Global liquidity in the 1990s: geographical allocation and long-run determinants

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1. Introduction and main conclusions

One of the most significant aspects of financial globalisation has been the extremely rapid expansion of international liquidity. The enormous increase in liquid assets available to international market participants is worrisome for several reasons: it erodes central banks' ability to exercise monetary control; it triggers potential inflationary pressures that could easily be triggered if expectations change; finally, it facilitates the opening of speculative positions and may cause the quality of credit to decline. These last two channels can create instability in the financial and real markets.

Other studies conducted by the Bank of Italy's Research Department have analysed this phenomenon,[2] focusing on the multiplication process of cross-border deposits to evaluate its stability, the implications for monetary control by central banks and the risk of inflation. The analyses found that the international multiplier is broadly stable for cross-border deposits, which make up a small share of the money available to households and firms. They therefore pose a limited threat to the stability of prices through the traditional channel whereby excess money leads to inflation. Alongside this relatively reassuring conclusion, however, the studies revealed important risks in two other areas.

First, in industrial nations there was evidence of a very rapid expansion in other types of financial assets held by households, especially bonds: the gross financial assets of the G6 doubled as a proportion of GDP between 1980 and 1994. Most of these assets could easily be sold and therefore represent an enormous reserve of potential liquidity that could fuel inflationary pressures through channels other than the traditional one linking prices only, or primarily, to the money supply. Second, the analyses reported evidence for the potential risks of the growth of cross-border interbank deposits: neglected by standard monetary analysis, these deposits have not only expanded very rapidly but unlike household deposits they have reached very high levels in relation to the corresponding measure of national liquidity. Cross-border interbank deposits are therefore a potential cause of financial instability both because they can fuel speculative bubbles (an all too real possibility considering current levels of share and bond prices) and because they can play an important role in the international transmission of financial turbulence, as recent crises suggest.

This paper continues the research on international liquidity, aiming to improve understanding of the latter by analysing cross-border financial flows differentiated by origin and destination. The approach is also a first step towards constructing a framework for international analysis that extends the analysis of the flow of funds within each financial system to the global level.

The examination of international liquidity by origin and destination is carried out in two stages, which correspond to the two parts of this paper. The first part studies flows between large geographical areas in order to better understand the role that cross-border flows have played in the international allocation of financial resources and, more recently, in the transmission of turbulence. We have devoted particular attention to Japan (where strong monetary expansion is said to have primarily translated into

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[1] This paper draws heavily on *Liquidità internazionale: distribuzione geografica e determinanti di fondo*, by F Fornari, A Levy and C Monticelli, preparatory paper for Bank of Italy's 1998 Annual Report, April 1999, mimeo. The authors wish to thank the participants at the Autumn Meeting of Central Bank Economists, held at the BIS in Basel on 25-26 October 1999, for their comments; the editorial assistance of Bianca Bucci and Giovanna Poggi is gratefully acknowledged.

[2] The literature on international liquidity dates back to the early 1970s; see, for instance, Fratianni and Savona (1972).

capital outflows rather than domestic demand) and to the offshore banking centres and their role as international intermediaries, especially towards the emerging economies. The singularity of recent episodes of financial instability has also prompted us to adopt a more cyclical viewpoint, focusing on the phases of the preparation, explosion and re-absorption of the Asian and Russian crises.

The second part of this analysis utilises a higher degree of geographical differentiation and studies the flows to and from each of the G6 countries in order to understand fully the structural factors that determine the allocation of funds in any given country. Using a longer time horizon makes it possible to conduct econometric analysis to uncover the factors underlying the holdings of cross-border deposits.

The main conclusions are as follows:

- In the period between 1991 and 1994, which was characterised by the stagnation of cross-border interbank flows in conjunction with the economic slowdown in the industrial countries, a total of $170 billion flowed out of Japan towards other industrial nations and Asian offshore banking centres. The latter played a major role in intermediating flows at the international level, borrowing funds from Japan and redirecting them to other industrial countries and the emerging economies.
- In the period between 1995 and 1997, global interbank activity expanded rapidly, characterised once again by net outflows from Japan. During this period, however, the banking system of the industrial countries (excluding Japan) played the role of intermediary in the reallocation of flows, having made loans to offshore centres that were nearly equal to fund-raising from Japan ($50 billion). The flows to emerging economies were enormous: $150 billion to banks and $130 billion to non-bank agents. Large capital flows (around $100 billion) were recorded in favour of non-bank agents located in offshore centres, among which some non-bank financial intermediaries such as hedge funds are also probably included.
- Following the outbreak of the Asian crisis in the first half of 1998, there was a generalised contraction in banks' gross international exposure; the year as a whole witnessed sizeable net capital outflows from offshore centres towards banks located in Japan and other OECD countries (around $190 billion) and a sharp reduction in loans to both banks ($53 billion) and non-bank borrowers (around $30 billion) in the emerging economies.
- An analysis of flows broken down by the nationality of the intermediaries' parent company, rather than by the country of location, shows that flows between parent companies and the foreign branches of Japanese banks represent a considerable share of international flows, suggesting that the evolution of the Japanese banking system is a key factor in analysing cross-border flows.
- Preliminary econometric estimates aimed at identifying the structural determinants of the international movement of bank capital - conducted for a longer time series (1985 to 1998) and using a more detailed geographical breakdown of flows – suggest that financial variables (such as the ratio of stock market capitalisation to GDP) have a greater explanatory power than more traditional macroeconomic variables (output, international trade, interest rate differentials). However, the group of significant variables differs from country to country and also depends on the criterion chosen for geographical disaggregation (that is, the depositor's residence or the intermediary's location). This suggests that other determinants that are specific to the country and to the nature of the cross-border relationship (with other banks or other subjects) can also be significant.

2. Flows of bank capital between large economic areas

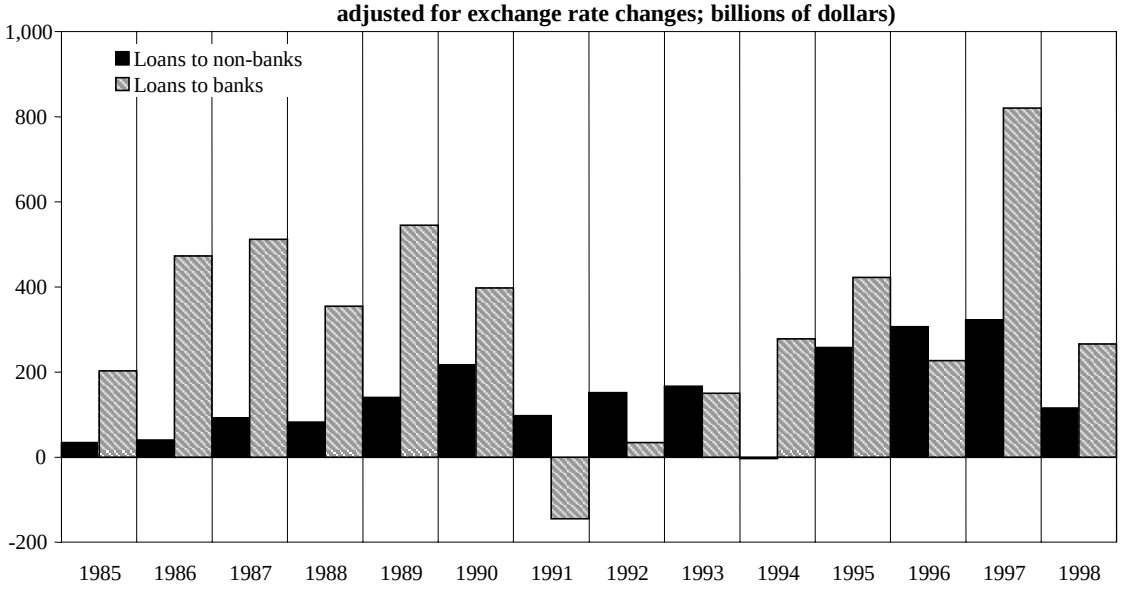
In this section we first identify the principal cycles that have characterised developments in the international banking sector in the 1990s. We then examine bank capital flows between the world's large economic areas, paying special attention to the hypothesis that between 1995 and 1997 the Japanese banking system furnished liquidity to the international banking system, which in turn reinvested these funds in the emerging market economies. The sudden unwinding of these positions

(de-leveraging) in 1998 seems to have amplified and propagated the effects of the international financial crisis.

2.1 International banking activity in the 1990s: cycles and underlying factors

After growing at exceptional rates in the second half of the 1980s (between 1984 and 1989 the stock of cross-border interbank assets grew on average by more than 20% annually and that with respect to non-banks rose at a 15% rate), stocks of loans to non-residents increased more slowly in the 1990s, rising at an annual rate of slightly less than 6% for banks and over 10% for non-banks. As shown in Chart 1 (the shaded histograms represent the change in gross lending to non-resident banks, the light histograms that to non-banks), after the high volumes observed in the second half of the 1980s, in the 1990s bank lending to non-residents decreased. An exception to this trend was 1997, when unprecedented flows were recorded. In the period considered, the flow of interbank loans was on average larger and showed greater volatility than lending to non-banks.

Chart 1: International lending activity
(annual changes in cross-border claims of reporting banks adjusted for exchange rate changes; billions of dollars)



Source: BIS, *International Banking and Financial Market Developments.*

Chart 1 enables us to identify three different sub-periods in this decade: 1991 to 1994, distinguished by a pronounced stagnation in activity; 1995 to 1997, characterised by rapid expansion; and 1998, when activity again stagnated owing to the international financial crisis.

2.1.1 From stagnation to strong expansion: 1991–94 and 1995–97

The stagnation recorded between 1991 and 1994 is attributable to a variety of factors (see BIS (1995)): the cyclical weakness of the world economy, which not only had direct effects but also was accompanied by a deterioration of the credit standing of many banking groups and, in some countries, by a large fall in prices of securities and real estate; and the contraction of international activity by Japanese banks, which is also linked to the collapse of Japan's financial and real estate sectors at the end of the 1980s.

The decline in international banking activity in the early 1990s was mitigated by two opposing phenomena: first, the 1992–93 currency crisis in Europe triggered a massive recourse to bank financing both by investors who were betting on the depreciation of the currencies under attack, and by other market participants who sought to insure themselves against this eventuality by hedging

against exchange rate risk; second, increased demand for bank funds was also created by the rise in international repurchase transactions, linked to the growth in global demand for government bonds.

By contrast, between 1995 and 1997 international banking activity expanded rapidly. It was driven by Japan's robust monetary expansion, aimed at countering the slowdown in its economy and the difficulties in its banking system, and more generally by favourable international economic conditions (see Giannini and Monticelli (1997); Tristani (1998)). As shown in Chart 1, banking activity was especially strong in 1997, with unprecedented growth in interbank lending (more than $800 billion) and lending to non-banks (over $300 billion). This enormous increase (some $400 billion was lent in the fourth quarter alone) was the product of two factors in particular: (i) loans granted by the parent companies of Japanese banks to their foreign branch offices (over $80 billion in the fourth quarter), made necessary owing to the funding difficulties of the latter (induced by the deterioration in their creditworthiness) and aided by the abundance of liquidity in Japan; (ii) the explosion of the Asian crisis, which generated large transfers of interbank funds between geographical areas to accommodate changes in portfolio composition and triggered a "flight to quality" that translated into a greater preference for liquidity.

An important phenomenon that characterised international banking activity in the period between 1995 and 1997, and which was prolonged and accentuated with the crisis of 1998, is the trend of banks in the industrial countries to employ a growing share of their external assets in the form of securities rather than traditional loans to customers: as can be seen in Table 1, between the end of 1995 (when the BIS began collecting data) and mid-1998, securities increased from 28% to 35% of the total stock of assets, and from 46% to almost 70% of flows.[3]

Table 1
Securitisation of external assets of reporting banks (vis-à-vis non-bank sector) (percentage share of securities in total assets)

	Stocks	Flows
1995	27.8	
1996	29.9	46.4
1997	32.5	46.1
1998*	34.7	68.1

* At end-June.

Source: BIS, International Banking Statistics.

2.1.2 The 1998 financial crisis

Beginning in the summer of 1997, the international financial markets were hit by successive waves of turbulence. In August 1998, what had appeared to be a regional crisis worsened and spread, becoming a global crisis that hit economies – principally exporters of raw materials – with characteristics and problems that were very different from those of the Asian countries. The Russian crisis, with the debt moratorium, had a sharp impact on other emerging economies through contagion effects, linked to fears of additional moratoriums on foreign debt servicing.

The sudden and violent fluctuations in the prices of financial assets (exchange rates, bond and share prices in emerging economies and industrial countries) recorded in the period signalled massive movements of international bank and non-bank capital that had few precedents in terms of the volumes traded, the range of financial instruments used and the countries involved.

[3] This trend has already been observed for a considerable period of time in domestic banking in many industrial nations, but it is a relatively recent phenomenon in international banking and it could have negative side effects, such as: (i) an increase in the instability of financial markets, since the stabilising role played by banks, whose "customer relations" make them less inclined to follow behaviour dictated by panic, will have diminished importance; (ii) a reduction in the effectiveness of monetary policy, owing to the weakening of the traditional channels through which it operates.

During the first phase of the crisis, capital flowed out of the crisis-stricken Asian economies towards the industrial countries (the three largest benefited in virtually equal measure), but also towards Latin America and eastern Europe. One indication of this was the sharp rise in stock and bond prices in the OECD countries, in the presence of broadly stable exchange rates.

With the intensification and the spread of the crisis in August 1998, financial asset prices reflected a generalised outflow of capital from the emerging economies, this time including Latin America and eastern Europe, as well as the industrial countries that export raw materials (Norway, Australia, etc.), towards the industrial countries, with borrowers with the highest credit standing benefiting most (flight to quality). In this second phase of the crisis, the relative stability of exchange rates among the three large industrialised areas (the slight depreciation of the dollar mainly reflected changing expectations for US monetary policy) suggest that the capital flows were divided fairly equally between them.

It is widely believed that the closing-out of international arbitrage positions that were taken in the preceding three-year period played an important role in the 1998 financial crisis. After international investors (typically hedge funds, see Eichengreen and Mathieson (1998)) made large profits by raising funds in yen and reinvesting in emerging markets between 1995 and 1997, the sudden unwinding of these positions in 1998 appeared to have contributed to the amplification and propagation of the crisis (see BIS (1999); IMF (1998)). There is ample empirical evidence on this phenomenon, although precise estimates of the volumes of funds involved are not available. This is partly because investors could borrow yen not only on the spot market (e.g. on the interbank market, for which data are available; see next section), but also with forward instruments and derivatives (for example, forward exchange rates, futures, swaps and options), for which equally complete data sets are not available (see Garber (1998)).

Below, this hypothesis will be tested utilising data on bank capital flows, paying particular attention to the role of Japanese and offshore centre banks (which are respectively the principal "creators" and "reallocators" of international liquidity) and to non-bank agents located in offshore centres, which presumably include some hedge funds and other non-bank financial intermediaries.

2.2 Bank capital flows between large areas

BIS statistics on international banking activity make it possible to track the movements of bank capital between the main geographical areas in recent years. It is important to note that the data on bank assets and liabilities are available with greater detail only for the 24 reporting countries. For the rest of the world, especially the emerging economies, information is only available to the extent that these countries have relations with banks in the reporting countries; hence data on bank relations between emerging economies are not included (for example, there are no data on the large movements of bank capital which reportedly took place between banks in Korea and Thailand at the beginning of the Asian crisis).

Charts 2 and 3 offer an overview of gross capital flows (adjusted by the BIS for exchange rate changes) initiated by banks located in a number of countries and geographical areas. The arrows indicate the direction of flows, i.e. of changes in gross assets of a country or an area with respect to the counterpart (in the case of interbank flows the arrows can also be read, in the opposite direction, as changes in liabilities). Where appropriate, the figures inside the squares show capital flows within the economic area considered (for example, between OECD countries or between offshore countries). By construction, if one added up all flows reported in Charts 2 and 3 (between areas and intra-area), one would obtain the totals given in Chart 1. The periods considered correspond to the three above mentioned cycles: 1991–94; 1995–97 and 1998. The last is divided into two sub-periods (first half and third quarter), owing to the different nature of the two phases of the crisis.

Chart 2a

Flows of interbank loans (adjusted for exchange rate changes)

(changes in gross assets and, in brackets, net assets; billions of dollars)

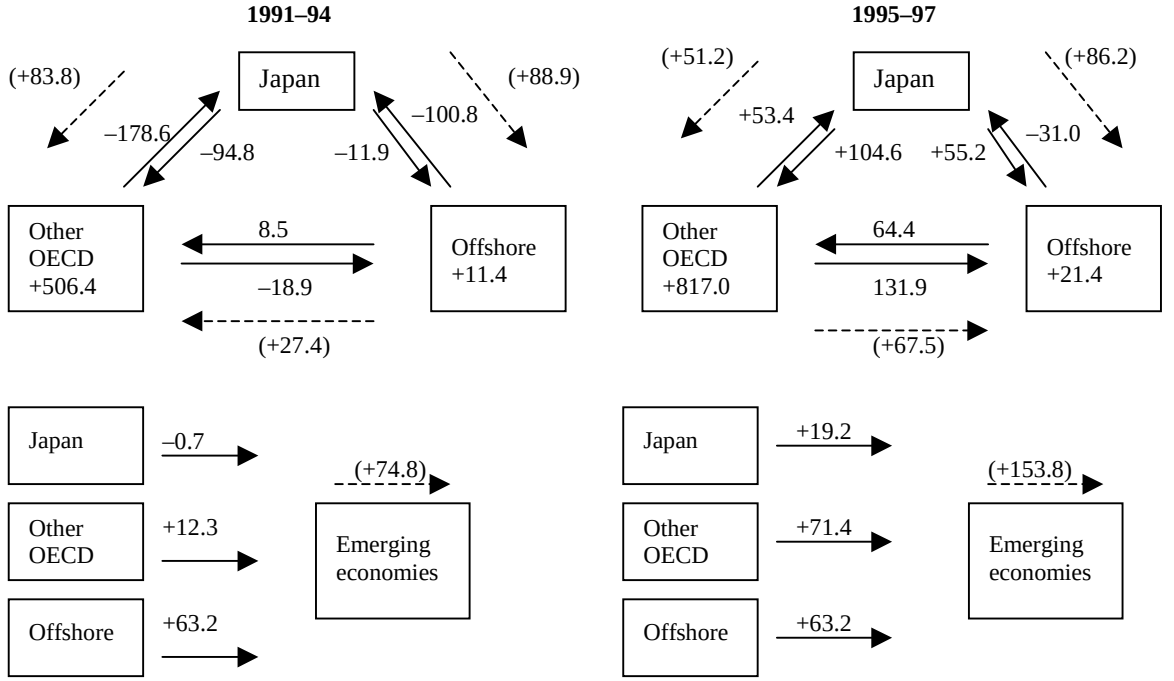
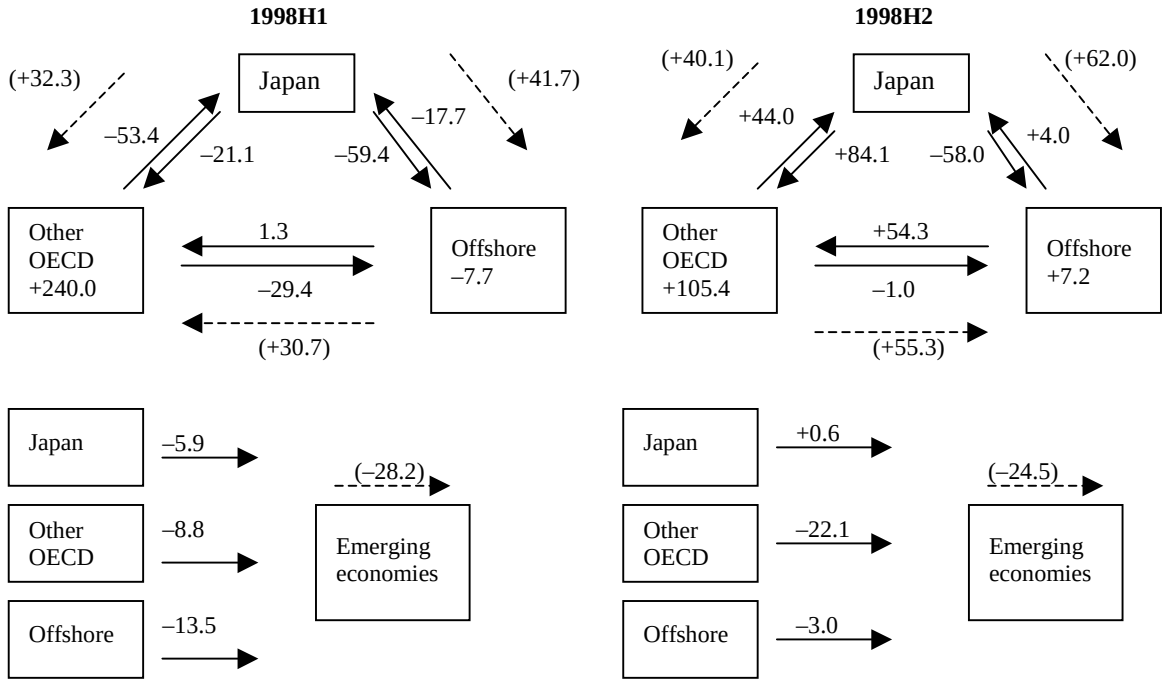


Chart 2b

Flows of interbank loans (adjusted for exchange rate changes)

(changes in gross assets and, in brackets, net assets; billions of dollars)



Source: BIS.

Chart 3a

Flows of bank loans to non-bank sector

(changes in gross assets adjusted for exchange rate changes; billions of dollars)

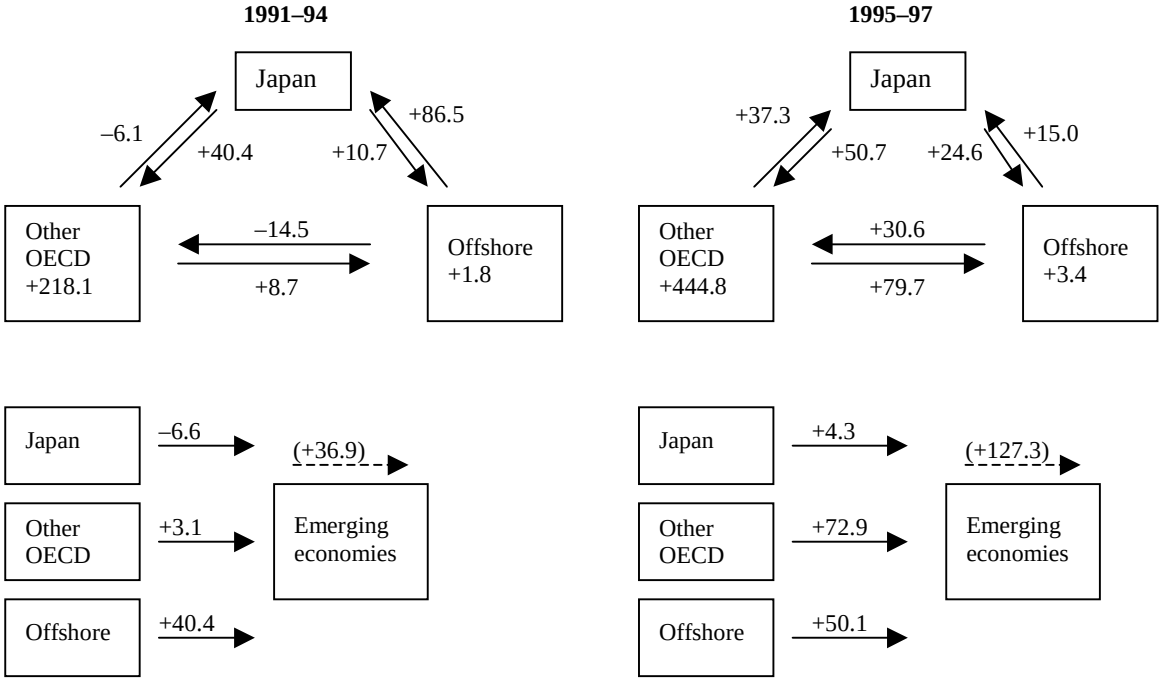
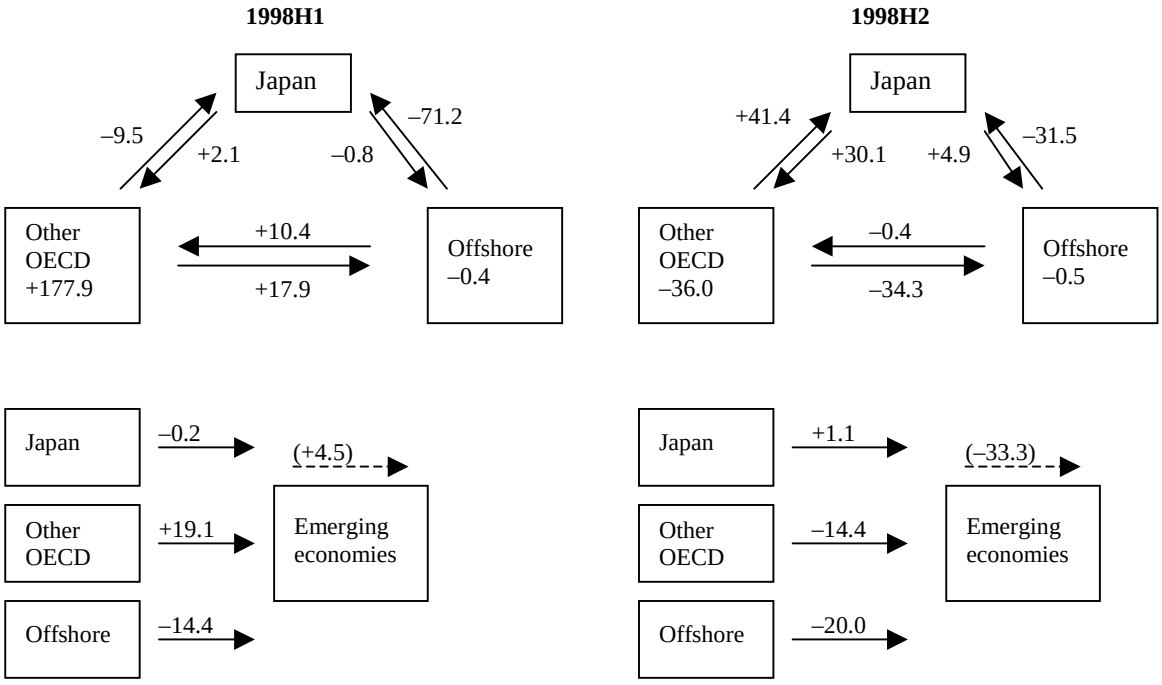


Chart 3b

Flows of bank loans to non-bank sector

(changes in gross assets adjusted for exchange rate changes; billions of dollars)



Source: BIS.

The top part of the charts refers to the reporting area only, indicating movements *between* reporting countries or areas (whose amount is given by the figures next to the arrows) and *within* reporting areas (figures inside the squares):

- Japan;
- other reporting industrial countries (henceforth "other OECD"): the United States, Canada, EU members (excluding Portugal and Greece), Switzerland and Norway;
- offshore centres: Hong Kong, Singapore, the Cayman Islands, the Bahamas and other minor centres.

The lower part of the charts describes the relations between the reporting area and a group of non-reporting countries labelled as "emerging economies": these include all Asia (excluding Japan, Hong Kong and Singapore), Latin America and central and eastern Europe.

2.2.1 Interbank capital movements

With reference to interbank flows (see Charts 2a and 2b), in the years 1991 to 1994 inside the reporting area there was a generalised withdrawal of funds between the three areas considered (close to $400 billion), in part owing to the retrenchment of cross-border activity by the banks operating in Japan. The latter reduced their gross lending to the rest of the OECD area by nearly $100 billion and their gross borrowing by around $180 billion, and reduced their liabilities to offshore centres by more than $100 billion. Reflecting the excess of saving over domestic investment, in the same period net capital outflows from Japan amounted to around $170 billion (i.e. resident banks' net external creditor position increased by this amount). As to capital movements with countries outside the reporting area, i.e. with banks in the emerging economies, there was a substantial flow of funds towards the latter ($75 billion) effected almost entirely by the offshore centres. At the global level, during the period in question banks in the offshore centres acted as international "reallocators" of funds; they were net borrowers from Japan in the order of $90 billion and net lenders of a virtually identical amount to the OECD area ($27 billion) and the emerging economies ($63 billion).

In the three years 1995–97, characterised by strong growth in international banking activity, inside the reporting area more than $400 billion of gross loans were granted across the three blocs. Japanese banks granted new gross loans in large amounts to the rest of the OECD area ($105 billion) and to offshore centres ($55 billion);[4] the net capital outflow from Japan was also large ($137 billion), although slightly lower than that recorded in the previous period. Within the reporting area a reallocative function was performed by the banks of the OECD area, which effected net funding in Japan ($50 billion) and net lending to the offshore centres ($65 billion). This development, in some respects surprising, seems to imply an assumption of risk by OECD area banks resulting from a maturity and/or currency transformation in intermediation between the other two areas.[5]

As to business with countries outside the reporting area, in 1995–97 the reporting countries (mainly the OECD countries and the offshore centres, in nearly equal measure) transferred some $150 billion to banks in emerging economies. Combining the information on cross-border activity inside and outside the area, at the global level it was again the banks in offshore centres that reallocated interbank funds with net fund-raising of around $150 billion from "other OECD" countries and Japan, and net lending of $63 billion to the emerging economies. It is worth noting that in terms of net flows, at a global interbank level, offshore centres were net borrowers for almost $90 billion: as will be seen below, part of this net funding was probably used to finance non-bank customers.

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[4] It should be borne in mind that these figures refer to the residence of the intermediaries, regardless of the nationality of the parent bank. As is detailed below, some of the interbank movements from Japan to offshore centres were actually transactions between parent banks and branches operating abroad.

[5] The BIS statistics are consistent with the hypothesis that in 1995–97 the banks of "other OECD" countries performed currency transformation: around 70% of the funds they raised from banks in Japan were in yen, while around 60% of the loans they granted to banks in offshore centres were in their own national currencies.

In 1998 the outbreak of the Asian crisis and, from August, its spread to other emerging economies caused a virtually across-the-board cutback in cross-border interbank gross lending in the first half of the year, which was followed by a rebound of gross lending in the second half. In terms of net flows, inside the reporting area both halves of the year witnessed large net outflows of capital from offshore banks to the other two areas (totalling roughly $190 billion); the repatriation of offshore capital to Japan (more than $100 billion net in 1998) is consistent with the hypothesis of de-leveraging. Outside the reporting area, Japan's banks reduced their lending to banks in the emerging economies by more than $50 billion.

2.2.2 Capital flows to non-bank customers

BIS statistics also allow tracking of cross-border bank capital movements in respect of non-bank counterparts (see Charts 3a and 3b), even though the definition of the non-bank sector is not uniform across countries and in some cases may include financial intermediaries such as hedge funds.

Inside the reporting area, in the four years 1991–94 the contraction in interbank activity was not accompanied by one in business with non-bank customers, which is traditionally more stable. Capital flows to the non-bank sector were positive in sign, albeit for relatively small amounts (more than $150 billion of gross loans were granted); exceptions were the large loans from offshore banks to Japanese non-banks, totalling $87 billion, and from Japanese banks to North American and European companies, amounting to $40 billion. Outside the area, there were substantial flows of nearly $40 billion from reporting area banks to non-banks in the emerging economies, perhaps compensating for the lower level of demand from the industrial countries during a period of cyclical weakness. Globally, in the same four years offshore banks were the largest lenders to the non-bank sector (for a total, net of redemptions, of more than $110 billion); since offshore banks' net interbank fund-raising was virtually nil (see the previous section), their net creditor position increased significantly.

In the period between 1995 and 1997 there was a generalised increase in international lending to non-banks. Inside the reporting area capital flowed across the three areas concerned; the largest flows were those from Japanese banks to non-bank borrowers in "other OECD" ($51 billion) and from banks in "other OECD" to non-banks in offshore centres ($80 billion). Together with the inflow of capital from banks in Japan ($25 billion), the latter brought the total inflow to the non-bank sector of the offshore centres to more than $100 billion; considering the relatively modest GDP of those countries, it is common opinion (see BIS (1999)) that part of this borrowing was carried out by hedge funds located in those countries, where they are registered as non-banks. Outside the circuit of reporting countries, there were movements of nearly $130 billion from reporting banks to firms in the emerging economies; adding up these to the above mentioned interbank flows, total capital flows to the emerging economies amounted to around $280 billion.[6] It is also worth emphasising that, globally, lending by offshore banks to foreign non-banks totalled around $95 billion, which is roughly the net borrowing by offshore centre banks in the interbank market (see above).

With the outbreak of the international financial crisis, in 1998 there was a slowdown in the flow of bank credit to foreign firms, but not a generalised contraction in lending. In the first half of the year there were positive flows both within the reporting area (e.g. between "other OECD" and offshore centres) and in activity external to it ("other OECD" provided nearly $20 billion to the emerging economies, diverting funds from Asia to Latin America). In the second half of 1998, with the spread of the crisis, there were further positive flows of credit within the reporting area, while loans to the emerging economies from all three reporting area blocs contracted by around $33 billion. It is worth noting that in 1998 banks in the offshore centres drastically curtailed their lending to non-banks in Japan by around $100 billion and in the emerging economies by around $34 billion.

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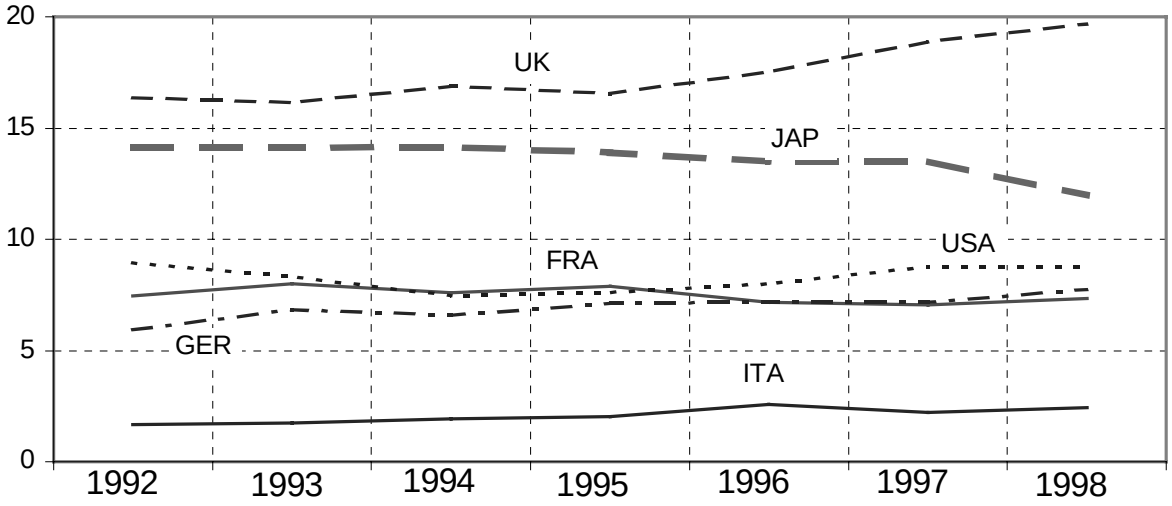
[6] In order to measure the total inflow of resources to emerging economies, in addition to banks one would need to consider capital transferred by private investors, e.g. purchases of bonds and shares, and by public organisations.

2.2.3 Capital flows between parent banks and foreign branches (international banking statistics by "nationality"): the case of Japanese banks

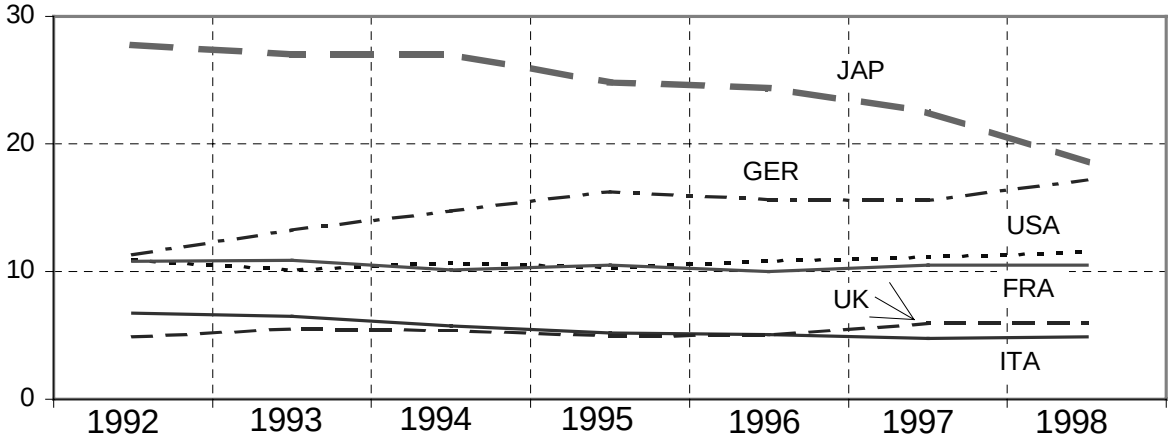
The data on international banking activity used above are based on the concept of *residence* of intermediaries. The BIS also collects and elaborates statistics based on banks' *nationality*, by consolidating data collected in all reporting countries, and provides a breakdown by counterpart (with three categories: branches of the same group, other banks and non-banks) and by currency of denomination.

Chart 4
External assets of reporting banks (with all sectors) *by residence*
(percentage share of total)



Source: BIS, International Banking Statistics. End-period data (1998: June).

Chart 5
External assets of reporting banks (with all sectors) *by nationality*
(percentage share of total)



Source: BIS, International Banking Statistics. End-period data (1998: June).

The statistics based on nationality provide important additional information with respect to those based on residence particularly for countries where there is a large presence of foreign intermediaries (e.g. the United Kingdom) or, conversely, whose banks have a large presence abroad (e.g. Japan). In the latter case, the quantification of intragroup funds transfers yields indications about the strategy pursued by a given banking system. This section takes a closer look at the behaviour of the Japanese banking system in the past few years, first considering Japanese banks' market shares and then examining their intragroup capital flows in the world.

Charts 4 and 5 show the gross external assets of the banks of each of the six leading industrial countries as a percentage of the total for all reporting countries (the sum of the six shares is therefore less than 100). While the market share of banks resident in Japan decreased from 14% to 12% between 1992 and 1998, mainly to the benefit of the United Kingdom and Germany, the market share of banks of Japanese nationality (i.e. including branches abroad) fell much more markedly, from 28% to around 18%, primarily to the benefit of German banks, whose market share grew from 11% to 18% and is now nearly equal to that of Japanese institutions. This redistribution of market shares, which gained pace in 1997 and 1998, is attributable to the crisis that has been plaguing the oversized and undercapitalised Japanese banking system since the start of the 1990s and to the policies of expansion and globalisation pursued in recent years by European and, above all, German banks (see BIS (1998)).

Charts 6a and 6b show the capital movements (changes in gross assets) effected by Japanese banks in the three periods examined earlier, broken down by counterpart.[7]

In the four years from 1991 to 1994 the significant contraction in the balance sheets of banks resident in Japan was paralleled by one in those of banks of Japanese nationality engaged in cross-border business. The latter's repayments of liabilities were mainly to other banks ($455 billion), whereas the reduction in their assets involved both claims on other branches of the group and claims on other banks ($227 billion and $354 billion respectively); activity with non-bank customers kept growing, with banks of Japanese nationality granting $140 billion of fresh funds.

The striking feature of the period 1995–97 is represented by the sharp reduction of lending by *Japanese banks* to non-bank borrowers by $207 billion; in comparison, in the same period transactions carried out by banks *located in Japan* with non-bank agents were much smaller in size (see Chart 3a). This fact is consistent with the anecdotal evidence according to which a division of labour exists between Japanese parent banks and foreign branches, with the former specialising in supplying funds to the latter (which are typically located in offshore centres) rather than directly to non-bank customers, and the foreign branches in disbursing loans to non-resident non-banks (typically located in Japan), with a sort of "rechannelling" of funds from banks located in Japan to their foreign branches and then back to Japanese firms.

A sharp contraction in activity in the first half of 1998 was followed by a relative stabilisation in the second half. The shrinking of balance sheets in the first half was not unlike that recorded at the start of the decade, i.e. Japanese banks sharply reduced both liabilities and assets principally in respect of banks (more heavily outside the group than vis-à-vis same-group branches); non-bank counterparts were spared this downsizing, with lending and borrowing increasing by around $20 and $90 billion, respectively. In the second half of 1998 the changes were smaller, and Japanese banks raised significantly their lending and borrowing with related offices while reducing or limiting it vis-à-vis other banks and non-banks.

[7] These data cannot be compared with those examined in the previous section (Charts 2 and 3) because they are based on the concept of bank nationality, not of bank location.

Chart 6a

Lending by Japanese banks to non-residents

(exchange rate adjusted changes in gross stocks; billions of dollars)

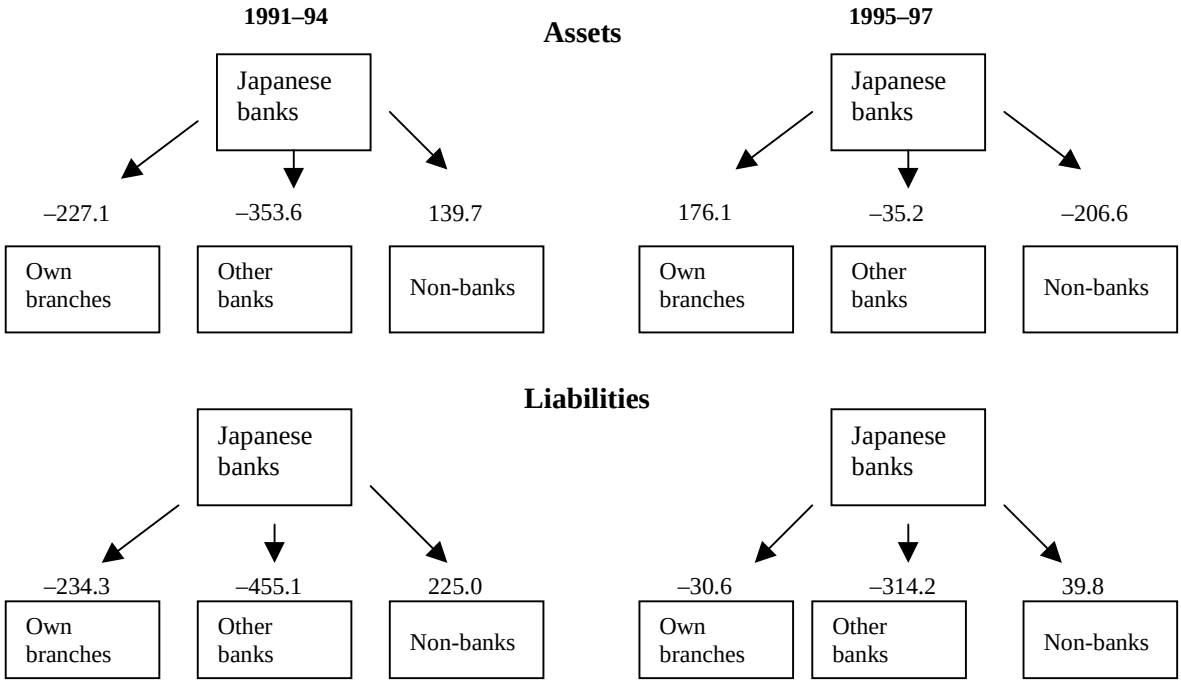
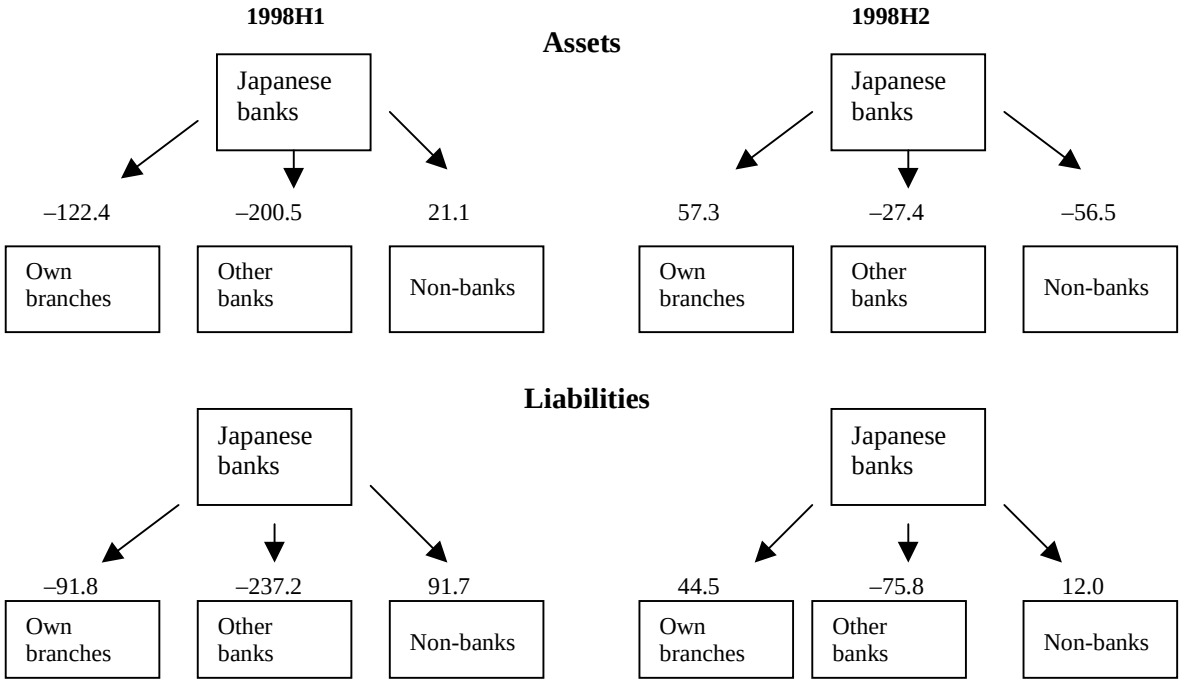


Chart 6b

Lending by Japanese banks to non-residents

(exchange rate adjusted changes in gross stocks; billions of dollars)



Source: BIS.

3. The determinants of international liquidity

3.1 Introduction

The literature analysing the development of international liquidity is extremely limited, particularly with regard to analysis of the geographical breakdown of cross-border flows. The most interesting contribution is that of Alworth and Andresen (1992), who examine the dynamics of cross-border deposits in the 1980s in connection with competition between financial centres. A first part of that study focuses on the development over time of cross-border deposits, classified according to the traditional criteria of residence of the bank and residence of the deposit holder. The data used in that work are supplemented in the present study with more recent statistics and shown in Tables 2 and 3. Table 2 shows the share held by each country's banking system in "hosting" cross-border deposits. As in the preceding years, the United Kingdom is the leading financial centre, with cross-border deposits at the end of September 1998 totalling around $2,500 billion, equal to 21% of the total stock of deposits held with banks located in the reporting area. Shares approaching that of the United Kingdom were held by the reporting offshore centres considered together (the Bahamas, Bahrain, the Cayman Islands, Hong Kong, the Netherlands Antilles and Singapore). Over the 15 years considered, the share of deposits held with banks located in Germany rose from 2.7% to 9.7% and that held with banks resident in France from 5.7% to 7.1%, while that with banks in the United States diminished slightly from 12.9% to 10.8%. The end-of-period share held with banks located in Japan fell sharply from 12.5% to 6.0% from the peak recorded at the end of the 1980s.

Table 2
Cross-border deposits held with banks of individual reporting countries as a share of area's total (billions of dollars and percentages)

	End-December 1983			End-December 1990			End-December 1996			End-September 1998		
	Total	Non-banks	% share	Total	Non-banks	% share	Total	Non-banks	% share	Total	Non-banks	% share
	(1)		(1)/(2)	(3)		(3)/(4)	(5)		(5)/(6)	(7)		(7)/(8)
AT	25.9	1.4	1.2	67.3	12.4	1.0	89.7	11.1	1.1	104.4	10.9	1.1
BE	72.6	8.5	3.4	217.3	36.4	3.4	266.4	70.9	3.3	278.6	82.3	2.9
LX	79.1	12.0	3.7	271.2	107.7	4.2	383.6	163.1	4.7	387.5	150.2	4.1
DK	5.1	0.4	0.2	43.8	2.5	0.6	38.8	7.7	0.5	278.6	9.9	3.0
SF	7.1	0.3	0.3	42.8	2.8	0.6	16.2	0.7	0.2	14.7	0.7	0.2
FR	138.7	15.1	6.5	482.1	46.9	7.5	617.0	56.3	7.6	712.0	61.7	7.6
DE	57.4	14.0	2.7	224.8	52.8	3.5	570.6	170.8	7.0	836.6	219.6	8.9
IE	5.0	2.5	0.2	17.8	5.6	0.3	64.2	18.3	0.8	128.3	38.8	1.4
IT	45.6	1.9	2.1	142.9	11.4	2.2	247.7	15.8	3.1	265.8	39.2	2.8
NL	55.5	12.1	2.6	148.0	42.7	2.3	217.9	55.5	2.7	331.6	60.8	3.5
NO	6.2	2.5	0.3	20.8	1.8	0.3	17.9	2.3	0.2	26.2	2.6	0.3
ES	18.5	8.4	0.9	64.0	26.7	1.0	128.0	43.4	1.6	189.2	52.1	2.0
SE	14.0	1.3	0.6	90.6	12.1	1.4	56.7	7.8	0.7	86.4	15.2	0.9
CH	117.5	90.0	5.5	312.7	217.0	4.9	404.0	242.6	4.9	509.2	261.3	5.4
UK	515.3	150.5	24.2	1,201.3	327.4	18.7	1,555.8	369.4	19.2	1,984.5	500.6	21.1
CA	62.2	25.1	2.9	81.0	35.9	1.3	98.8	36.7	1.2	120.0	36.5	1.3
JP	106.6	2.3	5.0	958.5	13.3	14.9	695.8	17.6	8.6	629.9	29.0	6.7
US	294.6	53.5	13.9	653.7	80.7	10.2	870.9	102.2	10.8	1,036.9	137.8	11.0
Off-shore	494.1	161.1	23.3	1,368.5	333.8	21.3	1,760.1	446.2	21.7	1,691.4	504.0	18.0
Total	2,121.0 (2)	562.9	100.0	6,409.1 (4)	1,369.9	100.0	8,100.1 (6)	1,838.3	100.0	9,390.6 (8)	1,506.0	100.0

Table 3

Area of origin of deposits held by non-banks with banks located in reporting area (billions of dollars; figures for banks plus non-banks in brackets)

Area of origin of deposit	End-December 1983	End-December 1990	End-December 1996	End-September 1998
Reporting area	371.3	1,247.8	1,377.9 (6,296.7)	1,664.9 (7,266.9)
Non-reporting industrial countries	12.8	49.0	64.7 (187.7)	66.9 (202.6)
Offshore centres	–	–	285.0 (1,127.4)	378.0 (1,319.7)
of which:				
Cayman Islands	–	–	66.9 (321.4)	127.8 (405.9)
Singapore	–	–	13.6 (177.8)	16.6 (221.6)
Eastern Europe	0.6	1.9	8.7 (48.8)	11.8 (49.1)
Asia	17.4	44.1	81.4 (257.2)	107.3 (287.4)
Latin America	37.3	85.2	110.1 (228.2)	118.8 (238.3)
of which:				
Argentina	6.1	17.0	16.4 (26.6)	16.8 (35.3)
Brazil	7.0	17.5	16.2 (71.4)	17.7 (59.5)
Mexico	11.5	19.5	21.1 (37.8)	24.7 (47.4)

Table 3 shows the geographical origin of cross-border deposits held by non-banks with banks located in the reporting area (i.e. based on the residence of the depositor). It can be seen that most of the deposits originate from agents located within the reporting area: roughly three quarters of the total in the case of both bank and non-bank depositors. The other main areas of origin of the funds are the offshore centres among which the Cayman Islands accounts for around one third and Latin America. Reflecting this characteristic of the geographical distribution of cross-border deposits, in the econometric section more attention is devoted to analysing total deposits, which are largely held in the industrial countries, rather than to their distribution by geographical area (eastern Europe, offshore centres, Latin America).

3.2 The results of Alworth and Andresen

Alworth and Andresen (1992) identify a number of determinants of the behaviour of cross-border deposits. The reasons for depositing funds abroad include financing trade flows, investing in foreign financial assets and diversifying the default risk of one's domestic banking system. Obviously, the amount of deposits held (like the size of trade flows between two countries) should be strictly dependent on the wealth of the two countries, as approximated by GDP. Alongside these main factors, the authors also consider other characteristics of the country where funds are deposited, such as the reserve requirement, the existence of regulatory constraints on interest rate movements, the efficiency of the financial market and the financial and political riskiness of the country.

The econometric investigation conducted by the authors analyses a cross section of deposits classified according to the residence of the deposit holder. The dependent variable is the logarithm of deposits

(expressed in billions of dollars) held by non-bank residents in country *i* with banks located in country *j*. The explanatory variables are:

- the output of the two countries (*i*, *j*), whose coefficients should be positive (GDP);
- the level of bilateral trade between the two countries (BITR), whose sign is expected to be positive;
- the ratio of stock market capitalisation to output (CAP/GDP), whose sign is expected to be positive;
- stock market turnover (TURN), whose sign is expected to be positive;
- the differential between the reserve ratio in the two countries (RR1–RR2), whose sign is expected to be negative;
- the level of taxation (WT);
- the level of banking secrecy (BSECR);
- the rating of the financial centre in which the deposits are held (RAT);
- the degree of specialisation of the financial centres, i.e. the fact that some are mainly involved in fund-raising, others in lending, as measured by the ratio between deposits held in the country by non-banks and those held by banks (RATC).

The equations were estimated on the basis of end-year data for 1983, 1986 and 1990. A summary of the results is given in Table 4.

Table 4
Summary of results

	1983	1986	1990
Specialisation (RATC)	–3.1057	–3.5429	–3.4216
Trade (BITR)	1.1278	1.2078	0.4438
GDP1	0.0024*	0.0047	0.0076
CAP/GDP2	0.0019*	0.0066	0.0072
RATING (RAT)	0.0048*	0.0023*	0.0050*
Reserves requirement, country 1 (RR1)	0.0133*	–0.0110*	–0.0931
Reserves requirement, country 2 (RR2)	–0.0916*	–0.0545*	–0.0907
Secrecy (BSECR)	0.4793	1.5869	0.9071
R^2	0.4194	0.5075	0.5546

* Not significant at the 5% level.

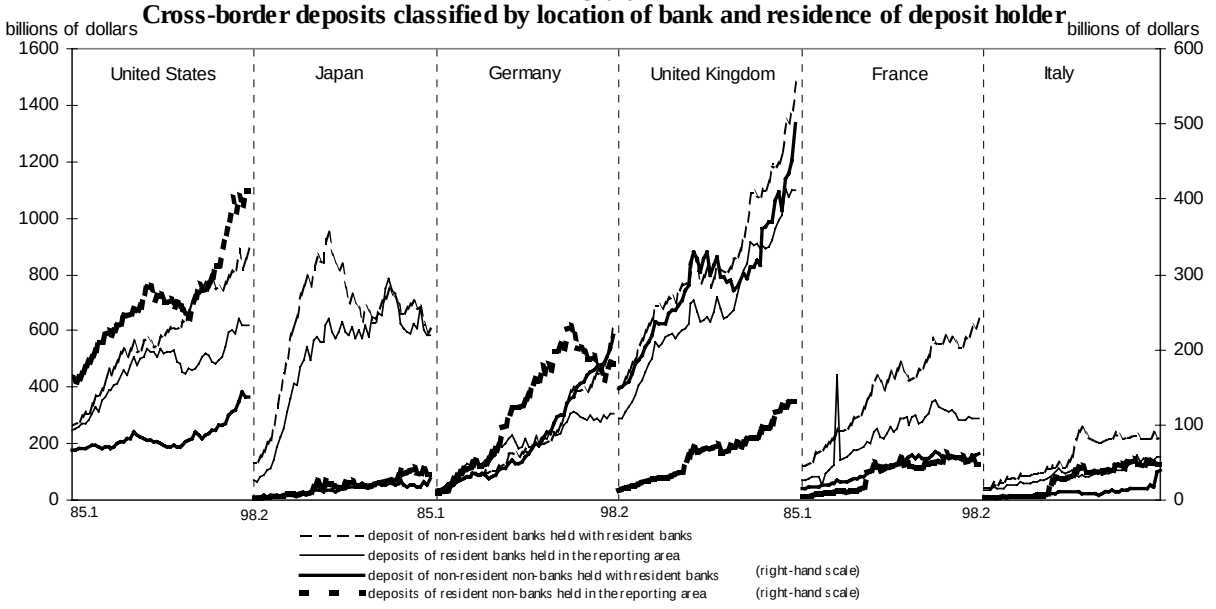
The R-squared of the regressions, which range between 42% for 1983 and 55% for 1990, are fairly high, especially considering the fact that the set of countries included in the study is heterogeneous (deposits held by non-bank residents of 17 countries with banks from 23 reporting countries). All of the main variables have the expected sign: domestic output is positively correlated with deposits, as are the ratio between market capitalisation in the bank's country of residence and the GDP of the deposit holder's country of residence and the size of bilateral trade flows. The other variables also have the expected sign: the level of banking secrecy has a positive sign and the RATC variable (ratio of non-bank deposits to interbank deposits) is negative, and can be interpreted as a scale variable, such that financial centres where interbank loans predominate attract more deposits from non-bank non-residents.

3.3 New econometric evidence

The econometric analysis conducted in this paper differs from the Alworth-Andresen study in that it examines a panel of data rather than a cross section. In addition, the range of cross-border deposits considered is broader in that it includes four categories of deposits: equations were estimated (over the period between the first quarter of 1985 and the second quarter of 1998) not only for cross-border deposits defined according to the *residence of the holder* (e.g. deposits held abroad by bank and non-bank residents of the United States) but also for deposits defined according to the *location of the issuer or "host"* (e.g. deposits held with US-located banks by both banks and non-banks located abroad).

The time profile of the four variables being estimated is shown in Chart 7. As noted in our discussion of Table 2, the United Kingdom is still the world's leading financial centre in terms of cross-border *deposits held with its banking system*: at the end of the second quarter of 1998, British banks held about $1.5 trillion in deposits by non-resident banks and non-banks. US banks held about $900 billion and Japanese banks $600 billion, sharply down from their peak of nearly $900 billion at the end of the 1980s. As regards the classification of deposits *by residence of the holder*, British banks held about $1.1 trillion abroad, compared with $600 billion by US and Japanese banks. Among non-bank deposit holders, US depositors held the largest amount of funds abroad, about $420 billion, compared with $200 billion by non-bank residents of Germany and $150 billion in the United Kingdom. The rates of growth of the above aggregates were very high, especially in the United Kingdom, the United States and Japan: over the period, deposits held by bank and non-bank non-residents with resident banks grew by 120% and 180%, respectively, in the United States, 270% and 700% in the United Kingdom and about 670% and 700% in Japan.

Chart 7
Cross-border deposits classified by location of bank and residence of deposit holder



Charts 8a–d show the logarithms of cross-border deposits held by non-banks with banks in each of the G6 countries in relation to a selection of key variables: domestic and foreign GDP; short- and long-term interest rate differentials; the volume of bilateral trade; the stock of securities issued by the country's private and public sectors; the ratio of stock market capitalisation to output; and stock market turnover in the country in which the bank is located. In Charts 9a–d, the exercise is repeated for interbank deposits held by non-resident banks with banks in the G6 countries.

Deposits with banks in the G6 countries grew more rapidly than both domestic and foreign GDP in the United States (Chart 8a); in the other five countries the rates of growth in deposits and output do not differ excessively, especially in the most recent period. Interbank deposits by non-residents in the G6

Chart 8a

Cross-border deposits in relation to a selection of key variables

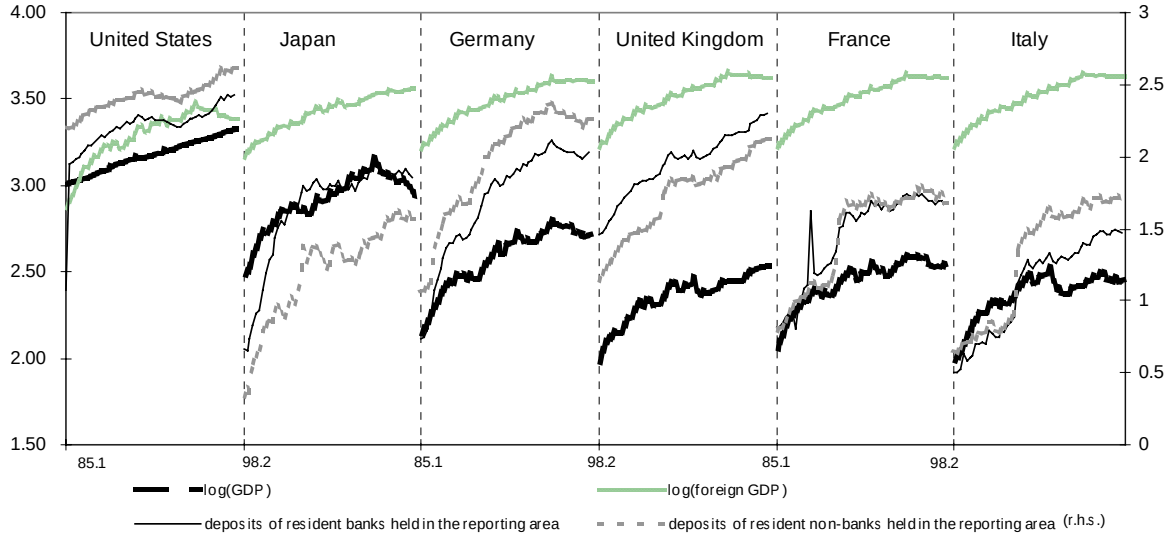


Chart 8b

Cross-border deposits in relation to a selection of key variables (cont.)

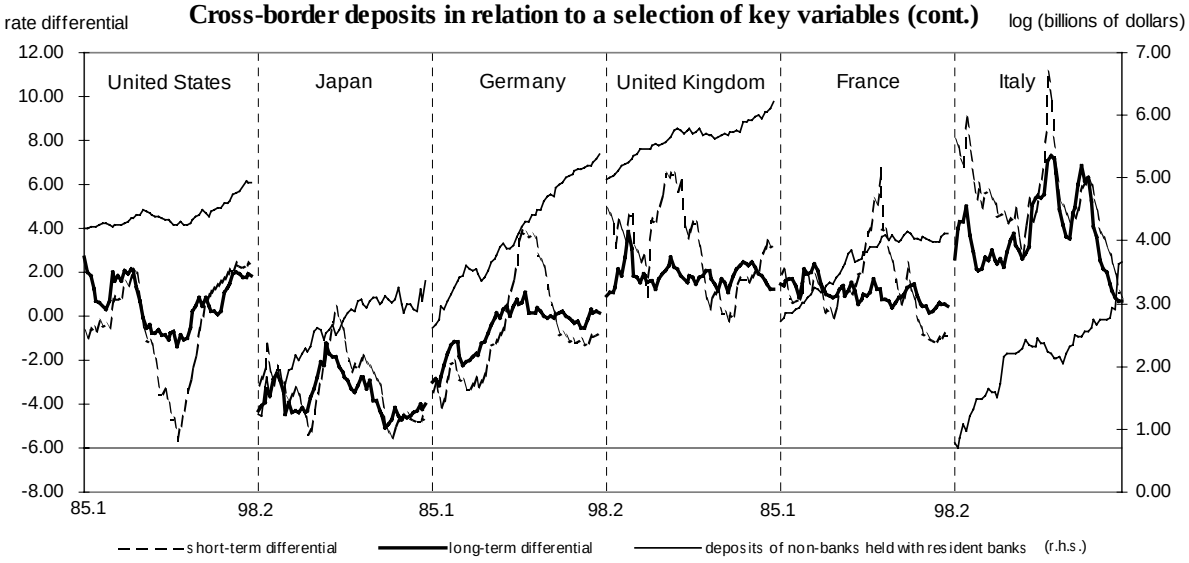


Chart 8c

Cross-border deposits in relation to a selection of key variables (cont.)

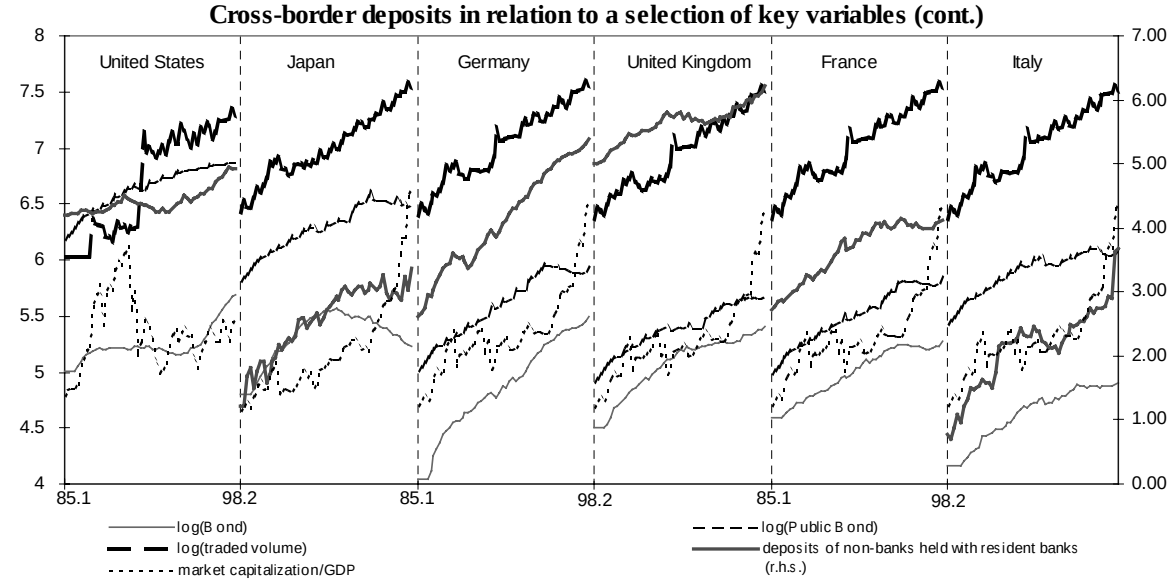
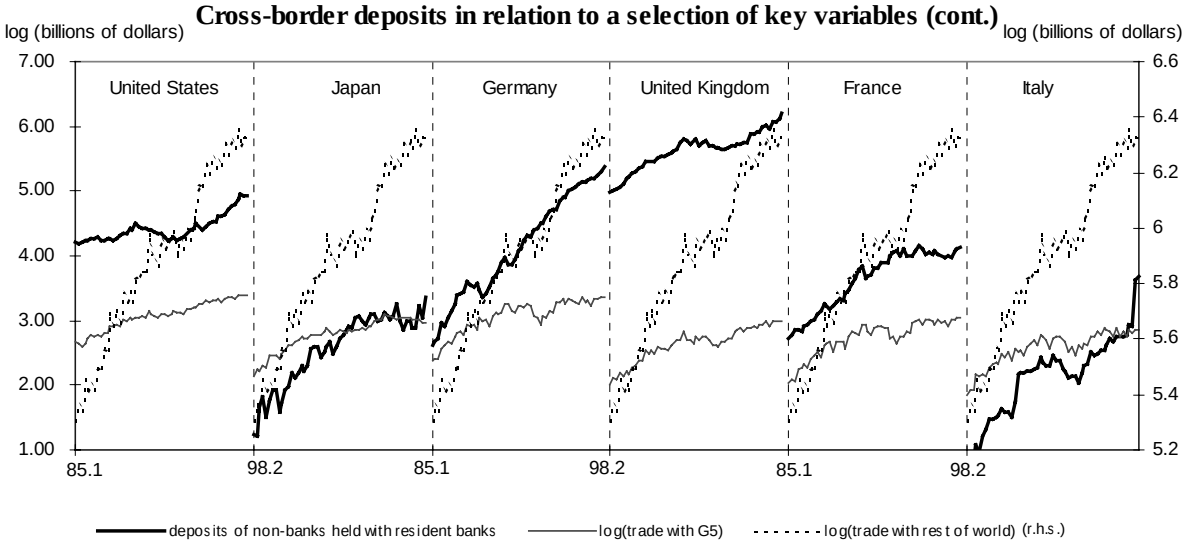


Chart 8d

Cross-border deposits in relation to a selection of key variables (cont.)



countries show much faster growth than GDP from the end of the 1980s, when the globalisation of markets began to accelerate (Chart 9a). Only Japan, where deposits grew very rapidly during the 1980s, recorded a sharp reversal of trend after the speculative bubble burst.

The link between the variables that measure the "financialisation" of the economy and the growth of deposits is especially evident in Charts 8c and 9c, where they are shown together with the logarithm of private and public sector securities, the ratio of market capitalisation to GDP and stock market trading volume. All these variables display high rates of growth during the 1990s, and those for stock market capitalisation are even higher than those recorded by deposits, which contributes to explaining their rapid expansion.

Chart 9a

Interbank deposits in relation to a selection of key variables

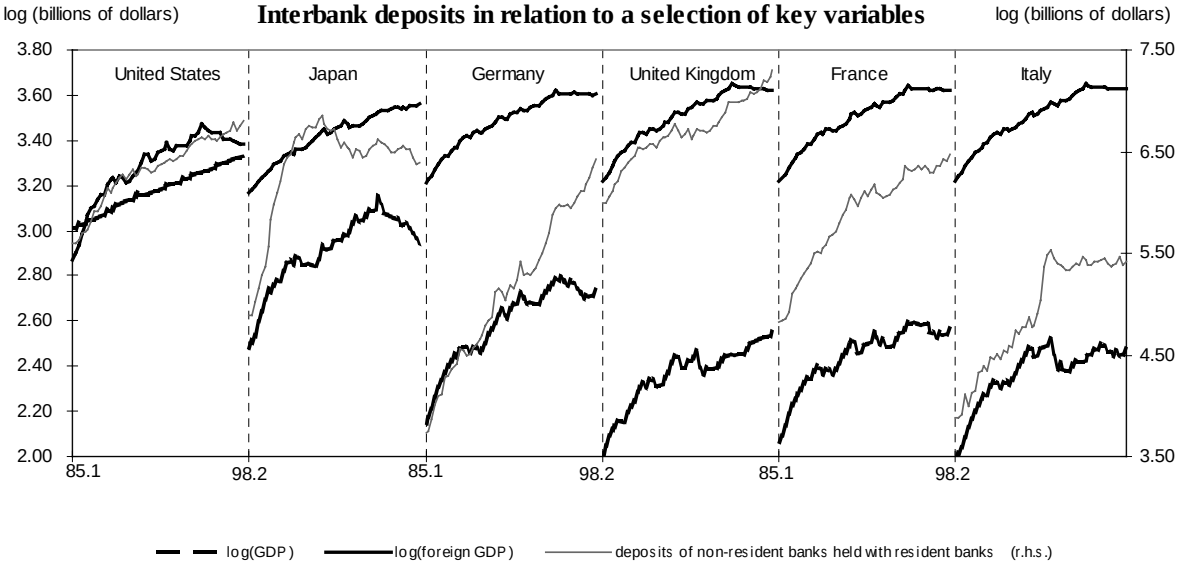


Chart 9b

Interbank deposits in relation to a selection of key variables (cont.)

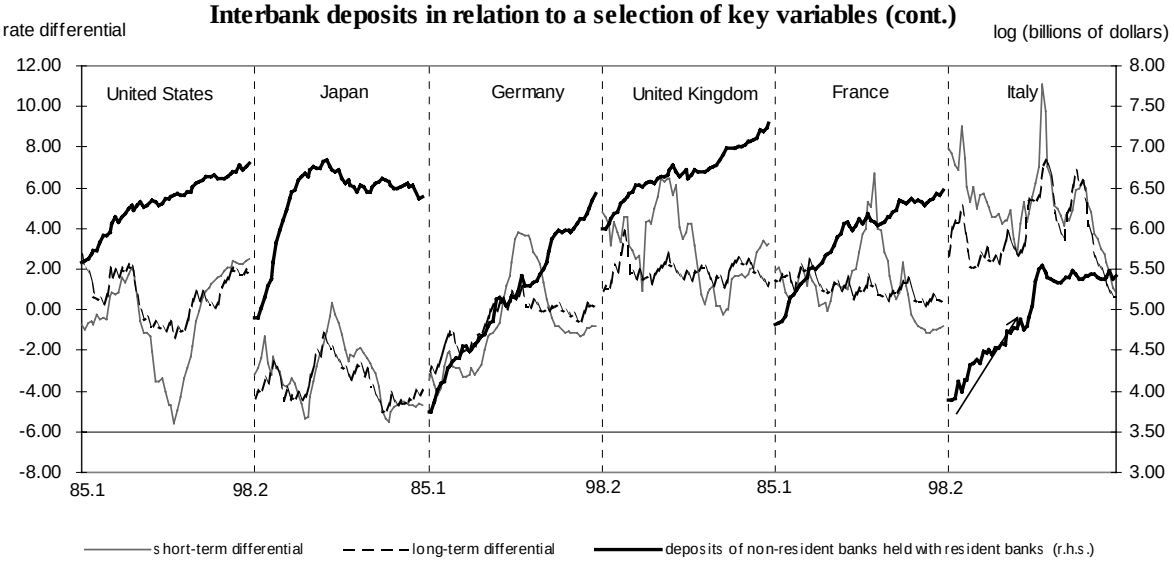


Chart 9c

Interbank deposits in relation to a selection of key variables (cont.)

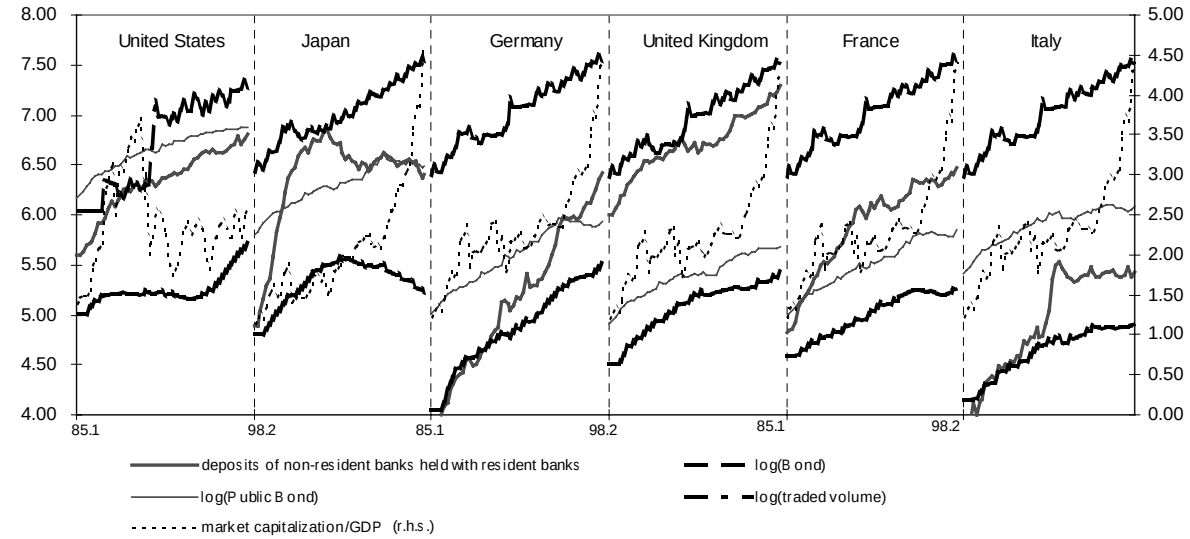
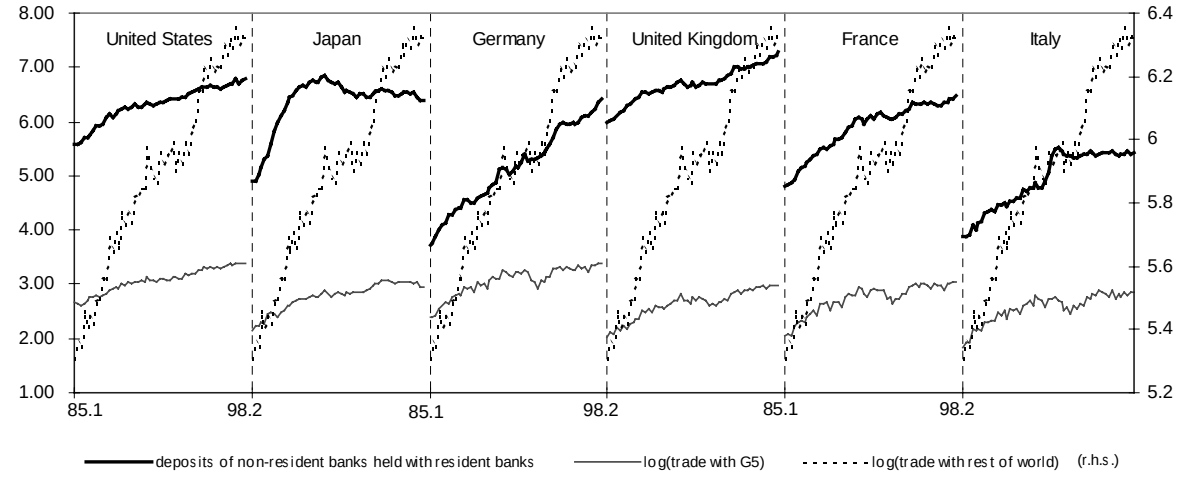


Chart 9d

Interbank deposits in relation to a selection of key variables (cont.)



If the regressions should confirm that cross-border deposits are more closely linked to financial variables than to macroeconomic determinants, we would be able to argue for a *financial view* of the growth of deposits. This position also finds support in a branch of the literature that in the last 10 years has focused on the so-called microstructure of financial markets and on the development of derivatives markets. The results obtained by this literature are based on direct observation of the foreign exchange market, the broadest and most active in the world. Trading volumes on this market are enormous because individual participants carry out repeated transactions to achieve a desired level of risk for their portfolio, selling foreign exchange forward for each asset position and buying foreign exchange forward for each liability position. Such behaviour sharply amplifies the original transaction volume, consistently with so-called "hot potato" models of risk sharing. According to such models, banks expand their original asset and liability positions with final investors on their balance sheets with positions taken with other intermediaries to achieve the desired risk-return combination for their portfolio.

Tables 5–7 show the results of the regressions performed on the deposits of banks and non-banks classified by residence of the bank and residence of the deposit holder. The estimates are in cross-section form for three periods: 1986Q2, 1990Q2 and 1998Q2. The equations were subsequently reestimated in time series form for the individual countries of the G6 and in panel form for the G6 as a whole; in all these cases, the sample period goes from the first quarter of 1985 to the second quarter of 1998.

Table 5
Cross-section estimate at 1986Q2

Explanatory variables	Non-bank sector deposits held by G6	Banking sector deposits held by G6	Non-bank sector deposits held by G6 in reporting area	Banking sector deposits held by G6 in reporting area
Domestic GDP	0.360*	1.620	0.377	0.480*
Foreign GDP	–0.496*	–1.660	0.840	4.320
Inflation difference	–0.026*	–0.025	0.0024*	0.013
Short-term rate difference	0.014	0.037	–0.0054**	–0.042*
Long-term rate difference	0.012*	–0.0073	–0.0112*	0.0122*
Trade with G5	1.050	1.050	0.089	0.0856*
World trade	0.180*	0.976	0.370	–1.090
Trade with world	–3.400	–4.150	–1.630	–6.970
G5 trade	1.580	0.130*	–0.086*	7.320
Capitalisation/domestic GDP	0.077	0.078	–0.018*	–0.134
Capitalisation/foreign GDP	–0.115	–0.103**	0.144	–0.293
Stock market volatility difference	0.006*	–0.025*	0.053	–0.052**
Exchange rate volatility difference	0.092	0.011	0.042**	0.017
Stock of private securities	0.565	0.811	0.029*	–0.019
Stock of public securities	1.080	0.813	–0.207**	0.611**
Trading volume in stock market	0.022	0.061	–0.047*	–0.559
Interbank/bank deposits in G6	0.010	–0.012	0*	–0.010*
Interbank/bank deposits in area	0.108	0.093	0.223	0.101
R^2	0.95	0.94	0.83	0.55
DW	0.37	0.45	0.57	1.70

* Not significant at the 5% level. ** Not significant at the 10% level.

The explanatory variables are:

- the GDP of country *i*;

- the GDP of the group of countries excluding *i*;
- the inflation differential between country *i* and the group of countries excluding *i*;
- the short-term interest rate differential between country *i* and the group of countries excluding *i*;
- the long-term interest rate differential between country *i* and the group of countries excluding *i*;
- the sum of exports and imports of country *i* with the group of countries excluding *i*;
- the sum of world exports and imports;
- the sum of exports and imports of the group of countries excluding *i*;
- the ratio of stock market capitalisation to the GDP of country *i*;
- the ratio of stock market capitalisation to the GDP of the group of countries excluding *i*;
- the differential between the volatility of the stock market of country *i* and that of the group of countries excluding *i*;
- the differential between the volatility of the nominal effective exchange rate of country *i* and that of the nominal effective exchange rates of the group of countries excluding *i*;
- the stock of private sector securities in country *i*;
- the stock of public sector securities in country *i*;
- stock market trading volume in country *i*.

Table 6
Cross-section estimate at 1990Q2

Explanatory variables	Non-bank sector deposits held by G6	Banking sector deposits held by G6	Non-bank sector deposits held by G6 in reporting area	Banking sector deposits held by G6 in reporting area
Domestic GDP	1.210	0.415	–0.196*	0.044*
Foreign GDP	–1.030	–0.383*	5.940	1.360
Inflation difference	–0.021	–0.0011*	0.026	0.032*
Short-term rate difference	0.028	0.0083**	–0.015	–0.036*
Long-term rate difference	0.010*	0.026	0.033*	–0.016
Trade with G5	0.614	0.699	–0.870*	0.970
World trade	0.724	0.171*	–1.400	0.130*
Trade with world	–2.110**	–2.090	–3.150*	–1.940
G5 trade	–0.614*	0.907*	5.850	0.350*
Capitalisation/domestic GDP	0.097	0.090	–0.137	–0.021*
Capitalisation/foreign GDP	–0.075*	–0.170	0.441	0.282
Stock market volatility difference	–0.0049*	0.0230**	–0.021*	0.047
Exchange rate volatility difference	0.0166	0.014	0.028	0.0035*
Stock of private securities	0.834	0.595	–0.058	0.029*
Stock of public securities	0.882	1.000	0.444	–0.100*
Trading volume in stock market	–0.050*	–0.017*	–0.604	–0.086**
Interbank/bank deposits in G6	–0.011	0.011	0.0024*	0.00033*
Interbank/bank deposits in area	0.075	0.071	0.062*	0.238
R^2	0.93	0.94	0.56	0.83
DW	0.39	0.31	1.71	0.57

* Not significant at the 5% level. ** Not significant at the 10% level.

Table 7
Cross-section estimate at 1998Q2

Explanatory variables	Non-bank sector deposits held by G6	Banking sector deposits held by G6	Non-bank sector deposits held by G6 in reporting area	Banking sector deposits held by G6 in reporting area
Domestic GDP	1.180	0.189*	1.400	–0.478
Foreign GDP	–1.540	–0.505*	6.230	1.430
Inflation difference	–0.032	–0.029	0.061	–0.011
Short-term rate difference	0.030	0.021	–0.018*	0.0072
Long-term rate difference	–0.019	0.026	0.0002*	–0.024
Trade with G5	0.379*	0.416*	–2.210	0.919
World trade	0.949	0.529	–1.360	0.102*
Trade with world	–0.866*	–0.854*	–1.080*	–1.510
G5 trade	–1.230*	–0.198*	6.700	0.257*
Capitalisation/domestic GDP	0.145	0.099	–0.022*	–0.026*
Capitalisation/foreign GDP	0.052*	0.245	–1.110	0.733
Stock market volatility difference	0*	0.026**	0.042**	0.038
Exchange rate volatility difference	0.013	0.015	0.0196	–0.0029*
Stock of private securities	1.190	0.824	–0.651	0.161
Stock of public securities	0.535	0.867	–0.184*	–0.016*
Trading volume in stock market	–0.271	–0.249	–0.277*	–0.240
Interbank/bank deposits in G6	–0.012	0.012	0.0009*	0.0015
Interbank/bank deposits in area	0.061	0.056	0.102	0.234
R^2	0.92	0.95	0.64	0.85
DW	0.40	0.42	1.68	0.65

* Not significant at the 5% level. ** Not significant at the 10% level.

Tables 8 and 9 give the results of the regressions performed on the time series of cross-border deposits classified by the residence of the bank and the residence of the deposit holder, respectively. The upper part of each table reports the results of the time series estimates by country, whereas the lower part shows the results of the panel estimates.

As regards the estimates for the individual countries, *cross-border deposits held by foreign non-banks with resident banks in the country concerned* (Table 8) are directly linked to the GDP of the country in which the bank is located in all cases except Italy; elasticities vary between 1.63 in France and 3.65 in the United States, while the coefficient is not significant in Italy. Foreign GDP, which was expected to have a positive sign, is negative in the United States, Germany and France and not significant in the other three. Short-term interest rate differentials were expected to be positive, as a higher short-term rate in country *i* than in country *j* should attract funds to country *i*. However, the hypothesis was confirmed only in the case of the United States and the United Kingdom, while the estimated coefficient is negative in Italy and zero in the remaining three cases.

By contrast, the coefficients of long-term rate differentials should be negative under the hypothesis that they are a proxy for expected inflation rate differentials (i.e. for a given expected real rate in the two countries). The hypothesis is confirmed for the United States and France, while there is no significant relationship in Japan, Germany or Italy. The relation is significant but positive in the United Kingdom.

The current inflation differential is significant and negative, as expected, in two of the six cases (United States and France). In the other countries it is not significant.

Table 8

Cross-border deposits held by non-residents with banks in the country concerned

Equations in levels (quarterly data)						**Period 1985Q1–1998Q2**					
Dependent variable	Deposits by non-banks	R^2	Durbin Watson	Log (domestic GDP)	Log (foreign GDP)	Inflation diff.	Short-term rate diff.	Long-term rate diff.	Trade with G5	World trade	Trade with world
	United States	0.961	1.72	**3.65**	**–1.56**	**–0.026**	**0.0347**	**–0.0229**	**1.715**	**1.106**	***–2.24***
	Japan	0.92	1.63	***1.67***	–1.74	0.023	0.0096	0.045	0.08	–1	4.46
	Germany	0.993	1.38	**3.01**	**–5.11**	0.0168	–0.047	–0.0303	**–1.82**	0.53	1.35
	United Kingdom	0.983	2.12	**1.75**	–0.06	–0.0077	**0.0226**	***0.025***	0.503	0.24	–0.073
	France	0.987	1.67	**1.63**	***–3.97***	**–0.114**	0.017	**–0.073**	–0.187	0.525	1.86
	Italy	0.958	1.43	–3.14	–4.15	–0.029	**–0.048**	0.018	1.6	–1.8	–1.218
Dependent variable	Deposits by banks										
	United States	0.99	1.72	**2.38**	**1.07**	0.005	***0.018***	**0.02**	0.2	0.09	1.05
	Japan	0.953	1.71	**2.08**	**–5.63**	–0.03	–0.0027	0.0399	**2.66**	**5.63**	**–6.81**
	Germany	0.993	1.72	***0.797***	**–4.57**	0.014	0.0173	0.033	–0.61	0.741	0.744
	United Kingdom	0.989	1.82	0.223	**1.407**	**0.025**	0	0.012	0.264	–0.382	0.452
	France	0.996	2.15	0.043	**–0.989**	**–0.057**	**–0.039**	**–0.037**	0.161	**–0.905**	***1.497***
	Italy	0.947	1.22	–0.44	0.111	**–0.079**	**0.0609**	0.022	–0.233	–1.14	2.73
PANEL	Deposits by non-banks OLS POOLED (*)	0.9	0.481	**1.92**	**–1.51**	–0.007	***0.0117***	**–0.028**	**–0.703**	**0.554**	0.929
PANEL	Deposits by banks OLS POOLED (*)	0.908	0.228	**–0.7**	0.159	–0.0067	***0.0113***	0.0109	**1.575**	–0.174	**–3.505**

Table 8 (cont.)

Equations in levels (quarterly data) **Period 1985Q1–1998Q2**

Dependent variable	Deposits by non-banks	G5 trade	Capitalisation/ GDP	Stock exchange volatility diff.	Exchange rate volatility diff.	Log (private securities)	Log (public securities)	Log(trading volume)	Dummy Q1	Dummy Q2	Dummy Q3	Dummy Q4
	United States	–1.59	0.03	–0.002	***–0.0088***	**0.42**	0.015	0.044	**–4.303**	**–4.292**	**–4.272**	**–4.293**
	Japan	0.03	**0.38**	0.0397	–0.0164	0.32	0.33	–0.64	0.0001	–0.013	–0.074	–0.089
	Germany	***1.67***	**0.11**	***0.067***	–0.001	**1.31**	0.414	0.132	0.0129	–0.011	–0.0319	–0.0054
	United Kingdom	**–1.62**	**0.06**	–0.029	**0.00556**	–0.02	0.112	**0.193**	**0.198**	**0.197**	**0.188**	**0.192**
	France	–2	**0.08**	–0.025	**–0.026**	**3.35**	–0.905	–0.092	–0.046	–0.056	–0.062	–0.067
	Italy	**4.43**	**0.35**	0.056	0.017	**1.57**	**2.868**	–0.028	0.079	0.037	0.184	0.022
Dependent variable	Deposits by banks											
	United States	***–1.5***	**0.05**	–0.006	0.003	–0.04	–0.112	–0.028	**–3.844**	**–3.836**	**–3.827**	**–3.808**
	Japan	**–6.64**	**–0.29**	***–0.075***	0.007	**2.12**	***–1.24***	***0.67***	–0.08	0.19	0.06	0.044
	Germany	***2.08***	***0.09***	0.035	***–0.022***	***0.53***	**1.14**	0.12	***0.131***	0.092	***0.163***	0.047
	United Kingdom	0.047	**0.12**	–0.0147	0.0022	***–0.34***	**0.376**	***0.158***	**0.109**	0.073	0.107	**0.114**
	France	0.946	**0.06**	**–0.027**	**–0.0139**	**1.63**	0.051	0.084	0.047	0.039	**0.141**	0.043
	Italy	–0.926	0.13	0.054	0.0127	**2.56**	–0.562	0.09	–0.179	–0.203	–0.209	–0.169
PANEL	Deposits by non-banks OLS POOLED (*)	–0.511	**0.14**	0.0162	***0.0063***	**0.858**	**0.556**	***–0.138***	0.0084	0.0054	–0.014	–0.0099
PANEL	Deposits by Banks OLS POOLED (*)	**1.267**	***–0.029***	**0.0404**	**0.0171**	**0.956**	**0.871**	**0.209**	–0.0048	–0.028	0.017	0.013

The coefficients in bold are significant at the 5% level; those in italics and bold are significant at the 10/15% level.

Table 9

Cross-border deposits held by residents in the country concerned with non-resident banks

Equations in levels (quarterly data)						**Period 1985Q1–1998Q2**					
Dependent variable	Deposits by non-banks	R^2	Durbin Watson	Log (domestic GDP)	Log (foreign GDP)	Inflation diff.	Short-term rate diff.	Long-term rate diff.	Trade with G5	World trade	Trade with World
	United States	0.988	1.96	–0.233	–0.175	–0.0016	**–0.007**	0.004	–0.0014	**0.411**	0.016
	Japan	0.953	1.14	***0.831***	**–4.2**	–0.005	–0.011	***0.057***	0.363	**2.44**	–0.453
	Germany	0.989	1.53	**1.08**	–0.136	**–0.026**	**0.031**	***0.042***	**1.54**	–0.381	**–4.11**
	United Kingdom	0.979	1.35	0.263	**–1.49**	–0.007	0.00025	0.022	**1.25**	0.067	**–3.11**
	France	0.967	1.48	**2.75**	**–4.85**	–0.029	0.0021	**–0.157**	**–2.28**	–1.01	**5.76**
	Italy	0.917	0.817	**2.77**	**–2.67**	0.002	**–0.047**	0.04	**–2.92**	–0.419	**7.31**
Dependent variable	Deposits by banks										
	United States	0.949	1.94	–0.211	0.009	0.0112	**–0.0228**	0.011	**0.688**	0.204	–0.564
	Japan	0.963	1.77	**1.514**	**–4.15**	***–0.019***	–0.012	–0.0083	**0.827**	**2.46**	**–2.57**
	Germany	0.937	1.6	**0.917**	**1.42**	–0.0127	**–0.041**	**0.059**	0.367	–0.666	–2.03
	United Kingdom	0.953	1.61	–0.378	**1.573**	**0.0241**	**–0.0167**	–0.006	–0.0688	–0.799	**1.09**
	France	0.746	1.98	–0.854	0.686	**–0.101**	***0.046***	**0.125**	**3.32**	**3.1**	–1.98
	Italy	0.769	1.36	0.473	–1.77	0.0008	–0.0166	–0.017	***1.32***	**1.65**	***–2.43***
PANEL	Deposits by non-banks OLS POOLED (*)	0.526	1.62	**1.845**	**2.51**	–0.0053	***–0.017***	**0.025**	**–1.22**	–0.248	–1.25
PANEL	Deposits by banks OLS POOLED (*)	0.665	0.624	**0.645**	0.178	**0.0098**	**–0.01**	**–0.036**	**0.702**	–0.106	–0.938

Table 9 (cont.)

Equations in levels (quarterly data) **Period 1985Q1–1998Q2**

Dependent variable	Deposits by non-banks	G5 trade	Capitalisation/ GDP	Stock exchange volatility diff.	Exchange rate volatility diff.	Log (private securities)	Log (public securities)	Log(trading volume)	Dummy Q1	Dummy Q2	Dummy Q3	Dummy Q4
	United States	–0.215	**0.0148**	**0.034**	***–0.0026***	**0.303**	0.141	–0.028	–0.575	–0.578	–0.568	–0.591
	Japan	–1.73	***0.083***	***0.042***	0.0047	**0.627**	–0.336	0.164	–0.048	–0.113	–0.02	–0.119
	Germany	**1.02**	–0.022	***0.047***	0	**0.489**	**0.546**	***–0.183***	0.0247	0.0372	0.0589	0.0316
	United Kingdom	**1.15**	–0.032	**–0.072**	0.0016	**0.843**	0.063	**0.288**	–0.022	–0.049	–0.014	–0.0474
	France	**2.09**	**–0.104**	–0.018	–0.013	**2.16**	***–1.03***	**0.478**	0.098	0.0825	**0.236**	0.076
	Italy	–0.461	–0.083	**0.114**	0.0083	**2.04**	***–1.67***	0.271	–0.125	–0.201	–0.155	–0.217
Dependent variable	Deposits by banks											
	United States	–0.438	**0.028**	–0.012	**0.0169**	***0.077***	0.435	–0.031	–1.67	–1.65	–1.64	–1.653
	Japan	**–2.42**	–0.027	–0.03	0.0028	**1.298**	–0.342	0.177	–0.0074	–0.076	0.037	–0.0259
	Germany	**1.61**	**0.072**	**0.0683**	–0.0023	***0.334***	***–0.483***	–0.166	–0.082	–0.06	–0.061	0.0203
	United Kingdom	**0.878**	**0.067**	**0.03**	–0.002	**–0.327**	0.077	–0.015	0.034	0.023	0.047	0.042
	France	**–8.65**	**0.167**	0.069	0.014	–0.358	–0.231	–0.296	0.077	0.032	–0.087	0.0896
	Italy	**1.72**	–0.01	–0.033	0.0014	**–1.003**	**0.931**	0.058	0.057	0.056	0.057	0.09
PANEL	Deposits by non-banks OLS POOLED (*)	**3.17**	–0.054	0.0072	**0.0237**	0.159	–0.089	**–0.587**	0.032	**0.066**	**–0.092**	0.0073
PANEL	Deposits by Banks OLS POOLED (*)	0.232	***0.016***	**0.058**	–0.004	**0.175**	***–0.211***	–0.067	–0.012	–0.011	0.008	**0.026**

The coefficients in bold are significant at the 5% level; those in italics and bold are significant at the 10/15% level.

The four measures of trade adopted in the study – world trade (the sum of exports and imports expressed in billions of dollars), trade between the country concerned and the remaining G5 countries, trade between the reporting area and the country concerned, and trade between the rest of the world and the country concerned – should be positively correlated with the behaviour of cross-border deposits but turn out to be so in only six of the 24 cases.

As could be expected on the basis of Charts 8 and 9, the variables that measure the "financialisation" of the six countries are more strongly correlated with deposits: the ratio of market capitalisation to GDP is positive and significantly different from zero in all cases except for the United States. The stock of private sector securities is significant except in Japan and the United Kingdom, while the stock of public sector securities is significant only in Italy. The volatility differentials between the domestic and foreign market and stock market trading volume are significant in only a few cases. The seasonal dummies in the equations do not reveal any significant seasonality for any of the series considered.

The same conclusions can be drawn from the *regressions by country performed on cross-border deposits held by banks located in the G6*. Output has a positive sign in three out of six cases (United States, Japan and Germany), while it is not significant in the others. Foreign GDP is positive only for the United States and the United Kingdom. The current inflation differential is negative only in Italy and France, while the expected inflation differential, measured by the long-term interest rate differential, is negative only in France. The short-term rate differential has the expected sign in the United States and Italy, whereas trade has the expected sign in one sixth of the cases, as before.

The aggregate regression performed on the panel of the six countries for the period between the first quarter of 1985 and the second of 1998 produces similar results to those obtained for the individual countries.

Table 9 gives the estimates performed on cross-border deposits held by *bank and non-bank residents of the countries concerned* with banks located abroad. In this case, the expected sign of some variables is the opposite of that in the previous regressions because we are studying deposits held abroad by residents, not deposits held by non-residents in the country concerned. This is the case with the short- and long-term rate differentials, the current inflation differential and the differential in the volatility of the stock market and nominal effective exchange rates. Domestic GDP has the expected sign in four cases (Japan, Germany, France and Italy) for deposits held by non-bank residents and two cases (Japan and Germany) for deposits held by banks. The short-term rate differential has the expected sign in two cases (United States and Italy) for non-banks and three cases for banks. Trade has the expected sign in nine out of 24 cases for deposits held by non-banks, 10 out of 24 for those held by banks. The ratio of stock market capitalisation to GDP is significant in two and four of the six cases respectively, while the stock of private-sector securities is significant in three of six. The stock of public sector securities is significant and has the expected sign only for Germany in the case of deposits held by non-banks and for Italy in the case of deposits held by banks.

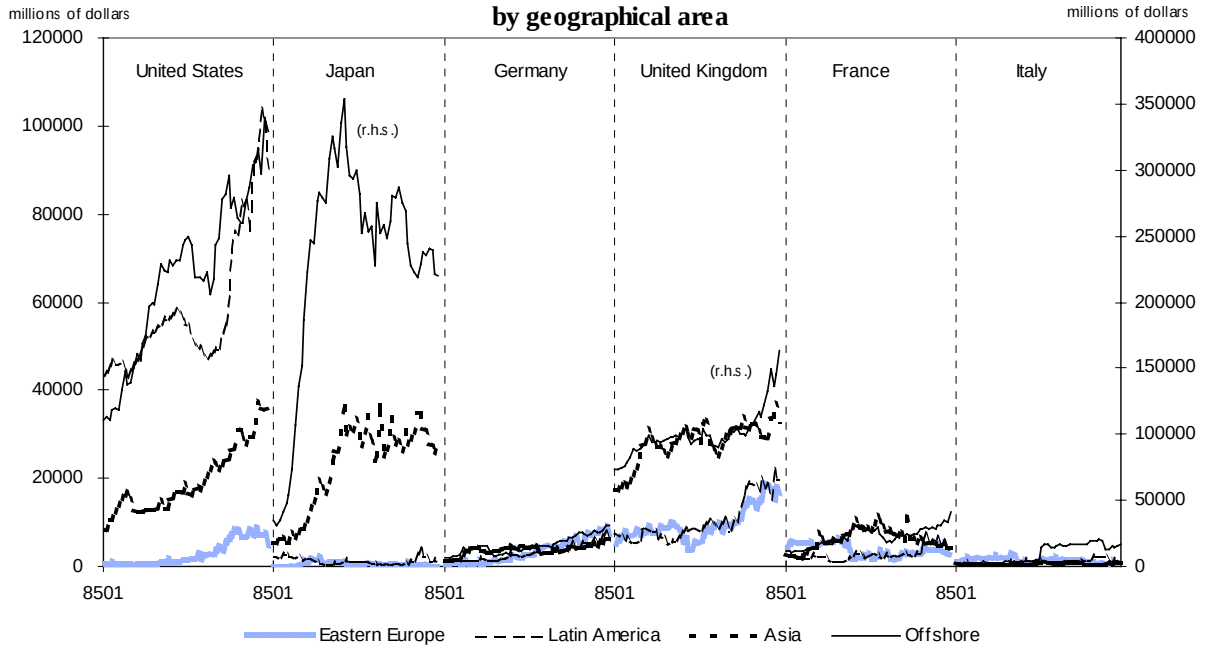
The panel estimates provide good results, especially for deposits held by banks with non-resident banks, where only the long-term rate differential and the stock of public sector securities do not have the expected sign. In the case of deposits held by non-banks, it is primarily the financial scale variables (capitalisation/GDP and the stock of securities) that are not significant.

Summing up, although the equations for the individual countries have R-squared close to unity, it is necessary to bear in mind that this is the predictable result of regressions performed on time series with first-order autoregressive process with a coefficient not significantly different from unity. Under such conditions, the equation estimated must be considered a static, long-run equation. It is not possible to introduce lags. The dynamic setting can only be studied in a second stage, estimating the same equation in terms of first differences and introducing the residual of the static equation estimated previously in order to take account of the constraints imposed by the long-run relationship on the short-term dynamics.

3.4 Analysis by geographical area

Charts 10 and 11 provide another classification of cross-border deposits. Chart 10 shows *deposits held with banks in the G6 countries* by bank and non-bank residents of four "non-reporting" areas (offshore centres, Latin America, Asia excluding Hong Kong and Singapore, and eastern Europe). Note the rapid growth in deposits held by bank and non-bank agents from offshore centres: in mid-1998 they held $350 billion and $100 billion in US and Japanese banks respectively, compared with just under $50 billion and $25 billion in 1985. However, deposits by Japanese residents fell sharply at the end of the 1980s, in conjunction with the bursting of the speculative bubble that had driven up securities prices. Residents in Latin America primarily deposit funds in the United States: this activity began to expand rapidly at the start of the 1990s, and since then deposits have nearly doubled from $50 to $100 billion. Chart 11 shows *loans made by resident banks in the G6 countries* to bank and non-bank residents of the four areas specified above. Loans to residents of offshore centres by Japanese banks increased very rapidly, rising to about $600 billion by mid-1998. Asia also emerges as the area of specialisation for Japanese lending, with loans to Asian countries soaring from $10 billion at the start of 1985 to nearly $70 billion in mid-1998.

Chart 10
Deposits of banks and non-banks held with banks in the G6, by geographical area

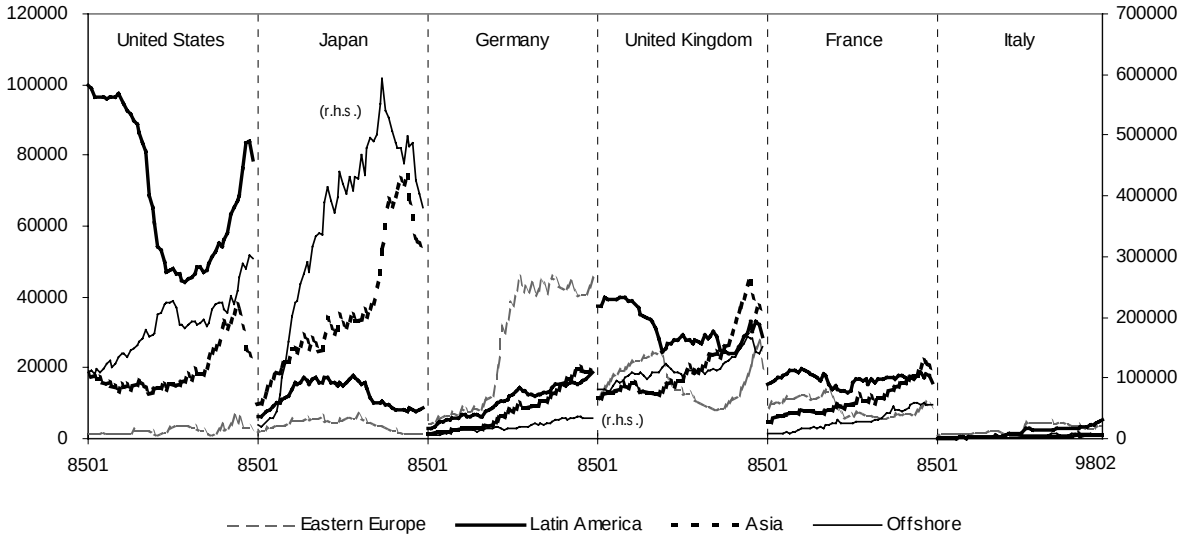


German banks have specialised in eastern Europe. The rise in lending to countries in the area from $10 billion at the end of the 1980s to about $50 billion in mid-1998 mainly came after German unification. Latin America is the prime destination for loans from US banks, although they showed little interest in the area until the start of the 1990s, when lending reached a low point of about $50 billion.

As in the previous regressions, trade and wealth (as approximated by GDP) should be the main explanatory variables for the behaviour of deposits and loans classified by geographical area. Nevertheless, these series show a pronounced degree of specialisation by geographical area. This aspect is not accounted for in the estimates but it could explain a significant part of lending decisions and therefore undermine the reliability of the estimations. For a preview, Charts 12–15 show the behaviour of deposits held in the G6 countries by banks resident in the four areas and the lending by banks resident in the G6 countries to bank and non-bank residents in the four areas, together with the series that are expected to explain their behaviour.

Chart 11

Lending by banks in the G6 to banks and non-banks, by geographical area
(millions of dollars; from 1985Q1 to 1998Q2)



Tables 10 and 11 report, respectively, the results of the regressions performed on deposits held by bank and non-bank agents resident in the four areas with banks resident in the G6 countries. As before, the estimates were performed for individual countries and for a panel of the six countries taken together (only one subset of the variables used earlier has been used in the regressions performed for the geographical areas). The R-squared of the panel regression performed for deposits by banks (Table 10, last section) range between 0.62 for depositors resident in eastern Europe and 0.96 for those in Asia. Domestic GDP has the expected sign for Asia and eastern Europe, while foreign GDP has the expected sign for eastern Europe and, marginally, for Latin America. The short-term interest rate differential is positive in all cases, while the long-term differential is negative but not significantly different from zero for Asia only. World trade has the expected sign in all cases, while trade between the individual areas and the G6 countries has a positive sign only for Latin America and eastern Europe. The current inflation differential has a negative sign for Latin America and Asia and, marginally, the offshore countries. For the panel regressions performed on deposits by non-banks (Table 11, last section), domestic GDP has a positive sign in all cases, with elasticities that vary from 0.39 for Asia to 1.0 for offshore countries (in other words, a 1% GDP growth prompts a 1% increase in deposits from the specified area).

Foreign GDP has the correct sign for offshore countries, Latin America and eastern Europe; it is negative for Asia. The short-term interest rate differential is positive only for Asia, while the long-term differential has the expected negative sign for offshore countries and Asia. World trade directly influences deposits by foreign non-banks in Latin America and Asia, while trade between the areas under consideration and the G6 countries had an impact for Asia and eastern Europe.

As a follow-up to these estimates, one could specify the equations in a more complete fashion by adding other regressors, most important the stock of private sector securities and the volatilities of exchange rates and stock markets, which strongly influenced investment decisions in these countries. In addition, one should also carry out regressions for loans granted by banks located in G6 countries to bank and non-bank residents of the four areas considered.

Chart 12a

Offshore countries

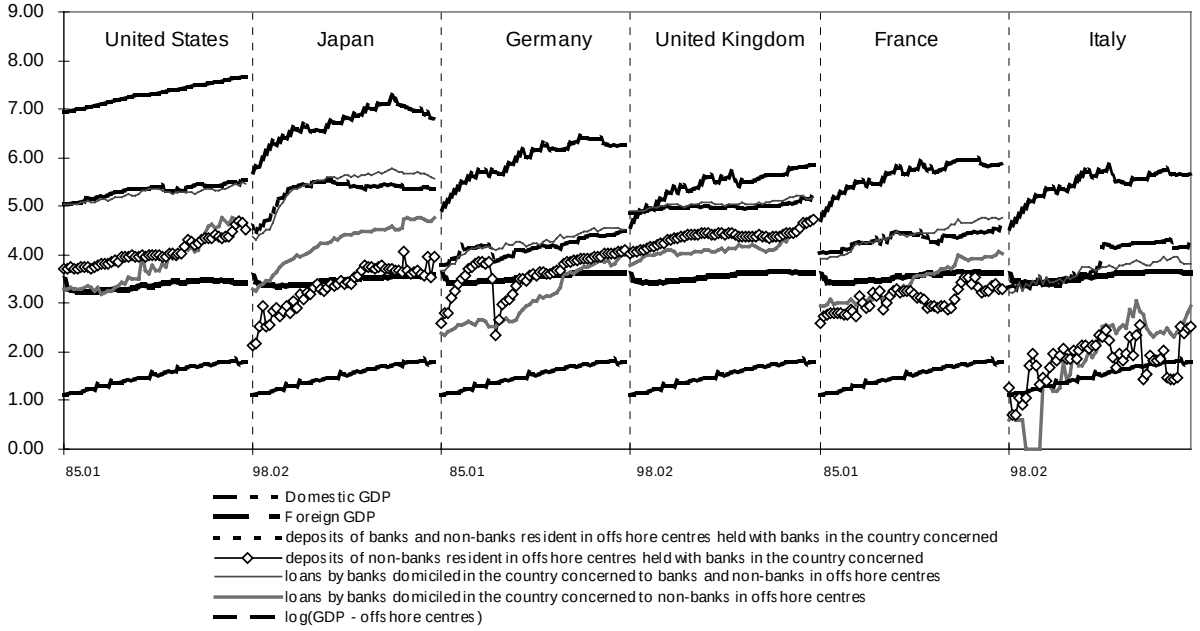


Chart 12b

Offshore countries

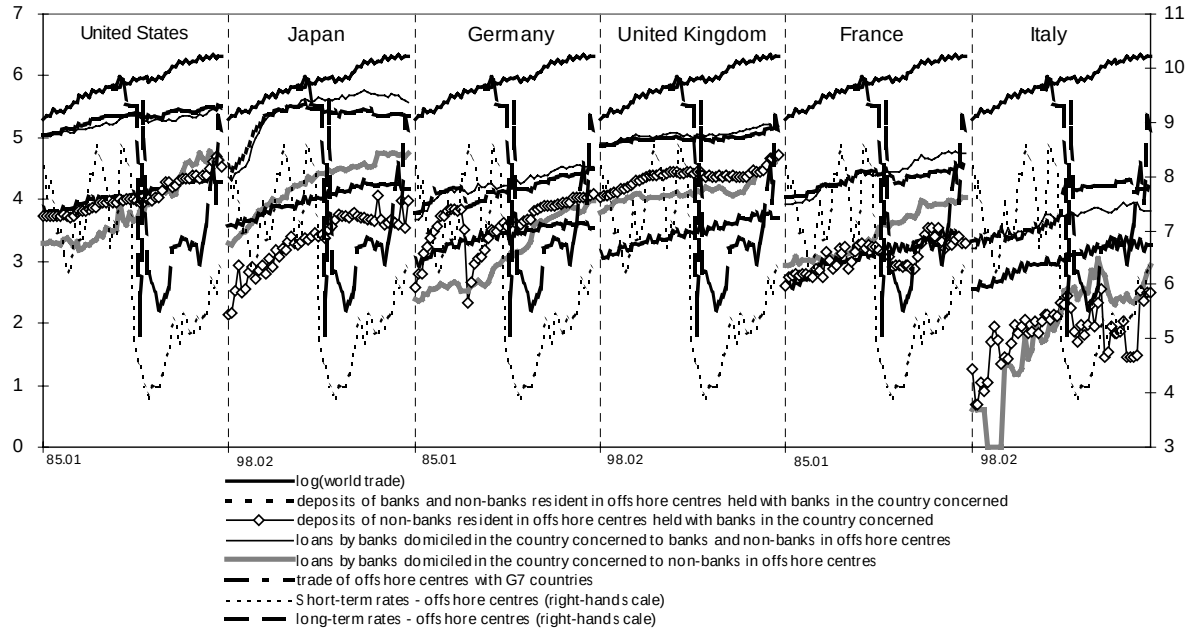


Chart 13a

Latin America

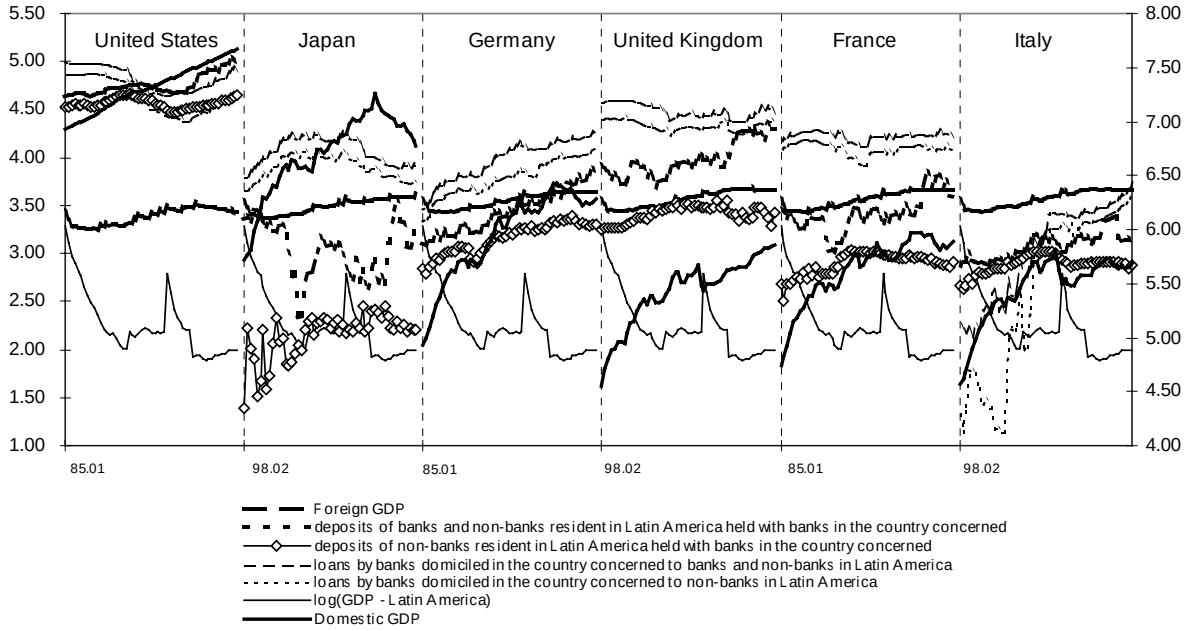


Chart 13b

Latin America

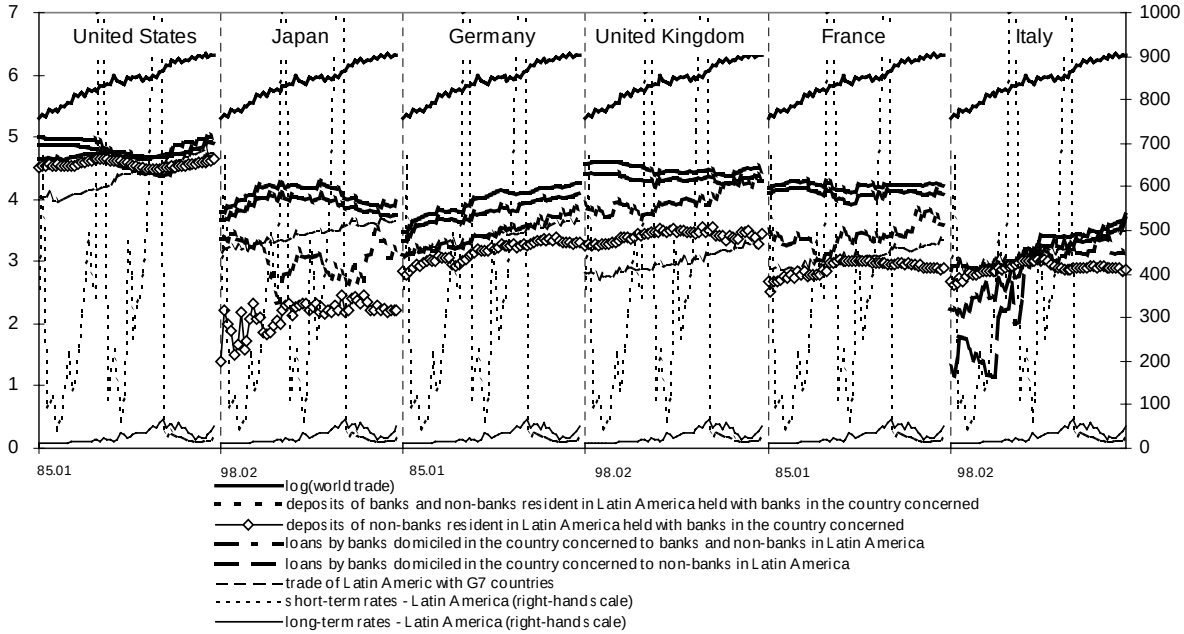


Chart 14a

Asia

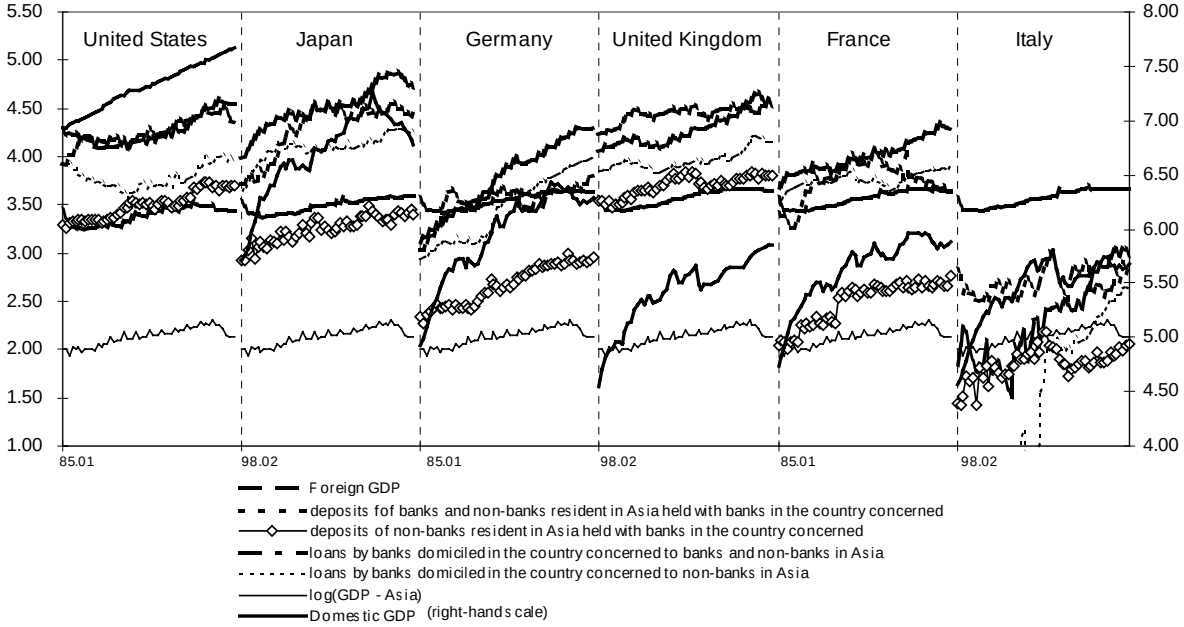


Chart 14b

Asia

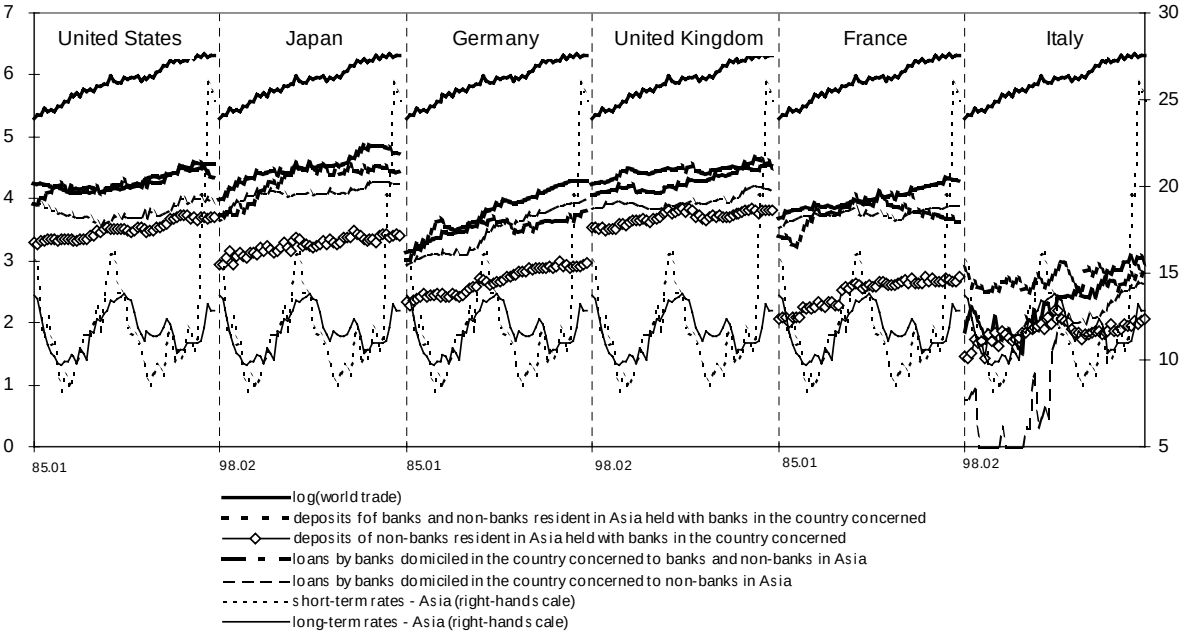


Chart 15a

Eastern Europe

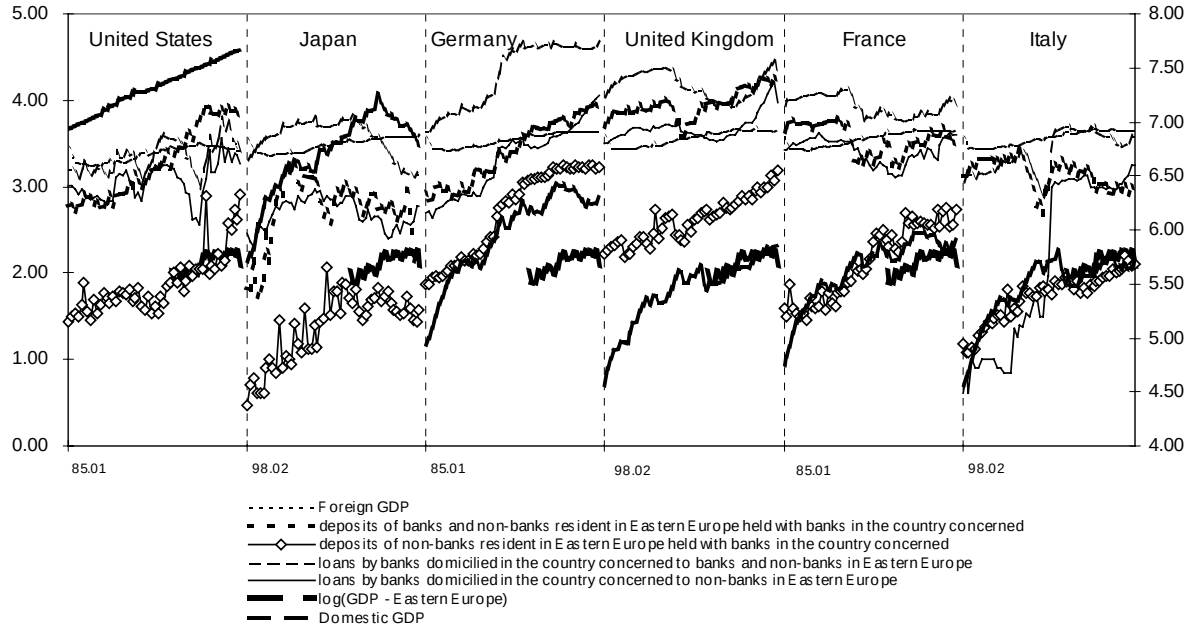


Chart 15b

Eastern Europe

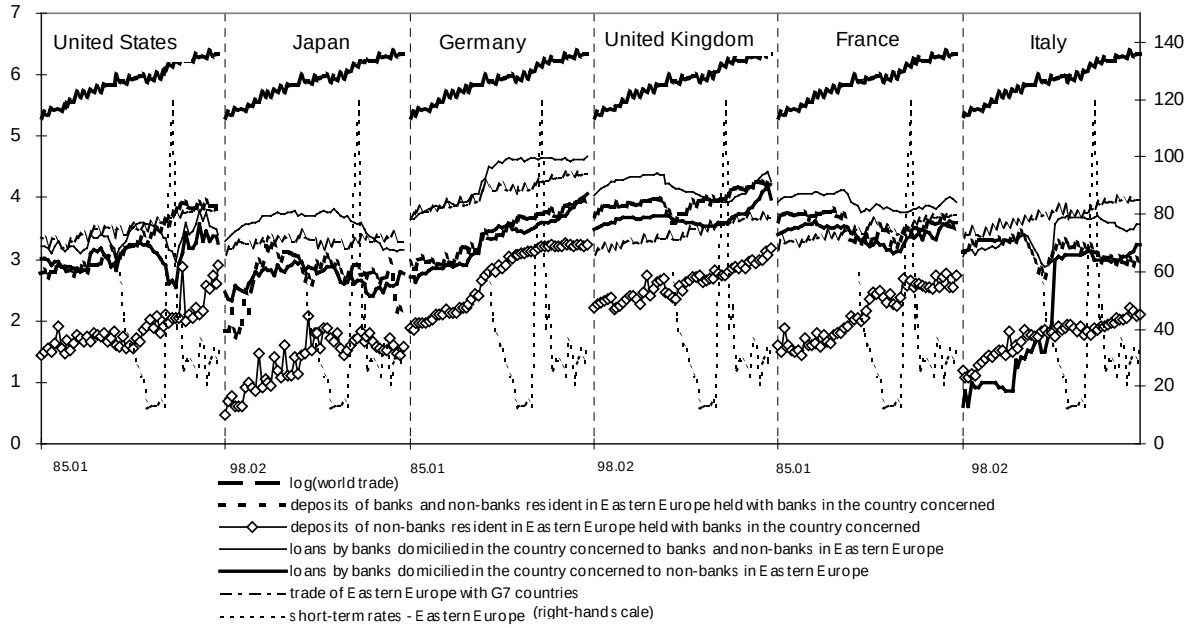


Table 10

Equations for deposits held with banks in the G6 by banks located in the specified geographical areas

	R^2	DW	Domestic GDP	Foreign GDP	Short-term rate differential	Long-term rate differential	World trade	Area's trade with G7	Inflation differential	Market capitalisation/GDP of country concerned
United States – Deposits of banks resident in:										
Offshore centres	0.91	0.81	–1.33**	1.72	–0.004*	–0.009*	1.22	–0.227**	0.037 [1]	0.095
Latin America	0.91	0.86	1.32*	–0.19*	0.00011*	0.0036**	–1.14*	1.30	0.0017	–0.201
Asia	0.85	0.84	5.46	–2.24	0.049*	0.055	–1.28	1.16	0.0039*	–0.164
Eastern Europe	0.96	1.43	1.00*	0.192	–0.0006*	–	0.938*	0.608	–0.111 [1]	–0.229
Japan – Deposits of banks resident in:										
Offshore centres	0.79	0.95	2.66	–8.20	0.055**	0.0029*	2.37	0.512*	0.280 [1]	0.283
Latin America	0.45	1.23	–1.54**	–0.06*	0.0013	0.017**	–0.443*	0.442*	–0.009	0.592
Asia	0.84	0.65	–0.328*	–1.30*	0.013*	0.076	3.55	–0.98*	–0.05*	–0.519
Eastern Europe	0.56	0.94	3.38	–0.506	0.010	–	–0.837*	0.520*	0.202* [1]	–0.042*
Germany – Deposits of banks resident in:										
Offshore centres	0.84	1.46	0.64	0.49*	0.0016*	–0.034**	0.376	–0.204	–0.076 [1]	0.059*
Latin America	0.91	2.02	–1.17	0.523	0.00029	0.00076*	4.13	–0.252*	–0.0032	0.0103
Asia	0.68	0.72	0.309*	–3.56	0.0182*	0.181	1.174**	–0.330*	–0.055**	0.296
Eastern Europe	0.94	0.69	–0.121*	0.268	0.0018**	–	1.16	0.578	0.034 [1]	–0.113
United Kingdom – Deposits of banks resident in:										
Offshore centres	0.82	1.20	–0.122**	–1.48	–0.0071**	0.0129**	0.583	0.189	–0.003 [1]	0.161
Latin America	0.77	1.23	–1.886	0.250*	0.00042	0.0042*	0.831*	2.08	–0.002*	0.116*
Asia	0.78	0.85	0.621	–0.595*	0.0089**	0.040	0.249*	0.109*	–0.042	–0.0101
Eastern Europe	0.76	1.12	–1.61	0.025*	0.0034	–	1.06**	0.667	0.049** [1]	0.324
France – Deposits of banks resident in:										
Offshore centres	0.81	0.79	0.388**	–1.57	0.027	–0.021*	1.82	0.0048*	0.104** [1]	0.032*
Latin America	0.515	1.04	–1.98	0.78**	0.0011	0.0064*	3.04	0.209*	–0.0057**	0.268*
Asia	0.698	0.94	1.42	–1.31*	0.053	–0.042**	–0.505*	–2.24	–0.139	–0.237**
Eastern Europe	0.40	0.63	–1.30	–0.042*	0.0015*	–	–0.075*	–0.035*	0.013 [1]	0.457
Italy – Deposits of banks resident in:										
Offshore centres	0.93	1.34	–0.472**	3.16	0.088	0.057**	1.33	–0.138*	–0.314 [1]	–0.043*
Latin America	0.56	0.78	–1.79	–0.43*	0.0006	0.0008*	0.772*	1.76	–0.0061	–0.232*
Asia	0.20	1.09	–0.046*	–3.52	–0.026*	0.035*	2.39	–0.28*	0.005*	–0.719
Eastern Europe	0.26	0.74	–0.102*	–0.032*	0.0024*	–	1.95	–1.70	–0.155* [1]	–0.132*
PANEL – Deposits of banks resident in:										
Offshore centres	0.94	0.21	0.161*	–0.704	0.0018*	0.064	1.64	–0.072*	–0.051** [1]	0.054*
Latin America	0.88	0.56	–1.74	0.008*	0.0008	0.002*	1.37	0.96	–0.005	0.141
Asia	0.96	0.56	0.515	–2.59	0.033	–0.0067*	1.22	–0.83	–0.042	–0.132
Eastern Europe	0.614	0.11	0.613	0.109	0.007	–	0.622	0.558	0.122 [1]	–0.480

* Not significant at the 5% level. ** Not significant at the 10/15% level. [1] Inflation in the G6 country concerned.

Table 11

Equations for deposits held with banks in the G6 by banks located in the specified geographical areas

	R^2	DW	Domestic GDP	Foreign GDP	Short-term rate differential	Long-term rate differential	World trade	Area's trade with G7	Inflation differential	Market capitalisation/GDP of country concerned
United States – Deposits of non-banks resident in:										
Offshore centres	0.94	0.89	3.43	–3.33	0.0045*	0.011**	0.036*	0.286	–0.053** [1]	–0.038**
Latin America	0.68	0.76	0.143*	–0.019*	–0.00005	0.0021	0.147*	–0.113**	0.0006	0.0115*
Asia	0.89	0.67	0.097*	0.244*	–0.005*	0.007*	0.359**	0.078*	0.0048*	–0.030
Eastern Europe	0.68	2.02	–0.912*	0.168	0.0028	–	1.14**	–0.05*	–0.204 [1]	0.074**
Japan – Deposits of non-banks resident in:										
Offshore centres	0.90	1.94	0.684	0.733*	0.015*	0.027*	–0.147*	0.0086*	0.0286* [1]	0.0854*
Latin America	0.54	1.57	–0.457**	–0.05*	0*	–0.0025*	1.19**	–0.013*	–0.0011*	–0.166**
Asia	0.85	1.93	0.051*	–0.419*	–0.004*	0.0093*	0.496	–0.180**	–0.002*	–0.061**
Eastern Europe	0.76	1.90	0.76	–0.154	–0.0013*	–	0.692**	–0.533	0.009* [1]	0.0073*
Germany – Deposits of non-banks resident in:										
Offshore centres	0.69	1.18	2.70	2.40	–0.058	–0.072**	–2.68	–0.55	–0.068* [1]	0.217**
Latin America	0.95	1.28	0.372	0.102	0.00003**	0.00011*	0.152*	–0.063*	–0.0002*	0.0242*
Asia	0.92	0.73	0.370	0.767	–0.0045*	–0.0405	–0.157*	–0.128*	0.0042*	0.036*
Eastern Europe	0.97	0.86	0.646	0.122	–0.0003*	–	–0.406**	0.579	0.077 [1]	–0.046*
United Kingdom – Deposits of non-banks resident in:										
Offshore centres	0.95	1.44	0.623	0.375	0.0069	–0.0054*	–0.449	–0.052**	0.019 [1]	0.109
Latin America	0.79	1.42	0.56	0.089	–0.0008	0.0008*	–0.199**	0.027*	0.00015*	–0.065
Asia	0.86	1.04	0.442	–0.024*	0.0039**	–0.015	–0.087*	0.0469*	0.0044*	–0.0063*
Eastern Europe	0.89	1.60	–0.422**	–0.019*	0.0011**	–	0.672	0.408	0.0148* [1]	0.049*
France – Deposits of non-banks resident in:										
Offshore centres	0.73	1.31	–0.007*	–2.05	0.004	–0.048*	2.41	0.0049*	0.073** [1]	–0.159
Latin America	0.79	1.25	0.723	0.090**	–0.00006	0.0014**	–0.271**	0.071*	0.00013*	–0.026*
Asia	0.92	1.23	0.526	0.019*	0.004*	–0.036	0.064*	–0.141*	–0.007*	–0.038*
Eastern Europe	0.90	1.33	0.167*	0.120	–0.0018**	–	0.534**	0.499	0.011* [1]	–0.178
Italy – Deposits of non-banks resident in:										
Offshore centres	0.58	1.22	1.87	1.18**	–0.035**	–0.0089**	–2.03	0.122*	0.084* [1]	–0.027*
Latin America	0.92	1.82	0.561	0.122	–0.00006	0.0008**	–0.156**	0.075**	0.0006	–0.041
Asia	0.71	1.65	0.622	–0.262*	–0.011**	0.017**	–0.149*	0.071*	0.0086*	0.023*
Eastern Europe	0.91	1.86	0.751	0.083	0*	–	–0.593	0.256	0.045** [1]	0.180
PANEL – Deposits of non-banks resident in:										
Offshore centres	0.94	0.74	1.00	1.01	–0.0098**	–0.028	–0.765	–0.052*	0.0173* [1]	0.0067*
Latin America	0.99	1.28	0.510	0.138	–0.00007	0.0015	0.216	–0.194	0.00044	–0.0079*
Asia	0.99	0.77	0.390	–0.216	0.0017*	–0.026	0.106**	0.200	0.00088*	–0.0079*
Eastern Europe	0.91	1.03	0.813	0.117	–0.0011	–	–0.631	0.351	0.037 [1]	0.063

* Not significant at the 5% level. ** Not significant at the 10/15% level. [1] Inflation in the G6 country concerned.

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