

## A shift in London's eurodollar market<sup>1</sup>

*London's interbank market went through a sectoral shift in recent years. The rate at which banks channel funds back into the interbank market declined sharply following the introduction of the euro and the subsequent contraction in foreign exchange trading. Surplus dollars from the banking sector have been used to finance non-bank borrowers, primarily in the United States, and may reflect the greater role of the London market in financing securities trading in New York.*

*JEL classification: G150*

London remains the largest depository for US dollars outside the United States. In recent years, however, the eurodollar market in London seems to have undergone a sectoral shift. Specifically, the “interbank recycling ratio” – the proportion of total funds deposited in London's banks which are recycled back into the interbank market – has declined sharply. Banks in London continue to receive deposits from banks abroad, but are directing an increasingly large share of these deposits to non-bank borrowers, particularly in the United States. Moreover, this shift seems to have been rather abrupt. An analysis of the patterns of activity in the London US dollar market suggests that the relative size of interbank lending remained remarkably stable from the late 1970s until at least 1996. A striking contraction in interbank business becomes clear only after 1997.

Although it is difficult to isolate the precise reasons for this move towards non-bank borrowers, it does seem to be consistent with several broader developments in the international banking market. The shift roughly coincides with the introduction of the euro and the subsequent drop in foreign exchange transactions involving the US dollar as a conduit currency. In addition, considerable global consolidation in the banking and financial services sectors in the 1990s is likely to have impacted the flow of funds passing through London. Indeed, the decline in the interbank recycling ratio in London has been accompanied by higher levels of activity between banks located there and non-bank borrowers in the United States. Increased business with US securities firms and other non-bank financial institutions may be a driving factor.

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<sup>1</sup> The views expressed in this article are those of the author and do not necessarily reflect those of the BIS.

The remainder of this paper is organised as follows. The next section discusses the role that London has played in the eurodollar market over the last 25 years, and highlights its growing importance as a global repository for US dollars placed outside the United States. The section which follows investigates the scale of the interbank activity over the period, measured as the share of total funds placed in London that are redeposited in the interbank market. Special attention is given to changes that have emerged in recent years with the introduction of the euro. After this, possible explanations are suggested for the shift towards non-bank borrowers, focusing on the increasing ties between European banks and residents of the United States.

## London at the centre of the eurodollar market

The geopolitical environment during the cold war and the regulation of US domestic banks in the 1960s and 1970s led oil-producing countries to search for a home outside the United States for their US dollar deposits. A long history as a global trade centre, coupled with a loosening of regulations on offshore transactions in the late 1950s, allowed London to emerge as the repository for these dollars.<sup>2</sup> Over the past 30 years, US dollar deposits outside the United States, or “eurodollars”, have grown exponentially, with London remaining at the centre of this market.<sup>3</sup>

This growth in eurodollar deposits has been a function of the greater efficiency of eurobanks relative to banks in the United States. Because eurobanks face fewer regulations than their domestic counterparts (eg reserve requirements), they can operate at lower spreads and hence offer more competitive deposit and loan interest rates.<sup>4</sup> With these lower operating costs, eurobanks have been able to attract deposits that would otherwise be placed in US domestic banks. As a result, the eurodollar market serves as an arena for the global recycling of funds, whereby eurobanks not only manage their own US dollar positions vis-à-vis other currencies, but ultimately place them in the hands of the global borrowers best able to use them.

London remains at the centre of the international banking market ...

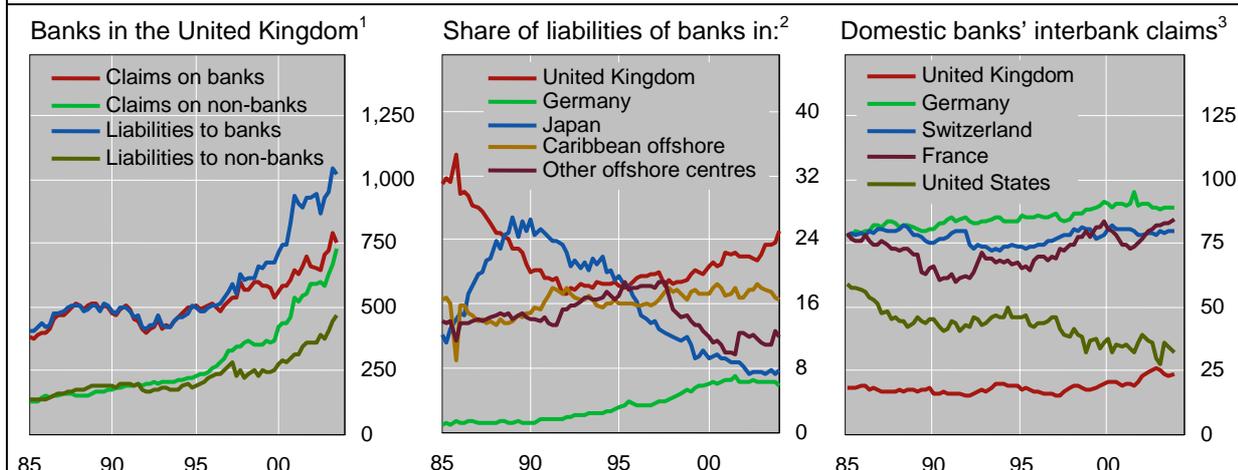
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<sup>2</sup> For a thorough treatment of the development of the eurodollar market, see Mayer (1979), McKinnon (1979), Johnston (1983), Niehans (1984) and Krugman and Obstfeld (1991).

<sup>3</sup> Formally, a eurodollar is a US dollar deposit, typically a 30-, 90- or 180-day time deposit, which is placed in a bank located outside the United States (often called a “eurobank”). Neither the nationality of the bank nor the location (or nationality) of the supplier of funds is relevant. What is relevant is the location of the bank accepting deposits. Thus, a US dollar deposit by a US manufacturing firm in a branch of a US bank in London is considered a eurodollar, while a US dollar deposit by a French company in a German bank in New York is not.

<sup>4</sup> In addition to regulations on reserve requirements, restrictions on dollar lending and borrowing in New York in the 1960s and 1970s contributed to the growth of eurodollar activity. In particular, the Interest Equalization Tax and the Foreign Credit Restraint Program placed limits on loans available to foreigners and US companies investing abroad. In addition, the Federal Reserve’s Regulation Q limited the interest paid on domestic deposits. See Grabbe (1986) for a discussion.

## US dollar international claims and liabilities



<sup>1</sup> In billions of US dollars. <sup>2</sup> The share of US dollar liabilities of selected reporting countries in total US dollar liabilities of all reporting countries excluding the United States; in per cent. <sup>3</sup> Calculated as the share of total claims on banks for each reporting country that is accounted for by banks headquartered in the reporting country; in per cent. For example, German banks' share of Germany's total claims on banks.

Source: BIS.

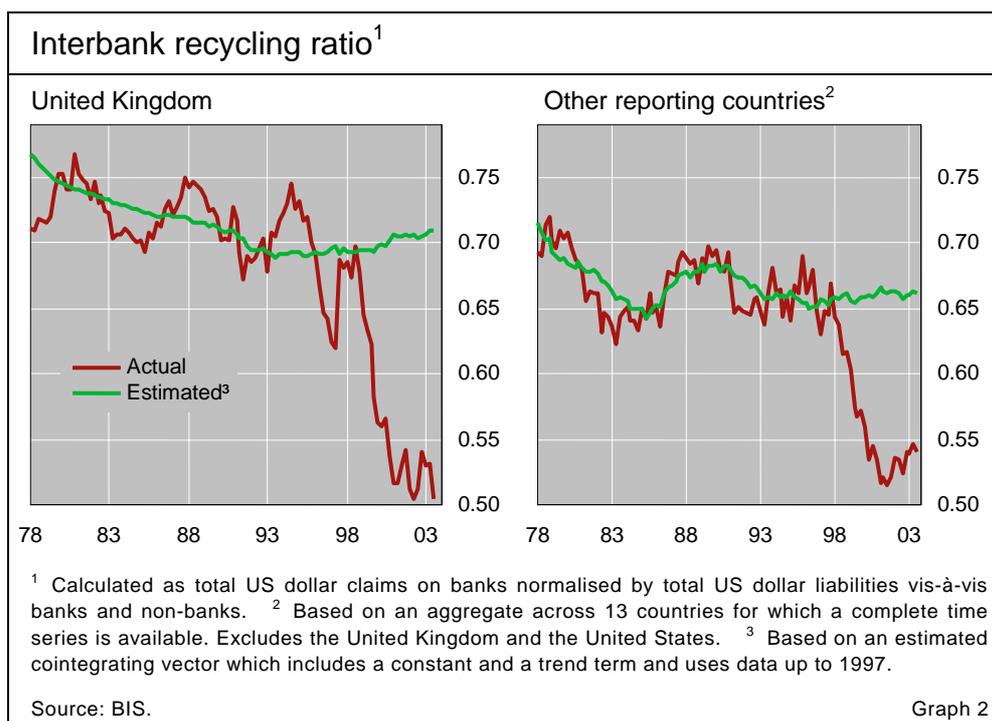
Graph 1

... despite competition from offshore and other financial centres

Despite the enormous expansion in eurodollar banking transactions over the last 30 years, the globalisation of the world's major banks and the rise of competing offshore centres over the last decade, London, if anything, occupies an increasingly important position in the eurodollar market. Since the market's infancy, a significant share of market participants' eurodollar deposits has been concentrated in London. As of the first quarter of 2004, \$1.86 trillion, or 25% of all US dollar liabilities of banks located outside the United States, were placed in banks in London, almost double that of the next largest repository country (the Cayman Islands). This share has been gradually rising over the last few years, from 18% in the third quarter of 1997 (Graph 1, centre panel).

Moreover, London remains the most diverse international banking centre in the world. While roughly 80% of the international interbank claims of banks located in Switzerland and France (and 90% for banks in Germany) are accounted for by domestic banks (ie banks actually headquartered in these countries), the corresponding figure for the United Kingdom is only 20% (Graph 1, right-hand panel). The United States, which has become more diversified over recent years, comes in second at 34%. Consistent with this, cross-border banking activity in the United Kingdom remains the least concentrated in terms of bank nationality relative to all other major international banking centres.<sup>5</sup>

<sup>5</sup> Other measures also indicate that the United Kingdom remains the most diverse international banking centre. For example, Herfindahl indices, which capture the degree of concentration of lending banks in each reporting country, indicate that the United Kingdom is the least concentrated reporting country. In contrast, Germany, where the majority of cross-border claims originate from domestic banks, is one of the most concentrated reporting countries among the developed economies.



## Evidence of a structural shift

Even casual inspection of the data suggests that the flow of US dollars through banks in London has changed in recent years. Looking past short-term fluctuations, the funds recycling activity through the London interbank market should be, on average, roughly proportional to the total funds available to eurobanks located there.<sup>6</sup> This suggests that a long-term average “interbank recycling ratio” could be measured using statistical tools that filter out the considerable short-term fluctuations in interbank activity.<sup>7</sup>

The broad characteristics of the US dollar interbank market in London are summarised in Graph 1. For all banks located in the United Kingdom, the stock of claims on banks abroad (interbank claims), and total liabilities vis-à-vis all sectors abroad, has risen consistently over the last two decades. While the relative size of these stocks remained stable during the 1970s and 1980s, visual inspection suggests that the expansion in lending to non-bank borrowers, as well as the growth in the stock of liabilities to banks, picked up in

<sup>6</sup> Interbank claims have relatively large quarterly swings for at least two reasons. First, short-term misalignments in the demand for and supply of funds to end-use borrowers mean that deposits in eurobanks may be temporarily passed to other banks. Each leg of this chain is reflected in the aggregate claims figure, and generates what appear to be swellings in interbank loan flows. Second, a significant portion of the stock of interbank claims is related to the foreign exchange activities of global banks, in particular their building-up and unwinding of forward positions (McKinnon (1979)).

<sup>7</sup> Cointegration analysis can be used to estimate the long-term equilibrium relationship between economic variables. It is based on the premise that some economic variables, while subject to idiosyncratic shocks, tend to move together in a defined way over time and can be described by a set of parameters which governs the long-term relationship (ie a cointegrating vector). When embedded in a dynamic econometric model (VAR), the cointegrating vector will tend to push the variables towards their long-run relationship.

the early 1990s, with no corresponding pickup in interbank lending from banks in London.<sup>8</sup>

This shift can be seen more clearly after normalising the stock of interbank claims out of London. The ratio of interbank US dollar claims of banks located in London to these banks' total US dollar liabilities (primarily deposits from other banks, corporations and governments) is but one of several possible normalisations, but has the advantage that the resulting ratio is the share of *total* funds available to banks in London that is redeposited in the interbank market, ie an estimate of the recycling ratio.

This ratio is presented in the left-hand panel of Graph 2. From the end of the 1970s to the mid-1990s, between 66 and 75 cents of every dollar placed in London was recycled in the interbank market. Put differently, roughly two dollars flowed to banks (including own-office lending) for every dollar that was lent to non-bank, or end-use, borrowers. The graph also displays the long-term relationship (based on an estimated cointegrating vector) between the size of the interbank market and total liabilities.<sup>9</sup> For the United Kingdom, the long-term average between the late 1970s and the mid-1990s implied that 71 cents of every dollar placed in London was channelled back into the interbank market. Moreover, at no time during this period did the actual ratio deviate from the estimated ratio by more than 8%, suggesting structural regularities.

Sometime in the second half of the 1990s, however, the relationships governing the flow of funds through London seem to have changed. The actual ratio of interbank claims to total liabilities began to fall in the mid-1990s, a trend which accelerated after 1997. By mid-2002, interbank lending had sunk to 50 cents on the dollar, a 25% deviation from the recycling ratio estimated on the assumption that the previous regime continued beyond the mid-1990s.

This phenomenon has not been restricted to London, although it seems to have been less pronounced elsewhere. A similar analysis of 13 other BIS reporting countries indicates that a decline in the relative size of interbank claims has been characteristic of global activity in the eurodollar market. The right-hand panel of Graph 2 plots the ratio of claims on banks to total liabilities for a sample of 13 reporting countries (excluding the United Kingdom and the United States).<sup>10</sup> Analysed together, the data imply that roughly 67 cents of every dollar placed in banks in these countries in the years prior to 1997 was

The interbank redeposit rate remained stable until the mid-1990s ...

... but declined sharply after 1997 in London and elsewhere

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<sup>8</sup> For banks located in the United Kingdom, the average year-over-year growth in US dollar-denominated claims on non-banks between the first quarter of 1979 and the fourth quarter of 1994 was 8.9%, while that of total liabilities of these banks was 8.4%. Between the first quarter of 1995 and the third quarter of 2003, these rates increased to 13.6% and 9.2%, respectively. The growth in claims on banks actually fell from 8.8% on average prior to 1995 to 5.2% more recently.

<sup>9</sup> The parameters of the cointegrating vector were estimated using data up to 1997.

<sup>10</sup> Only reporting countries for which a complete time series is available are used in this exercise. The 13 countries in the sample are Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, Sweden and Switzerland. The United States was not included here because its domestic currency is the US dollar.

redeposited in the interbank market.<sup>11</sup> This is a smaller share than that reported for the same period in the United Kingdom, and reflects London's unique position at the centre of the eurodollar market. However, similar to changes in the level of activity in the London interbank market, the recycling ratio for these 13 countries fell dramatically in the second half of the 1990s and eventually ended up over 20% away from the long-term relationship of the 1970s and 1980s.

## Explaining the change

This decline in the interbank recycling ratio in London might be explained by structural changes observable over the second half of the 1990s. The first of these was a fall-off in foreign exchange trading in the late 1990s which reflected the introduction of the euro, consolidation in the corporate sector, and the growing role of electronic broking in foreign exchange markets. The second trend relates to banks' increased ties with non-bank financial firms, such as hedge funds and securities houses, which evolved concurrently with the consolidation in the banking industry over the 1990s. Claims out of the United Kingdom have increasingly gravitated towards non-bank borrowers, particularly those in the United States.

### *Foreign exchange trading and the interbank market*

The timing of the decline in the interbank recycling rate roughly coincides with the introduction of the euro. This is likely to have contributed to a decline in the *volume* of foreign exchange-related transactions in the interbank market and in turn the recycling rate for dollar deposits. This relationship reflected the fact that throughout the 1970s and 1980s, almost all trading of convertible currencies used the US dollar as a conduit currency.<sup>12</sup> Moreover, banks located in London have generally been the dominant players in the foreign exchange market.

The consolidation of 11 European currencies into one led to reduced foreign exchange business, which shows up in the BIS data as relatively lower eurodollar interbank activity. This occurs because of the intimate link between the foreign exchange market and the interbank market. Forward contracts are priced on the basis of interest differentials in the interbank market and are almost always hedged with deposits in that market. For example, a bank in Berlin might borrow US dollars in London from another bank, convert these into yen in the spot market, and lend the yen for three months to another bank or a non-bank customer. Meanwhile, the bank will cover the exchange risk by selling the yen three months forward for dollars. In three months, the yen loan is repaid and the funds are immediately exchanged for dollars at the rate

The interbank market is intimately linked to the foreign exchange market

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<sup>11</sup> While this aggregation certainly masks considerable cross-country heterogeneity, it is clear from inspection of individual reporting country data that the recycling ratio fell in most major banking systems in the second half of the 1990s.

<sup>12</sup> The Deutsche mark was also used as a conduit currency within the countries that later came to form the euro area.

specified in the forward contract. The original interbank loan, as well as the repayment, appears in the BIS international banking data as US dollar-denominated interbank activity. The forward contract, by contrast, is not captured.

The advent of the euro led to a drop in forex trading ...

Data from recent BIS triennial central bank surveys on foreign exchange and derivatives market activity show a relatively sharp drop in foreign exchange activity after the introduction of the euro.<sup>13</sup> Overall, global foreign exchange turnover declined from a daily average of \$1.49 trillion in 1998 to \$1.2 trillion in 2001. US dollar business in particular shrank from \$1.25 trillion to \$1.06 trillion between 1998 and 2001, a reduction of 15% (Table 1). This reflected a fall-off in activity with regard to most of the major currencies. Moreover, the sum of US dollar foreign exchange activity in the United Kingdom which involved the legacy currencies averaged \$281 billion per day in April 1998, or half of all foreign exchange business in the United Kingdom. However, these transactions declined after the introduction of the euro, with the

US dollar foreign exchange turnover by currency pair <sup>1</sup>												
Currency pair	All reporting countries <sup>2</sup>						United Kingdom <sup>3</sup>					
	1995		1998		2001		1995		1998		2001	
	Amt <sup>4</sup>	Share <sup>5</sup>	Amt <sup>4</sup>	Share <sup>5</sup>	Amt <sup>4</sup>	Share <sup>5</sup>	Amt <sup>4</sup>	Share <sup>5</sup>	Amt <sup>4</sup>	Share <sup>5</sup>	Amt <sup>4</sup>	Share <sup>5</sup>
US dollar/euro	.	.	.	.	354	33	.	.	.	.	170	37
US dollar/legacy currencies	427	45	537	43	.	.	193	50	281	50	.	.
Of which:												
US dollar/Deutsche mark	254	27	290	23	.	.	100	26	138	25	.	.
US dollar/French franc	51	5	58	5	.	.	25	6	29	5	.	.
US dollar/ECU	18	2	17	1	.	.	15	4	13	2	.	.
US dollar/other EMS	104	11	172	14	.	.	53	14	101	18	.	.
US dollar/other currencies <sup>6</sup>	520	55	711	57	706	67	195	50	277	50	291	63
Total	947	100	1,248	100	1,060	100	388	100	558	100	461	100

<sup>1</sup> Daily averages in April of each year, adjusted for local and cross-border double-counting. <sup>2</sup> Net of local and cross-border inter-dealer double-counting. <sup>3</sup> Net of local double-counting. <sup>4</sup> Amount, in billions of US dollars. <sup>5</sup> In per cent. <sup>6</sup> Includes the total of yen, sterling, Swiss franc, Canadian dollar, Australian dollar and other currency exchanges with the US dollar.

Source: BIS (1999, 2002). Table 1

<sup>13</sup> See the BIS publications on the triennial central bank surveys of May 1996, May 1999 and March 2002 and Galati (2001) for details. The surveys were conducted by central banks and monetary authorities in April 1995, April 1998 and April 2001. They collected data on (monthly) turnover in traditional foreign exchange markets – spot, outright forwards and foreign exchange swaps – and in over-the-counter currency, interest rate, equity, commodity, credit and other derivatives.

US dollar foreign exchange turnover by counterparty <sup>1</sup>						
Daily averages in April, in billions of US dollars						
	1995		1998		2001	
	Amount	% share	Amount	% share	Amount	% share
With reporting dealers	610	64	806	64	637	60
With other financial institutions	197	21	245	19	298	28
With non-financial customers	140	15	197	17	125	12
Total	947	100	1,248	100	1,060	100

<sup>1</sup> Adjusted for local and cross-border double-counting. Excludes estimated gaps in reporting.

Source: BIS (1996, 1999, 2002).

Table 2

daily average falling by April 2001 to \$170 billion, roughly one third of all activity in London.<sup>14</sup>

In addition, changes in the *distribution* of counterparties in foreign exchange transactions, as indicated by the triennial surveys, are suggestive of a growing link between non-bank financial institutions and large commercial banks (Table 2). In 1998, 64% of the average daily turnover in foreign exchange transactions involving the US dollar was with other dealers, including many of the global banks covered in the BIS international banking statistics. In contrast, only 19% of these transactions had non-bank financial institutions as counterparties. By 2001, transactions with these counterparties had risen in absolute as well as percentage terms, to 28% of all activity, while transactions between dealers had fallen to 60%. Galati (2001) cites the growing reliance on electronic broking in the foreign exchange market, as well as consolidation in the banking sector, as reasons for the fall in inter-dealer transactions and, by extension, the rise in the share of transactions with non-bank financials.

... and changes in the distribution of counterparties

#### *Financing of securities trading*

The decline in foreign exchange activity, while significant, cannot completely account for the relative contraction in interbank lending out of London. In particular, a fall in US dollar-related foreign exchange business should presumably have similar implications for both the asset and liability side of bank balance sheets. Yet the BIS data indicate that, even as the growth in interbank claims *from* banks in London has slowed in recent years, banks located around the world have continued to deposit US dollars *in* banks in London. This suggests a deeper structural change in the intermediation activities of banks.

A move towards a "hub and spoke" banking structure ...

Market participants often refer to the emergence (over the last decade) of a "hub and spoke" banking structure. Increasingly, large commercial banks are

<sup>14</sup> In 1995, outright forwards involving the US dollar and the legacy currencies accounted for 43% of total US dollar turnover in outright forwards (38% in 1998). By 2001, the corresponding share for the euro had fallen to 36%.

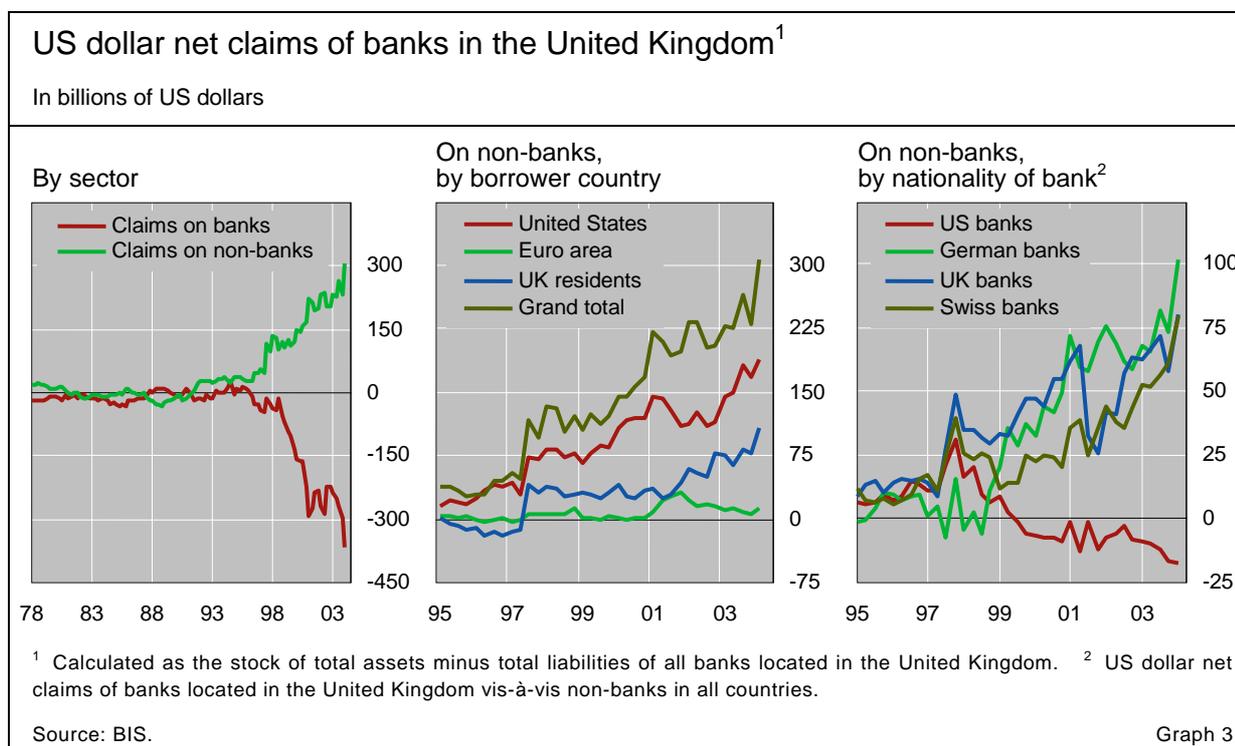
concentrating their international operations in a single location, typically a major financial centre like London. In the most generic structure, branches of these banks located around the world serve as a means of collecting deposits, which are then funnelled to the global “hub”, thus inflating the stock of claims (reported in the BIS data) on banks located there. These funds are then redistributed from this central location to both banks and, increasingly, non-banks (often financial institutions) around the world.

... has contributed to sectoral shifts in the London interbank market

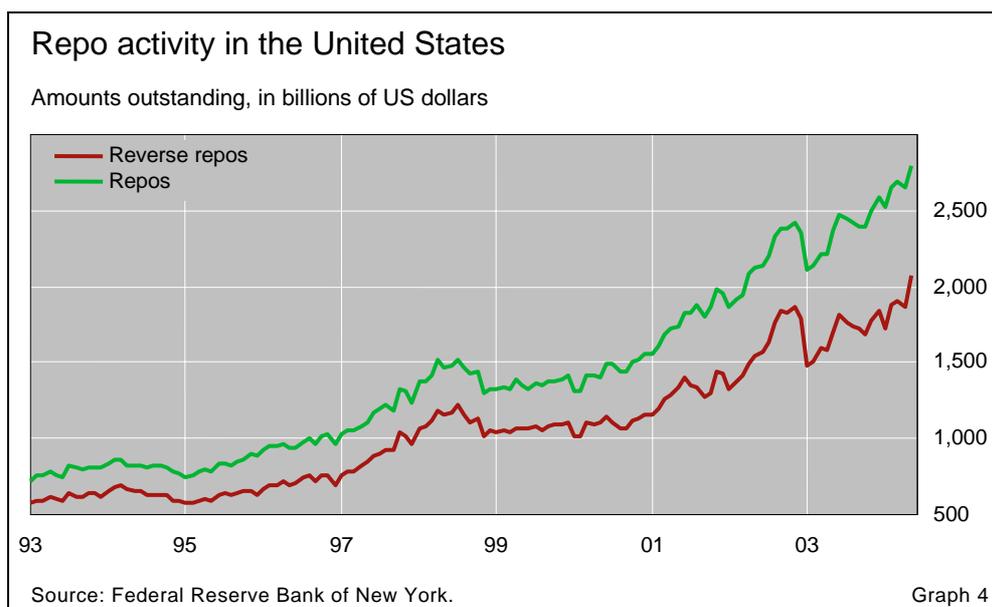
Such a shift is clearly evident in London. Relative to the early years in the eurodollar market, more and more of the dollars placed in London by banks around the world are being lent to non-bank borrowers (Graph 3, left-hand panel). Total US dollar liabilities of banks in the United Kingdom to banks totalled \$1.3 trillion in the first quarter of 2004, more than double the level at end-1997. Interbank *lending*, by contrast, did not keep pace with the growth in liabilities, rising by less than 60% over this same period.<sup>15</sup> Combined, this generated a \$368 billion net stock of dollars which has not been redeposited in the interbank market.

Increased lending to borrowers in the United States ...

These excess dollars have been used to finance US dollar borrowing by non-banks, primarily in the United States (Graph 3, left-hand panel). Overall, the net stock of claims on non-bank borrowers reached \$307 billion in the first quarter of 2004, up from \$97 billion at end-1997. Almost two thirds of these funds flowed to borrowers in the United States (Graph 3, centre panel). Much



<sup>15</sup> The net stock of liabilities vis-à-vis banks in the United States increased by \$122 billion, while the net stock vis-à-vis banks in offshore centres increased by \$40 billion, in Japan by \$22 billion, in the euro area by \$23.5 billion and in developing countries by \$40 billion.



of the remainder (\$82 billion) flowed to non-bank residents in the United Kingdom.<sup>16</sup>

Identifying the non-bank borrowers in the United States is more difficult, but the trends in global banking in the 1990s point to securities houses, hedge funds and other non-bank financials which have relied on banks in London to leverage their capital in taking positions in fixed income securities. The BIS data indicate that the London offices of UK, German and Swiss banks have mostly been responsible for the rise in the United Kingdom's net stock of US dollar claims on this sector globally (Graph 3, right-hand panel). Over this same period, a number of major banks headquartered in these countries shifted some or all of their global operations to London. In addition, much of the consolidation in the financial services sector which took place in the 1990s involved banks headquartered in these European countries and non-bank financial institutions, some of which were located in the United States.<sup>17</sup>

... may reflect strengthened ties with non-bank financials

The strengthened ties between banks and securities dealers may have facilitated the increased use of repurchase agreements, or "repos", a primary instrument by which dealers in fixed income securities markets finance their positions. Concurrent with the shifts described above, outstanding repos recorded in the United States, which include agreements with both domestic and foreign counterparties, grew from roughly \$1 trillion in 1997 to over \$2.5 trillion at end-2003 (Graph 4).

<sup>16</sup> In recent years, UK-owned banks and building societies have tapped foreign currency wholesale markets to fund domestic lending (Speight and Parkinson (2003)).

<sup>17</sup> To name but a few, Deutsche Bank acquired Morgan Grenfell Group in the United Kingdom in 1989, Bankers Trust in the United States in 1999, and Scudder Investments, a US asset management firm, in 2002. UBS/SBC acquired SG Warburg plc in London in 1995. In 1997, it acquired Dillon, Read & Co, an investment bank in New York, and later merged with PaineWebber (in 2001). Credit Suisse increased its holdings in First Boston in 1990, and then reorganised into CSFB in 1996-97. Barclays created an investment banking operation in 1986, which subsequently developed into Barclays Capital. In 1995 Barclays purchased the fund manager Wells Fargo Nikko Investment Advisors, which was integrated with BZW Investment Management to form Barclays Global Investors.

## Conclusion

Eurodollar deposits are increasingly concentrated in London. While the overall structure of the London interbank market remained stable for much of the period of eurodollar growth, the long-term relationships governing the flow of funds through banks in London appear to have changed recently. Whereas 75 cents of every dollar deposited in London was returned to the interbank market until the mid-1990s, this redeposit rate has dropped to just above 50 cents on the dollar in recent years.

Changes in banks' business, as well as the fall in US dollar foreign exchange activity related to the introduction of the euro, have apparently been factors behind this decline. Banks in London continue to receive US dollar deposits from banks abroad, but are directing increasingly large portions of these deposits to non-bank borrowers, primarily in the United States. Reduced interbank dealing in the currency markets, a broadening of the menu of services offered by major commercial banks, and the financing of securities houses, particularly in the United States, have coincided with the shift towards non-bank borrowers.

## References

Bank for International Settlements (1996): *Triennial central bank survey of foreign exchange and derivatives market activity*, May.

——— (1999): *Triennial central bank survey of foreign exchange and derivatives market activity*, May.

——— (2002): *Triennial central bank survey of foreign exchange and derivatives market activity*, March.

Galati, G (2001): "Why has global FX turnover declined? Explaining the 2001 triennial survey", *BIS Quarterly Review*, December.

Grabbe, O (1986): *International financial markets*, Elsevier Science Publishing Co Inc, New York.

Johnston, R B (1983): *The economics of the euromarket: history, theory and practice*, Macmillan, New York.

Krugman, P and M Obstfeld (1991): *International economics, theory and policy*, second edition, HarperCollins Publishers Inc.

Mayer, H (1979): "Credit and liquidity creation in the international banking sector", *BIS Economic Papers*, no 1.

McKinnon, R (1979): *Money in international exchange, the convertible currency system*, Oxford University Press, New York, Oxford.

Niehans, J (1984): *International monetary economics*, the Johns Hopkins University Press, Baltimore, Maryland.

Speight, G and S Parkinson (2003): "Large UK-owned banks' funding patterns: recent changes and implications", *Bank of England Financial Stability Review*, December.