance sheet items.

Broad definition

The series used, which include domestic and foreign currencies, were:

- **A** Total external liabilities of banks in the BIS reporting area, excluding US banks and overseas branches.
- **B** Liabilities to non-banks within A.
- **C** External liabilities of foreign branches of US banks in certain offshore centres for which statistics are available.
- **D** External liabilities of banks in the United States.
- **E** Liabilities to CMIs within A.
- **F** Liabilities to CMIs within C.
- **G** Liabilities to CMIs within D.
- **h** Proportion of external liabilities of overseas branches of US banks which are to non-banks.
- **j** Proportion of dollar external liabilities of US banks which are to non-banks. (A breakdown for non-dollar liabilities is not available, but as these are small the inaccuracy in considering only the dollar portion is unlikely to be important.)

The series were then constructed as follows:

Total cross-border liabilities in domestic and foreign currencies	$= A + C + D$
	$= T$, say
Inter-bank	$= T - (B + E + F + G + hC + jD)$

Narrower definition

Suitable figures for the narrower definition of the markets, including only liabilities in foreign currencies, are not available for US banks and branches.

- **K** Total foreign currency liabilities to non-residents of banks in the reporting area, excluding US banks and their branches.
- **L** Liabilities to non-banks within K.
- **M** Liabilities to CMIs within K.

Total cross-border liabilities in foreign currencies	$= K$
Inter-bank	$= K - (L + M)$

Figures for the euromarkets which include intra-centre activity are constructed in a similar way, but using as the basic series total foreign currency liabilities to residents and non-residents.

Expanded version of Table C

Liabilities in foreign currencies of banks in the United Kingdom

$ billions
Percentages in italics

	All reporting institutions		British banks		American banks		Japanese banks		Other overseas banks		Consortium banks	
	Total	Inter-bank	Total	Inter-bank	Total	Inter-bank	Total	Inter-bank	Total	Inter-bank	Total	Inter-bank
End-period												
1978 Q2	247.3	*60*	49.7	*57*	83.2	*49*	31.1	*65*	68.3	*68*	15.1	*81*
Q3	268.1	*61*	52.3	*57*	89.0	*50*	34.9	*69*	75.6	*68*	16.2	*82*
Q4	288.6	*62*	57.4	*58*	94.9	*54*	39.2	*67*	80.2	*68*	16.9	*82*
1979 Q1	292.2	*60*	57.9	*57*	90.1	*47*	44.4	*69*	81.8	*65*	17.8	*81*
Q2	317.0	*59*	64.3	*59*	99.5	*46*	47.3	*69*	87.1	*64*	18.9	*82*
Q3	356.3	*59*	70.5	*58*	112.5	*45*	59.2	*71*	94.2	*64*	19.6	*82*
Q4	382.3	*58*	79.4	*59*	114.1	*42*	64.3	*70*	104.6	*64*	20.0	*79*
1980 Q1	406.8	*59*	80.5	*57*	121.4	*44*	73.1	*74*	111.4	*65*	20.6	*80*
Q2	433.7	*60*	91.5	*59*	122.8	*43*	79.7	*75*	117.6	*64*	22.2	*79*
Q3	445.7	*60*	94.8	*57*	119.2	*42*	90.3	*75*	118.0	*64*	23.4	*81*
Q4	480.8	*61*	103.3	*57*	123.7	*45*	99.8	*78*	129.9	*65*	24.2	*80*
1981 Q1	513.9	*61*	108.1	*56*	128.5	*43*	116.6	*80*	133.8	*63*	26.7	*82*

Relationship between inter-bank and non-bank aggregates

The series used were those on which Table B is based, and the qualifications noted in the section on the size and structure of the market are therefore relevant. The method of estimating components for the broader definition series would tend to generate an apparent correlation between non-bank and inter-bank levels in the earlier years even if little correlation actually existed. Consequently the 1973 Q1–1975 Q2 figures were ignored and the result from using 1975 Q3–1980 Q4 data checked using figures for the period when no component series had to be estimated (1977 Q4–1980 Q4), even though the latter period is very short.

To calculate a simple correlation coefficient between the inter-bank and non-bank series in Table B would involve including central bank deposits with other non-bank funds. It seemed preferable to consider the influence of central bank and non-bank activity separately and so regressions were run treating these two components of the non-bank series in Table B as independent explanatory variables of the volume of inter-bank funds.

When this was done (equations 1–3 in the table below), the CMI variable was insignificant even at the 10% level for each of the three data sets and the adjusted coefficient of determination is not worsened by omitting this variable from the regression (equations 4–6). If the constant term is suppressed, the Durbin-Watson statistic gives a strong suspicion of autocorrelation, but these equations (7–9) are useful in underlining the close correlation between the volumes of inter-bank funds and of non-bank funds (excluding CMIs): to two decimal places the correlation coefficient is unity in each case.

Detailed results

Data sets: I Broader definition 1975 Q3–1980 Q4
II Broader definition 1977 Q4–1980 Q4
III Narrower definition 1973 Q3–1980 Q4

Equation	Data set	Coefficients on variables (t-ratios in parentheses)			$\bar{R}^2$	DW	F
		Constant	Non-bank deposits	CMI deposits			
1	I	− 64.6 (4.0)	2.9 (5.0)	0.8 (0.8)	0.99	1.1(a)	1,338
2	II	−124.3 (5.5)	3.2 (6.0)	0.8 (0.9)	0.99	2.5	683
3	III	25.7 (4.1)	4.8 (13.3)	0.1 (0.3)	0.99	1.9	2,448
4	I	− 55.5 (4.9)	3.3 (52.2)		0.99	1.0(a)	2,727
5	II	−116.3 (5.7)	3.6 (37.3)		0.99	2.2	1,394
6	III	26.9 (6.0)	4.9 (71.2)		0.99	1.9	5,065
7	I		3.0 (98.5)		1.00	0.5(a)	9,700
8	II		3.1 (82.2)		1.00	0.6(a)	6,752
9	III		5.2 (113.0)		1.00	0.9(a)	12,760

(a) Below the 5% lower critical value.

Relationship between inter-bank and non-bank changes

Regressions using quarterly changes in the data underlying Table B were run with the results indicated in the table below. In this and subsequent sections of this appendix, the dependent variable is always quarterly changes in the appropriate inter-bank aggregate. The data sets from which the quarterly changes are calculated are those defined above.

Using non-bank and CMI changes as explanatory factors (equations 10–12) gave fairly low adjusted coefficients of determination and in one case an unsatisfactory F-statistic. Neither the constant term nor the CMI variable was significant. Alternative equations (13–15) using fluctuations in the non-bank aggregate as the sole explanatory variable seem to produce a better fit, although the Durbin-Watson statistics are unsatisfactory for most of this group of equations.

Equation	Data set	Coefficients on variables (t-ratios in parentheses)			$\bar{R}^2$	DW	F
		Constant	Non-bank deposits	CMI deposits			
10	I	3.4 (0.5)	2.9 (3.9)	0.0 (0.0)	0.47	2.8(a)	10
11	II	5.7 (0.4)	2.9 (2.2)	−0.1 (0.1)	0.25	2.5	3(b)
12	III	1.3 (0.2)	4.4 (4.2)	0.2 (0.3)	0.37	2.9(a)	9
13	I		3.2 (9.0)		0.79	2.8(a)	81
14	II		3.4 (7.4)		0.80	2.9	54
15	III		4.7 (7.6)		0.66	2.9(a)	57

(a) (4-DW) below the 5% lower critical value.
(b) F-statistic below 5% critical value.

Influence of the dollar exchange rate

The results from which the conclusions in the main text are drawn include those given in the table below.

Equation	Data set	Coefficients on variables (t-ratios in parentheses)			$\bar{R}^2$	DW	F
		Constant	Non-bank deposits	Dollar effective exchange rate			
16	I		3.0 (4.8)	0.0 (0.4)	0.78	2.8	39
17	III		4.5 (4.6)	0.0 (0.4)	0.65	2.9	28
18	I	260.3 (3.0)		−2.3 (2.6)	0.23	2.8 (a)	7
19	III	213.7 (3.0)		−2.0 (2.8)	0.19	2.4	8

(a) (4-DW) below the 5% lower critical value.

Influence of the shape of the yield curve

The dollar yield gap between three-month rates and an index of long-term bond yields was used as a proxy variable for the shape of the yield curve. As most of the inter-bank market is in dollars the yield gap most likely to appear significant is the dollar one.

Some of the equations incorporating the yield gap as an explanatory factor are listed below.

Equation	Data set	Coefficients on variables (t-ratios in parentheses)			$\bar{R}^2$	DW	F
		Constant	Non-bank deposits	Dollar yield gap			
20	I		3.2 (9.1)	− 2.1 (1.3)	0.80	2.9(a)	43
21	III		4.8 (7.3)	0.3 (0.2)	0.65	2.9(a)	28
22	I	33.2 (7.0)		− 6.1 (3.1)	0.30	2.8(a)	10
23	III	20.2 (5.8)		− 4.2 (2.7)	0.19	2.2	8

(a) (4-DW) below the 5% lower critical value.

Influence of LIBOR

Some of the regression equations including LIBOR as an explanatory variable are detailed below. When LIBOR was included with non-bank fluctuations, the interest rate proxy was insignificant and the coefficient of determination no better than without the interest rate variable. The coefficients on the non-bank changes were reduced by including LIBOR, which suggests a multicollinearity problem. If LIBOR is used as the sole independent variable this problem is obviously avoided, but the resulting equations are unsatisfactory.

Equation	Data set	Coefficients on variables (t-ratios in parentheses)			$\bar{R}^2$	DW	F
		Constant	Non-bank deposits	Three-month LIBOR			
24	I		2.4 (3.7)	1.0 (1.4)	0.80	2.9(a)	44
25	III		4.5 (3.3)	0.2 (0.2)	0.65	2.9(a)	28
26	I	− 1.0 (0.1)		3.3 (2.5)	0.21	2.7	6
27	III	− 5.8 (0.6)		2.6 (2.5)	0.15	2.2	6

(a) (4-DW) below the 5% lower critical value.

Maturity mismatching data

Some of the figures on which Table F in the main text is based are set out below.

Net foreign currency liabilities (−)/claims (+) in the inter-bank market of London banks as percentage of their total foreign currency liabilities in the inter-bank market

	British banks							American banks							Japanese banks						
Mid-August	1974	1975	1976	1977	1978	1979	1980	1974	1975	1976	1977	1978	1979	1980	1974	1975	1976	1977	1978	1979	1980
Remaining maturity																					
Less than 8 days	+5.1	− 0.7	−0.6	+ 2.3	+1.7	+0.4	+3.4	−7.7	−5.3	−2.6	−5.8	−6.1	−4.3	− 6.3	+ 6.8	+5.7	+3.9	−0.1	−4.8	−2.9	−1.4
8 days–1 month	−5.3	− 2.6	−3.0	− 1.4	−3.8	−2.5	−2.2	−2.0	−1.0	−2.9	−1.4	−1.1	+0.8	− 0.3	− 5.1	−3.2	−4.5	−4.4	−2.7	−3.5	−3.9
1–3 months	−9.3	−10.4	−9.8	− 7.5	−8.0	−9.0	−7.6	−0.5	−0.3	−2.8	+5.0	+3.1	+7.7	+11.8	−11.9	−9.3	−7.7	−3.0	+0.3	+0.8	−2.1
3–6 months	−7.1	− 9.8	−9.5	−10.8	−9.2	−9.3	−7.0	+2.0	−1.6	+0.2	+6.2	+3.0	+7.6	+ 9.6	− 6.4	−5.4	−4.1	−1.9	−2.7	−0.6	+0.2
6–12 months	−1.8	− 4.9	−4.4	− 4.2	−3.0	−0.5	−0.5	+1.3	−1.1	−0.3	+0.8	+0.2	+2.1	+ 3.4	− 0.5	−2.4	−1.6	−0.5	−1.9	−1.8	−1.6
1–3 years	—	− 2.4	−1.6	+ 0.7	+2.5	+2.0	+2.0	−0.2	−0.3	−0.9	+1.0	+1.3	+2.1	+ 2.3	− 0.1	−0.2	−1.0	+1.9	+1.4	+0.7	+1.0
3 years and over	+0.4	+ 0.9	+2.7	+ 2.5	+3.4	+4.5	+4.9	−1.1	−0.5	+1.0	+1.4	+2.3	+2.6	+ 3.0	− 0.1	+1.0	+1.7	+2.7	+3.5	+4.0	+3.2

	Other overseas banks							Consortium banks						
Mid-August	1974	1975	1976	1977	1978	1979	1980	1974	1975	1976	1977	1978	1979	1980
Remaining maturity														
Less than 8 days	−2.9	−4.7	−3.8	−2.9	−0.9	−2.8	−1.9	− 1.2	− 2.6	− 4.4	− 2.4	− 3.5	− 1.0	− 2.0
8 days–1 month	+1.0	−0.3	−0.6	−0.1	−1.5	+0.9	+1.8	−13.7	− 9.9	− 9.8	− 8.5	− 6.0	−10.0	− 8.2
1–3 months	−1.9	−5.0	−4.8	−4.9	−4.1	−1.2	−1.8	−18.4	−17.9	−17.3	−16.0	−16.4	−19.1	−18.2
3–6 months	−3.1	−2.9	−4.5	−0.3	−5.0	−3.5	−4.1	−14.2	−15.2	−16.0	−18.4	−20.2	−17.9	−18.0
6–12 months	−0.7	−3.0	−1.9	−2.0	−0.8	−0.4	−0.6	− 2.2	− 5.6	− 3.6	− 3.7	− 3.3	− 1.2	− 1.0
1–3 years	—	+1.3	+0.7	+2.3	+1.0	+2.5	+2.6	+ 1.2	+ 0.7	+ 1.9	+ 2.8	+ 3.9	+ 4.0	+ 4.3
3 years and over	+1.4	+1.5	+3.0	+2.7	+1.1	+1.9	+3.1	+ 2.2	+ 4.0	+ 4.2	+ 4.0	+ 4.3	+ 5.8	+ 6.3