

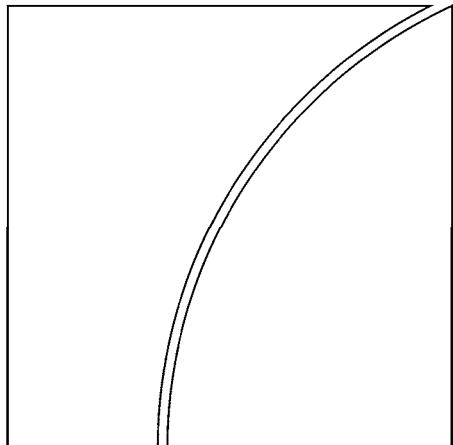


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The global crisis and  
financial intermediation  
in emerging market  
economies



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# The global crisis and financial intermediation in emerging market economies: an overview<sup>1</sup>

## Introduction

Emerging market economies (EMEs) were significantly affected by the global financial crisis. Nevertheless, compared with their experience in previous crises, EMEs displayed remarkable resilience, maintaining robust rates of growth even as the crisis unfolded in advanced economies starting around mid-2007, and containing disruptions to financial markets so as to avoid experiencing crises themselves. The peak period of stress in EME financial markets was also comparatively limited, with severe pressures in the aftermath of the Lehman Brothers bankruptcy in mid-September 2008, and improved stability and signs of recovery starting around the second quarter of 2009. Since then, EMEs have outperformed advanced economies, both in terms of economic growth and in asset price valuations.

On 28–29 January 2010, senior central bank officials from EMEs met at the BIS in Basel to discuss the impact of the international crisis on emerging market economies and how policymakers had responded. This overview draws on that discussion, which highlighted four topics: (i) capital flows and cross-border lending; (ii) financial intermediation in EMEs during the crisis: home-owned versus foreign-owned banks; (iii) the impact of the crisis on local money and debt markets; and (iv) central bank instruments in response to the crisis.

## 1. Capital flows and cross-border lending

A key feature of financial crises in EMEs in the 1980s and 1990s was a “sudden stop” or reversal of capital inflows.<sup>2</sup> The most recent crisis also saw a sharp reduction in gross capital inflows to EMEs. However, there were important differences from past crises. On the one hand, EMEs were much stronger than in previous episodes of capital inflow reversals. For example, net financing requirements were lower in many EMEs because current accounts were in surplus or balanced (Graph 1).

On the other hand, policies in the EMEs could do little to counter capital flow reversals caused by the crisis in the advanced financial markets. In particular, the sharp declines in cross-border bank lending in the most recent crisis reflected weaknesses in the capital and liquidity positions of major international banks that prompted them to deleverage and reduce financing. This is consistent with the evidence of Takáts (2010) that supply factors played a dominant role in the reduction in cross-border lending in the fourth quarter of 2008.<sup>3</sup> One implication was that EME policy responses, such as large increases in interest rates, would have had little effect in attracting cross-border lending until global financing conditions had stabilised.<sup>4</sup> During the meeting, concerns were also expressed that advanced economies

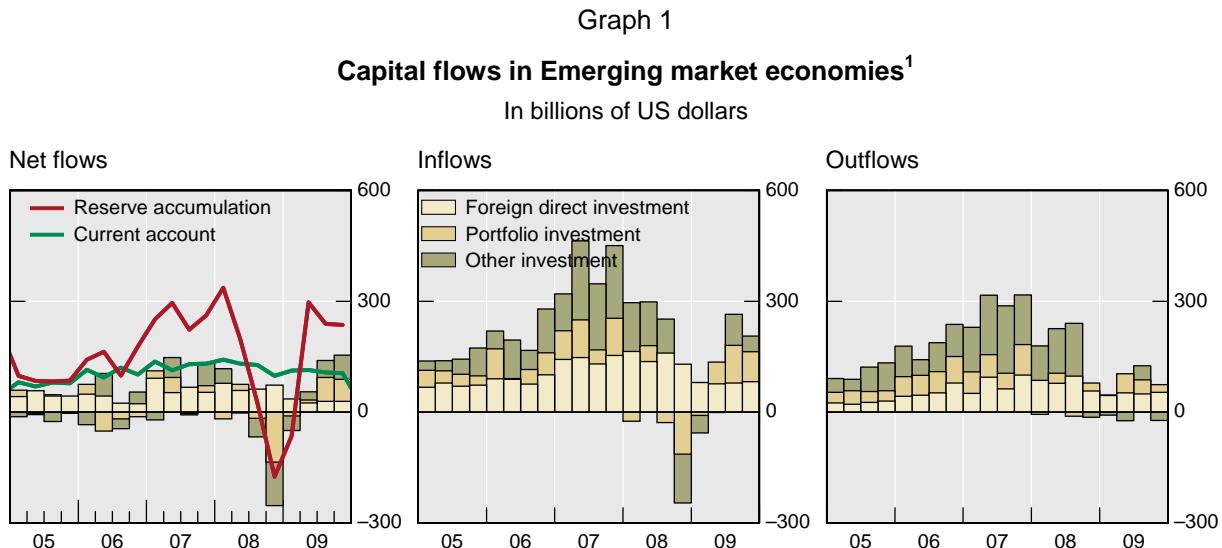
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<sup>1</sup> This overview chapter was prepared by Ramon Moreno based on contributions by Dubravko Mihajek, Előd Takáts and Agustín Villar. Comments by Philip Turner are gratefully acknowledged.

<sup>2</sup> See BIS (2009) pp 8–12 for a historical overview.

<sup>3</sup> See Takáts (2010). The importance of external factors is also suggested by the correlation between the rise and fall in financial stress reported by EME central banks following the Lehman bankruptcy and the fairly sharp rise and fall in indicators of risk aversion or stress in developed markets. See Moreno and Villar (2010).

might adopt policies supporting financing in their own economies, which could restrict flows to emerging market economies and might imply a need for policy coordination.



<sup>1</sup> Quarterly sums across Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela, China, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, Czech Republic, Hungary, Poland, Russia, South Africa, Turkey.

Source: IMF IFS; national data.

Notwithstanding these concerns, capital flows to EMEs recovered relatively quickly. First, net and gross capital flows to EMEs rebounded starting around the second quarter of 2009 after declining sharply in the last quarter of 2008 (Graph 1, left-hand and middle panels) indicating an early recovery in foreign investor interest in EMEs. Second, gross capital outflows appear to have played a stabilising role (Graph 1, right-hand panel). They declined in late 2008 and in early 2009, partly counteracting the reduction in gross capital inflows. This contributed to the recovery observed in net capital flows to EMEs in 2009.

## 2. Bank intermediation: home-owned versus foreign-owned banks<sup>5</sup>

The financial stress caused by the crisis affected bank intermediation in emerging market economies. During the meeting, three aspects were discussed: (i) changes in bank business models (including funding, lending and liquidity operations); (ii) how foreign-owned banks' responses compared with those of home-owned banks; and (iii) securitisation in EMEs since the crisis.

<sup>4</sup> For further discussion of cross-border flows, see the contributions by Central Bank of Argentina (2010), Babicky (2010) or South African Reserve Bank (2010). Ong (2010) discusses the risks associated with cross-border financial intermediation.

<sup>5</sup> For background material on this topic, see Mihaljek (2010).

## Changes in business models

EME banks by and large adjusted to the crisis in ways that stabilised their financial positions. On the funding side, they reduced reliance on wholesale markets and sought to attract retail deposits. On the lending side, banks lowered the growth of new lending to firms and households, shifted towards less risky loans and increased their holdings of government bonds. In an effort to boost liquidity, banks shortened the maturity of their assets, relied less on the interbank market and increased their transactions with central banks.<sup>6</sup>

A particular concern was foreign currency lending to households, which was widespread in some central and eastern European countries. At the macroeconomic level, this type of lending was encouraged by the trend appreciation of local currencies, relatively low exchange rate volatility, and high domestic interest rates in some countries. Some participants thought that flexible exchange rates were the best tool to limit the spread of foreign currency lending.

At the microeconomic level, foreign banks undertook foreign currency lending to increase their competitiveness in local banking markets, thus helping to lower financing costs in an expanding market. That is, such lending did not reflect the traditional currency substitution due to macroeconomic instability.

However, there was a certain lack of appreciation by banks of the large currency mismatch risks that borrowers had assumed (ie debts were in foreign currency but income was in local currency). In some cases, controlling the expansion of foreign currency lending was more difficult because views differed on how best to address this issue. However, with the crisis, a consensus in favour of limiting foreign currency lending has emerged.

## Role of foreign-owned banks<sup>7</sup>

Some meeting participants reported that foreign and domestically-owned banks adjusted to the crisis (in terms of their funding, lending and liquidity operations) more or less in the same way. Nevertheless, there were some important differences in foreign-owned bank behaviour across EMEs. First, *foreign bank subsidiaries in some EMEs funded their parent banks during the crisis*, apparently to strengthen the liquidity and overall financial position of parent banks. This raised concerns in some countries where foreign exchange markets were under pressure, although parent banks with subsidiaries in central Europe used some of this funding to support subsidiaries in crisis-affected countries in the region. There were also other examples of parents providing support to their subsidiaries in EMEs.

Second, in a number of countries *foreign bank participation in domestic interbank or credit markets was affected*. For example, foreign banks in one EME – apparently on instructions from their parent banks – withdrew earlier than domestic banks from the interbank market at the height of the crisis in the fourth quarter of 2008, preferring to deal with the central bank rather than with other commercial banks. As for credit, BIS statistics show that lending by the local affiliates of foreign banks denominated in domestic currency was remarkably stable during the crisis.<sup>8</sup> However, in a number of EMEs, including large economies like China and Brazil, foreign bank credit growth lagged behind that of domestic banks after the Lehman Brothers bankruptcy. Foreign banks also scaled back credit to certain sectors (eg consumer lending).

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<sup>6</sup> For a discussion of funding patterns and credit, see for example Al-Hamidy (2010), Babický (2010), Kozinski (2010) or Moreno (2010a).

<sup>7</sup> For discussions of the role of foreign banks see Banai et al (2010), Marzuk (2010) and Sinha (2010).

<sup>8</sup> See for example Avdjiev et al (2009), Graphs 4 and 5.

A number of explanations were offered for differences in foreign bank behaviour. One was the nature of the *funding model*.<sup>9</sup> It was suggested that the behaviour of foreign banks that relied on retail deposits for funding was very similar to that of domestic banks during the crisis. The *financial condition of the parent* was also important. In one EME, headquarters financial support was received by a subsidiary of a bank whose parent was weathering the crisis well, but not by a subsidiary of a bank (headquartered in another country) whose parent had been much more severely affected. In another EME, smaller foreign-owned banks whose parents were more exposed to the global financial turmoil were cut off from head office funding and had to reduce their exposures to the corporate sector. Still another explanation was the *strategic importance of the market*. For example, a number of EU-headquartered banks consider central and eastern Europe part of their core market, which creates a strong incentive to maintain a presence, even in the face of significant stress.

Recent experience has also prompted a reassessment of the relative merits of foreign branch banking. From the perspective of EMEs, foreign bank branches were traditionally seen as providing greater incentive to foreign banks to transfer know-how and technology to EMEs. With the crisis, however, subsidiaries came to appear more attractive for EMEs because their assets can be ring-fenced and they can be regulated more tightly than branches in some jurisdictions, ensuring that they maintain a stronger financial position (eg adequate capital). Another reason is that subsidiaries, which tend to lend and fund in the local market, are thought to signal greater commitment.

While a number of EMEs favoured a foreign bank subsidiary approach (even in those cases where foreign bank branches are currently dominant), others still saw a role for branches. One participant reported a reluctance to give foreign-owned banks dominance over some market segments, which could happen if they were granted full national treatment as subsidiaries. It was also noted that with appropriate legislation, depositors of branches could be protected just as well as depositors of subsidiaries.

Foreign banks themselves also face trade-offs in choosing between entering EME markets as branches or subsidiaries. On the one hand, reputation risks are the same whether affiliates operate as branches or subsidiaries, and increased regulation of subsidiaries can impose costs. By these criteria, foreign banks might prefer to set up branches. On the other hand, subsidiaries might have a greater capacity to expand in a rapidly growing market, implying greater profit opportunities.

## Securitisation

In most EMEs, securitisation of domestic bank loans was not widespread before the crisis,<sup>10</sup> but it was present in a number of countries (eg Brazil, China and India). Participants' views differed on the merits of encouraging further securitisation. In one case, authorities sought to set up a legal and regulatory framework so as to prevent banks from resorting to potentially risky unregulated or "informal" securitisation. In another case, authorities were concerned that securitisation would further stimulate already rapid (double digit) bank lending, and consequently took no steps to encourage it by providing a legal framework.

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<sup>9</sup> How international banks changed their funding patterns is explored in some detail in BIS (2010).

<sup>10</sup> For emerging market economies, securitisation has traditionally been a way to reduce the cost of cross-border financing. Risk mitigation for "future flow" securitisation (eg by backing the instrument by revenues collected offshore) has been effective; at least one rating agency reports that for this type of securitisation, the default rate is low compared to the typical rating (BBB) assigned.

### 3. Impact of the crisis on emerging financial markets<sup>11</sup>

The crisis affected liquidity in various segments of EME foreign exchange (FX) markets (spot, forward, swaps etc) and in domestic financial markets.

#### Effects on EME forex markets<sup>12</sup>

The effects of the crisis on forex markets appeared to vary across EMEs, although in general both spot and foreign exchange swap markets experienced a tightening in financing conditions. This resulted in a reduction in the number of intermediaries active in the marketplace, as well as shorter maturities in some FX derivative markets, including the cessation of longer-maturity (five- to seven-year) FX swap deals. Another result was improvements in the documentation of transactions, more stringent collateral requirements for swap transactions and the migration of derivatives to exchanges, all of which helped reduce the outstanding notional amounts and possibly reduced risk. In some countries where derivatives markets are small, their contraction was not seen as a major source of concern.

A number of factors influenced the scale and duration of the impact on foreign exchange markets. Possibly the most important were *external factors*, particularly the financial position of parent banks (which in some cases led to cutbacks in limits that the headquarters applied to their EME subsidiaries' FX positions) and changes in global investor sentiment or risk aversion (eg the normalisation of one FX swap market was attributed to the improvement in government bond prices).

The *degree of financial integration and deepening* also played a role. For example, the effects of the crisis on less developed forward markets in some Asian countries appear to have been smaller than in more developed markets. The reasons why different segments of the FX markets developed in different countries are not clear and could be idiosyncratic (eg specialisation of traders who first established the market).

Finally, and as discussed further below, *policy responses* were also important, notably the availability of foreign reserves, foreign central bank swap or repo facilities, or IMF financing.

#### Effects on domestic liquidity conditions<sup>13</sup>

Difficulties in cross-border financing affected domestic liquidity conditions in EMEs through three channels. First, funding costs in domestic currency increased in several economies as the dislocation of the cross-border funding market prompted financial institutions to fund their US dollar borrowing through the FX swap market. Second, heightened counterparty risk affected borrowing in the interbank market (eg foreign banks were particularly affected). For example, market segmentation appears to have increased in some interbank markets, with some banks paying a higher average interest rate or facing reduced access to credit. Finally, there was a shortening in the maturity structure of banks' funding.

Of particular interest at the meeting was the impact of the crisis on interbank markets and on bond markets.

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<sup>11</sup> For further discussion of this topic and some references to central bank contributions, see Moreno and Villar (2010).

<sup>12</sup> In the immediate aftermath of the Lehman bankruptcy there was also concern about the reduction in trade financing; this is reflected in the policy responses mentioned below.

<sup>13</sup> See BIS (2009) pp 117–30 for an analysis of the impact of the crisis on the liquidity of local interbank and capital markets.

**Impact on interbank markets.** The crisis effectively shut down interbank markets for longer-term funding in a number of economies, leaving only short-term interbank funding available.<sup>14</sup> Nevertheless, questionnaire responses by central banks suggest that the impact of the crisis on secured and unsecured local currency lending between banks (where the central bank is not the counterparty) was generally limited. Few episodes of stress in the domestic interbank money markets were reported, particularly compared to those reported for the foreign exchange market. In one large EME, there was brief period during which liquidity problems arose in the domestic interbank market after the bankruptcy of Lehman Brothers. This reflected liquidity shortages rather than perceived counterparty risks and could be addressed without a change in monetary policy. While liquidity problems are generally linked to maturity transformation, some participants suggested that the impact is lessened if bank funding is from deposits rather than wholesale financing.

**Impact on government bond markets.** In some EMEs, the effects on domestic bond markets were relatively limited. In Mexico, however, market uncertainty affecting foreign exchange markets (notably related to losses by firms on derivative positions) spilled over to domestic markets, leading to an increased demand for liquidity, massive withdrawals from mutual funds and sales of securities. This was associated with a sharp decline in demand for 20- to 30-year government bonds. Many issuers could not place new securities. At the time of the meeting, markets were back to normal although liquidity conditions were not the same as before.<sup>15</sup> In another EME where bond markets are comparatively deep, concerns that foreign investors would sell their government bond positions led to a sharp widening in bid-ask spreads that effectively stopped market activity. Authorities responded by offering repo lines with government bonds as collateral.

## 4. Central bank instruments in response to the crisis<sup>16</sup>

A wide range of tools were employed to deal with the crisis, notably measures taken to support foreign currency financing (eg lending from foreign reserves, foreign exchange auctions based on swap lines with other central banks) and domestic currency financing.

### Supporting foreign currency financing

A number of countries implemented foreign exchange market operations to provide foreign currency, in some cases (eg Chile, Turkey) after discontinuing foreign reserve purchases. Foreign exchange market intervention took place in a variety of market segments (eg spot, forward, swaps or repos) that appeared to reflect perceptions of effectiveness or central bank balance sheet positions, and there was a tendency to increase duration (some transactions ranged from about one month to one year). Important considerations in providing support were to target certain priority sectors (eg trade finance, small enterprises), facilitate price

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<sup>14</sup> Individual country experiences varied. Fung and Yu (2010) provide empirical evidence showing that stress in US dollar money markets was rapidly transmitted to Hong Kong dollar money markets. In contrast, some other money markets experienced moderate or no effects (see for example Central Bank of Argentina (2010), Ibrahim (2010) or Bank of Thailand (2010)). See Babický (2010) and Sinha (2010) for additional experiences.

<sup>15</sup> See Sidaoui et al (2010) for a discussion of Mexico's experience.

<sup>16</sup> For more on this topic, see Moreno (2010a), this volume and BIS (2009) pp 51–8. Country responses are discussed in a number of papers, eg Al-Hamidy (2010), Bank of Thailand (2010), Central Bank of Argentina (2010), Chung (2010), Guinigundo (2010), Ibrahim (2010), Mesquita and Toros (2010), People's Bank of China (2010), Quispe and Rossini (2010), Sidaoui et al (2010), Sinha (2010), South African Reserve Bank (2010) and Yörükoglu and Atasoy (2010).

discovery (eg through the use of auctions) and economise on foreign reserves (eg via the use of swaps rather than outright sales).

Most foreign exchange market intervention was financed by drawing on foreign reserves (only Korea also drew on the Federal Reserve swap facility persistently and on a relatively large scale).<sup>17</sup> Nevertheless, views differed on what the crisis revealed about the benefits and costs of foreign reserve accumulation. One view was that the benefits from accumulating international reserves were clearly shown to outweigh the costs. This was particularly so in the case of commodity (eg oil) exporters because of high volatility in export revenues. It was also noted that the standard indicator of foreign reserve cover for short-term external debt has shortcomings: it appeared to be adequate in some countries up to mid-2008, but a shortening of maturities by external lenders led to a sharp decline in this ratio, to below the 100% Guidotti-Greenspan threshold in a few cases.

Another view was that reserve holdings were in fact too high: the amount of foreign reserves used during the crisis was generally limited compared to the stock, and reserve hoarding is costly. Indeed, recently the high costs of sterilised intervention appear to have revived interest in capital controls.

As for alternatives to foreign reserves, a number of countries had obtained access to the IMF's Flexible Credit Line, but views differed about this alternative and possible stigma effects. One participant noted that US dollar swaps of central banks with the Federal Reserves helped maintain market confidence, consistent with some recent empirical evidence.<sup>18</sup> Indeed, such evidence more generally underscores the importance of policy responses in advanced economies in stabilising conditions in emerging market economies.<sup>19</sup>

Regional central bank cooperation was also seen as playing a role. Central banks in Asia and Latin America consulted frequently on conditions in foreign exchange markets. In Asia, a regional foreign exchange swap facility has been set up, drawing on a pool of foreign reserves.

### **Supporting local currency financing**

A big difference from past crises is that many EMEs had more room to ease macroeconomic policies to counter a severe tightening of global financing conditions and an economic downturn. Thus, central banks changed their monetary operations or set up facilities (allowing for wider collateral or extending maturities eg via term lending facilities) to provide domestic currency financing. Some facilities were already in place and could be used immediately, which strengthened confidence in the private sector.

There were also reductions in policy rates, which in some cases very large (eg from 8.25% to 0.50% in Chile). However, as noted by Moreno (2010a), policy rate reductions in some countries took place after most of the market turmoil had passed, so they appeared intended to counter the sharp decline in aggregate demand in EMEs. The pass-through to bank lending rates was in many cases significant, although deposit rates in at least one instance reacted more quickly than loan rates, apparently because risk reassessment took some time.

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<sup>17</sup> Mexico drew on the Fed swap facility once, while the other two EMEs with access to Federal Reserve swap lines (Brazil and Singapore) did not draw on the funds. For further discussion of foreign reserves versus the alternatives, see Moreno (2010b) and Ong (2010). In some countries repatriation of capital by households helped stabilise the currency.

<sup>18</sup> See Stone et al (2009) and Baba and Shim (2010).

<sup>19</sup> See Baba and Packer (2009) and Goldberg et al (2010).

Policy rate cuts tended to depreciate EME exchange rates, but in a number of cases this effect was more than offset by sharp declines in (extreme) risk aversion.

Countries also responded by lowering reserve requirements; among the participants at the meeting, at least 10 countries changed reserve requirements in response to the crisis. In Brazil, lower reserve requirements were an important tool, especially to help small and medium-sized businesses.<sup>20</sup>

The need for appropriate institutional arrangements and the pace for exit strategies were also mentioned, as was the importance of transparency in implementing such strategies.

### **Factors influencing policy responses and effectiveness<sup>21</sup>**

A number of factors influencing policy responses and their effectiveness were cited. First, the *duration and severity of stress*, which in some cases was very brief or limited in its impact. It was also noted that increasing liquidity or lowering interest rates was more effective if the shock was largely from the real rather than the financial sector.

Second, *reduced vulnerabilities*. These included no currency mismatches (attributed in part to floating exchange rates), regulatory measures taken to cool overheating economies before the crisis and sufficient or large international reserves.

Third, *consistency of economic policy*, especially fiscal policy, which was seen as crucial for maintaining stability and allowing for countercyclical policies.

Fourth, *effective communications*. This posed challenges, as technical changes that may have been communicated in a way that was well understood by markets were not always easily understood by journalists. Some central banks hired public relations firms for this purpose.

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<sup>20</sup> For discussions of reserve requirements, see in particular Mesquita and Toros (2010) and Vargas et al (2010). Quispe and Rossini (2010) highlight the use of reserve requirements in domestic and foreign currencies.

<sup>21</sup> For further discussion of the effectiveness of policy responses, see Moreno (2010a).

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# Cross-border bank lending to emerging market economies<sup>1</sup>

Előd Takáts

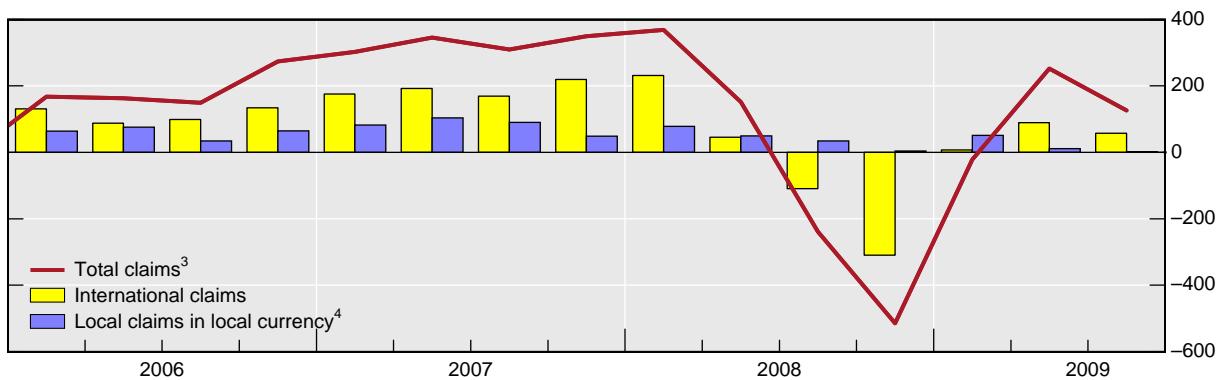
The global financial crisis shook the foundations of international banking and finance and put the international banking system under intense stress. Many financial markets became dysfunctional, and many international banks went bankrupt. Although the crisis originated in advanced economies, it quickly moved to emerging market economies (EMEs), particularly in the aftermath of the collapse of Lehman Brothers. Cross-border bank lending proved to be one of the major financial channels through which stresses in the international financial system were transmitted to individual EMEs. This paper examines cross-border bank lending during the crisis. It also aims to understand the role played by international banks and hopes to provide lessons for thinking about economic policy.

Cross-border lending to EMEs declined steeply during the crisis. Economies and banks relying on wholesale funding were hit especially hard. This decline raises many questions for policymakers – perhaps the most important one concerns the drivers of the decline.

Graph 1

## BIS reporting banks' consolidated lending to EMEs (adjusted)<sup>1</sup>

Changes in stocks,<sup>2</sup> in billions of US dollars



<sup>1</sup> Emerging market consolidated positions of banks headquartered in 30 reporting countries. <sup>2</sup> Quarterly difference in outstanding stocks. <sup>3</sup> Sum of international claims and local claims in local currency (unadjusted); international claims comprise cross-border claims in all currencies and local claims in foreign currencies; local claims relate to those booked by reporting banks' foreign offices on residents of the country in which the foreign office is located. <sup>4</sup> Adjusted for exchange rate movements by converting all changes in local claims at the exchange rate prevailing in Q1 2009. Note that total claims (red line) are computed using unadjusted local claims.

Source: BIS consolidated banking statistics on an immediate borrower basis.

Although the decline in cross-border lending is necessarily linked to the international banks which provide those loans, a careful look suggests a more nuanced picture of their role. In particular, even though international lending fell substantially during the crisis, there was a slight increase in domestic currency loans provided by international banks to local affiliates (Graph 1).<sup>2</sup> Based on consolidated claims of BIS reporting banks, Graph 1 contrasts

<sup>1</sup> Prepared by Előd Takáts. Research assistance was provided by Pablo García-Luna, Jhuvésh Sobrun and Agne Subelyte.

<sup>2</sup> As documented in detail in the *BIS Quarterly Review*, in particular in Gyntelberg et al (2009), Baba et al (2009) and Avdjiev et al (2009).

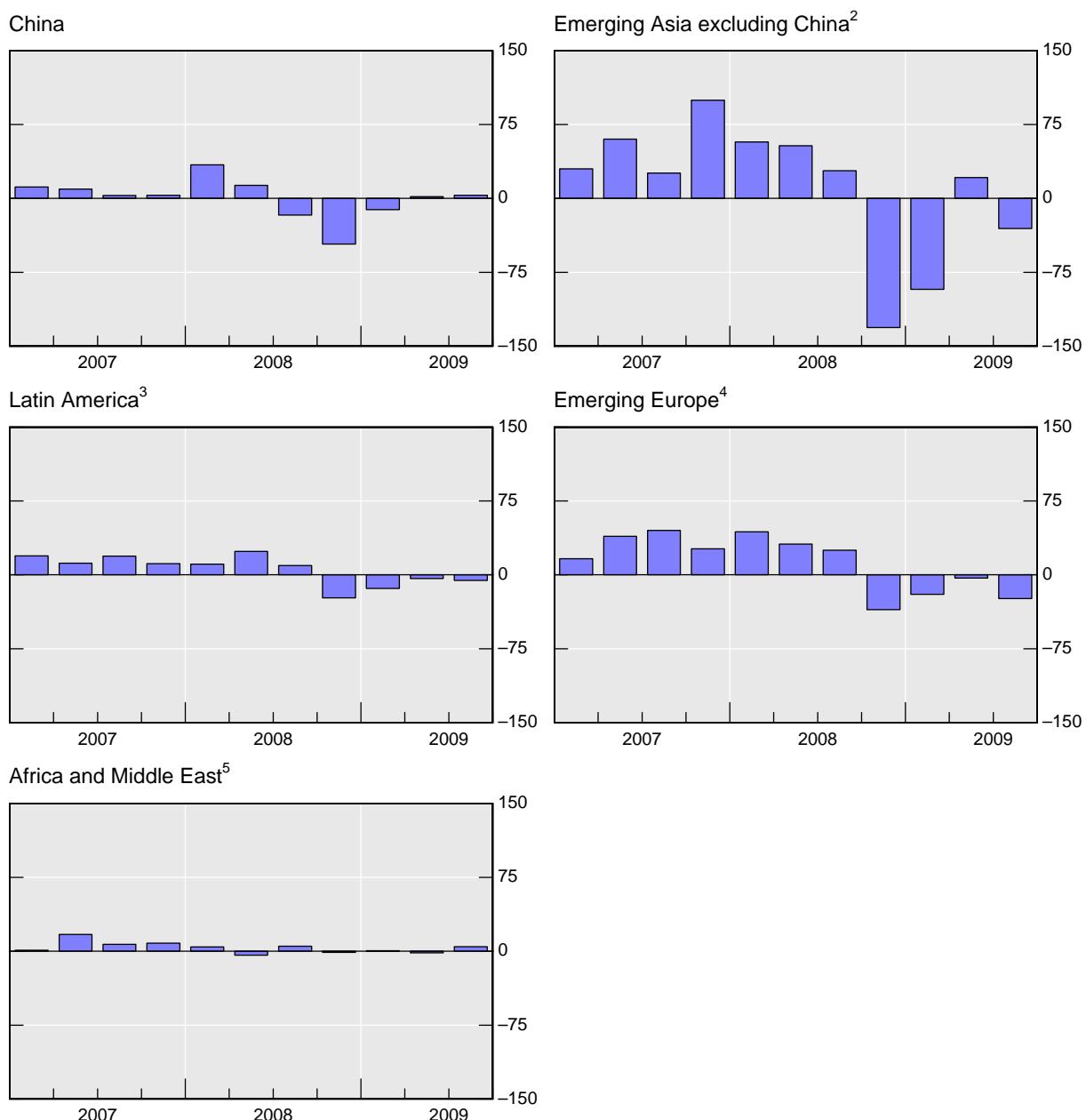
international claims (the sum of cross-border and local lending denominated in foreign currency – in yellow) and the local claims of their affiliates in local currency (in blue).

The heterogeneity of international banks may reveal further nuances. As the example of Mexico suggests, centralised international banks were perhaps more likely to respond to local market disturbances and limit lending than decentralised ones. The first section of this paper discusses the relevant developments in the organisation of international banking in further detail.

Graph 2

**Reversal of financial inflows<sup>1</sup>**

Quarterly flows, in billions of US dollars



<sup>1</sup> External loans of BIS reporting banks vis-à-vis EMEs; estimated exchange rate adjusted changes. <sup>2</sup> Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. <sup>3</sup> Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. <sup>4</sup> The Czech Republic, Hungary, Poland, Russia and Turkey. <sup>5</sup> Israel, Saudi Arabia and South Africa.

Source: BIS.

There is also considerable geographic heterogeneity (Graph 2). Different regions have experienced very different economic developments, which – as an important demand factor – could explain some of the outcomes. For instance, financial flows to China have stabilised faster than in the rest of emerging Asia. However, it seems that there are some common factors across regions which are not fully explained by economic fundamentals. For instance, financial flows have reversed sharply both in booming China and in emerging Europe. This could potentially be explained by supply factors.

The second section of this paper examines the supply and demand factors in cross-border lending, and finds that supply factors were the main drivers in the fall in cross-border bank lending to emerging markets. The demand for cross-border bank lending also declined, but it played a much smaller role. This contrasts with a much more balanced impact prior to the crisis. The section examines further, more detailed, evidence from some particularly affected countries. Certain well-performing economies, such as China or India, faced a withdrawal of cross-border lending which was unexplained by credit demand factors. Nevertheless, supply effects were not uniformly negative: for instance, parent banks seem to have supported banking operations in Hungary during the financial crisis. This heterogeneity in experiences suggests that a nuanced view might be appropriate for assessing the role of international banks before and during the global financial crisis.

The remainder of the paper is organised as follows: the third section examines the types of cross-border lending and the most affected sectors. The fourth section documents the available evidence on lending conditions. The fifth section examines the role of parent banks and the final section concludes with implications for the future.

## **1. The organisation of international bank lending**

The changing role and organisation of international banks seems to be a major factor in cross-border bank lending. Three main stylised facts regarding the changes in international banking appear to have been relevant for cross-border lending to emerging markets in the last two decades.

First, foreign banks became major players in the domestic financial markets of most emerging markets. By the end of 2008, total bank lending of foreign banks and their affiliates exceeded US\$ 1,500 billion in emerging Asia, US\$ 900 billion in emerging Europe and US\$ 800 billion in Latin America.

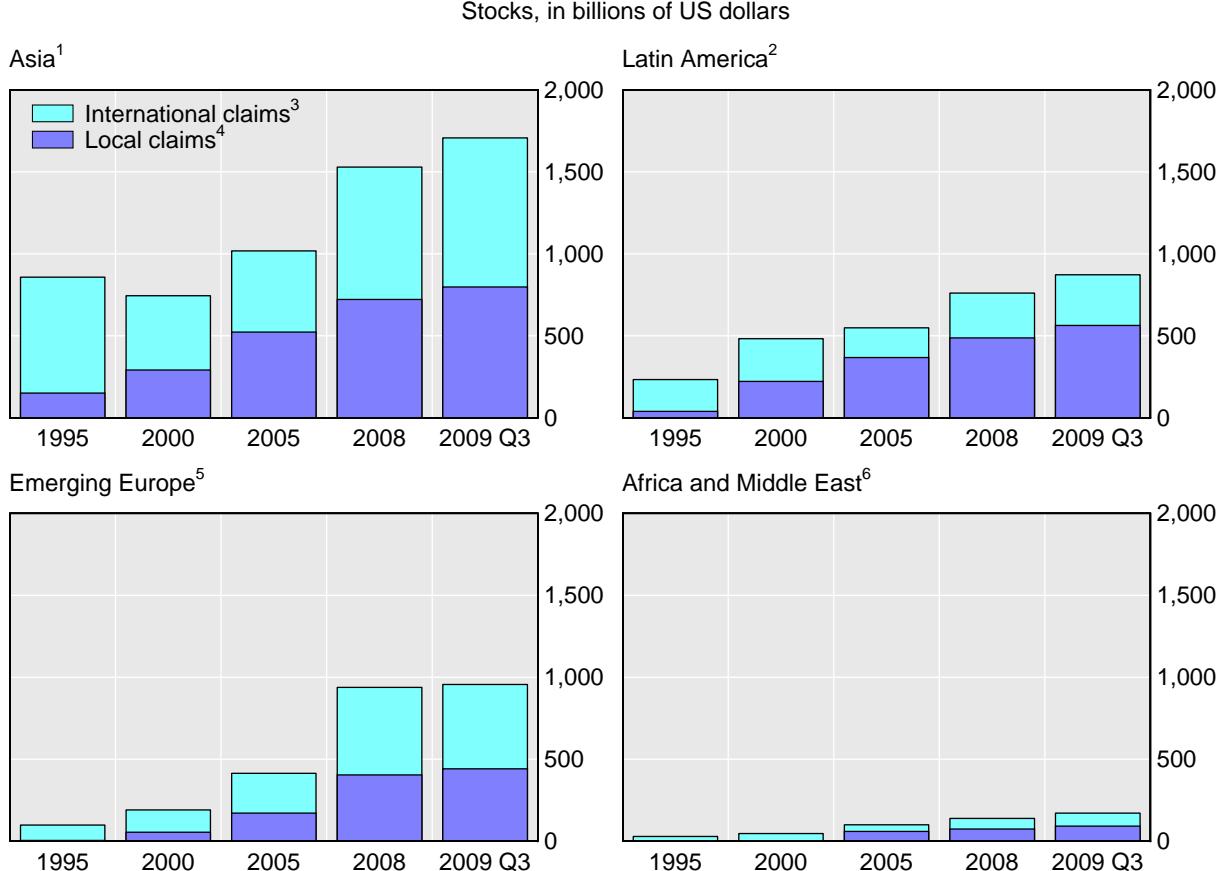
Second, the expansion of international banks mainly took the form of increased domestic currency lending by local affiliates, especially in Latin America (Graph 3). This implies that cross-border bank lending became relatively less important in those regions. In essence, many of those subsidiaries operate almost as local banks – with foreign ownership. Furthermore, currency mismatches were also limited in those regions. Finally, domestic currency lending by local affiliates suggests that when thinking about the role of international banks aside from cross-border lending, a wider context also needs to be considered.

However, somewhat exceptionally, emerging Europe remained largely reliant on cross-border lending. Such reliance, especially on cross-border wholesale funding, exposed the banking sector to the risks of sudden stops. The risks were exacerbated by foreign currency loans creating currency mismatches. However, foreign bank participation needs to be evaluated by assessing long-term impacts, as focusing solely on the crisis period could be misleading. For instance, the Magyar Nemzeti Bank notes that increasing foreign bank presence together with bank privatisation improved the functioning of the banking sector in Hungary.

Third, two distinct models of international banking have emerged, creating substantial heterogeneity in cross-border bank lending and bank behaviour. On the one hand, some

international banks centralised liquidity management, capital structure and lending decisions (eg Deutsche Bank and UBS), linking emerging market activities more closely to the aggregate lending decisions of the bank. On the other hand, some banks decentralised these activities, managing liquidity separately (eg BBVA and HSBC). Of course, there are many dimensions to the structure of international banking, and the broad characterisation referred to above could be further refined for policy purposes.

Graph 3  
Lending from BIS reporting banks



<sup>1</sup> China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. <sup>2</sup> Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. <sup>3</sup> Consolidated cross-border claims in all currencies and local claims in non-local currencies. <sup>4</sup> Local currency positions of reporting banks' foreign offices with local residents. <sup>5</sup> The Czech Republic, Hungary, Poland, Russia and Turkey. <sup>6</sup> Israel, Saudi Arabia and South Africa.

Source: BIS.

The structure of international banking could have been important in the crisis. Preliminary evidence from Mexico suggests that decentralised banks provided more stable lending during the crisis.<sup>3</sup> Bank Negara Malaysia also notes that requiring foreign banks to be locally incorporated and committing capital locally limited any contagion effects. Hence, it is possible that distressed centralised banks could not provide adequate lending to relatively robust emerging markets. However, in other cases, centralised banks might have been able to provide support for severely distressed markets by quickly reallocating liquidity.

<sup>3</sup> Although Mexican legislation sets rigorous limits on banks' operations with related parties, the banking structure might have had an impact within these limits.

The above factors may have shaped emerging market experience during the crisis. The size of foreign banks, the lending channel they chose and their organisational structure could have played a role in the way in which the crisis affected lending in emerging markets.

## **2. Supply and demand factors in cross-border lending**

The decline in cross-border lending to emerging markets coincided on the one hand with falling export demand (and, in many cases, sharply falling domestic output) and, on the other hand, with severe stress experienced by internationally active banks. Thus, it seems obvious that both demand and supply factors played a role.

This section aims to assess these impacts and examine which effect was stronger during the financial turmoil. It finds that supply factors seem to have played a larger role in determining cross-border bank lending. First, a panel regression framework is used on BIS data to disentangle demand and supply factors in cross-border bank lending. Second, further investigations are undertaken to examine the roles of demand and supply using alternative measures.

### **a. Panel regression analysis**

The analysis uses a panel regression framework that incorporates a global supply factor and country-specific demand factors. The dataset covers quarterly data from 21 emerging market countries between early 1995 and the third quarter of 2009: Argentina, Brazil, Chile, China, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Thailand and Turkey.

Currency-adjusted locational claims are used as the dependent variable. The advantage of using BIS locational statistics is that they measure cross-border lending exactly, ie consistently with the principles underlying national accounts and balance of payment statistics. By contrast, the consolidated statistics measure international claims, which also include local claims in foreign currency besides cross-border lending. These local claims in foreign currency are not directly relevant for balance of payment financing, and might therefore bias the results. They are also substantial in many emerging economies, so any bias might be non-trivial. Furthermore, changes in locational claims are also available in currency-adjusted form, which is not the case for consolidated data.

However, using locational data also involves trade-offs. Most importantly, it only allows global supply factors to be identified. In contrast to consolidated data, the locational statistics do not permit researchers to exploit information in the variation across lender countries due to the presence of financial centres, such as London, which intermediate bank lending. These intermediated claims show up twice in the locational data: first, between the original lender's country and the financial centre, and second, between the financial centre and the end destination. Since it is not possible to track flows from their origin to their destination, bilateral flows cannot be explained by demand and supply factors of the two countries involved.

The analysis uses the normalised quarterly volatility of the S&P 500 financial index for the global supply factor. Volatility tends to be high in periods of stress, which is in turn negatively related to credit supply. Higher volatility also implies that it is more difficult for banks to raise additional capital, which also limits credit supply. A further advantage is that volatility is computed from stock prices, which are based on large trading volumes and have a long track record.

The most important demand factor in the analysis is quarterly GDP. This follows straightforwardly from the standard credit equation: higher levels of output require more

credit, including more cross-border lending. Takats (2010) shows the robustness of the above demand and supply specification.

The impact of country-specific demand factors and a global supply factor on cross-border lending is estimated in a panel regression (Table 1). The benchmark model estimates demand and supply factors jointly. All coefficients have the right sign and are statistically significant. The size of coefficients also seems plausible: a 1% increase in output is associated with an increase in cross-border bank lending of around 0.2%. However, the demand and supply factors are correlated, which calls for the standalone “demand only” and “supply only” estimates. By omitting the other variable, these standalone models force their respective coefficients to assume the full effect of correlation between the two variables. They therefore provide upper bounds for the demand and supply effects, respectively. The relative proximity of the standalone and the respective benchmark coefficients suggests that the correlation does not substantially affect the magnitude of the estimates.

Table 1	Demand and supply factors in cross-border bank lending to emerging markets <sup>1</sup>				
	Q1 1995–Q3 2009				
Model	Obs	R <sup>2</sup>	Constant	Supply <sup>2</sup>	Demand <sup>3</sup>
Benchmark	1,197	0.18	0.0370***	– 0.1009***	0.2032***
Demand only	1,197	0.12	0.0097**	...	0.2886***
Supply only	1,218	0.15	0.0463***	0.1221***	...

\* , \*\* , \*\*\* denote coefficients significantly different from zero at the 10%, 5% and 1% levels, respectively.

<sup>1</sup> The dependent variable is the quarter-on-quarter growth rate (logarithmic) in BIS reporting banks' currency-adjusted cross-border gross claims vis-à-vis each country in the sample. The model is estimated through a panel regression allowing for heteroskedasticity across countries and using country-specific fixed effects. <sup>2</sup> Volatility of US S&P 500 financial index, average for the period, normalised. <sup>3</sup> GDP of each country and at current prices, expressed in US dollars at average exchange rates, in logarithms, seasonally adjusted.

Sources: BIS locational banking statistics; BIS estimates; Datastream; national data.

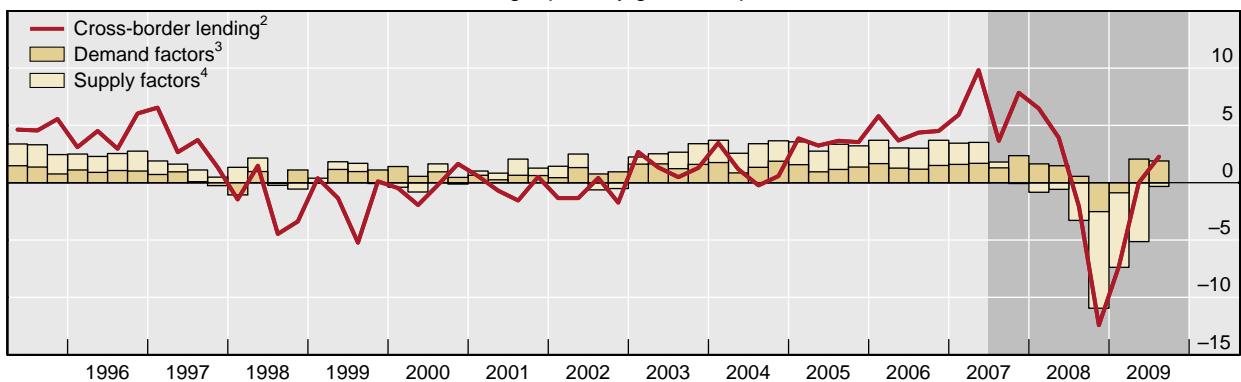
Supply factors dominated during the financial crisis, although demand factors also contributed to the decline (Graph 1). During the most intense quarter of the crisis, Q4 2008, cross-border lending to an average emerging market economy declined by 12.4%; supply factors contributed 8.4% and demand factors 2.5% to the decline (leaving the remainder unexplained).

By contrast, demand and supply factors tend to be more balanced during non-crisis periods. For example, between 2003 and 2007, demand and supply factors each contributed to around one third of cross-border lending (leaving the remaining third unexplained). This suggests that the credit boom of advanced countries also spilled over to emerging markets.

Graph 4

**Demand and supply factors in cross-border bank lending to emerging markets<sup>1</sup>**

Average quarterly growth, in per cent



<sup>1</sup> Based on the panel regression reported in Table 1; for each quarter, the graph shows the average estimated forecasts across countries in the sample. <sup>2</sup> Quarter-on-quarter growth rate (logarithmic) in BIS reporting banks' cross-border gross claims vis-à-vis the sample country average; actual data, in per cent. <sup>3</sup> Quarter-on-quarter growth rate (logarithmic) in seasonally adjusted nominal GDP in US dollar terms times its panel coefficient estimate plus a constant. <sup>4</sup> Volatility of the S&P financial index times the panel coefficient plus a constant. The demand and supply constants are calculated by dividing the benchmark model's constant in the ratio of the standalone (demand and supply only) constants. The country fixed effects are divided similarly.

Sources: Datastream; BIS estimates.

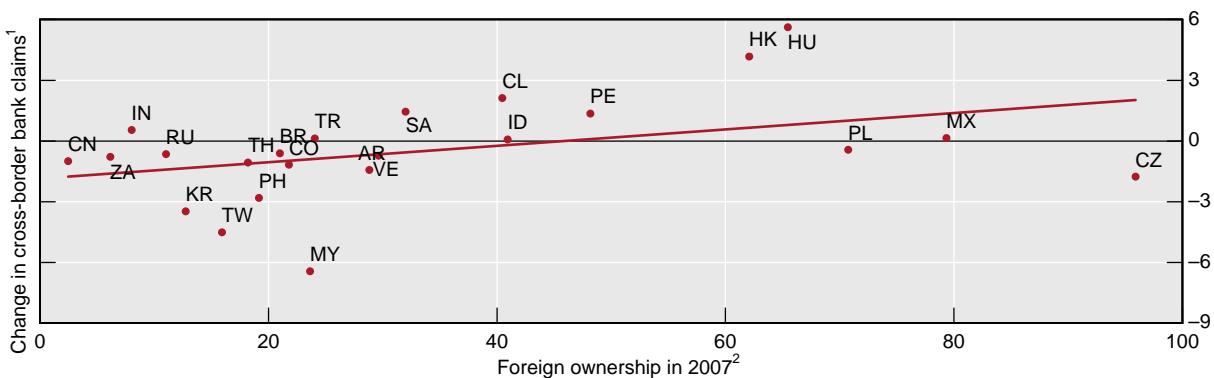
Of course, all these results apply only to an average emerging market economy, and there is substantial heterogeneity among them. It is possible that the 1997–98 and 2002 crises meant very strong supply constraints for some economies. In the current crisis, international banks seem to have supported operations in some countries – even though they retrenched their activities in general. These issues are revisited in the next section.

**b. Further investigations**

The findings of the panel regression analysis can be further substantiated by examining additional perspectives on cross-border bank lending to emerging market economies.

The presence of foreign banks seems to have stabilised cross-border lending, which suggests that supply factors played a role (Graph 5). Larger foreign ownership of the banking sector is correlated with higher cross-border lending. The graph shows that a 10% increase in foreign ownership in the banking sector is associated with around 0.4% of GDP higher cross-border bank lending during the crisis, implying that foreign bank penetration paid stability dividends during the crisis. CGFS discussions with the private sector suggest that parent bank funding was an important channel for stabilisation. This evidence suggests that major international banks stood by their emerging market subsidiaries and provided funding to them even if they cut their funding to unrelated banks.

Graph 5  
Foreign ownership of banks and changes in cross-border claims



AR = Argentina; BR = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = the Czech Republic; HK = Hong Kong SAR; HU = Hungary; ID = Indonesia; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PH = the Philippines; PL = Poland; RU = Russia; SA = Saudi Arabia; TH = Thailand; TR = Turkey; TW = Chinese Taipei; VE = Venezuela; ZA = South Africa.

<sup>1</sup> Average of Q3 2008 to Q2 2009 minus average of Q3 2007 to Q2 2008 of BIS reporting banks' cross-border gross claims (including inter-office claims); as a percentage of the 2008 GDP in US dollars. <sup>2</sup> As a percentage of system assets.

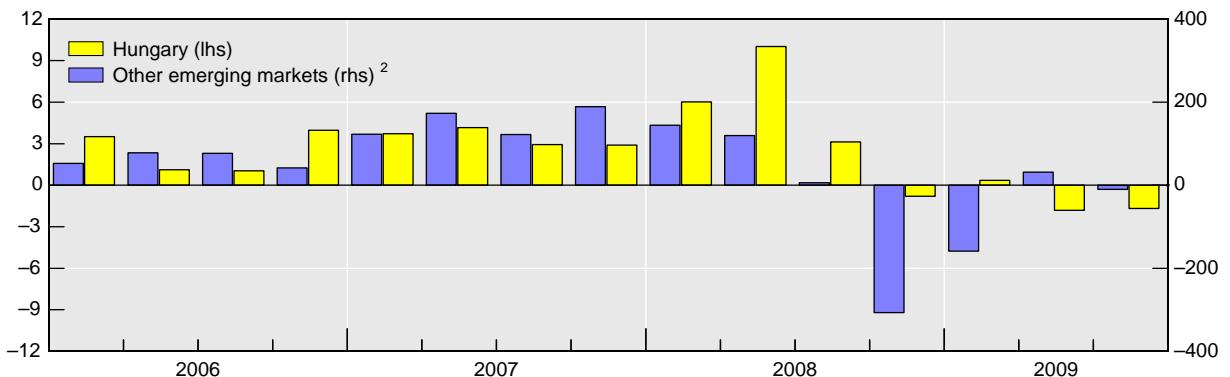
Sources: BIS locational banking statistics by residence; IMF; Federal Reserve Bank of New York (FRBNY), based on banking superintendence and central bank data.

Naturally, there are important exceptions to these general findings, illustrated by the outliers in Graph 5. For instance, the Czech Republic might have experienced "reverse flows" (ie a decrease in cross-border lending in spite of strong economic fundamentals). These reverse flows appear to be so strong that, in spite of high foreign ownership, cross-border lending declined.

However, a strong role for supply factors does not necessarily imply that cross-border lending was sufficiently constrained to cause domestic concerns. For example, the Czech National Bank, the People's Bank of China and the Reserve Bank of India note that international banks seem to have faced lending constraints at the same time as they aimed to preserve liquidity and capital. However, this supply constraint did not have major implications for the domestic economies of those countries.

Hungary is also an outlier, as it experienced higher cross-border lending than expected based on economic fundamentals (Graphs 5 and 6). Although it had developed significant vulnerabilities in the pre-crisis period, which became apparent during the crisis, cross-border lending to Hungary remained among the highest. The relative strength of cross-border lending to Hungary can be best illustrated by comparing quarterly cross-border lending to Hungary with the remaining emerging markets (Graph 6). Once again, this suggests that supply factors could have played an important role. Although credit demand in Hungary was arguably lower than in the average emerging market economy, cross-border flows held up much better. The Magyar Nemzeti Bank also notes that parent banks provided support, mainly in the form of foreign exchange funding, for their local subsidiaries, suggesting the importance of supply factors. Graph A1 in the appendix shows the changes in cross-border lending in all emerging market economies for further country-by-country comparison.

Graph 6  
**Changes in cross-border positions vis-à-vis emerging markets**  
 (flows; in billions of US dollars)



<sup>1</sup> BIS reporting banks' cross-border gross claims (including inter-office claims) in all currencies plus locally booked foreign currency claims on residents of BIS reporting countries; estimated exchange rate adjusted changes. <sup>2</sup> Argentina, Brazil, China, Chile, Colombia, the Czech Republic, Hong Kong SAR, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand, Turkey and Venezuela.

Source: BIS locational banking statistics by residence.

The case of Hungary highlights two potential supply factor explanations. First, major international banks may have retrenched their positions wherever it was possible (ie in countries with strong fundamentals), and provided credit where it was impossible to withdraw it (ie in countries with weaker fundamentals). Paradoxically, vulnerability could have stabilised lending as it made it impossible to withdraw funding without triggering an even deeper crisis. Why and through which mechanisms banks became convinced that it was in their best interest not to trigger a further crisis is an interesting question. Second, international agreements, such as the IMF programme in Hungary or the Vienna Initiative, in which foreign banks agreed to maintain credit exposure, could also have helped to stabilise cross-border lending. During the financial crisis, many governments aimed to stabilise bank credit in the domestic economy. These agreements might have been more effective with IMF support. Given the fact that, in many cases, cross-border lending was a necessary requirement in fulfilling such agreements, they could, almost as a corollary, have stabilised cross-border lending.

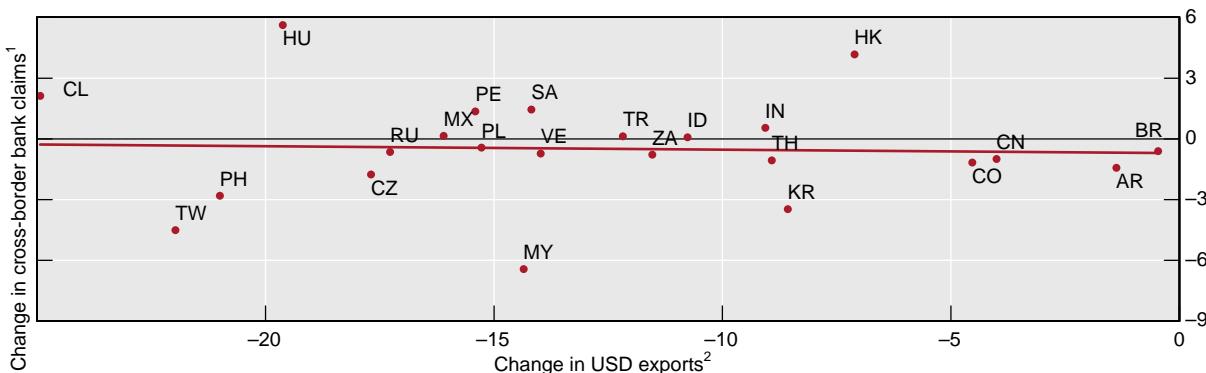
Direct investigation of demand-related factors during the financial crisis also suggests that supply factors might have had a stronger impact. However, it seems that, in many countries, demand factors were important drivers. For instance, the Czech National Bank notes that changes in cross-border lending to the Czech Republic are mostly explained by demand factors. Furthermore, the South African Reserve Bank sees demand factors dominating in the sub-Saharan region, where there were no declines in cross-border lending.<sup>4</sup>

However, the impact of demand factors seems to be weaker, as shown by the lack of correlation between changes in export demand and cross-border lending (Graph 7). To the extent that demand was driving cross-border lending, one would expect a positive correlation between export demand and cross-border lending: however, this does not seem to be the case.

<sup>4</sup> However, sub-Saharan lending might have longer execution times than elsewhere, as noted by the South African Reserve Bank, which might explain the slightly different trends from those prevailing globally.

Graph 7

**Exports and international cross-border bank lending**



AR = Argentina; BR = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = the Czech Republic; HK = Hong Kong SAR; HU = Hungary; ID = Indonesia; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PH = the Philippines; PL = Poland; RU = Russia; SA = Saudi Arabia; TH = Thailand; TR = Turkey; TW = Chinese Taipei; VE = Venezuela; ZA = South Africa.

<sup>1</sup> Average of Q3 2008 to Q2 2009 minus average of Q3 2007 to Q2 2008 of BIS reporting banks' cross-border gross claims (including inter-office claims) in all currencies plus locally booked foreign currency claims on residents of BIS reporting countries; as a percentage in the outstanding stock at end-2008. <sup>2</sup> Total exports between Q3 2008 and Q2 2009 minus total exports between Q3 2007 and Q2 2008; as a percentage of total exports between Q3 2007 and Q2 2008.

Sources: BIS locational banking statistics by residence; Datastream; national data; BIS calculations.

The lack of correlation between export demand and cross-border lending is somewhat puzzling based on the experience from trade finance, which has fallen substantially and roughly in line with trade values. There are various demand and supply side explanations for this phenomenon. On the one hand, in discussions with the CGFS, major international banks explained the drop in trade finance through demand factors, ie a decrease in exports. Declines in collateral values (due to lower export demand) could have also made certain borrowers ineligible for trade credit from a risk management perspective. On the other hand, others argued that supply factors were more relevant. According to this argument, trade finance became much more expensive as major internationally active banks experienced distress. The export sector was severely hit by the resulting high financing costs, especially in regions, such as Southeast Asia, where the product chain involves many stops and the value added in each country is relatively small. In marginal cases, declines in export profitability led to the full cessation of exports. Hence, there are both supply and demand side arguments for the co-movement of lending and trade volumes, which, interestingly, is not apparent in the BIS data.

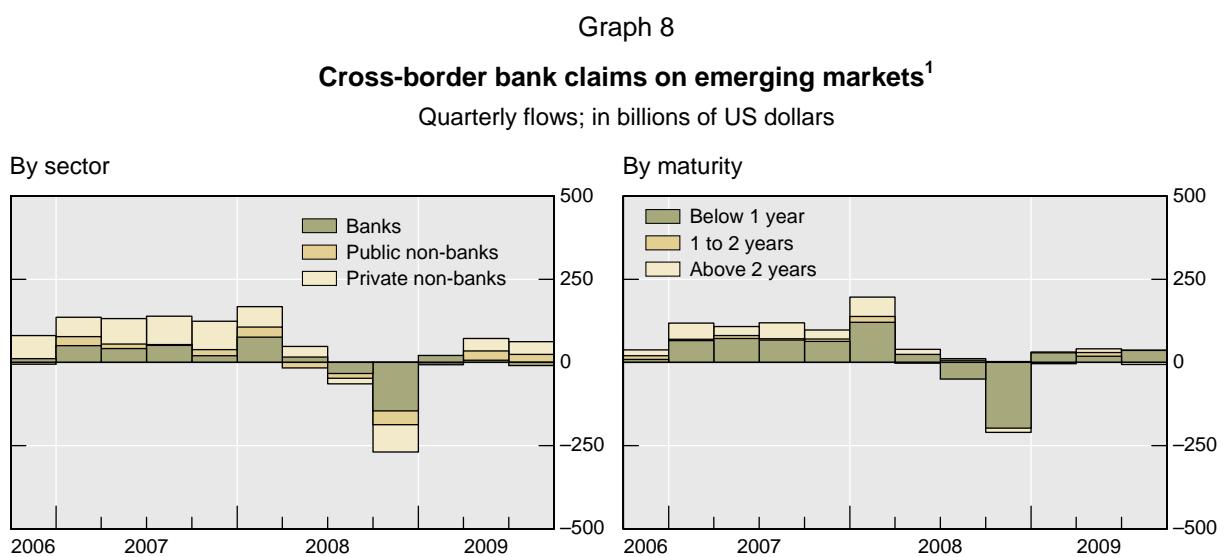
Though it seems that supply factors have played a significant role in determining cross-border lending to emerging markets during the crisis, the analysis shows that there is much room left for future research. Heterogeneity across countries and across international banks could further nuance the picture. For instance, the experience from Mexico suggests that exposure to highly distressed financial centres can be disruptive. In sum, the question needs due attention and further work before a definitive conclusion can be drawn.

### 3. Changes in the composition of lending

International bank claims have receded in all sectors, but lending to banks has been the hardest hit (Graph 8, left-hand panel). Interbank market financing difficulties were noted by many central banks, including the Czech National Bank and the Magyar Nemzeti Bank. According to CGFS (2010a), many internationally active banks indicated that they had experienced severed access to interbank markets. Given that those banks also highlighted

that funding by parent banks had remained relatively intact, interbank lending to unrelated banks may have been disproportionately hard hit during the crisis. Understanding what happens on interbank markets is especially relevant, as funding problems can quickly translate into broader balance of payment difficulties. Interbank market funding difficulties also preceded and contributed to previous emerging market crises. Furthermore, in contrast to other kinds of lending, interbank lending did not begin to recover in the third quarter of 2009, and, given such difficulties, it might continue to lag in the future as well.

The maturity of cross-border claims paints a more favourable picture, as the stock of longer-term maturity cross-border lending did not decrease (Graph 8, right-hand panel). During the crisis, short-term (below one year) maturities mainly declined and longer-term maturities remained stable. This suggests that cross-border lending took place at longer maturities, which roughly compensated for the natural shortening of the maturity profile.



Source: BIS consolidated banking statistics.

However, it is also possible that a marked shortening happened in the shortest maturity category (below one year), which is not captured in the BIS data categories; there is some evidence pointing to this from central banks. In India, for instance, overseas institutions were not interested in maturities longer than six months during the peak of the crisis. The Saudi Arabian Monetary Authority quotes anecdotal evidence which shows that funding maturities by international banks to Saudi counterparties shortened substantially (eg from 90 days to 30 days). Similarly, the South African Reserve Bank has also seen a shortening of maturities.

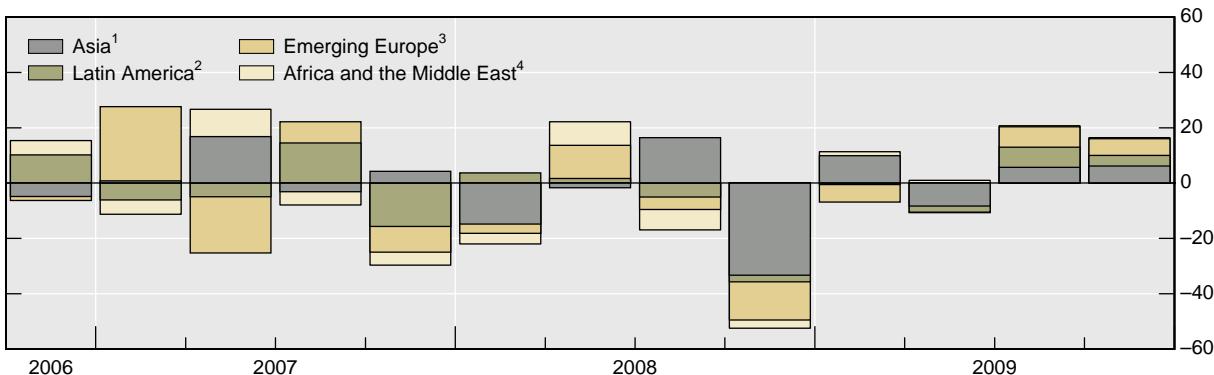
Trade finance also became distressed in the aftermath of the crisis. For example, export finance contracts dropped by 30% between September and October 2008 in Brazil. Concerns even prompted innovative foreign exchange reserve lending.

International syndicated credit started to decline even before the financial turmoil began to affect emerging markets (Graph 9). Syndicated credit developments are relevant for two reasons: first, syndicated credit provides substantial funding to emerging markets; and second, syndicated loans serve a market segment which might be difficult to finance by standalone bank lending or securitisation. The decline in syndicated lending could well have been a reflection of supply side effects, as large advanced country banks active in credit syndication were already experiencing pressures that were unrelated to emerging markets.

Graph 9

**Signed international syndicated credit facilities**

Quarterly flows by nationality of borrower; in billions of US dollars



<sup>1</sup> China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, Singapore and Thailand. <sup>2</sup> Argentina, Brazil, Chile, Mexico and Peru. <sup>3</sup> The Czech Republic, Hungary, Poland, Russia and Turkey. <sup>4</sup> Israel, Saudi Arabia and South Africa.

Source: BIS syndicated loan statistics.

Particular concerns over the syndicated markets were evidenced by “self-syndication”. In this process, borrowers entered into bilateral loans with several banks, thereby replicating syndicated credit. Self-syndication is also consistent with the apparent discrepancy of syndicated and cross-border lending statistics during the quarters immediately preceding the crisis.

Although syndicated credit declines preceded those in cross-border lending, syndicated lending growth did not precede the pickup in cross-border lending (compare Graphs 1 and 9). However, the more recent third quarter pickup in syndicated lending may signal further increases in cross-border lending for the remainder of the year.

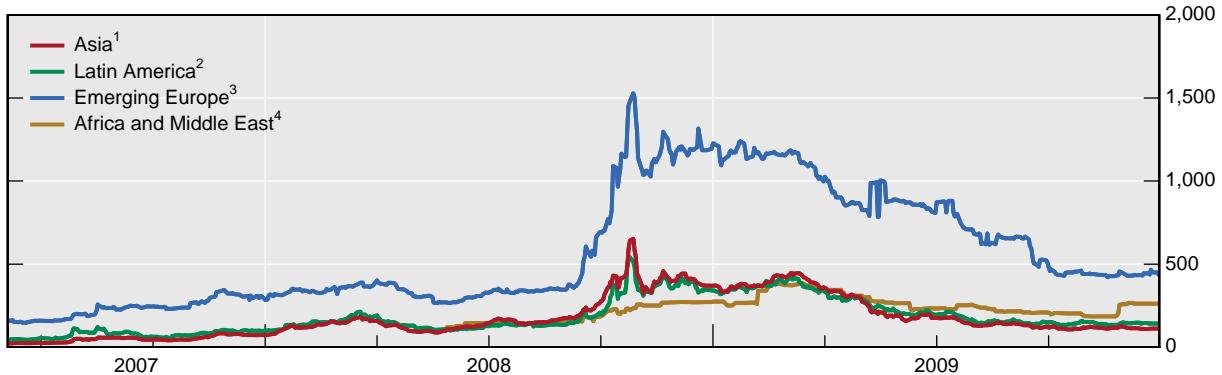
Finally, there is some evidence to suggest that the syndicated credit situation was even worse than Graph 9 suggests. There is some anecdotal evidence that loans previously contracted on the interbank market have been moved to the syndicated market as risk appetite – especially towards interbank market risk-taking – has decreased substantially. Many emerging markets document disruptions on the interbank market, and even some advanced countries are currently syndicating loans for their sovereign needs instead of using the interbank market.

#### 4. Changes in lending terms

Lending terms deteriorated substantially for all emerging market banks during the crisis. Although there are no direct measures for cost and conditions of lending, CDS spreads of emerging market banks provide a useful proxy for lending conditions.

Graph 10 shows that average emerging market bank CDS spreads widened substantially from pre-crisis levels. The most dramatic increases were observed in emerging Europe, where average CDS spreads peaked at more than 1,300 points higher than the pre-crisis levels of mid-2007. In comparison, CDS spread peaks were around 600, 500 and 400 points higher in Asia, Latin America, and Africa and the Middle East, respectively.

Graph 10  
**Bank CDS spreads by region**  
Five-year on-the-run, simple average, in basis points



<sup>1</sup> ICICI Bank, Bank of China, China Development Bank, Industrial & Commercial Bank China, Agricultural Bank China, Bank East Asia, Citic Ka Wah Bank, Bank Negara Indonesia TBank PT, Industrial Bank Korea, Korea Development Bank, Korea Exchange Bank, Export Import Bank Korea, Hana Bank, Kookmin Bank, Woori Bank, Shin Han Bank, Southern Bank, Pub Bank, Malayan Bank, United Overseas Bank, Krung Thai Bank, Bangkok Bank, Siam Commercial Bank. <sup>2</sup> Unibanco Unico de Bancos Brasileiros, Banco Itau, Banco Bradesco, Banco Nacional Desenvolvimento Economico E Social, Banco Do Brasil, Banco Santander Chile, Banco Nacional de Comercio Exterior SNC. <sup>3</sup> OTP Bank, Vnesheconombank, Alfa Bank, SBERBANK, Bank Russkii Standart, Akbank TAS, Finansbank. <sup>4</sup> Saudi Brit Bank.

Source: Markit.

However, some caution is required in analysing the regional CDS data. Due to limited data availability, regional spreads are not fully representative of the region. This may be most relevant for emerging Europe, where the regional CDS spread contains one Hungarian, four Russian and two Turkish banks. Similarly, there is a single Saudi bank in the Africa and Middle East category. In order to provide a full picture, Appendix Graph A2 shows the CDS spread data for all available individual banks.

Though lending conditions have not yet returned to pre-crisis levels, bank CDS spreads have declined substantially. It remains an open question whether credit market conditions have reverted to normal levels. While CDS spreads are still above pre-crisis levels, this may simply reflect the new norm for credit conditions.

With regard to other lending terms, such as collaterals or guarantees, there is no strong evidence. One might argue that increased risk aversion has impacted these terms, yet the issue does not appear to have surfaced. For instance, the Saudi Arabian Monetary Authority notes explicitly that it did not experience significant changes to these terms.

## 5. Parent bank funding

The crisis tested the presence of foreign banks in emerging markets. The value of foreign bank contributions has been previously debated. During the crisis, these questions resurfaced with renewed relevance. Some feared that global risk management would make emerging markets vulnerable to sudden and – from their perspective – arbitrary reallocations of credit by parent banks. Furthermore, it appears, from the experience of advanced economies, that in certain circumstances, parent banks became unable to support their branches or subsidiaries in emerging economies. Hence, understanding the parent bank funding of emerging market activities is highly relevant when thinking about economic policy and regulation.

There is much anecdotal evidence on the positive role of parent bank funding during the crisis. The Magyar Nemzeti Bank found that parent bank support, especially in terms of foreign exchange funding, increased by around EUR 3 billion during the most intense liquidity crisis in late 2008. The Czech National Bank also finds that parent bank funding remained stable compared to unrelated funding. CGFS (2010b) confirms that, according to major international banks, parent bank lending remained the stable channel for interbank lending. When interbank markets closed, or became substantially shallower, parent banks continued to provide credit to their subsidiaries.

Most evidence analysed in this paper is consistent with the anecdotes on the strength of parent bank lending. The finding that the strength of foreign ownership is a factor determining cross-border lending supports the role attributed to parent bank lending during the crisis.

In sum, the available evidence points towards parent bank involvement and support for emerging market operations. It seems that one of the dividends of increased foreign ownership has been the stabilisation of credit conditions. However, this conclusion is preliminary and subject to certain caveats. Heterogeneity across countries and banks might imply that experiences could have varied substantially.

## 6. Looking forward

In spite of calming conditions, challenges remain in the global economy. It is still unclear what will drive global demand as households, corporations and governments in major advanced economies need to restore their balance sheets. Growth might remain weak in the coming years, putting further strain on international banks. Furthermore, some emerging markets also need to repair household and corporate balance sheets, which will weigh on the banking sector.

Further analysis of the role of international banks in emerging markets will take place in this complicated economic environment. It seems that, during the crisis, supply factors, in particular liquidity and capital constraints of international banks, played a significant role in cross-border lending. However, organisational structures (decentralised vs centralised capital and liquidity management) and risk monitoring by central banks substantially affected the evolution of cross-border lending – and the effects of the crisis on particular emerging market economies.

There are some policy lessons, however, which seem to be universally relevant. The sharp declines in cross-border lending to banks have highlighted the risks of wholesale funding structures and the need to carefully monitor liquidity. Similarly, there is an understanding that private sector risk-taking needs to be monitored more closely.

However, other policy lessons are less straightforward. The role of supply factors suggests that emerging economies have a vested interest in the health of international banks providing cross-border lending, yet enforcing this looks difficult. Regulating the organisational structure of international banks' local operations could provide a channel for mitigating supply shocks. For instance, decentralised bank structures could have shielded the local operations of international banks from global shocks. However, in other countries, centralised liquidity and capital management seems to have eased the consequences of the financial crisis. It could well be that, in some areas, there are simply no one-size-fits-all answers.

In sum, policy challenges remain. It appears that the economic landscape will remain complex for the foreseeable future. This implies that, from an international perspective, safeguarding cross-border lending and preventing large and unwarranted declines in lending remains a priority. Further analysis of economic policies, supervision and regulation will take place against this background.

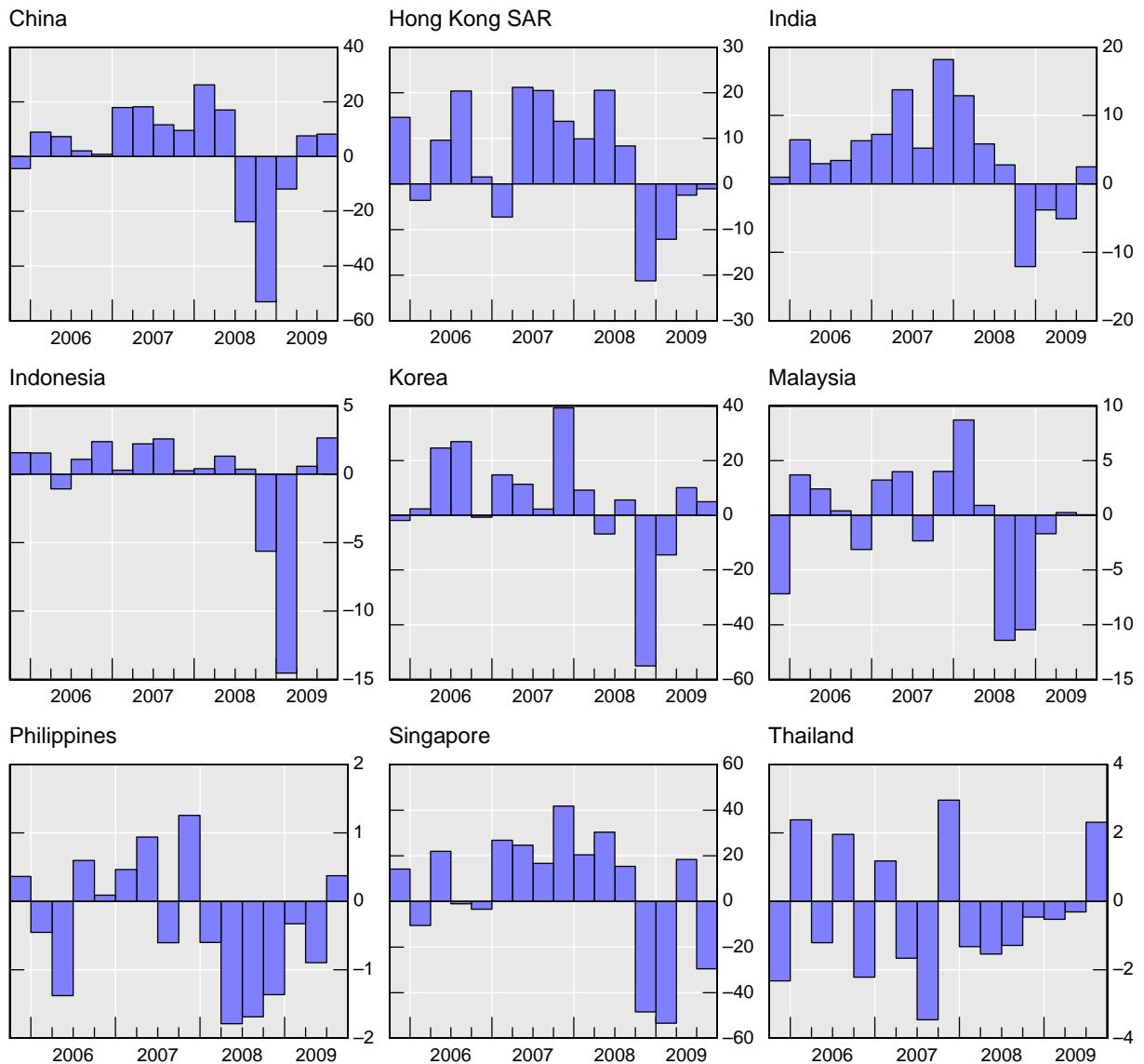
## Appendix

Graph A1

### Changes in cross-border positions vis-à-vis emerging markets<sup>1</sup>

Quarterly flows; in billions of US dollars

#### Emerging Asia



<sup>1</sup> BIS reporting banks' cross-border gross claims (including inter-office claims) in all currencies plus locally booked foreign currency claims on residents of BIS reporting countries; estimated exchange rate adjusted changes.

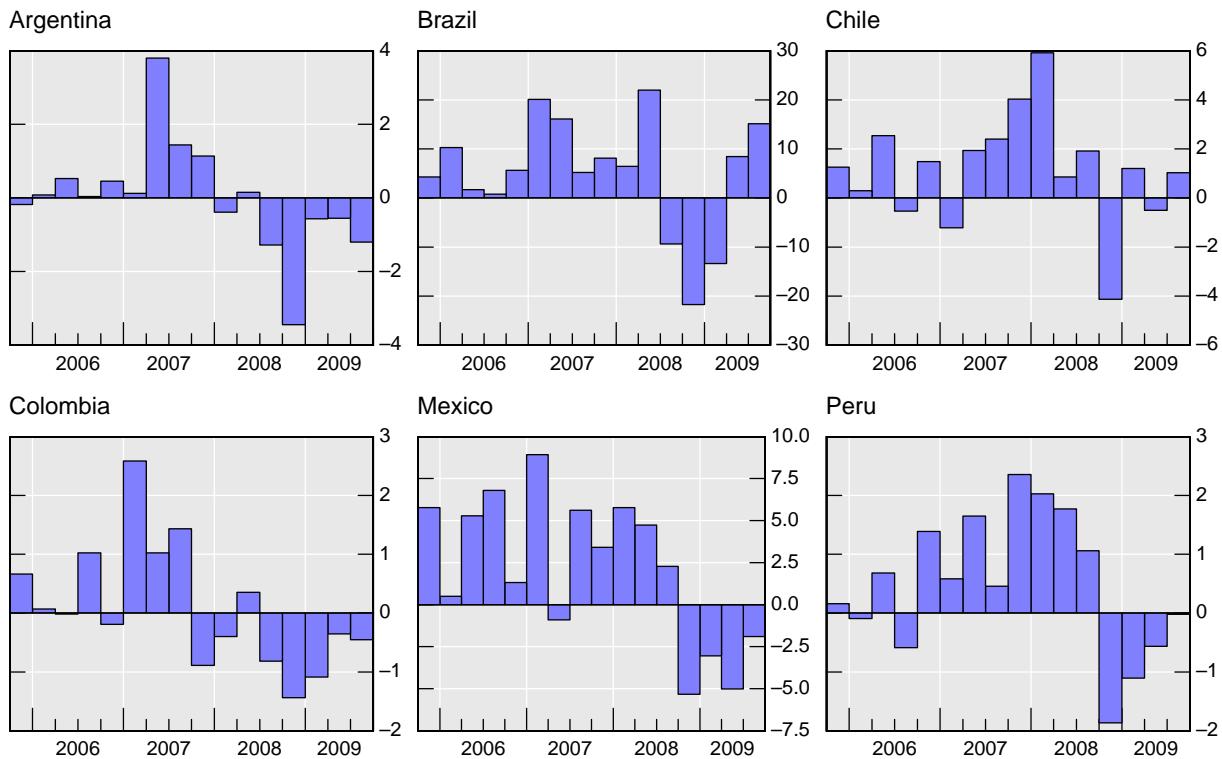
Source: BIS locational banking statistics by residence.

Graph A1 (cont)

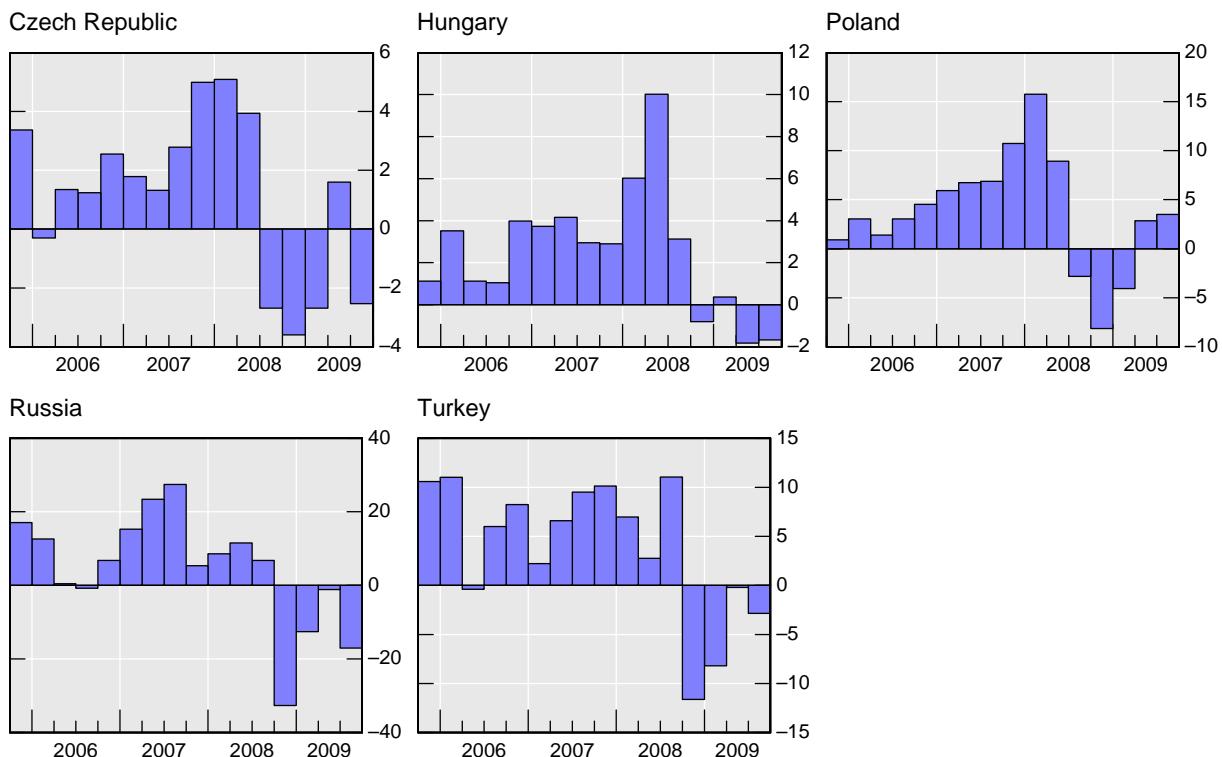
**Changes in cross-border positions vis-à-vis emerging markets<sup>1</sup>**

Quarterly flows; in billions of US dollars

**Latin America**



**Emerging Europe**



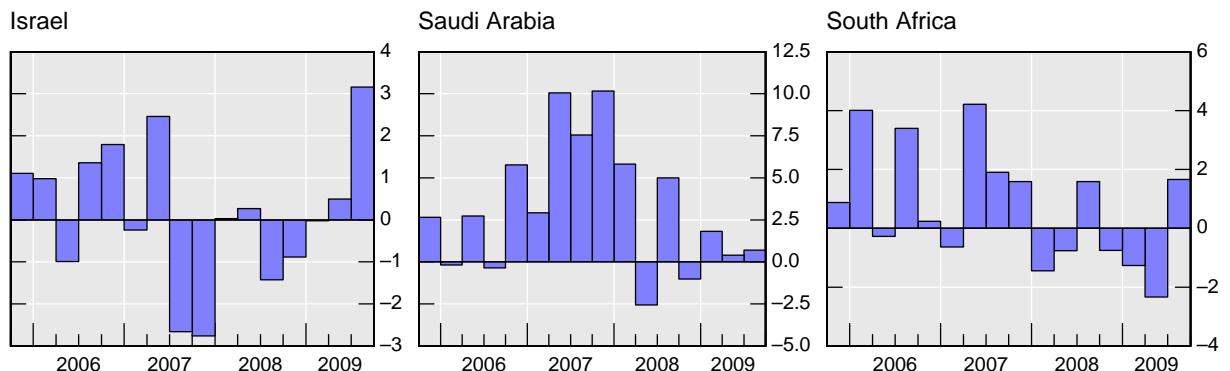
Source: BIS locational banking statistics by residence.

Graph A1 (cont)

**Changes in cross-border positions vis-à-vis emerging markets<sup>1</sup>**

Quarterly flows; in billions of US dollars

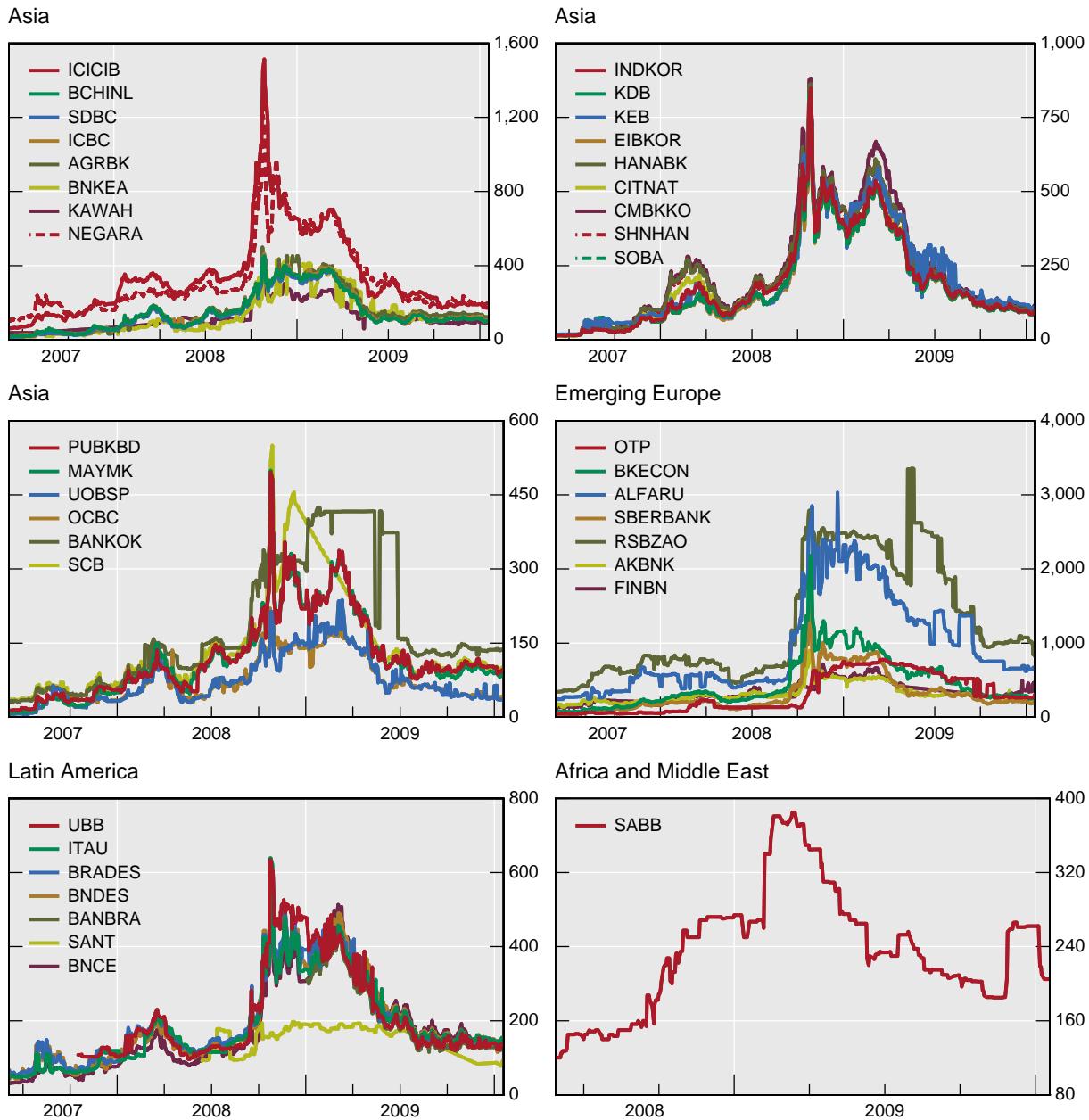
**Africa and Middle East**



<sup>1</sup> BIS reporting banks' cross-border gross claims (including inter-office claims) in all currencies plus locally booked foreign currency claims on residents of BIS reporting countries; estimated exchange rate adjusted changes.

Source: BIS locational banking statistics by residence.

**Graph A2**  
**Individual bank CDS spreads, by region**  
 Five-year on-the-run, in basis points



AGRIBANK = Agric Bank China, AKBNK = Akbank TAS, ALFARU = Alfa Bank, BANBRA = Banco Do Brasil, BANKOK = Bangkok Bank Pub Co, BANVOR = Banco Votorantim, BCHINL = Bank of China, BHIP = Banco Hip, BANKECON = Vnesheconombank, BNCE = Banco Nacional de Comercio Exterior SNC, BNDES = Banco Nacional Desenvolvimento Economico E Social, BNKEA = Bank East Asia, BRADES = Banco Bradesco, CITNAT = Kookmin Bank, CMBANKKO = Woori Bank, EIBANKOR = Export Import Bank Korea, FINBN = Finansbank, HANABANK = Hana Bank, ICBC = Industrial & Commercial Bank China, ICICIB = ICICI Bank, INDKOR = Industrial Bank Korea, ITAU = Banco Itau, KAWAH = Citic Ka Wah Bank, KDB = Korea Dev Bank, KEB = Korea Exchange Bank, KTB = Krung Thai Bank Pub Co, MAYMK = Malayan Bank, NEGARA = Bank Negara Indonesia, OCBC = Oversea Chinese Bank Corp, OTP = OTP Bank Rt, PUBANKBD = Pub Bank, RSBZAO = Bank Russkii Standart, SABB = Saudi Brit Bank, NT = Banco Santander Chile, SBERBANK = SBERBANK Svgs Bank Russian Federation, SCB = Siam Commercial Bank, SDBC = China Dev Bank, SHNHAN = Shin Han Bank, SOBA = Southern Bank, UBB = Unibanco Unico de Bancos Brasileiros, UOBSP = United Overseas Bank, ZENIT = Bank Zenit.

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# **Domestic bank intermediation in emerging market economies during the crisis: locally owned versus foreign-owned banks**

Dubravko Mihaljek<sup>1</sup>

## **1. Introduction**

This paper discusses how the global financial crisis of 2008–09 affected banks operating in emerging market economies (EMEs) and how far it led them to change key aspects of their business models. Aspects of particular interest include: changes in bank funding (maturity and sources of funding); changes in bank lending (in terms of loan maturities; required collateral; types of borrowers; etc); and changes in liquidity management (evidence of a build-up of liquid assets; shortening of lending maturities, etc). The paper also looks at evidence of different response patterns between foreign and local banks in EMEs during the crisis. The analysis is based almost entirely on central bank responses to a BIS questionnaire prepared for the BIS meeting of Deputy Governors of emerging market economies (28–29 January 2010, Basel). The aim is to provide an up-to-date assessment of key changes in domestic bank intermediation in EMEs resulting from the spillovers of the global financial crisis of 2008–09.

The main finding is that, despite the great variety of financial intermediation and bank ownership structures in EMEs, by and large, banks adjusted to the crisis as in a textbook scenario. On the funding side, they reduced their reliance on wholesale markets and increased their efforts to attract retail deposits. On the lending side, they reduced the growth of new loans to firms and households, shifted towards less risky types of loans and increased their holdings of government bonds. On the liquidity side, banks shortened the maturity of their assets, relied less on the interbank market and started doing more business with central banks.

Foreign and domestic banks broadly adjusted to the crisis in the same way. Initially, there were some differences in the speed of adjustment, but eventually, both domestic and foreign banks moved in the same direction and adjusted their funding, lending and liquidity operations to a similar extent. The funding model seems to have mattered more for adjustment than bank ownership.

This paper is divided into four sections. Section 2 reviews the structure of financial intermediation in EMEs. Section 3 analyses the structure of bank funding before and during the 2008–09 crisis, and section 4 looks at changes in bank lending patterns. Section 5 evaluates the responses to the crisis by the domestic and foreign-owned banks and discusses the incentives for establishing subsidiaries versus branches after the crisis.

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<sup>1</sup> The author thanks Agne Subelyte for research assistance and Stephen Cecchetti, Ramon Moreno, Haibin Zhu and participants of the BIS meeting of Deputy Governors of emerging market economies for comments on an earlier draft of this paper.

## 2. Structure of financial intermediation in EMEs

To understand how banks in different EMEs reacted to the crisis, it is useful to start by analysing the structure of domestic financial intermediation. The relative importance of banks differs greatly both within and among emerging market regions. This section looks at: the relative size of banks, non-bank financial institutions (NBFIs), equity markets and bond markets in EMEs; the ownership structure of domestic banking systems; and the legal form of incorporation of foreign banks' affiliates (ie subsidiaries vs branches). Each of these elements is potentially relevant for explaining the observed trends in financial intermediation during the crisis.

For instance, banks were generally more affected than NBFIs by the crisis so, other things equal, one would expect countries with larger non-bank financial sectors to have experienced fewer disruptions in domestic financial intermediation. Similarly, one would expect countries with more developed domestic bond markets to have experienced less financial market upheaval than those relying mostly on international bond markets.

Regarding the ownership structure, one view is that problems in international banks' domestic markets inevitably led banks to withdraw from emerging markets. A classic example is the large-scale withdrawal of Japanese banks from emerging Asia during the 1997–98 crisis. When Japanese banks experienced problems in their domestic market as a result of declines in equity and real estate prices, they had to shrink their balance sheets to maintain their capital adequacy requirements. The resulting pullback provided a major impetus to the crisis that was unfolding in emerging Asia at the time.

A competing view is that international banks consider some emerging markets of strategic importance for their overall business strategy. Therefore, it is in their vital interest to support operations in these markets during the crisis (de Haas and Lelyveld (2004), EBRD (2009)). The case in point is banks from smaller western European countries (eg Austria, Belgium) that established a dense network of subsidiaries in central and eastern Europe (CEE). These subsidiaries generated the lion's share of profits at the group level in the second half of the 2000s, and were therefore vitally important for the financial performance of parent banks.

Yet another view is that, during periods of crisis, lending by state-owned banks tends to be less procyclical than lending by foreign and private domestic banks. For instance, during the crises in emerging Asia and Latin America in the 1990s, state-owned banks expanded credit faster (or cut credit to a smaller extent) than domestic and foreign-owned private banks (Hawkins and Mihaljek (2001)). A similar experience was reported in some EMEs during the current crisis.

Finally, the legal form of incorporation of foreign banks' affiliates may matter during a crisis. Foreign bank affiliates are often of small importance from the parent banks' perspective, but systemically important for the host country. One issue that arises in this context is how the host country authorities might deal with the loss of liquidity and disruptions in the domestic payment system if the parent institution decides to cut back support for such an affiliate. Other things equal, one would expect the authorities in countries where foreign banks are present as subsidiaries to be better able to preserve liquidity and stability, because subsidiaries are standalone entities with their own capital and are supervised by both host country supervisor and, on a consolidated basis, by the parent's supervisory authority.

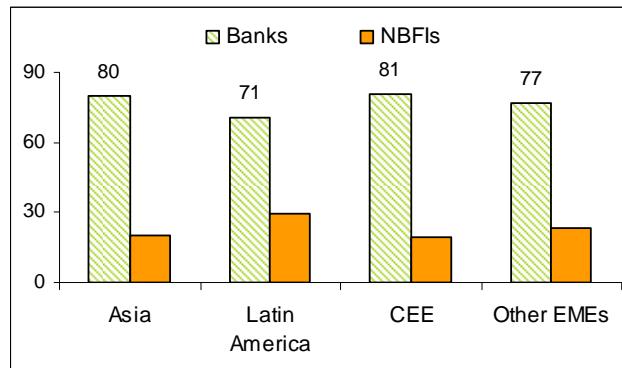
## Banks versus other financial intermediaries

Banks in EMEs remain much larger than NBFIs and account, on average, for 70–80% of total financial sector assets (Graph 1).<sup>2</sup> However, there are large differences across countries. In Latin America, for instance, the share of banks in combined assets of banks and NBFIs ranged from around 50% (Chile and Colombia) to 98% (Argentina), while in other EMEs it ranged from 65% (Israel, Korea, Malaysia) to 95% or higher (Hong Kong SAR, the Philippines, South Africa).

The relative shares of banks and NBFIs were stable throughout the latest crisis. However, there were some exceptions: banks in India and Peru increased their relative share of total assets by 7 percentage points (pp) between 2006 and 2009; and in Hungary and Poland by 3–4 pp. Banks “retreated” compared to NBFIs on a larger scale only in Israel (by 5 pp), Colombia (3 pp) and Mexico (2 pp).

Graph 1  
**Banks vs NBFIs**

As a percentage of total financial sector assets, 2007

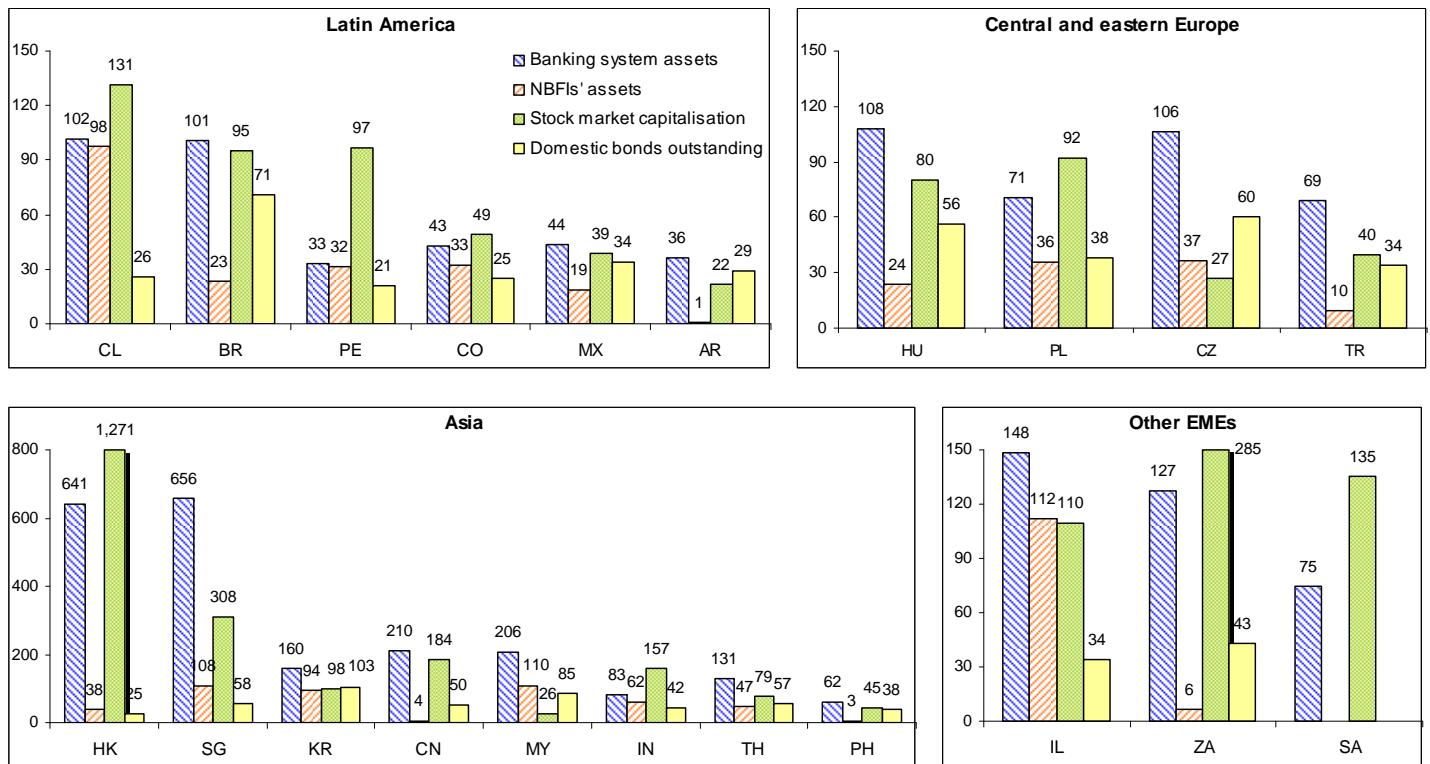


Source: Central bank questionnaires.

Differences in the structure of financial intermediation are even larger when stock and bond markets are considered. At end-2007, when EMEs were still unaffected by the crisis, stock market capitalisation was close to or higher than the local GDP in more than half of EMEs in our sample of 22 countries (Graph 2). Stock markets were also larger than the local banking system – in some cases two–three times so – in Chile, Colombia, Hong Kong SAR, India, Peru, Saudi Arabia, Singapore and South Africa. Many countries, especially in emerging Asia, Brazil, the Czech Republic and Hungary, also had fairly large local bond markets, ranging in size from 50% to over 100% of local GDP. Overall, countries in emerging Asia stood out in terms of the size and diversity of their financial systems, followed by Israel, Chile, South Africa, Brazil, central European countries and Saudi Arabia (Graph 2).

<sup>2</sup> Unless otherwise noted, regional figures in the text, graphs and tables refer to simple averages of countries in a region. These are: China, Hong Kong SAR, India, Korea, Malaysia, the Philippines, Singapore and Thailand (emerging Asia); Argentina, Brazil, Chile, Colombia, Mexico and Peru (Latin America); the Czech Republic, Hungary, Poland and Turkey (CEE); and Israel, Saudi Arabia and South Africa (other EMEs).

**Graph 2**  
**Structure of financial intermediation, 2007**  
As a percentage of GDP



Note: AR = Argentina; BR = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; HK = Hong Kong SAR; HU = Hungary; IL = Israel; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PH = Philippines; PL = Poland; SA = Saudi Arabia; SG = Singapore; TR = Turkey; TH = Thailand; ZA = South Africa.

Source: Central bank questionnaires.

These data suggest that many EMEs are no longer quite “emerging” in terms of the size and diversity of their financial sectors. Although the crisis had a huge impact on stock markets in many EMEs – equity prices fell by 20–40% between end-2007 and end-2009 – other segments of EMEs’ financial sectors were unaffected or expanded.

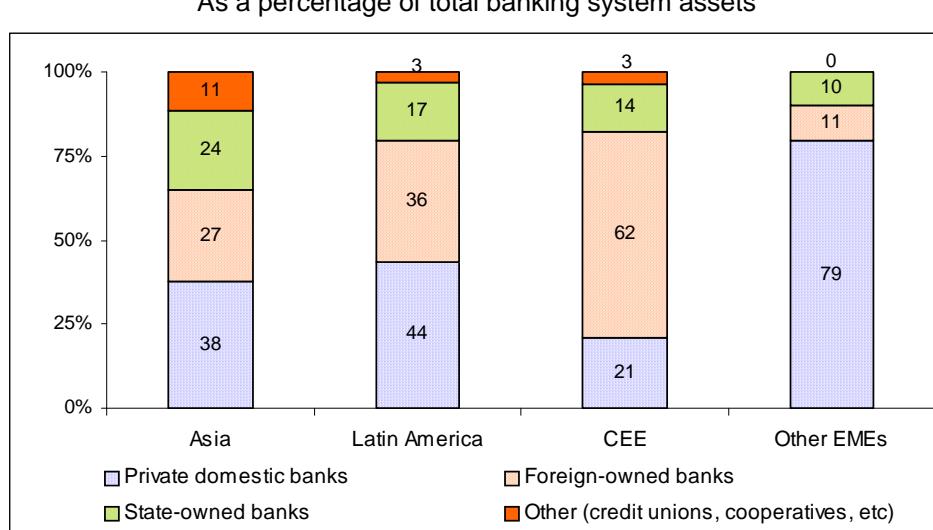
The data in Graph 2 also show that the financial sectors of the majority of emerging market countries can no longer be characterised as bank-centred: NBFIs, equity and bond markets match or exceed the size of the local banking sector in many EMEs. A comprehensive assessment of the impact of the crisis on financial intermediation in EMEs would therefore need to go beyond the narrow banking sector, on which the rest of this paper will focus.

### Ownership structure of banks

EMEs also differ considerably in terms of the ownership structure of their banks. Banking systems in Asia have, on average, a fairly balanced ownership structure (Graph 3). Compared to other emerging market regions, Asia also stands out in terms of the relative importance of state-owned banks and other banking institutions (cooperative banks, credit unions, etc). However, this is mainly due to the large size of the state and cooperative sectors in China and India. In Latin America, foreign and private domestic banks each account for about 40% of banking system assets, and state-owned banks account for the remaining 20%. In CEE, foreign-owned banks dominate, accounting for over 60% of total

banking system assets on average, and often much more in individual countries. In other EMEs – Israel, Saudi Arabia and South Africa – private domestic banks are dominant, accounting for 80% of total assets, with the remainder split between foreign and state-owned banks.

Graph 3  
Ownership structure of emerging market banks, 2009  
As a percentage of total banking system assets



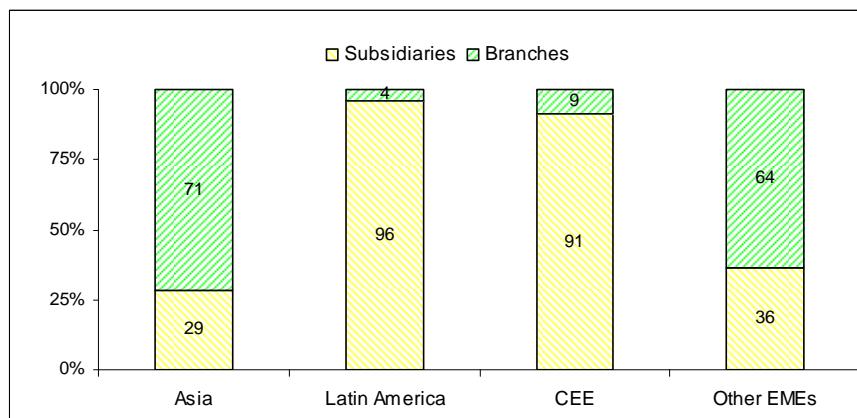
Source: Central bank questionnaires.

Again, regional averages mask considerable country differences. What is striking when one looks at country detail is how diverse bank ownership in EMEs has become. With the exception of the Czech Republic and Saudi Arabia, where foreign and private domestic banks account for, respectively, 96% and 98% of total banking system assets, different forms of ownership are well represented in almost all EMEs. For instance, private domestic banks account for more than 50% of total assets in Brazil, Colombia, Israel, Malaysia, Peru, the Philippines, South Africa, Thailand and Turkey, and foreign-owned banks account for more than 50% of total assets in Hong Kong SAR, Hungary, Mexico, Peru, Poland and Singapore (Appendix Graph A1). State-owned banks have a strong presence (more than 30% of total assets) in Argentina, Brazil, China, India and Korea. The ownership structure of banks in EMEs has been fairly stable since 2006. This contrasts with developments in the 1990s and the first half of the 2000s, when major changes were taking place in the structure of the banking industry in EMEs (see Mihaljek (2006), Turner (2008)).

Regarding the legal form of foreign banks' presence in EMEs, subsidiaries are dominant in Latin America and CEE, while branches account for about two thirds of foreign banks' assets in Asia and other EMEs (Graph 4). In Colombia, Malaysia, Mexico and Peru, foreign banks operate only as subsidiaries, while in China, India, Saudi Arabia and South Africa they operate only as branches. Unlike the overall ownership structure, the legal form of foreign banks' operations has changed in several EMEs since 2006: the relative share of branches increased by 15 pp in Korea, 8 pp in Hungary, 4 pp in Israel and 3 pp in Poland. On the other hand, in Chile and South Africa, the subsidiaries' shares increased by over 6 pp.

Graph 4  
**Foreign bank subsidiaries and branches, 2009**

As a percentage of total assets of foreign banks' affiliates



Source: Central bank questionnaires.

### 3. Bank funding

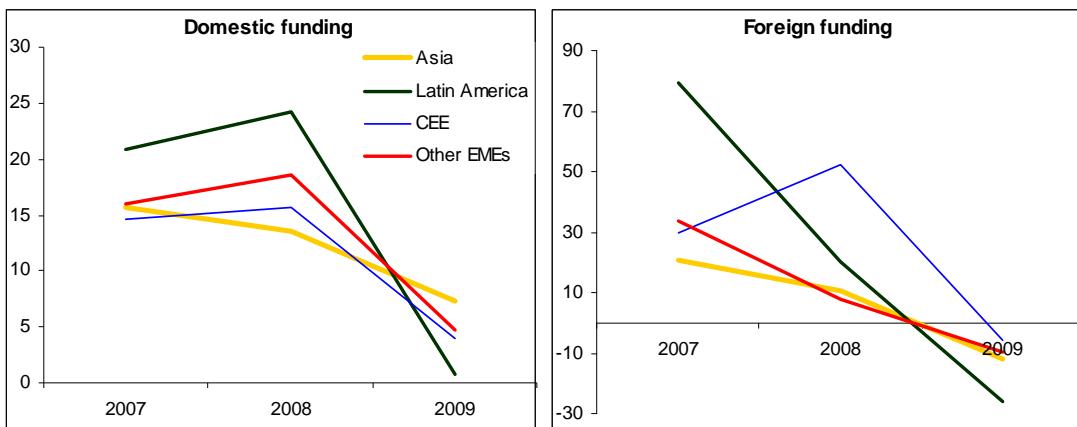
In the run-up to the latest crisis, the funding of banks in EMEs was characterised by two main trends: first, domestic deposits were generally growing more slowly than bank lending, resulting in rising loan to deposit ratios; and second, banks in EMEs were increasingly relying on foreign sources in order to fund the rapid expansion of credit. These trends were particularly pronounced in CEE, parts of Latin America, South Africa and Korea.

With the onset of the crisis in October 2008, both domestic and foreign sources of bank funding in EMEs largely evaporated. Growth rates of domestic funding plunged from 15–25% year-on-year in 2007–08, to 0–7% in 2009 (Graph 5, left-hand panel). The retrenchment in foreign funding was even more dramatic, especially in Latin America and CEE (right-hand panel). The banking systems in virtually all EMEs recorded negative growth of foreign funding for the full year 2009.

Among domestic sources of funding, both deposit growth and market-based funding slowed sharply in 2009 (Graph 6).<sup>3</sup> This is not surprising in view of the severity of the real and financial shocks that hit the EMEs in the first half of 2009: the collapse in exports depressed the growth of customer deposits (left-hand panel), while disruptions in local interbank and securities markets led to the sharp fall in domestic market funding (right-hand panel). During the second half of 2009, as global and local financial markets gradually recovered, banks in several Asian countries, including China, India, the Philippines and Thailand, started again to issue securities in domestic markets, mostly short-term money market instruments.

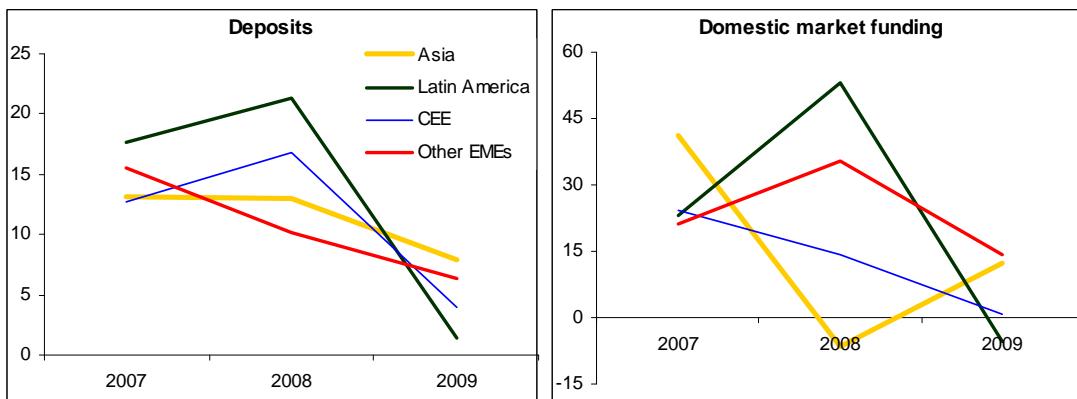
<sup>3</sup> Domestic market-based funding includes here borrowing from other domestic financial institutions and bonds and money market instruments issued by banks in domestic markets.

**Graph 5**  
**Funding of emerging market banks**  
Year-on-year growth rates, in per cent



Source: Central bank questionnaires.

**Graph 6**  
**Domestic funding**  
Year-on-year growth rates, in per cent

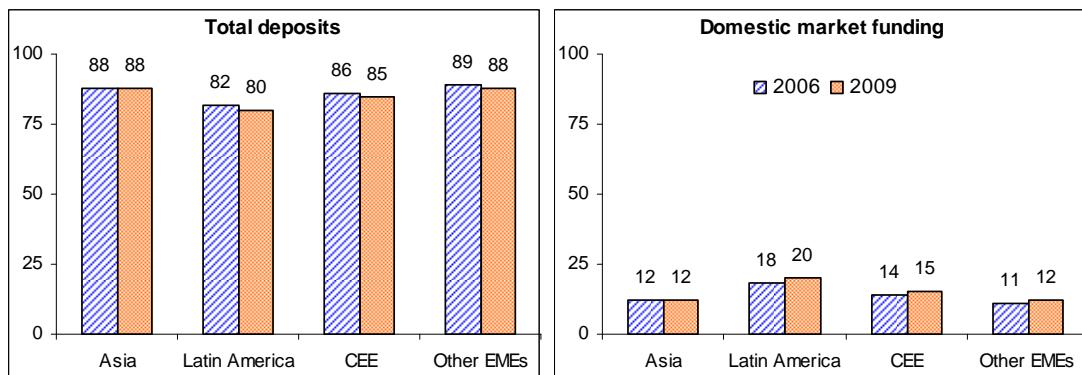


Source: Central bank questionnaires.

In relative terms, the shock to deposits was generally stronger than the one to domestic funding. As indicated in Graph 7, the share of deposits in domestic liabilities decreased in all emerging market regions with the exception of Asia, while the share of domestic money and bond market funding increased slightly in three out of four regions in 2009 compared to 2006.

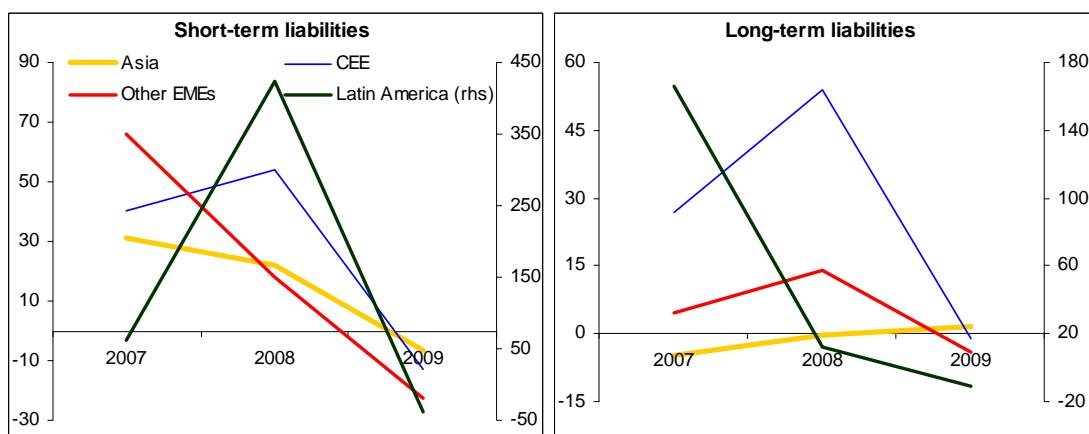
The situation with foreign funding was similar. Short-term liabilities plunged everywhere in 2009, recording average growth rates from  $-10\%$  to  $-40\%$  year-on-year (Graph 8, left-hand panel). Long-term liabilities dropped precipitously in CEE, where banks had for years relied on longer-term funding provided by international banks, and in Latin America, especially Brazil and Chile (right-hand panel). Long-term liabilities increased modestly only in emerging Asia. These developments reflected disruptions in global money markets on the one hand, and a temporary halt in cross-border credit flows to EMEs on the other.

**Graph 7**  
**Composition of domestic funding**  
As a percentage of domestic liabilities



Source: Central bank questionnaires.

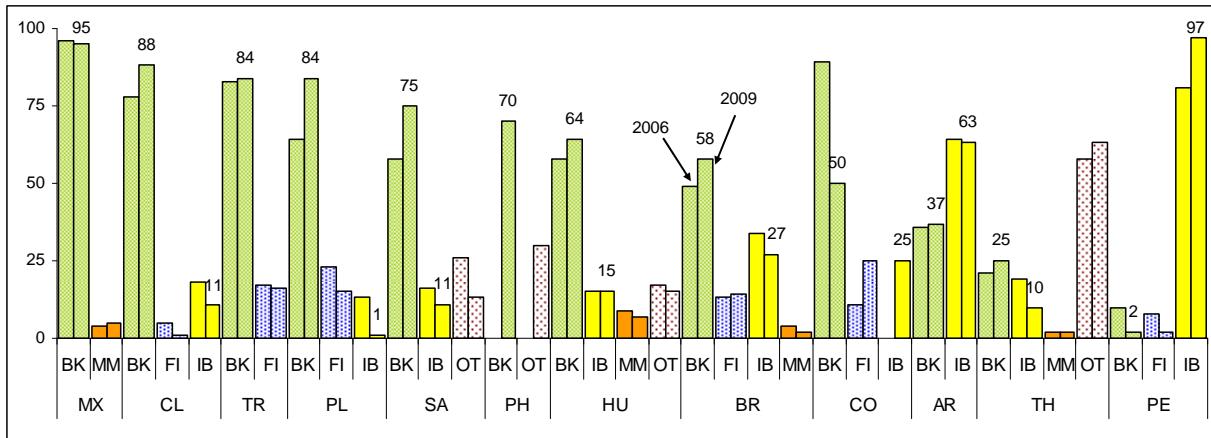
**Graph 8**  
**Foreign funding**  
Year-on-year growth rates, in per cent



Source: Central bank questionnaires.

Disturbances in the international money and bond markets seem to have had a bigger impact on the composition of foreign funding than disruptions in cross-border bank flows. As indicated in Graph 9, with the exception of Colombia, Mexico and Peru, the share of cross-border bank funding in total foreign liabilities was still higher in 2009 than in 2006, while the share of international money market instruments and bonds issued by emerging market banks was generally lower (Peru was a notable exception in bond issuance). The funding of emerging market banks by other foreign financial institutions – as well as from other foreign sources – was lower as a percentage of foreign liabilities in almost all the countries in 2009 compared with 2006.

**Graph 9**  
**Composition of foreign funding**  
As a percentage of foreign liabilities



Note: BK = cross-border loans provided by foreign banks; FI = loans provided by other foreign financial institutions; MM = international money market instruments issued by emerging market banks; IB = international bonds issued by emerging market banks; OT = other sources of foreign funding.

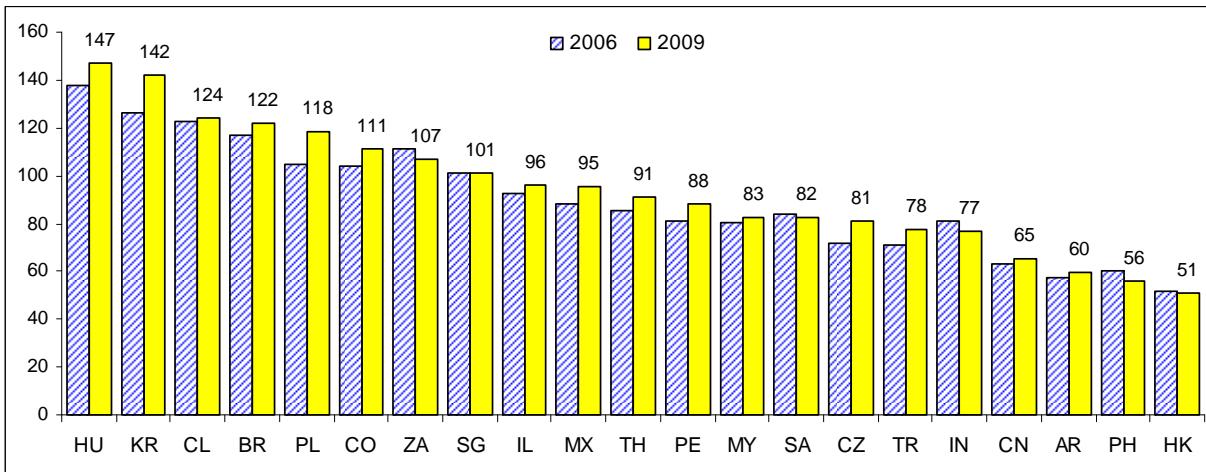
Source: Central bank questionnaires.

Central banks clearly identified problems in domestic and foreign funding in their papers and questionnaire responses prepared for the BIS meeting of Deputy Governors of emerging market economies. For instance, although Brazilian banks do not rely on foreign deposits for funding, they usually turn to international banks for credit lines for exporters. Their access to export credit lines was significantly restrained for some time during the crisis, prompting the central bank to provide a trade credit facility to banks until the access to foreign sources of credit gradually resumed.

In Mexico, some smaller- and medium-sized banks launched aggressive campaigns to increase funding from retail depositors by offering very attractive interest rates, while others expanded their branch network. Some Mexican banks also increased the proportion of liabilities held as liquid assets, while others called back some assets and reduced their lending commitments as a temporary measure to get through the crisis. Competition for deposits also strengthened in Hong Kong SAR, Korea and Hungary. In Poland, banks replaced maturing domestic interbank exposures with borrowing from foreign banks (mainly parent companies), and made efforts to raise more stable domestic sources such as deposits from non-financial clients (mainly households). This was, however, accompanied by a “deposit price war” that negatively affected banks’ financing costs and increased pressure on their interest margins.

Despite evidence of funding pressures in a large number of EMEs, many central banks felt that the financial crisis had no major impact on the funding strategies of banks operating in their domestic market. The main reason for this is that many emerging market banks do not rely extensively on either domestic or foreign market funding – they generally had a sufficient pool of local deposits to fund loans to their clients. As shown in Graph 10, roughly two thirds of EMEs in our sample had loan to deposit ratios below 100% in 2009, despite a widespread increase in these ratios since 2006. Another reason is that local interbank markets by and large continued to function normally through the crisis – although, admittedly, these markets are not as important a source of liquidity in EMEs as in advanced economies.

Graph 10  
**Loan to deposit ratios<sup>1</sup>**  
 In per cent



<sup>1</sup> Total loans as a percentage of total deposits. For Singapore, domestic banks only.

Sources: Central bank questionnaires; BIS calculations.

Another source of funding – the securitisation of bank loans – was also affected by the crisis. In most EMEs, securitisation was not widespread, but plans for its development were well-advanced in some countries prior to the crisis. In India, securitisation was mostly based on retail loans and was not too complex. With the crisis, securitisation decreased in volume, but was expected to resume in the future. In China, there were several pilot programmes for the securitisation of bank loans. However, with loan to deposit ratios of around 60%, the motivation for securitisation was relatively low. The central bank nevertheless promoted the development of a legal infrastructure and regulatory framework for securitisation because of concerns that banks might start moving riskier loans off their balance sheets by selling them to trust companies; these had already been in trouble several times in the past decade because of investments that were too risky. In Saudi Arabia, the authorities were approached by the banking industry on the issue of securitisation prior to the crisis. However, with bank loans already growing at annual rates of more than 25%, the Saudi Arabian Monetary Authority decided that it was not in the interest of financial stability to provide a further boost to credit growth by developing a framework for securitisation. By contrast, the authorities in South Africa gave a push to securitisation by lowering the loan to value ratio for mortgage loans during the crisis.

#### 4. Bank lending

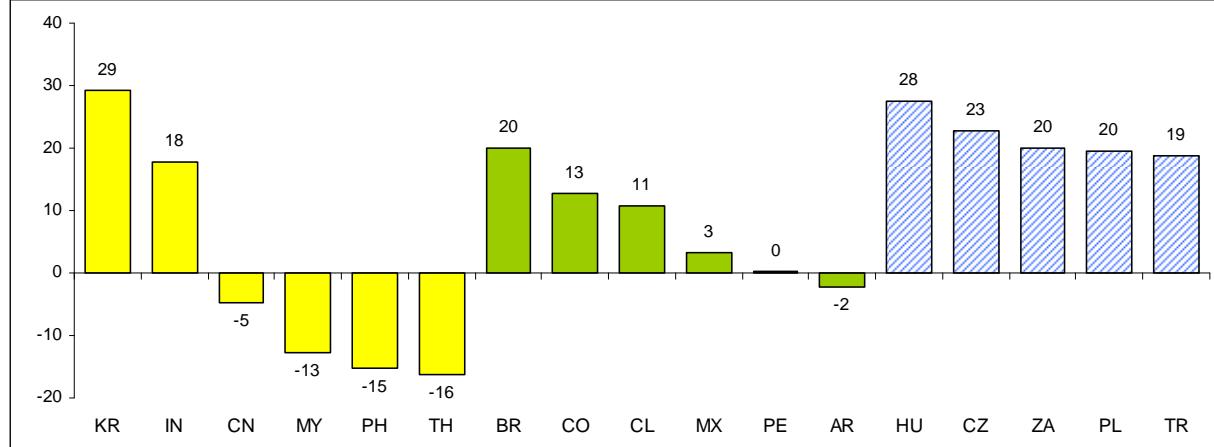
Before the crisis spread from advanced to emerging market economies in October 2008, private sector credit had expanded rapidly in most EMEs. The expansion was particularly pronounced in CEE, Brazil, Chile, Korea and South Africa. Credit stagnated or decreased as a percentage of GDP only in a few Asian and Latin American economies (Graph 11).

The great credit expansion resulted from a combination of cyclical, structural and policy factors that were in place from 2002 onwards. Low real interest rates and the strong growth of the global economy were the key cyclical factors. Rapid financial sector development and growing economic and financial integration of EMEs with advanced economies were the major structural forces. More disciplined macroeconomic policies and greater emphasis on

financial stability in EMEs were also contributing elements. Together, these factors provided incentives for portfolio diversification by global investors and led to a surge in capital flows to EMEs, which funded much of the credit expansion (Mihaljek (2009)). In addition, the balance sheets of commercial banks in some EMEs with fixed exchange rates expanded as a result of prolonged foreign exchange (FX) intervention by central banks resisting currency appreciation.

**Graph 11**  
**Domestic bank credit to the private sector, end-2002 to August 2008**

Cumulative change in end-period stocks, as a percentage of GDP

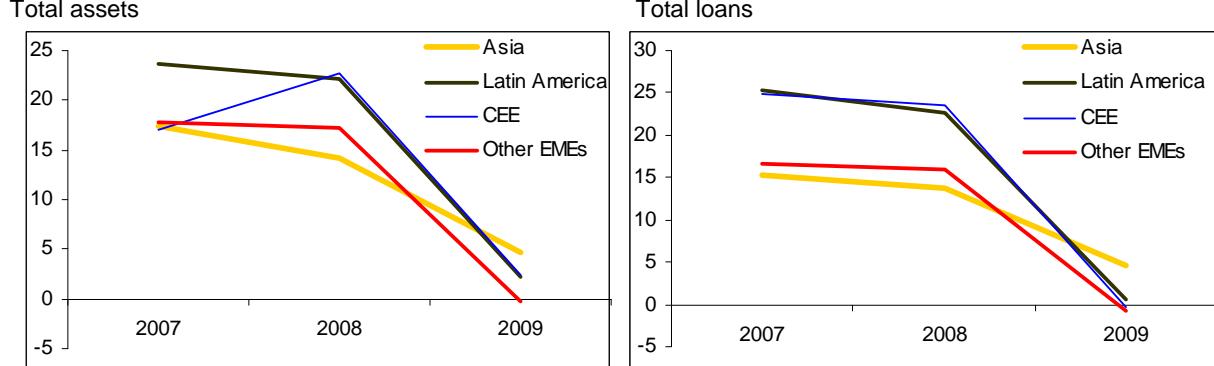


Source: IMF, *International Financial Statistics*.

Following the onset of the crisis in the main financial centres in August 2007, total assets and loans of banks in most EMEs began to slow down (Graph 12). As the crisis spread in October 2008, credit growth decelerated sharply. Apart from some Asian and Latin American countries, most EMEs recorded negative credit growth rates in 2009. It is striking, for instance, how similar the average rate of decline was in CEE and Latin America (right-hand panel).

**Graph 12**  
**Total assets and loans of banks in EMEs**

Year-on-year growth rates, in per cent

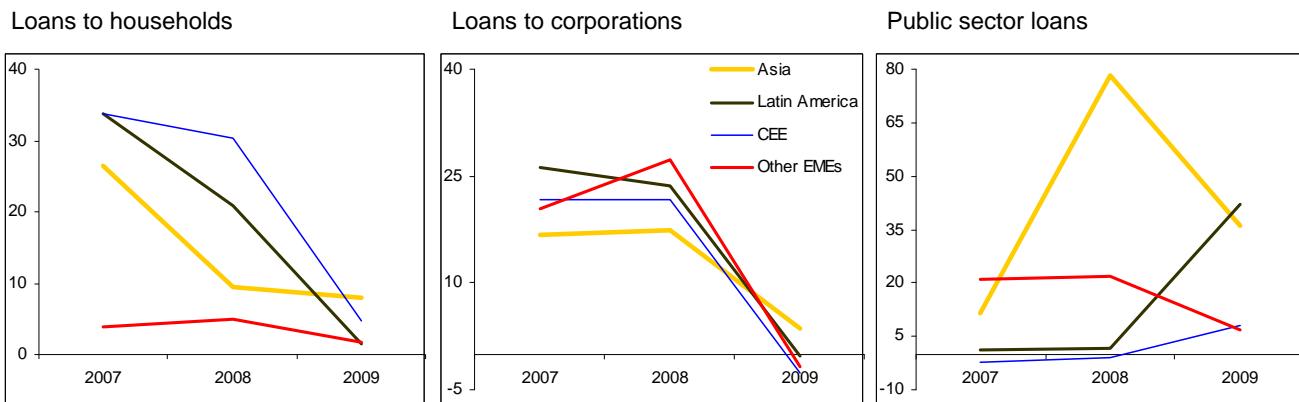


Source: Central bank questionnaires.

Corporate credit growth decelerated sharply in all emerging market regions in 2009 (Graph 13, centre panel). The slowdown in household lending was pronounced in CEE and Latin America, and more moderate in Asia and other EMEs (left-hand panel). Lending to the public sector increased in CEE, and in particular in Latin America, while in Asia and other EMEs, public sector lending decreased (right-hand panel).

In terms of the currency composition of loans, foreign currency loans decreased much faster than domestic currency loans in 2009 (Graph 14). While the rates of decrease across regions were quite similar in 2009, it is interesting to note that foreign currency lending in CEE *increased* during 2008, despite the ongoing crisis in many western European countries, where most banks operating in CEE have headquarters. As a result, foreign currency loans accounted for about 35% of total outstanding domestic bank credit in CEE in 2009, compared with 15–18% in other emerging market regions. This was a major source of vulnerability during the crisis, especially since a quarter of foreign currency loans were taken by households, which in most cases do not have foreign currency income and cannot hedge exchange rate risk due to the lack of hedging instruments. One should note, however, that foreign currency lending was more a question of banking product development than a problem of currency substitution induced by macroeconomic instability, although some macroeconomic developments did play a role in the spread of foreign currency lending, including fiscal deficits in Hungary, which kept domestic interest rates high.

Graph 13  
**Domestic credit growth**  
Year-on-year growth rates, in per cent

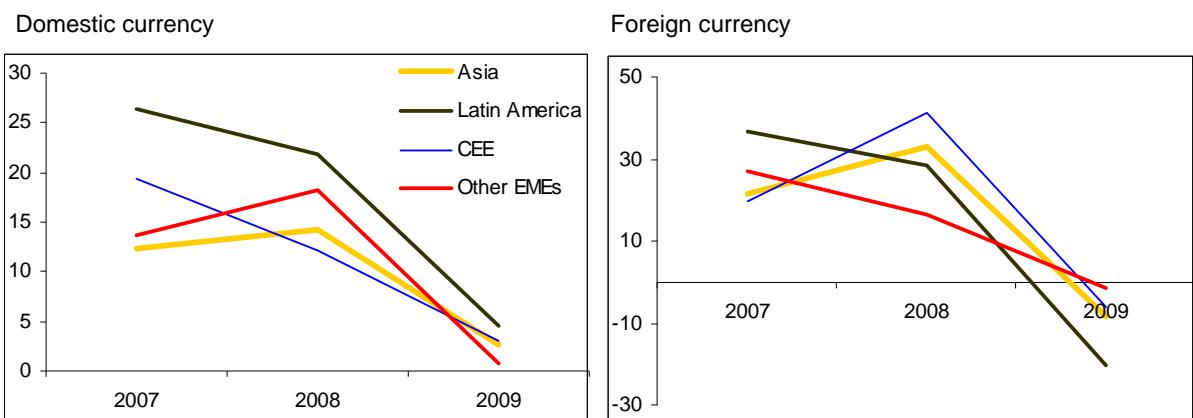


Source: Central bank questionnaires.

There were also some significant changes in the composition of bank assets other than loans. Holdings of long-term securities fell sharply in CEE and Latin America, and increased in Asia and other EMEs in 2009 (Appendix Graph A2, left-hand panel). In CEE, the reduction in long-term bond holdings was limited to domestic corporate and government bonds, while foreign bond holdings increased sharply (Appendix Graph A3). Banks in Asia and other EMEs also increased their foreign bond holdings in 2009. In addition, banks in most EMEs increased their holdings of short-term securities (Appendix Graph A2, right-hand panel).

Central bank contributions to the meeting provided further detail on these developments and on changes in banks' behaviour during the crisis. In Hungary, India, Korea, Singapore, South Africa, Thailand and Turkey, credit growth slowed sharply as credit demand fell and banks tightened their credit standards and price and non-price credit terms. In Argentina and the Philippines, the composition of domestic credit shifted from the household sector before the crisis towards the corporate sector in 2009. In South Africa, in contrast, corporate lending decreased more than loans to households due to a sharp contraction in output. China was an important exception: the growth rate of total loans doubled in 2009 to 30% year-on-year by end-October.

Graph 14  
**Domestic and foreign currency loans**  
Year-on-year growth rates, in per cent



Source: Central bank questionnaires.

Banks in several countries (including Brazil, the Czech Republic and South Africa) shortened the maturity of lending and often increased voluntarily their holdings of statutory liquid assets. This was also the case with commercial banks in India and Turkey, which significantly increased their holdings of government securities. In Korea, banks expanded their short-term placements in money market funds.

In Poland, there was a significant disruption of the domestic interbank deposit market. In response, banks limited the growth of credit to the economy (especially the non-financial corporate sector), raised the share of highly marketable treasury securities in their assets, and increased holdings of central bank bills, current account balances, and deposits at the central bank.

## 5. Domestic versus foreign-owned banks

Reflecting the diversity of ownership forms and market positions of banks in EMEs, the responses of domestic and foreign-owned banks to the crisis have been quite varied and cannot be easily categorised.

A number of central banks in countries with both low and high shares of foreign bank ownership (eg Brazil, Hong Kong SAR, Korea, Malaysia, Saudi Arabia, Singapore and Thailand) reported that there have been no major differences in the reactions of domestic and foreign-owned banks during the crisis. For instance, South Africa's largest foreign-owned bank (which is the second largest bank in the country) responded to the crisis in a similar way to the domestic banks. In Thailand, both foreign and local banks became more cautious in lending to risky businesses (especially small- and medium-sized enterprises, which was also the case in Korea); and reduced their off-balance sheet transactions, especially in FX derivatives. The main difference was that foreign-owned banks reduced household loans and increased secured lending slightly, while the Thai banks increased household loans and kept secured lending unchanged.

Similarly, in Hong Kong SAR, both local and overseas banks cut back loans to the corporate and household sectors sharply after the onset of the crisis. One difference was that locally incorporated banks were more aggressive in securing stable funding in the retail market by offering more attractive time deposit rates. In Singapore, some foreign banks cut back

lending to non-core customers and complex trading activities as part of restructuring measures undertaken by parent banks worldwide. Overall, however, these cutbacks were not significant. In Saudi Arabia, liquidity from head offices decreased temporarily for some foreign bank branches, which restricted their usual role in interbank funding and lending to various sectors in the economy. Nevertheless, one foreign bank branch was able to issue an Islamic bond (sukuk) to fund its Saudi assets during the crisis.

Among the countries with a moderate share of foreign-owned banks (ie 15–30% of total banking sector assets), foreign-owned banks generally reduced domestic credit faster than private domestic banks, for instance in Argentina, Turkey, and among smaller foreign banks in South Africa. Similarly, foreign-owned banks in Colombia were quite procyclical in consumer lending. In Argentina and Turkey, the decline in credit by the private banks – both foreign and domestic – was partly offset by increased lending by the state-owned banks.

The funding responses of private domestic banks and foreign-owned banks also differed in this group of countries. In Turkey, for instance, foreign-owned banks reduced interbank borrowing much more than private domestic banks (this was also the case in the Philippines); they issued subordinated debt to offset the decline in cross-border loans and significantly increased the amount of funds raised from repo transactions, while the private domestic banks reduced their funding through repos.

It is interesting to note that reactions to the crisis differed even among some foreign-owned banks. In South Africa, smaller foreign-owned banks whose parents were more exposed to the global financial turmoil were cut off from head office funding and had to reduce their exposures to the corporate sector. If the news about their foreign owners was bad, they tried to emphasise how they were de-linked and independent; if the news was good, they stressed the willingness of their parents to stand by them.

Among the countries where foreign-owned banks play a key role in domestic financial intermediation, the question of domestic versus foreign-owned banks was less relevant than the question whether foreign banks helped to maintain financial stability through the crisis. On this issue, experiences varied. In Mexico, some subsidiaries – especially those whose parents were in trouble – initially reduced credit faster than other banks, although later on, domestic banks also cut back their lending. Many foreign-owned banks in Mexico ended up lending to parent banks.<sup>4</sup> Some parent banks also transferred loans to large Mexican firms from the books of the head office to the books of the subsidiaries in order to reduce the head office leverage. Foreign bank subsidiaries also reduced their risk positions and trading activity in the FX and sovereign debt markets.

In contrast to Mexico, parent banks fulfilled their support function in Hungary during the crisis, with no signs of withdrawing funds from their subsidiaries. In addition to stabilising the position of subsidiaries, parent banks provided them with FX funding and increased the role of intragroup foreign currency swaps. On the other hand, domestically owned banks received government loans to strengthen their liquidity position during the crisis, and the central bank provided FX liquidity under its swap facility. Both local and foreign-owned banks reduced their profit targets for 2009, started competing for deposits, and cut back loans to risky industries such as construction.

The experience of Poland was somewhere between these extremes. Foreign-owned banks generally reduced corporate credit and expanded household credit faster than Polish-owned banks. They kept on providing foreign currency loans (though at a much diminished rate), while Polish-owned banks largely stopped providing such loans, replacing them with local currency loans. Foreign-owned banks also closed their liquidity funding gap faster than

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<sup>4</sup> This was also the case in some central European countries – in particular the Czech Republic and Slovakia – in the last quarter of 2008 and the first quarter of 2009 (see Mihaljek (2010)).

domestically owned banks. In particular, at the height of the crisis in Q4 2008, foreign-owned banks withdrew earlier than domestic banks from the interbank market, preferring to deal with the central bank rather than with other commercial banks. This lack of confidence was “imported” from the outside: parent banks apparently instructed their Polish subsidiaries to withdraw from the local interbank market. But, on the whole, parent banks did not abandon their subsidiaries in Poland or elsewhere in CEE during the crisis (see Mihaljek (2010)). They broadly maintained their cross-border credit lines and lending in domestic currency, thus acting as a stabilising force during the crisis and demonstrating that these markets were of strategic importance to them.

A related issue is whether parent banks would convert some of their emerging market subsidiaries into branches after the crisis. Over the past decade, centralisation of the decision-making process in global financial institutions has led to a system in which subsidiaries operate more or less like branches. In the European Union, this development has been facilitated by the adoption of the single EU banking passport.

Branch banking often looked more attractive to host country authorities in the past because it seemed to provide greater incentives to foreign banks to transfer know-how and technology to EMEs. With the crisis, however, the focus of host country authorities has shifted towards financial stability issues. This has made subsidiaries more attractive because of the possibility of ring fencing their assets and of regulating them more tightly than branches. New banking regulations proposed by the Basel Committee on Banking Supervision (2009) could reinforce this trend by raising capital and liquidity requirements for subsidiaries. In CEE, for instance, some foreign banks announced that they might turn their subsidiaries into branches if the local regulation of subsidiaries’ activities increased significantly after the crisis.

However, there has also been a movement away from foreign bank branches in some countries. In China, the authorities would like foreign-owned banks – which are currently present only as branches – to expand their presence in the form of subsidiaries in the future. One reason for this was the high concentration of some activities in foreign bank branches: with just 2% of total banking system assets, foreign bank branches accounted for 50% of derivatives and 18% of FX trading before the crisis. The authorities would like foreign banks to commit to the local market, ie to lend and fund their activities in China in the future. Malaysia had some positive experience with this approach – by requiring foreign banks to operate as subsidiaries, the authorities ensured that banks had a level playing field and entered the crisis with sufficient capital. By contrast, the authorities in India were reluctant to give foreign-owned banks dominance over some market segments. This could happen if foreign banks were granted the full national treatment currently given to domestic banks, ie if foreign banks were allowed to turn their branches into subsidiaries.

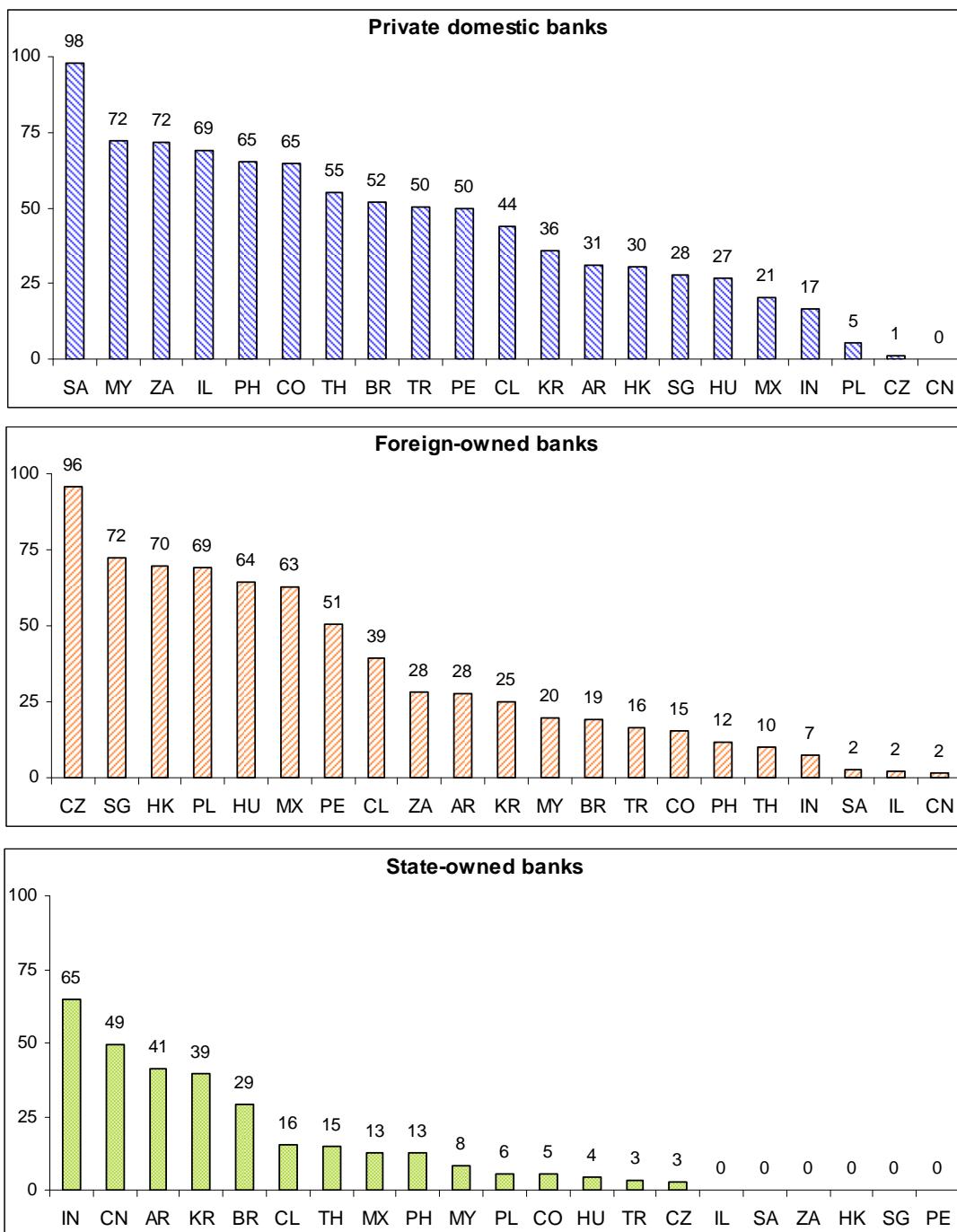
In summary, in many EMEs where foreign-owned banks do not play a key role in domestic financial intermediation, the differences in the reactions of local and foreign-owned banks to the crisis were small and discernible mainly in the details of their funding and lending operations. In particular, there have been no noticeable changes in the composition of the loan portfolios of the two groups of banks after the crisis. In EMEs, where foreign banks play a somewhat bigger role, foreign-owned banks generally adjusted their balance sheets faster and more deeply than domestic banks. Finally, in EMEs where foreign-owned banks are the dominant financial intermediaries, reactions to the crisis depended on the exposure of parent institutions, the financial health of subsidiaries, and the strategic importance of subsidiaries for parent banks. In the end, financial stability has been preserved both in those EMEs where parent banks fulfilled their support function and those where they withdrew funds from subsidiaries. However, as discussed in the accompanying BIS papers prepared for the meeting, in both cases, this required some extraordinary efforts on the part of central banks to stabilise the local financial markets.

## Appendix

Graph A1

### Ownership structure of banking systems in EMEs, 2009

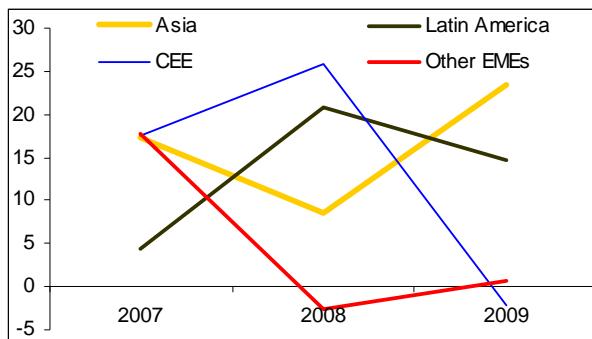
As a percentage of total banking system assets



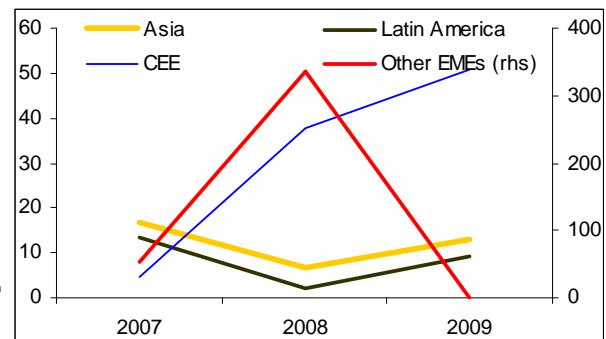
Source: Central bank questionnaires.

**Graph A2**  
**Holdings of securities by banks in emerging markets**  
Year-on-year growth rates, in per cent

Long-term securities



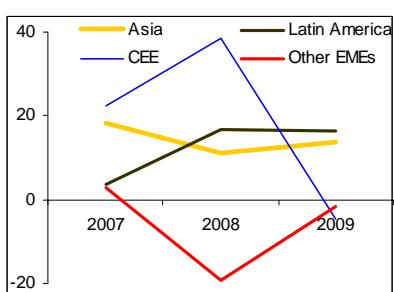
Short-term securities



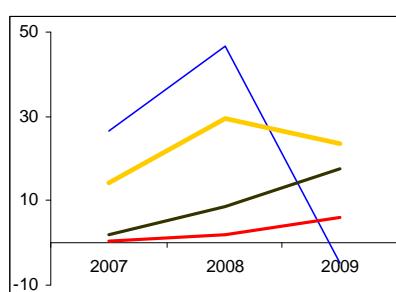
Source: Central bank questionnaires.

**Graph A3**  
**Holdings of long-term securities by banks in emerging markets**  
Year-on-year growth rates, in per cent

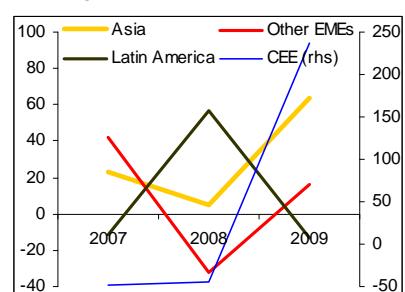
Domestic corporate bonds



Government bonds



Foreign bonds



Source: Central bank questionnaires.

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# Impact of the crisis on local money and debt markets in emerging market economies

Ramon Moreno and Agustín Villar<sup>1</sup>

## I. Financial crisis and panic in global financial markets

Starting in the second half of 2007, increased risk aversion and perceptions of counterparty risk led to disruptions in financing in developed money markets that spilled over to foreign exchange (FX) markets, as seen in widening Libor–OIS spreads and spreads between the FX swap-implied dollar rate and dollar Libor, with the latter reaching 40 basis points (bp) in September 2007, indicating large and persistent deviation from covered interest parity (CIP) (see Baba and Packer (2009a, 2009b)).<sup>2</sup> The effects on emerging market economies (EMEs) were relatively limited until the failure of Lehman Brothers in September 2008. In the third and fourth quarters of 2007, and then around the first and second quarters of 2008, only two central banks responding to the questionnaire circulated for the BIS meeting reported sustained periods of stress in their FX markets. Two others reported stress, but only for a very brief period. Over these periods, there were distinct and persistent (but relatively limited) increases in the MOVE index, suggesting higher perceived risks in developed debt markets, as well as in (EME sovereign) CDX spreads, suggesting higher perceived EME sovereign default risks, and also in the Libor–OIS spreads, reflecting disruptions to FX cash markets. The effects of tighter financing conditions on EMEs at the time were most apparent in equity price declines.

The impact on EMEs was much greater following the failure of Lehman Brothers on 15 September 2008. In response to deleveraging, there were large capital inflow reversals, notably in cross-border bank lending. International debt markets for emerging market issuers closed and trading collapsed, irrespective of the credit quality of borrowers (BIS (2009)). The number of EMEs reporting financial stress increased sharply, jumping from four to 10 (ie almost two thirds of the central bank questionnaire respondents) in the space of a week. However, reported stress episodes had declined significantly by the end of 2008 and declined further after rebounding around February–March 2009. They had fallen to zero by the third quarter of 2009. The rise and fall in the number of reported stress episodes was broadly correlated with the fairly sharp rise and fall in the MOVE index and the Libor–OIS and (EME sovereign) CDX spreads, suggesting that external factors played a large role in explaining stress episodes.<sup>3</sup> However, the rise in CDX spreads was more persistent than in the other series; they jumped to around 1,000 bp in late September 2008, then hovered around 700–900 bp until the end of the first quarter of 2009, before declining to about 400 bp in the second quarter of 2009 and to about 250 bp towards the end of 2009. This was around 100 bp higher than in 2007, but similar to the level seen in the first part of 2008. It may be

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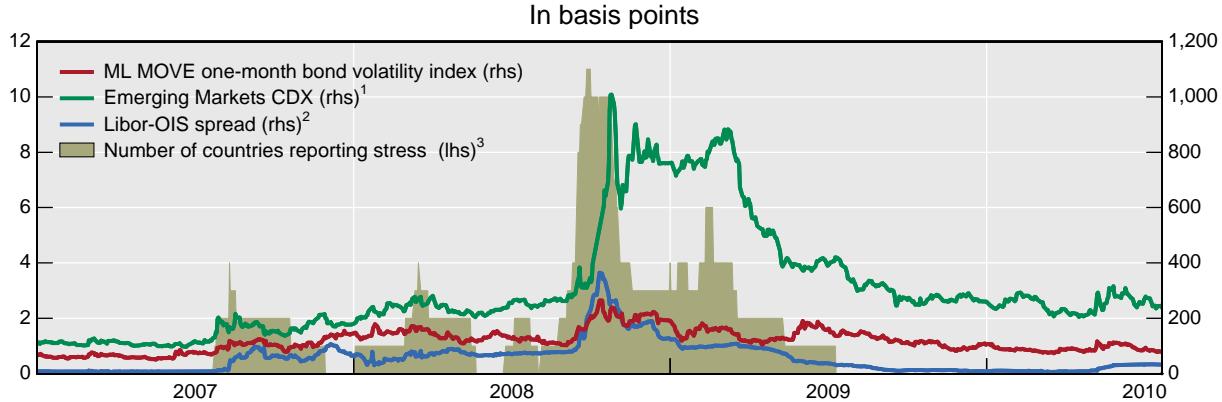
<sup>1</sup> BIS. Research assistance by Pablo García-Luna and Agne Subelyte is gratefully acknowledged.

<sup>2</sup> On 12 December 2007, the Federal Reserve, the European Central Bank, the Bank of Japan, the Bank of England and the Swiss National Bank announced coordinated measures designed to address pressures in short-term funding markets, including the establishment of US dollar swap lines (BIS (2009)).

<sup>3</sup> This interpretation is broadly consistent with the evidence on the importance of credit supply factors in explaining the reversal of cross-border financing to EMEs presented in the paper by Takats ((2010), this volume).

noted that the number of countries reporting stress in late 2008 fell, even though the CDX spreads remained high, suggesting resilience to stress in international debt markets.

Graph 1  
Stress episodes and credit spreads



<sup>1</sup> Five-year on-the-run credit default swap (CDS) mid-spread on index contracts of investment grade and below investment grade. <sup>2</sup> Three-month US dollar Libor minus overnight index swap (OIS) rates, in basis points. <sup>3</sup> The countries in the sample are Argentina, Brazil, Chile, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Korea, Malaysia, Mexico, Peru, Poland, Saudi Arabia, Singapore and Turkey.

Sources: Bloomberg; Datastream; JPMorgan Chase; BIS calculations.

The policy responses of central banks in developed market economies helped lower the stress indicators reported in Graph 1. First, large central bank funding and financial rescue efforts, including the unlimited provision of dollars in Federal Reserve swap lines<sup>4</sup> with developed central banks (and unprecedented swap lines of US\$ 30 billion each with four EME central banks) helped stabilise global funding markets. Second, as market sentiment stabilised, the reduction in policy rates in developed market economies towards zero (in the United States, interest rates fell from 5.25% in September 2007 to 2% by April 2008 and to 0.25% in December 2008) increased the attractiveness of emerging market assets, eventually contributing to improvements in financing conditions and a resumption in capital flows.

The effects of the shock affected asset prices across several markets. Sovereign bond spreads for EMEs jumped across the board to levels not seen since past emerging market crisis episodes. EME equity and domestic sovereign bond markets declined sharply (BIS (2009)). Exchange rates depreciated in many countries, although in some cases, heavy FX market intervention dampened exchange rate adjustment. In some countries, funding pressures also arose in domestic money markets.

Central bank contributions in this volume point to the sudden change in conditions in financial markets in EMEs following the collapse of Lehman Brothers, with some arguing that the financial crisis effectively erupted in EMEs after the bankruptcy of Lehman Brothers. Mesquita and Toros (2010) emphasise the foreign-driven dollar liquidity squeeze that affected the financial markets in Brazil. Fung and Yu (2010) also observe that, after the

<sup>4</sup> On 12 December 2007, the Federal Reserve Board of the United States, the European Central Bank, the Bank of Japan, the Bank of England and the Swiss National Bank announced coordinated measures designed to address pressures in short-term funding markets, including the establishment of US dollar swap lines (BIS (2009)). Starting in mid-October 2008, Federal Reserve swap facilities with these central banks were unlimited.

bankruptcy of Lehman Brothers, developments in financial markets took a dramatic turn and international money markets were the main channel of spillover for the shock. The Hong Kong SAR money market became a source of funding for international banks, but there were no disruptions in that market. In its paper for this meeting, the Czech National Bank observes that financial and FX markets were affected in a permanent manner after the bankruptcy of Lehman Brothers. Al-Hamidy (2010) suggests that the collapse of Lehman Brothers made international banks reluctant to fund even the strongest emerging market banks due to their own need to build up liquid assets.

## II. Foreign exchange markets

The turbulence following the failure of Lehman Brothers created strong depreciation pressures on EME currencies as dollar funding conditions tightened globally and resulted in a sudden stop in capital inflows to EMEs.<sup>5</sup> The effects are illustrated in Graph 1 of the Supplementary Graphs and Tables circulated for this meeting and in Table 1 of this paper.

As summarised in Table 1 (columns 1 and 2), the bankruptcy of Lehman Brothers was associated with sharp depreciations in spot exchange rates and increases in exchange rate volatility. The cumulative median depreciation over the period 1 September 2008–31 March 2009 was 22.5%. This was partly reversed starting around April 2009 (column 3). With regard to forward rates, notwithstanding the sharp depreciations in the spot markets, there was a general tendency for forward premia to rise or for forward discounts to switch to forward premia (Table 1 and Annex, Graph A1), indicating a desire to insure against possible further depreciation.

### Cross-country variation

There was significant cross-country variation in spot and forward rate behaviour. Turning first to the countries whose exchange rate depreciation was below the median in Table 1, in some cases there was limited (eg the Philippines, Singapore, Thailand) or no (eg China, Hong Kong SAR, Saudi Arabia) *spot exchange rate* depreciation. The impact of the crisis on forward rates was also limited, although in some cases it was more visible than the impact on the spot rate. For example, in China, the (non-deliverable offshore) forward rate exhibited some volatility, switching from a discount to a premium in the third quarter of 2008. Volatility persisted until the second quarter of 2009, although it was moderate in comparison with other countries. There was also some volatility in the forward rate in Malaysia, with the forward discount increasing briefly, before switching to a premium. Forward rates were otherwise stable in the countries in this group, with most countries reporting no stress episodes in their FX markets in the aftermath of the collapse of Lehman Brothers (eg China, Hong Kong SAR, Saudi Arabia, Thailand), while those countries reporting stress episodes stated that such episodes were very brief (Malaysia and Singapore). In countries with exchange rate depreciations above the median, exchange rate movements were in some cases very large, ranging from 38% to 56% in Brazil, Hungary, Mexico, Poland, Russia and Turkey.

It might be noted that there is no clear pattern relating the degree of exchange rate depreciation to the forward premium. If expectations stabilise in response to exchange rate

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<sup>5</sup> Corporates (financial and non-financial) and (to a lesser extent) governments that had outstanding external debt found that the value of their liabilities increased sharply. While many EMEs have become net creditors (ie Brazil, China), sectoral balance sheets were still exposed to foreign creditors in several EMEs.

adjustment, we would expect forward premia to fall as the exchange rates depreciate, but this is not apparent in the data.

Table 1  
Exchange rates

	Spot rate <sup>1</sup>			Forward premium <sup>2</sup>		
	1 Aug 07– 31 Aug 08	1 Sep 08– 31 Mar 09	1 Apr 09– 31 Dec 09	1 Aug 07– 31 Aug 08	1 Sep 08– 31 Mar 09	1 Apr 09– 31 Dec 09
<b>Emerging Asia</b>						
China	−9.8	0.0	−0.1	−1.8	1.0	−0.1
Hong Kong SAR	−0.2	−0.7	0.1	−0.2	−0.1	−0.1
India	8.3	16.4	−8.4	0.6	0.8	0.7
Indonesia	−0.4	26.5	−18.8	1.0	2.3	1.8
Korea	17.2	27.3	−15.2	−0.0	−0.4	−0.2
Malaysia	−1.9	7.6	−6.1	−0.1	−0.0	0.3
Philippines	0.2	6.0	−4.3	0.6	0.7	0.9
Singapore	−6.3	7.3	−7.6	−0.5	−0.1	0.0
Thailand	1.4	4.0	−6.1	−0.1	0.8	0.2
<b>Latin America</b>						
Argentina	−2.9	22.6	2.2	1.8	12.9	4.2
Brazil	−13.0	41.7	−24.8	1.6	2.8	1.9
Chile	−1.3	12.7	−13.0	0.4	1.1	−0.4
Colombia	−3.2	34.2	−20.2	1.6	1.9	1.0
Mexico	−5.9	38.1	−8.0	1.0	1.9	1.2
Peru	−6.5	6.8	−8.5	−0.5	1.2	0.3
<b>Other emerging markets</b>						
Czech Republic	−17.9	22.5	−10.7	−0.0	0.1	0.3
Hungary	−11.5	44.0	−19.3	1.0	1.7	1.6
Israel	−16.6	16.6	−9.9	0.1	0.3	−0.1
Poland	−17.9	56.1	−19.5	0.4	0.7	0.5
Russia	−3.9	38.6	−13.0	0.4	7.0	2.1
Saudi Arabia	−0.0	0.0	0.0	−0.3	0.1	−0.0
South Africa	7.9	25.5	−23.4	1.9	2.2	1.6
Turkey	−9.1	42.8	−10.8	3.7	4.0	2.3
<b>Median for all EMEs in table</b>	<b>−3.2</b>	<b>22.5</b>	<b>−9.9</b>	<b>0.4</b>	<b>1.0</b>	<b>0.5</b>

<sup>1</sup> A negative sign indicates an appreciation of the local currency; period changes, in per cent. <sup>2</sup> Premium (or discount) resulting from a forward contract to be executed in the future at a forward rate. The premium is calculated as follows:  $((\text{forward rate} - \text{spot rate}) / \text{spot rate}) * 100$ . The resulting value is a percentage and termed a premium if it is positive. If the resulting percentage is negative, it is a forward discount; period averages.

Sources: Bloomberg; CEIC; Datastream; national data.

## Discussion

While the primary trigger was external, depreciation pressures in each EME reflected the varying influence of a number of factors.<sup>6</sup> The following explanations may be offered for the differences in exchange rate volatility.

First, the *differences in monetary frameworks and exchange rate regimes*. Spot exchange rate volatility was lower in several EMEs where currencies were more closely linked (at least

<sup>6</sup> For example, in its questionnaire response, the Bank of Mexico explains that the stress period observed at the time in the FX market was due to a combination of increased risk aversion, reduced liquidity (fewer participants) and cutbacks in leverage.

de facto) to the US dollar or other international currencies. All the countries showing greater exchange rate volatility are inflation targeting regimes with floating rates. As noted in Moreno ((2010), this volume), many of those countries provided a great deal of foreign currency support to FX markets but (as intended) not to the extent of preventing exchange rate adjustment. In contrast, in other countries, exchange rate volatility was not much higher before and after the collapse of Lehman Brothers.

Second, *country-specific factors*, including:

- *Greater financial integration.* In some countries, foreign investors sought funding in EME local currency markets. One element was foreign investors closing their positions in domestic markets to acquire foreign currency. For example, market commentary suggests that, in Mexico, the forward market turned into the main source of foreign exchange as the supply from the FX swap market dried up at the end of the third quarter of 2008. Prior to the failure of Lehman Brothers, tighter financing conditions appear to have prompted foreign investor withdrawal from EME equity markets. Another element was exposure to cross-border bank financing; EMEs with a greater reliance on such financing were more vulnerable to the reversals in cross-border lending, which started in the third quarter of 2008. Still another element was the onshore presence of foreign banks – while this generally appeared to be a stabilising factor, in some cases, foreign bank subsidiaries appear to have supplied financing to their parents. In its contribution for this meeting, the Hong Kong Monetary Authority suggests that domestic money markets became funding markets for international banks with a large onshore presence (see also the discussion in Takats ((2010), this volume)).
- *Use of derivatives to take positions in FX markets.* In some countries (eg Brazil, Korea, Mexico and Poland) firms engaged in derivatives transactions that implied delivery of foreign currency when the currency depreciated past a certain threshold; this appears to have contributed to depreciation pressures. For example, in the Banco de Mexico's contribution for this meeting, Sidaoui, Cuadra and Ramos-Francia (2009) observe that FX derivatives might have played a destabilising role in the Mexican peso market.
- *Differences in foreign reserve levels:* some recent research (Obstfeld, Shambaugh and Taylor (2009)) suggests that countries with lower ratios of foreign reserves to M2 experienced sharper depreciation pressures than other countries (see the discussion in Moreno ((2010), this volume)).

To what extent was exchange rate volatility a concern? A number of points may be highlighted.

First, the fact that there was little or no exchange rate volatility does not mean that there was no pressure in FX markets. For example, in Hong Kong SAR and Saudi Arabia, which maintain pegs to the US dollar, the currencies hit the upper bound of the band and foreign currency sales took place.

Second, some of the exchange rate adjustment reflected real as well as financial factors, and was not necessarily (directly) related to the spillover from the crisis. For example, commodity-exporting countries experienced depreciations as a result of declines in commodity prices. In South Africa, the South African Reserve Bank (SARB) reports that the fluctuations in the spot exchange rate were related to movements in the currencies of developed economies and were not due to the direct impact of the global crisis on South African financial markets.

Third, the extent to which exchange rate volatility raised concerns appears to have varied across countries. In some cases, efforts were made to dampen exchange rate volatility, and there was significant concern about the possibility of downward spirals. This may account for the significant decline in foreign reserves in some countries. In other countries, particularly those with high inflation, exchange rate depreciation pressures may have made monetary

authorities more reluctant to ease (see the discussion in Moreno ((2010), this volume)). In particular, even if the pass-through of exchange rates to inflation is usually low, under unsettled market conditions it could possibly be higher.

### **The FX swap market**

The development of the FX swap market appears to have played a crucial role in the transmission of shock to FX markets in global financial markets. But dislocations in the FX swap market<sup>7</sup> also spilled over to a number of EMEs. For example, in the Czech Republic, the Czech National Bank reports that liquidity in the FX spot and outright forward markets fell sharply in the winter of 2008, at the same time as the operation of domestic money markets was impaired.

The FX swap market is a channel of transmission between the financial markets in EMEs and global interbank markets. Saxena and Villar (2008) show that the FX swap market is an important source of funding in many EMEs. Hong Kong SAR, Hungary, Mexico, Poland, Singapore and South Africa account for the largest share of the FX swap market in EMEs. These countries host foreign bank subsidiaries or branches that might face more limited access to local funding. Most of their operations in domestic capital markets are funded through the FX swap market. Foreign currency funds grant access to local funds without having FX converted in the spot market and taking the exchange rate exposure. Other foreign investors with investment activities in emerging financial markets also make extensive use of the FX swap market for hedging purposes (Baba and Packer (2009)). In the case of foreign bank subsidiaries, these liabilities are very short-term and cross-border. If international banks were to stop rolling them over they would subject the EME banking sectors and financial markets to severe stress. Likewise, EMEs with large and liquid FX swap markets could experience stress if financial pressures developed in global financial markets (as in the case cited above of foreign banks funding themselves in Hong Kong SAR).

The FX swap market involves simultaneous spot and forward FX transactions. Investors in EMEs can sell foreign currency (usually dollars) at the spot FX rate in exchange for local currency and simultaneously purchase foreign exchange at the forward rate. A number of financial considerations arise from these transactions. First, changes in the exchange rate over the period alter the price of the FX swap contract. If the foreign exchange depreciates, the price of the FX swap increases. It is clear that, if the FX swap were used to hedge the holding of local currency domestic investment (ie local currency bonds) the investment would be partly protected against the FX depreciation owing to the increase in the price of the swap contract.

Second, an FX swap is subject to considerable counterparty risk. In particular, the seller of the foreign exchange in the spot market is open to the risk of the counterparty defaulting on the delivery of the FX forward. The credit risk-mitigating mechanisms embedded in the contract (ie cash collateral) are subject to considerable FX risk. This is particularly the case during periods of stress, when the exchange rate depreciates in EMEs and the value of collateral falls. The party on the receiving side of the foreign currency at a later date might like to demand additional collateral to secure the delivery of the foreign exchange. The hedging purpose of the contract has encouraged comparisons with the interest rate swap. Baba and Packer (2009) explain that this last contract is less subject to counterparty risk.<sup>8</sup>

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<sup>7</sup> This paper uses a relatively broad definition of FX swap. It includes derivatives contracts where the counterparties agree to exchange foreign exchange in a jurisdiction as well as the synthetic financial instrument that is built around the purchase/sale of spot and forward or futures of foreign exchange. It could also encompass onshore or offshore contracts involving an emerging market currency.

<sup>8</sup> The paper refers to Duffie and Huang (1998).

The intuition here is that the interest rate swap implies an exchange of notional amounts but the FX swap implies an open position on the contracted amount to the extent that the value of the collateral might be altered with the depreciation of the currency or the increase in counterparty risk.

Third, as an FX swap contract involves transactions in different currencies, country risk may be even more relevant than counterparty risk. This is because the contract is subject to differences in sovereign risk between the jurisdictions (the risk of default of the sovereign in the country of each of the contracting parties) and the possibility of the governments altering the payout through their actions (eg capital controls).

The cost of funds obtained in an FX swap contract is apparent in the following expression:

$$\frac{S_t(1+i_t)}{F_{t,t+k}} \geq 1 + i_t^* \quad [1]$$

where  $S_t$  is the spot FX rate (expressed as the amount of domestic currency per unit of foreign currency),  $F_{t+k}$  is the forward exchange rate  $k$  periods ahead and  $i_t$  is the money market (riskless) interest rate and  $i_t^*$  is the foreign interest rate relevant for the period  $k$ . This condition indicates that demand and supply conditions in the FX swap market in EMEs will adjust to reflect differences between domestic and foreign interest rates.

The left-hand side of expression [1] shows the financing cost in foreign currency in a national jurisdiction. It reflects the FX swap-implied foreign currency interest rate, which is often not directly observable in many jurisdictions. The implied ("onshore") foreign currency interest rate can be computed from spot and forward FX rates and the relevant money market rate. If covered interest parity holds, the FX swap-implied foreign currency rate would equal the foreign interest rate in international markets (eg Libor). Indeed, during periods of tranquillity, spreads between the two have been small. However, during the crisis, disruptions in FX swap markets caused large divergence between FX swap-implied rates and Libor rates, which could be attributed to different sources of risk. One source was difficulties in securing dollar financing in a specific market, which affected non-dollar developed financial markets (see Baba and Packer (2009)). However, EMEs also appear to have been affected by perceptions of other risks (eg financial, economic, political, etc) and possibly also illiquidity in some markets, leading to particularly high spreads in some cases.

In September 2008, as FX swap prices increased in several jurisdictions, the spread between FX swap-implied dollar interest rates and Libor widened.<sup>9</sup> The global surge in demand for the dollar raised implied interest rates in Chile, the Czech Republic, India, Hong Kong SAR, Korea and Turkey (Annex, Graph A1). For example, in India and Korea, the FX swap-implied spreads exceeded 1,000 bp; in Chile and Turkey, the spread hovered at around 500–600 bp (see Central Bank of Chile (2009)); and in the Czech Republic and Hong Kong SAR, the spread peaked at around 300 bp.

One case of interest is Mexico, where the calculations result in a (counterintuitive) fall in the onshore dollar-implied rate in domestic financial markets. One plausible explanation is that the forward premia had turned negative either because of an increase in the supply of US dollars in the forward market or because of a drop in demand. Market commentary at the time suggested that demand for dollars in the forward market fell sharply in Mexico during

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<sup>9</sup> As noted above, the Libor-OIS spread widened up to 250 bp in September 2008.

the period.<sup>10</sup> Alternatively, the supply of foreign exchange in the forward market could have increased sharply, feeding the demand for foreign exchange in the spot market.

Another case of interest is that of Hungary (see Mák and Páles (2009)). The problems in the international money markets brought disorder to the FX swap market in September 2008, quickly spreading to the banking sector. Foreign currency liquidity collapsed along with a sharp reduction in the supply of foreign currency (especially US dollars) and a rise in counterparty risk in the domestic banking sector. The implied yield in foreign currency on newly concluded transactions in the FX swap market increased significantly in September and October. Mák and Páles (2009) argue that the rise in the FX swap-implied yield, combined with a market structure where some banks (international ones) had access to foreign currency funding while others (locally owned banks) did not, led to disorderly market dynamics. The forward premium provided evidence of the sharp rise in the cost of foreign currency borrowing observed in October 2008. When foreign-owned banks managed to roll over transactions with their headquarters, the FX swap market risks to financial stability receded.

### **III. Interbank and government debt markets**

Domestic financial markets reacted in a very disparate manner during the financial crisis. The changes observed in interest rates and asset prices varied across EMEs. Two facts stand out from the questionnaire responses and central bank contributions for this meeting. First, several contributions report the absence of any disruption in interbank overnight and money markets, or even in other large domestic markets, such as the government bond market. However, in the case of others, the effects of the financial shock on domestic markets were quite severe. Second, the episodes of financial stress in interbank and money markets were fewer in number and shorter in duration than those reported in FX markets (see the shaded areas in the Annex Graphs A1 and A2).

The central bank contributions to this meeting give accounts of some stress episodes. Al-Hamidy (2010) reports that offered rates in Saudi Arabia rose more than 200 bp over the reverse repo rate in the aftermath of the collapse of Lehman Brothers. Mesquita and Toros (2010) note that smaller Brazilian banking institutions were vulnerable to a domestic liquidity shock. Local banks were funded in local wholesale money markets rather than by retail deposits, which turned out to be a source of financial vulnerability that propagated the crisis and affected the economy. From a broader financial market perspective, Mesquita and Toros (2010) also report that FX (and equity price) volatility led to a substantial increase in margin requirements in the organised exchange (the São Paulo Mercantile and Futures Exchange (BMF) and the Brazilian stock index (Bovespa)). The increase in margin requirements and corresponding tighter financial conditions for the financial sector led to a liquidity squeeze. The paper reports that the number of financial conglomerates with high liquidity utilisation jumped from three to 41 in a few days. Through this channel, the external shock exerted upward pressure on money market interest rates. The Czech National Bank paper prepared for this meeting (Babicky, 2010) also explains that there was a malfunctioning of the money markets in early October 2008.

In contrast, Ibrahim (2009) reports that activities in the Malaysian ringgit interbank market were unaffected. Overnight and benchmark rates in the interbank market remained stable and trading at a tight spread. He also adds that price and yield movements in domestic capital markets were not driven by external factors.

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<sup>10</sup> See "México: Reporte Económico Diario", Banamex, no 446, 28 October 2008.

Some of the stresses are reflected in available cross-country data. Interest rates rose in early October 2008 in several economies (Annex, Graph A2), including in Hong Kong SAR, India, Singapore; and in Argentina, Chile, Mexico and Peru. The upward movement in interest rates in Hong Kong SAR (about 300 bp) and Singapore (about 100 bp) happened at the time when the yield curve shifted upwards. Hong Kong SAR and Singapore are open economies with close links with international markets. In the case of India, while the interbank rate rose (about 450 bp), the overnight rate jumped even more, so that the spread between the one-month and the overnight rates fell briefly to almost -450 bp. That period has been characterised as one of severe financial distress in money markets. In Argentina, the interbank market also underwent a period of intense stress with overnight and short-term money market rates rising by about 500 bp. In Chile, interbank money market rates increased marginally before the markets entered a brief period of volatility. Immediately afterwards, they fell quickly, although the reduction exceeded the fall in the overnight contemporaneous rate (the interest rate that conveys information about future monetary policy).

Financial stress lasted longer in Mexico and Peru. The movements in interest rates in the interbank market were relatively moderate but there were concerns about potential threats to the economy. Sidaoui, Cuadra and Ramos-Francia (2009) explain that stress in the interbank market stemmed from the fall in the value of collateral and increased counterparty risk. In the case of Peru, the interbank money market rate rose marginally, but during October, the overnight rate entered a period of volatility, possibly due to expectations of a reduction in the policy rate.

### **Local currency government debt markets**

The performance of the local currency government debt market during the crisis is of importance because many EMEs have made considerable efforts to develop them. The paper prepared by the SARB ((2010), this volume) observes that bond spreads and premia generally soar for government debt in EMEs during a crisis (see also BIS (2009)), and this is particularly the case for local currency government debt and other securities that are subject to considerable exchange rate risk.

However, local currency government bonds do not appear to have been particularly affected in EMEs this time around. The central bank questionnaire responses are quite sanguine about the government bond market reaction to the crisis. The periods of stress reported are generally seen as having originated elsewhere (ie global risk aversion, or in the FX market, etc) rather than reflecting specific conditions in the government bond market (see episodes of stress in Graphs 1 and 4 of the Supplementary Graphs and Tables and in the Annex). Only a handful of countries experienced a marked disarray that forced a policy change. In particular, average spreads between longer-term government bond yields and money market rates during the period of global market turbulence were not necessarily higher than prior to the collapse of Lehman Brothers (Table 2); however, spreads subsequently rose.

When the financial crisis erupted in September 2008, international and local currency sovereign bond prices fell sharply (Graph 2, left-hand panel). Returns turned positive in the last quarter of the year but the performance of domestic currency bonds suffered in the first quarter of 2009 from a new bout of heightened FX risk. In addition, volatility rose quite markedly across EMEs but more significantly in Latin America and emerging Europe. Differences in the performance of local currency are not clear. Solvency indicators – in particular, debt/GDP and debt service/government revenue – do not differ greatly among regions, on average. Liquidity indicators are considerably better in emerging Asia (ie reserves/government debt).

The effects of the financial crisis on government debt markets varied across economies. In Mexico, the financial crisis hit the local currency government bond market particularly hard. Sidaoui, Cuadra and Ramos-Francia (2010) explain that a sharp deterioration in

creditworthiness in the corporate private sector led to greater uncertainty in the economy that spread to financial markets. The government yield curve steepened considerably and higher short-term interest rates put great pressure on several parts of the financial system (eg mutual funds).

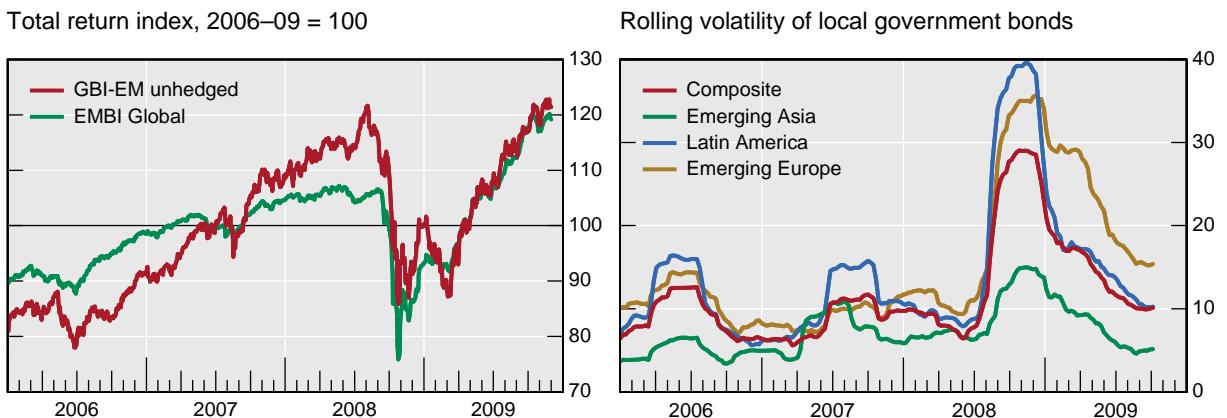
Table 2  
Government debt markets<sup>1</sup>

	Government bond market five-year to three-month spread <sup>2</sup>		
	1 Aug 07– 31 Aug 08	1 Sep 08– 31 Mar 09	1 Apr 09– 31 Dec 09
<b>Emerging Asia</b>			
China	0.7	0.7	1.6
Hong Kong SAR	1.4	1.5	1.7
India	0.5	0.7	3.4
Indonesia	2.1	3.0	2.6
Korea	0.4	1.4	2.6
Malaysia	0.1	0.4	1.6
Philippines	3.8	2.9	3.9
Singapore	0.7	1.0	1.0
Thailand	1.1	0.6	2.0
<b>Latin America</b>			
Argentina	-0.2	-3.8	1.2
Brazil	1.4	0.9	2.7
Chile	0.1	-0.7	3.9
Colombia	1.5	1.5	3.4
Mexico	0.2	0.3	2.2
Peru	1.2	0.6	1.2
<b>Other emerging markets</b>			
Czech Republic	0.3	-0.3	1.3
Hungary	-0.4	-1.4	-0.4
Israel	1.9	3.2	4.6
Poland	-0.0	-0.9	1.1
Russia	0.6	1.8	4.4
Saudi Arabia	...	...	...
South Africa	-2.1	-3.7	0.5
Turkey	1.4	0.5	1.9
<b>Median for all EMEs in table</b>	<b>0.7</b>	<b>0.7</b>	<b>1.9</b>

<sup>1</sup> Period averages, in percentage points. <sup>2</sup> Government bond rate for Argentina, central bank issues at issue, closest to one-year maturity (one-year maturity until February 2007); for Israel, eight-year government bond; for the Philippines, 10-year government bond; for Turkey, two-year government bond.

The government took steps to counter the disruptions in the government bond market with some policy changes that sought to facilitate the adjustment of financial sector balance sheets and reduce the pressures on asset prices (see Moreno (2010)). The participation of foreign investors in the local currency bond market fell considerably during the crisis (Jara, Moreno and Tovar (2009)).

Graph 2  
Returns and volatility in domestic government bond markets



The Czech Republic went through a less disruptive experience. The Czech National Bank paper for this meeting (Babicky (2010)) explains that the government risk premium increased by about 350 bp (gauged by the CDS spread) and that the government had to alter its debt management policy: the amount of bonds issued was cut down and auctions had to take place once a month. Short-term government paper (T-bills) remained well bid, though bid-ask spreads widened somewhat. In Brazil, the government auction planned in November 2008 did not take place.

Several central banks reported that yields widened in local currency government bond markets but there was no major disruption. In Peru, government bond yields recorded a mild increase. In Turkey, government bond yields also increased but there was no report of market disruption. Other countries where central banks reported the effects of global risk aversion as a main influence on market dynamics are Colombia and South Korea, although there does not appear to have been any major market disruption.

Some central banks do not see the global financial crisis as the main cause of stress in the government bond market. Ibrahim ((2010), this volume) explains that, in Malaysia, the unwinding of foreign investors' portfolio investments pushed and sustained yields at elevated levels in early 2008 but, following the collapse of Lehman Brothers, government bond yields trended downwards in response to monetary policy actions and a flight to quality. In early 2009, an expansionary fiscal policy put pressures on yields once again. Al-Hamidy (2010) also reports that the financial crisis did not have any major impact on the local currency government bond market as the government had paid down a large share of it and investors in those bonds did not disinvest. In its response to the questionnaire, the Reserve Bank of India (RBI) emphasises the more prominent role fiscal policy played in government bond market developments in late 2008 and afterwards. The RBI paper attributes it to a calibrated opening of the market to foreign investors. There was some activism in debt management policy in order to guarantee greater coordination with monetary policy (see RBI (2010), this volume).

In Hong Kong SAR, the monetary authority reports that flight to quality took place in the government bond market – in particular at very short maturities. The demand for these debt securities (and other safe ones) surged on the back of banks' demand. These securities helped banks to secure their borrowing in the collateralised interbank markets and preserved the liquidity in the market for their liabilities.

#### **IV. Conclusion**

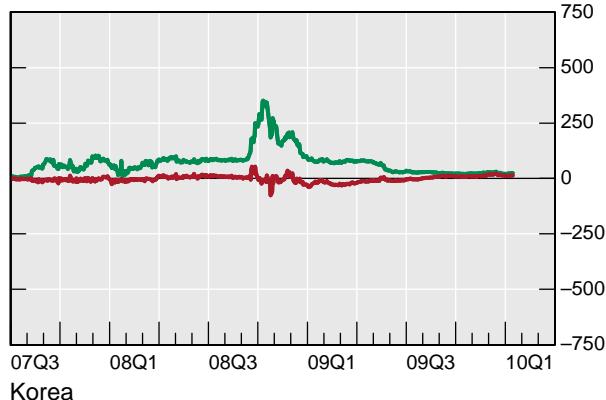
The global financial crisis that started in the second quarter of 2007 eventually spread to many EMEs, particularly following the bankruptcy of Lehman Brothers in September 2008. The problems affecting the international interbank market and other funding markets in the developed economies determined that many EMEs became a source of global dollar liquidity. The consequences for these economies, where financial markets are less developed, were significant. Initially, the policy response in developed markets helped to sustain capital flows to EMEs. But the financial panic that followed the bankruptcy of Lehman Brothers led to a deep, extreme and prolonged period of financial stress in EMEs. Its consequences were felt across many EMEs and made policymakers fear that they would bring significant financial and economic costs for their economies. The impact of the crisis on different financial markets across EMEs, as this paper illustrates, has not been homogenous. Whether financial markets have fully recovered or are still vulnerable to large shocks remains an open question.

## Annex

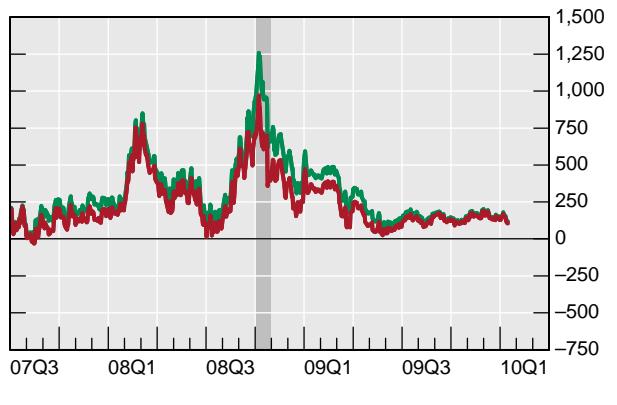
Graph A1  
**FX market: swap-implied foreign rate spreads<sup>1, 2</sup>**

In basis points

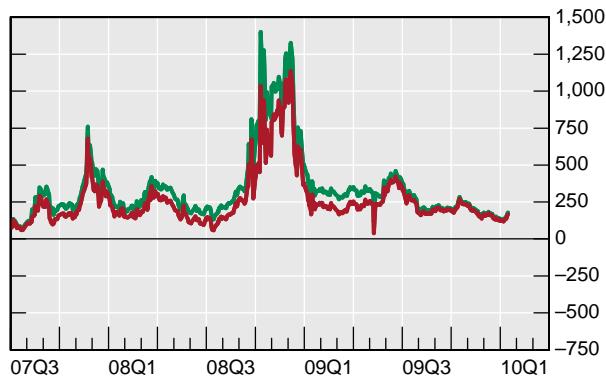
Emerging Asia  
 Hong Kong SAR



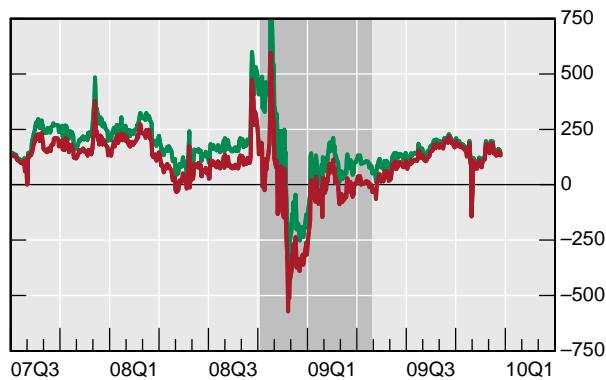
India



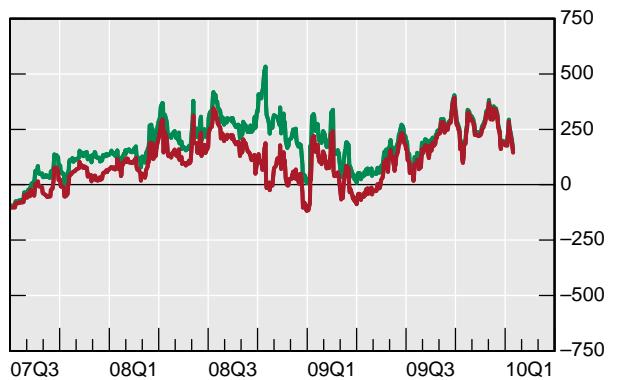
Korea



Latin America  
 Brazil<sup>3</sup>



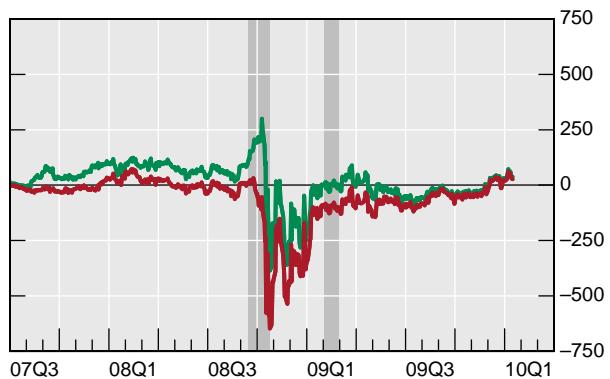
Chile



Graph A1 (cont'd)  
**FX market: swap-implied foreign rate spreads<sup>1, 2</sup>**

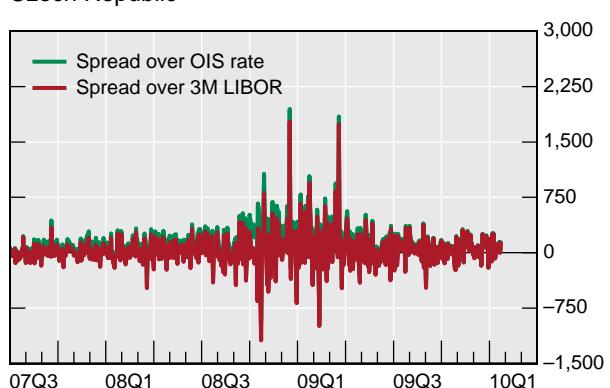
In basis points

Mexico

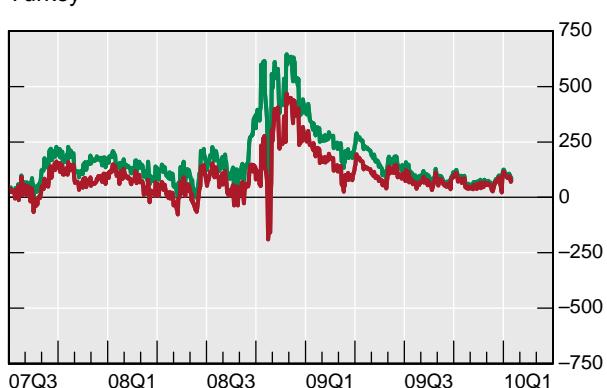


Emerging Europe

Czech Republic



Turkey



<sup>1</sup> Spreads of implied US dollar rate over Libor or OIS rate; implied rates calculated using local currency to US dollar 3M forward rates, spot exchange rates against US dollar and local interbank market rates (3M maturity). <sup>2</sup> Shaded areas correspond to central bank-reported episodes of stress in the FX market. <sup>3</sup> In Brazil, the spread over OIS reached 856.5 bp on 24 October 2008.

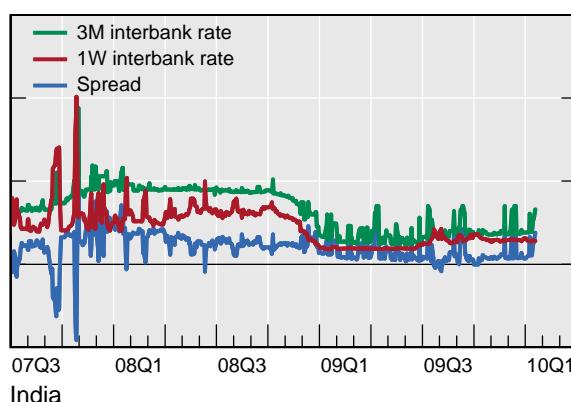
Sources: Bloomberg; Datastream; JPMorgan; national data; BIS calculations.

**Graph A2**  
**Local interbank and money markets<sup>1, 2</sup>**

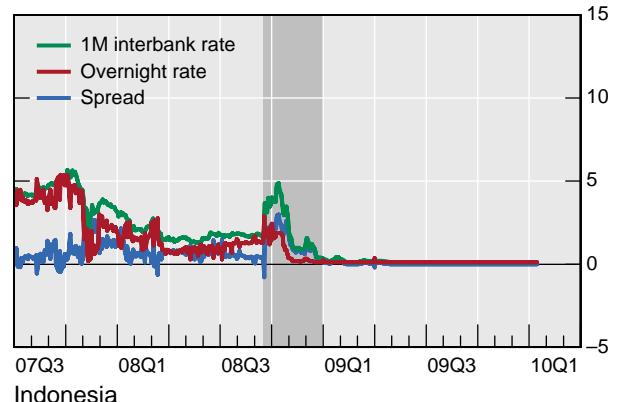
In percentage points

Emerging Asia

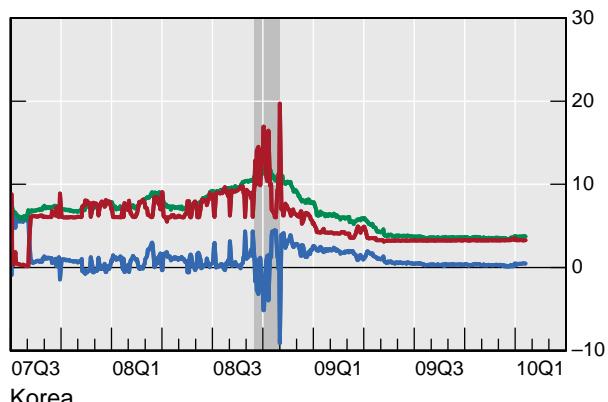
China



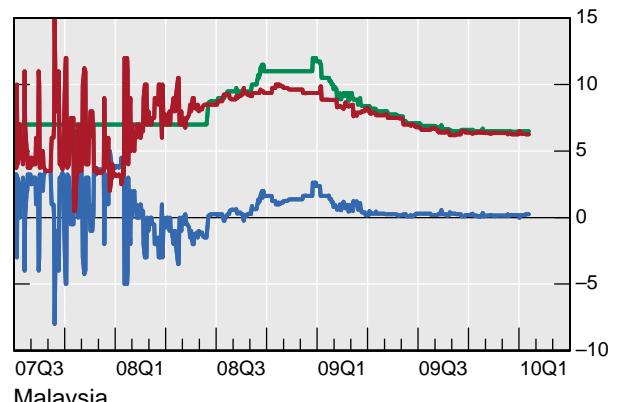
Hong Kong SAR



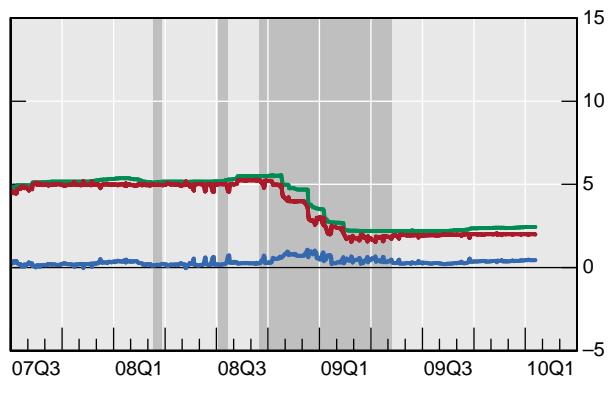
India



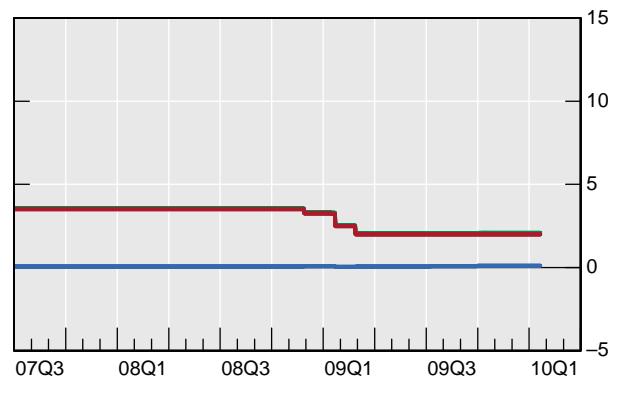
Indonesia



Korea



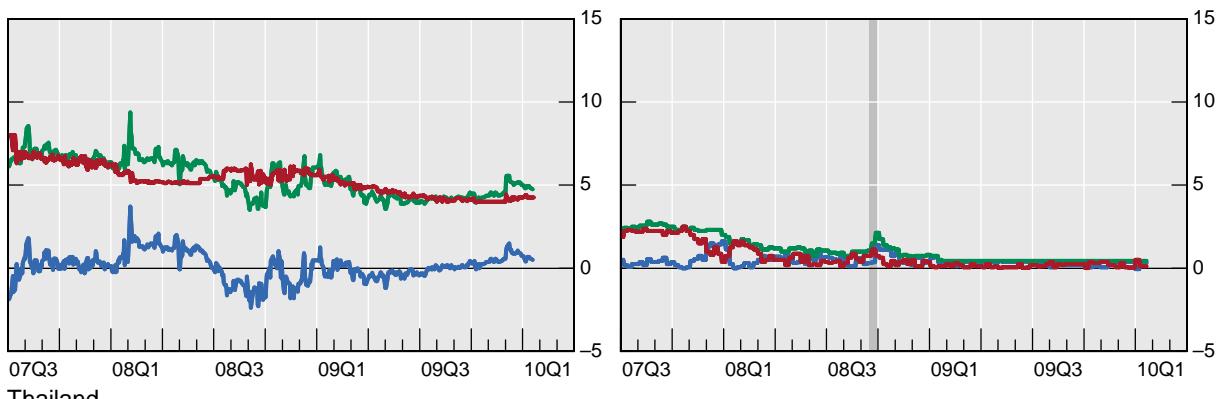
Malaysia



Graph A2 (cont'd)  
**Local interbank and money markets<sup>1,2</sup>**

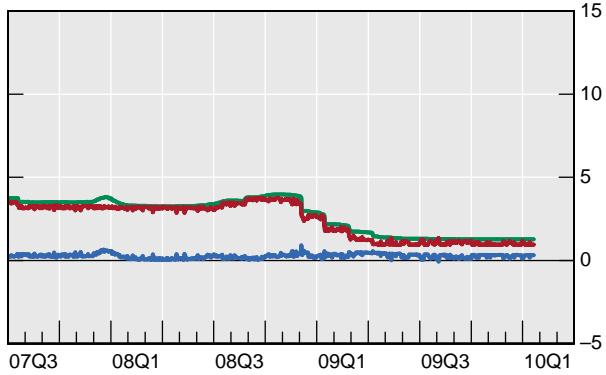
In percentage points

Philippines



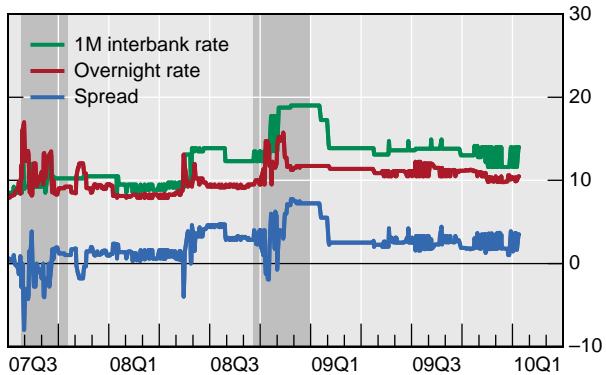
Singapore

Thailand

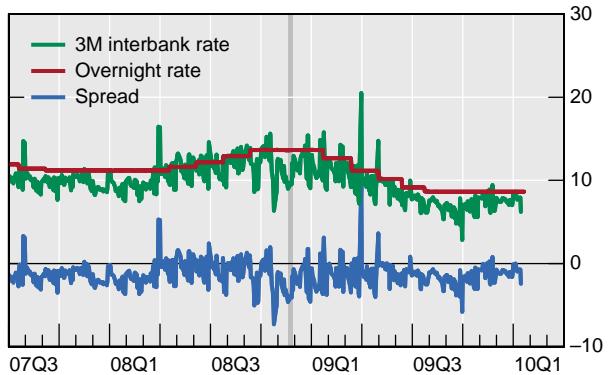


Latin America

Argentina



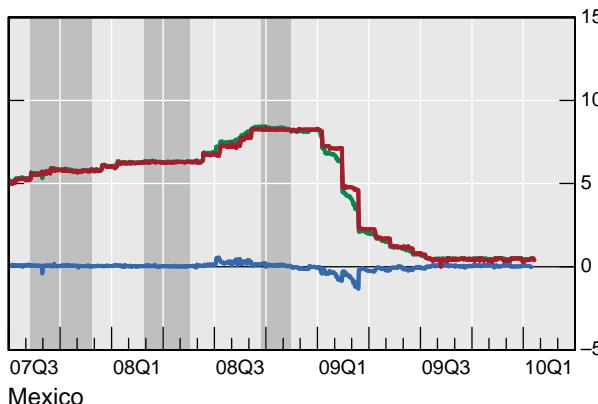
Brazil



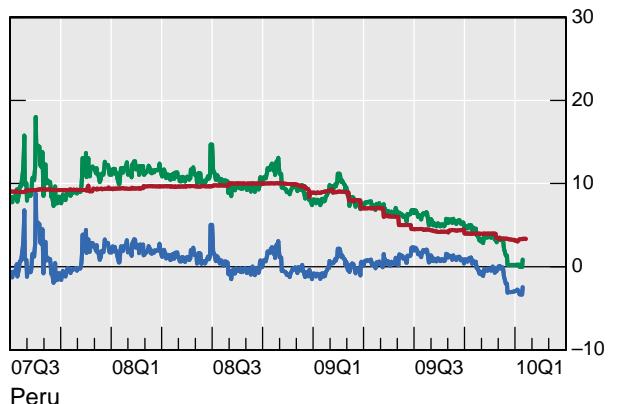
Graph A2 (cont'd)  
**Local interbank and money markets<sup>1,2</sup>**

In percentage points

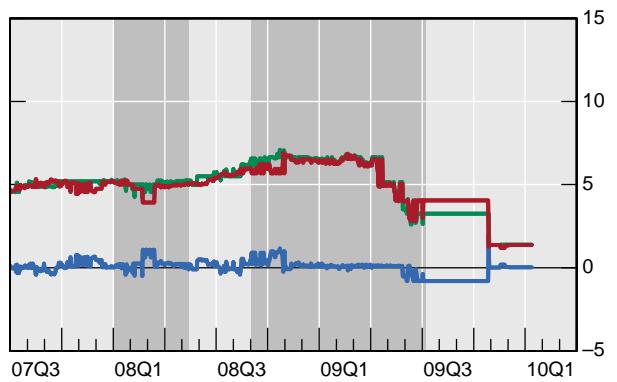
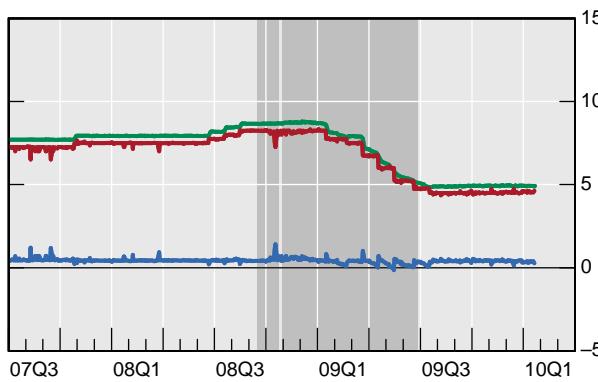
Chile



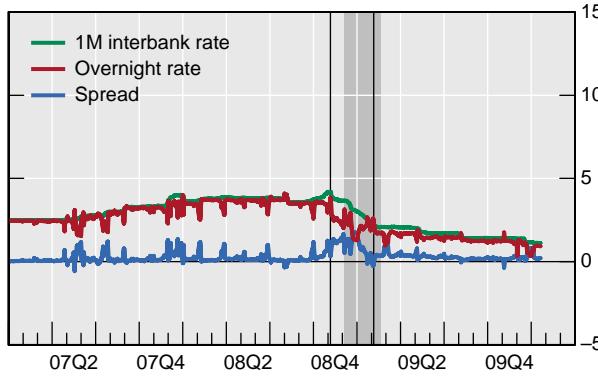
Colombia



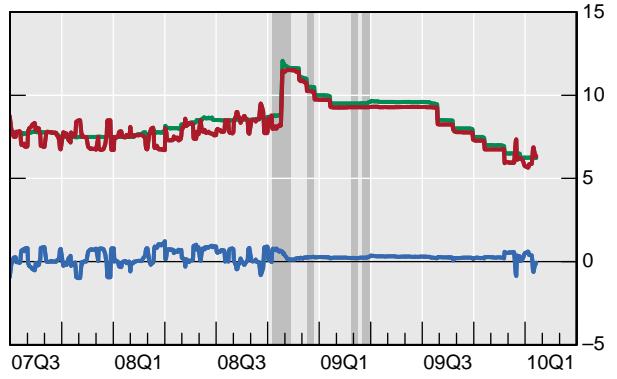
Mexico



Emerging Europe  
Czech Republic



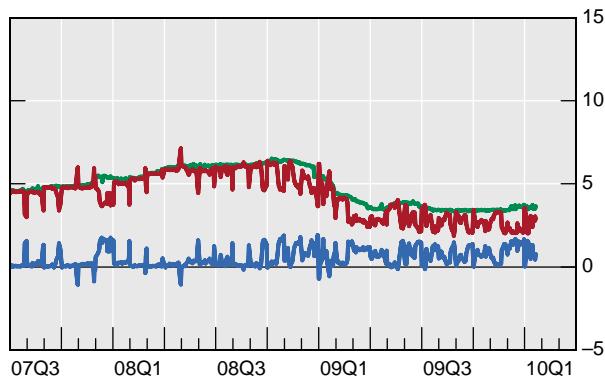
Hungary



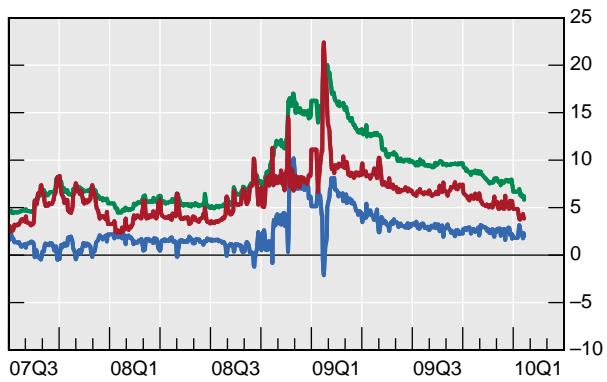
Graph A2 (cont'd)  
**Local interbank and money markets<sup>1,2</sup>**

In percentage points

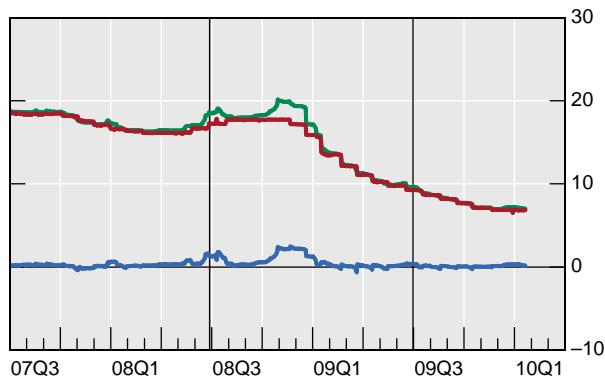
Poland



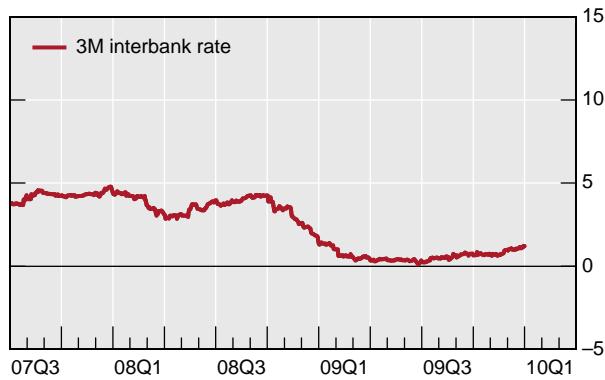
Russia



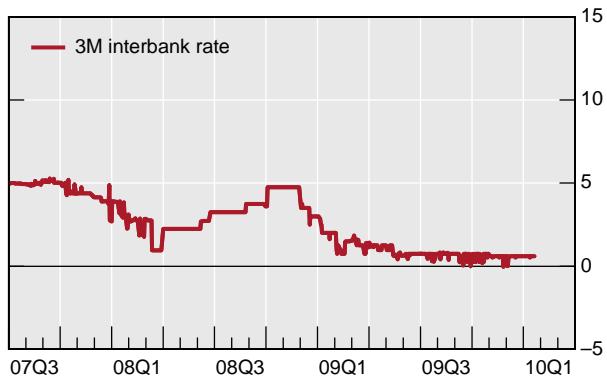
Turkey



Other emerging  
Israel



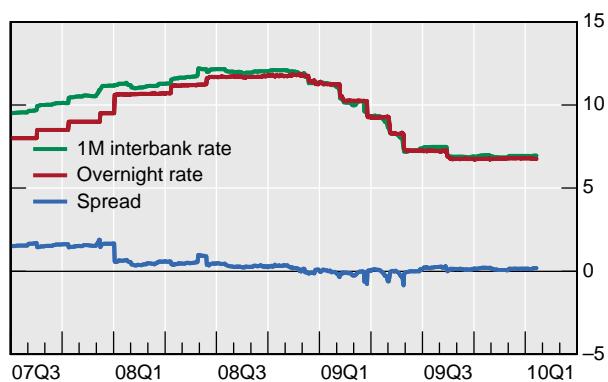
Saudi Arabia



Graph A2 (cont'd)  
**Local interbank and money markets<sup>1,2</sup>**

In percentage points

South Africa



<sup>1</sup> Graphs show one-month interbank and overnight rates, unless indicated otherwise.

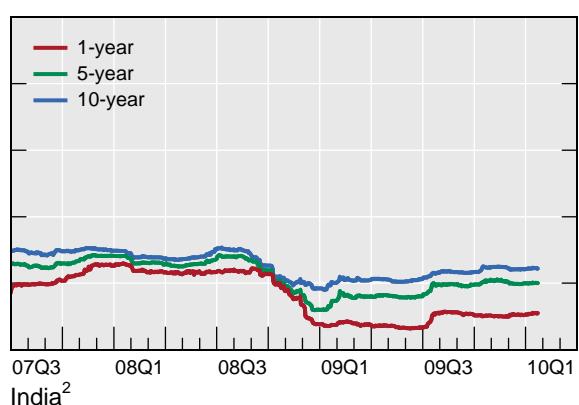
<sup>2</sup> Shaded areas correspond to central bank-reported episodes of stress in local interbank and money markets.

Sources: Bloomberg; CEIC; Datastream; national data.

**Graph A3**  
**Government bond markets<sup>1</sup>**  
Yields in percentage points

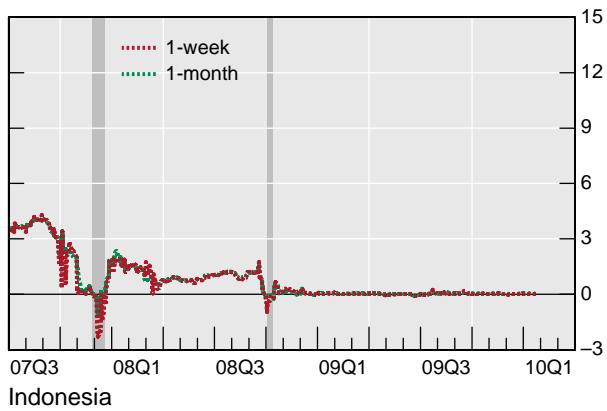
Emerging Asia

China

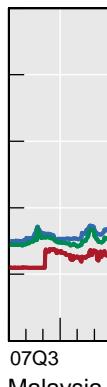
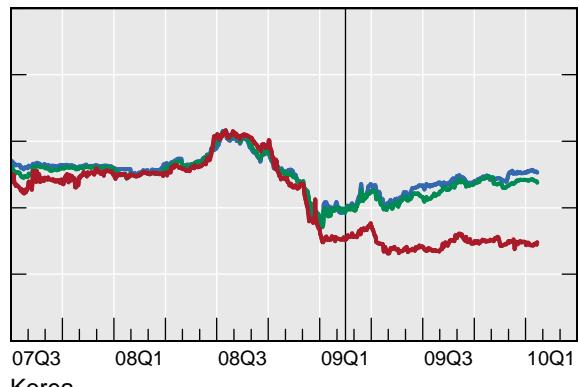


India<sup>2</sup>

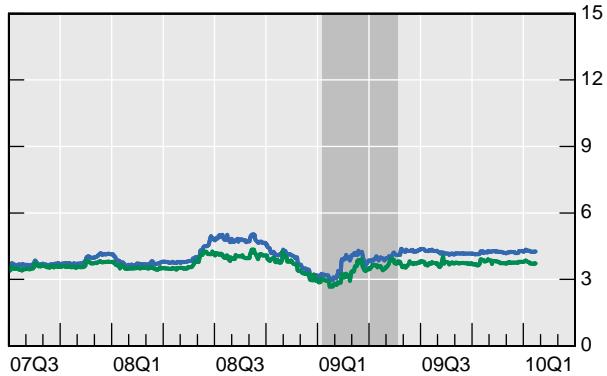
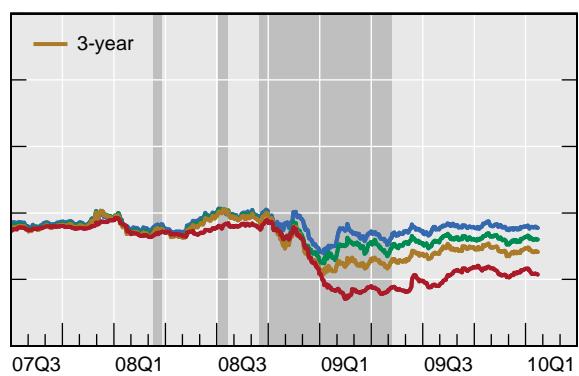
Hong Kong SAR



Indonesia

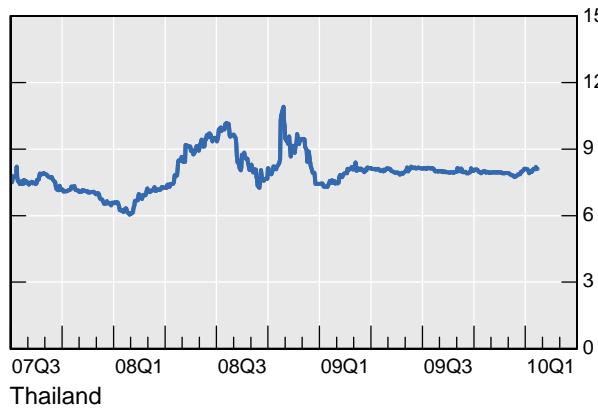


Korea

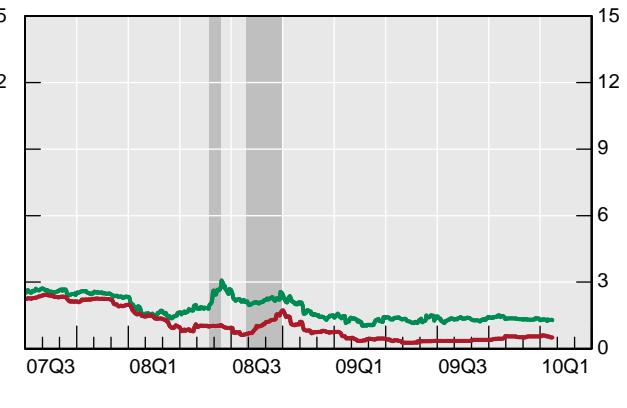


Graph A3 (cont'd)  
**Government bond markets<sup>1</sup>**  
 Yields in percentage points

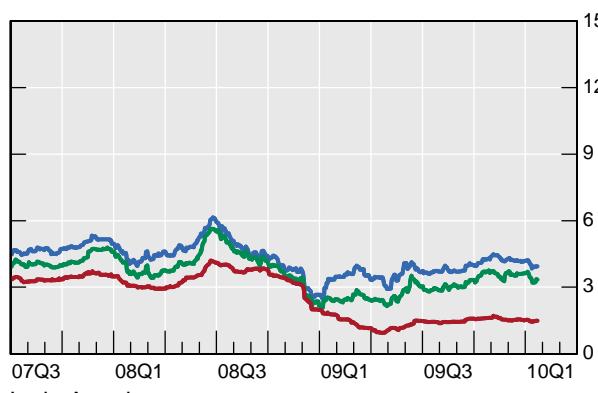
Philippines



Singapore

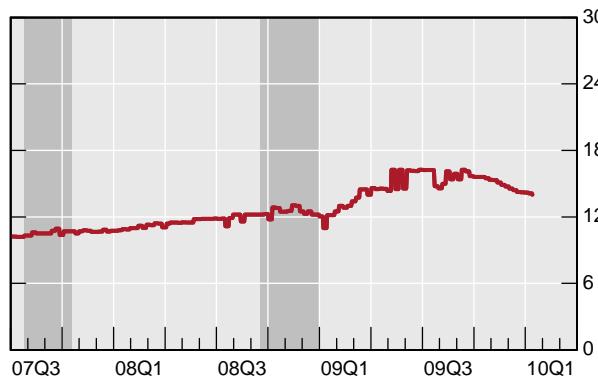


Thailand

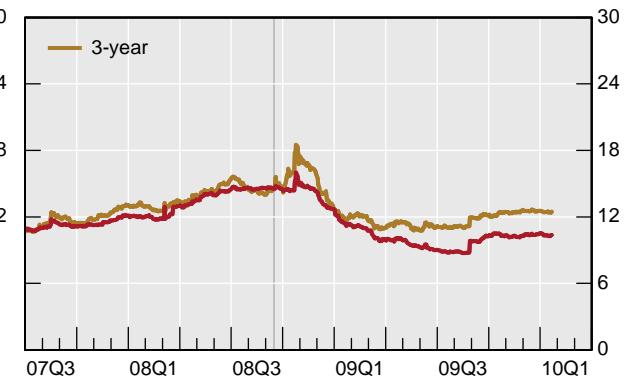


Latin America

Argentina



Brazil



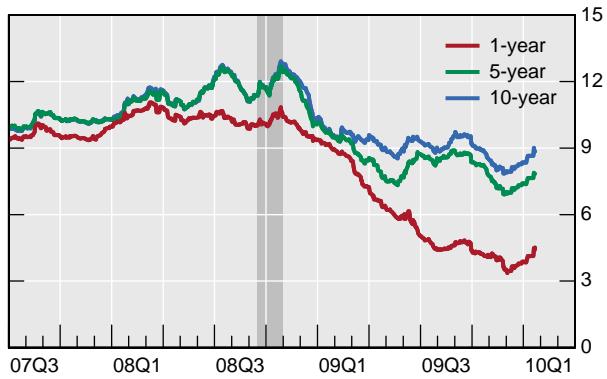
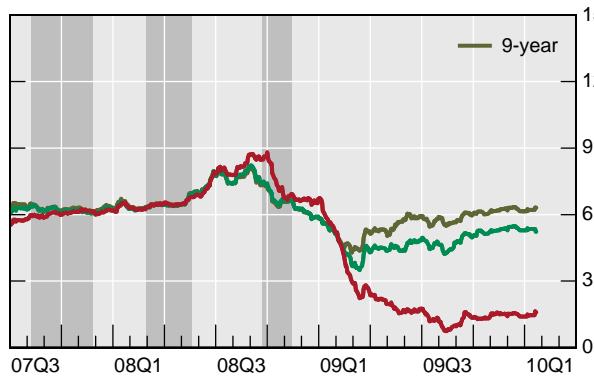
Graph A3 (cont'd)

**Government bond markets<sup>1</sup>**

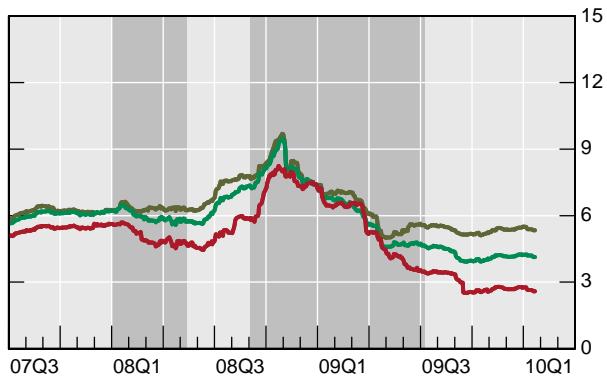
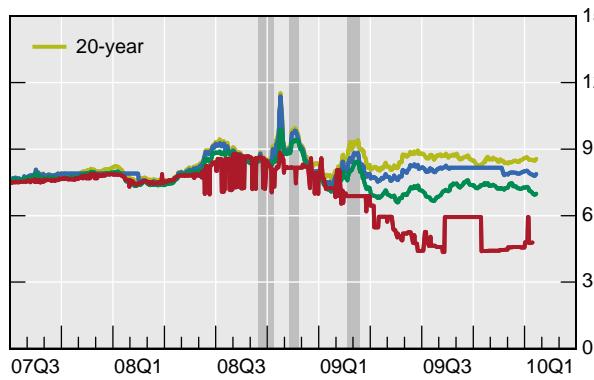
Yields in percentage points

Colombia

Chile

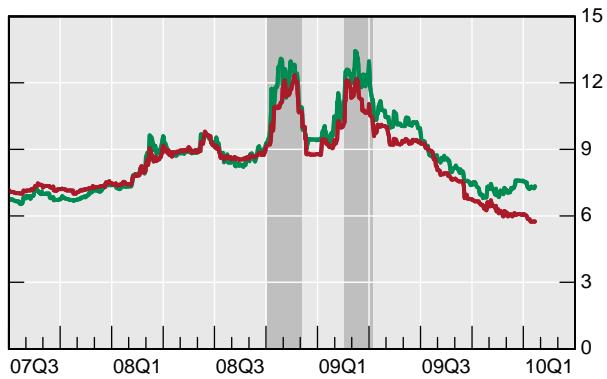
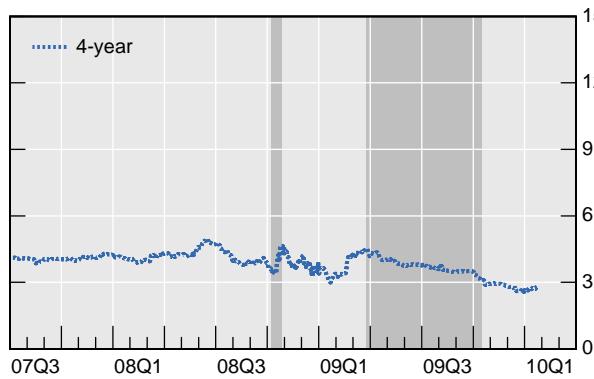


Mexico



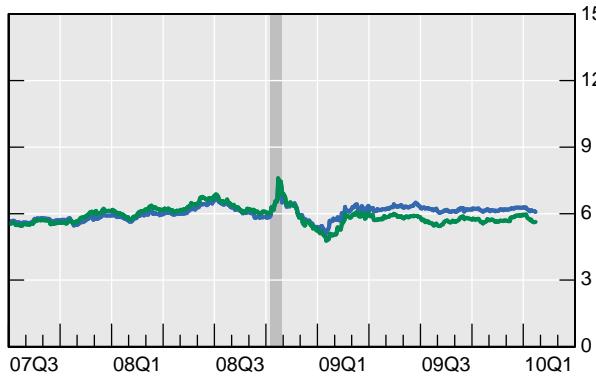
Emerging Europe

Czech Republic

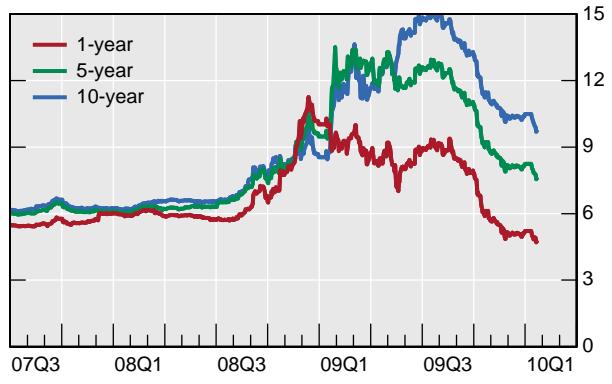


Graph A3 (cont'd)  
**Government bond markets<sup>1</sup>**  
 Yields in percentage points

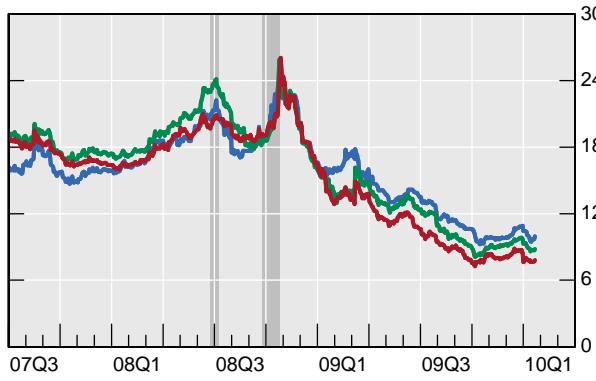
Poland



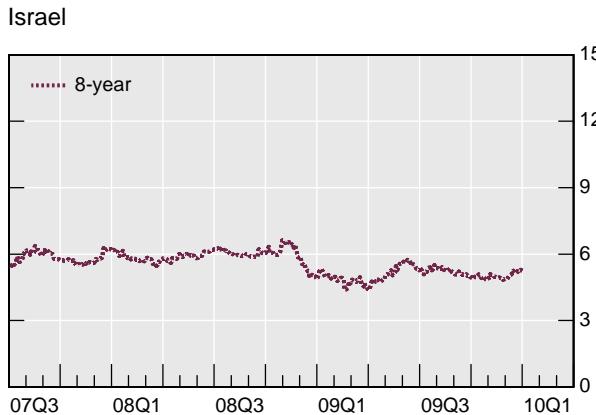
Russia



Turkey



Other emerging



Israel



<sup>1</sup> Shaded areas correspond to central bank-reported episodes of stress in the government bond markets. <sup>2</sup> In India, from mid-February 2009, due to higher borrowing requirements by the government, the long-term yields firmed up on the back of concerns over excess supply.

Sources: Bloomberg; national data.

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# Central bank instruments to deal with the effects of the crisis on emerging market economies

Ramon Moreno<sup>1</sup>

The bankruptcy of Lehman Brothers on 15 September 2008 was accompanied by disruptions in financing to emerging market economies (EMEs), as reflected in the sharp declines in cross-border financing, the increases in sovereign spreads and the pressures in the foreign exchange and domestic financial markets.<sup>2</sup> Policymakers in EMEs responded to these developments by increasing foreign and domestic currency financing or liquidity.<sup>3</sup> They used a variety of tools, including central bank operations in the foreign exchange and domestic money markets, the establishment of financing facilities, guarantees, and changes in regulations, reserve requirements and policy rates. This paper discusses some of these tools, as well as their characteristics and effectiveness. It concludes by briefly reviewing what central banks have learned about the instruments at their disposal in dealing with a crisis.

## I. Foreign currency financing

In response to the crisis, central banks sought to provide foreign currency financing or liquidity to the private sector in order to: ensure the continued operation of foreign exchange (FX) markets (eg by lowering the cost of foreign currency financing as reflected in the increases in FX swap-implied foreign currency rates); compensate for interruptions in the availability of external private financing (eg by compensating for the withdrawal of foreign loans and supporting FX liquidity management by domestic institutions, or by facilitating the rollover of external debt through guarantees or regulatory changes); and prevent disorderly exchange rate movements, particularly a downward spiral in the exchange rate.

EME central banks supplied foreign currency financing through intervention or operations in FX markets, as described below. These operations were scaled back in 2009 as FX markets stabilised. At least two aspects can be highlighted: (i) the specific measures used to improve foreign currency financing and the issues they raised; and (ii) whether the crisis altered the views of central banks on the role of FX reserves and exchange market intervention.

### A. Measures to improve foreign currency financing

Some of the more important measures to improve foreign currency financing during the peak periods of turbulence may be summarised as follows.

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<sup>1</sup> BIS. Research assistance from Pablo Garcia-Luna, Agne Subelyte and Elias Hafner is acknowledged. The discussion in this paper draws heavily on central bank questionnaire responses. I also thank Andre Minella for specific comments on Brazil. The discussion in this paper generally covers the period up to end 2009.

<sup>2</sup> See Moreno and Villar (2010).

<sup>3</sup> In this paper, “financing” will refer to operations by the central bank to supply foreign or domestic currency to markets (eg via FX market intervention or open market operations) as well as special lending facilities. An alternative term is “liquidity” provision.

- *Spot market transactions.* A number of central banks (eg in Chile, Colombia, Peru and Turkey) discontinued foreign reserve accumulation programmes and some sold foreign currency in the spot market (eg in Brazil, India and Mexico).<sup>4</sup> Data on spot FX market operations or intervention in some countries, notably in Asia, are not available. However, indirect data from forward positions suggest that, in some Southeast Asian countries, spot market purchases of foreign currency declined with reduced capital inflows.
- *Swap markets.* Swap market auctions were widely used to provide financing or liquidity in FX markets (eg in Brazil, Chile, Hungary, India, Korea and Poland). For example, in the case of Brazil, the central bank had accumulated a large long forward position in foreign currency and unwound it by selling traditional swaps (where the central bank commits to sell dollars in the future), making up to US\$ 50 billion available, although a much smaller amount was used.
- *Foreign currency repo facilities.* Some central banks (eg in Argentina, Brazil and the Philippines) set up foreign currency repo facilities to provide trade finance and to help companies roll over their foreign debt. In contrast to swap transactions, which provided foreign currency in exchange for domestic assets in the short term, central banks provided foreign currency in exchange for foreign currency receivables or (eligible) foreign currency securities. However, the use of such facilities varied across countries.
- *Loan facilities.* Some central banks established dollar loan facilities. For example, the Central Bank of Brazil drew on its foreign reserves to auction collateralised loans to FX dealers. The Bank of Korea set up a facility to extend foreign currency loans secured by export bills, while the Bank of Mexico lent dollars to commercial and development banks, drawing on a foreign currency swap line with the US Federal Reserve.
- *Implicit or explicit guarantees on external borrowing or bank deposits.* A number of countries offered guarantees on foreign currency (and also domestic currency) deposits, including Hong Kong SAR, Malaysia and Singapore. In Korea, the authorities announced a guarantee of up to US\$ 100 billion for external debts. In some cases, commitments were broader: for example, immediately after the collapse of Lehman Brothers, the Reserve Bank of India (RBI) committed to meet any demand-supply FX gaps in the domestic FX market. In other cases, the central bank stepped in directly as a counterparty: for example, the Central Bank of the Republic of Turkey (CBRT) resumed its intermediation role in its FX deposit market to ensure the continued operation of that market.
- *Changes in regulations to facilitate foreign borrowing.* Examples include: (i) the RBI eased restrictions on foreign currency borrowing and raised the ceiling on the interest rates that could be paid; and (ii) the Bank of Korea allowed domestic export firms to take out foreign currency loans for the settlement of currency option (including knock-in/knock-out (KIKO) derivatives) transactions and later abolished the restriction on the rollover of foreign currency loans for use as working capital. In some cases (eg Colombia and Peru), reserve requirements on foreign currency denominated deposits were lowered. In Chile, the central bank also authorised some financial institutions to meet their reserve requirements in different international reserve currencies (eg the euro and the yen) and not just in US dollars.

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<sup>4</sup> The contributions to this volume by Mesquita and Toros (2010) and by Sidaoui, Cuadra and Ramos Francia (2010) provide further details on central bank operations in FX markets in Brazil and Mexico respectively.

Three issues pertaining to these foreign currency financing measures may be highlighted: (i) choice of instruments; (ii) alternative uses of FX swaps; and (iii) discretionary versus non-discretionary intervention.<sup>5</sup>

*Choice of instruments.* The choice of instruments or measures adopted would depend in part on the goals and perceived constraints faced by the authorities. For example, a central bank seeking to limit exposure to the private sector or counterparty risk might avoid providing guarantees and limit the overall value of its transactions in the FX market. The central bank might also limit the size of transactions if it wants to show that it does not intend to target the exchange rate or otherwise influence perceptions of future monetary policy in a way that might be inconsistent with the existing monetary framework. This may be particularly important in monetary regimes with highly developed procedures for communicating with the public, such as inflation targeting regimes. A central bank wishing to economise on the use of foreign reserves might prefer alternatives to drawing on them, such as serving as an intermediary between financial institutions (eg as was done by the CBRT) or liberalising access to external financing (eg as in India and Korea). As for FX market intervention, outright spot sales of foreign reserves would deplete foreign reserves more than alternative transactions, which can be a concern if the duration of the turmoil is very uncertain. In contrast, collateralised foreign currency lending, foreign currency repos and sales of foreign currency via FX swaps imply future repayment or reversal of the transaction, so that any depletion in foreign reserves would be temporary. The collateral in such transactions (in the case of the swap, the collateral would be in domestic currency), would also limit central bank exposure. In practice, the choice would also depend on the perceived scope for replenishing reserves from other sources, such as export revenues or capital inflows.

*Uses of FX swaps.* A complication in interpreting FX market intervention is that central bank FX swap transactions are not always intended to simply increase or decrease the supply of foreign currency in the spot market in a way that is reversed at some future date. For example, during the crisis, the Central Bank of Brazil sold FX swaps that delivered US dollars in the future in order to provide hedges to firms that needed to unwind dollar short derivatives positions. The swap transactions also had the effect of unwinding the Central Bank of Brazil's long foreign currency position.<sup>6</sup> Another example is that some central banks in Asia that buy foreign currency in the spot market *sterilise* via an offsetting swap transaction in which they sell foreign currency spot and buy it forward. In particular, the evolution of official net (positive) foreign currency positions in a number of EMEs during the period of exchange rate appreciation from around 2005 to 2008 was consistent with increased spot purchases of foreign currency that were sterilised via FX swaps. A subsequent decline in net forward positions during the most recent period of exchange rate depreciation suggests that central banks reduced their foreign currency purchases as foreign currency inflows fell. In those cases where net forward positions turned negative, the central bank may have sold foreign currency in the spot market, at least partly sterilising via swap transactions. However, in some countries, the connection between forward positions and the exchange rate is much looser; this could be because the sterilisation is incomplete, other sterilisation instruments are available or because there is little connection between operations in the FX market and the exchange rate. A question of interest is what determines how swaps are used in the FX market (eg to provide foreign currency in the spot market, to sterilise, to provide hedges for the private sector, etc). For example, one might expect that swaps would be used to sterilise spot transactions if alternative sterilisation instruments were unavailable or particularly costly

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<sup>5</sup> In a later section, the effectiveness of the various measures will be discussed.

<sup>6</sup> See Mesquita and Toros (2010). Losses from derivatives positions in Mexico are also described by Sidaoui, Cuadra and Ramos Francia (2010).

(eg when the supply of government securities is limited or domestic interest rates are much higher than FX rates so the carry cost of foreign reserve holdings is higher).

*Discretionary versus non-discretionary intervention.* In some countries, FX market intervention was non-discretionary. This was to underscore that central banks were not targeting an exchange rate level, which, as past experience has shown, can trigger speculative attacks. For this reason, auctions were widely used. For example, Colombia followed a rule whereby large exchange rate movements triggered auctions of so-called volatility “call” options (giving market participants the option to buy foreign currency from the central bank). This mechanism was triggered in October 2008 and in the first two months of 2009. Mexico adopted a rule to set the daily amount to be auctioned (initially US\$ 400 million, lowered to US\$ 250 million by May 2009) with a minimum price floor. However, non-discretionary intervention posed some difficulties. Some commentary suggests that in Mexico, the floor set a basis for speculation. Also, the amounts of foreign currency supplied by the rules could sometimes fall short of demand. The central bank introduced two measures with different features: (i) daily auctions with no price floor; and (ii) direct sales in FX market operations.<sup>7</sup>

## B. Role of foreign reserves

A key issue in central bank operations in the FX markets was the availability of foreign currency. Most central banks drew on their foreign reserve holdings, which in some cases fell significantly compared to mid-2008 levels before recovering – in Asia by as much as 15–30%, in Latin America by 7–15% and in other EMEs by as much as 25–35%. Central banks replenished their reserves as soon as the opportunity arose, particularly as capital flows recovered sometime after March 2009 (Graph 1). In some cases, current account surpluses have supported recent foreign reserve accumulation. The crisis brought two issues into sharp relief: (i) foreign reserve adequacy; and (ii) alternatives to foreign reserve accumulation.

### 1. Foreign reserve adequacy

Some conventional indicators suggest that reserve holdings have remained ample (Table 1). For example, foreign reserve cover of short-term external debt, an approximate indicator of the ability to meet financing requirements should external funding be interrupted, was generally well in excess of the Guidotti-Greenspan threshold of 100%, even in countries where foreign reserves fell significantly.<sup>8</sup> In some countries where the decline in foreign reserves has persisted, the foreign reserve to short-term external debt ratio has not fallen (in the case of Malaysia, for example, it has risen sharply), suggesting that the declines in foreign reserves were associated with declines in short-term external debt. An interesting question is: under what conditions should foreign reserves be used to retire short-term external debt as opposed to encouraging rollovers of such debt?

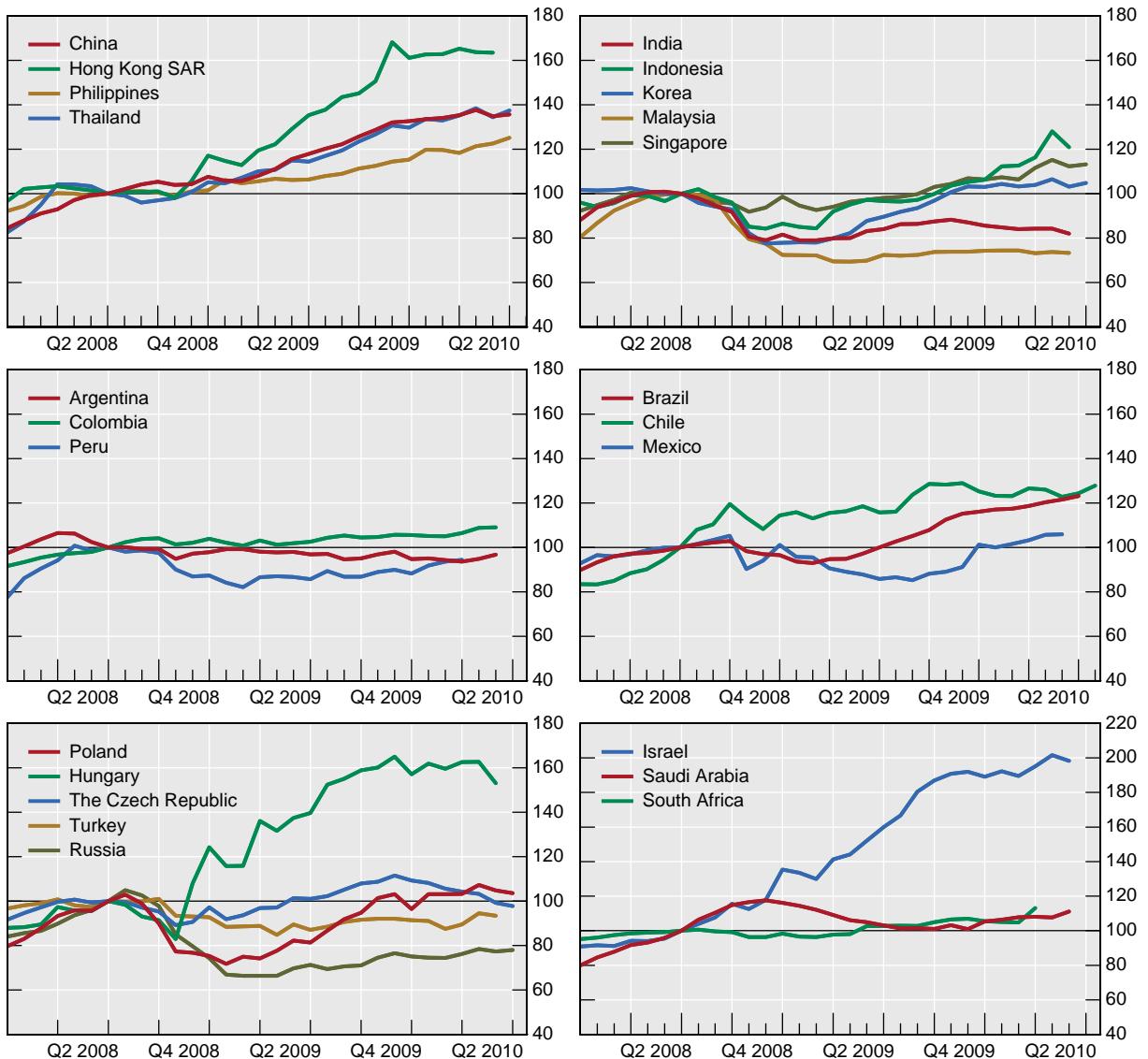
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<sup>7</sup> For further discussion of foreign exchange market intervention in Latin America in response to the crisis see Jara, Moreno and Tovar (2010).

<sup>8</sup> In Malaysia, the ratio did not fall, suggesting that the declines in foreign reserves were associated with declines in short-term external debt.

Graph 1  
Foreign reserves

June 2008 = 100



Sources: IMF, national data.

Reserve adequacy concerns nevertheless appear to have arisen. Some have argued that, rather than focusing on the ratio of foreign reserves to short-term external debt, policymakers should seek to ensure that foreign reserves are high enough to prevent simultaneous runs on a country's banking system and its currency. This would suggest tracking an indicator like foreign reserves to M2. Some recent research suggests that, according to this criterion, foreign reserve holdings were not that excessive, and that countries with higher foreign reserves to M2 experienced less depreciation pressure.<sup>9</sup>

Even foreign reserves to M2 may not provide a complete picture. First, markets appear to care not only about the level of foreign reserves, but their rapid or persistent depletion. Second, foreign reserve levels that exceed conventional rules of thumb may still be seen as

<sup>9</sup> Shambaugh, Obstfeld and Taylor (2009).

insufficient if they are low compared to a country's peers. Third, in some countries, the government (via sovereign wealth funds) or the private sector (eg pension funds) holds large amounts of foreign assets. The repatriation of some of these assets appears to have helped stabilise external financing conditions during periods of financial stress. In those cases, conventional indicators of reserve adequacy could overstate the need for foreign reserves.

Table 1  
Foreign reserve adequacy<sup>1</sup>

	Outstanding year-end position					As a percentage of							
	In billions of US dollars				% GDP	Short-term external debt <sup>2</sup>				M2			
	96	07	08	09		96	07	08	09	96	07	08	09
Asia <sup>3</sup>	477	2,907	3,318	4,028	55	170	449	586	545	22	35	35	35
China	105	1,528	1,946	2,399	49	376	1,249	1,868	1,597	11	28	28	27
Hong Kong SAR	63	147	178	245	116	36	144	189	252	19	19	22	29
India	20	267	247	259	21	260	340	338	302	11	28	27	23
Indonesia	18	55	49	60	11	51	185	174	198	15	31	30	27
Korea	33	262	200	265	32	45	176	172	175	6	19	19	20
Malaysia	26	101	91	93	49	226	447	402	544	20	40	35	31
Philippines	10	30	33	37	23	121	225	406	305	26	39	43	43
Singapore	77	163	174	188	106	44	127	150	164	73	77	75	69
Thailand	37	85	108	134	51	80	866	997	1,048	18	31	38	42
Latin America	142	397	440	466	13	145	238	362	305	71	47	49	37
Argentina	18	44	44	43	14	60	200	279	350	27	51	49	46
Brazil	58	179	193	232	15	111	292	364	300	21	20	24	18
Chile	16	17	23	25	16	201	86	113	130	54	18	28	25
Colombia	9	20	23	23	10	142	201	390	374	23	26	28	24
Mexico	19	86	94	94	11	60	256	240	277	13	15	18	16
Peru	11	27	30	31	24	166	284	248	309	266	165	157	132
Venezuela	11	24	33	18	5	273	347	901	398	91	33	36	0
CEE <sup>4,5</sup>	78	753	703	724	20	452	153	144	167	...	38	40	37
Czech Republic	12	35	37	42	21	262	200	236	311	32	25	27	27
Hungary	10	24	34	42	33	169	88	99	126	49	29	43	50
Poland	18	66	62	80	19	718	245	178	236	37	29	28	31
Russia	11	467	413	417	34	42	493	490	618	22	86	86	80
Turkey	16	73	70	69	11	125	124	119	132	35	23	24	20
Other	25	359	510	488	50	263	605	993	695	...	72	89	80
Israel	11	28	42	59	30	565	587	556	590	38	34	44	53
Saudi Arabia <sup>6</sup>	13	301	438	397	107	217	1,058	2,215	1,254	...	169	207	176
South Africa	1	29	30	32	11	8	170	207	240	1	12	16	12

<sup>1</sup> Regional aggregates for the outstanding year-end position of FX reserves are the sum of the economies listed, simple averages otherwise. <sup>2</sup> Short-term external debt defined as short-term liabilities to BIS reporting banks: consolidated cross-border claims to all BIS reporting banks in countries outside the reporting area with a maturity of up to and including one year plus international debt securities outstanding with a maturity of up to one year. <sup>3</sup> Countries shown plus Chinese Taipei. <sup>4</sup> Central and eastern Europe: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia and Turkey. <sup>5</sup> M2 for Croatia unavailable. <sup>6</sup> For Saudi Arabia, excluding investment in foreign securities.

Sources: IMF; Thompson Reuters; national data.

## 2. Alternatives to foreign reserve accumulation

A number of EMEs have obtained access to foreign currency financing to deal with the crisis. An important development following the Lehman Brothers collapse was the significant expansion in central bank swap arrangements. In an effort to supply US dollar financing (or liquidity) to the global markets, the Federal Reserve implemented a number of swap agreements with central banks from advanced market economies (eventually, the size of these swap lines was unlimited). The central banks of Brazil, Mexico, Korea and Singapore

also established swap lines with the Federal Reserve (for US\$ 30 billion each).<sup>10</sup> In Europe, the European Central Bank implemented cooperation agreements with the Central Bank of Hungary and the National Bank of Poland. In Asia, in the course of the 2000s, central banks concluded a number of bilateral foreign currency swap arrangements, many under the so-called Chiang Mai Initiative (CMI). This has been further enhanced by recent initiatives to create a US\$ 120 billion regional swap facility drawing on foreign reserves of participating East Asian central banks (CMI Multilateralisation). Apart from these central bank facilities, Colombia, Mexico and Poland gained access to the newly created IMF Flexible Credit Line (FCL) aimed at countries with sound fundamentals.

An ongoing issue is whether central bank swap lines or new IMF facilities can provide effective alternatives to foreign reserve accumulation. On the one hand, there is evidence to suggest that Federal Reserve swap lines played an important role in restoring stability in global FX markets and also in Brazil and Korea.<sup>11</sup> Furthermore, central banks believe that foreign reserve holdings and access to central bank swap facilities or to the IMF Flexible Credit Line have contributed to improved market confidence.<sup>12</sup> Indeed, some believe that even very large foreign reserves might be insufficient to preserve stability if the shock is sufficiently large (as was the case in the current crisis). On the other hand, there is more certainty and discretion associated with the use of foreign reserves. Some of these alternative facilities are of limited duration and future access is uncertain. There may also be stigma associated with the use of some of these facilities.<sup>13</sup>

On balance, the crisis appears to have reinforced the perception among EME authorities that it is important to maintain sufficiently large foreign reserves. As noted above, many authorities resumed foreign reserve accumulation as soon as was feasible. However, reserve accumulation is costly and the crisis has also renewed the question of what the appropriate indicators of foreign reserve adequacy are, and whether viable alternatives to foreign reserves are available.

## II. Domestic currency financing and monetary policy

As described in contributions by central banks to this volume and by Moreno and Villar (2010),<sup>14</sup> the crisis led to disruptions in some domestic financial markets. For example, the prevalence of uncollateralised overnight lending in some markets, as well as heightened perceptions of counterparty risk, led to declines in interbank transactions in some countries. Reversals of capital inflows in EMEs were sometimes associated with efforts to liquidate domestic assets, draining domestic liquidity. In some markets, domestic bond yields picked up sharply, and investor demand switched to shorter maturity assets. The liquidity squeeze was in some cases accentuated by increased equity market volatility, which increased margin requirements. Central bank sales of foreign currency could also add to the liquidity drain. In some cases, domestic residents cut off from external financing switched to domestic markets for financing or increased their utilisation of domestic liquidity. There was also a flight

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<sup>10</sup> Among the EMEs listed, these facilities have been used by Korea and Mexico.

<sup>11</sup> For example, see Baba and Packer (2009), Stone et al (2009) and Baba and Shim (2010).

<sup>12</sup> For related discussions see, for example, the contributions to this volume by Sidaoui, Cuadra and Ramos Francia (2010) on Mexico by Yorukoglu and Atasoy (2010) on Turkey and by Ong (2010).

<sup>13</sup> For further discussion, see Moreno (forthcoming).

<sup>14</sup> See Moreno and Villar (2010).

to qualify in some countries as domestic residents moved their funds to larger or more stable financial institutions, especially state-owned institutions.

Policy responses to developments in domestic financial markets may be classified as (i) central bank measures to supply or support domestic currency financing; and (ii) adjustments to monetary policy.

## **A. Central bank measures to supply or support domestic currency financing<sup>15</sup>**

### **1. Central bank operations**

Measures were implemented so as to offset shortfalls in domestic liquidity (if any) and to dampen volatility in short-term interest rates. A number of central banks stepped up the scale of their open market operations. For example, in August 2008, the Czech National Bank (CNB), which traditionally entered the domestic interbank market to drain liquidity, introduced extraordinary liquidity-providing repo operations with two-week and three-month maturities. While these operations were mostly used at the end of 2008 and the beginning of 2009, they were to remain available until the end of 2010.

The range of assets accepted as collateral in open market operations and their maturity was also expanded. For example, a number of central banks (eg in Argentina and the Czech Republic) allowed the use of government bonds or guaranteed loans as eligible collateral in repo transactions with the central bank. In Korea, the range of collateral was expanded to include bank debentures and certain government agency bonds (previously only treasury bonds, government-guaranteed bonds and monetary stabilisation bonds were eligible). In Chile, bank term deposits were accepted as collateral in central bank repo transactions and the central bank extended the overnight liquidity facility for banks to 180-day tenors. Some central banks also expanded the range of eligible counterparties for central bank open market operations, reducing the focus on banks. For example, the Bank of Korea added 12 securities companies as eligible counterparties for repo operations to the original list of 19 banks and two securities companies.

Some central banks have also used FX swaps to provide domestic currency liquidity. For example, the CNB has offered CZK/EUR currency swaps to commercial banks in order to provide CZK liquidity to foreign bank branches. (However, this instrument has been infrequently used.)

Central banks also strengthened discount window lending or created special financing facilities. In Brazil, the central bank was authorised to use the discount window to buy loan portfolios of (small) banks via repo agreements. In India, a special refinance facility allowed scheduled commercial banks to borrow up to 1% of their net demand and time liabilities (NDTLs) up to a maximum period of 90 days; this facility was offered between October 2008 and October 2009. In Mexico, the central bank established a new facility allowing banks to access liquidity using a broader range of eligible assets than in the existing operating facility and at a lower cost.

It may be noted that in some cases (eg Colombia, Malaysia, South Africa and Thailand) domestic currency financing in money markets was unaffected and the central bank did not need to resort to special or unconventional measures.

Policy responses sometimes implied coordination with the Treasury or other state agencies. For instance, in Mexico, the government bond markets were disrupted by foreign investors, who closed their positions, particularly those at longer maturities. In order to restore the

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<sup>15</sup> The discussion in this section reflects central bank responses to a questionnaire.

normal functioning of the bond markets, the Mexican Treasury sought to accommodate the shift in demand away from long-term bonds to short-term bonds by reducing long-term bond issuance during the fourth quarter of 2008 (both for fixed-rate and inflation-indexed instruments) and increasing the issuance of short-term instruments.<sup>16</sup> In parallel, the central bank started auctioning interest rate swaps to ease the pressures in credit institutions' balance sheets and, more generally, credit conditions across the economy. As another example, the Bank of Korea participated in the creation of funds to recapitalise banks and purchase non-performing loans (NPLs).

Some actions by the authorities in a number of EMEs also had important implications for the operation of the financial sector. These include guarantees for debt issuance to improve funding conditions in the commercial paper market or to facilitate the rollover of short-term domestic debt (eg Mexico), or credit guarantees. In some cases, financing via state-owned financial institutions appeared to provide an alternative to the direct provision of financing by the central bank.

## **2. *Reduced domestic currency reserve requirements***

Many central banks that either maintained high average reserve requirements or had raised them prior to the failure of Lehman Brothers were able to reduce them countercyclically in response to the crisis. These included China, India and Malaysia in Asia, and Brazil, Colombia and Peru in Latin America (Graph 2). Colombia and Peru also used *marginal* reserve requirements, which fell sharply.

As is well known, domestic bank reserve requirements have traditionally been used as a monetary policy tool in countries with less developed financial markets. Central banks lacking government securities for open market operations still use reserve requirements to sterilise the impact of FX market intervention. However, the crisis highlighted the role of reserve requirements in supplying liquidity during periods of financial turmoil. For example, in Brazil, reserve requirements were used with a great deal of flexibility. Reduced reserve requirements released an estimated R\$ 116 billion, or 4% of GDP (2009 prices).<sup>17</sup> An innovation was the use of rebates in reserve requirements to encourage purchases of bank assets and foreign currency (as a way of offsetting the contractionary impact on the liquidity of US dollar sales by the central bank). Specifically, deductions of reserve requirements on deposits from leasing companies and on time deposits were allowed if they were used to buy assets from other banks subject to certain restrictions, or to buy US dollars.<sup>18</sup> An interesting feature of the use of reserve requirements to encourage asset purchases is that they are an alternative to the central bank expanding its own balance sheet to undertake asset purchases.<sup>19</sup>

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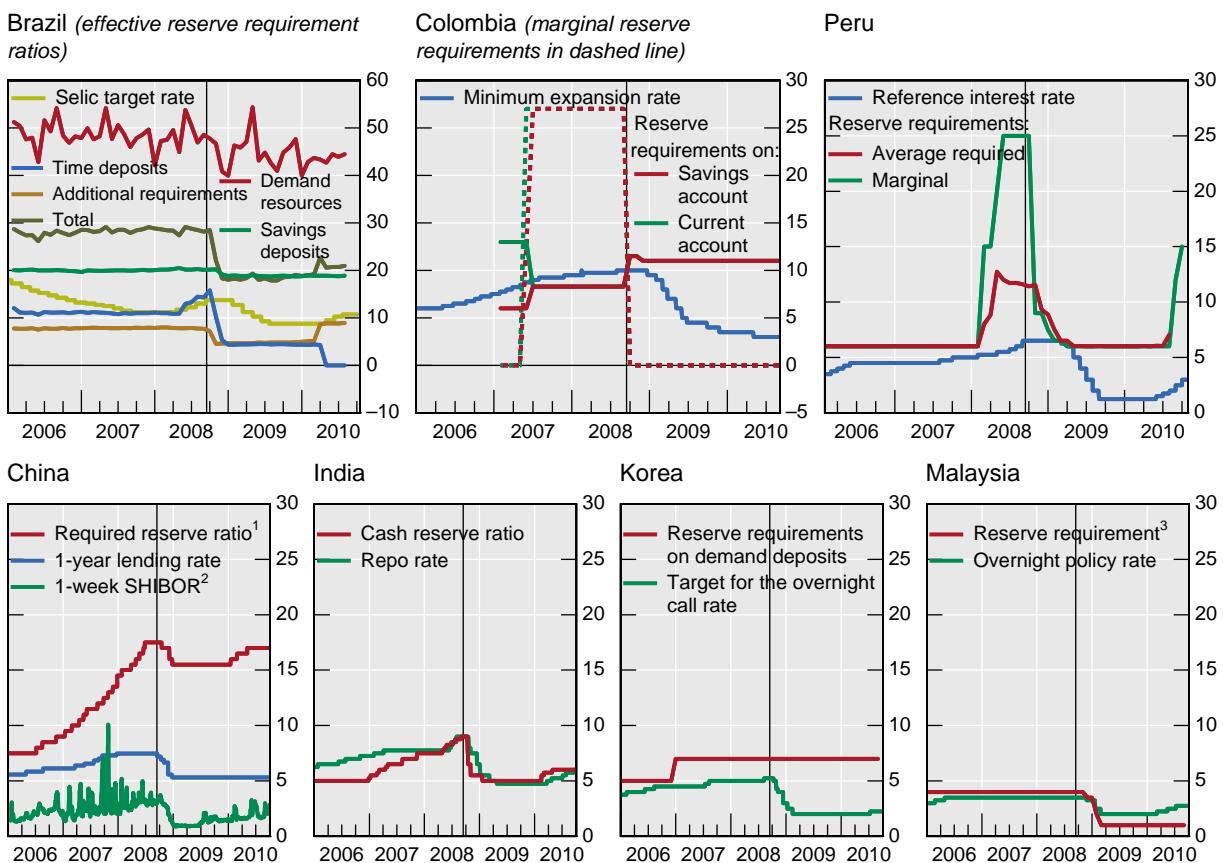
<sup>16</sup> See Sidaoui, Cuadra and Ramos-Francias (2010). In Chile, the issuance of one- and two-year central bank bonds was reduced.

<sup>17</sup> The bulk of the released funds referred to drawdowns of the so-called "additional requirements" (that had been introduced in the 2002 crisis) (R\$ 42 billion), and of the requirements on time deposits (R\$ 62 billion).

<sup>18</sup> See details in Mesquita and Toros (2010). The various adjustments to reserve requirements thus include not only lower nominal ratios but also changes in other related variables (eg an increase during the crisis in the amounts that can be deducted from time deposits from R\$300 million to R\$2 billion and from additional requirements from R\$100 million to R\$1 billion.) These effects are taken into account in the "effective reserve requirements" shown in Graph 2. I thank Jose Antonio Marciano and Rodrigo Collares Arantes of the Central Bank of Brazil for making the data available and for providing guidance on interpretation.

<sup>19</sup> Reserve requirements can also play a role as a supplementary tool to interest rate policy. See the contributions of the central banks of Colombia and Peru for this meeting.

Graph 2  
Domestic reserve requirements and policy rates



<sup>1</sup> For major banks. <sup>2</sup> Repo rate prior to October 2006. <sup>3</sup> For commercial banks.

The vertical line marks the date of the Lehman Brothers bankruptcy on 15 September, 2008.

Sources: Bloomberg; CEIC; Central Bank of Brazil; Central Bank of Peru; national data.

## B. Adjustments to monetary policy

The spread of the crisis to EMEs after the collapse of Lehman Brothers in September 2008 created a dilemma for some EME monetary authorities. On the one hand, credit spreads on virtually all financial assets widened as market liquidity dropped sharply. Emerging market assets were strongly affected by this, and most EME currencies fell sharply. This shock to confidence, and recent high inflation, tended to argue against cutting policy interest rates. Second, there was a sharp contraction in global output and a steep and rapid reduction in policy rates in the advanced market economies; government bond yields in major markets also dropped sharply. The slowdown in growth and widening interest rate differentials in favour of EMEs suggested that EMEs had the incentive and leeway to cut interest rates.

In practice, the timing of the cuts in policy rates varied across countries, reflecting the fact that inflation fell more rapidly in some regions, notably in Asia, but remained high in others, for example in Latin America (where inflation had exceeded inflation targets for much of 2008) or in Indonesia and Russia. In terms of the dilemma cited above, policymakers in countries still experiencing high inflation at the time of the failure of Lehman Brothers apparently assigned greater weight to the risk that easing could increase inflation expectations and further unsettle financial markets, thus accentuating depreciation pressures, than to the need to offset tighter financing conditions and support economic activity. These countries did not lower rates until after the peak period of market turbulence had passed and the inflation pressures had declined with the global economic downturn and

lower commodity prices (around December 2008 or January 2009, or even later; see Table 2 and Graph 2). As noted earlier, the authorities instead relied on alternative tools to support the financial sector and economic activity, starting around September or October 2008. The cycle of easing, which started earlier in Asia, also generally appears to have ended earlier, during the first half of 2009. In contrast, easing continued until late 2009 in a number of Latin American economies as well as in other EMEs. However, rates were subsequently raised in a number of EMEs.

Table 2  
Changes in monetary policy or short-term interest rates<sup>1</sup>

	Inflation			End 2009	Monetary policy rates					
	Dec 2008	Latest reading <sup>2</sup>	Target 2009		Last change <sup>3</sup>		Cumulative changes during period <sup>3</sup>	Sep– Dec 08	Jan– Dec 09	
					Policy decision	Date				
<b>Emerging Asia</b>										
China	1.2	0.6		5.31	-0.27	22 Dec 08	-2.16	0.00		
Hong Kong SAR	2.0	0.5	...	0.03	-0.02	...	-1.54	-0.17		
India	5.7	7.3	...	4.75	-0.25	21 Apr 09	-2.50	-1.75		
Indonesia	11.1	2.8	4.5±1	6.50	-0.25	5 Aug 09	0.25	-2.75		
Korea	4.1	2.8	3.0±0.5	2.00	-0.50	12 Feb 09	-2.25	-1.00		
Malaysia	4.4	-0.1	...	2.00	-0.50	24 Feb 09	-0.25	-1.25		
Philippines	8.0	4.4	3.5±1	5.00	-0.25	9 Jul 09	-0.50	-1.50		
Singapore	4.3	-0.2	...	0.19	0.06	...	-0.25	-0.06		
Thailand	0.4	3.5	0.5 – 3.0	1.25	-0.25	8 Apr 09	-1.00	-1.50		
<b>Latin America</b>										
Argentina	7.2	7.7	...	9.50	-0.25	21 Oct 09	1.75	-1.50		
Brazil	5.9	4.3	4.5±2	8.75	-0.50	22 Jul 09	0.75	-5.00		
Chile	7.1	-1.4	3±1	0.50	-0.25	9 Jul 09	0.50	-7.75		
Colombia	7.7	2.0	4.5 – 5.5	3.50	-0.50	23 Nov 09	-0.50	-6.00		
Mexico	6.5	3.6	3±1	4.50	-0.25	17 Jul 09	0.00	-3.75		
Peru	6.7	0.2	2±1	1.25	-0.75	6 Aug 09	0.50	-5.25		
<b>Other emerging markets</b>										
Czech Republic	3.6	1.0	2.0±1	1.00	-0.25	16 Dec 09	-1.25	-1.25		
Hungary	3.5	5.3	3.0	6.25	-0.25	21 Dec 09	1.50	-3.75		
Israel	3.8	3.8	1.0 – 3.0	1.25	0.25	28 Dec 09	-1.75	-1.25		
Poland	3.4	3.7	2.5±1	3.50	-0.25	24 Jun 09	-1.00	-1.50		
Russia	13.3	8.8	...	8.75	-0.25	28 Dec 09	2.00	-4.25		
Saudi Arabia	9.0	4.0	...	2.00	-0.50	Jan 09	-3.00	-0.50		
South Africa	9.0	5.8	3.0 – 6.0	7.00	-0.50	13 Aug 09	-0.50	-4.50		
Turkey	10.1	6.5	7.5	6.50	-0.25	19 Nov 09	-1.75	-8.50		
<b>Memo:</b>										
Euro area	1.6	0.9	Below, but close to, 2	1.00	-0.25	7 May 09	-1.75	-1.50		
Japan	0.4	-1.9	...	0.30	-0.20	19 Dec 08	-0.45	0.00		
United States	0.1	2.7	...	0.13	-0.88	16 Dec 08	-1.88	0.00		

<sup>1</sup> Argentina, Central Bank of Argentina (BCRA) seven-day reverse repo rate; for Brazil, SELIC target rate; for Chile, official monetary policy rate; for China, benchmark one-year lending rate; for Colombia, minimum expansion rate; for the Czech Republic, two-week repo rate; for the euro area, repo rate; for Hungary, base rate; for India, repo rate; for Indonesia, one-month official discount rate; for Israel, base rate; for Korea, target for the overnight call rate; for Japan, overnight call rate; for Malaysia, overnight policy rate; for Mexico, bank funding rate; for Peru, reference interest rate; for the Philippines, midpoint of repo and reverse repo rate range; for Poland, reference rate; for Russia, refinancing rate; for Saudi Arabia, repo rate; for Singapore, overnight interbank rate; for South Africa, official repo rate; for Turkey, minimum interbank overnight rate; for Thailand, overnight repo rate; for the United States, federal funds target rate; in percentage points. <sup>2</sup> For India, wholesale prices; November data for China, Hong Kong SAR, Hungary, Israel, Japan, Malaysia, Singapore, Saudi Arabia and South Africa; December data otherwise; annual changes, in per cent. <sup>3</sup> In basis points.

Source: national data.

## 1. *Interest rates, supplementary tools and policy assignment*

As noted above, central banks used a variety of tools to respond to the crisis, including changes in monetary operations and reduced reserve requirements as well as changes in policy rates. Indeed, the crisis has generated considerable interest in the use of supplementary or “macroprudential” instruments to dampen boom and bust cycles.<sup>20</sup> This raises the question of how these instruments might be related to interest rate policy. Both interest rates and supplementary instruments are ways of trying to ease or tighten financial conditions and ultimately affect the availability and cost of financing for private and public borrowers. For example, it has been demonstrated that interest rates and capital adequacy ratios may both be adjusted to deal with the same macroeconomic or financial shock.<sup>21</sup> They are partial substitutes (ie the authorities can raise interest rates or capital requirements). As macroprudential instruments do this by influencing the incentives and robustness of the financial sector they have a direct effect on the monetary policy transmission mechanism. From this point of view, such instruments can strengthen or weaken how the policy rate is ultimately reflected in the availability and cost of financing faced by borrowers (private and public).

How much interest rates and macroprudential instruments will be used will depend in part on the monetary framework, whether macroeconomic and financial stability considerations coincide, the effects of these instruments and institutional considerations.

For example, under a fixed exchange rate regime (eg Hong Kong SAR), policymakers have no interest rate tool and would have to rely on supplementary tools. In some cases, such as when there are rising inflationary pressures, rapid credit growth and higher asset prices, both policy interest rates and supplementary macroprudential instruments should clearly reinforce each other to tighten financing conditions. A more difficult question is how to deal with possible policy dilemmas. For example, as noted above, following the collapse of Lehman Brothers some EME authorities were faced with, on the one hand, high inflation, and, on the other hand, tightening financing conditions and the risk of a severe economic downturn.<sup>22</sup> Some central banks (eg Brazil and Peru) lowered reserve requirements to enhance domestic currency financing, while keeping interest rates unchanged (Graph 2); they only lowered rates as inflation prospects improved. In other EMEs, however, there was greater synchronisation of interest rates and reserve requirements. There are also important differences in the use of reserve requirements over the cycle; for example, China and India appear to have relied more heavily on adjustments to reserve requirements during the period of expansion prior to the failure of Lehman Brothers than other EMEs.

The development or condition of the financial system may also have a bearing on the types of instruments used. For example, in some cases where domestic interbank markets are less developed, the authorities may find it more effective to set bank lending rates (eg as in

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<sup>20</sup> Some of these instruments are monetary or microprudential, now re-examined through a macroprudential lens with a view to assessing their implications for the business cycle, credit growth and systemic risks or financial stability. Apart from reserve requirements, the instruments include measures that influence credit and the quality of bank balance sheets, such as credit targets or ceilings on credit (eg ceilings are used by Korea focusing on credit to small- and medium-sized enterprises (SMEs)), loan-to-value (LTV) ratios (eg used in Hong Kong SAR), capital adequacy requirements and buffers, and loan loss provisioning (notably countercyclical dynamic provisioning, recently adopted in Colombia). For a discussion of macroprudential instruments see CGFS (2010).

<sup>21</sup> See Cecchetti (2009).

<sup>22</sup> During expansion periods in the 2000s, a common dilemma was posed by a combination of low goods and services price inflation with rapid increases in both credit growth and asset prices. The questions then are: to what extent should interest rates respond to asset price increases or rapid credit growth? What role should be assigned to supplementary or macroprudential instruments?

China) directly rather than to rely exclusively on open market operations to set interbank rates. The way in which supplementary tools affect the transmission of monetary policy will determine the extent to which they will be used. In some cases, higher reserve requirements do not increase deposit rates and could be used to tighten financing conditions without attracting capital inflows during periods of expansion.<sup>23</sup> This could address the dilemma faced by the authorities regarding the need to raise domestic interest rates during periods of large and expansionary capital inflows.

Institutional factors are an important determinant of which tools are used. Many central banks are no longer responsible for financial supervision and regulation; consequently, reserve requirements are one of the few supplementary tools they have available to influence financing conditions in the economy.<sup>24</sup> Coordination between central banks and supervisory authorities is necessary to ensure that other tools (eg capital adequacy requirements, loan loss provisioning, etc) are used in conjunction with monetary policy to dampen boom and bust cycles and preserve medium-term financial stability.

### **III. Assessment of crisis responses**

#### **A. Measures to provide foreign currency liquidity or financing**

BIS staff contributions to this volume<sup>25</sup> indicate that global factors played a large role in determining the incidence of stress episodes reported by central banks during the recent crisis. In this setting, it appears unlikely that the responses by EME authorities could have prevented the disruptions in the FX markets or interruptions in external financing; for them to do so, global financial conditions had to stabilise. Instead, measures to improve the availability of foreign currency liquidity (drawing on foreign reserves, and in some cases on foreign exchange swap facilities) appear to have compensated for or covered shortfalls in foreign currency financing until global market conditions improved, which occurred sometime around the second quarter of 2009. For example, in Korea, operations to support foreign currency financing (for which US\$ 55 billion in foreign reserves were set aside) appear to have played a major role in ensuring that the decline in the rollover ratio on maturing foreign debt to around 40% in the latter part of 2008 did not result in widespread defaults and lasting interruptions in external financing. Measures to provide foreign currency financing, in Korea and elsewhere, may also have helped to dampen exchange rate volatility, and lowered financing costs for borrowers seeking to access new credit or roll over external debts. One indication of the success of these measures is that, as conditions have normalised, private capital flows have returned and some of the foreign currency financing support in EMEs has been successfully withdrawn.

There is some empirical evidence on the effectiveness of these measures.<sup>26</sup> In the Hong Kong Monetary Authority (HKMA) contribution to this meeting, Fung and Yu (2010) find

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<sup>23</sup> For further analysis of how reserve requirements affect monetary policy transmission, see the contribution in this volume by Vargas, Betancourt, Varela and Rodríguez (2010).

<sup>24</sup> In countries where the central bank is also responsible for bank supervision and regulation, other tools become available. For example, the RBI adjusted the risk weights for capital adequacy requirements or loan loss provisioning requirements to contain risks associated with credit to certain sectors. In the aftermath of the collapse of Lehman Brothers, it lowered the statutory liquidity ratio of the banking sector but has since restored it to its previous level (see Sinha. (2010)).

<sup>25</sup> See Takats (2010) and Moreno and Villar (2010, particularly Graph 1).

<sup>26</sup> See also discussion in section I.B.2 of this paper.

that HKMA policy actions helped mitigate dislocations in the money and FX swap markets and effectively reduced the covered interest parity (CIP) deviations following the collapse of Lehman Brothers. Furthermore, a recent study of Brazil (Stone et al (2009)) finds that the measures by the Central Bank of Brazil reduced on impact the relative cost of onshore dollar financing (a market proxy for FX liquidity). However, announcement effects are estimated to be bigger than those of the interventions themselves. In particular, the announcement of the FX swap with the Federal Reserve had the biggest empirical effect suggesting that external, rather than domestic, policy responses to the crisis played the largest role in stabilising market conditions. The level and implied volatility of the spot exchange rate are also estimated to have been positively affected by the FX easing measures, implying that those measures stabilised the exchange rate in addition to easing dollar liquidity.

## **B. Measures to provide financing in domestic markets and monetary policy responses**

The preceding discussion suggests that one of the key goals of policymakers in adopting the auxiliary measures discussed below was to preserve the flow of credit and consequently the operation of the monetary transmission mechanism. While more systematic analysis is needed to assess the various measures adopted, an impression can be obtained by reviewing: (i) the path of interest rates at various maturities as policy rates were lowered; (ii) the behaviour of credit to the private sector over time.

### **1. *Interest rate behaviour***

Financing conditions in domestic money markets and in the banking sector improved from around December 2008 onwards as policy rate declines were associated with significant reductions in interbank and average bank lending rates (Table 3). In contrast, the reductions in bond yields were generally smaller (in some cases yields increased), so that yield curves in EMEs steepened.

The decline in three-month and bank lending rates suggests that programmes to support the banking sector and credit extension, as well as the reduction in policy rates, may have helped to lower the cost of credit. Competitive pressures among banks to obtain business as economic activity weakened may also have played a role. These effects appear to have offset the factors that contributed to the downward rigidity in domestic bond yields, including widening risk premia for assets at longer maturities.

**Table 3**  
**Interest rates changes**

1 December 2008–31 December 2009

	Policy or short-term rate <sup>1</sup>	Interbank three-month	Lending rate	Local currency bonds <sup>2</sup>	Foreign currency bonds <sup>3</sup>
<b>Emerging Asia</b>					
China	–0.3	–0.9	–0.3	0.5	–1.2
Hong Kong SAR	–0.5	–1.9	–0.1	0.4	...
India	–2.8	–5.9	–1.5	0.2	...
Indonesia	–3.0	–4.9	–1.1	–6.3	–6.0
Korea	–2.0	–2.6	–1.7	–0.1	...
Malaysia	–1.3	–1.3	–1.1	0.4	–1.7
Philippines	–2.0	0.1	–1.8	–1.3	–2.4
Singapore	–0.2	–0.1	0.0	–0.3	...
Thailand	–2.5	–2.5	–1.4	0.2	...
<b>Latin America</b>					
Argentina	–1.5	–7.4	–21.1	1.9	–9.3
Brazil	–5.0	–5.1	–15.0	–3.4	–2.0
Chile	–7.8	–7.9	...	–1.0	–1.5
Colombia	–6.5	–6.2	–7.6	–4.2	–2.7
Mexico	–3.8	–3.6	–5.5	–1.7	–1.9
Peru	–5.3	–5.4	–0.8	–3.5	–2.6
<b>Other emerging markets</b>					
Czech Republic	–1.8	–2.5	–0.4	–0.0	...
Hungary	–4.8	–4.9	–3.2	–0.8	–2.1
Israel	–1.3	–1.4	–2.0	–0.6	...
Poland	–2.3	–2.5	–2.0	1.0	–0.7
Russia	–3.3	–9.6	–0.3	–0.6	–5.2
Saudi Arabia	–1.0	–4.2	...	...	...
South Africa	–5.0	–4.8	–5.0	0.1	–3.7
Turkey	–9.8	–12.9	...	–10.4	–3.2

<sup>1</sup> Argentina, BCRA seven-day reverse repo rate; for Brazil, SELIC target rate; for Chile, official monetary policy rate; for China, benchmark one-year lending rate; for Colombia, minimum expansion rate; for the Czech Republic, two-week repo rate; for Hungary, base rate; for India, repo rate; for Indonesia, one-month official discount rate; for Israel, base rate; for Korea, target for the overnight call rate; for Malaysia, overnight policy rate; for Mexico, bank funding rate; for Peru, reference interest rate; for the Philippines, midpoint of repo and reverse-repo rate range; for Poland, reference rate; for Russia, refinancing rate; for Saudi Arabia, repo rate; for Singapore, overnight interbank rate; for South Africa, official repo rate; for Turkey, minimum interbank overnight rate; for Thailand, overnight repo rate; in percentage points. <sup>2</sup> For India, wholesale prices; December data for Chile, Colombia, the Czech Republic, Indonesia, Korea, Mexico, Peru, the Philippines, Russia, Thailand and Turkey; November data otherwise. <sup>3</sup> Argentina, BCRA issues at issue, closest to one-year maturity (one-year maturity until February 2007); for Israel, eight-year government bond; for the Philippines, 10-year government bond; for Turkey, two-year government bond; five-year government bond yield otherwise.

Sources: IMF, *International Financial Statistics*; Bloomberg; CEIC; Datastream; JPMorgan Chase; national data.

A more precise assessment of these effects requires systematic empirical analysis. In Hong Kong, empirical analysis by Fung and Yu (2010) indicates that policy actions did not affect the three-month HIBOR–OIS spread (the indicator of stress in the interbank market), in line with IMF findings on the apparent ineffectiveness of liquidity support measures by central banks in developed countries. One explanation is that the actions may have been anticipated by market participants. However, as noted above, the HKMA's actions appear to have mitigated disruptions in the FX swap markets. The HKMA assigns particular importance to the role of its five temporary measures (see Fung and Yu (2010)) in stimulating interbank financing, by reducing uncertainty about the availability of funds (by providing additional longer-term funding to banks against a wider range of collateral at a potentially lower interest cost) and reducing perceived counterparty risk (by containing the solvency risk in the banking system).

## 2. Trends in bank credit

Bank credit displayed a robust upward trend in most EMEs until around the third quarter of 2008. The trend later flattened in a number of countries and declined in others (the last with a recent rebound – see Graph 3).

An important question is the extent to which the decline in credit growth reflected reductions in credit supply or demand. A reduction in credit supply would suggest that the impact of the crisis on the financial sector has amplified the effects of the very large cyclical downturn. In contrast, if demand effects are dominant, this would suggest that efforts to supply financing and support the operation of the financial sector have been successful in boosting credit supply and mitigating the adverse effects of the crisis in developed financial markets. While disentangling credit supply and demand effects requires more systematic analysis, the fact that the decline in credit growth in 2009 was accompanied by much easier financing conditions than in October–November 2008 and lower policy and bank lending rates (Table 3 and Annex Graph A1) suggests that reduced credit demand has been an important driver of slower credit growth.<sup>27</sup> At least two factors – bank deposits and still strong balance sheets – appear to have supported credit supply. The policy responses cited above may also have helped.

*Reliance on bank deposits, which on average tended to grow.* Loan-to-deposit ratios in many EMEs tend to be below unity, suggesting a greater reliance on deposits (as opposed to wholesale financing) to fund credit. On average, deposits in EMEs have remained on an upward trend, which would tend to support credit growth. However, this in part reflects substitution away from other investments in favour of the banking sector. It may also reflect the impact of guarantees or other policies to support the banking sector. These averages mask significant cross-country variation as loan-to-deposit ratios exceed unity in some countries (eg Chile and Colombia). Furthermore, deposits have recently declined or displayed volatility in a number of EMEs (Graph A2).

*Still strong balance sheets.*<sup>28</sup> The relative resilience of bank deposits was at least partly the result of the strength of banks' balance sheets. This was reflected in: (i) *the limited deterioration in credit quality*; (ii) *still profitable banks*; and (iii) *significant capital buffers and bank resilience to shocks*. The cyclical downturn tended to reduce borrower creditworthiness, with lending to exporters, SMEs and households in some cases posing concerns. However, median NPL ratios in a set of EMEs have been low, declining from around 7% at the beginning of the decade to less than 3% in 2007. Furthermore, unlike many banks in advanced economies, EME banks generally had limited exposure to toxic assets.<sup>29</sup>

Present indications for most countries are that NPL ratios will generally not reach the levels observed in past crises. With regard to bank profitability, while profits fell from their peaks in 2007, banks remained profitable in a number of EMEs. Both narrowing net interest margins and in some cases increases in provisioning (to cover loan losses) lowered profitability. More generally, however, bank provisions to NPLs tended to decline (countercyclically) as the economy slowed. Lastly, by 2007, banks in EMEs typically had regulatory capital ratios well above the minimum 8% (based on the 1988 Basel Accord). In some countries, Tier 1 capital ratios also exceeded 8%.

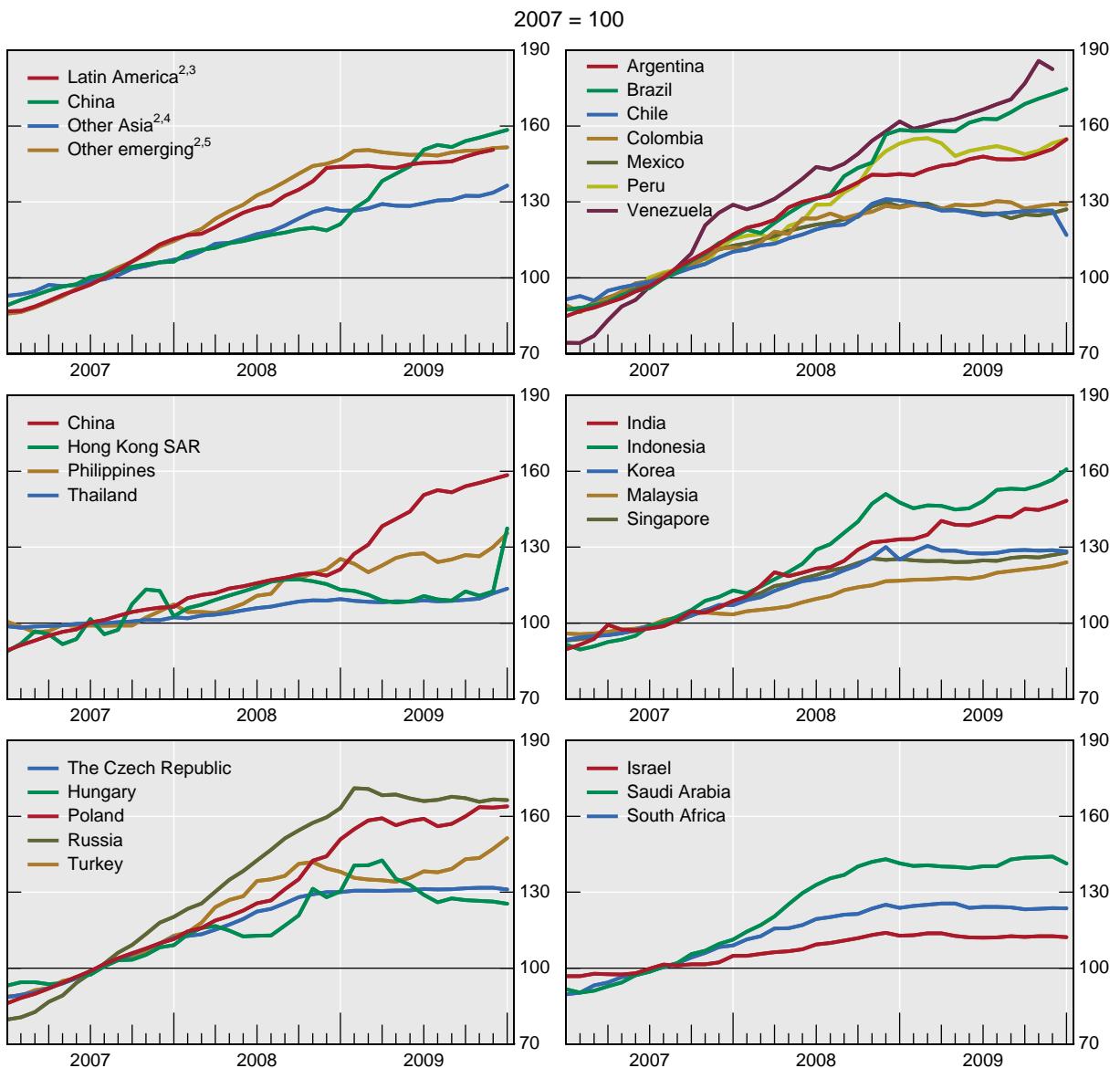
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<sup>27</sup> Credit supply factors also appear to have been important; see Cowan and Marfán (2010).

<sup>28</sup> Some central bank contributions for this meeting (eg Ibrahim (2010), Sidaoui, Cuadra and Ramos Francia (2010) and Kozinski (2010)) highlight the importance of robust banking systems.

<sup>29</sup> Banks in some EMEs were affected but without threatening their financial stability.

Graph 3  
Domestic bank credit to the private sector<sup>1</sup>



<sup>1</sup> In nominal and local currency terms. <sup>2</sup> Weighted average of the economies listed, based on 2005 GDP and PPP exchange rates. <sup>3</sup> Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. <sup>4</sup> Chinese Taipei, Hong Kong, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. <sup>5</sup> The Czech Republic, Hungary, Israel, Poland, Russia, Saudi Arabia, South Africa and Turkey.

Source: national data.

### 3. Other criteria

**Dampening shocks.** A concern during a crisis is ensuring that any major exchange rate or asset price shock is not amplified. Trying to dampen exchange rate or asset price volatility poses some trade-offs. On the one hand, not allowing adjustment can be distortionary – movements in financial prices can help with the price discovery process if they absorb shocks or stimulate corrective action. On the other hand, a lot of volatility could lead to market closure and aggravate financial stability risks. This is the case if there is a breakdown in the payment system; a loss of confidence in the liquidity position of banks that can lead to a bank run; or if firms are unable to adjust their exposures. Output volatility also poses concerns if firms or households are unable to borrow.

*Innocent bystanders.* It is generally accepted that those taking excessive risks should pay the consequences of their actions. Unfortunately, during a crisis, many other parties – households, companies, or even governments – are negatively affected, even if they did not take excessive risks. In other words, their behaviour did not cause the crisis; they were “innocent bystanders”. For central banks, sustaining economic activity and avoiding high unemployment become strong macroeconomic arguments for ensuring continued access to credit for such “innocent bystanders”.

*Exit policies.* An important issue in the assessment of crisis responses is the relative ease in exiting from these policies. For example, efforts to unwind unconventional policies (eg to end central bank operations at longer maturities) could complicate interest rate policy, raising communication problems. If a central bank were to discontinue operations at longer maturities it could be interpreted as monetary policy tightening even if the central bank has no intention of raising the policy rate. Exiting from other policies that have a bearing on financial stability could also pose concerns. For example, the authorities in a number of EMEs have provided guarantees on external debt or bank deposits. These guarantees pose moral hazard issues, so there is an incentive to remove them as soon as possible. The timing of the exit from these policies has generally been announced either as a fixed date or as conditional on the normalisation of financial conditions. However, in financially integrated economies, exiting could make financial systems vulnerable to increases in market volatility. Withdrawing guarantees when others have not done so can also present difficulties, so there are issues of cross-country coordination. Policies to support certain sectors (eg SMEs) raise the issue of balancing the need for support to “innocent victims” of the crisis against the need to ensure that sectors can function independently as the recovery proceeds.

On balance, the authorities appear to have accepted a significant amount of volatility in exchange rates and in equity and bond prices. At the same time, the steps taken appear to have helped countries to emerge with their financial systems relatively intact (ie no breakdown in payments, no runs, and the ability – sometimes with government assistance – to close positions). The flow of credit to some more vulnerable borrowers and “innocent bystanders” (eg SMEs<sup>30</sup>) was facilitated in some cases by government policies or the actions of state-owned banks. As for exit policies, these have been facilitated in EMEs by fairly robust economic recovery and attractiveness as investment destinations.

## IV. Conclusions

What did central banks learn about the instruments at their disposal for dealing with the domestic repercussions of an international financial crisis? A number of points may be highlighted from this brief survey.

First, central banks successfully found ways to provide financing in FX markets to offset the sudden withdrawal of foreign funding and disruptions in international FX markets. In many cases, intervention had to be designed to address complex issues, such as the smooth unwinding of foreign currency derivatives positions in some countries. Some central banks found ways of increasing confidence, thereby reducing uncertainty about counterparty risks or the availability of financing. These factors played a large role in preventing defaults on external debts as well as lasting disruptions to EME financial systems.

Second, a number of central banks drew heavily on foreign reserves, reinforcing perceptions that adequate levels of such reserves are needed. However, the crisis raises new questions

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<sup>30</sup> Ibrahim (2010) discusses the condition of SMEs in Malaysia.

about the appropriate measures of foreign reserve adequacy. At the same time, there have been very large increases in the availability of foreign currency resources for EMEs, and the extent to which such resources could provide an alternative to domestic foreign reserve accumulation warrants further examination.

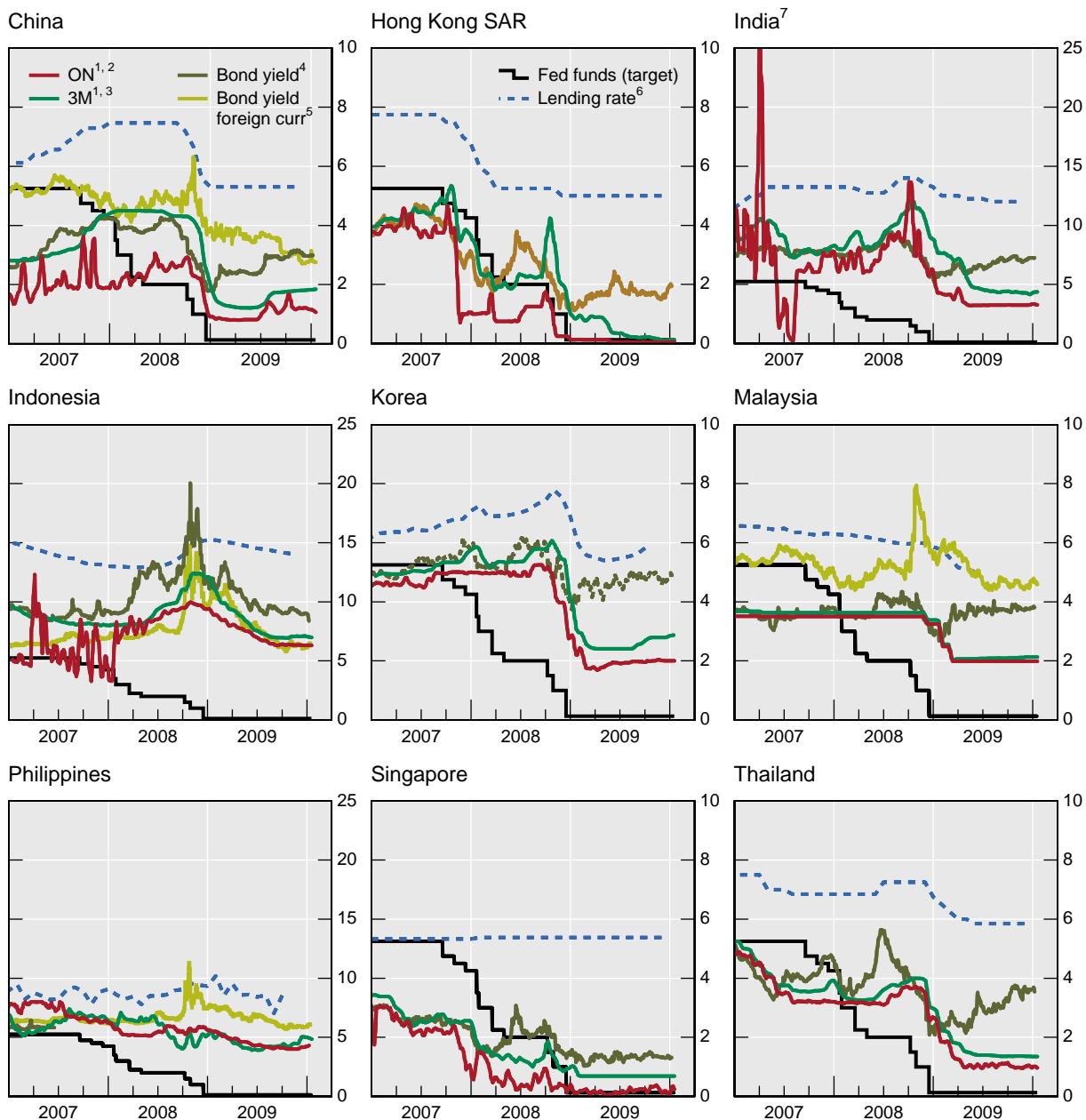
Third, central banks innovated in a number of ways to support local currency financing. A number of central banks extended maturities, accepted new types of collateral and also new counterparties in implementing open market operations. Others reduced reserve requirements, in some cases in ways that provided support to priority sectors. These measures appear to have contributed to easier domestic financing conditions and supported domestic credit. In this context, the strength of domestic banking systems appears to have played an important role (eg by helping to stabilise deposits). However, exiting from some of these measures raises a number of challenges in terms of implications for monetary policy, financial stability or necessary structural adjustment.

## Annex graphs

Graph A1

### Interest rate

In per cent



<sup>1</sup> 10-day moving average. <sup>2</sup> Interbank overnight. <sup>3</sup> Interbank 3-month. <sup>4</sup> 5-year government bond yield. <sup>5</sup> EMBI Global. <sup>6</sup> IMF International Financial Statistics definitions. <sup>7</sup> The interbank overnight rate peaked at 43.725% on 21 March 2007.

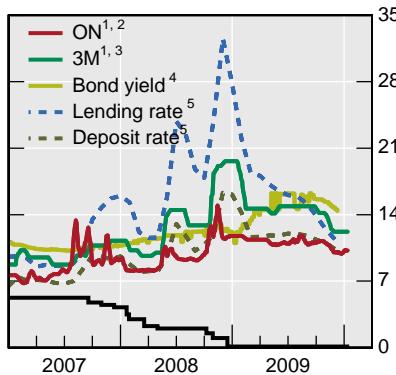
Sources: IMF, International Financial Statistics; Bloomberg; CEIC; Datastream; JPMorgan Chase; national data.

Graph A1 (cont)

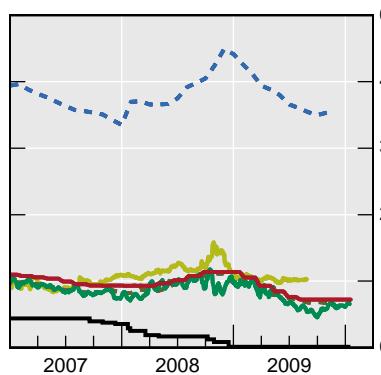
**Interest rate**

In per cent

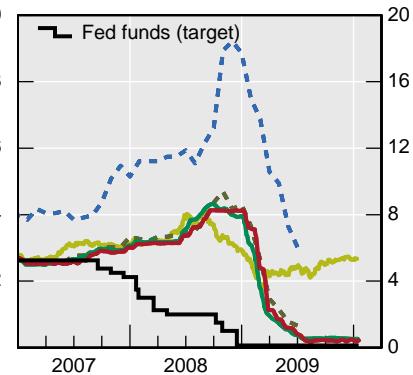
Argentina



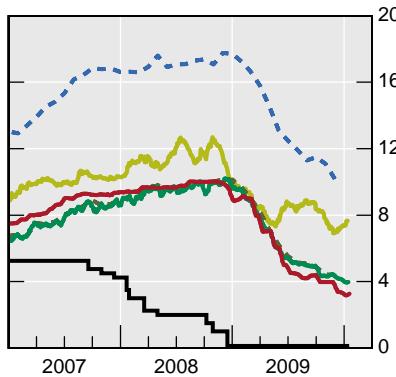
Brazil



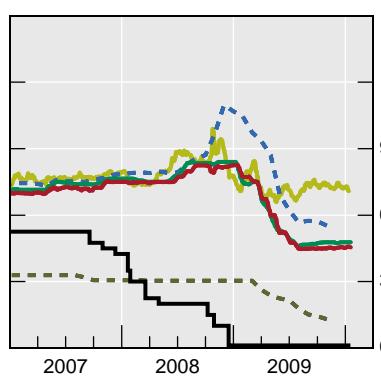
Chile



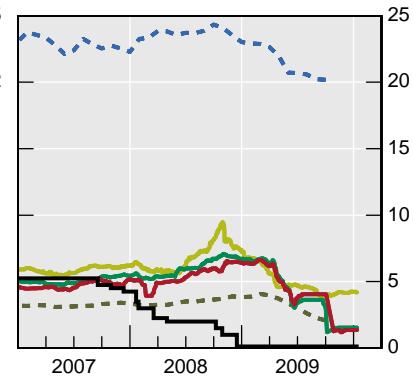
Colombia



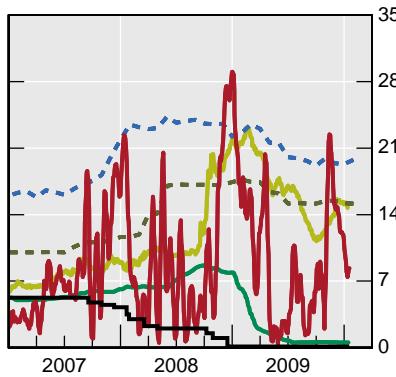
Mexico



Peru



Venezuela



<sup>1</sup> 10-day moving average. <sup>2</sup> Interbank overnight. <sup>3</sup> Interbank three-month. <sup>4</sup> Argentina, BCRA issues at issue, closest to one-year maturity (one-year maturity until February 2007; five-year government bond yield otherwise). <sup>5</sup> IMF *International Financial Statistics* definitions.

Sources: IMF, *International Financial Statistics*; Bloomberg; CEIC; Datastream; JPMorgan Chase; national data.

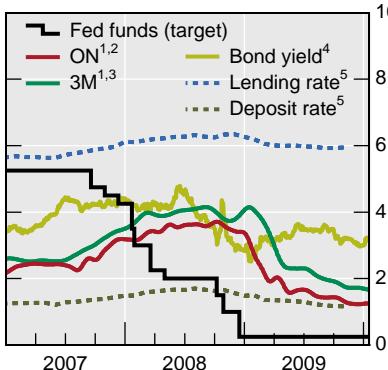
Graph A1 (cont)

**Interest rate**

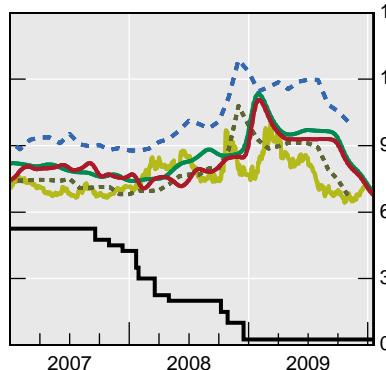
In per cent

CEE

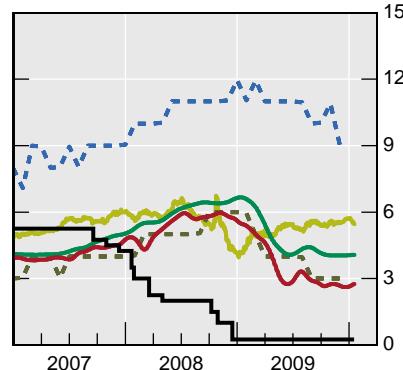
The Czech Republic



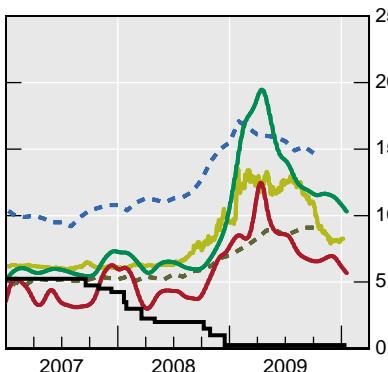
Hungary



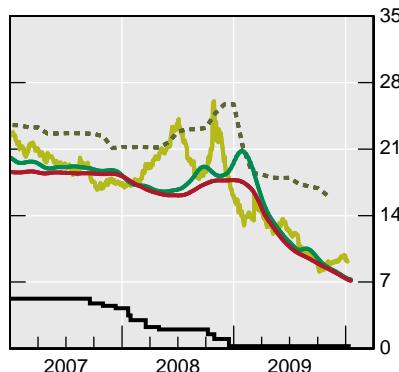
Poland



Russia

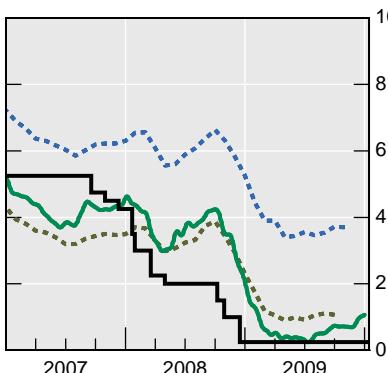


Turkey

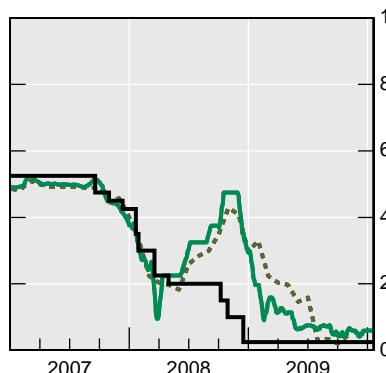


Other

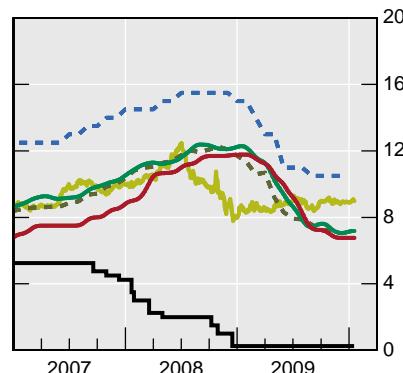
Israel



Saudi Arabia



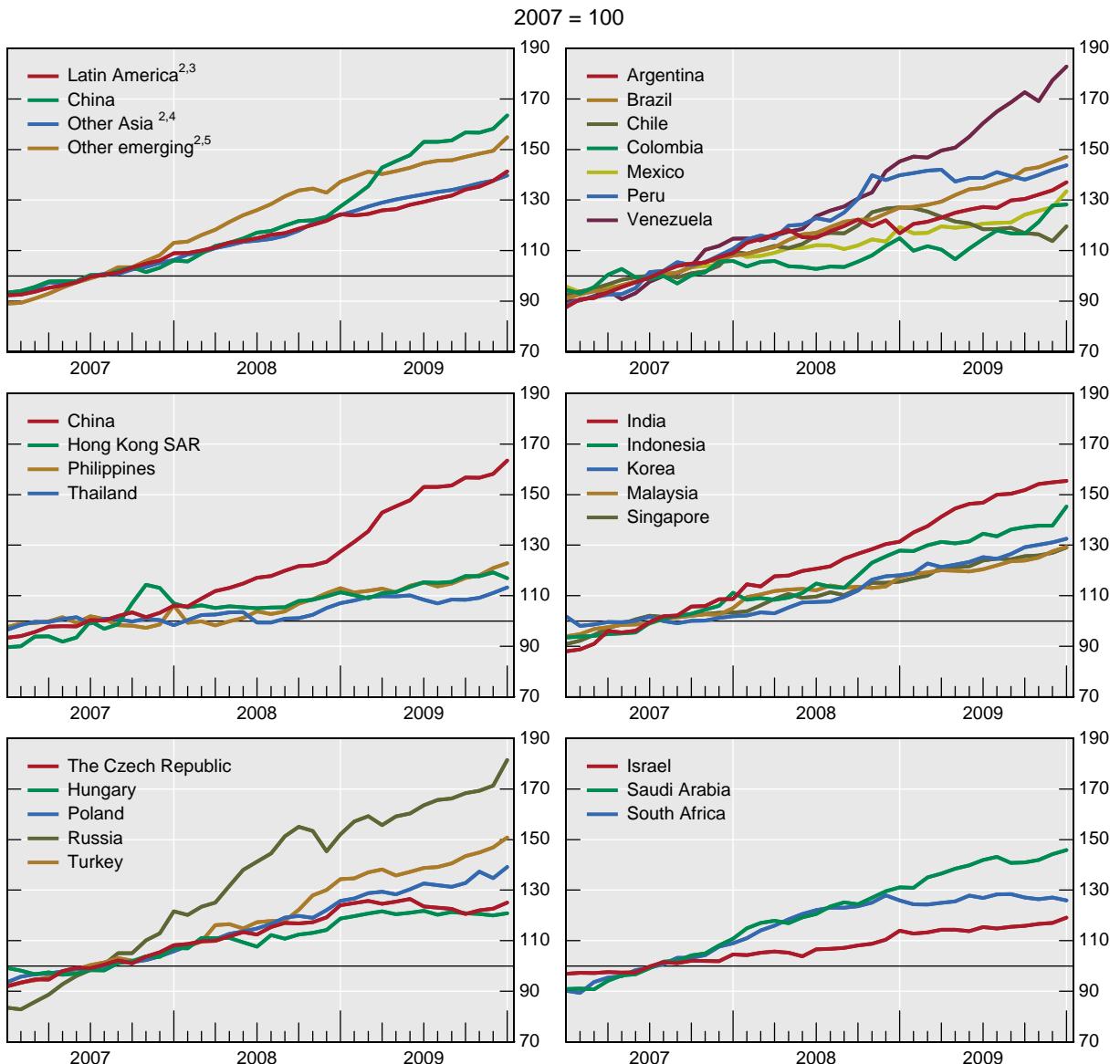
South Africa



<sup>1</sup> 10-day moving average. <sup>2</sup> Interbank overnight. <sup>3</sup> Interbank three-month. <sup>4</sup> Argentina, BCRA issues at issue, closest to one-year maturity (one-year maturity until February 2007); for the Philippines, 10-year government bond yield; five-year government bond yield otherwise. <sup>5</sup> IMF *International Financial Statistics* definitions.

Sources: IMF, *International Financial Statistics*; Bloomberg; CEIC; Datastream; JPMorgan Chase; national data.

Graph A2  
Bank deposits<sup>1</sup>



Source: national data.

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# The international banking crisis and its impact on Argentina

Central Bank of Argentina

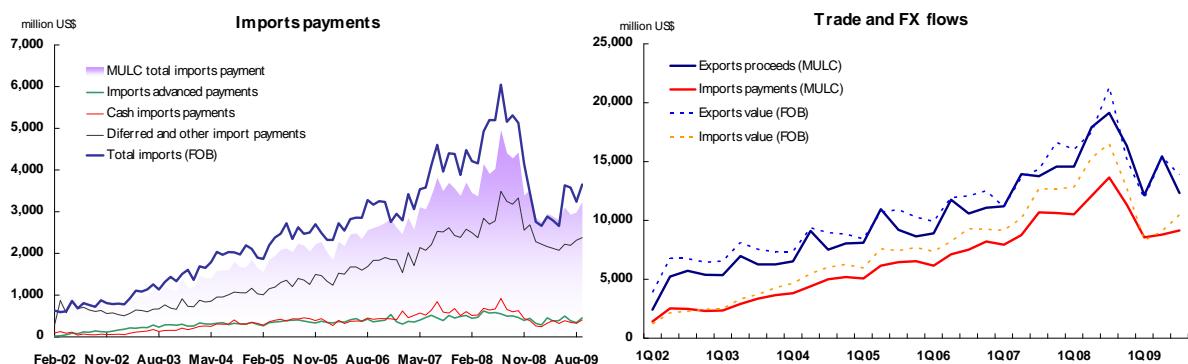
## 1. Cross-border bank lending to emerging market economies (EMEs)

### (a) The role of supply and demand factors

The volume of trade financing usually depends on the size of international trade. However, during the recent crisis there was a slump in trade financing related to the troubles in one particular large financial institution, which led to a sharp decline in world trade. Another significant factor behind the retrenchment in trade financing was the increase in the perception of counterparty risk, which is critical for this type of operation where, typically, more than three financial institutions are involved in a single operation.

In this regard, there was an increase in import payments in Argentina between the last quarter of 2008 and the first half of 2009, which led to a reduction in outstanding commercial debt and an increase in local trade financing (see Figure 1 below).

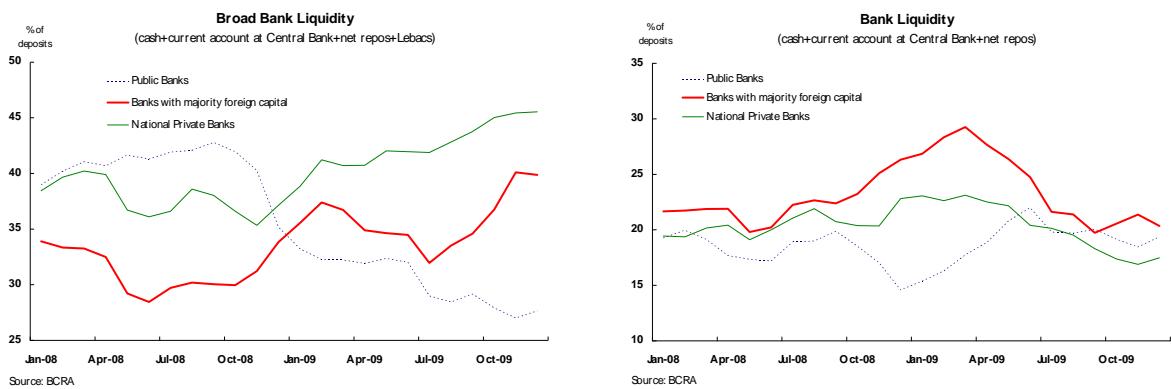
Figure 1  
Trade in goods and trade financing



All in all, the liquidity in the local banking system was high enough to allow a normal functioning of the economy without foreign lending for some time (broad liquidity, which includes banking sector holdings of central bank papers, in the financial system is above 40% of deposits whereas narrow liquidity occurs at a rate of almost 30% – see Figure 2).

At the same time, interest rates on foreign currency denominated loans in the local banking system were cheaper than loans from abroad. Regulatory policies set in previous years to deter currency mismatches in the domestic financial system together with the relaxation of minimum liquidity requirements for foreign currency denominated deposits at the onset of the crisis allowed the local banking system to increase lending in foreign currency for trade operations. As a result, there was an increase in the proportion of local trade financing in relation to external trade financing.

**Figure 2**  
**Systemic liquidity**



Given the particular situation facing Argentina in recent years, financing in the economy has been more reliant on domestic savings and less dependent on international capital flows, which is one of the key reasons for the relatively good performance of the local economy when compared to the rest of the world and to previous international crises.

**(b) Types of lending that were hardest hit**

Until the financial crisis became a fully fledged economic crisis, commercial lending from abroad registered 10 consecutive quarters of growth but, starting in the last quarter of 2008, it declined by more than 50% in six months.

However, financial lending began to fall only in the fourth quarter of 2008 and by just 4.5% against the previous period and it recovered in the first three months of 2009 increasing again by 0.2%.

**(c) Cross-border lending terms**

There has been no significant change in the terms of lending. Neither the duration of outstanding debt (around two years) nor interest rates (although the average rate remained stable, the spread over Libor increased by more than 100 basis points (bp)) have changed significantly since the last few months of 2008.

Nevertheless, there has been a significant change in the types of instruments issued since the beginning of the crisis. There has been a move from financing via loans to issuing debt instruments.

**(d) Parent financing of affiliates versus unrelated parties**

Although there was a decline in the amount of external lending, the non-financial private sector showed a decline in lending from foreign financial institutions, whereas the financial sector remained financed by related financial institutions at pre-crisis levels.

## **2. Domestic bank intermediation: domestically owned versus foreign-owned banks**

### **(a) Changes in bank business models in the domestic market**

Domestic financial entities exhibit high liquidity levels. The financial system's total liquid assets<sup>1</sup> amount to 30% of deposits, almost 7 percentage points (pp) above the figure recorded prior to the start of the subprime crisis. All groups of banks have maintained high liquidity levels (public banks, domestic private banks and foreign institutions), even showing an increase in liquidity levels in the last two years. Moreover, financial system liquidity amounts to 42% of deposits if holdings of central bank bills and notes are included.

In order to ensure the adequate management of liquidity risk, the Central Bank of Argentina (BCRA) developed additional liquidity windows with non-traditional collateral and introduced changes to the rediscount window (with pre-assessments of collateral and enhanced access to all funding sources, not only deposits) and implemented larger facilities on the repo market (new lines in domestic and foreign currency). It also started auctioning repo options, anticipated the buyback of central bank bills and notes (secondary market, automatic facility and put options) and made open market operations more flexible by making more types of government bonds eligible as collateral. These measures, combined with the BCRA's role as lender of last resort, consolidated a sound banking system position in order to face liquidity risk.

The severity of the global economic scenario was reflected in a moderate worsening of local economic activity during the first few months of 2009, with some economic sectors adjusting their output levels. This framework led to a slight decrease in the strong performance demonstrated by domestic financial intermediation vis-à-vis companies and households over the previous few years. Private sector credit growth slowed, showing a 5% year-on-year (y-o-y) increase, below the outstanding annual average expansion recorded in the previous three years. Whereas in the period 2007–08 the rise in private sector lending stock was predominantly driven by households loans (especially in terms of credit cards and personal loans), this framework gradually changed, augmenting the role of productive companies in bank financing in 2009.

Bank deposits continued to be the main source of funding for credit to households and firms, and there was no need to resort to central bank assistance. After growing steadily over the last few years, deposits now represent more than two thirds of financial institutions' liabilities, and are significantly boosted by both time and sight deposits. Further, domestic banks do not depend on foreign financing, thereby minimising any possible adverse effects associated with the volatility of international capital flows during the last two years. In particular, the financial system's outstanding obligations (ON) and foreign credit lines currently represent 3% of total banking liabilities (almost 1.5 pp less than two years ago) and are mainly channelled to local and foreign private banks.

Private banks have shown a lower credit increase since the beginning of the international financial crisis, while public institutions have continued to expand credit at a remarkable pace. Regarding credit expansion to the private sector, November 2009 data show that, while public banks grew by 19.3% y-o-y, in the same period, domestic private banks grew by 9.8% and foreign private banks fell by 2.8%. As a consequence, public sector financial institutions have been progressively increasing their market share (almost 30.2% of total credit), while both private domestic and foreign banks have been slowly reducing their share

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<sup>1</sup> Local and foreign currency liquid assets.

(34.3% and 31.9%, respectively, the latter being mainly led by European global financial institutions<sup>2</sup>).

In a global context of continuing uncertain economic conditions, the repayment capacity of local households and firms gradually came under pressure. Although it showed a slight increase, non-performance of credit still remains at a historically low level and, following a hike between October 2008 and August 2009, it is currently showing signs of a gradual reduction. The activity levels of some productive sectors were partially affected by the economic crisis, while households began to face some challenges. After reaching a minimum of 2.8% in September 2008, some of the credit risk assumed by banks started to materialise, and the non-performance ratio gradually rose to almost 3.8% of loans to the private sector in July 2009. In that month, the increase in the non-performing loan (NPL) indicator stopped and subsequently began to fall. This trend has been mostly observed in domestic and foreign private banks. In line with this movement, credit line interest rates showed a moderate increase among all bank groups.

The moderate increase in private sector non-performance was being driven by household credit (due to higher levels of indebtedness), in particular consumption lines. Households' NPLs account for 5.2% of total financing to this sector, almost 1.5 pp above the figure observed two years ago – this trend has been observed among all groups of private institutions (local and foreign). This evolution can also be seen in corporate loans, but the ratio is still at a very low level (2.5% non-performance). In order to tackle this situation, banks have provision coverage that exceeds NPLs, thereby enabling them to face greater levels of arrears without significantly affecting their solvency levels. This coverage amounts to almost 118% for the financial system, and is even higher in public banks.

Banking sector solvency has remained at adequate levels, due to both the new capital injections received (almost USD 6 billion since 2002 and USD 600 million since the onset of the subprime crisis) and the recovery of traditional sources of revenue. All groups of financial entities exceed internationally recommended and local prudential solvency levels. Financial system capital compliance in terms of risk-weighted assets totals nearly 18%, and has remained at similar levels for the last few years.

The moderation of banking activity has not prevented the financial system from continuing to accrue book profits, reaching almost a five-year period with consecutive nominal utilities (an average return on assets (ROA) of 1.4% in the 2005–08 period and 2.4% annualised in the first nine months of 2009). These gains are being mainly driven by the more stable revenue sources, net interest income and service income margin, which currently account for 7.9% of bank assets (above the level of the last few years). Operating costs and loan loss charges are gradually increasing, reaching 6.6% and only 1.1% of assets, respectively. Regarding profits, during the first few months of 2009, while private banks showed an ROA of 3.1% and a return on equity (ROE) of 23.7% (at annualised rates), public banks showed 1.3% and 13.9%, respectively.

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<sup>2</sup> The other financial institutions are non-banking financial entities.

### 3. Impact on the financial markets

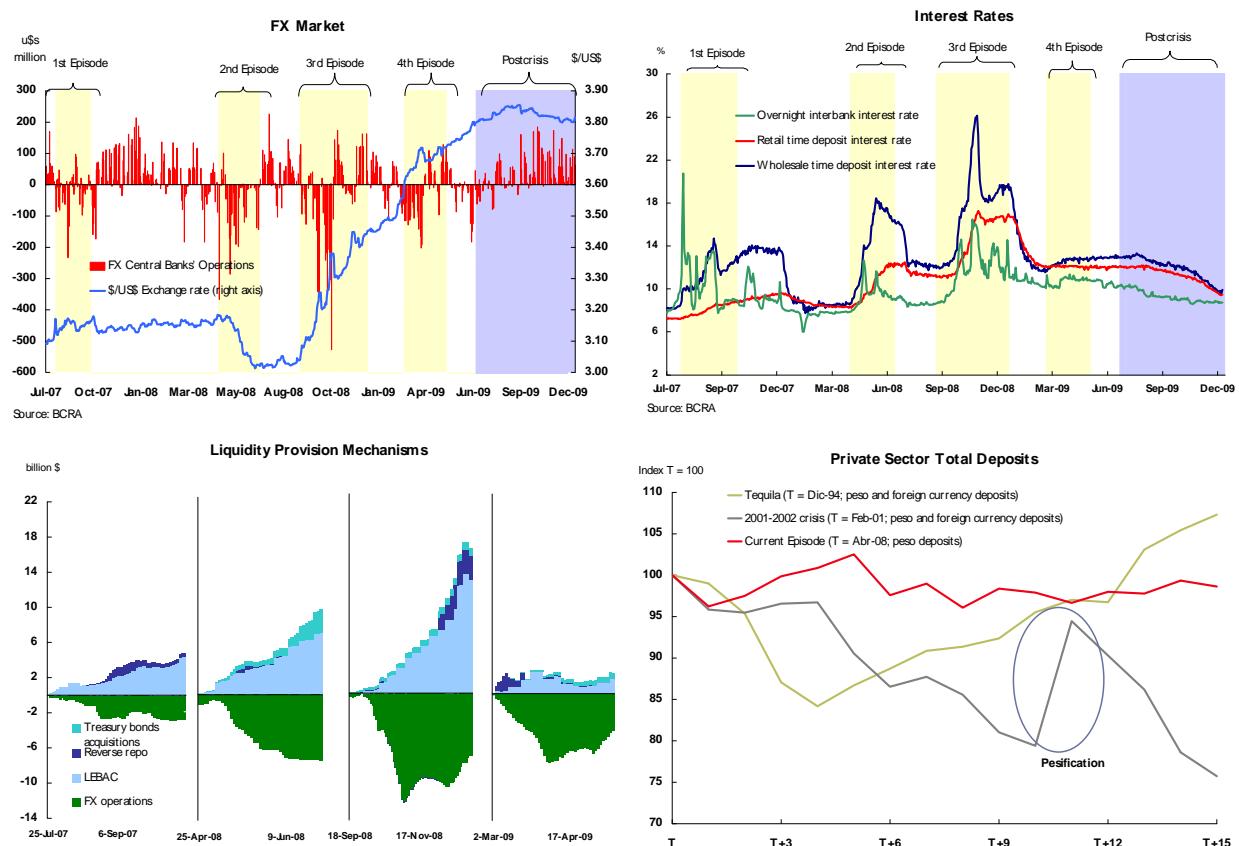
#### (a) Impact on the foreign exchange and domestic money markets

Foreign exchange (FX) markets remained highly liquid over the crisis period, both spot and futures, although there was a setback in the money market which was partly policy-driven as a means to prevent a feedback loop to the FX market.

However, it is worth noting that, after three episodes of stress in the local market, a fourth one occurred at the beginning of 2009 but had no major impact on the money market, as can be seen from the evolution of the interest rate.

Figure 3

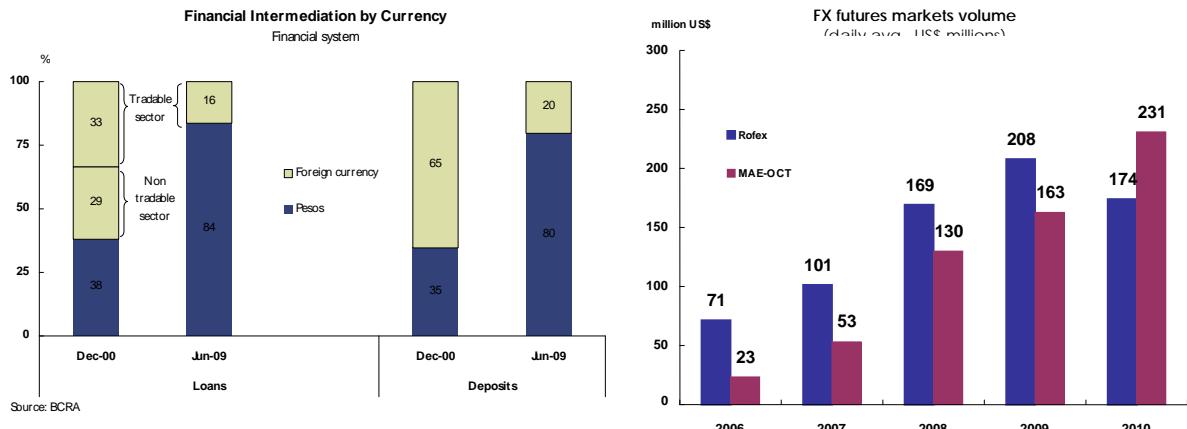
#### Local FX and money markets



Private sector deposits also showed a remarkable performance when compared to the previous crisis. Local currency deposits remained relatively stable while foreign currency deposits showed an upward trend for several consecutive months.

To encourage a gradual reduction in the mismatch between assets and liabilities in foreign currency, the financial policy implemented by the BCRA established that deposits in dollars could only be used to make loans in dollars, and that loans in dollars should only be granted to companies and households recording dollar-linked income. In addition, limits were placed on positions in foreign currency and capital requirements for foreign currency mismatching. The development of hedge markets was encouraged in order to provide market solutions to this risk (see Figure 4, left-hand panel). As a result of this series of measures, foreign currency mismatches are currently well below the levels recorded four years earlier, amounting to 32% of bank net worth, compared to the post-2002 crisis high of 69%.

Figure 4  
Currency mismatch and FX futures markets



**(b) Effects on the local money markets**

Different factors affected the local money markets in EMEs according to their level of interconnectedness with the international markets. In some cases, the margin calls from parents' institutions on developed economies were one of the key drivers of the funding drain.

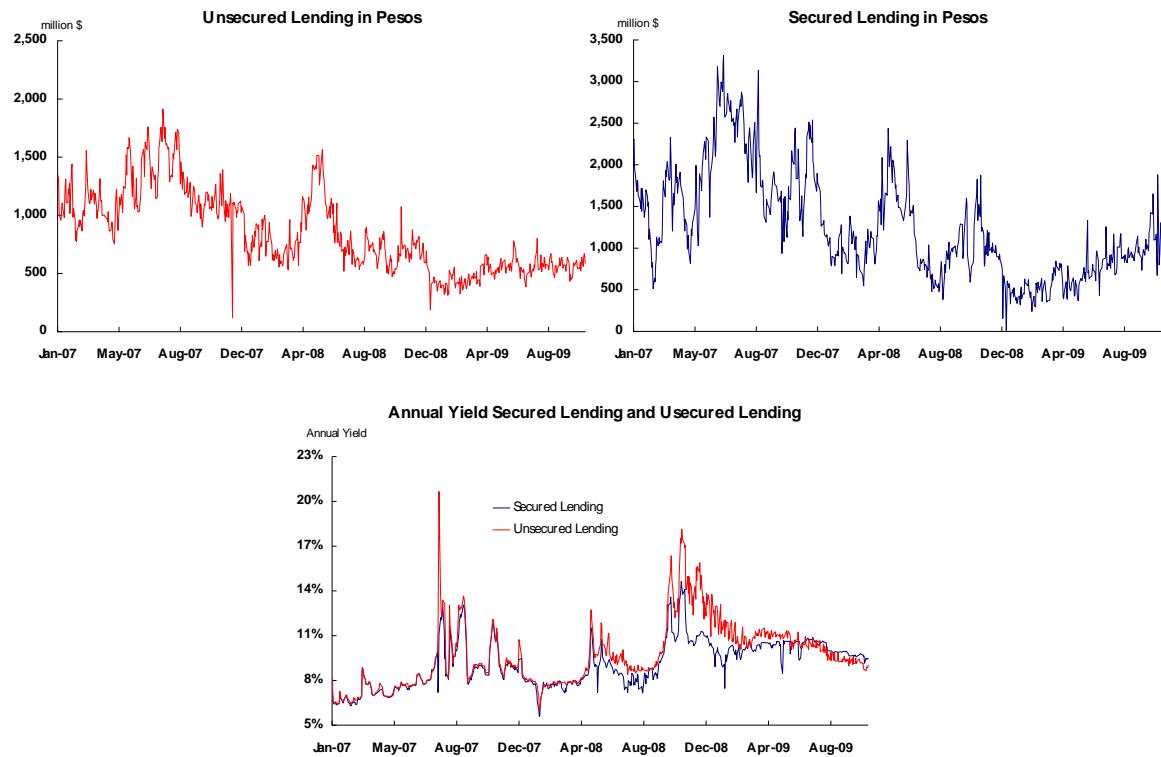
On the other hand, when risk appetite was at its highest level, carry trade on FX markets between EMEs had a significant impact on some countries.

With the onset of the crisis, the flight to quality and to safety hinged on those kinds of speculations, leading to a decrease in money market liquidity and a significant impact on the currencies involved.

**(c) Effects of the crisis on secured and unsecured interbank lending (local currency)**

As mentioned above, the local financial market operates with very high liquidity levels. This is reflected in the reduced levels of interbank lending. However, at some points during the crisis there were some spikes in interest rates, which were more related to local circumstances than to the international crisis.

**Figure 5**  
**Local money market: secured and unsecured lending**



**(d) Difficulties in the local currency government debt market**

A remarkable feature during the pre-crisis period was the performance of local markets in EMEs. They witnessed a surge in long-dated local currency bond issuance by some countries, and an appetite for these assets as more EMEs became rated as investment grade and were thus allowed to be incorporated into institutional investors' portfolios.

As the crisis spread from subprime mortgages to the whole financial system, EMEs started to suffer a sudden stop episode, not only in the local markets but also in the international ones. More recently, there was a return to the markets for sovereign and corporate bond issuance in EMEs, but for the moment, it is mostly confined to the international markets.

Thus, following a period of de-dollarisation of EME debt, the crisis brought back the need to issue bonds in developed economies' currencies (it is interesting to note the issuance of samurai bonds by some countries even during a difficult period for the yen).

As long as the markets return to normal and, more importantly, as risk appetite returns, there is a high probability of a resurgence in the local bond markets.

**4. Central bank instruments to deal with the crisis**

**(a) Instruments at the disposal of the BCRA**

Facing an adverse scenario, the BCRA, like other central banks, started to deploy measures to ensure systemic liquidity and avoid abrupt fluctuations in exchange rates. These measures were accompanied by government countercyclical fiscal measures. In this context, it is worth noting that the Argentine economy was better prepared to face a crisis episode than in

previous years, due to the liquidity buffers reflecting fiscal and current account surpluses and the BCRA's implementation of sound monetary and financial policies over the last five years. This included the implementation of countercyclical policies, generating liquidity buffers in local and foreign currencies, a managed floating exchange rate regime, and regulatory policies that boosted financial system soundness, limiting excessive risky exposures.

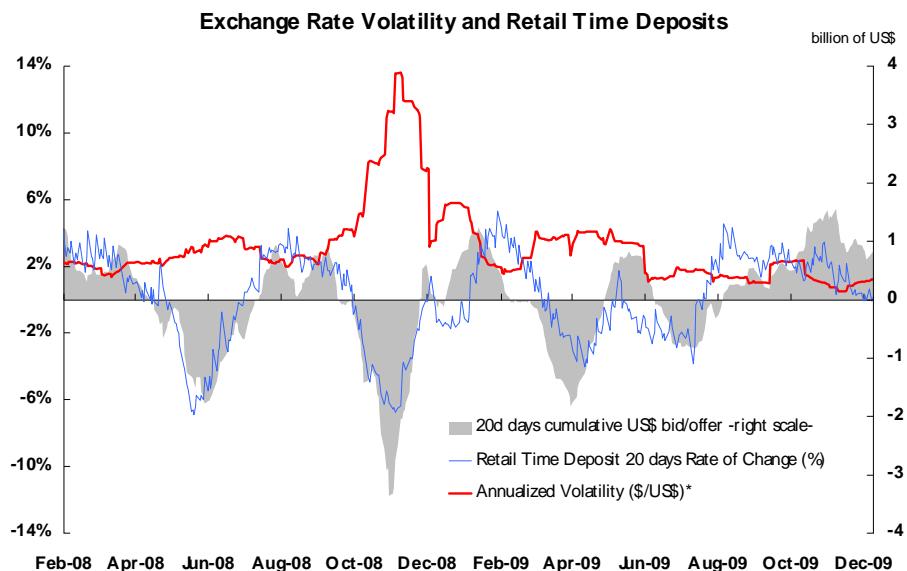
Within this framework, the BCRA has been able to react to secure the normalisation of the demand for money and stabilise the FX market. During that period, the BCRA played an active role on the FX market in order to moderate volatility in the value of the peso and sterilise the monetary effect of foreign currency sales by injecting liquidity, mainly through the market for central bank bills (LEBAC) and notes (NOBAC), which proved to be an appropriate way to manage liquidity across the cycle (issuing notes when the peso supply was in excess of demand, and redeeming the notes when the peso supply was needed). As a result of the BCRA's prudential policies and sound individual banking strategies, domestic financial entities exhibited high liquidity levels.

In order to ensure the adequate management of liquidity risk, the BCRA developed additional liquidity windows with non-traditional collateral, redefined the rediscount window (with pre-assessment of collateral, enhanced access to all funding sources – not only deposits), implemented larger facilities on the repo market (new lines in domestic and foreign currency), started to auction repo options, anticipated the buyback of central bank bills and notes (secondary market, automatic facility and put options) and implemented open market operations with government bonds. These measures, together with the BCRA's role as lender of last resort, consolidated a sound banking system position to face liquidity risk.

#### **(b) Determinants of monetary policy response**

There are several features that determine the capability of monetary policy to react to an international crisis. Among the most important for Argentina is the degree of dollarisation of the private and public sectors' balance sheet, particularly on the liability side. As history has taught us, having large currency mismatches on an agents' balance sheet has a strong impact on economic performance in the event of an international crisis.

Figure 6  
FX and financial stability



(\*) Volatility is a measure of change in respect to its average value, with a time horizon of 20 working days and annualized.

However, the traditional use of interest rates as a countercyclical monetary response is not an appropriate option in Argentina given the existence of a shallow credit channel. This was the reason why policy rates were unchanged, and had nothing to do with fears of a large depreciation of the peso.

Argentina has a managed floating exchange rate regime and, as such, the BCRA performs FX market operations to keep exchange rate volatility low given the high correlation between this variable and financial stability measured by term deposit withdrawals (see Figure 6).

### **(c) Support to interbank lending in local currency**

Much of the support occurred through changes or intervention in the repo market.

- In order to avoid distorting the liquidity reserve characteristics of LEBAC and NOBAC, the BCRA decided to issue domestic LEBAC and NOBAC, which can only be traded locally, seeking to prevent short-term foreign investors from acquiring positions in these securities.
- A scheme was established to offer liquidity at a fixed (up to 3 billion pesos) and a variable (BADLAR) interest rate. By offering a wider variety of options, the BCRA ensured the availability of resources in appropriate conditions to provide liquidity to the system.
- Central bank securities coming due were renewed only partially and some other securities with near-term maturities were repurchased.
- The BCRA began to carry out open market operations through the government securities market by purchasing instruments that could be liquidated in pesos or dollars in the secondary market. This mechanism worked as an additional tool to provide liquidity beyond the banking sector and, at the same time, enabled intervention on the various segments of the yield curve, avoiding distortions in its temporal structure.
- To alleviate the seasonal effects on the traditionally illiquid month of July, the BCRA unified the financial institutions' minimum cash requirement for June and July 2007/08 in a single bimonthly term. This improved the institutions' liquidity management.
- A new liquidity window was opened to include as collateral certain instruments (Bogar and guaranteed loans) that cannot be used in traditional repo operations. This enabled institutions that had no significant central bank bills and notes positions in their portfolios to access the BCRA's liquidity-providing mechanisms.
- New maturity options for repos were offered, readjusting the cost in line with the new term structure.
- The liquidity provision scheme was adapted to provide immediate liquidity to bank holders of LEBAC–NOBAC with a maturity of up to six months.
- Repo interest rates were modified several times.
- Auctions of put options on LEBAC and NOBAC.
- A window to pre-qualify collateral for the illiquidity assistance regime was established.
- The fixed-rate repo line was expanded to \$10,000 million from the previous \$3,000 million.

**(d) Measures taken to support foreign currency refinancing of banks/corporations**

The BCRA also took steps to support foreign currency financing. Measures included:

- The limits to operate in the futures market, both for the BCRA and for some of its counterparties, were extended.
- The reference FX rate for futures and forward transactions between the BCRA and its counterparties was allowed to be settled by the Emerging Market Traders Association (EMTA). This measure is clearly a vote of confidence in the BCRA's approach.
- A mechanism was developed for supplying US dollar-denominated repos. This was an additional way of ensuring dollar supply at times when the dollar increased its share in investors' portfolios and when it was necessary to lower depreciation expectations.
- The BCRA started to participate in the NDF market with operations up to 12 months and with counterparties whose credit quality was not lower than A-.
- Auctions of US dollar repos with a pre-established interest rate directed to the financial system institutions that had previously increased their loans in US dollars to the export sector and had suffered a drop in US dollar deposits.

**(e) Other instruments and their effectiveness**

The BCRA also used other instruments or took other measures to strengthen financial conditions, including:

- Adjustments to minimum cash requirements. The minimum cash requirement on dollar deposits was reduced so that financial institutions could have more funds available to grant loans in this currency (for the tradable sector). In addition, the October and November 2008 minimum cash requirements were changed to a two-month position. Changes were also made to the way in which cash holdings in banks are considered in the reserve requirements position. Specifically, financial entities were temporarily allowed to include their entire cash holdings in order to fulfil reserve requirements.
- Currency swap arrangements. A currency swap arrangement with the People's Bank of China was agreed which will provide CNY 70 billion/ARS 38 billion. The effective period of the arrangement will be three years, and could be extended by agreement between the two sides. A currency swap arrangement was also agreed with the Banco Central do Brasil.
- Interest rate swap auctions to help banks avoid mismatches in fixed and variable interest rates were established.

**(f) Lessons learned from the role of FX reserves and interventions**

The crisis proved once again the need for prudential FX accumulation in the absence of an international lender of last resort and a set of inadequate lending facilities from the IMF.

The accumulation of foreign reserves allowed most EMEs to withstand the crisis with no major impact on the domestic financial markets without recourse to the IMF, given its lack of

assistance to fulfil the needs of EMEs with sound fundamentals but with a foreign currency liquidity shortage.

In a framework marked by large capital inflows, the government decided, by means of Decree no 616 of 2005 and regulatory and complementary measures,<sup>3</sup> to deepen the instruments to follow up and control capital movements. Among the measures adopted was the obligation to set up a non-remunerated deposit at a one-year term (called a reserve) of 30% of the inflow for certain concepts related to: (a) private sector foreign financial debt; (b) portfolio investments by non-residents; and (c) repatriations by residents that exceed USD 2 million monthly.<sup>4</sup> In addition, the minimum term for financial debt contracted abroad and for portfolio investment by non-residents was extended to a year.

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<sup>3</sup> Ministry of Finance Resolution no 365/05 and BCRA communications "A" 4359, 4360, 4377 and 4386.

<sup>4</sup> Exceptions are allowed for: (a) primary issuances of publicly quoted and traded debt instruments, loans from international organisations, loans used to cancel other debts abroad or direct investments in foreign companies and loans with average maturities of over two years used for investment in non-financial activities; (b) investments by non-residents to be used for primary subscriptions of shares and bonds publicly quoted for trading on self-regulated markets; and (c) repatriations by residents to be used to subscribe to primary issuances of national government bonds.

## Annex: Argentina's banking system

Table 1  
**Structure of the domestic banking system**  
In domestic currency  
End of year (or latest available month for 2009)

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Total assets</b>	<b>254,900</b>	<b>292,588</b>	<b>339,743</b>	<b>370,870</b>
Private domestic banks	82,585	93,968	109,073	115,501
Foreign-owned banks	69,829	81,541	99,815	102,948
Subsidiaries	49,699	66,406	79,258	83,786
Branches	20,130	15,135	20,557	19,162
State-owned banks	102,486	117,079	130,855	152,421
<b>Total capital</b> <sup>(*)</sup>	<b>26,189</b>	<b>29,245</b>	<b>33,248</b>	<b>37,964</b>
Tier 1 capital as a % of total assets <sup>(**)</sup>	11,2	11,2	10,4	10,2
<b>Memo items</b> <sup>1</sup>				
Total assets of non-bank financial institutions	3,483	5,375	7,019	6,264
Stock market capitalisation	157,118	179,771	137,815	163,252

<sup>1</sup> Total for the economy.

<sup>(\*)</sup> RPC: Adjusted stockholders' equity, calculated towards meeting capital regulations (Responsabilidad Patrimonial Computable).

<sup>(\*\*)</sup> The RPC (Responsabilidad Patrimonial Computable) is the result of: Basic Net Worth (Patrimonio Neto Básico) plus Complementary Net Worth, concepts that are net of deductible items (Conceptos Deducibles). In this case, Basic Net Worth is taken into account to build the ratio "Tier 1 capital as a % of total assets".

**Table 2**  
**Bank funding**  
In domestic currency  
End of year (or latest available month for 2009)

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Total liabilities</b>	<b>222,954</b>	<b>257,103</b>	<b>300,447</b>	<b>327,083</b>
<b>Foreign funding</b>	<b>11,789</b>	<b>10,632</b>	<b>10,615</b>	<b>9,689</b>
By source				
Banks (*)	4,240	3,864	4,541	3,611
Other foreign fin'l insts				
Int'l money market instruments				
Int'l bonds issued by banks (**)	7,549	6,768	6,074	6,077
<b>Domestic funding</b>	<b>175,264</b>	<b>210,922</b>	<b>241,201</b>	<b>265,376</b>
Total deposits	170,402	204,783	235,529	261,176
Households	71,718	87,610	92,897	101,463
Non-financial private corporations	51,225	66,681	72,854	82,712
Government and public sector corporations	45,410	48,340	67,102	73,078
Other	2,049	2,152	2,676	3,922
Domestic market funding	5,236	6,270	5,794	4,275
Borrowing from other domestic fin'l insts	4,731	4,683	4,436	3,296
Domestic bonds issued by banks (**)	506	1,587	1,357	979

(\*) Foreign lines of credit (USD).

(\*\*) Outstanding bonds and subordinated debt.

**Table 3**  
**Bank lending**  
In domestic currency<sup>1</sup>  
End of year (or latest available month for 2009)

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Total assets</b>	<b>254,900</b>	<b>292,588</b>	<b>339,743</b>	<b>370,870</b>
<b>Total loans</b>	<b>97,848</b>	<b>125,606</b>	<b>148,858</b>	<b>155,960</b>
<b>Holdings of bonds<sup>2</sup></b>	<b>69,298</b>	<b>69,241</b>	<b>59,241</b>	<b>74,475</b>
Domestic				
Government (*)	37,131	31,814	27,085	34,453
Central bank securities (**)	25,749	31,555	25,652	32,841
Other (***)	6,418	5,872	6,504	7,149

<sup>1</sup> Including foreign currency loans, where applicable.

<sup>2</sup> ie debt securities held by banks with a fixed interest rate and maturity greater than one year.

(\*) Public sector.

(\*\*) Central bank bills and notes.

(\*\*\*) Includes total amounts of private bonds, financial trust, corporate outstanding bonds and subordinated debt.

**Table 4**  
**Bank lending (currency breakdown)**

In domestic currency, end of period

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Households</b>	<b>28,770</b>	<b>44,258</b>	<b>58,422</b>	<b>59,298</b>
Domestic currency	28,177	43,123	56,870	57,989
Foreign currency <sup>1 (*)</sup>	593	1,136	1,552	1,308
<b>Non-financial corporations</b>	<b>48,205</b>	<b>64,582</b>	<b>73,360</b>	<b>77,500</b>
Domestic currency	37,292	48,967	54,359	58,654
Foreign currency <sup>1 (*)</sup>	10,913	15,615	19,001	18,846
<b>Government and public sector corporations</b>	<b>20,873</b>	<b>16,765</b>	<b>17,077</b>	<b>19,163</b>
Domestic currency	20,784	16,699	17,047	19,134
Foreign currency <sup>1 (*)</sup>	89	67	30	29
<b>Total</b>	<b>97,848</b>	<b>125,606</b>	<b>148,858</b>	<b>155,960</b>
Domestic currency	86,253	108,789	128,275	135,777
Foreign currency <sup>1 (*)</sup>	11,595	16,817	20,583	20,183

<sup>1</sup> Or linked to the exchange rate; total of all currencies, in domestic currency terms.

(\*) In the case of foreign currency items, the exchange rates considered are those of the last day of each period.



# Brazil and the 2008 panic

Mário Mesquita<sup>1</sup> and Mário Torós<sup>2</sup>

## Brazil before the crisis: the asset price boom and economic upswing

Although the subprime crisis started in the summer of 2007 (in the northern hemisphere), it only reached Brazil, and emerging markets in general, after the collapse of Lehman Brothers. Major central banks at the core of the crisis responded by aggressively easing policy from mid-2007, while also introducing measures to help revive interbank funding markets. Thus, capital flows to emerging markets, most of which had deleveraged and strengthened fiscal and monetary policy frameworks in previous years, were initially spared.

Emerging economies with rigid exchange rate regimes imported the monetary policy stance prevailing in mature economies, which was ill-suited to their own cyclical positions and, as a result, started to experience faster growth, asset price appreciation and, in several cases, rising inflationary pressures. Even emerging economies, such as Brazil, with flexible foreign exchange regimes, started to see faster asset price appreciation (partly derived from the improvement in the sovereign rating), stronger economic growth, as well as accelerating inflation.

Thus, equity prices (the Brazilian stock index – IBOVESPA) rose by 20% (in local currency) between June 2007 and June 2008 (44% in USD terms). The local capital market saw R\$ 165 billion of issuance, equivalent to around 5.6% of GDP (a new activity record), thereby helping to fund Brazilian corporates. At the same time, bank credit rose from 32% to 36% of GDP. Not surprisingly, the economy accelerated, with year-on-year GDP growth rising from 5.4% to 6.8% between Q3 2007 and Q3 2008, while domestic demand growth rose from 7.7% to 9.5%. Between June 2007 and June 2008, as economic activity strengthened, led by domestic demand, the current account balance went from a surplus equivalent to 1.1% of GDP to a deficit of 1.4% of GDP, while accumulated inflation rose from 3.7% to 6.1% and 12-month ahead inflation expectations increased from 3.5% to 5.3% – above the 4.5% central target.

The Banco Central do Brazil (BCB) thus undertook a monetary tightening, aimed at aligning the speeds of aggregate demand and supply growth, as well as reining in inflation expectations, with the ultimate goal of bringing inflation back to its target. On the regulatory front, the BCB had taken measures in 2007 to limit financial institutions' exposure to exchange rate volatility.<sup>3</sup> Those measures proved their worth in the 2008 panic, by limiting the direct exposure of Brazilian banks to the strong currency depreciation seen between August and December 2008.

The macroeconomic scenario changed suddenly and sharply in Q4 2008 in the aftermath of the failure of Lehman Brothers and the heightened stress in global financial markets. There is no doubt that Brazil was better prepared to face the crisis than in previous periods. Nevertheless, the crisis led to a substantial tightening of financial conditions in foreign and

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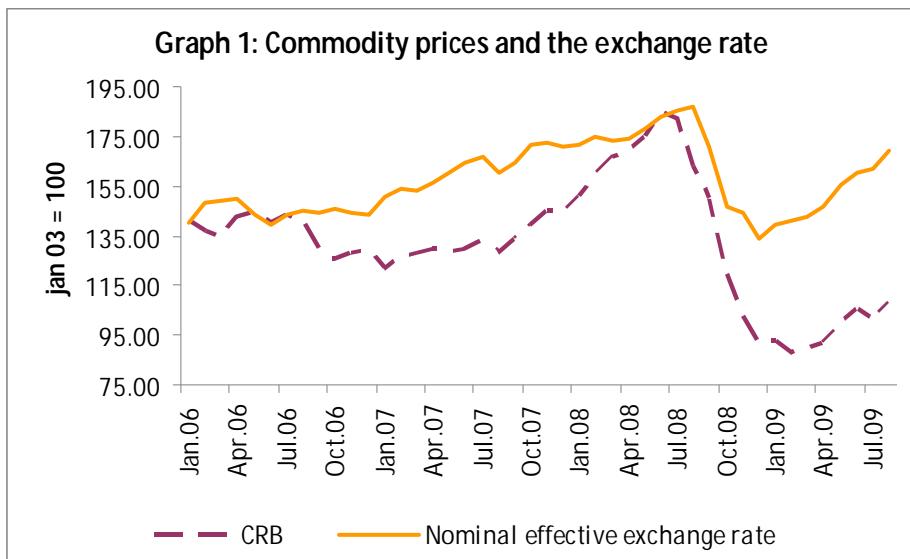
<sup>1</sup> Central Bank of Brasil, Deputy Governor for Economic Policy up to March 2010.

<sup>2</sup> Central Bank of Brasil, Deputy Governor for Monetary Policy up to December 2009.

<sup>3</sup> *Circulares* nos 3351, 3352 and 3353 of 8 June 2007.

local currency and had a negative impact on consumer and business confidence and, of course, on economic activity.

This was a global crisis, and its strongest initial effect was BRL depreciation, which resulted from the global USD liquidity squeeze as well as from the terms of trade deterioration brought about by falling commodity prices (Graph 1).



Source: Bloomberg, Banco Central do Brasil.

The exchange rate depreciation was magnified by the effects of non-financial corporate exposure to foreign exchange derivatives.<sup>4</sup> BCB research, based on supervision data and information on bank client positions in the clearing house CETIP SA (Balcão Organizado de Ativos e Derivativos), shows that such exposure was close to \$ 37 billion (delta) by the end of September 2008. This estimate was taken into account in the BCB's crisis management strategy.

The USD liquidity squeeze had many aspects. The volume of export finance contracts, dubbed ACC, fell by 30% between September and October, while the rollover ratio of external debt fell from an average of 167% in January–October to only 22% in November. Short-term foreign funding of Brazilian banks contracted sharply from August – cumulative net remittances reached R\$ 11.4 billion in the second half of 2008. Finally, externally funded domestic credit, adjusting for exchange rate changes, fell by 11% between August and October 2008.

Note also that, as in other sectors of the economy, Brazilian banks took advantage of the pre-Lehman Brothers period of high global liquidity and rising sovereign credit ratings to increase debt and equity issuance to domestic and foreign investors. Specifically, in 2007, 11 small- and medium-sized banks (with a net worth of less than R\$ 7 billion), issued R\$ 6.2 billion in equities (initial and secondary offers) with the significant participation of foreign investors. With a bolstered equity base, small- and medium-sized banks could accelerate

<sup>4</sup> Similar developments occurred in other emerging economies, such as Mexico, Poland and the Republic of Korea.

loan growth – this trend was also favoured by their presence in the fast-growth payroll-backed credit segment.

In Brazil, the funding of smaller institutions is normally based on time deposits by a limited number of institutional investors, whereas bigger banks rely on retail funding. Well-established Brazilian market practice, due to years of macroeconomic turbulence and high volatility, requires that banks effectively offer short-term liquidity to their deposits, regardless of the original nominal maturity. Therefore, the concentration of deposits seems to be far more relevant from the viewpoint of liquidity risk than (apparent) duration.

Thus, a combination of structural factors, such as a reliance on concentrated sources of funding, as well as cyclical factors, such as the USD liquidity squeeze in a context of fast credit expansion, made smaller Brazilian institutions vulnerable to a *domestic* liquidity squeeze. Added to this was a process of flight to quality, that is, towards assets with explicit or implicit federal government guarantees, and away from private debt, which affected not only the funding of smaller banks but also led to pressure on some investment funds. Finally, the increase in asset price volatility, especially equities and the exchange rate, led to a substantial rise of margin requirements at the São Paulo Mercantile and Futures Exchange (BMF) and the São Paulo Stock Exchange (BOVESPA) – from R\$ 72 billion, on average, in August, to R\$ 93.6 billion in December. These developments led to the BRL liquidity squeeze described in Table 1, in which available liquidity is defined as the sum of cash reserves, reserve requirements held at the BCB (in bonds and cash) and available government bonds.<sup>5</sup>

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**Table 1**  
**Liquidity availability utilisation**

Class	8 Sep 2008 - 12 Sep 2008		6 Oct - 10 Oct 2008		17 Nov 2008 - 21 Nov 2008	
	number of banks	Share of the payments (%)	number of banks	share of the payments (%)	number of banks	share of the payments (%)
0 - 30%	83	90.8	29	75.5	88	94.8
30-70%	20	8.8	36	19.1	15	4.2
70-100%	3	0.4	41	5.3	3	1.0

Source: Banco Central do Brasil.

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The data shows that the number of financial conglomerates displaying high liquidity utilisation jumped from three to 41 in the aftermath of the collapse of Lehman Brothers. On the other hand, the volume of payments affected was relatively modest, as deposits flew from smaller to larger institutions but not outside the system. Moreover, by mid-November, the system had already overcome the more acute liquidity squeeze – although the implications of tight banking sector liquidity on credit growth were to be felt for much longer.

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<sup>5</sup> In Table 1, the 3–70% class, for instance, refers to institutions that utilised between 30 and 70% of their intraday liquidity availability to meet commitments in the payments system.

## Crisis management: liquidity provision in USD and BRL

The various BCB initiatives to tackle the liquidity issues, in BRL and USD, were adjusted to market conditions at every stage of the crisis but followed certain basic principles. The first was to prevent crisis management from jeopardising the monetary policy regime, namely inflation targeting and a floating exchange rate. The second was to minimise BCB financial exposure to private sector decisions. The third principle was to avoid rewarding excessive risk-taking by the private sector, which would have increased moral hazard within the system. The BCB also acknowledged that there was intense uncertainty regarding the duration of the crisis – this meant preparing for a scenario of protracted global financial turmoil.

With regard to USD liquidity provision, uncertainty about the duration of the crisis led the BCB to undertake not only sales of USD spots but also repo auctions, thereby signalling that it was prepared to supply liquidity for a long time, while also mitigating the risk of a fast depletion of foreign exchange reserves. Such risk was limited, too, by accepting that the exchange rate had to respond to the change in fundamentals, even if that implied some initial overshooting. Nevertheless, the BCB acted in a timely way to alleviate the liquidity squeeze in the USD market – repo USD auctions were announced on 18 September and the first one took place a day later, on 19 September. It should also be noted that, although the BCB provided liquidity while allowing the exchange rate to adjust, it never adopted any preset limit for its USD operations.

Overall, the BCB sold US\$ 14.5 billion (7% of total reserves as of end-August 2008) on the spot market from 8 October through auctions to foreign exchange dealer banks, following the same structure as those employed in the building up of foreign exchange reserves, ie at the going market price. With the normalisation of liquidity, such auctions were discontinued from February 2009. At the same time, the BCB placed US\$ 11.8 billion through repo auctions, also operating with foreign exchange dealer banks.

The BCB innovated through the introduction of a window for foreign exchange reserve lending aimed at supporting trade finance. Lending, rather than selling, reserves was seen as an approach that was both more prudent and efficient than simply selling reserves. Since the goal was to ensure a minimal supply of liquidity to trade finance, the loan auctions were open to all banks that operated in the Brazilian foreign exchange market rather than just the *dealer* banks. Setting up this window required not only substantial operational measures within the BCB but also changes in legislation.<sup>6</sup> The first loan auction took place on 20 October, and the whole programme reached US\$ 12.6 billion, of which US\$ 9 billion was targeted at the ACC market.

Another innovation was the agreement, announced on 29 October 2009, of a currency swap arrangement with the Federal Reserve.<sup>7</sup> The arrangement was essentially seen from the beginning as a signalling device, despite the absence of a pre-commitment to use the available funds, which could reach \$ 30 billion. Its goals were, on the one hand, to level the playing field for Brazilian banks in their foreign issuance, as the Federal Reserve had already announced swap arrangements with other central banks and, on the other hand, to signal the importance of the Brazilian financial system to global market participants, in a context of heightened differentiation among emerging economies. The swap announcement seems to have been effective in boosting confidence and thereby in reining in expectations of further foreign exchange volatility, even though the BCB did not tap the facility.<sup>8</sup>

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<sup>6</sup> Medida Provisória 442 of 6 October 2008 (later Law no 11.882).

<sup>7</sup> The agreement was made legally possible in Brazil thanks to Medida Provisória 443 of 21 October 2008.

<sup>8</sup> Stone, Walker and Yasui (2009).

Besides providing liquidity to the spot market, the BCB also acted in the derivatives markets, specifically the foreign exchange swap market. In the pre-crisis boom period, the BCB had built up a long USD position in foreign exchange swaps, which reached \$ 23 billion by June 2008. The exposure of non-financial corporates to foreign exchange derivatives led to major imbalances in the futures market, which inevitably added to pressure on the spot market. Under those circumstances, the BCB started to unwind its reverse swap position (BCB long USD) and, from the beginning of October, started to sell traditional swaps (BCB short USD), thus providing a hedging device to its counterparties.

Given the considerable uncertainty about the magnitude of exposures to foreign exchange derivatives among non-financial corporates, foreign exchange market volatility rose significantly. Thus, it was important to act promptly to re-establish normal conditions and price-setting in the futures market. In that regard, the BCB announced, on 23 October 2008, that it would sell up to \$ 50 billion of foreign exchange swaps. This amount was set by taking account of both the estimated size of foreign exchange exposures, hence the size of the potential demand for hedge, and the magnitude of foreign exchange reserves. The latter aspect was important because announcing an exaggeratedly large supply of swaps (relative to total reserves) might have led to the perception that the BCB wanted to prevent the currency from adjusting, eliciting the kind of one-way bet that characterises speculative attacks. Therefore, the announced volume of up to \$ 50 billion was equivalent to around 25% of pre-crisis reserves. With the positive effects of the package of measures and the gradual normalisation of international financial conditions, actual sales of swaps only reached \$ 12 billion.

Besides providing USD liquidity, the BCB had to ensure adequate liquidity conditions in local currency. This meant not simply increasing the liquidity available to the system, but rather channelling it to where it was needed. It should be noted that there was no deposit drain at a systemic level, only an increase in concentration within large-sized institutions. In aggregate terms, bank deposits actually rose, partly as a result of migration from investment funds that were exposed to the equity market into time deposits.

After the failure of Lehman Brothers, increased risk aversion led to a concentration of deposits in large institutions. Thus, between August 2008 and January 2009, while total deposits grew by 13%, deposits in large banks rose by 20%, and those in medium- and small-sized institutions experienced declines of 11% and 23%, respectively.

Against this background, the BCB took measures to alleviate the liquidity squeeze while ensuring that monetary policy decisions were focused on its macroeconomic objective, namely to align inflation to its targets. This followed the separation principle, that is, the segmentation between monetary policy and liquidity management, a well-established operational concept in central banking.<sup>9</sup> It is important to recall that, in the acute period of the crisis, from September to October 2008, inflation expectations, and the BCB's own inflation forecasts, were clearly overshooting the targets. This resulted from the acceleration of inflation and intense utilisation of production factors seen before the crisis, as well as from the substantial currency depreciation that followed its onset. Under such circumstances, premature policy easing, which could not have contemporaneous effects on activity, would have had negative implications for inflation expectations, jeopardising the credibility of the BCB's commitment to price stability and therefore preventing the central bank from taking action that, with appropriate timing, had important anticyclical effects.

Thus, the BCB and the National Monetary Council (CMN) implemented a series of liquidity management measures, adapting the policy response to the changing conditions in the

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<sup>9</sup> See, for instance, González-Páramo (2008), Trichet (2008) and Tucker (2009).

market.<sup>10</sup> Over time, when market segmentation between small and larger institutions became stronger, measures became more targeted. Such measures involved three areas: reserve requirements; the Deposit Insurance Fund (FGC); and the discount window.

Reserve requirements reached R\$ 250 billion in the immediate pre-crisis period. Simulations based on pre-crisis rules show that the amount of reserve requirements would have reached R\$ 295 billion by end-August 2009, compared with the actual observed volume of R\$ 179 billion. Thus, the reserve requirements released amounted to around R\$ 116 billion, or 4% of GDP at 2009 prices. The bulk of the released funds referred to drawdowns of the so-called “additional requirements” (that had been introduced in the 2002 crisis) of R\$ 42 billion, and of requirements on time deposits (R\$ 62 billion).<sup>11</sup>

Moreover, reserve requirement rebates were used to spread liquidity throughout the system. This was achieved through incentives for the use of released funds in the acquisition of assets of small- and medium-sized banks. Specifically, the authorities introduced deductions of reserve requirements on deposits from leasing companies and on time deposits subject to restrictions: they were to be used to buy assets from other banks provided that (a) there were no asset purchases within the same financial conglomerate; (b) the selling bank had equity of less than R\$ 7 billion; and (c) purchases from a single institution did not exceed 20% of the reserve requirements (held in cash) of the acquiring bank.

Reserve requirement rebates were also directed at USD purchases by the banks so as to offset the effects of USD sales by the BCB on local currency liquidity – *Circulares* no 3.412 of 13 October 2008 and no 3.427 of 19 December 2008.

In addition, there was a substantial overhaul of regulation regarding the discount window. Specifically, Law no 11.882 and CMN Resolution no 3.622 established that discount window operations could have tenor of up to 359 days, as well as criteria for the acceptance and pricing of banks’ assets and enabled the BCB to impose corrective actions to institutions that relied on that window. The initiative also involved several operational measures within the BCB regarding data transfer, analysis and pricing of loan portfolios that were deemed necessary in order to set in place a timely and efficient discount window facility. However, beyond ordinary intraday loans, the discount window was not used during the crisis, as banks feared the stigma effect.

The crisis highlighted the flexibility and usefulness of the Deposit Guarantee Fund (FGC) within the system’s safety net. In addition to enhancing its ability to buy assets from banks, the FGC introduced a programme of bank certificates of deposit purchases.<sup>12</sup> Finally, in March 2009, the authorities introduced Guaranteed Time Deposits (DPGE), backed by the FGC, with tenors from six to 60 months. Those deposits were limited to R\$ 20 million per account per bank and required that the issuing banks increased their contributions to the FGC. The introduction of the DPGE succeeded in reviving issuance by smaller institutions – the amount of time deposits in small banks rose by around 24% between March and May 2009. The timing of the introduction of DPGE was important since, as shown by international experience during the crisis, the setting up of guarantee mechanisms in periods of high stress can be counterproductive because it can risk stigmatising entire classes of institutions, with negative effects on liquidity distribution.

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<sup>10</sup> The CMN is comprised of the Finance and Planning Ministers, in addition to the BCB Governor, and has jurisdiction over some regulatory matters, including reserve requirements for savings accounts.

<sup>11</sup> Measures on reserve requirements were consolidated through *Circulares* nos 3.426 and 3.427 of 19 December 2008.

<sup>12</sup> CMN Resolution no 3.656 increased the limit of asset purchases by the FGC from 20% to 50% of equity.

This comprehensive set of measures, adopted in a sequential way, succeeded in ending the liquidity squeeze, favouring a credit recovery, initially to households and later to corporates. The re-acceleration of credit also benefited from actions by state-owned banks, which gained market share during the crisis. This increase in market share was first seen on the liability side (as state-owned banks enjoy a *de facto* government guarantee) and later on the asset side – large public sector banks accounted for 34% of total credit by June 2009, compared with 28% by August 2008. It should be noted that the increased role of the state in the financial sector, in the aftermath of the 2008 panic, was not unique to Brazil.

## Conclusion

Several lessons can be drawn from the Brazilian experience during the financial crisis. With regard to monitoring and prevention, it is clear that the trading of derivatives should, as far as possible, be confined to organised exchanges rather than over-the-counter (OTC) in order to prevent problems such as those faced by Brazilian non-financial corporates from remaining hidden for too long. Intra-agency cooperation should also be strengthened, whether between central banks and securities supervisors within jurisdictions or between central banks in different jurisdictions.

In relation to liquidity management in local currency, the Brazilian experience shows that, although costly in terms of systemic efficiency over the medium-term, reserve requirements can be an extremely effective and flexible policy tool in crisis scenarios. However, the lack of demand for discount window operations highlights the importance of the stigma issue and shows that liquidity auctions, in the form of the Federal Reserve's Term Auction Facility (TAF) could also be important additional tools. The crisis also highlighted the importance of broadening the range of institutions that are eligible to borrow from the central bank – including the FGC and systemically important clearing houses.<sup>13</sup>

The crisis showed that having adequate buffers of foreign exchange reserves is very important: it enabled the BCB to restore liquidity conditions in the foreign exchange market while allowing the exchange rate to adjust to changing fundamentals. Moreover, having reserves enabled the BCB to enter a currency swap arrangement with the Federal Reserve, which helped to contain currency volatility. Having adequate reserves allowed the BCB to mitigate a “double drain” scenario, characterised by liquidity squeezes in foreign and local currency.<sup>14</sup> Additionally, self-reliance, rather than reliance on shared reserves, proved useful in a crisis situation in which timely action was essential. The crisis also showed that direct intervention in derivatives markets, if they become dysfunctional and start affecting price-setting in the spot market, may be quite effective.

Finally, we note that the crisis was not a failure of inflation targeting. Rather, it was a failure of bank and financial supervision in some mature economies, not all of them practitioners of inflation targeting. Economies such as Brazil which, under fully fledged inflation targeting, adopted prudent monetary policies and conservative prudential rules, were hit by the crisis at a late stage, emerged faster from it and saw smaller and less persistent deviations from the price stability objective. This is another important lesson from the crisis.

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<sup>13</sup> This last provision is included in a draft legislative proposal that the BCB placed in public consultation in October 2009.

<sup>14</sup> Obstfeld, Shambaugh and Taylor (2008) formalise the “double drain” concept.

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# The evolution of credit in Chile

Kevin Cowan and Manuel Marfán<sup>1</sup>

## Introduction

In the last quarter of 2008, Chile began to experience relatively mild shocks to external financial conditions and minor tensions in bank funding conditions. However, economic activity was under stress, with large negative shocks to external demand and expectations regarding future output, together with rising uncertainty regarding future growth. This shift in perceptions generated a simultaneous shock to the supply of and demand for credit by firms and households. The result was a large reduction in domestic spending, particularly in inventories, and a significant slowdown in net credit flows. The latter was not restricted to bank lending – it also affected net flows of non-bank credit to households.

A similar credit slowdown took place in Chile in the period following the Asian financial crisis in the late 1990s. However, there are a number of differences between the two episodes. While net flows of household loans to GDP fell by less in the current episode, net bank credit to firms contracted more. This contraction was partly offset by increased bond issuance, which partly offset reduced bank credit flows to non-financial companies.

The evolution of credit in Chile raises a number of questions. The first is to understand the extent to which the shift in credit supply was the optimal reaction of lenders to the deterioration of short-term forecasts and increasing uncertainty or the result of incentives associated with financial regulation that may have amplified the contraction. The second is to determine the extent to which coordination failures can be overcome by macroprudential regulation and traditional macro policy vis-à-vis direct public sector participation in the banking sector. In this respect, the Chilean case is interesting as the state bank (Banco del Estado) played an active anticyclical role in the current economic slowdown.

## Funding conditions for Chilean banks

Following the initial tensions in money markets in early October 2008, Chilean banks have enjoyed relatively favourable financing conditions in local currency (pesos) due to the combination of falling policy rates, enhanced liquidity support from the Central Bank of Chile – which extended the maturity of its repo operations and expanded eligible collateral – and a “flight” to the safety/liquidity of bank deposits by local investors, most notably money market mutual funds. Borrowing rates at all maturities have dropped due to falling policy rates and funding spreads (Figure 1).

There have been no major changes to the structure of bank liabilities over the last year. The maturity of deposits decreased transitorily in October 2008, subsequently returning to pre-crisis maturities. In recent months, the relative importance of sight deposits has increased as time deposits have contracted somewhat. Banks were able to issue senior and subordinated debt during 2009 at spreads over central bank paper similar to historic averages.

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<sup>1</sup> Central Bank of Chile.

In October 2008, Chilean banks began to face a shock to the supply of external funding, which manifested itself in higher borrowing spreads over Libor, rising from close to 10 basis points (bp) to a maximum of 150 bp (Figure 2).<sup>2</sup> Compared to other emerging economies, the supply shock was relatively mild, at least in terms of the increase in spreads on public debt (Figure 3).<sup>3</sup> In recent months, the spreads on cross-border bank lending have fallen, although they remain above pre-crisis levels, and the dispersion of spreads across banks remains above those observed prior to October 2008.<sup>4</sup>

## Credit conditions and credit flows in the Chilean economy

The main development in the Chilean banking system has been the tightening of credit conditions. Banks significantly tightened lending conditions in October 2008, gradually normalising them by mid-2009. According to the Bank Lending Conditions Survey carried out by the Central Bank of Chile, this has led to higher spreads on loans, higher collateral requirements and smaller loans. The survey also reports a similar trend in demand perceptions (Figure 4).

The survey data on spreads is corroborated by the evolution of effective spreads between bank borrowing and lending rates (Figure 5). Although spreads fell relatively quickly during the first quarter of 2009, the level reached in the fourth quarter of 2008 was high compared to previous episodes of economic slowdowns, including the period following the Asian financial crisis in 1998, during which the economy experienced a similar drop in growth rates (Figures 6 and 7).

Credit risk, measured by the index of non-performing loans (NPLs), increased after September 2008 but to a lower level compared to the months following the Asian crisis. The index for commercial loans increased less than during the Asian crisis, while the index for consumer loans reached a level similar to the one in 1999. Housing loans have shown an upward trend since the end of 2006 (Figure 8).<sup>5</sup>

As a result of the combination of tightening credit conditions and falling demand from consumers and firms, net credit flows dropped considerably. Net flows of bank consumer loans fell to -0.1% in September 2009 from an average of 1.3% of GDP in September 2007. The slowdown in bank residential mortgage financing was slightly milder, with bank mortgage lending flows decreasing from almost 2% of GDP in September 2007 to 1.3% two years later.

Non-bank household loans experienced a similar slowdown to bank loans in 2009, although the net flow of non-bank consumer credit remained above that of bank loans (Figure 9).<sup>6</sup>

Data is not available to make a comparison of all sources of household debt in the current international financial crisis with the period following the Asian financial crisis. However, it is possible to focus on the net flow of credit from banks and *financieras* – financial institutions that were relevant until the late 1990s in the Chilean credit market but were later absorbed by

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<sup>2</sup> During this period, the term of cross-border borrowing shortened from 13 to six months.

<sup>3</sup> A similar pattern can be observed using credit default swaps (CDS).

<sup>4</sup> During 2009, Chilean banks switched their counterparties for cross-border debt, moving away from banks that had been reducing their cross-border loans.

<sup>5</sup> NPLs for housing exclude the Banco del Estado (the state-owned bank), which has seen a large increase in NPLs on loans associated with low-income housing programmes.

<sup>6</sup> Non-bank credit granted by retailers and other non-bank financial intermediaries is a significant source of financing for households in Chile, making up 50% of total consumer loans and 10% of mortgage lending.

banks. The drop in the flow of consumer credit from banks and *financieras* following the Asian financial crisis was more pronounced than the drop in bank credit following the subprime crisis, despite a similar fall in GDP growth. Indeed, in late 1999, net consumer credit was falling at a rate of –1.5% of GDP (Figure 10).<sup>7</sup>

The total net flow of credit to firms contracted substantially after the fourth quarter of 2008, falling to 6% in September 2009 from close to 10% of GDP in mid-2007. The net flow of credit to firms from domestic banks experienced the largest decline, dropping to almost zero in September 2009 from close to 6% of GDP in mid-2007, a significantly larger drop than in late 1998 and early 1999. Loans from non-resident banks to Chilean firms also experienced a mild contraction in 2009 to 2% of GDP (Figure 11).

Bond financing, particularly bonds issued in domestic markets, increased during 2009, partially offsetting the reduction in bank credit. Compared to the levels of September 2007, the higher bond issuance (2.5% of GDP) compensated for more than half of the fall in total bank credit flows (4.5% of GDP). This pattern of increased domestic bond financing in a context of restrictive credit policies by banks – both domestic and foreign – also took place, although to a lesser extent, in the late 1990s.

A simple calculation illustrates the potential crowding out effects of the contraction in external credit on firms that only have access to domestic bank financing. Consider the case that large internationally active firms substitute external financing for domestic credit, either bank or bonds. In the 2008 episode, net external bank credit flows fell by close to 1.5% of GDP but were more than completely offset by increased domestic and foreign bond issuance (close to 2.5% of GDP).

In Chile, the key distinction over the last 15 months has not been between foreign and local banks but between public and private banks. Comparable local and foreign banks have behaved in similar terms over the last year, although the slowdown in loans from foreign-owned banks started sooner than for their local counterparts (Figure 12).

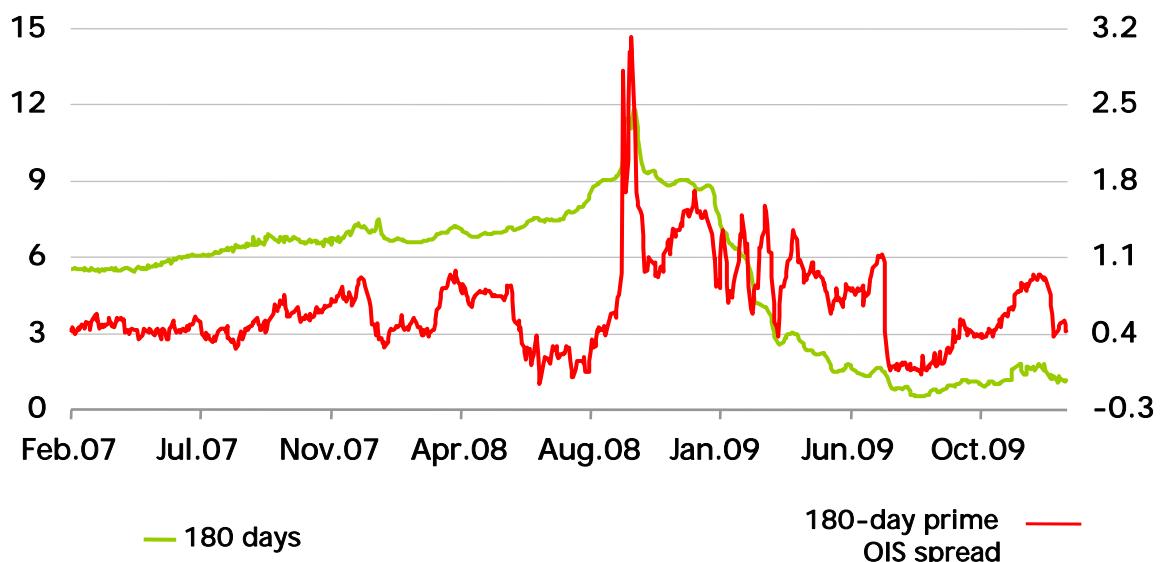
The behaviour of the state-owned bank, on the other hand, is markedly more anticyclical than that of private banks (Figure 13). This same pattern has occurred following previous slowdowns in the Chilean economy (eg in 1991 and 1999).

Within an international context, the growth of bank credit in Chile after October 2008 was higher than in the average economy in Latin America, emerging Europe and the group of OECD countries most affected by the subprime crisis but lower than in the average economy in emerging Asia and the remaining OECD countries. On the other hand, the fall in the rate of credit growth in Chile vis-à-vis the 2005–07 period was smaller than in any other region, with the exception of the OECD countries least affected by the subprime crisis (Table 1). Recent research carried out by the Central Bank of Chile shows that the smaller slowdown in Chile can be explained by the relatively lower credit expansion in the country during the period prior to September 2007 and the relatively more aggressive monetary policy response. By contrast, a higher than average drop in trading partners' GDP growth and a higher degree of financial integration reduced credit growth in Chile relative to the sample mean.

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<sup>7</sup> Note that this contraction was not only due to shrinking net loans from the financial companies (*financieras*) – which faced a complex solvency situation in the late 1990s – but also to falling net credit from banks.

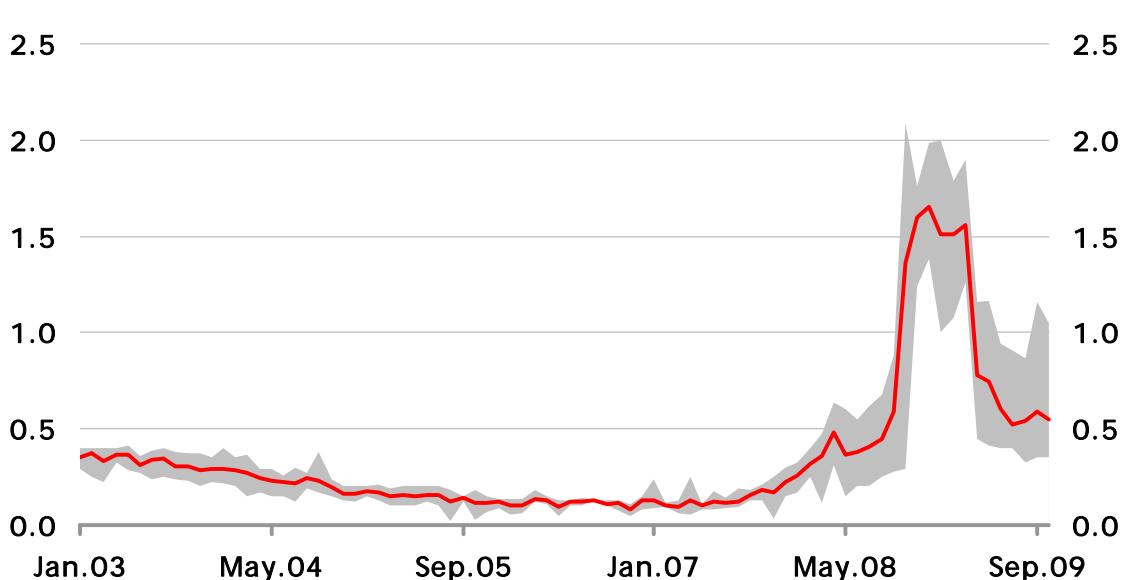
Figure 1  
**Bank borrowing rates and the borrowing-OIS spread (\*)**  
(in per cent)



(\*) Rates on time deposits traded in secondary markets and the prime-borrowing OIS spread. Five-day moving average.

Sources: Central Bank of Chile; Santiago Stock Exchange.

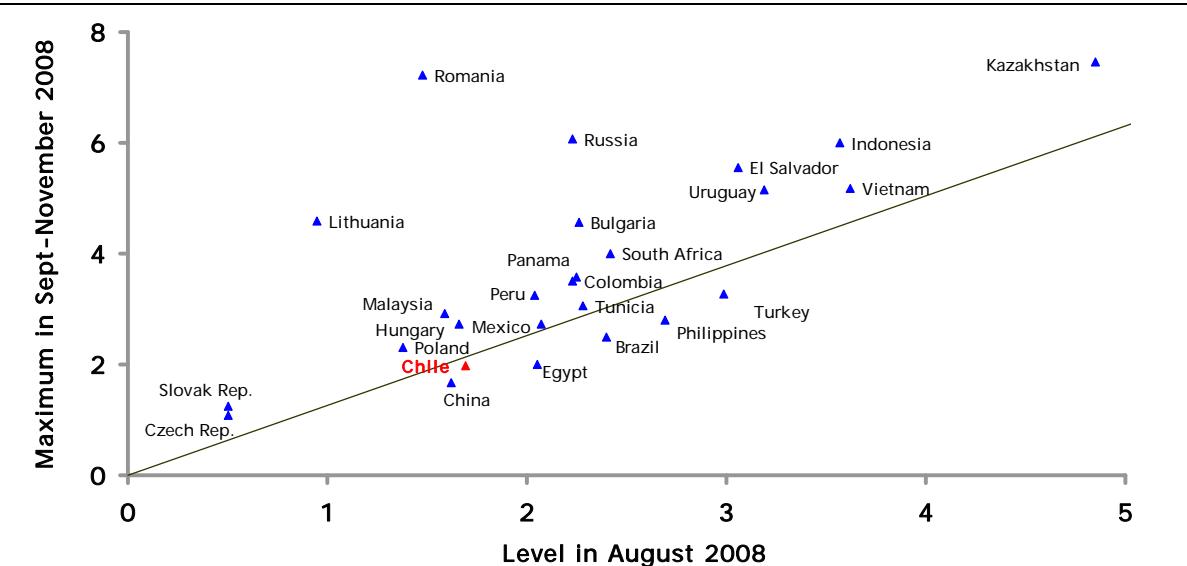
Figure 2  
**Spread on short-term external financing for resident banks**  
(monthly average, in per cent) (\*)



(\*) Floating rate loans from unrelated banks. The grey area represents the interval between the fifth and 95th percentiles of the sample each month.

Source: Central Bank of Chile.

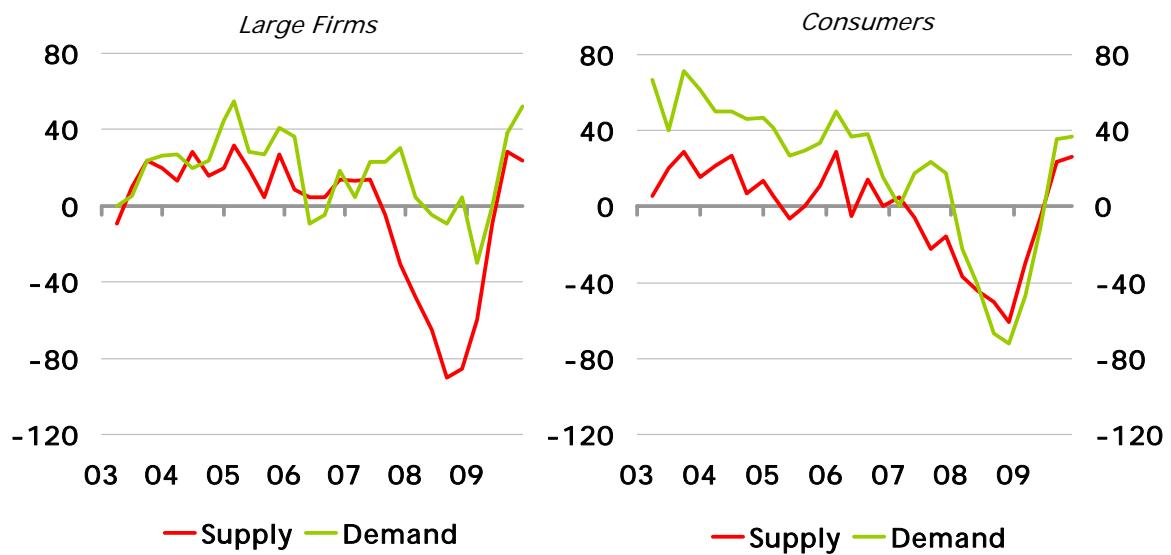
Figure 3  
**Change in sovereign spreads**  
(in per cent) (\*)



(\*) Measured through the EMBI spread. A similar pattern is observed using CDS.

Source: Bloomberg.

Figure 4  
**Bank Lending Conditions Survey**  
(net percentage of survey responses) (\*)



(\*) Negative values indicate a weaker perception of demand and less flexible supply conditions.

Source: Central Bank of Chile.

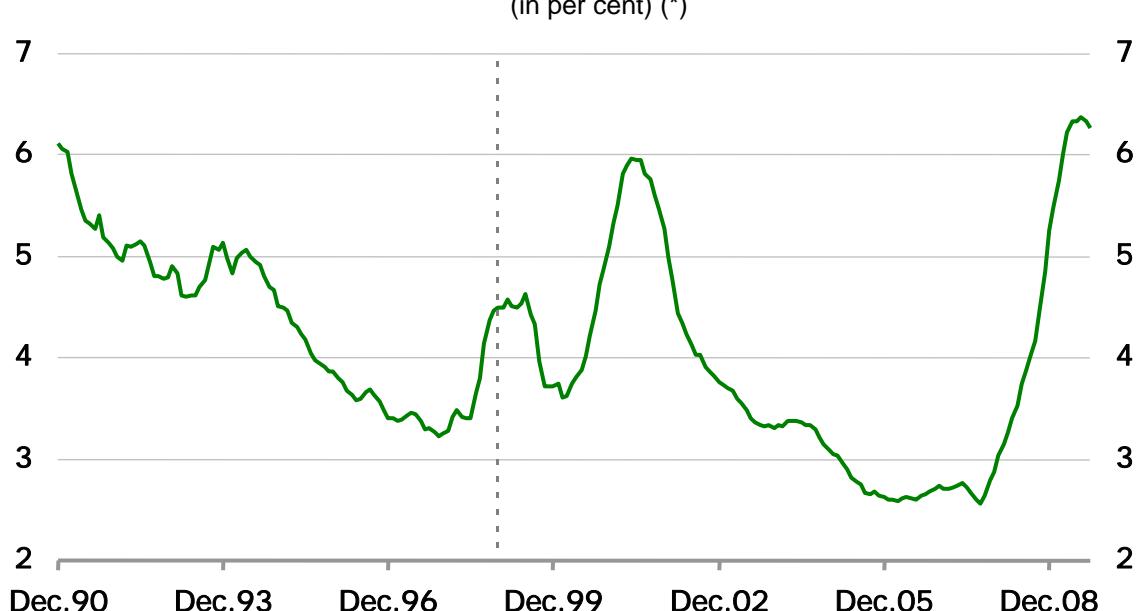
Figure 5  
**Lending-borrowing spread**  
(in per cent) (\*)



(\*) Spreads between 30–89-day commercial loan lending and borrowing rates.

Source: Central Bank of Chile.

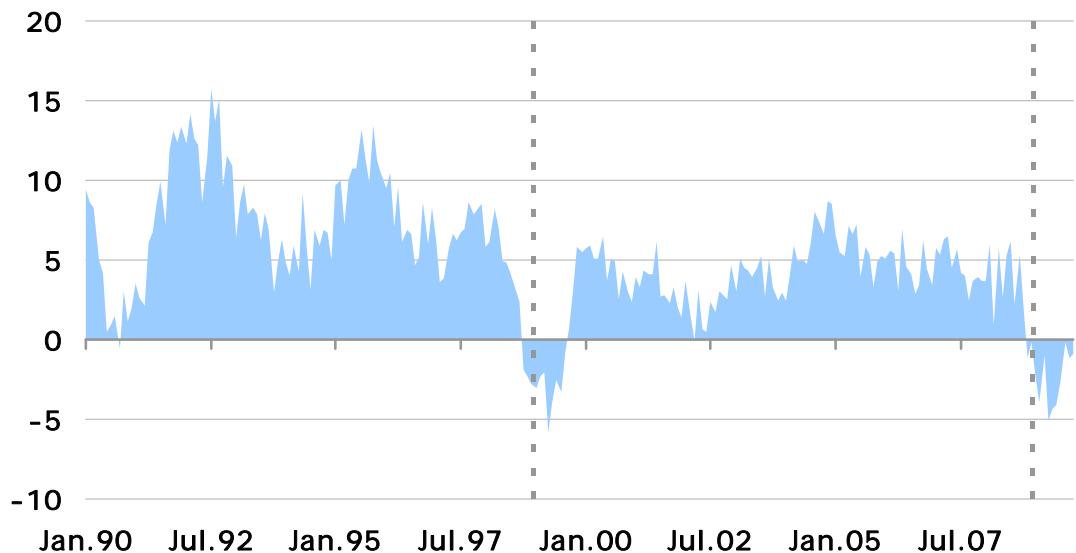
Figure 6  
**Historic lending-borrowing spread**  
(in per cent) (\*)



(\*) Spreads between 30–89-day lending rates and bank borrowing rates. Twelve-month moving average.  
Dotted lines mark December 1998 and December 2008.

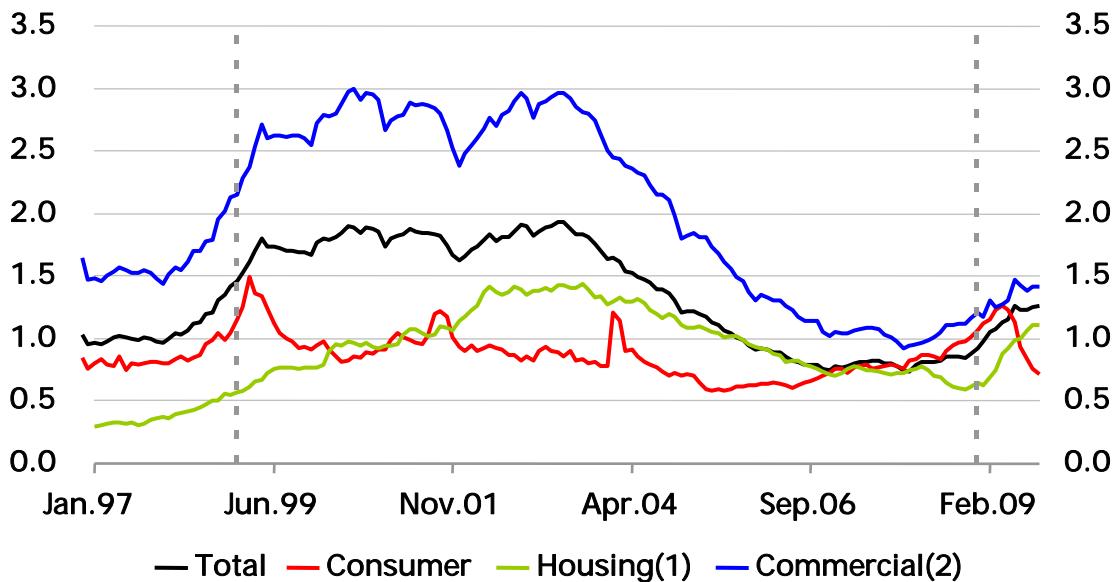
Source: Central Bank of Chile.

Figure 7  
**Monthly Index of Economic Activity (IMACEC)**  
 (real annual variation, in per cent)



Source: Central Bank of Chile.

Figure 8  
**Non-performing loans**  
 (percentage of loans)

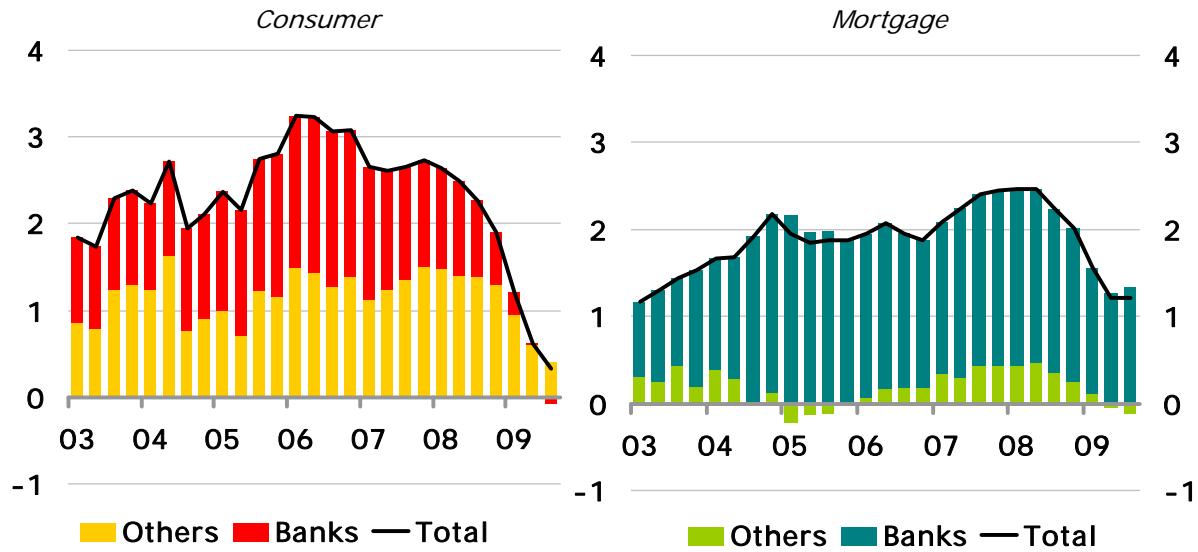


1. Excludes the Banco del Estado.

2. Excludes foreign trade operations.

Source: Central Bank of Chile based on data from the SBIF.

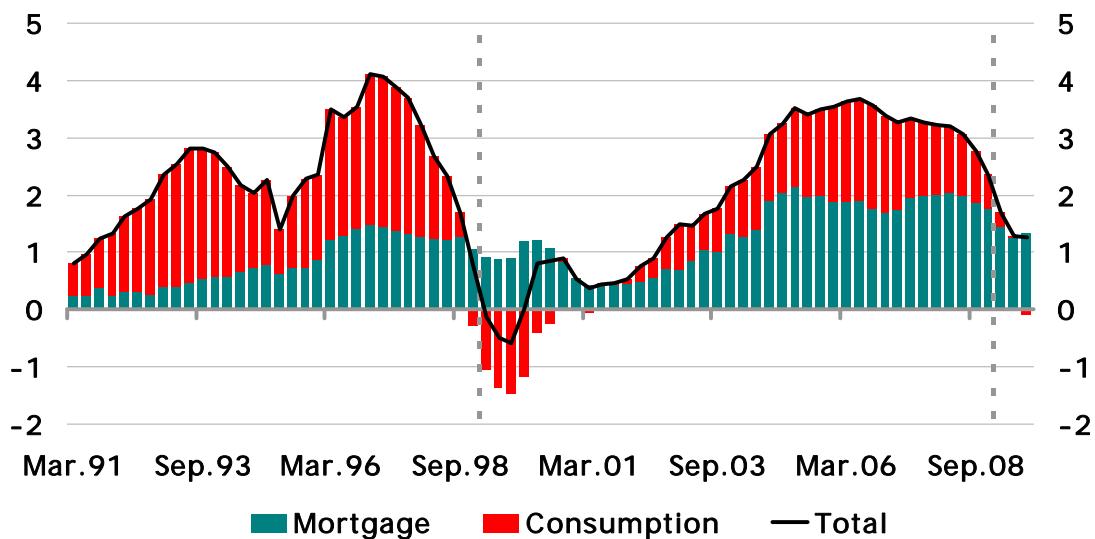
Figure 9  
**Net credit flows to households (\*)**  
(annualised, percentage of nominal GDP)



(\*) Annual change in the stock of debt, net of CPI adjustments in the case of housing loans, over annual nominal GDP.

Source: Central Bank of Chile.

Figure 10  
**Net credit flows from banks and financial companies (*financieras*) to households**  
(annualised, percentage of nominal GDP) (\*)

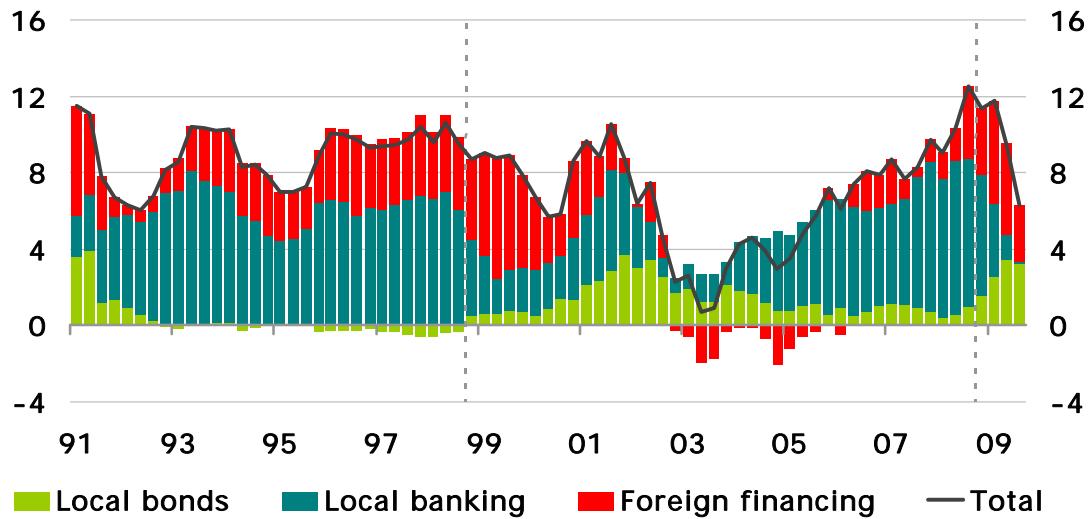


(\*) Annual change in the stock of debt, net of CPI adjustments in the case of housing loans, over annual nominal GDP.

Source: Central Bank of Chile.

Note: relates to the consumer, not consumption.

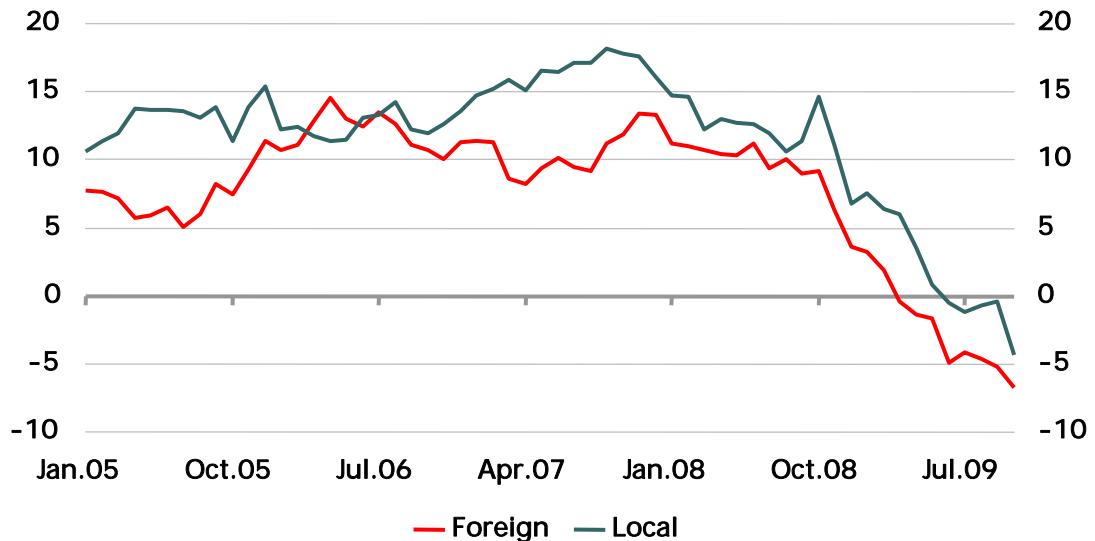
Figure 11  
**Net credit flows to firms**  
(annualised, percentage of nominal GDP) (\*)



(\*) For domestic debt, net flows are the annual change in the stock of debt, net of CPI adjustments in the case of bonds, over annual nominal GDP. For foreign debt, net flows are cumulative annual flows from balance of payment statistics, converted to local currency at market exchange rates, over annual nominal GDP.

Source: Central Bank of Chile.

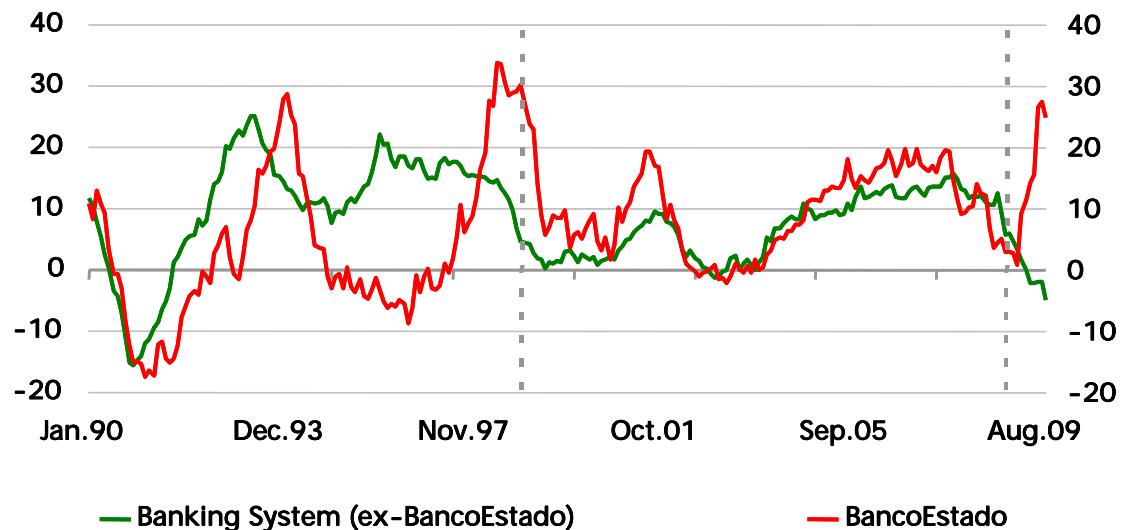
Figure 12  
**Credit from foreign and local banks (\*)**  
(real annual change in credit, in per cent)



(\*) Commercial loans. Foreign banks are those banks with more than 50% foreign ownership in November 2009. Foreign banks involved mainly in treasury operations and foreign trade are excluded from the sample.

Source: Central Bank of Chile.

Figure 13  
**Credit from private and public banks (\*)**  
 (real annual change in credit, in per cent)



(\*) Commercial loans.

Source: Central Bank of Chile.

Table 1  
**Real growth of banking credit (1)**  
 (monthly average, in per cent)

	July 2005– June 2007	July 2007– September 2008	October 2008– May 2009
OECD without capital injection (2)(3)	1.00	0.77	0.80
OECD with capital injection (2)(4)	0.89	0.69	0.18
Emerging Asia (5)	1.68	0.38	0.86
Emerging Europe (5)	2.14	1.42	0.11
Latin America (5)	1.22	0.95	0.27
Chile	0.99	0.67	0.39

(1) Seasonally adjusted series. Values for each group refer to the averages of the member countries, excluding those for which data are not available.

(2) Capital injections from the government to the banking system.

(3) Czech Republic, Finland, Japan, Poland, Portugal and Spain.

(4) Austria, Belgium, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Sweden, Switzerland, and the United Kingdom. Excludes Mexico and Turkey.

(5) Emerging and developing economies, as defined by the IMF, in that region.

Source: Central Bank of Chile based on IMF data.

# Central bank instruments to deal with the crisis – from the perspective of the People's Bank of China

People's Bank of China

## I. Monetary policy instruments to support interbank lending in local currency

With the adoption of an appropriately accommodative monetary policy, the People's Bank of China (PBC) has closely monitored and actively responded to the changing internal and external economic and financial situations and has employed a mix of monetary policy instruments including interest rates, reserve requirement ratios, open market operations (OMOs), central bank lending and rediscount operations to stabilise the financial market, boost domestic demand and promote economic growth.

**First, the leveraging role of the interest rate was brought into full play.** Since September 2008, the PBC has reduced the benchmark deposit and lending rates of financial institutions on five occasions, with the one-year benchmark deposit rate and lending rate being shaved accumulatively by 189 and 216 basis points, respectively. Cutting the benchmark interest rate effectively stimulated credit demand and resulted in a rapid rebound of money and credit, contributing to a more buoyant domestic demand and stronger market confidence. At end-November 2009, the year-on-year growth of M2 and M1 had reached 29.7% and 34.6%, respectively, suggesting steadily enhanced liquidity. New renminbi (RMB) loans totalled 9.21 trillion yuan and credit growth registered 33.8%, which greatly satisfied the corporate and individual needs for funds. Growth of RMB deposits reached 28.3%, indicating adequate funds and strong payment capability in the corporate sector.

**Second, the reserve requirement ratio was used appropriately.** In 2008, the PBC cut the RMB reserve requirement ratio of financial institutions four times in a row from 25 September to 25 December. Specifically, the reserve requirement ratio of large financial institutions was cut by 2 percentage points accumulatively, whereas that of small financial institutions was cut by 4 percentage points accumulatively. By the end of 2008, according to trend calculations, a total of 800 billion yuan of liquidity had been released. The liquidity in the banking system remained ample.

**Third, open market operations were carried out flexibly with a steadily optimised toolkit to stabilise market expectations.** In light of the liquidity demands during different periods, the PBC effectively handled the pace and intensity of OMOs and appropriately enhanced the flexibility of interest rates on the OMO market so as to guide market expectations and ensure abundant liquidity in the interbank market. Since July 2008, the PBC has gradually decreased the amount and frequency of central bank bill issuance and has used both central bank bills and short-term repos to further enhance the resilience of the banking system to short-term liquidity shocks. In coordination with movements of the benchmark deposit and lending interest rates and the reserve requirement ratio, the interest rates on the OMO market fell steadily, significantly driving down interest rates on money and bond markets and contributing to the sound and smooth conduct of interbank lending. From late June 2009, with the improving economic situation, OMO rates were moderately increased and the role of the market interest rate in adjusting the demand and supply of funds was further strengthened.

**Fourth, the innovation of monetary policy instruments was strengthened with the introduction of the Term Auction Facility (TAF).** At end-October 2008, the PBC launched the TAF, ie the issuance of short-term pledged loans with a maturity of no more than three

months, to qualified domestic financial institutions (including foreign-funded banks incorporated in China) through bids. Qualified domestic financial institutions could submit an application to the PBC for TAF financing and provide eligible collateral such as government securities, central bank bills, financial bonds issued by policy banks, foreign exchange in cash, credit assets and equities, etc. The introduction of TAF not only alleviated the liquidity problems of some foreign-funded banks in a timely fashion but also stabilised financial market confidence.

**Fifth, the PBC provided rediscount operations and central bank lending to financial institutions facing liquidity difficulties.** Central bank lending and rediscount operations were conducted according to relevant procedures and regulations. Commercial drafts accepted by the central bank for rediscount operations are limited to bank acceptance drafts. The central bank must grant loans to financial institutions against eligible collateral, which was expanded to include equities held by financial institutions and eligible collateral provided by their parent banks.

## **II. Measures to support foreign currency refinancing of banks and corporations**

Banks and corporations in many economies have faced an insufficient supply of foreign exchange refinancing since the outbreak of the global financial crisis. However, this has not been the case for China for the following reasons. First, the stable RMB exchange rate, proactive fiscal policy and appropriately accommodative monetary policy, together with the RMB 4 trillion yuan stimulus package, have contributed to stable market confidence and a well-functioning foreign exchange debt market. Second, China's foreign exchange debt is at a moderate level and of a reasonable structure. Both the external debt/foreign exchange reserve ratio and the short-term external debt/foreign exchange reserve ratio have been kept below international safety standards, with the share of external debt of financial institutions not exceeding one fifth of their foreign exchange assets and short-term foreign currency loans of corporations less than one 24th of annual exports. Third, in contrast to the liquidity stress in the international US dollar market, local foreign exchange liquidity was abundant with low financing costs because financial institutions retained their foreign exchange domestically to hedge risks in the international market when the crisis gradually intensified. Therefore, with both the interbank foreign exchange market and the foreign exchange debt market functioning effectively, the central bank, besides paying close attention to market movement, has not taken additional measures.

At the same time, as a responsible stakeholder in international society, China has done its best to actively participate in the international crisis bailout by providing funding resources and commitments. The PBC has signed six bilateral swap agreements in local currencies totalling 650 billion yuan with central banks in Korea, Malaysia, Belarus, Indonesia and Argentina as well as the Hong Kong Monetary Authority. As an important measure to bolster liquidity, these agreements have helped to strengthen economic and financial stability, lift market confidence and boost trade, investment and economic growth in the region.

# Effects of reserve requirements in an inflation targeting regime: the case of Colombia

Hernando Vargas Herrera, Yanneth R Betancourt,  
Carlos Varela and Norberto Rodríguez<sup>1</sup>

## 1. Introduction

The Colombian economy and financial system have coped reasonably well with the effects of the global financial crisis. Hence, “unconventional” policy measures have not been at the centre of the Colombian central bank’s policy decisions and discussions.

Even though bank loans decelerated markedly in 2009, they are still growing in real terms and credit markets have not experienced the severe crunch that is hindering economic growth in other parts of the world. Deposit, loan, bond and interbank markets have not undergone any important disruption. This has been a consequence of the restrictions and prudential regulation that existed before 2006 or which were introduced thereafter (Uribe (2008a,b, 2009)). As a result, there has been little room for “unconventional” financial/monetary policy measures aimed at preserving liquidity in key markets or at reactivating the credit channel for firms and households. For example, the collateral requirements and maturity of central bank credit facilities have remained basically unchanged since the onset of the crisis.

At the same time, annual consumer price index (CPI) inflation decreased significantly from 7.67% in December 2008 to 2% a year later. Unlike other countries, however, this reversion has not turned into deflation, and the economic slowdown has been relatively moderate. Thus, nominal short-term interest rates have not hit the zero bound and have remained the main monetary policy tool. “Quantitative easing” measures have not been central in the policy response.

Changes in reserve requirements (RRs) on financial system deposits have been the one “unconventional” monetary instrument used by the central bank in Colombia. Interestingly, they were adopted *before* the global financial crisis, as a reaction to domestic credit conditions. Between the second half of 2006 and the first half of 2007, the Colombian financial system produced a rapid expansion of loan supply, partially offsetting the monetary policy tightening pursued by the central bank to curb excessive expenditure growth and inflation. Marginal reserve requirements were then introduced in May 2007 to try to reinforce the transmission of policy interest rate increases and limit credit growth. Towards the third quarter of 2008, the economy started to show signs of a slowdown and, as uncertainty about the effects of the crisis increased the liquidity risk perception of financial intermediaries, some local lending interest rates rose in the fourth quarter of 2008. The central bank responded by reducing RRs to increase the liquidity in the hands of banks.

What is the role of RRs as a monetary policy tool in an inflation targeting (IT) regime, where the central bank stabilises the short-term interest rate? What were the effects of the changes

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in RRs on the transmission of policy rate movements? Were the changes in RRs effective in achieving the objectives that motivated them? This paper attempts to answer such questions. The next section provides the rationale for the use of RRs as a monetary policy instrument in an IT regime, both theoretically and in the context of the Colombian economy over the past three years. The effects of RR changes are empirically examined in the third section. The final section concludes.

## **2. The rationale for reserve requirements as a monetary policy tool in an inflation targeting regime**

### **a. Events in Colombian credit markets**

Following a prolonged decline in sovereign risk premia and inflation, local government bond long interest rates fell significantly between 2003 and 2005 (Graph 1). Colombian financial intermediaries had steadily increased their share of local public bonds in total assets since 2003 (Graph 2) and had benefited substantially from the rising trend in public bond prices. By the first quarter of 2006, bond holdings represented around a third of banks' assets, implying a large exposure to unhedged market risk (Vargas et al (2006)). These institutions sustained large losses in the second quarter of 2006, when a spike in global risk aversion caused a drop in the price of domestic public bonds.

In response, financial intermediaries reduced their exposure to market risk and abruptly shifted their asset portfolios away from government bonds and into loans to firms and households (Graph 2). In doing so, they delayed or offset the tightening of monetary policy that the central bank had started in April 2006 to slow aggregate expenditure and prevent emerging inflationary pressures (Graph 3). While policy interest rates increased throughout 2006 and in the first quarter of 2007, consumer, commercial and mortgage lending rates dropped or remained stable (Graphs 4 and 5). Only short-term commercial bank treasury rates and prime lending rates increased along with the policy interest rate (Graph 6).

At the same time, average financial system credit real growth rates jumped from 15.2% in the first half of 2006 to 25.3% in the second semester of 2006 and 26.3% in the first half of 2007 (Graph 7). The behaviour of prices and quantities in the loan markets suggested the effect of a supply shock generated by the shift in the bank asset portfolio. The near one-year delay in the transmission of policy rate hikes (Graphs 4 and 5) and the abrupt jump of loan growth raised concerns in the central bank about both price and financial stability. There was also apprehension about the quality of the new loans, especially in the consumer credit segment (Graph 8).<sup>2</sup>

Hence, it was deemed crucial to intervene in the credit markets to prevent excessive leverage of the private sector and control the credit risk of the financial system. Loan provisioning requirements were increased by the Financial Superintendency,<sup>3</sup> while the

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<sup>2</sup> Consumer credit growth rates went from 29.4% on average in the second half of 2005 to 37.5% in the first half of 2006, 42.2% in the second half of 2006 and 39.5% in the first half of 2007.

<sup>3</sup> A system to manage commercial loan credit risk (SARC) was introduced by the Financial Superintendency in July 2007. This system determines the loan provisioning requirements for commercial loans depending on each loan's risk qualification. Since higher provisions were foreseen before implementation, the Superintendency required a gradual upward adjustment in provisions prior to the formal introduction of SARC. Something similar occurred with the adoption of an analogous system for consumer credit. The system was formally introduced in July 2008, but provisioning requirements were raised from June 2007.

central bank introduced marginal RRs on domestic deposits in May 2007 (Table 1). RRs on foreign indebtedness were reactivated as a complementary measure.

In June 2007, RRs and their remuneration were again modified to combine savings accounts and sight deposits in one group.<sup>4</sup> The rationale was that the distinction between these types of deposits in terms of liquidity had been blurred, so their RRs should be levelled as well. A year later, the central bank changed the RRs again in order to sterilise part of the monetary expansion caused by a programme of international reserve purchases. This time, the marginal RRs were eliminated, but the average levels were increased (Table 1).

In the last quarter of 2008, following the failure of Lehman Brothers, commercial bank treasury interest rates and prime lending rates rose (Graph 9). Interestingly, in the same period, longer maturity loan rates (consumer and commercial) did not increase (Graph 10), suggesting that, at that time, financial intermediaries were mostly concerned about liquidity and not credit risk. A bank liquidity gap indicator shows a slight deterioration in the same period (Graph 11).<sup>5</sup> The central bank then acted pre-emptively, allowing the currency to depreciate with minimal intervention in the foreign exchange (FX) market and reducing RRs to ensure the availability of local currency liquidity (Table 1). Finally, remuneration of RRs was reduced in January 2009 and eliminated altogether in July 2009.

In sum, RRs have been used in Colombia since May 2007 to enhance the transmission of policy interest rates and curb credit growth, to sterilise FX purchases by the central bank and to guarantee the provision of liquidity in periods of potential turmoil. Among these objectives, the first deserves special attention, as RRs had been used in the past in Colombia as a monetary policy tool under financially repressed monetary targeting regimes. Their use in an IT regime, where the central bank stabilises the interest rate in the short term, had no precedent in the country.

### **b. Reserve requirements in an inflation targeting regime**

In a monetary targeting regime, an increase in RRs causes a rise in base money demand and, given the money supply, pushes up short-term interest rates. In a regime that stabilises short-term interest rates, such as the conventional IT strategy, the central bank will provide the additional money demand implied by larger RRs, so that short-term interest rates do not change. Thus, the effects of RRs in such a regime are not as straightforward as those under a monetary targeting regime.

In an IT regime, RRs may directly affect market interest rates and the pass-through from the policy interest rate to those interest rates. In both cases, the results would depend on the degree of substitution between central bank credit and deposits, as explained below.

#### **(i) Direct effects of reserve requirements on market interest rates**

One effect stems from the fact that RRs constitute a tax on financial intermediation. Therefore, higher RRs are reflected in larger interest rate spreads. However, as long as central bank credit is a close substitute of deposits as a source of funds for banks, higher RRs will produce a fall in deposit interest rates, leaving lending rates unchanged. Intuitively, a step up in RRs makes deposits more expensive, reduces bank demand for deposits and increases bank demand for central bank credit. If the interest rate on the latter (the policy

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<sup>4</sup> The existing regime remunerated RR on savings accounts and CDs.

<sup>5</sup> Liquidity gap indicator = (liquid liabilities - liquid assets)/illiquid assets. Liquid assets include domestic government bonds whose prices fell during the Lehman Brothers crisis. This may help to explain the observed increase in the indicator.

rate) is constant, the marginal cost of funds for banks does not change and neither does the lending interest rate. In contrast, the fall in bank demand for deposits reduces their interest rate.

A key assumption in the foregoing analysis is the high degree of substitution between deposits and central bank credit as funding sources for banks. If that is not the case, a rise in RRs will not be fully accommodated with a larger use of central bank credit. Thus, both bank loan supply and demand for deposits will be affected, as will lending and deposit rates.

Betancourt and Vargas (2009) show that, in the presence of interest rate risk and risk-averse banks, central bank credit and deposits are not perfect substitutes. In this case, an increase in RRs in an interest rate smoothing monetary regime raises lending rates and has an ambiguous effect on deposit rates. Intuitively, higher RRs make deposits more expensive and tend to reduce bank demand for deposits and increase bank demand for central bank credit. Nevertheless, a larger reliance on term central bank credit adds to interest rate risk when the latter has shorter maturities than loans. The increased risk reduces the perceived benefits of loans for risk-averse banks, restricts loan supply and drives lending interest rates up.

The net effect on bank demand for deposits is uncertain. On the one hand, higher RRs make them more expensive for banks and reduce demand. On the other, if deposits have longer maturities than central bank credit, a larger reliance on the latter generates higher interest rate risk, makes deposits more convenient and increases deposit demand by banks.<sup>6</sup> As a result, the effect on deposit interest rates is also ambiguous.

The impact of RRs on the volume of loans and deposits follows the effects they have on the respective interest rates. If credit demand is inversely related to the lending rate, higher RRs imply higher loan interest rates and a smaller volume of credit. Given a deposit supply schedule, higher RRs have an ambiguous effect on the volume of deposits.

#### **(ii) Effects of reserve requirements on interest rate pass-through**

RRs may not only affect market interest rates directly, but also influence the pass-through from policy rates to market rates, ie the transmission of monetary policy is determined to some extent by the RRs. A policy interest rate hike makes central bank credit more expensive and induces banks to rely more on deposits, pushing up deposit interest rates. The marginal cost of funds for banks increases, bank loan supply is cut and lending interest rates go up. In this context, higher RRs do not affect transmission to loan rates, but they do influence deposit rates. Increased RRs imply costlier additional deposits and, therefore, a smaller expansion of deposit demand by banks. Thus, the transmission of the policy interest rate hike to deposit rates decreases with the level of RRs.

The effect of RRs on monetary policy transmission is further complicated when RRs affect the risks facing banks. For example, in the case studied by Betancourt and Vargas (2009), RRs induce demand for central bank credit by banks to fund their assets, exposing them to interest rate risk. In this situation, a policy rate hike amplifies interest rate risk by raising the need for short-term central bank credit in the future, as the initial borrowing plus the accrued interest must be rolled over. The rise in interest rate risk is larger when central bank credit is larger too, which is likely when RRs are higher.

Moreover, higher RRs reduce the amount by which additional deposits alleviate interest rate risk. In this case, one additional dollar in deposits yields less funds to be used to substitute for central bank credit. These effects entail a larger cut in bank loan supply in the face of a

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<sup>6</sup> In a world with several types of deposits, it also leads to a greater reliance on long-term deposits.

policy interest rate increase. Therefore, RRs strengthen the pass-through from policy rates to lending interest rates.

The impact of RRs on the pass-through to deposit interest rates is ambiguous in this case. On the one hand, additional deposits are less profitable in the presence of higher RRs, so deposit demand by banks expands less after a policy interest rate rise, as mentioned above. On the other hand, higher RRs exacerbate the interest rate risk related to central bank credit and induce banks to demand more deposits instead.

Finally, it should be noted that these outcomes depend on the extent to which the central bank is a net creditor of the financial system. When the supply of the monetary base is large relative to bank reserves, central bank credit to financial institutions may be low or negative, even if RRs are high (in percentage). In the case of Colombia in recent years, for example, international reserve accumulation has provided financial intermediaries with large amounts of new deposits, reducing the net creditor position of the central bank. According to the foregoing hypotheses, this would weaken interest rate pass-through, since the interest rate risk facing banks is lower. Appendix 1 formally shows these results in the context of the model by Betancourt and Vargas (2009).

### **3. Effects of reserve requirements in Colombia**

#### **a. Reserve requirement measures**

To gauge the effects of RRs in Colombia, their aggregate measures must be generated (in addition to the deposit-specific ratios). These measures must be related to the purpose for which the RRs were set. The same concept of aggregate RRs may not necessarily be useful to pin down the effects on both the liquidity of the financial system and the impact on credit expansion or market interest rates. In Colombia, this is further complicated because of the many changes in the structure of RRs between 2006 and 2009, including the establishment of marginal RRs and shifts in RR remuneration (Table 1).

A simple measure of RRs is the ratio of observed required reserves to deposits subject to RRs (ORR). This indicator includes both average and marginal RRs (when effective) and is affected by the changes in deposit composition occurring throughout the period. While ORR is useful to capture the liquidity changes introduced by RR policy, it may not be the best measure of the effect of RR changes on the marginal cost of bank funds and market interest rates. It may put too much weight on average rather than marginal RRs and does not consider movements in RR remuneration.

The last drawback is especially relevant in 2007 and 2009, when RR remuneration was changed (Table 1). In addition, the existence of RR remuneration affects the actual burden of RRs on the marginal cost of bank funds, so the ORR ratio alone may overestimate the impact of RR policy on market interest rates. To correct for this possible bias, two remuneration-adjusted RR (RARR) concepts were calculated, as explained in Appendix 2. One allows for changes in deposit composition through time, while the other assumes a fixed composition equal to the May 2002–November 2009 average. This distinction may be important, for RR shifts induced important recompositions of deposits in some periods (Saade and Pérez (2009)).

Graph 12 shows that the dynamics of the three measures are similar until 2009, when RR remuneration was reduced and ultimately eliminated (Table 1). In that year, the RARR gauges increased, indicating that the burden of RRs on market financial intermediation rose, despite the fact that RR ratios remained stable. Throughout the period 2002–08, RR remuneration implied a reduction of roughly 1 percentage point in RR ratios in terms of their effect on the marginal cost of deposits (Graph 12).

## b. Reserve requirements, interest rates and liquidity

Based on a simple inspection of the data, it is difficult to judge the effectiveness of RR policy in influencing market interest rates. Graph 13 indicates that short-term CD interest rates (90–360 days) tracked policy interest rates more closely after 2006. Savings account interest rates are generally more sluggish than policy rates. Longer-term CD interest rates (greater than 360 days) are more volatile than other deposit interest rates, a feature that may be attributed to the relatively small issuance of this type of deposit.

The spread between short-term CD interest rates and the policy rate started to increase around the time that marginal RRs were adopted and has been growing slowly ever since (Graphs 14 and 15). The spreads for the other deposit interest rates do not exhibit a clear relationship with RRs. In the particular case of savings account interest rates, their spread with respect to the policy rate fell after marginal RRs were introduced, but rose in 2009 when RARR measures increased (Graph 16).

With regard to loan interest rates, the impact of RRs is not apparent either. The spreads between lending and policy interest rates tended to increase or stopped falling by the end of 2006 and the beginning of 2007, before marginal RRs were imposed (Graph 17). The consumer loan interest rate spread shifted abruptly in February 2007 due to a redefinition of the usury limits, which seem to be binding for a significant fraction of those loans.

Interestingly, the spreads between commercial bank treasury and prime lending rates with respect to the policy rate started to fall at the beginning of 2009, after RRs had been reduced to increase liquidity. The central bank was successful in this regard, since the cumulative effect of international reserve purchases and the reduction of RRs expanded liquidity in money markets, as reflected by the growing deviation of the interbank overnight interest rate from the policy rate (Graph 18).

In general, capturing the effects of RRs on market interest rates and interest rate pass-through requires controlling for other variables affecting deposit and credit markets, such as economic growth, expectations of future policy rates, credit and sovereign risk shifts, etc. An empirical exercise along these lines is presented in the next section.

## c. Econometric evidence

### (i) **Market interest rate models and the effects of reserve requirements**

To assess the effect of RRs on market interest rates and interest rate pass-through, a simple model is posited in the spirit of the expectations theory of interest rates:

$$i_{mt} = \beta_o i_{bt} + \beta_1 s_t + f(X_t) + \varepsilon_t \quad (1)$$

$i_{mt}$  is a deposit or loan interest rate,  $i_{bt}$  is the overnight policy interest rate,  $s_t$  is the slope of the zero coupon curve for government bonds corresponding to the average maturity of the deposit or loan, and  $f(X_t)$  is a function of variables affecting the specific loan or deposit market, such as industrial production, credit risk, RRs, etc. The slope of the zero coupon curve is intended to proxy the expectations on future central bank interest rates and is defined as:

$$s_t \equiv i_{rf_t} - i_{bt}$$

$i_{rf_t}$  is the risk-free interest rate for the maturity of the corresponding market interest rate (approximated by the government zero coupon interest rate).

Equation (1) represents a long-term relationship between market interest rates and their determinants. This is complemented with an error correction equation describing the short-term dynamics:

$$\Delta i_{m_t} = \alpha \varepsilon_{t-1} + (\Phi(L) + \gamma e_t) \Delta i_{b_{t-1}} + \Gamma(L) \Delta i_{m_{t-1}} + \Lambda(L) \Delta s_{t-1} + \Omega(L) \Delta X_{t-1} + u_t$$

$\varepsilon_t$  represents the error correction term. The influence of RRs on interest rate pass-through is captured by the term  $\gamma e_t$ , which shows the additional short-term effect of policy interest rates on market rates due to RRs.

The estimations were made for different loan and deposit interest rates using Colombian monthly data for the period May 2002–October 2009. The Johansen VEC Cointegration methodology was used. According to the information criteria (Schwarz and Akaike) only one lag turned out to be significant in the VEC models for all cases. After verifying normality<sup>7</sup> – the existence of at least one cointegrating vector with the expected signs and weak endogeneity of market interest rates – we found the following results (Tables 2 and 3):

*Long-term relationships:*

- A positive relationship between the policy interest rate and market rates, except for the mortgage rate. With the exception of the savings account and consumer loan rates, in all cases the long-term coefficient of the policy rate is close to unity. For savings account rates, the coefficient is significantly less than 1 and for consumer loan rates is greater than 1.
- Mortgage loan rates are positively related to long-term government bond rates, with a coefficient close to 1.
- The slope of the zero coupon curve enters positively in the long-term relationship for consumer, prime and average lending rates. It also appears in the equations for CD interest rates.
- The RARRh ratio is directly related to commercial, prime and commercial bank treasury interest rates, in line with the hypotheses presented above.
- Marginal CD RARR ratios have a significant positive impact in the longer-term and average CD interest rates. Interestingly, longer-term CDs, which have a zero RR, are positively affected by other CD marginal RRs. This is possibly caused by a shift in the composition of deposits induced by changes in the RR structure.
- (Seasonally adjusted) industrial production was found to be directly related to commercial, prime and commercial bank treasury interest rates.

*Short-term dynamics:*

- The combined effect of the RARRh ratio and the change in the policy rates is significantly positive in the short-term dynamics for all market interest rates, except mortgage rates.<sup>8</sup> In other words, the interest rate pass-through appears to be generally strengthened by the RRs.<sup>9</sup>

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<sup>7</sup> In some cases, it was necessary to include dummy variables for particular dates in order to obtain normality.

<sup>8</sup> However, mortgage rates are positively affected by changes in policy interest rates in the short-term dynamics.

<sup>9</sup> These results did not change when the RARRc measure was used.

The previous result stems from the significance of the coefficient of ( $RARRh^* \Delta i_b$ ) in the error correction equations for the market interest rates. This is suggestive, but ignores the overall dynamics of the VEC system involving the joint interaction of the cointegrated variables and their short-term responses. This effect is gauged through the examination of the impulse response functions (Charts 1 and 2). After a policy rate shock, the responses of market interest rates are larger when the  $RARRh$  ratio is higher. However, without confidence intervals, the statistical significance of the difference between the responses under distinct RR levels cannot be determined.<sup>10</sup>

### **(ii) Other features of interest rate dynamics**

The long-term models posited above may be used to characterise other features of interest rate dynamics. Specifically, it is interesting to verify whether interest rate pass-through is asymmetric and whether the net creditor position of the central bank with the financial system affects the short-term response of market interest rates to policy rate shocks.

To check for asymmetric responses of market interest rates to policy rate changes, the short-term dynamics model used above was modified as follows:

$$\Delta i_{m_t} = \alpha \varepsilon_{t-1} + (\Phi(L) + \eta dir_t) \Delta i_{b_{t-1}} + \Gamma(L) \Delta i_{m_{t-1}} + \Lambda(L) \Delta s_{t-1} + \Omega(L) \Delta X_{t-1} + u_t$$

$dir_t$  is a dummy variable that takes the value of 1 when the lagged change in policy rates is positive and zero otherwise.<sup>11</sup> In general, downward movements in the policy rate appear to generate a stronger response of market rates than upward movements (Tables 4 and 5). In fact, for some market rates (consumer, commercial, average lending rates and long CD rates) the short-term response is *negative* after an increase in the central bank rate.<sup>12</sup>

Again, these results are derived from the sign and the significance of the coefficient of ( $dir^* \Delta i_b$ ), which are suggestive, but ignore the joint interaction of the VEC system. Charts 3 and 4 confirm that the asymmetric response result holds when the complete system dynamics are considered.<sup>13</sup>

Turning to the effect of the net creditor position (NCP) of the central bank on interest rate transmission, the short-term dynamics equations were transformed as follows:

$$\Delta i_{m_t} = \alpha \varepsilon_{t-1} + (\Phi(L) + \vartheta ncp_t) \Delta i_{b_{t-1}} + \Gamma(L) \Delta i_{m_{t-1}} + \Lambda(L) \Delta s_{t-1} + \Omega(L) \Delta X_{t-1} + u_t$$

or

$$\Delta i_{m_t} = \alpha \varepsilon_{t-1} + (\Phi(L) + \theta dir_t ncp_t) \Delta i_{b_{t-1}} + \Gamma(L) \Delta i_{m_{t-1}} + \Lambda(L) \Delta s_{t-1} + \Omega(L) \Delta X_{t-1} + u_t$$

$ncp_t$  is a dummy variable, taking the value of 1 when the net creditor position of the central bank is lower than Col\$ 1 trillion (approximately US\$ 500 million) and zero otherwise. Unlike

<sup>10</sup> A rigorous analysis of the impulse response functions should include confidence intervals. However, this requires further work because the short-term dynamics equations include a multiplicative interaction that is not considered in the standard econometric packages.

<sup>11</sup> A general model should simultaneously include the effects of RRs, the asymmetry of the interest rate responses and the impact of the central bank's NCP in the short-term dynamics equation. However, these variables are all transformations of the lagged change in policy rates. Therefore, severe multicollinearity problems may arise, complicating statistical inference on the significance of the coefficients. That is why the estimation was done separately for each case.

<sup>12</sup> The only exception is that of long-term CD rates (greater than 360 days), for which the response to policy rate increase is stronger.

<sup>13</sup> See footnote 10 above.

the effect of RARRh on interest rate pass-through and the asymmetric responses to policy rate changes, the influence of the central bank's NCP is not general. It is restricted to a few lending interest rates (commercial bank treasury and prime lending rates) and most deposit rates (Tables 6 and 7). In these cases, a low or negative NCP weakens the interest rate pass-through in both directions. For an increase in policy rates, the abundant liquidity implied by the low NCP runs counter to the policy tightening. For a decrease in policy rates, it is possible that the market rates are already low in response to the small NCP. Hence, when the policy rate is reduced, a strong concurrent movement in the market rate is not observed. Impulse response function analysis corroborates these results when allowing for complete VEC system dynamics (Charts 5 and 6).

Finally, the interaction of  $ncp_t$  and  $dir_t$  has negative coefficients for commercial treasury lending rates, savings and short-term CD rates (Tables 6 and 7), indicating that the transmission of policy interest rate *increases* is diminished when the central bank's NCP is low or negative.

#### 4. Conclusions

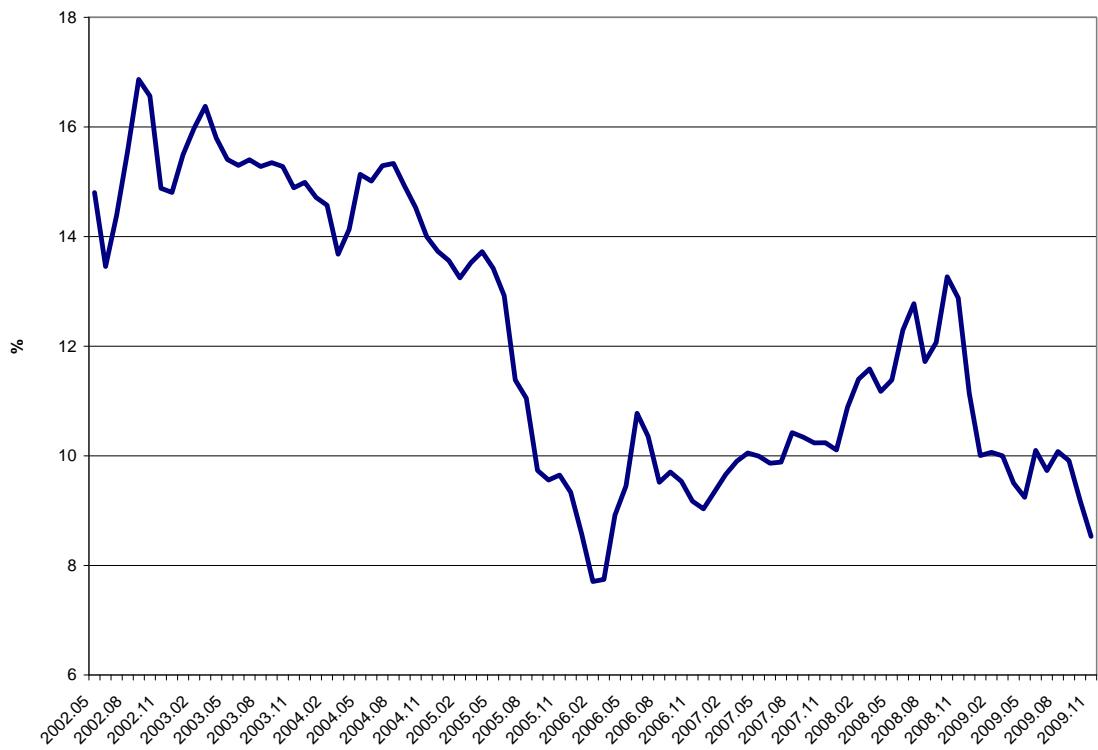
RRs have been used in Colombia under an IT regime with different objectives. In 2007, RR increases were aimed at speeding up monetary policy transmission and curbing excessive credit growth. In 2008, RRs were again raised to sterilise part of the monetary expansion resulting from international reserve purchases. Later that year, they were reduced to ensure the provision of adequate liquidity in the context of heightened uncertainty brought about by the Lehman Brothers crisis.

The effects of RRs on interest rate and interest rate pass-through in an IT regime are not as straightforward as those under a monetary targeting regime. Conceptually, those effects depend on the degree of substitution between deposits and central bank credit as sources of bank funding and on the extent to which RR changes affect the risks facing banks. The empirical results for Colombia suggest that RRs are important long-term determinants of business loan interest rates and have been effective in strengthening the pass-through from policy to deposit and lending interest rates.

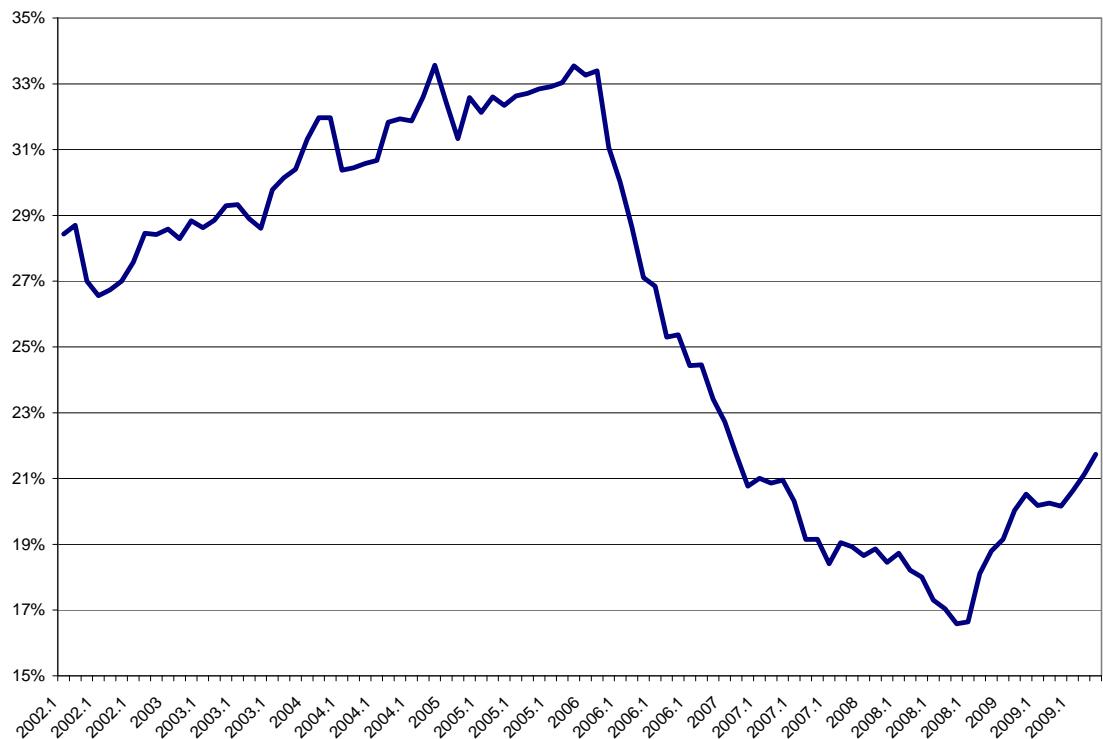
These findings support the use of RRs as a policy instrument in an IT regime in terms of their effectiveness in reinforcing monetary policy transmission. These benefits must be contrasted with the fact that RRs are costly taxes on financial intermediation and may be too blunt a tool to fine-tune the adjustment of credit markets or aggregate demand. Hence, their use is justified when policymakers perceive that standard, less costly policy instruments are deemed insufficient to maintain price or financial stability.

The empirical models used to assess the impact of RRs on interest rates were also exploited to characterise other features of the dynamics of interest rate pass-through. For Colombia, policy rate transmission seems to be asymmetric, with rate drops generating larger responses of market rates than policy rate increases. Moreover, a low NCP of the central bank with the financial system appears to weaken the transmission of policy rates to CD and short-term lending interest rates.

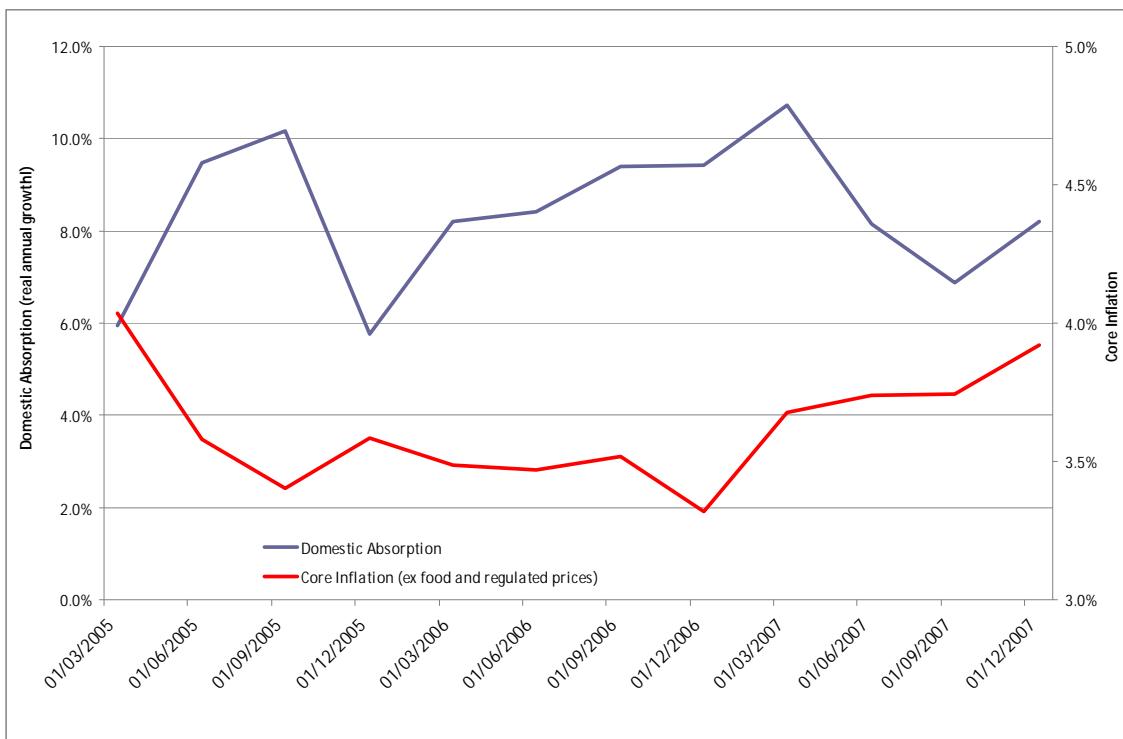
Graph 1  
**10-year interest rates on domestic government bonds (TES)**



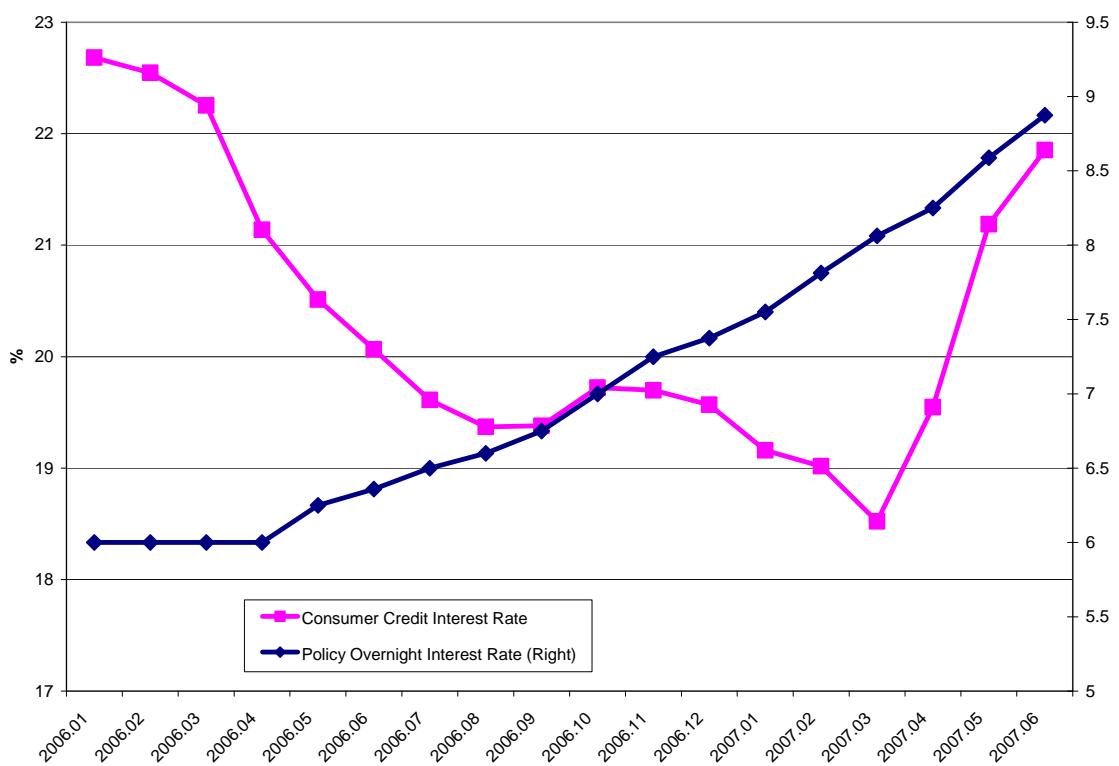
Graph 2  
**Share of bond holdings in banks' total assets**



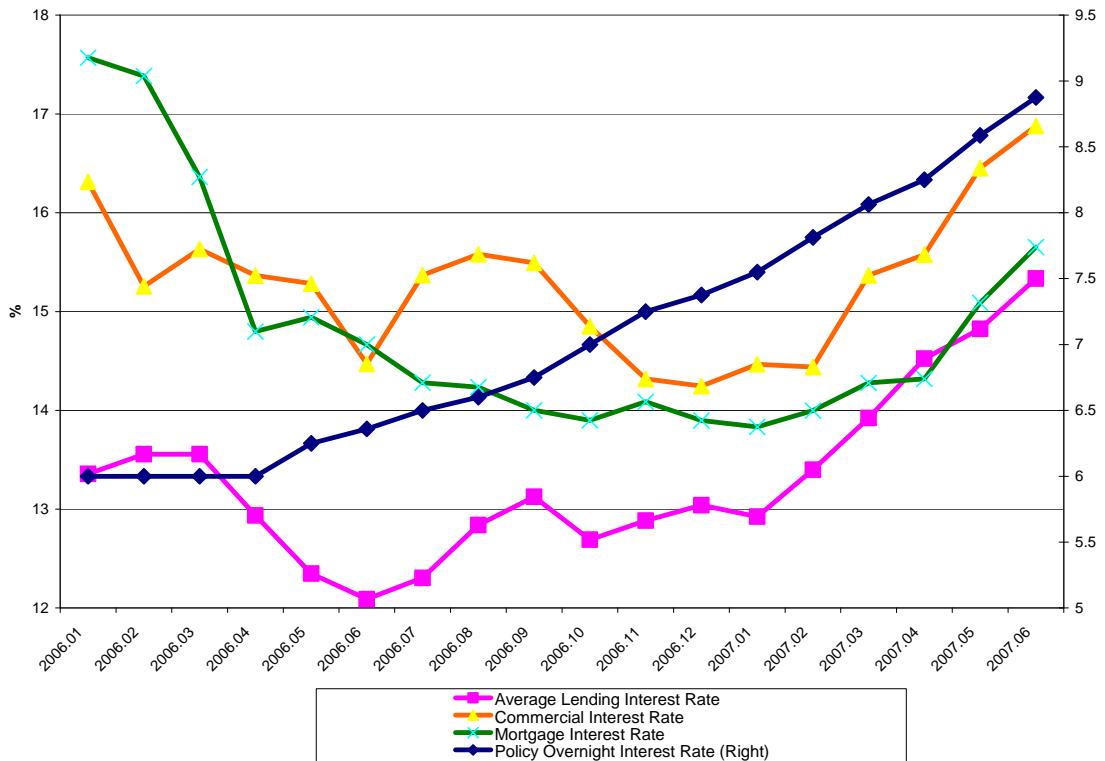
**Graph 3**  
**Domestic absorption growth and core inflation**



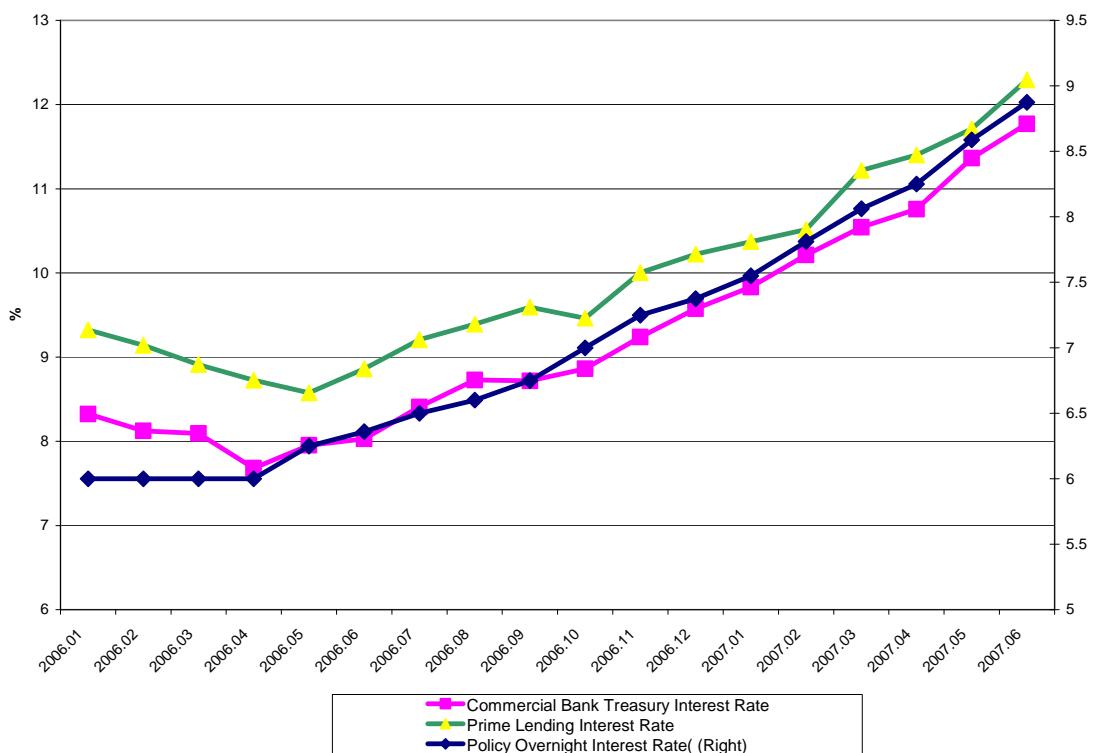
**Graph 4**  
**Policy interest rate and consumer credit interest rate**



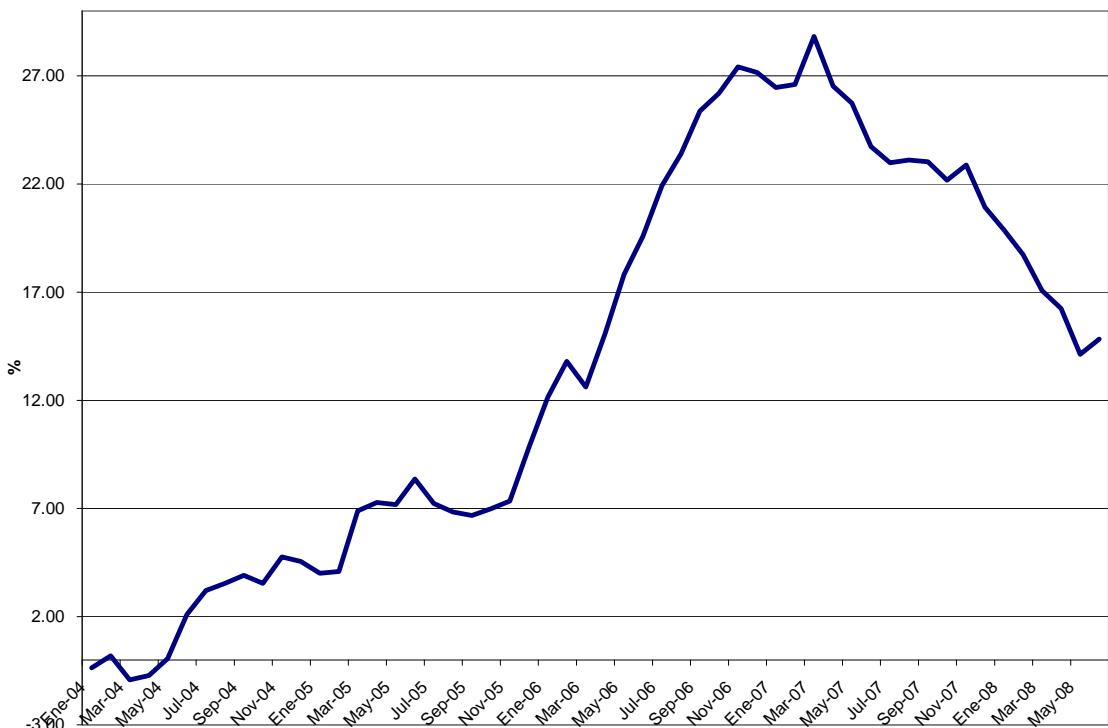
Graph 5  
Policy, average, commercial and mortgage interest rates



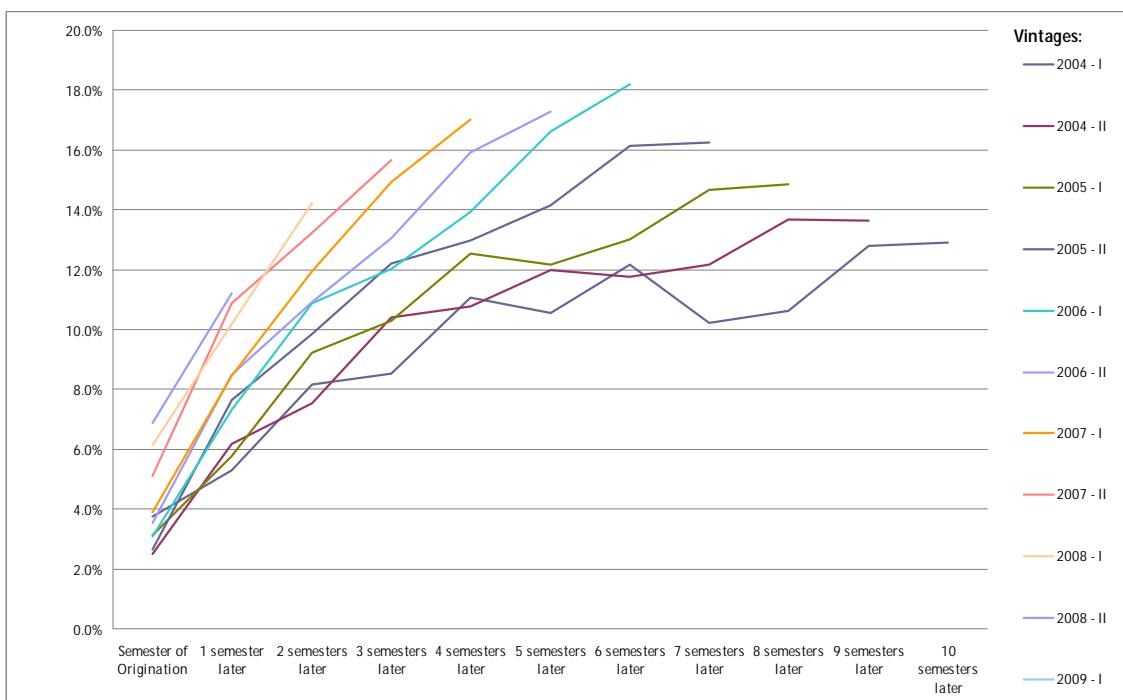
Graph 6  
Policy, prime and commercial bank treasury interest rates



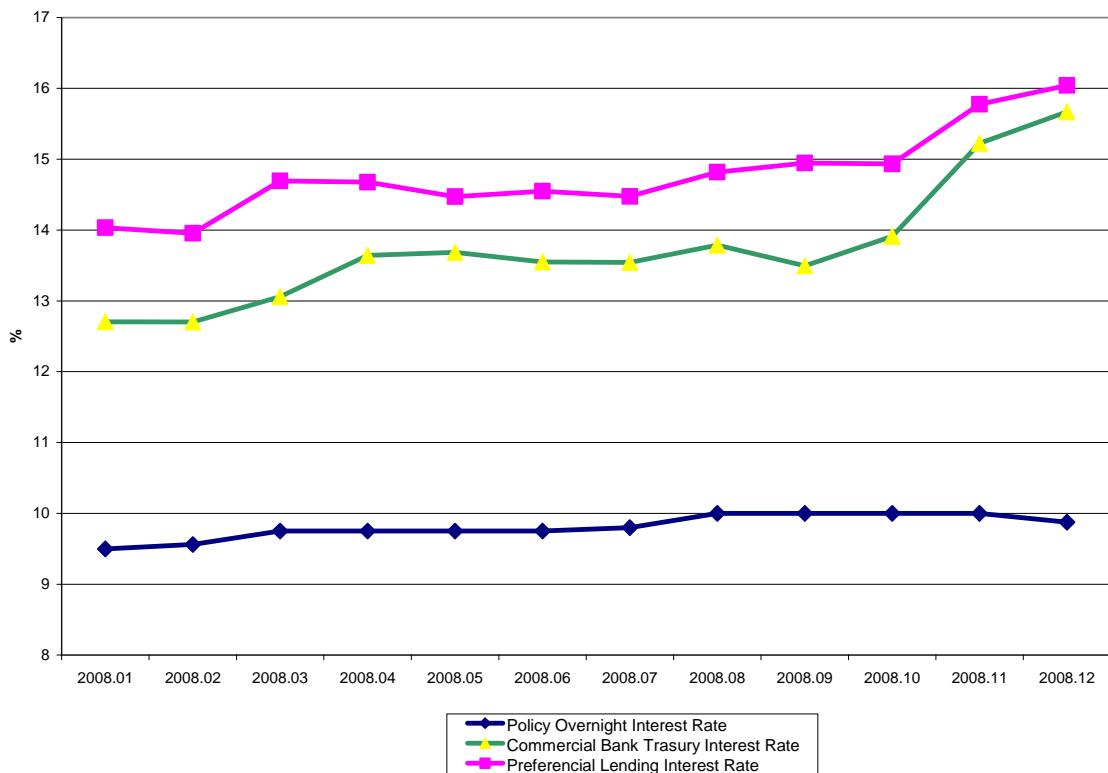
Graph 7  
Real bank loan annual growth (CPI ex food)



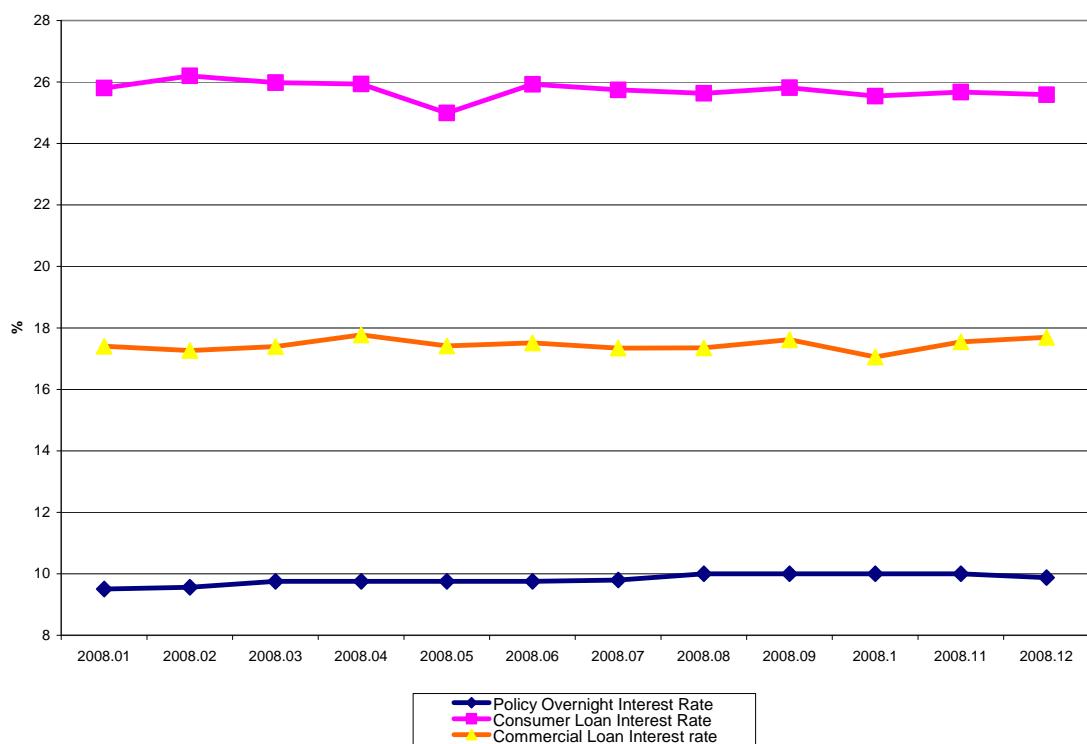
Graph 8  
Consumer credit: risky loans/total loans by vintage



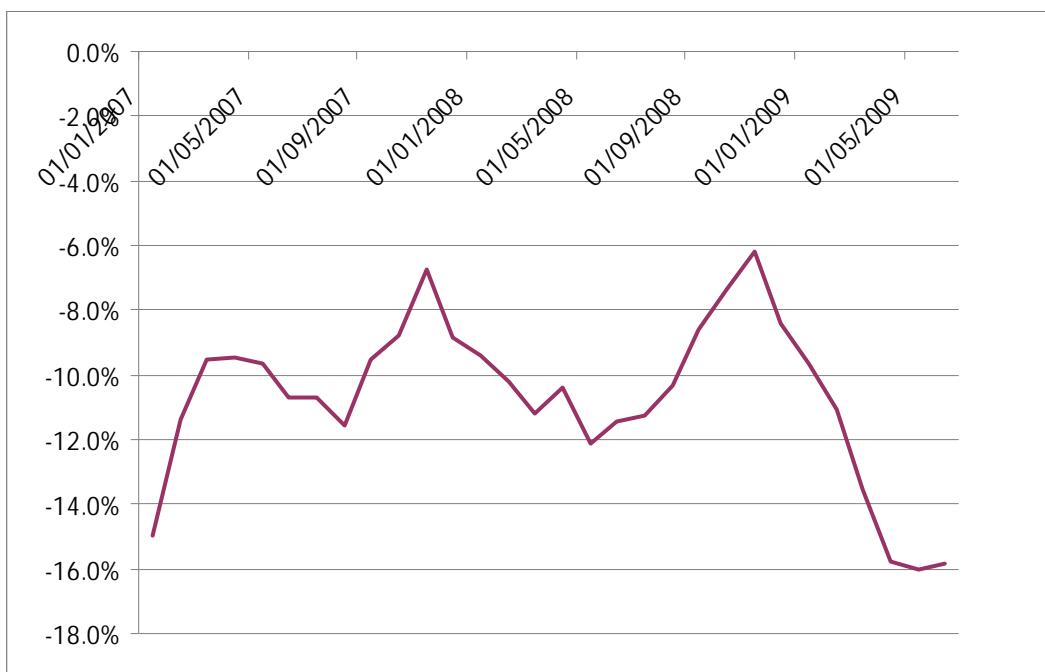
Graph 9  
**Policy, prime and commercial bank treasury interest rates 2008**



Graph 10  
**Policy, consumer and commercial loan interest rates**

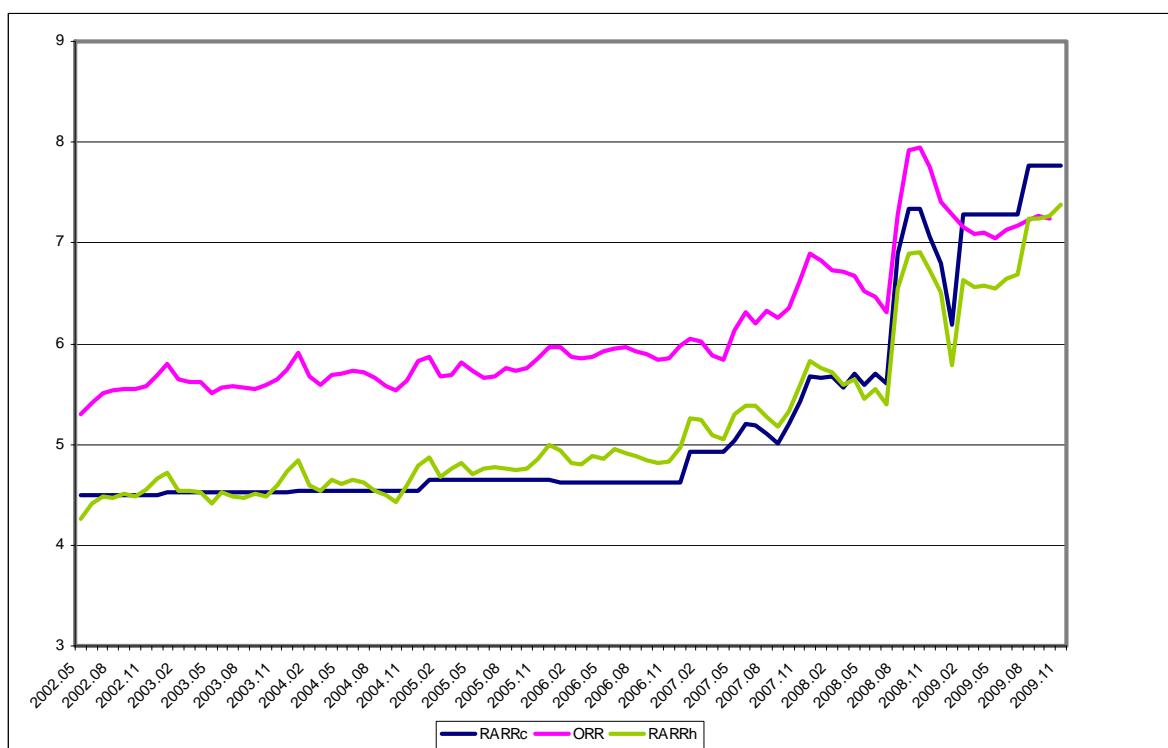


Graph 11  
Liquidity GAP indicator



Indicator = (liquid liabilities – liquid assets)/(illiquid assets)

Graph 12  
Aggregate reserve requirement ratios

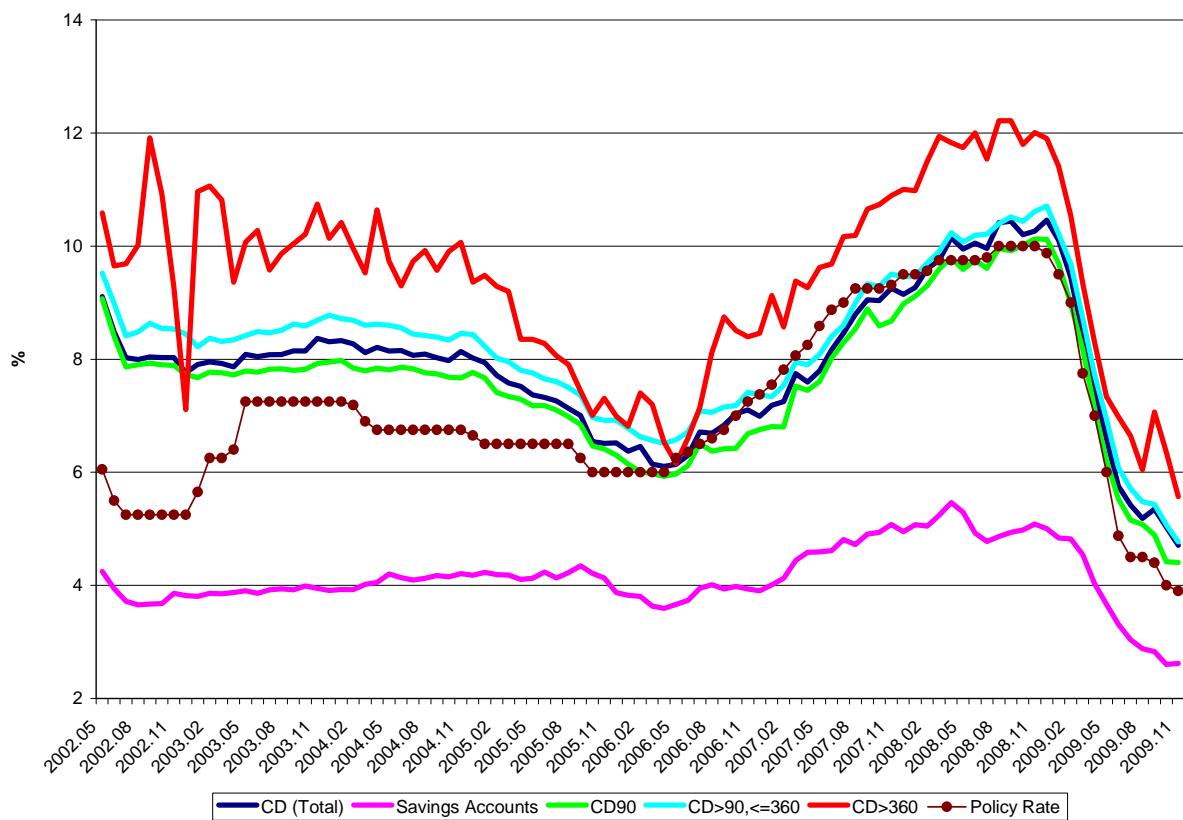


ORR = Observed required reserves/total deposits subject to RRs

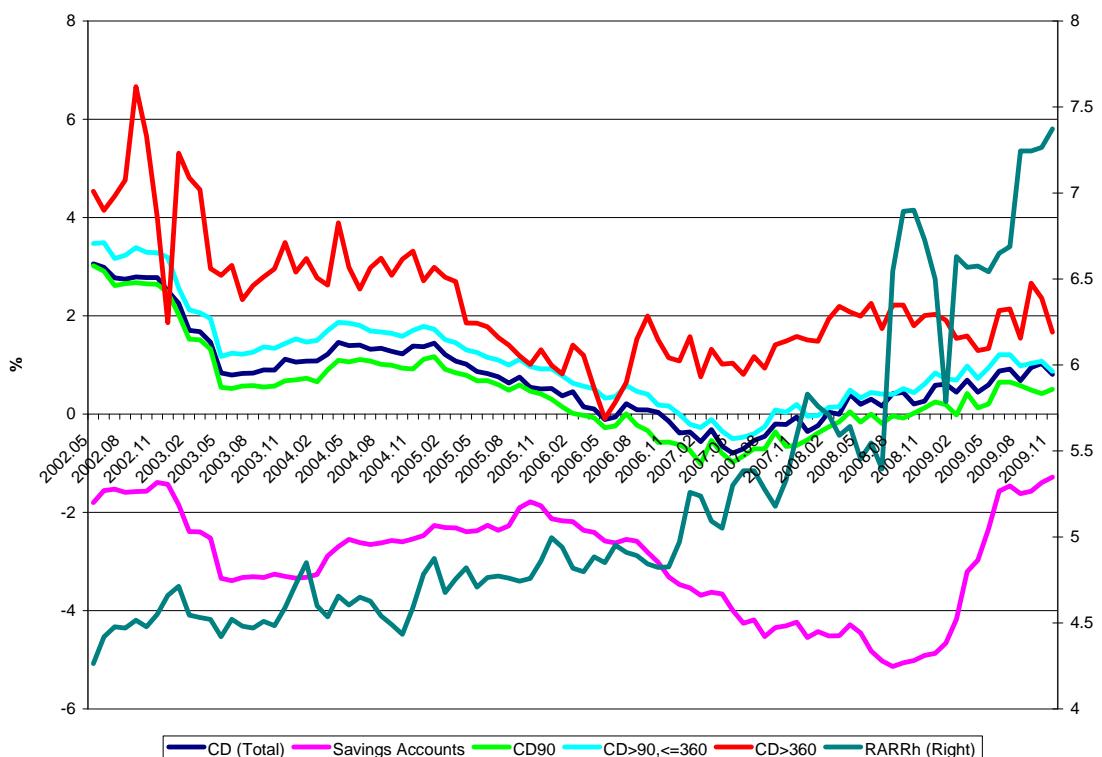
RARR<sub>c</sub> = Remuneration-adjusted RR ratio (fixed deposit composition)

RARR<sub>h</sub> = Remuneration-adjusted RR ratio (variable deposit composition)

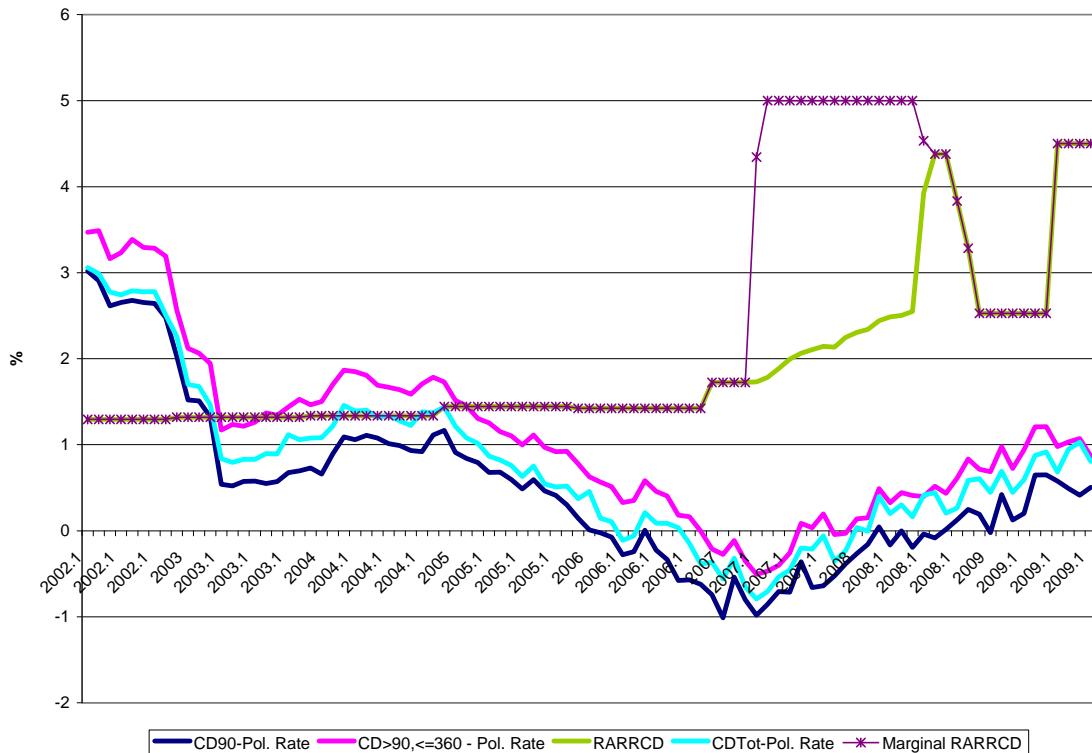
Graph 13  
Policy and deposit interest rates



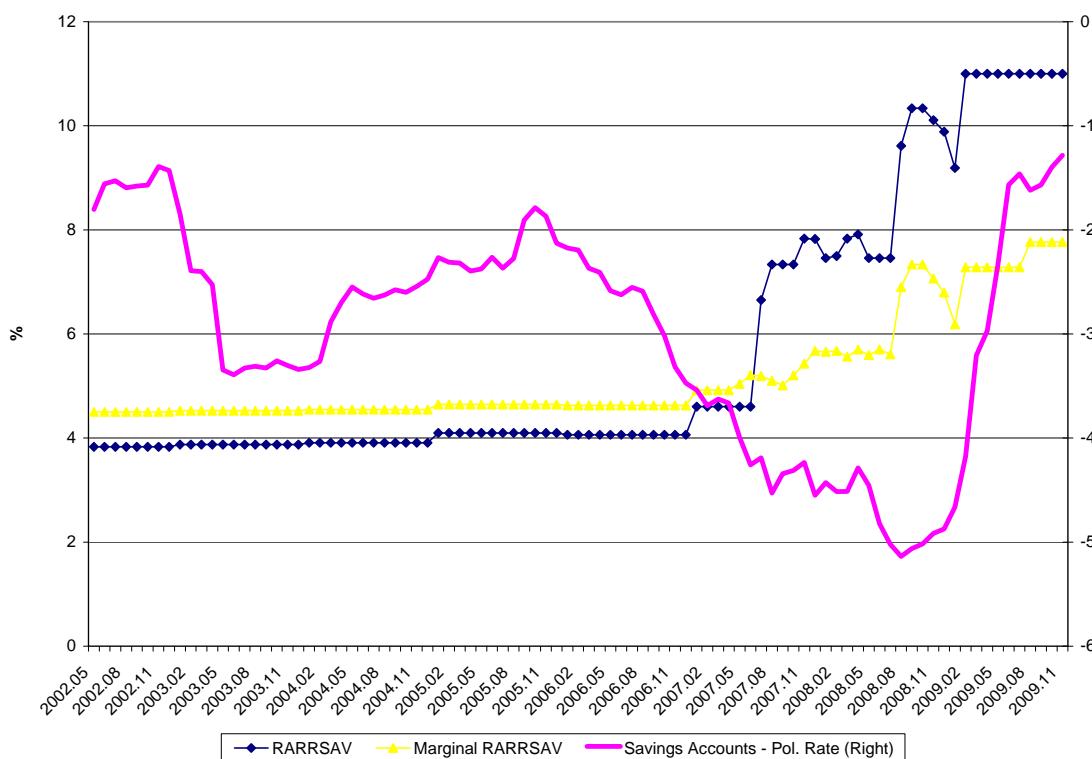
Graph 14  
Spread between deposit interest rates and the overnight policy rate



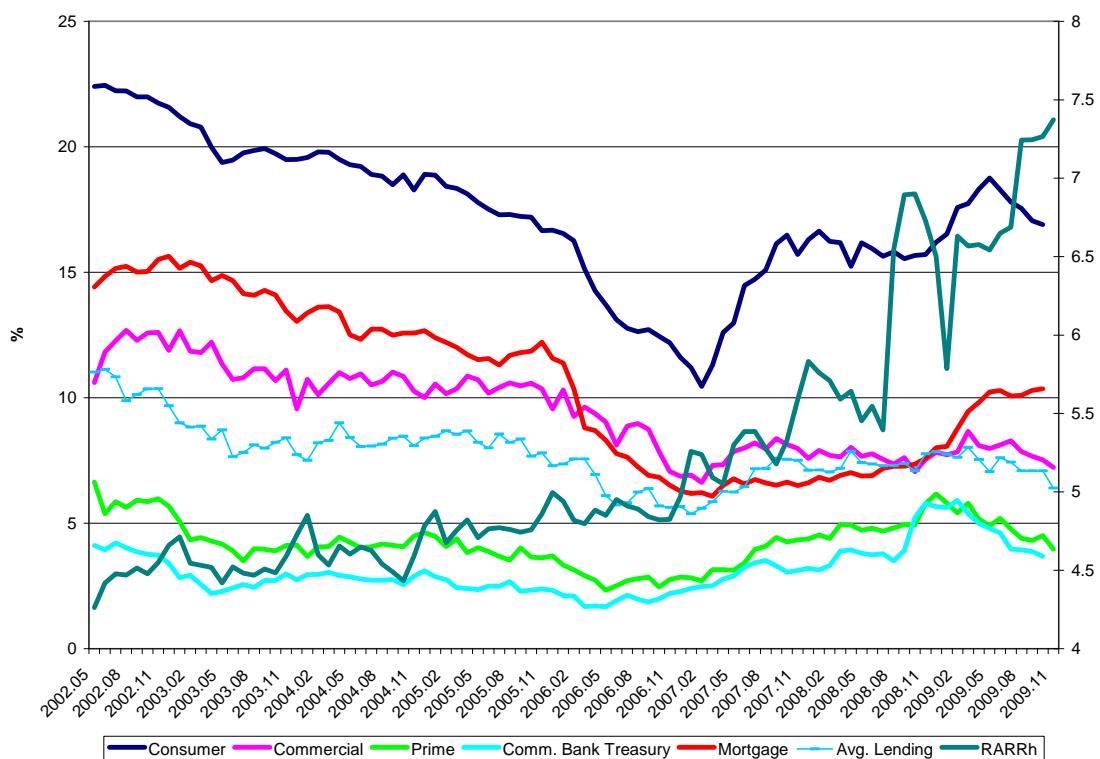
Graph 15  
**Average and marginal CD remuneration-adjusted reserve requirements and spreads between CD interest rates and policy interest rates**



Graph 16  
**Average and marginal savings account remuneration-adjusted reserve requirements and spreads between savings account interest rates and policy interest rates**



Graph 17  
Spread between lending interest rates and the overnight policy rate



Graph 18  
Overnight interbank and policy interest rates 2008

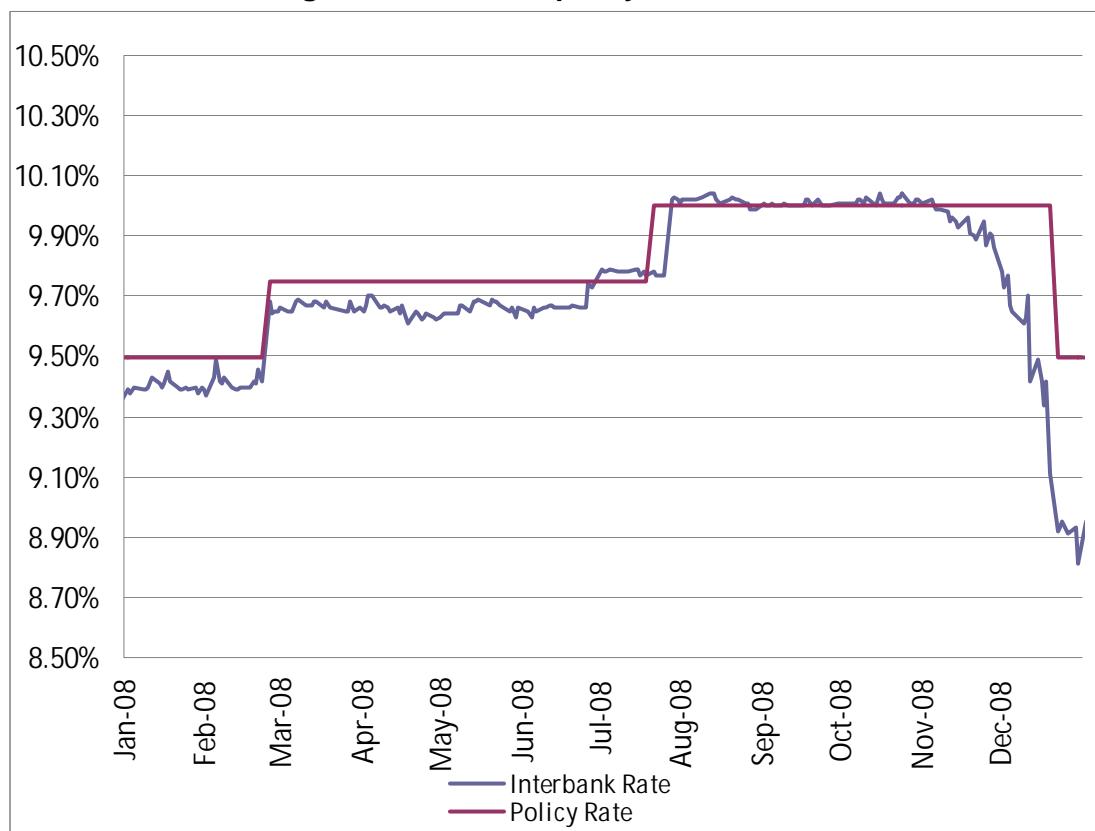


Table 1  
Reserve requirement regulation

DATE	AVERAGE RESERVE REQUIREMENTS	MARGINAL RESERVE REQUIREMENTS	RESERVE REQUIREMENT REMUNERATION	NOTES
2000–2007	13% checking accounts and sight deposits 6% savings accounts 2.5% CD and bonds with maturity $\leq$ 18 months 0% CD and bonds with maturity $>$ 18 months	----	75% of the inflation target for RRs on savings accounts 100% of the inflation target for RRs on CD and bonds $\leq$ 18 months	----
6 May 2007	Unchanged	27% checking accounts and sight deposits 12.5% savings accounts 5% CD with maturity $\leq$ 18 months	Marginal RRs are NOT remunerated Average RR remuneration is unchanged	Applies since 7 May 2007 Marginal RRs apply for deposits above the level at 7 May 2007
15 June 2007	8.3% checking accounts, sight deposits and savings accounts 2.5% CD and bonds with maturity $\leq$ 18 months 0% CD and bonds with maturity $>$ 18 months	27% checking accounts, sight deposits and savings accounts 5% CD and bonds with maturity $\leq$ 18 months	Marginal RRs are NOT remunerated Remuneration of average RRs: <ul style="list-style-type: none"><li>37.5% of the inflation target for RRs on checking accounts, sight deposits and savings accounts</li><li>100% of the inflation target for RRs on CD and bonds <math>\leq</math> 18 months</li></ul>	RRs on checking accounts, sight deposits and savings accounts are levelled
20 June 2008	11.5% checking accounts, sight deposits and savings accounts 6% CD and bonds with maturity $\leq$ 18 months 0% CD and bonds with maturity $>$ 18 months	Marginal RRs are ELIMINATED	Unchanged	Applies since the last half of August 2008

24 October 2008	11% checking accounts, sight deposits and savings accounts  4.5% CD and bonds with maturity $\leq$ 18 months  0% CD and bonds with maturity $>$ 18 months	---	Unchanged	Applies since December 2008
30 January 2009	Unchanged	---	Remuneration of average RRs: • 0% for RRs on checking accounts, sight deposits and savings accounts • 100% of the inflation target for RRs on CD and bonds $\leq$ 18 months	Applies since February 2009
2420	Unchanged	---	Remuneration of RRs is ELIMINATED	---

Table 2  
Loan interest rates and reserve requirements

LONG-TERM RELATIONSHIP						
	Consumer loan interest rate	Commercial loan interest rate	Prime lending rate	Commercial bank treasury interest rate	Mortgage interest rate	Average lending rate
<b>Market interest rate</b>	1.0	1.0	1.0	1.0	1.0	1.0
<b>Constant</b>	-6.690	182.710	0.464	82.036	-4.603 (-3.457)	-5.367 (-5.383)
<b>Trend</b>	0.0135 (0.484)	0.375 (5.721)	N/A	0.139 (7.124)	N/A	N/A
<b>Policy interest rate</b>	-1.925 (-5.857)	-0.993 (-3.391)	-1.331 (-17.493)	-0.942 (-9.359)	N/A	-1.158 (-9.823)
<b>Slope of the yield curve</b>	-1.437 (-4.897)	N/A	-0.463 (-7.370)	N/A	N/A	-0.662 (-5.885)
<b>RARRh</b>	N/A	-5.143 (-4.265)	-0.723 (-3.921)	-3.203 (-7.921)	N/A	N/A
<b>Industrial production index</b>	N/A	-38.259 (-3.826)	0.461 (0.348)	-15.782 (-5.327)	N/A	N/A
<b>TES interest rate</b>	N/A	N/A	N/A	N/A	-1.060 (-9.956)	N/A
SHORT-TERM DYNAMICS FOR LOAN INTEREST RATES						
	Δ Consumer loan interest rate	Δ Commercial loan interest rate	Δ Prime lending rate	Δ Commercial bank treasury interest rate	Δ Mortgage interest rate	Δ Average lending rate
<b>Cointegration error</b>	-0.072 (-3.339)	-0.092 (-3.817)	-0.314 (-5.369)	-0.155 (-4.395)	-0.102 (-3.792)	-0.253 (-5.015)
<b>Constant</b>	-0.080 (-1.995)	-0.003 (-0.072)	0.024 (0.819)	0.040 (0.926)	N/A	N/A
Δ Loan interest rate (-1)	0.084 (0.955)	-0.336 (-3.718)	-0.108 (-1.287)	0.149 (1.766)	0.253 (2.744)	0.014 (0.130)
Δ Policy interest rate (-1)	-2.231 (-2.627)	-2.892 (-2.937)	-2.380 (-3.551)	-0.962 (-1.736)	0.308 (2.646)	-2.670 (-2.878)
Δ Slope yield curve (-1)	-0.057 (-0.935)	N/A	0.040 (0.760)	N/A	N/A	0.0006 (0.007)
Δ RARRh (-1)	N/A	-0.228 (-1.078)	-0.219 (-1.61)	-0.361 (-2.703)	N/A	N/A
Δ Policy rate (-1) * RARRh	0.359 (2.606)	0.557 (3.340)	0.494 (4.630)	0.239 (2.573)	N/A	0.505 (3.430)
Δ SA industrial production index (-1)	N/A	-2.202 (-1.940)	0.667 (0.964)	-1.481 (-2.185)	N/A	N/A
Δ TES interest rate	N/A	N/A	N/A	N/A	-0.076 (-1.365)	N/A
<b>Dummy variables</b>	2007_01 2007_04	2003_12	N/A	2008_11 2009_10	N/A	N/A

t-statistics in parenthesis.

**Table 3**  
**Deposit interest rates and reserve requirements**

<b>LONG-TERM RELATIONSHIP</b>					
	Savings account interest rate	Short-term CD interest rate (90 days)	Short-term CD interest rate (91-360 days)	Long-term CD interest rate (greater than 360 days)	Average CD interest rate
<b>Market interest rate</b>	1.0	1.0	1.0	1.0	1.0
<b>Trend</b>	N/A	N/A	N/A	N/A	N/A
<b>Constant</b>	-1.099 (-2.651)	0.013	-0.842 (-2.12)	0.229 (0.385)	N/A
<b>Policy interest rate</b>	-0.429 (-7.650)	-1.005 (-12.527)	-0.924 (-19.012)	-1.053 (-11.801)	-0.933 (-42.845)
<b>Slope of the yield curve</b>	N/A	-0.638 (-5.352)	-0.550 (-10.88)	-0.565 (-12.786)	-0.491 (-15.569)
<b>Marginal RARRh</b>	N/A	N/A	N/A	-0.181 (-2.010)	-0.158 (-3.122)
<b>SHORT-TERM DYNAMICS FOR DEPOSIT INTEREST RATES</b>					
	Δ Savings account interest rate	Δ Short-term CD interest rate (90 days)	Δ Short-term CD interest rate (91-360 days)	Δ Long-term CD interest rate (greater than 360 days)	Δ Average CD interest rate
<b>Cointegration error</b>	-0.091 (-2.214)	-0.153 (-3.631)	-0.248 (-5.549)	-0.546 (-4.979)	-0.276 (-7.01)
<b>Constant</b>	N/A	-0.018 (-0.945)	N/A	N/A	N/A
<b>Δ Deposit interest rate (-1)</b>	0.116 (1.252)	0.017 (0.150)	-0.073 (-0.692)	0.101 (1.113)	-0.241 (-2.76)
<b>Δ Policy interest rate (-1)</b>	-0.488 (-2.075)	-0.655 (-1.490)	-1.259 (-3.305)	-2.679 (-2.252)	-1.767 (-5.17)
<b>Δ Slope yield curve (-1)</b>	N/A	0.032 (0.556)	0.030 (0.751)	0.074 (0.739)	0.041 (1.074)
<b>Δ RARRh (-1)</b>	N/A	N/A	N/A	0.044 (0.325)	0.008 (0.222)
<b>Δ Policy rate (-1) * RARRh</b>	<b>0.124 (3.158)</b>	<b>0.198 (2.66)</b>	<b>0.290 (4.553)</b>	<b>0.466 (2.489)</b>	<b>0.402 (6.878)</b>
<b>Dummy variables</b>	2008_6	N/A	N/A	2002_12 2003_1	2009_03 2009_07

t-statistics in parenthesis.

Table 4  
Loan interest rates – asymmetric response to policy rate changes

LONG-TERM RELATIONSHIP					
	Consumer loan interest rate	Commercial loan interest rate	Prime lending rate	Commercial bank treasury interest rate	Average lending rate
<b>Market interest rate</b>	1.0	1.0	1.0	1.0	1.0
<b>Constant</b>	-7.394	103.296	7.503	92.755	-5.056
<b>Trend</b>	0.013 (0.512)	0.243 (6.228)	N/A	0.152 (7.516)	N/A
<b>Policy interest rate</b>	-1.819 (-5.773)	-0.868 (-4.988)	-1.326 (-14.957)	-0.950 (-9.229)	-1.207 (-9.076)
<b>Slope of the yield curve</b>	-1.444 (-5.287)	N/A	-0.526 (-7.058)	N/A	-0.763 (-6.014)
<b>RARRh</b>	N/A	-2.651 (-3.673)	-0.398 (-1.932)	-3.245 (-7.681)	N/A
<b>Industrial production index</b>	N/A	-23.256 (-3.899)	-1.349 (-0.851)	-18.092 (-5.899)	N/A
SHORT-TERM DYNAMICS FOR LOAN INTEREST RATES					
	Δ Consumer loan interest rate	Δ Commercial loan interest rate	Δ Prime lending rate	Δ Commercial bank treasury interest rate	Δ Average lending rate
<b>Cointegration error</b>	-0.066 (-2.916)	-0.183 (-5.178)	-0.264 (-4.732)	-0.155 (-4.758)	-0.207 (-4.320)
<b>Constant</b>	-0.059 (-1.289)	0.023 (0.463)	0.031 (0.868)	0.041 (1.353)	N/A
<b>Δ Loan interest rate (-1)</b>	0.1024 (1.146)	-0.261 (-2.977)	-0.118 (-1.299)	0.125 (1.457)	0.027 (0.251)
<b>Δ Policy interest rate (-1)</b>	0.127 (0.627)	0.481 (2.308)	0.740 (3.878)	0.587 (3.335)	0.668 (3.261)
<b>Δ Slope yield curve (-1)</b>	-0.063 (-1.006)	N/A	0.049 (0.854)	N/A	0.016 (0.186)
<b>Δ RARRh (-1)</b>	N/A	-0.139 (-0.674)	-0.049 (-0.350)	-0.325 (-2.472)	N/A
<b>Δ Policy rate (-1) * dir (asymmetric effect)</b>	<b>-0.691 (-1.962)</b>	<b>-0.944 (-2.467)</b>	<b>-0.671 (-2.468)</b>	<b>-0.496 (-2.196)</b>	<b>-0.993 (-3.121)</b>
<b>Δ SA industrial production index (-1)</b>	N/A	-3.060 (-2.757)	0.101 (0.135)	-1.821 (-2.673)	N/A
<b>Dummy variables</b>	2007_01 2007_04	2003_12	N/A	2008_11 2009_10	N/A

t-statistics in parenthesis.

**Table 5**  
**Deposit interest rates – asymmetric response to policy rate changes**

<b>LONG-TERM RELATIONSHIP</b>						
	Savings account interest rate	Short-term CD interest rate (90 days)	Short-term CD interest rate (91-360 days)	Short-term CD interest rate (91-360 days)	Long-term CD interest rate (greater than 360 days)	Average CD interest rate
<b>Market interest rate</b>	1.0	1.0	1.0	1.0	1.0	1.0
<b>Constant</b>	-0.850	0.088	-0.640	-0.802	0.136	N/A
<b>Policy interest rate</b>	-0.462 (-6.876)	-1.009 (-13.128)	-0.960 (-19.230)	-0.937 (-20.199)	-1.038 (-11.585)	-0.953 (-38.438)
<b>Slope of the yield curve</b>	N/A	-0.711 (-6.362)	-0.591 (-11.534)	-0.566 (-11.873)	-0.550 (-12.433)	-0.506 (-14.359)
<b>Marginal reserve requirement</b>	N/A	N/A	N/A	N/A	-0.185 (-2.040)	-0.138 (-2.440)
<b>SHORT-TERM DYNAMICS FOR LOAN INTEREST RATES</b>						
	Δ Savings account interest rate	Δ Short-term CD interest rate (90 days)	Δ Short-term CD interest rate (91-360 days)	Δ Short-term CD interest rate (91-360 days)	Δ Long-term CD interest rate (greater than 360 days)	Δ Average CD interest rate
<b>Cointegration error</b>	-0.063 (-1.736)	-0.165 (-3.789)	-0.227 (-5.138)	-0.256 (-5.691)	-0.574 (-5.374)	-0.246 (-6.008)
<b>Constant</b>	N/A	-0.001 (-0.063)	N/A	N/A	N/A	N/A
<b>Δ Market interest rate (-1)</b>	0.119 (1.256)	0.011 (0.099)	-0.102 (-0.915)	-0.127 (-1.161)	0.109 (1.223)	-0.214 (-2.271)
<b>Δ Policy interest rate (-1)</b>	0.304 (5.689)	0.639 (5.186)	0.690 (6.345)	-0.552 (-1.024)	-5.354 (-2.926)	0.840 (7.955)
<b>Δ Slope yield curve (-1)</b>	N/A	0.137 (0.232)	0.0345 (0.852)	0.023 (0.567)	0.091 (0.929)	0.044 (1.104)
<b>Δ Marginal RARRh (-1)</b>	N/A	N/A	N/A	N/A	-0.010 (-0.075)	0.049 (1.199)
<b>Δ Policy rate (-1) * dir</b>	<b>-0.183 (-2.196)</b>	<b>-0.453 (-2.458)</b>	<b>-0.656 (-4.512)</b>	<b>-0.363 (-2.037)</b>	<b>1.161 (1.996)</b>	<b>-0.803 (-5.956)</b>
<b>Δ Policy rate *RARRh</b>	N/A	N/A	N/A	0.193 (2.323)	0.861 (3.093)	N/A
<b>Dummy variables</b>	2008_06	N/A	N/A	N/A	2002_12 2003_1	2009_3 2009_7

t-statistics in parenthesis.

Table 6  
Loan interest rates – central bank's net creditor position

LONG-TERM RELATIONSHIP			
	Commercial bank treasury interest rate	Commercial bank treasury interest rate	Prime lending rate
<b>Market interest rate</b>	1.0	1.0	1.0
<b>Constant</b>	84.667	81.888	2.198
<b>Trend</b>	0.143 (7.201)	0.140 (7.264)	N/A
<b>Policy interest rate</b>	-0.984 (-9.849)	-0.998 (-10.188)	-1.429 (-16.255)
<b>Slope of the yield curve</b>	N/A	N/A	-0.508 (-7.44)
<b>Average reserve requirement</b>	-3.004 (-7.231)	-3.001 (-7.621)	-0.48 (-2.555)
<b>Industrial production index</b>	-16.520 (-5.553)	-15.892 (-5.429)	N/A
SHORT-TERM DYNAMICS FOR LOAN INTEREST RATES			
	Δ Commercial bank treasury interest rate	Δ Commercial bank treasury interest rate	Δ Prime lending rate
<b>Cointegration error</b>	-0.163 (-4.778)	-0.166 (-4.761)	-0.264 (-4.682)
<b>Constant</b>	0.013 (0.516)	0.005 (0.210)	-0.01 (-0.344)
<b>Δ Loan interest rate (-1)</b>	0.134 (1.522)	0.178 (2.105)	-0.077 (-0.864)
<b>Δ Policy interest rate (-1)</b>	0.457 (2.730)	0.432 (2.701)	0.607 (3.495)
<b>Δ Slope yield curve (-1)</b>	N/A	N/A	0.058 (1.03)
<b>Δ RARRh (-1)</b>	-0.301 (-2.304)	-0.303 (-2.316)	-0.034 (-0.241)
<b>Δ Industrial production index (-1)</b>	-1.889 (-2.765)	-1.829 (-2.707)	N/A
<b>Δ Policy rate (-1) * dir * NCP</b>	<b>-0.518 (-1.648)</b>	N/A	N/A
<b>Δ Policy rate (-1) * NCP</b>	N/A	<b>-0.420 (-1.887)</b>	<b>-0.567 (-2.084)</b>
<b>Δ Industrial production index</b>	N/A	N/A	-1.243 (-1.688)
<b>Dummy variables</b>	2008_11 2009_10	2008_11 2009_10	N/A

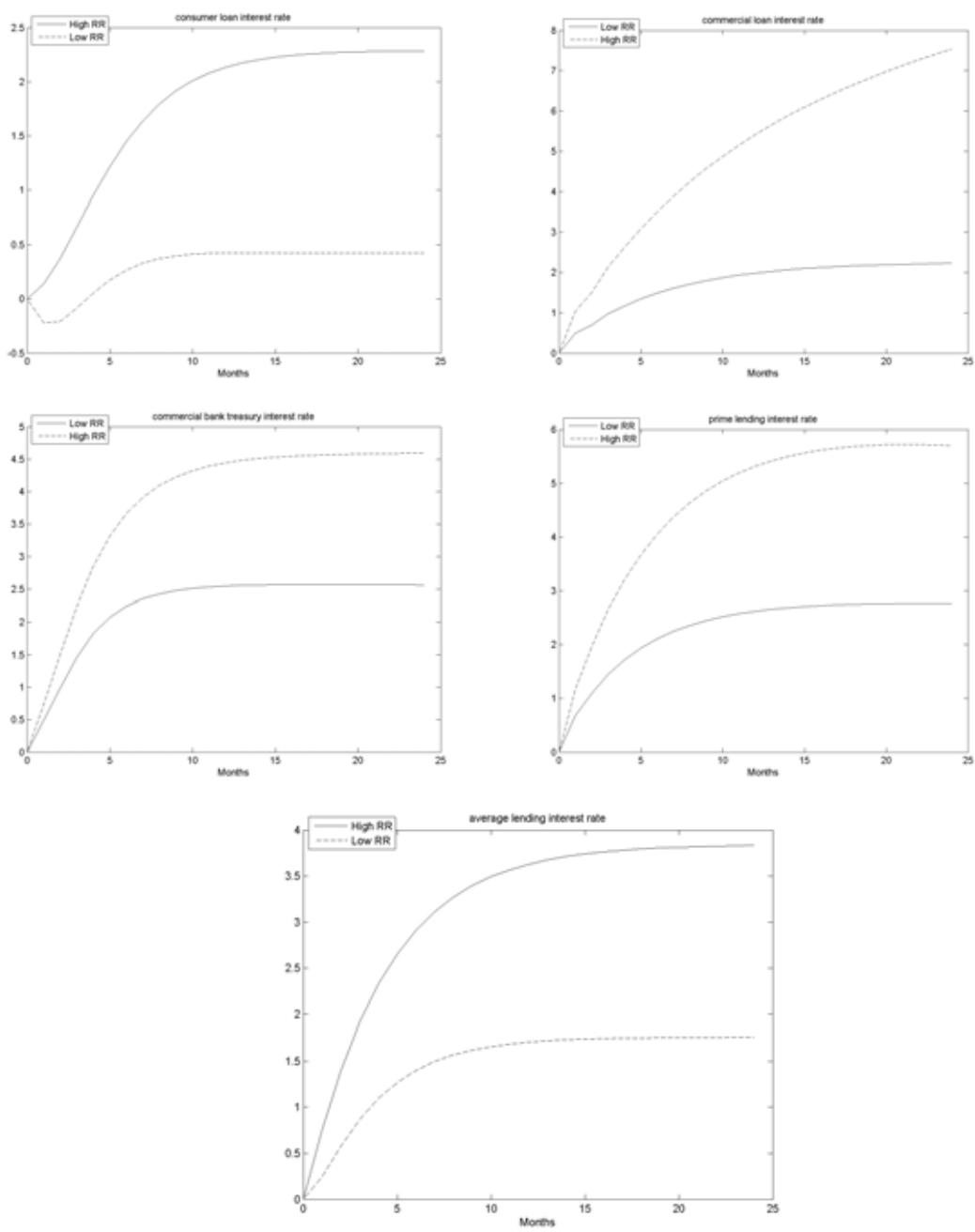
t-statistics in parenthesis.

**Table 7**  
**Deposit interest rates – central bank's net creditor position effects**

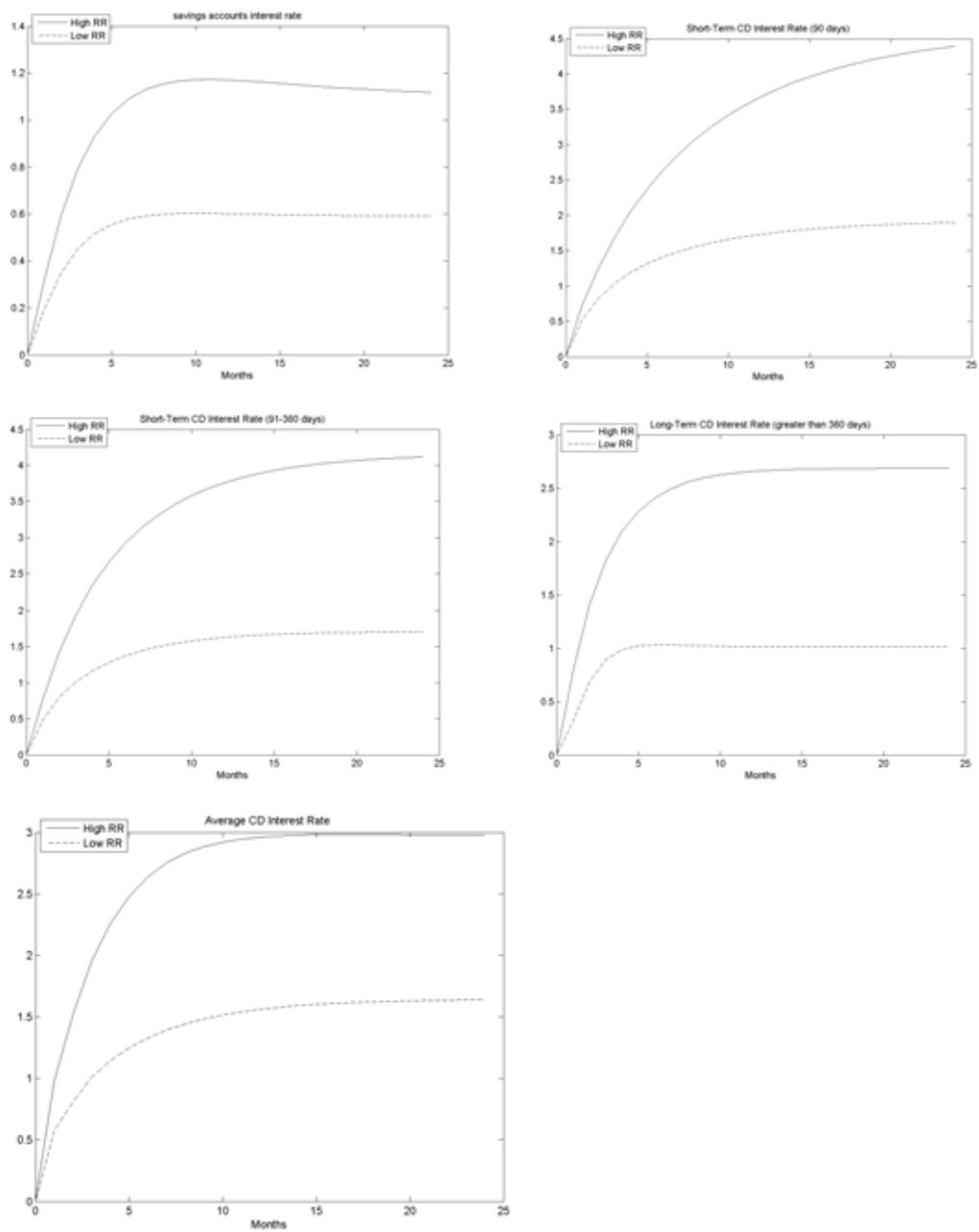
<b>LONG-TERM RELATIONSHIP</b>							
	Savings account interest rate	Short-term CD interest rate (90 days)	Short-term CD interest rate (90 days)	Short-term CD interest rate (91-360 days)	Short-term CD interest rate (91-360 days)	Average CD interest rate	Average CD interest rate
<b>Market interest rate</b>	1	1	1	1	1	1	1
<b>Constant</b>	-0.787	0.528	0.538	-0.003	-0.054	N/A	N/A
<b>Policy interest rate</b>	-0.471 (-6.534)	-1.064 (-11.318)	-1.071 (-11.663)	-1.018 (-13.46)	-1.011 (-13.704)	-0.920 (-26.861)	-0.929 (-29.798)
<b>Slope of the yield curve</b>	N/A	-0.769 (-5.601)	-0.7101 (-5.323)	-0.631 (-7.961)	-0.591 (-7.765)	-0.497 (-9.868)	-0.479 (-10.617)
<b>Marginal reserve requirement</b>	N/A	N/A	N/A	N/A	N/A	-0.179 (-2.242)	-0.153 (-2.106)
<b>SHORT-TERM DYNAMICS FOR LOAN INTEREST RATES</b>							
	Δ Savings account interest rate	Δ Short-term CD interest rate (90 days)	Δ Short-term CD interest rate (90 days)	Δ Short-term CD interest rate (91-360 days)	Δ Short-term CD interest rate (91-360 days)	Δ Average CD interest rate	Δ Average CD interest rate
<b>Cointegration error</b>	-0.047 (-1.311)	-0.115 (-2.864)	-0.117 (-3.056)	-0.146 (-3.708)	-0.161 (-4.116)	-0.175 (-3.954)	-0.194 (-4.434)
<b>Constant</b>	N/A	-0.022 (-1.138)	-0.026 (-1.386)	N/A	N/A		
<b>Δ Deposit interest rate (-1)</b>	0.156 (1.656)	0.086 (0.773)	0.113 (1.023)	0.043 (0.401)	0.066 (0.63)	-0.070 (-0.694)	-0.038 (-0.394)
<b>Δ Policy interest rate (-1)</b>	0.263 (5.448)	0.523 (4.777)	0.539 (5.163)	0.523 (5.021)	0.513 (5.22)	0.612 (5.635)	0.605 (5.850)
<b>Δ Slope yield curve (-1)</b>	N/A	0.03 (0.497)	0.048 (0.837)	0.069 (1.68)	0.072 (1.759)	0.023 (0.506)	0.022 (0.504)
<b>Δ Marginal RARRh (-1)</b>	N/A	N/A	N/A	N/A	N/A	0.107 (2.378)	0.110 (2.525)
<b>Δ Policy rate (-1) * dir * NCP</b>	<b>-0.185 (-1.425)</b>	<b>-0.357 (-1.434)</b>	N/A	<b>-0.438 (-2.175)</b>	N/A	<b>-0.474 (-2.337)</b>	N/A
<b>Δ Policy rate (-1) * NCP</b>	N/A	N/A	<b>-0.0402 (-2.35)</b>	N/A	<b>-0.355 (-2.395)</b>	N/A	<b>-0.430 (-2.876)</b>
<b>Dummy variables</b>	2008_6	N/A	N/A	N/A	N/A	N/A	N/A

t-statistics in parenthesis.

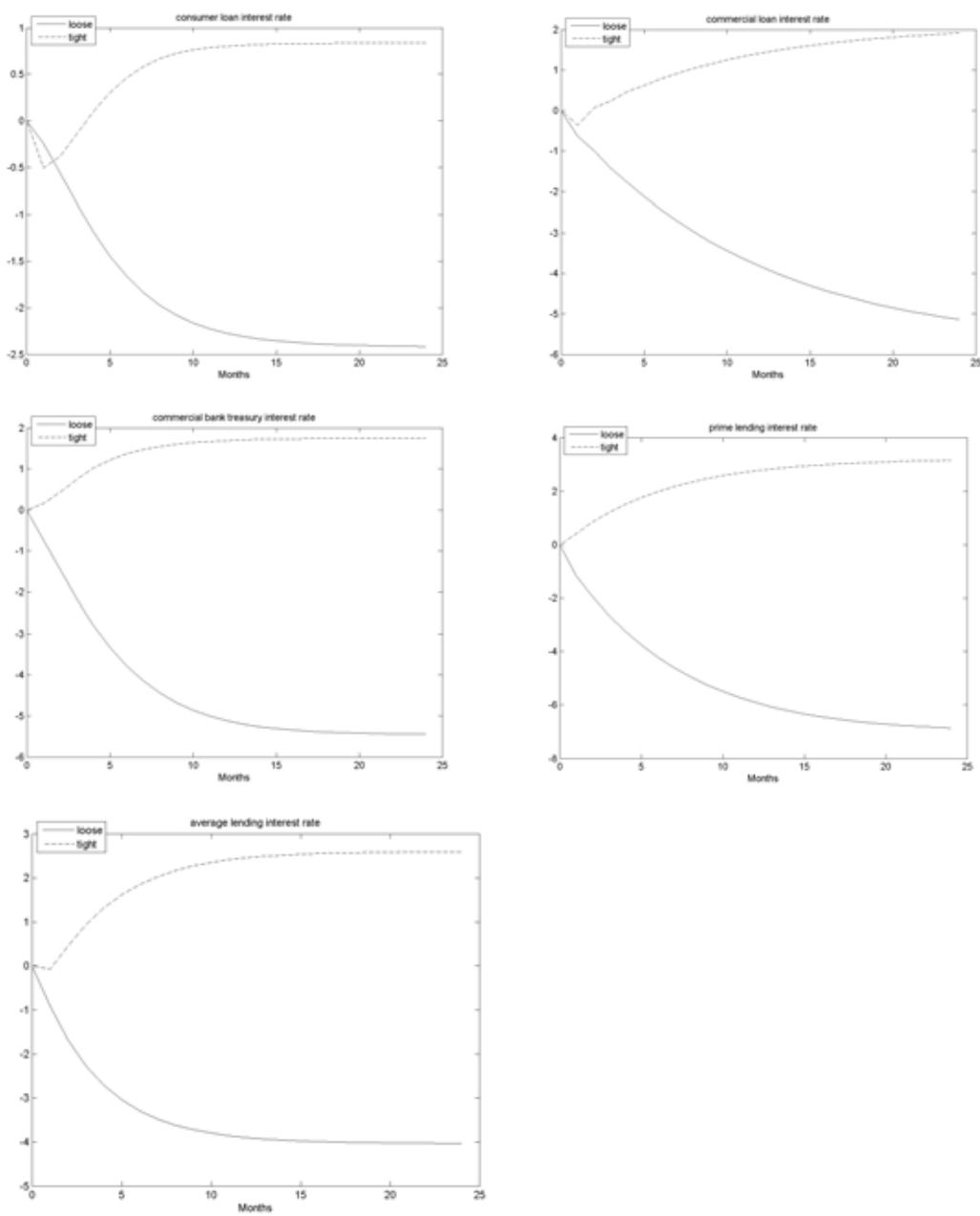
**Chart 1**  
**Impulse response functions for loan interest rates**  
**Policy rate shock for different reserve requirement levels**



**Chart 2**  
**Impulse response functions for deposit interest rates**  
**Policy rate shock for different reserve requirement levels**



**Chart 3**  
**Impulse response functions for loan interest rates**  
**Asymmetric response to policy rate changes**



**Chart 4**  
**Impulse response functions for deposit interest rates**  
**Asymmetric response to policy rate changes**

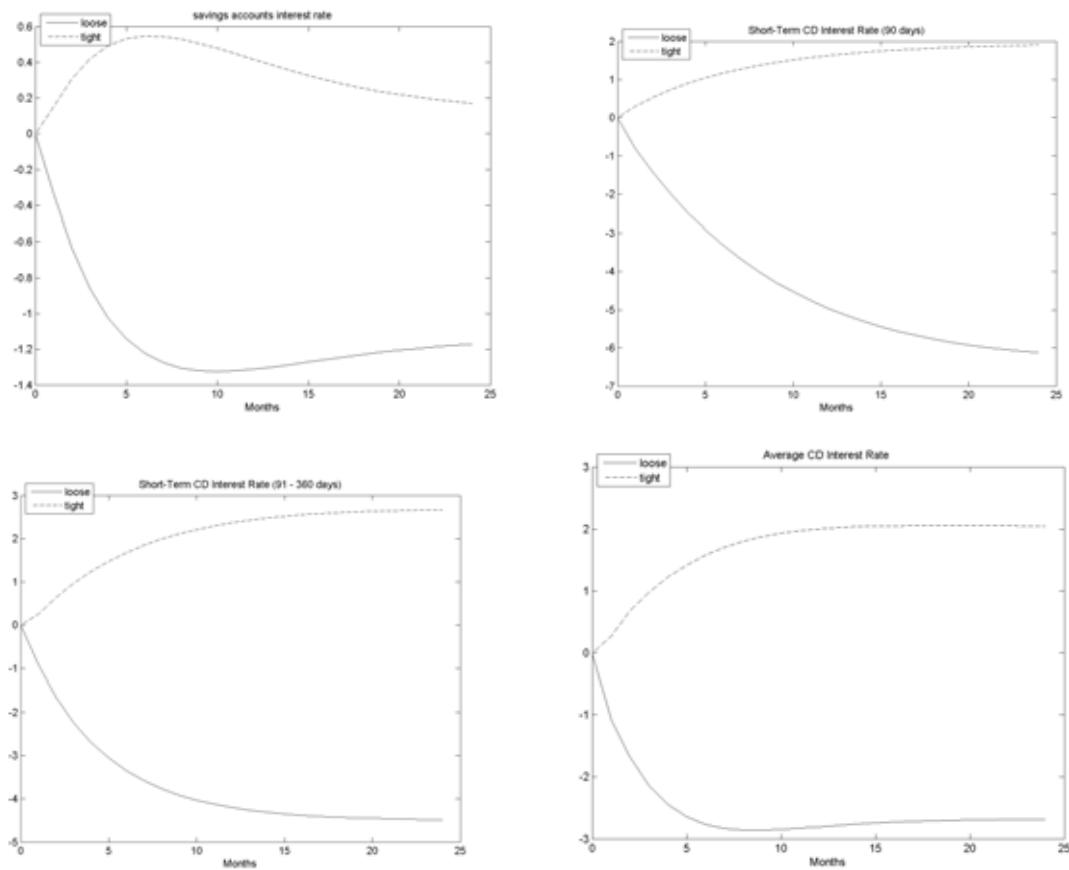


Chart 5  
Impulse response functions for loan  
interest rates Policy rate shock – central bank's  
net creditor position (NCP) effects

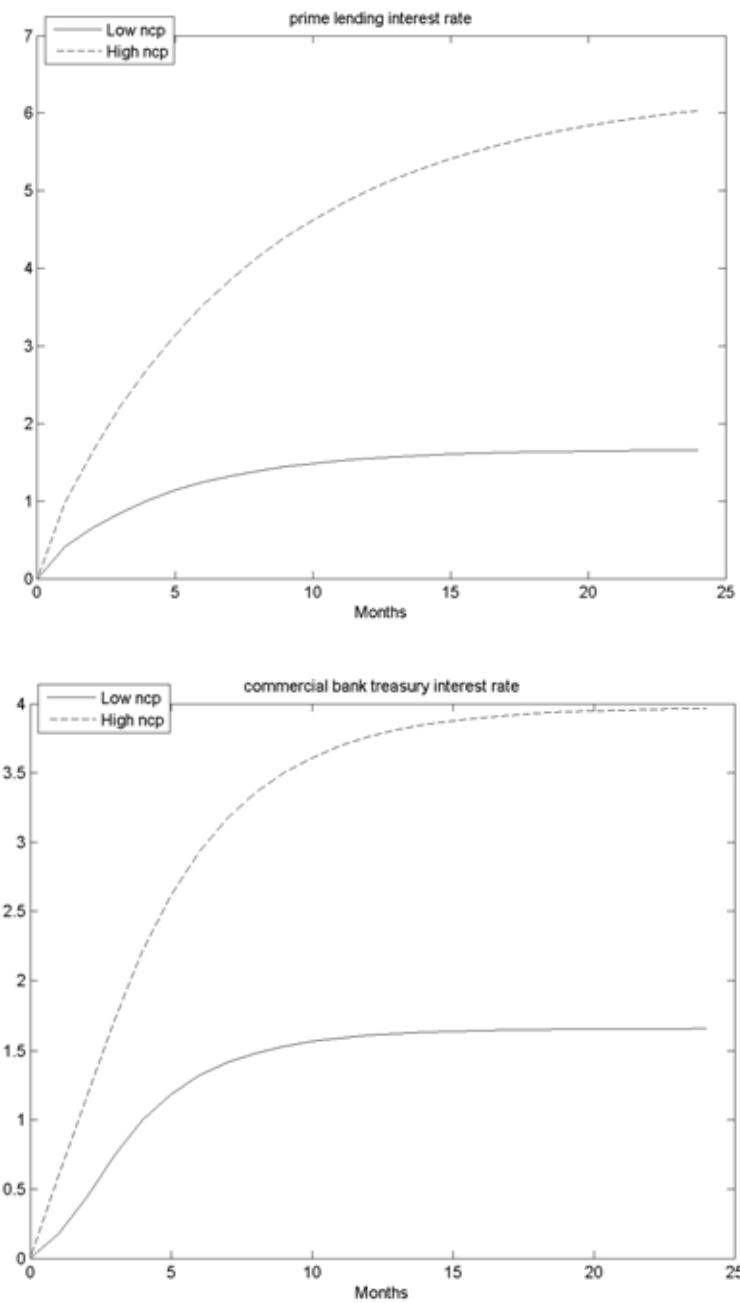
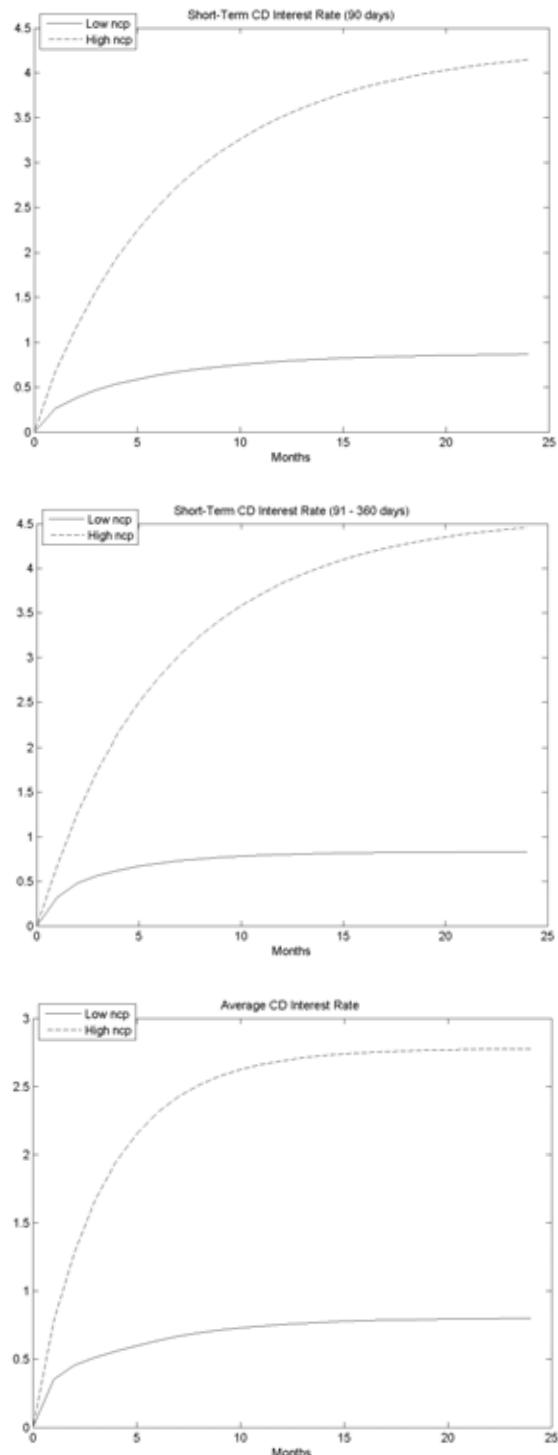


Chart 6  
**Impulse response functions for deposit interest rates Asymmetric response to policy rate changes**



## Appendix 1: Effect of RRs on interest rate pass-through

Betancourt and Vargas (2009) develop a partial equilibrium model of the deposit and credit markets in which risk-averse banks use deposits ( $D$ ) and central bank credit ( $B$ ) to fund loans ( $C$ ). A fraction  $e$  of deposits must be held as RRs. Both credit and deposits have a 2-period maturity, whereas central bank credit has a 1-period maturity. This implies that banks face interest rate risk because the cost of part of the funding of credit may change if the central bank moves the policy interest rate ( $i_b$ ) before loans mature. This risk makes deposit and central bank credit imperfect substitutes. In this setting, Betancourt and Vargas find the following results regarding loan interest rates ( $i_c$ ), deposit rates ( $i_d$ ) and central bank credit ( $B$ ), among others:<sup>14</sup>

$$\frac{di_c}{de} > 0, \quad \frac{di_d}{de} \geq 0 \text{ or } \leq 0, \quad \frac{dB}{de} > 0$$

$$\frac{di_c}{di_{b1}} = \frac{1 + E[i_{b2}] + 2\rho B(1 + i_{b1})Var[i_{b2}]}{1 - \rho(1 + i_{b1})^2Var[i_{b2}](C_{ic}^D - (1 - e)^2 D_{id}^S)} > 0$$

$$\frac{di_d}{di_{b1}} = (1 - e) \frac{di_c}{di_{b1}} > 0$$

$\rho$  is the parameter of constant absolute risk aversion of banks.  $i_{b1}$  and  $i_{b2}$  are the policy interest rates for periods 1 and 2, respectively. Notice that  $i_{b2}$  is a random variable in the beginning of period 1. The loan demand function  $C^D(i_c)$  depends inversely in lending interest rates:  $C_{ic}^D < 0$ . The deposit supply function  $D^S(i_d)$  depends positively on deposit interest rates:  $D_{id}^S > 0$ .

Based on these results, it is possible to calculate the effect of RRs on interest rate pass-

through, namely,  $\frac{d\left(\frac{di_c}{di_{b1}}\right)}{de}$  and  $\frac{d\left(\frac{di_d}{di_{b1}}\right)}{de}$ . Assuming that  $C_{ic}^D$  and  $D_{id}^S$  are constant, these derivates are:

$$\frac{d^2 i_c}{di_{b1} de} = \frac{(1 + E[i_{b2}] + 2\rho B(1 + i_{b1})Var[i_{b2}])(2\rho(1 - e)(1 + i_{b1})^2Var[i_{b2}]D_{id}^S)}{(1 - \rho(1 + i_{b1})^2Var[i_{b2}](C_{ic}^D - (1 - e)^2 D_{id}^S))^2} + \frac{2\rho\left(\frac{dB}{de}\right)(1 + i_{b1})Var[i_{b2}]}{1 - \rho(1 + i_{b1})^2Var[i_{b2}](C_{ic}^D - (1 - e)^2 D_{id}^S)} > 0$$

$$\frac{d^2 i_d}{di_{b1} de} = (1 - e) \frac{d^2 i_c}{di_{b1} de} - \frac{di_c}{di_{b1}} \geq 0 \text{ or } \leq 0$$

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<sup>14</sup> A sufficient condition for these results to hold is  $B \geq 0$ .

Notice that the magnitude of the derivatives  $\frac{di_c}{di_{b1}}$ ,  $\frac{di_d}{di_{b1}}$ ,  $\frac{d^2i_c}{di_{b1}de}$  and  $\frac{d^2i_d}{di_{b1}de}$  depends on the value of central bank credit,  $B$ . The larger it is, the greater the interest rate pass-through and the impact of RRs on interest rate pass-through.<sup>15</sup> A larger reliance on central bank credit implies a higher response of interest rate risk to policy rate increases.

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<sup>15</sup> Mathematically, this can be seen in the expressions for the respective derivatives. In the case of the impact of RRs on interest rate pass-through,  $\frac{dB}{de}$  depends positively on  $B$ , as shown in Betancourt and Vargas (2009).

## Appendix 2: Remuneration-adjusted RRs

The remuneration-adjusted reserve requirement for a particular deposit is the RR ratio without remuneration that yields the same equilibrium prices in quantities in the deposit and credit markets as the official RR ratio with remuneration.

To compute it, the marginal net benefit of a deposit under the official RR ratio with remuneration is equated to the marginal net benefit of a deposit under the remuneration-adjusted RR ratio:

Under the official RR ratio, the marginal net benefit of a deposit for a competitive bank is:  $i_c(1-r) - i_d + r i_r - CMg_d - (1-r) CMg_c$ . Here,  $i_c$  is the nominal lending interest rate,  $i_d$  is the nominal deposit interest rate,  $CMg_d$  is the marginal “operating” cost of deposits,  $CMg_c$  is the marginal “operating” cost of loans,  $r$  is the required reserve ratio and  $i_r$  is the remuneration on the RR. Under the remuneration-adjustment RR ratio, the marginal net benefit of a deposit for a competitive bank is:  $i_c(1-e) - i_d - CMg_d - (1-e) CMg_c$ . Here,  $e$  is the remuneration-adjusted RR ratio.<sup>16</sup>

For the equilibrium that emerges from both RR regimes to be the same, lending and deposit interest rates as well as deposit and loan volumes (and hence marginal costs) must coincide. Thus, the remuneration-adjusted RR ratio may be found by equating the net marginal benefits in each regime:

$$e = r \left( 1 - \frac{i_r}{i_c - CMg_c} \right) \quad (\text{A2-1})$$

If some market power in the loan market or credit risk were allowed, the above expression should be modified as follows:

$$e = r \left( 1 - \frac{i_r}{\kappa i_c - CMg_c} \right)$$

Here,  $\kappa \in (0, 1)$  represents a “markup” term if there is market power or the fraction of interest that is collected if there is credit risk. Notice that the adjustment basically takes into account the fact that the burden of the RR is smaller the larger RR remuneration,  $i_r$ , and the smaller the marginal revenue of a dollar lent (ie the opportunity cost of the RRs).

The expression for the remuneration-adjusted RR ratio ( $e$ ) may be refined to consider all the details that must be included in the net marginal benefit of deposits. In this paper, the basic formula assuming perfect competition (A2-1) is used as a rough approximation. Still, this simple equation has at least two practical problems for empirical purposes. First, “operational” marginal costs of lending are not observed. And, second, if this measure is used in lending interest rate regressions, there will be a strong correlation by construction, since the lending rate is used in the definition of  $e$ .

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<sup>16</sup> Notice that at the bank optimum, both net marginal benefits must be zero.

The second problem was solved by using the average overall lending interest rate for each year of the sample, so that a monthly variation of  $e$  does not reflect lending interest rate changes. The first problem was solved by re-expressing equation (A2-1) as:

$$e = r \left( 1 - \frac{i_r}{i_c \left( 1 - \frac{CMg_c}{i_c} \right)} \right) \quad (A2-2)$$

and calculating the term  $\frac{CMg_c}{i_c}$  as:

$$\frac{CMg_c}{i_c} \approx \left( \frac{\text{Total Operating Cost}}{\text{Total Loan Interest Revenue}} \right) \left( \frac{\text{Loans}}{\text{Total Assets}} \right)$$

ie marginal costs of loans are approximated by average costs. The latter, in turn, are estimated on the basis of an attribution of total operating costs<sup>17</sup> to loans according to the fraction of loans in total assets or in the aggregate Loans + Deposits.

Formula (A2-2) was used to calculate the remuneration-adjusted RR ratio for each type of deposit  $j = \{\text{Checking Accounts and Sight Deposits, Savings Accounts, CD and Bonds with maturities} \leq 18 \text{ months}\}$ . When there were marginal RRs (without remuneration), a weighted average of remuneration-adjusted average and marginal RR ratios was computed using the amounts of deposits subject to average and marginal RRs to construct the weights. Hence, for each month,  $t$ , and deposit,  $j$ , in the sample there are estimates of remuneration-adjusted RR ratios,  $e_{j,t}$ .

Finally, two measures of aggregate remuneration-adjusted RR ratios were calculated:

$$RARR_{h,t} = \sum_j \phi_{j,t} e_{j,t} \quad (A2-3)$$

$$RARR_{c,t} = \sum_j \bar{\phi}_j e_{j,t} \quad (A2-4)$$

(A2-3) allows for changes in deposit composition over time. In contrast, (A2-4) uses a fixed deposit composition, corresponding to the sample average (May 2002–November 2009).

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<sup>17</sup> Total operating costs include fees, personnel and depreciation of fixed assets.

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# The international banking crisis and domestic financial intermediation in the Czech Republic

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The global financial crisis did not significantly affect the Czech banking sector. Due to its massive deposit base, the Czech banking sector did not suffer from a lack of liquidity during the crisis. In contrast to most other European countries, the Czech Government did not have to provide any subsidies to the banking sector. However, in response to the malfunctioning of the money market, the Czech National Bank (CNB) introduced extraordinary liquidity-providing repo operations with two-week and three-month maturities. The purpose of those instruments was also to support the functioning of the government bond market by allowing government bonds to be used as eligible collateral. With regard to the Czech economy as a whole, the effects of the crisis were more visible. The Czech Republic, as a small, export-oriented country, is vulnerable to external factors and the reduced demand, especially in western countries, resulted in a decline in GDP and an increase in the unemployment rate. According to the Czech Statistical Office, GDP adjusted for price, seasonal and working day effects fell by 3.1% in Q4 2009 in comparison to Q4 2008. By contrast, GDP increased by 0.7% compared to Q3 2009. Total employment adjusted for seasonal effects dropped in Q4 2009 by 1.9% year-on-year and increased by 0.2% quarter-on-quarter. Over the course of 2009, real GDP fell by 4.1% compared to the previous year, while employment fell by 1.2% on average. Nevertheless, it is important to point out that the decline in GDP and the growth in the unemployment rate were much more moderate than in other central and eastern European countries. This paper will further describe the effects of the crisis on financial intermediation in the Czech Republic, eg changes in domestic and cross-border lending both on the interbank markets and to the corporate sector, changes in bank funding and the effects of the crisis on the Czech money, foreign exchange (FX) and derivatives markets as well as the responses of the CNB to the new situation and newly emerging risks.

The terms (maturities, spreads, collateral, etc) in which cross-border lending takes place did not change significantly in the case of the Czech Republic during the crisis. The Czech banking sector has systemic liquidity surplus and, therefore, tends to be a creditor in cross-border interbank lending (see Table 1). Most banks operating on the Czech market are subsidiaries of large European internationally active banks, which implies that cross-border interbank lending mostly takes the form of intragroup transactions. The CNB has no evidence that the tightening of banks' lending policies that started in autumn and winter 2008 was accompanied by a loosening of parent funding of Czech subsidiaries or branches. Such loosening was not necessary because in 2007, 2008 and 2009 Czech banks achieved record profits. Moreover, parent funding is not a major source of funding for Czech banks (see Tables 5 and 7). On the other hand, conditions in the domestic money market were tighter than before the crisis.

Cross-border bank lending to the corporate sector is predominantly provided by EU banks benefiting from the free movement of services under the single licence. A total of 276 banks from EU Member States that had notified the CNB of such activity were prepared to provide banking services on that basis at the end of 2009. They are able to offer banking services, including loans, without establishing a branch in the Czech Republic, pursuant to Article 21 of Directive 2000/12/EC of the European Parliament and of the Council. As in many other EU Member States, the aforementioned banks are not subject to a reporting duty to the host country and their operations in the Czech market are not subject to CNB supervision. The number of banks that notified the CNB of their provision of cross-border services in the Czech Republic increased by 24 in 2009.

**Table 1**  
**Cross-border borrowing and lending of the Czech banking sector**

	<b>1/07</b>	<b>2/07</b>	<b>3/07</b>	<b>4/07</b>	<b>1/08</b>	<b>2/08</b>	<b>3/08</b>	<b>4/08</b>	<b>1/09</b>	<b>2/09</b>	<b>3/09</b>	<b>4/09</b>
Cross-border lending to banks	260.7	312.5	277.4	312.2	335.7	401.8	387.3	329.2	315.3	309.3	271.7	284.5
Cross-border borrowing from banks	204.3	238.7	267.7	266.1	298.0	336.7	321.4	342.9	305.1	277.9	268.8	278.9
Saldo	56.4	73.8	9.7	46.2	37.7	65.1	65.9	-13.7	10.1	31.4	2.9	5.6

Quarterly data in CZK billion.

Source: CNB data for monetary statistics.

Cross-border bank lending to the Czech economy in the second half of 2008 followed the rising trend of previous years. However, in the first half of 2009, lending decreased from CZK 702 billion to CZK 631 billion (EUR 27 billion to EUR 24 billion), mainly due to the decline of interbank loans by CZK 64 billion (see Tables 1 and 2). The increase in this segment of cross-border lending in the last quarter of 2008 probably substituted the sharp liquidity drop in the spot and outright forward markets during the winter. The subsequent decrease in 2009 can be attributed both to the improving liquidity of the markets and to the downturn in the Czech economy that was accompanied by a protracted contraction of exports and imports as well as by a decrease in cross-border and domestic loans to the corporate sector.

**Table 2**  
**Cross-border lending by creditors**

	<b>Foreign banks</b>	<b>Government institutions</b>	<b>Multilateral institutions</b>	<b>Suppliers and direct investors</b>	<b>Other investors</b>
1/07	525.3	8.7	104.2	256.3	318.9
2/07	562.1	8.7	105.7	264.8	360.1
3/07	587.4	8.7	107.4	263.0	347.6
4/07	583.4	8.7	102.1	292.6	387.9
1/08	612.8	7.2	104.5	268.1	388.4
2/08	657.1	7.2	109.3	308.2	426.9
3/08	662.1	7.2	120.5	337.8	459.2
4/08	702.5	7.2	123.6	346.4	427.7
1/09	669.6	5.7	123.2	340.7	415.8
2/09	621.9	5.7	123.6	320.5	447.1
3/09	599.1	5.7	127.5	286.2	446.2
4/09	630.8	5.7	136.6	296.1	520.5

Quarterly data in CZK billion.

Note: Data regarding cross-border lending from balance of payment statistics are only partially comparable with data regarding domestic lending from banking statistics.

Source: CNB data for monetary statistics.

**Table 3**  
**Cross-border lending by debtors**

	<b>CNB</b>	<b>Commercial banks</b>	<b>Government</b>	<b>Other sectors</b>
1/07	0.6	283.4	256.3	673.0
2/07	0.7	338.7	271.3	690.8
3/07	1.8	367.4	263.2	681.7
4/07	1.2	382.0	274.4	717.0
1/08	0.5	433.2	269.5	677.9
2/08	0.2	469.0	316.4	732.2
3/08	0.7	474.5	325.0	786.6
4/08	1.8	482.4	295.4	827.8
1/09	1.5	444.2	280.6	828.9
2/09	1.8	407.4	313.7	796.0
3/09	1.9	395.3	320.3	747.3
4/09	3.7	410.4	364.1	811.5

Quarterly data in CZK billion.

Note: Data regarding cross-border lending from balance of payment statistics are only partially comparable with data regarding domestic lending from banking statistics.

Source: CNB data for monetary statistics.

In the second and third quarters of 2009, cross-border lending to the corporate sector declined by more than CZK 80 billion in total, mainly due to a decrease in loans granted by suppliers and direct investors (Table 2). This decrease was probably caused by demand factors, ie the downturn in the Czech economy and the continued contraction of exports and imports. The adverse impact of the credit contraction on financial conditions in the corporate sector was significant because, first, the sector largely depends on foreign borrowing and, second, because of the simultaneous decrease in corporate loans granted by the Czech banking sector (Table 4). The fourth quarter of 2009 brought an economic revival accompanied by the increase in cross-border lending to the corporate sector amounting to almost CZK 65 billion. In contrast, financing by the Czech banking sector trended downwards during 2009.

As of 1 January 2010, the Czech banking sector consisted of 21 banks and 18 branches of foreign banks. A total of 96% of the sector's total assets was controlled by foreign owners. The remaining 4% was held by two state-controlled banks specialising mainly in export and business promotion (Česká exportní banka and Českomoravská záruční a rozvojová banka) and one small domestically owned private bank. The structure of the banking sector has been fairly stable since the privatisation of large banks at the beginning of the 21st century. By taking account of these facts, it would be misleading to analyse the different behaviour of foreign and domestically owned banks.

Table 4  
**Domestic and cross-border lending to the corporate sector**

	<b>Czech banks' lending to the corporate sector</b>	<b>Cross-border bank and non-bank lending to the corporate sector</b>	<b>Ratio of cross-border lending to domestic lending</b>
1/07	763.9	673.0	88.1%
2/07	819.5	690.8	84.3%
3/07	870.1	681.7	78.3%
4/07	903.6	717.0	79.4%
1/08	919.6	677.9	73.7%
2/08	979.4	723.2	73.8%
3/08	1,018.2	786.6	77.3%
4/08	1,020.8	827.8	81.1%
1/09	1,008.4	828.9	82.2%
2/09	993.2	796.0	80.1%
3/09	970.9	747.3	77.0%
4/09	946.3	811.5	85.8%

Quarterly data in CZK billion.

Note: Data regarding cross-border lending from balance of payment statistics are only partially comparable with data regarding domestic lending from banking statistics.

Source: CNB data for monetary statistics.

With regard to the maturity of bank funding, Table 5 shows that, in the second half of 2008 as well as throughout 2009, the shares of medium- and long-term liabilities grew slightly and the shares of the shortest-term maturities decreased somewhat. These facts, together with the fairly stable share of liabilities with an undetermined maturity, indicate that the crisis caused neither a liquidity strain nor an infringement of trust of Czech banks' creditors. Nevertheless, the crisis caused some damage. For example, in August 2009 the rating agency Moody's downgraded the domestic-currency deposit ratings of the largest Czech banks, ČSOB, Česká spořitelna and Komerční banka, by one notch from Aa3 to A1. However, this downgrade was the agency's reaction to the global financial crisis, the emerging economic recession and related concerns over whether the local government would potentially be able to provide banks with any financial assistance because of the recent situation regarding the Czech Parliament.

Table 6 demonstrates that clients', ie non-bank, deposits (residents and non-residents) are the most important source of funding for the Czech banking sector. Such deposits were growing steadily, with the exception of Q4 2008 and Q3 and Q4 2009 when the growth was interrupted by a decrease in deposits of government institutions (household deposits continued to rise). There were virtually no loans granted by the CNB, and interbank lending represented roughly 10% of funding. Cross-border interbank loans represented approximately two thirds of the total interbank lending figure. The Czech banking sector has a systemic surplus of liquidity and interbank lending to Czech banks is not a major source of funding for the Czech banking sector. Data also indicate that the structure of the Czech banking sector's funding has been fairly stable; the crisis did not cause any significant changes to that structure.

**Table 5**  
**Maturity of the banking sector's liabilities**

In per cent

	1W	1Y	5Y	More than 5Y	Not determined
1/07	52.75	22.50	10.02	4.26	10.47
2/07	52.24	24.77	8.73	4.30	9.96
3/07	54.22	23.50	7.87	4.85	9.57
4/07	53.65	23.71	6.62	6.23	9.80
1/08	53.30	23.87	6.06	5.94	10.84
2/08	51.96	26.03	5.81	5.67	10.54
3/08	51.02	25.46	6.61	6.18	10.73
4/08	49.43	24.47	7.62	6.57	11.91
1/09	48.44	25.38	8.02	6.63	11.53
2/09	48.77	25.56	8.21	6.83	10.62
3/09	48.65	25.07	8.37	7.14	10.77
4/09	47.72	25.51	8.63	7.22	10.91

Quarterly data as ratios.

Note: 1W means (<=) than one week, 1Y means (<=) than one year, 5Y means (<=) than five years.

Source: CNB data for banking supervisory purposes (note that this dataset is collected according to a different methodology than the dataset collected for monetary statistics purposes).

**Table 6**  
**Interbank deposits versus other sources**

	Total balance sheet liabilities	Clients' deposits	Interbank loans – cross-border lending	Interbank loans – Czech banks	Clients' deposits	Bonds	Capital and other balance sheet liabilities
1/07	3,331.4	2,203.2	6.1%	3.2%	66.1%	5.4%	19.0%
2/07	3,546.4	2,317.6	6.7%	4.0%	65.4%	5.6%	18.3%
3/07	3,638.6	2,350.2	7.4%	4.3%	64.6%	5.9%	17.9%
4/07	3,708.2	2,369.0	7.2%	3.7%	63.9%	6.9%	18.4%
1/08	3,879.6	2,455.0	7.7%	3.4%	63.3%	6.4%	19.2%
2/08	4,080.6	2,562.2	8.3%	3.9%	62.8%	6.1%	18.9%
3/08	4,128.3	2,608.1	7.8%	3.7%	63.2%	6.5%	18.8%
4/08	4,153.4	2,566.9	8.3%	2.8%	61.8%	6.5%	20.7%
1/09	4,248.9	2,666.1	7.2%	3.6%	62.7%	6.4%	20.1%
2/09	4,222.7	2,739.0	6.6%	3.6%	64.9%	6.5%	18.4%
3/09	4,179.7	2,722.9	6.4%	3.4%	65.1%	6.7%	18.3%
4/09	4,223.1	2,698.2	6.6%	4.2%	63.9%	7.0%	18.4%

Quarterly data in CZK billion for total liabilities and clients' deposits, % for remaining columns.

Source: CNB data for monetary statistics.

The funding of the Czech banking sector has a strong and steadily growing retail deposit base. Although bond issuance plays a supplementary role, it nevertheless grew considerably in the fourth quarter of 2007, causing a year-on-year increase in the ratio of bonds to retail deposits by 5%; that ratio remained fairly stable thereafter and the crisis did not cause any major shift from retail deposits to funding via capital markets or vice versa.

Table 7  
Retail deposits versus markets

	Bonds	Household deposits	Quarterly growth of bonds	Quarterly growth of retail deposits	Ratio of bonds to retail deposits
1/07	181.3	1,207.0	6.5%	2.8%	15.0%
2/07	198.3	1,254.0	9.3%	3.9%	15.8%
3/07	213.5	1,268.4	7.7%	1.1%	16.8%
4/07	254.0	1,289.5	19.0%	1.7%	19.7%
1/08	247.4	1,323.4	-2.6%	2.6%	18.7%
2/08	248.9	1,367.2	0.6%	3.3%	18.2%
3/08	267.0	1,399.5	7.3%	2.4%	19.1%
4/08	269.5	1,439.8	0.9%	2.9%	18.7%
1/09	270.8	1,494.5	0.5%	3.8%	18.1%
2/09	275.1	1,513.5	1.6%	1.3%	18.2%
3/09	281.0	1,518.4	2.1%	0.3%	18.5%
4/09	293.8	1,551.3	4.6%	2.2%	18.9%

Quarterly data in CZK billion.

Source: CNB data for monetary statistics.

The crisis caused a stagnation of loans granted by the Czech banking sector to clients in 2009. The maturity structure of the loans changed slightly in favour of long-term loans.

The crisis strengthened a long-term trend of an increase in the share of loans to households in the Czech banking sector's portfolio accompanied by a downturn in corporate loans.

With regard to direct loans and investments in debt securities, the share of loans to clients in total assets of the Czech banking sector is more than twice as large as the share of tradable debt securities. The crisis did not significantly change that structure.

The recession in the first half of 2009 motivated Czech banks to moderately increase the share of quick assets in their balance sheets. At end-2007, this share was 23.7%, and in December 2008 it decreased to 23.0%. However, in the first quarter of 2009, this share reached 25.5% and in June it climbed to 26.5%. The quick assets include cash, claims on central banks, claims on credit institutions repayable on demand and bonds issued by central banks and general government, except for non-marketable bonds included under the loans and receivables portfolio.

Beside the facts mentioned above, the global financial crisis affected the local money market. As in all other countries, the money market yield curve declined sharply following interest rate cuts by the CNB. The short end of the curve declined more than the long end, leading the curve to steepen. The 1Y Pribor spread versus the monetary policy rate increased to

81 basis points from 23 basis points the previous year, while the bid-ask spreads and Pribor-OIS spreads widened.

**Table 8**  
**Maturity of loans to clients**

	<b>Total loans to clients</b>	<b>Short-term</b>	<b>Medium-term</b>	<b>Long-term</b>
1/07	1,471.9	23.1%	19.9%	57.0%
2/07	1,591.2	23.1%	19.7%	57.2%
3/07	1,686.2	23.6%	19.2%	57.1%
4/07	1,784.0	24.4%	18.1%	57.4%
1/08	1,831.8	24.0%	18.3%	57.7%
2/08	1,938.5	25.4%	17.5%	57.2%
3/08	2,029.4	25.4%	17.2%	57.4%
4/08	2,075.7	22.6%	17.4%	60.0%
1/09	2,078.8	19.8%	18.1%	62.1%
2/09	2,091.4	20.2%	16.6%	63.2%
3/09	2,091.3	19.5%	15.8%	64.7%
4/09	2,102.1	18.4%	15.1%	66.5%

Quarterly data in CZK billion for total loans.

Loans to clients, ie non-banks, residents and non-residents.

Source: CNB data for monetary statistics.

The volumes traded by banks are strongly concentrated in short maturities, while trading above one month is virtually non-existent. Most of the trading activity remains overnight unsecured lending. Secured lending transactions remain rare. The reassessment of interbank credit lines led to reduced lending activity and some credit lines were cut to zero. Client-based financing and FX swaps with parent banks thus became more important for many banks.

The crisis and related lack of confidence between banks also caused some difficulties on the Czech capital market. Market-making on Czech government bonds between banks was limited but there was still a well-functioning market between banks and their clients and brokered interbank trading. Bid-ask spreads increased. The primary market worked quite well for T-bills and most auctions were oversubscribed at very low yields.

Due to the difficulties in many local currency government debt markets, the government risk premium (measured by credit default swaps (CDS)) increased, peaking at 350 basis points. In addition, the Ministry of Finance cancelled some of the planned auctions, reduced offered volumes and switched to the monthly publication of auctions.

The situation on the Czech FX market was also influenced by the crisis, leading to a sharp liquidity drop in the spot and outright forward markets, mainly during the winter. The current situation has more or less stabilised, although the liquidity still seems to be slightly subdued compared to the period prior to the collapse of Lehman Brothers. Liquidity in the FX swap market was reduced only for a couple of weeks. Local banks also started to show a preference for using the FX market rather than the money market to steer their liquidity in FX currencies.

Table 9  
**Corporate versus household loans**

	<b>Corporate sector</b>	<b>Households</b>	<b>Ratio of corporate to household loans</b>
1/07	763.9	561.3	136.1
2/07	819.5	604.2	135.6
3/07	870.1	646.8	134.5
4/07	903.6	707.8	127.7
1/08	919.6	737.4	124.7
2/08	979.4	778.1	125.9
3/08	1,018.2	818.4	124.4
4/08	1,020.8	851.5	119.9
1/09	1,008.4	870.8	115.8
2/09	993.2	896.6	110.8
3/09	970.9	919.2	105.6
4/09	946.3	940.5	100.6

Quarterly data in CZK billion and ratio in %.

Source: CNB data for monetary statistics.

In relation to derivatives markets, Czech banks mostly trade in standard derivative contracts, ie FRA, IRS and FX swap, and three aspects of these contracts changed. First, there was a decrease in the liquidity of longer-term maturities; second, some credit lines were reduced due to the higher volatility in 2008 that caused an increase in VaR values of exposures; and, finally, banks adjusted their limits for certain counterparty exposures more frequently in response to information received concerning the respective counterparty.

The Czech banking sector and the Czech financial market as a whole were, of course, affected by the global financial crisis. Nevertheless, the crisis did not cause significant damage to the Czech financial system and there was no need for the Czech authorities to take any drastic action to provide financial subsidies to the banking sector. Given the systemic liquidity surplus in the Czech banking sector, the main monetary policy instrument of the CNB is liquidity-sterilising repo tenders. However, the malfunctioning of the money market during the financial crisis led to the situation whereby some market participants lacked liquidity rather had a surplus. In response to this situation, the CNB introduced, in autumn 2008, liquidity-providing repo operations with two-week and three-month maturities. The purpose of those instruments was also to bolster the functioning of the government bond market by allowing government bonds to be used as eligible collateral.

The liquidity-providing repo operations were mostly used at the end of 2008 and the beginning of 2009 with the maximum outstanding amount of CZK 38 billion. The scheme has been deemed a success and it will probably remain available until the end of 2010. In addition to introducing liquidity-providing repos, CZK/EUR currency swaps were offered to commercial banks. The purpose of this was to support the CZK liquidity of foreign bank branches. However, this instrument was infrequently used, with a maximum outstanding amount of EUR 40 million.

CNB monetary decisions to cut interest rates are guided by unconditional inflation forecasts using a DSGE macro model, which assumes an exchange rate reaction to changes in

interest rates. Some exchange rate depreciation is therefore a desirable effect of interest rate cuts. However, fast koruna depreciation at the beginning of 2009 (January and the first half of February) was considered unreasonable by the February 2009 forecast and the forecast expected a correction. Exchange rate development was also discussed during the February 2009 board meeting (see February 2009 minutes: "The Board agreed that the exchange rate was encumbered with considerable uncertainty, but that a weaker exchange rate would reduce the scope for lowering monetary policy rates.") and considered to be a risk to the forecast. At the end, the board decided, broadly in line with the forecast, to cut interest rates by 0.5 percentage points. The decision was accompanied by verbal interventions against the weak CZK. Consequent exchange rate development, when the koruna appreciated to 25.50 CZK/EUR in summer 2009, confirmed our expectations.

The CNB has not intervened on the FX market since 2002. Therefore, the Czech exchange rate regime is classified as free floating. Our policy has been to intervene only under exceptional circumstances, when the exchange rate diverges from fundamentals over a long period of time and poses a threat to the economy. Verbal interventions are more frequently used, mainly because of shorter-term deviations, with the purpose of conveying CNB concerns regarding exchange rate developments to markets. This philosophy did not change with the crisis.

The Czech authorities have not taken any measures to support foreign currency refinancing. The vast majority of commercial loans provided by Czech banks, local subsidiaries and branches of foreign banks are denominated in CZK (foreign loans represent less than 20% of total loans in the case of companies and almost 0% in the case of households). In the situation of falling foreign trade, there was no urgent need to provide commercial banks with additional foreign currency liquidity.

Although no additional measures have been taken, proactive communication and forward-looking elements in the CNB's monetary policy decision-making might have had a stabilising effect.



# **Dislocations in the FX swap and money markets in Hong Kong SAR during the global credit crisis of 2007–08**

Laurence Fung and Ip-wing Yu<sup>1</sup>

## **I. Introduction**

The subprime crisis emerged in the United States in mid-2007 and spilled over to other economies. From mid-2007 to mid-2008, the spillovers were relatively modest, but the situation began to change in mid-2008. Following the bankruptcy of Lehman Brothers in mid-September 2008, developments took a dramatic turn. One channel for those spillovers was severe disruptions in international money markets. Uncertainty about losses incurred by banks increased banks' liquidity needs as well as their reluctance to lend to each other in money markets. Reflecting these, and possibly other, factors, interbank short-term interest rates surged substantially after the failure of Lehman Brothers and persisted at high levels, prompting central banks around the world to adopt unprecedented policy measures to supply funds to banks. The Hong Kong dollar (HKD) money market was also hit hard by the liquidity squeeze.<sup>2</sup> The turbulence in the global interbank markets also spilled over to the foreign exchange (FX) swap markets, including in Hong Kong SAR. In response to the stress in the local financial markets, the Hong Kong Monetary Authority (HKMA) and the Hong Kong SAR Government announced a series of measures to help contain the global stresses from spilling over to the domestic banking system.

In this paper, we examine the anomalies and distress experienced in the local financial markets and attempt to provide answers to the following questions:

1. To what extent was the distress that originated from US dollar (USD) money markets transmitted to the HKD money market?
2. How effective were the policy actions undertaken by the HKMA and the Hong Kong SAR Government in mitigating the stress within the interbank market in Hong Kong SAR?
3. To what extent did the policy actions help to improve the efficiency of the money and FX swap markets in Hong Kong SAR?

## **II. Transmission of term funding shock and volatility linkage**

In this study, we look at the Hibor-OIS spread as the indicator of interbank stress. This interbank stress indicator is derived by subtracting the HKD overnight index swap (OIS) rate of corresponding maturity from the Hong Kong interbank offered rate (Hibor) of the same

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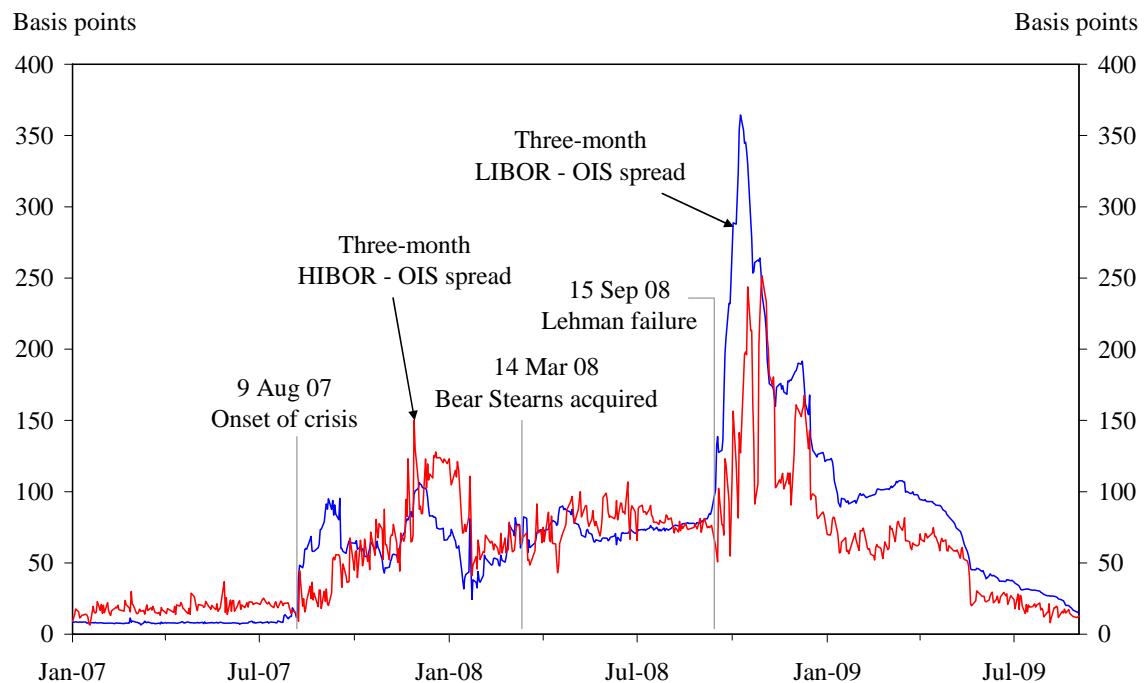
<sup>1</sup> Research Department, Hong Kong Monetary Authority.

<sup>2</sup> Note that in this paper the words "money market" and "interbank market" are interchangeable.

maturity,<sup>3</sup> and is relevant to central banks in their assessment of interbank market distress and applicable policy actions.<sup>4</sup>

Chart 1 shows the three-month Hibor less the three-month OIS rate (the Hibor-OIS spread) against that of the USD (the Libor-OIS spread) from January 2007 to September 2009. It can be seen that, before the onset of the crisis on 9 August 2007, the Hibor-OIS spread averaged around 18.5 basis points (bp), compared to 8.4 bp of its USD counterpart.<sup>5</sup> As the financial crisis unfolded, the HKD money market responded to the developments in international financial markets with a sharp increase in the Hibor-OIS spread. With an increasing number of international banks reporting substantial asset writedowns due to subprime-related investments and the collapse of Lehman Brothers in September 2008, both HKD and USD interbank stress series rose sharply from late September to mid-October 2008. Global efforts to support financial stability and confidence in the banking system finally eased the stress in the money markets in November–December 2008.

Chart 1  
Three-month Hibor-OIS and Libor-OIS spreads



Source: Bloomberg.

<sup>3</sup> In principle, the interbank rate of a given tenor reflects the current and expected future overnight interest rate and premia associated with liquidity and credit risks. The OIS rate, meanwhile, is closely related to the average overnight interest rate expected to prevail over the term of the swap. The spread between the interbank rate and the OIS rate can be used as an indicator to gauge the level of stress in the interbank market. A widened interbank rate-OIS spread reflects the increase in liquidity and/or counterparty default risks.

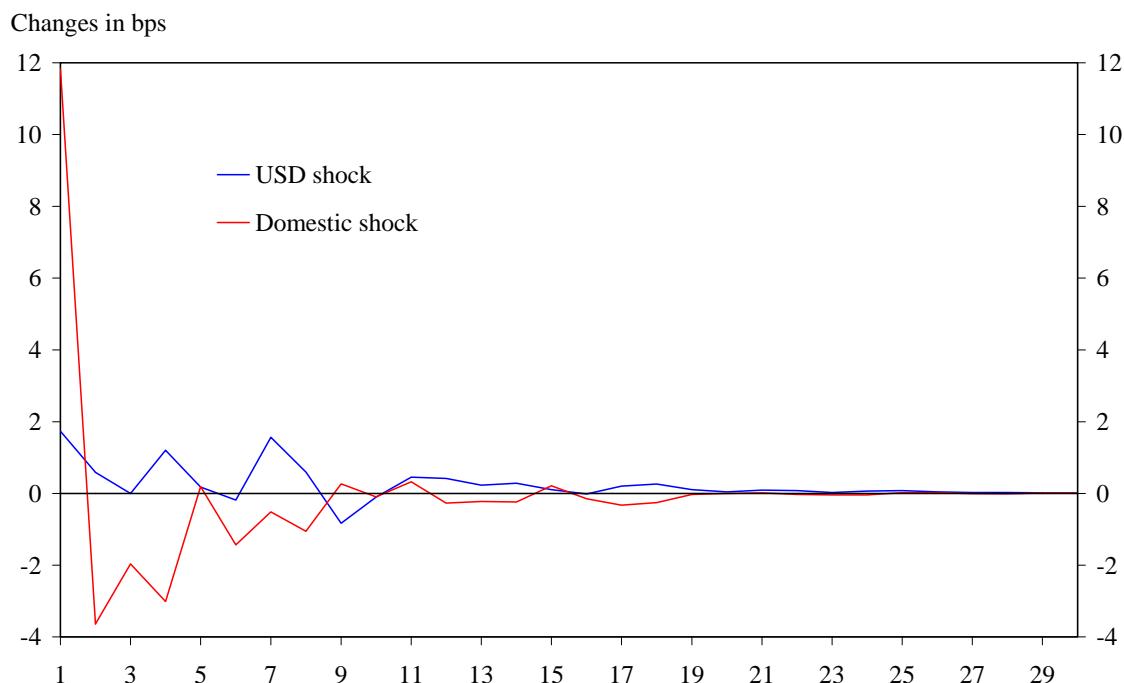
<sup>4</sup> Throughout the paper, the interbank stress indicator for the money markets under study will be referred to as the interbank stress of the respective money market.

<sup>5</sup> We follow Taylor and Williams (2008) and choose 9 August 2007 as the onset of the turmoil when BNP Paribas froze redemptions for three of its investment funds.

One possible transmission mechanism of the USD shock to the HKD money market during the crisis may have been the increased use of the HKD money market to secure USD funding. As noted in Imaikubo et al (2008), financial institutions were facing a shortage of USD funding when the USD Libor surged to an unprecedented level. US banks, which encountered increased financing difficulties and had to preserve funds on hand, were reluctant to lend their USD to peers. To secure USD funds, non-US financial institutions increased their borrowings in currencies other than USD and actively converted them into USD through FX swaps. Such a strategy could have led to the tightening of conditions in the HKD money market.<sup>6</sup>

The dynamic interrelationship between the USD and HKD interbank stress series is examined through the impulse response function of a bivariate vector error correction model (VECM).<sup>7</sup> Chart 2 shows the responses to changes in HKD interbank stress to a one-standard-deviation innovation in the changes in the USD series as well as in its own series for a period up to 30 days.<sup>8</sup>

Chart 2  
**Responses to changes in HKD interbank stress to one-standard-deviation of USD and domestic shocks**



Source: HKMA estimates.

<sup>6</sup> Gengberg et al (2009) analyse the link between the turbulence in money markets and the FX swap markets.

<sup>7</sup> For details, see Fung and Yu (2009a).

<sup>8</sup> An innovation refers to a shock to the random disturbance term on a series in the VECM system. Through the dynamic structure of the VECM system, a shock to one of the series is also transmitted to the other series in the system.

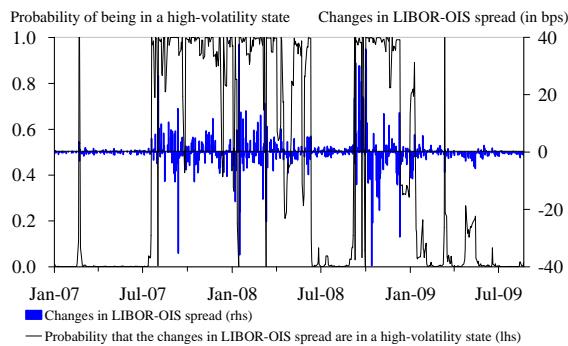
Chart 2 shows that the responses to the USD shock are gradual and persistent. The impact from the USD shock dies out to zero after 15 days. In relation to the impact of domestic shocks on its own money market, while overwhelming on the first day, the impact rapidly dies out to zero after nine days.

The results from the impulse response function show that the changes in HKD term funding stress are subject to pronounced and persistent influences from the USD shock. Hence, it appears that changes in interbank stress in the USD money market fed through to the HKD interbank market. This result is not surprising, as Hong Kong SAR is a small and open economy with a Linked Exchange Rate System (LERS), linking the Hong Kong dollar to the US dollar, and an international financial centre with some of the major international financial institutions participating in the local interbank market. In fact, as the funding stress first unfolded in the USD money market, exerting heavy pressure on many major international financial institutions, their ability to obtain term funding in the local interbank market could also have been affected.<sup>9</sup>

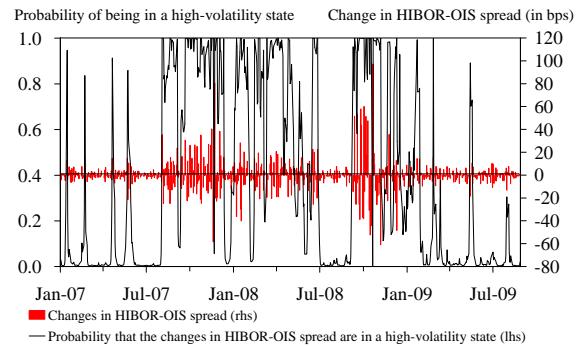
The above finding provides an assessment of the transmission of money market tensions from USD to HKD. If the variations in these interbank stress series are highly synchronised, the linkages may have implications for financial stability. To further examine whether these interbank stresses are synchronised, we model the possible switch in variance regimes by using a univariate regime-switching ARCH (SWARCH) model with two volatility regimes to identify periods of unusually high volatility. The graphs in Chart 3 feature the smoothed probabilities of the high-volatility state in each money market's interbank stress along with the changes in interbank rate-OIS spreads.<sup>10</sup>

Chart 3  
**Smoothed probabilities of being in a high-volatility state and changes in interbank stress**

The United States



Hong Kong SAR



Source: HKMA estimates.

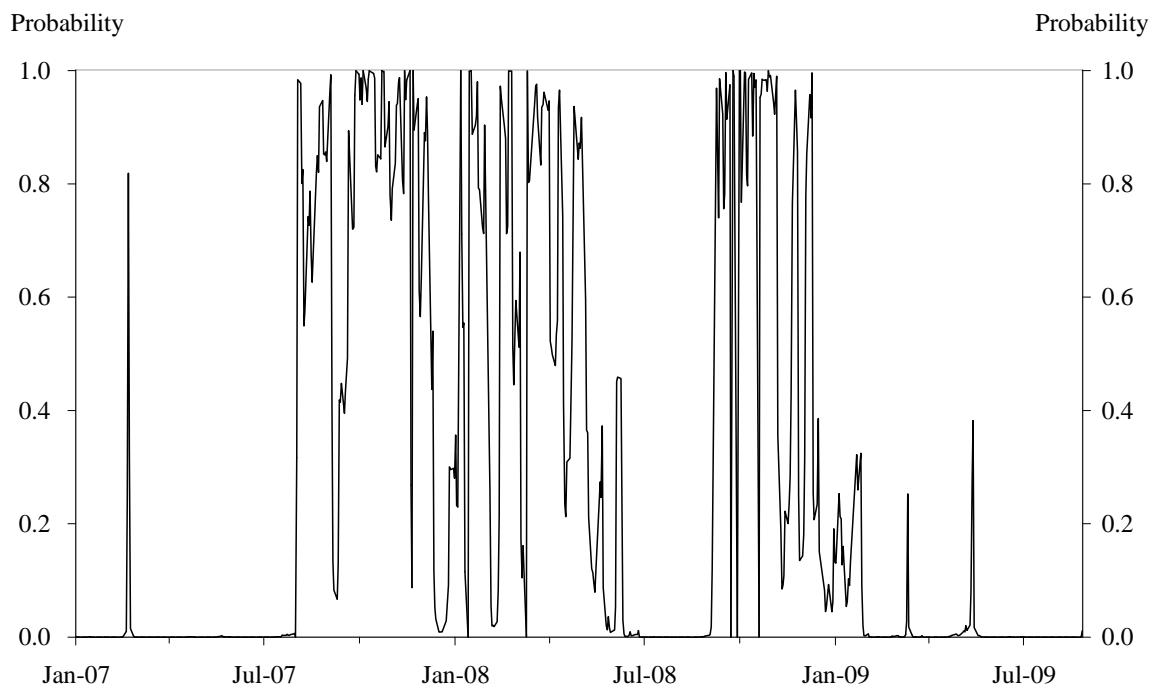
<sup>9</sup> This may be due to the reappraisal of counterparty risks and the need to preserve liquidity by local banks.

<sup>10</sup> The smoothed probability provides information about the likelihood that the changes in spread are in a particular volatility state at time  $t$  based on the full sample of observations.

By comparing the pattern of the smoothed probabilities across the USD and HKD money markets, it is possible to examine whether the high-volatility state occurred concurrently during the financial turmoil from the second half of 2007. As shown in Chart 3, the daily changes in interbank stress in the two money markets experience high volatility simultaneously on several occasions, such as in August 2007 and mid-September 2008, suggesting that a volatility linkage or co-movement exists between the money markets. The interbank stress in the two money markets had shifted to a low-volatility state by the end of January 2009.

The univariate SWARCH model is extended to a bivariate one in order to examine the issue of volatility linkages, especially in the high-volatility state. Chart 4 graphs the smoothed probabilities when the interbank stresses of the USD and HKD money markets are both in a high-volatility state. If we focus on the situation in September 2008, the money market pairs responded significantly to the collapse of Lehman Brothers and shifted to a high-volatility state for over a month. Therefore, a very significant adverse shock (ie a substantial increase in the variations of interbank stress) in the USD money market might have a destabilising impact on the HKD money market.

Chart 4  
**Smoothed probabilities of both markets in a high-volatility state**



Source: HKMA estimates.

Results from the bivariate SWARCH estimation show that the expected duration for the USD and HKD money markets to jointly be in a high-volatility state is 5.5 days. That means, on average, that the two money markets are expected to stay in the high-volatility state for 5.5 days before they shift into other states of volatility. Hence, the expected duration provides useful information on the extent of the volatility linkage between money markets during a crisis period.

Overall, the above analysis shows that the transmission of USD money market stress to the HKD money market is rapid and persistent. The impact of a USD shock on the changes in

HKD interbank stress can last for 15 days before the impact dies out. There is also an indication of volatility co-movement between the interbank stress of these two money markets and the expected duration of their joint high-volatility state is 5.5 days. In the next section, we conduct an event study and examine the effectiveness of policy actions taken by the HKMA and the Hong Kong SAR Government in mitigating the stress in the HKD interbank market.

### III. Effectiveness of policy actions on HKD interbank market stress and the dislocations in the FX swap market<sup>11</sup>

#### 1. Dislocations in the FX swap market

In Section II, we examined how distress originating in USD money markets was transmitted to the HKD interbank market. When uncollateralised USD money markets malfunctioned and the interbank interest rates shot up during the turmoil, many non-US financial institutions relied heavily on FX swap markets to raise US dollars using local currencies. Heightened concerns over liquidity and counterparty risks rationed them out of the USD money markets, and they all bid for USD in the FX swap market, creating a one-sided market. This one-sided market induced an FX swap-market premium, ie a deviation from the covered interest parity (CIP) condition, as many non-US financial institutions found themselves facing similar USD funding shortages. This unusual pricing behaviour reflected dislocations in the FX swap markets and a similar situation was also observed in Hong Kong SAR.

The CIP condition is almost always observed. However, there are times and situations in which the condition breaks down.<sup>12</sup> One possibility is that, in times of financial turmoil, the risks as perceived by market participants might change, rendering the assumptions of the CIP condition inapplicable. Indeed, Baba and Packer (2008) and Genberg et al (2009) find that, in the recent global financial crisis, the turbulence in money markets spilled over to FX swap markets amid a reappraisal of counterparty risks.

During the financial crisis, the turbulence in the global interbank markets spilled over to the local financial markets in which deviations from the CIP condition were observed in terms of the difference between the FX swap-implied USD rate and the USD Libor as shown in the following equation:

$$CIP \text{ deviation} = \frac{F_{t, t+x} \left(1 + r_{t, x}^{HKD}\right)}{\underbrace{S_t}_{FX \text{ swap-implied USD rate}}} - \underbrace{\left(1 + r_{t, x}^{USD}\right)}_{USD \text{ interbank rate}} \quad (1)$$

where  $S_t$  is the HKD per USD spot rate at time  $t$ .  $F_{t, t+x}$  is the HKD per USD forward rate contracted at time  $t$  for exchange at time  $t + x$ .  $r_{t, x}^{HKD}$  and  $r_{t, x}^{USD}$  are the corresponding uncollateralised HKD and USD interest rates at time  $t$  with a tenor of  $x$ , proxied by the HKD interbank rate (Hibor) and the USD interbank rate (Libor) respectively with the same tenor.

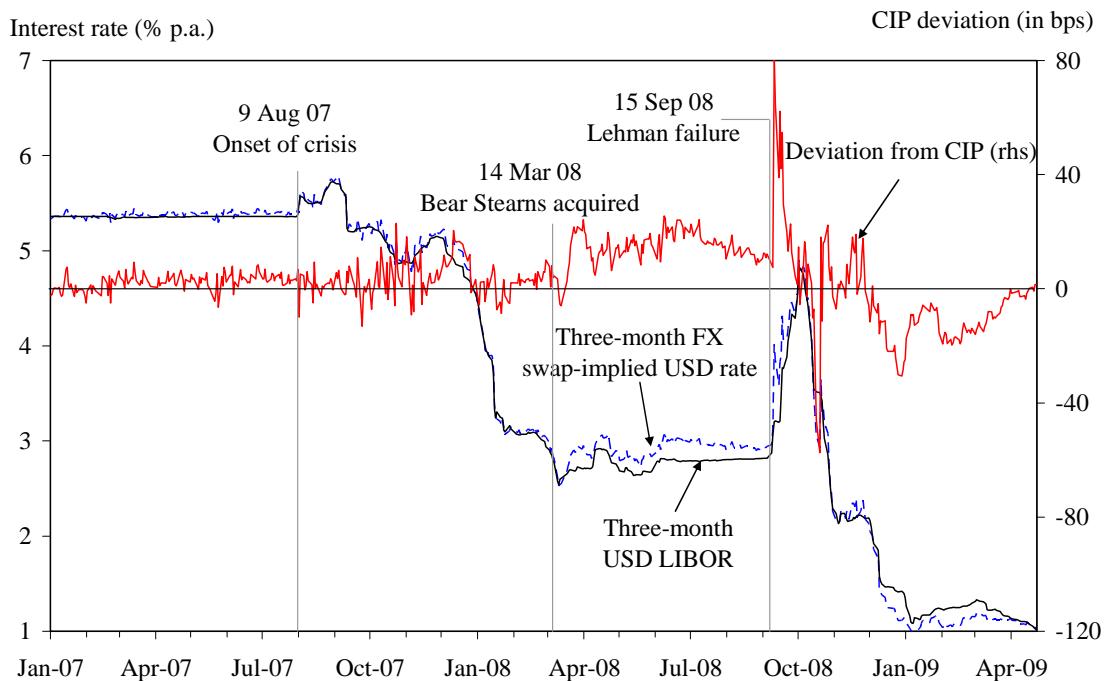
In Chart 5, the red line measures how much the FX swap-implied three-month USD funding rate deviates from the corresponding USD Libor – the risk premium demanded by dollar

<sup>11</sup> For a detailed discussion, see Fung and Yu (2009b).

<sup>12</sup> See Taylor (1989) for such occasions during the flotation of sterling in 1972 and the inception of the European Monetary System in 1979.

lenders in the swap market or the departure from CIP in the local financial markets. As can be seen, before the summer of 2007, it oscillated around 0 basis points (bp), but subsequently started to follow an upward trend. Around the beginning of September 2008, it fluctuated wildly.

Chart 5  
FX swap-implied USD rate, USD Libor and CIP deviation



Sources: Bloomberg and HKMA estimates.

In addition to the dislocations in the local FX swap market reflected by the CIP deviations, the HKD interbank market, as referred to above, was also under stress during the crisis. Again, we use the three-month Hibor-OIS spread as a measure of stress in the local interbank market. Chart 1 shows that the three-month Hibor-OIS spread increased when the crisis emerged in August 2007 and surged to more than 200 bp after the failure of Lehman Brothers in mid-September 2008.

## 2. Key policy actions and analysis framework

In response to the stress in the HKD interbank market following the collapse of Lehman Brothers in mid-September 2008, the HKMA and the Hong Kong SAR Government announced a series of measures to help contain the liquidity and solvency risks in the domestic banking system. Table 1 outlines these policy initiatives from September 2008 to March 2009.<sup>13</sup>

<sup>13</sup> See HKMA (2008) for more details on the measures that were implemented in response to the crisis.

Table 1

**Policy measures announced by the HKMA and the Hong Kong SAR Government  
from September 2008 to March 2009**

Announcement date	Measure
2008	
(1) 30 September	Five temporary liquidity measures
(2) 8 October	Modification of the Base Rate formula
(3) 14 October	Two precautionary measures to support confidence in the Hong Kong SAR banking system
(4) 20 October	Additional supply of three-month Exchange Fund Bills
(5) 6 November	Two refinements to the temporary liquidity measures
(6) 24 November	Additional supply of three-month Exchange Fund Bills
2009	
(7) 26 March	HKMA to continue the provision of liquidity assistance to banks

Source: HKMA (2008) and HKMA press releases.

### 3. Model specification

To capture the effects of policy actions or announcements as detailed in Table 1, a policy-action dummy variable is constructed where it is equal to one on days with policy actions or announcements and zero on other days. Given that the policy actions may influence both the level and volatility of the CIP deviation and three-month Hibor-OIS spread, we model the effect of policy actions or announcements under a standard exponential GARCH (EGARCH) model proposed by Nelson (1991). The EGARCH model has been widely used in analysing the effects of policy events on financial markets, as the model captures the asymmetric effect in the volatility of financial time series.

The dislocations in the HKD-USD FX swap market, measured by the changes in the CIP deviations, are assumed to be associated with the relative risk of the banking systems of Hong Kong SAR and the United States, along with the policy-action dummy.<sup>14</sup> A similar framework is applied to analyse the relationship between the interbank stress measured by the Hibor-OIS spread and the effectiveness of the policy actions.<sup>15</sup>

### 4. Effectiveness of the policy actions

Results from the EGARCH estimation show that the policy actions had no material impact on the three-month Hibor-OIS spread (the indicator of interbank market stress), indicating that they did not ease the distress in the longer end of the HKD interbank market following the collapse of Lehman Brothers.<sup>16</sup> This finding is, however, consistent with the recent study by the IMF (2009) which shows that the liquidity support measures initiated by the central banks

<sup>14</sup> The relative risk of the banking system can be considered as the funding liquidity risk (see Hui et al (2009)).

<sup>15</sup> Details of the model specification are set out in Annex I.

<sup>16</sup> Shortly after the measures were implemented, the overnight Hibor gradually eased.

in Japan, Sweden, Switzerland, the United Kingdom, the United States and the European Central Bank had an insignificant impact on the Libor-OIS spreads after the Lehman Brothers failure. The IMF study suggests that the finding does not necessarily mean that the policy actions to provide liquidity to the banking system were ineffective, but that those actions may have been anticipated by market participants. Therefore, their effects on the Libor-OIS spreads are not noticeable in the empirical tests. The same market reactions might also have happened in Hong Kong SAR, making the effects of the HKMA and Government policy actions on the Hibor-OIS spread not visible in our empirical analysis.

In relation to the dislocations in the FX swap market, it is found that the policy actions have a negative impact (with statistical significance) on the CIP deviations, suggesting that the policy actions effectively reduced the CIP deviations during the crisis. This implies that arbitrage opportunities diminished as the financial markets returned to normal, to a certain extent. In other words, following the failure of Lehman Brothers, the policy actions taken by the HKMA and the Government helped to mitigate the dislocations and therefore improved the efficiency in the money and FX swap markets to facilitate arbitrage transactions. In particular, the five temporary measures provided additional longer-term funding to banks against a wider range of collateral at a potentially lower interest cost. Banks were reassured about the availability of funds and more willing to lend in the interbank market. Furthermore, policy actions aimed at containing the solvency risk in the banking system relaxed the counterparty risk constraint on the markets and thus removed the financial dislocations.<sup>17</sup>

#### IV. Conclusions

This paper investigates the transmission of term funding stress from USD to HKD and examines the effectiveness of the policy actions taken by the HKMA and the Hong Kong SAR Government to mitigate the anomalies and stress in the FX swap and interbank markets in Hong Kong SAR during the financial crisis of 2008.

On the question of transmission of term funding stress, the results show a strong interdependence between the variations in USD and HKD interbank stress. Following a shock in the USD money market, the HKD interbank stress increased immediately and the impact died out in around 15 days. This suggests that for a market which is as open as Hong Kong SAR and with such a high degree of participation of foreign institutions, the US influence can be very profound. Similarly, the analyses find evidence of co-movements in interbank stress volatility in USD and HKD during the crisis. The expected duration when the two money markets are both in a high-volatility state can be as long as 5.5 days. The short-lived impact of a shock in the USD money market on the HKD money market can be attributed to the coordinated efforts by central banks and policymakers worldwide to contain the credit crisis.

On the effectiveness of the policy actions in mitigating the dislocations in the FX swap market and the stress in the HKD interbank market, the results suggest that the policy actions had no visible impact on the Hibor-OIS spread, indicating that they did not ease the distress in the HKD interbank market. However, this may be due to the fact that the policy actions might have been anticipated by market participants and, therefore, their effects might not have been visible in the HKD interbank market. On the other hand, the policy actions undertaken effectively reduced the dislocations in the FX swap market after the failure of Lehman Brothers. The reduction in the CIP deviations showed that the policy actions improved the efficiency of the money and FX swap markets where liquidity resumed to eliminate arbitrage opportunities.

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<sup>17</sup> The EGARCH estimation results are reported in Annex II.

## Appendix I: EGARCH model specifications

The dislocations in the FX swap market between USD and HKD, measured by the changes in the CIP deviation (in basis points (bp)), are assumed to be associated with the relative risk of the banking systems of Hong Kong SAR and the United States, along with the policy-action dummy. The policy-action dummy is also put into the conditional variance equation to study whether it has any effects on the degree of volatility.

The conditional mean equation of the EGARCH model is written as:

$$\Delta CIP_t = a + \sum_{i=1}^n b_i \Delta CIP_{t-i} + c \Delta RRB_t + d PA_t + \varepsilon_{CIP,t}, \quad \varepsilon_{CIP,t} \sim N(0, \sigma_{CIP,t}^2), \quad (A1)$$

where  $\Delta$  is the first difference operator.  $CIP_t$  is the CIP deviation (in bp) at time  $t$  for the respective crisis period.  $RRB_t$  is the variable for the relative risk of the banking systems of Hong Kong SAR and the United States at time  $t$ , which is measured by the difference (in bp) between the Hibor-OIS spread and the USD Libor-OIS spread during the global credit crisis of 2008.  $PA_t$  is the dummy variable for policy action announcements at time  $t$ . Lags of the dependent variable are included in equation (A1) to control for the serial correlation, if necessary. If the relative risk of the banking systems is a determinant of the premium or discount as reflected in the swap-implied USD rate, the estimated coefficient  $c$  in equation (A1) should be positive and statistically significant. If policy actions are helpful in reducing the CIP deviations, the estimated coefficient  $d$  should be negative (and it should also be statistically significant if the policy actions have a material impact on the CIP deviations).

In the EGARCH (p, q, r) model, the conditional variance equation is given as:

$$\ln(\sigma_{CIP,t}^2) = \varpi + \sum_{j=1}^q \beta_j \ln(\sigma_{CIP,t-j}^2) + \sum_{i=1}^p \alpha_i \left| \frac{\varepsilon_{CIP,t-i}}{\sigma_{CIP,t-i}} \right| + \sum_{k=1}^r \gamma_k \frac{\varepsilon_{CIP,t-k}}{\sigma_{CIP,t-k}} + \vartheta PA_t \quad (A2)$$

The coefficient  $\vartheta$  measures the potential impact of the policy actions on the degree of volatility. If the policy actions have the desirable effect of reducing the volatility of the CIP deviation, the estimated coefficient  $\vartheta$  is expected to have a negative sign. The coefficient  $\beta$  measures the persistent effect in the dynamics of the conditional variance  $\sigma^2$ , while the coefficient  $\gamma_k$  captures the asymmetric effect of news.

A similar framework is applied to the empirical analysis of the relationship between the interbank market stress and the effectiveness of policy actions. Fung and Yu (2009a) find that, during the credit crisis of 2008, the distress in the USD interbank market had a material impact on the HKD interbank market. Thus, in the conditional mean equation of the EGARCH model, the interbank stress indicator for HKD is assumed to have a linear relationship with the stress measure of the USD interbank market. The conditional mean equation is specified as:

$$\Delta IS_t^{HK} = a + \sum_{i=1}^n b_i \Delta IS_{t-i}^{HK} + c IS_{t-1}^{HK} + d \Delta IS_{t-1}^{US} + e PA_t + \varepsilon_{IS,t}, \quad \varepsilon_{IS,t} \sim N(0, \sigma_{IS,t}^2), \quad (A3)$$

where  $\Delta$  is the first difference operator.  $IS_t^{HK}$  and  $IS_t^{US}$  are the interbank stress indicators for HKD and USD (in bp) respectively at time  $t$ , which are the Hibor-OIS spread and the USD Libor-OIS spread. The lagged term of the HKD interbank stress indicator ( $IS_{t-1}^{HK}$ ) is included as a control variable in case the changes in the spread depend on its level.  $PA_t$  is the dummy variable for policy action announcements at time  $t$ . Lags of the dependent variable

are included in equation (A3) to control for the serial correlation, if necessary. If the policy actions ease the distress in the HKD interbank market, then it is expected that the estimated coefficient  $\epsilon$  should be negative (and should also be statistically different from zero if the policy actions have a material impact on the interbank stress indicator).

Similarly, the conditional variance equation in the EGARCH model is given as:

$$\ln(\sigma_{IS,t}^2) = \varpi + \sum_{j=1}^q \beta_j \ln(\sigma_{IS,t-j}^2) + \sum_{i=1}^p \alpha_i \left| \frac{\varepsilon_{IS,t-i}}{\sigma_{IS,t-i}} \right| + \sum_{k=1}^r \gamma_k \frac{\varepsilon_{IS,t-k}}{\sigma_{IS,t-k}} + \vartheta PA_t \quad (A4)$$

The coefficient  $\vartheta$  measures the potential impact of policy actions on the degree of volatility. Again, if policy actions have any effect in reducing the volatility of the Hibor-OIS spread, then the estimated coefficient  $\vartheta$  is expected to have a negative sign.

## Appendix II: EGARCH model estimation results

Table A1

### Estimation results of the CIP deviation, Hibor-OIS spread and the effectiveness of policy actions for the global credit crisis of 2008

Sample period: 16 Sep 2008 to 31 Mar 2009	
Dependent variable: changes in CIP deviation ( $\Delta CIP$ )	Dependent variable: changes in Hibor-OIS spread ( $\Delta IS$ )
Estimated coefficient in the conditional mean equation	
$\Delta CIP_t = a + \sum_{i=1}^n b_i \Delta CIP_{t-i} + c \Delta RRB_t + d PA_t + \varepsilon_{CIP,t}$	$\Delta IS_t^{HK} = a + \sum_{i=1}^n b_i \Delta IS_{t-i}^{HK} + c IS_{t-1}^{HK} + d \Delta IS_{t-1}^{US} + e PA_t + \varepsilon_{IS,t}$
a (0.84)	a (1.94)
b <sub>1</sub> (-1.15)	b <sub>1</sub> —
c (5.21)	c (-2.04)
<b>PA<sub>t</sub> (d)</b> (-1.86)	d (2.11)
	<i>PA<sub>t</sub> (e)</i> <b>3.67</b> (0.33)
Estimated coefficient in the conditional variance equation	
$\ln(\sigma_{CIP,t}^2) = \varpi + \sum_{j=1}^q \beta_j \ln(\sigma_{CIP,t-j}^2) + \sum_{i=1}^p \alpha_i \left  \frac{\varepsilon_{CIP,t-i}}{\sigma_{CIP,t-i}} \right  + \sum_{k=1}^r \gamma_k \frac{\varepsilon_{CIP,t-k}}{\sigma_{CIP,t-k}} + 9 PA_t$	$\ln(\sigma_{IS,t}^2) = \varpi + \sum_{j=1}^q \beta_j \ln(\sigma_{IS,t-j}^2) + \sum_{i=1}^p \alpha_i \left  \frac{\varepsilon_{IS,t-i}}{\sigma_{IS,t-i}} \right  + \sum_{k=1}^r \gamma_k \frac{\varepsilon_{IS,t-k}}{\sigma_{IS,t-k}} + 9 PA_t$
$\varpi$ (0.84)	$\varpi$ (-1.10)
$\beta_1$ (165.13)	$\beta_1$ (68.46)
$\alpha_1$ (-0.86)	$\alpha_1$ (2.07)
$\gamma_1$ (-0.34)	$\gamma_1$ (-0.05)
<b>PA<sub>t</sub> (9)</b> (1.01)	<b>PA<sub>t</sub> (9)</b> (0.36)

Notes: Figures in parentheses are z-statistics based on Bollerslev-Wooldridge robust standard errors.  
\* indicates significance at the 5% confidence level. \*\* indicates significance at the 10% confidence level.

Source: HKMA estimates.

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# **The demise of the halcyon days in Hungary: “foreign” and “local” banks – before and after the crisis**

Ádám Banai, Júlia Király and Márton Nagy<sup>1</sup>

## **Introduction**

Banks owned by foreign strategic owners have been present in Hungary since the mid-1980s and, as a result of the large-scale bank privatisation in the mid-1990s, the lion's share of the Hungarian banking system was acquired by foreign strategic owners. The effects of this process have been the subject of numerous studies. Ábel and Szakadát (1997) focus on the structural transformation of the banking system in the 1990s and the related costs. The authors conclude that the transformation of the banking system was successful overall, but that its pace was too sluggish, leading to additional costs. Hence, had large banks been pushed into carrying out structural transformations at the very beginning of the 1990s, consolidation costs would have been lower. Várhegyi (1998) examines the Hungarian banking system's ownership structure. The study comes to the major conclusion that, by allowing foreign banks entry and participation in bank privatisation, the Hungarian banking system's operation resembled that of developed countries in many aspects by the end of the 1990s. Mérő and Valentinyi (2003) reach a similar conclusion after examining the role of the appearance of foreign banks in central and eastern Europe. Várhegyi (2002) explains in detail the development of the banking system following the transition by presenting the transformation and business strategy of individual banks. Király et al (2007) examine the Hungarian banking system's corporate governance structure. The study reveals that the murky, fragmented nature of state ownership is the source of severe management problems.

Numerous studies have also been written on the Hungarian features of the 2007 global financial crisis and its effects on the banking system. From October 2008, following the collapse of Lehman Brothers, Hungary was affected by a severe financial/liquidity crisis, which threatened to paralyse the entire financial system, followed by a deep recession. The Hungarian banking system's reaction to the global financial and economic crisis has also been presented from numerous perspectives. Király et al (2008) deal mainly with contagion channels, highlighting the role of risk premia and two-way contagion channels between parent banks and subsidiaries. Várhegyi (2008) attributes Hungary's and its banking system's high vulnerability to external balance problems and substantial credit expansion. Király (2008) presents the Hungarian banking system's pre- and post-Lehman period from a liquidity perspective. According to the study, the crisis could have been prevented with restrictions and limitations in all cases where an apparent excess of liquidity led to irrational results, such as disproportionately high leverage, asset price bubbles financed by credit growth and banking systems supported solely by external financing, operating with excessively high loan-to-deposit ratios. Banai et al (2009) analyse the behaviour of European banking groups exposed to the central-eastern European region and conclude that, contrary to the fear of foreign investors, the outflow in parent bank financing remained modest during the crisis.

A number of studies have thus dealt with the effects of privatisation, the performance of banks acquired by foreign strategic owners and those having chosen other paths, as well as

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<sup>1</sup> Central bank of Hungary. This paper was finalized at the end of 2009 and reflects the authors' personal professional opinion, and not the Magyar Nemzeti Bank's official stance.

the effects of the 2007 crisis on the banking system.<sup>2</sup> However, to the best of our knowledge, this is the first paper to examine the asymmetries in the behaviour of the two main strategic groups of the Hungarian banking system in the pre- and post-Lehman period.

From the perspective of the events which occurred in Hungary, we consider October 2008 as the starting point of the crisis. We will compare the performance of two groups of banks: “foreign” and “local”. “*Foreign banks*”<sup>3</sup> include institutions in which *foreign strategic investors acquired majority ownership* primarily in the course of privatisation in the 1990s. “*Local banks*”<sup>4</sup> include banks held in majority by *domestic (state) investors*, or held in shares scattered among owners *on the stock market*, ie where privatisation by foreign strategic investors was avoided. We are aware of the fact that the “foreign” and “local” groups are highly heterogeneous,<sup>5</sup> but the present paper does not aim to elucidate this heterogeneity, focusing instead on the differences in behaviour between the two groups.

The first half of the paper examines in detail the performance of banks from the end of the 1990s until the onset of the financial crisis in October 2008. In the early 2000s, increasing retail credit market competition<sup>6</sup> among foreign and local banks determined the similarities or differences in strategy. “*Local banks*” began their expansion in eastern Europe at that time, thereby competing not only with the subsidiaries but also with the parent banks of “foreign” banks. During this period, the balance sheets of the two groups were characterised by rapid credit expansion, high profitability and the emergence of liquidity and credit risks.

In the second half of the paper we focus on the divergent behaviour of banks during the global financial crisis. Following the onset of the crisis in Hungary in October 2008, all banks faced a radically altered financial and macroeconomic environment and had to adapt to the new conditions. With regard to this period, we concentrate on examining whether the

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<sup>2</sup> The banking system includes all the banks, branches and specialised financial institutions except for Keler, MFB and Exim. Savings cooperatives and savings cooperatives which transformed into banks (Dél-Dunántúli Regionális Bank, HBW Express Bank, Kinizsi Bank and Mohácsi Bank) were left out of our analysis due to their special corporate governance and business strategies.

<sup>3</sup> In the investigated period (1999–2009) the group of foreign banks includes the following: Allianz Bank (formerly Dresdner Bank until 2006), ABN Amro Bank (merged with Kereskedelmi és Hitelbank in 2001), Általános Értékforgalmi Bank (became an investment company in 2007 and was left out of our analysis), Banco Popolare (formerly IC Bank), Bank of China, Bank Plus Bank, Budapest Bank, Cetelem Bank, CIB Bank, Commerzbank, Credigen, Deutsche Bank, EB und HYPO Bank Burgenland Sopron, Erste Bank, Fundamenta Lakástakarékpénztár, Hanwha Bank, Inter-Európa Bank (merged with CIB in 2007), KDB Bank (formerly Daewoo Bank), Kereskedelmi és Hitelbank, Magyar Külkereskedelmi Bank, Opel Bank (became a financial enterprise in 2002 and was left out of our analysis), Porsche Bank, Rabobank (became a financial enterprise in 2002 and was left out of our analysis), Raiffeisen Bank, Société Générale Bank (became a financial enterprise in 2002 and was left out of our analysis), Unicredit Bank (formerly HVB Bank – prior to 2006 – which was established through the merger of Hypovereinsbank and Bank Austria Creditanstalt), Unicredit Jelzálogbank (HVB Jelzálogbank until November 2006), Volksbank and Westdeutsche Landesbank. The group of foreign banks also includes the following foreign branches: Axa branch (formerly Ella, then Axa Bank), Banco Primus branch, Bank Sal Oppenheim, BNP-Paribas branch (formerly BNP-Dresdner then BNP-Paribas Bank), Calyon SA branch (formerly Credit Lyonnais then Calyon Bank), Citibank branch (formerly Citibank), Cofidis branch, Fortis branch, ING branch (formerly ING Bank) and Oberbank branch.

<sup>4</sup> In the investigated period (1999–2009), the group of local banks includes OTP Bankgroup (OTP Bank, OTP Mortgagebank, Merkantilbank and OTP Lakástakarékpénztár), FHB Bankgroup (FHB Mortgagebank and FHB Bank), the Postabank (until 2004), Magyar Takarékszövetkezeti Bank and ELLA Első Lakáshitel Kereskedelmi Bank. Despite the small number of banks, the overall market share of this group exceeded 30% of the total assets of the banking system in 2008.

<sup>5</sup> Privatisation unquestionably represents a behavioural change in a bank’s operations: nevertheless, we consider the difference between banks owned by foreign strategic owners and those without such ownership more significant than the difference between state-owned banks and those with ownership dispersed through the Hungarian stock exchange.

<sup>6</sup> We focus mainly on the retail market, and only touch on the development of the corporate market.

different ownership structures and the various pre-crisis strategies required diverse crisis management practices.

## I. “Foreign” and “local” banks before the crisis

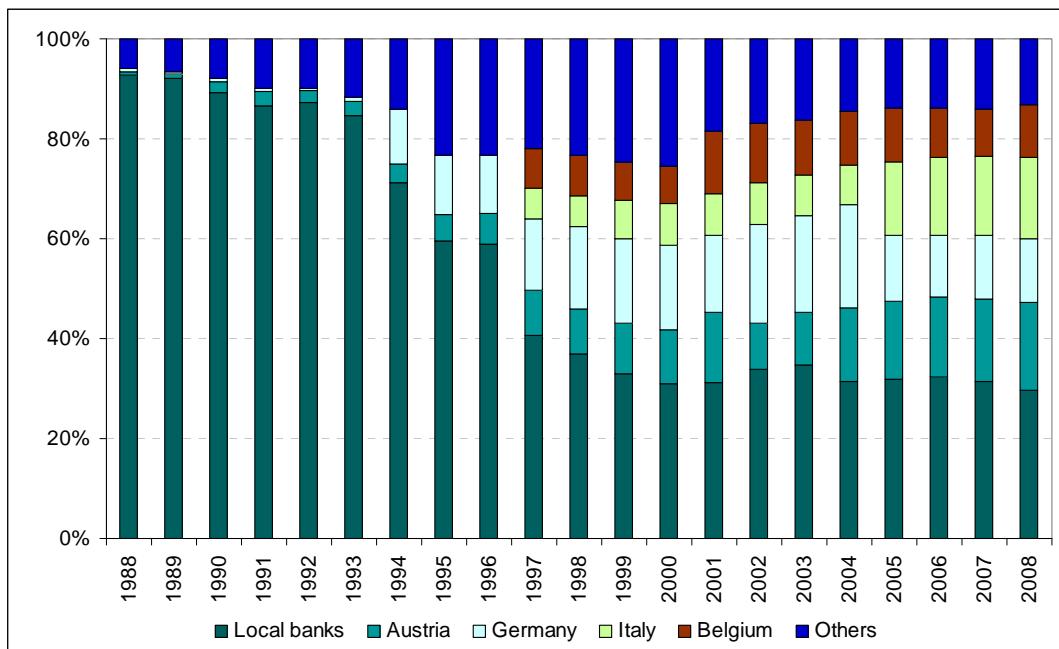
The consolidation of the banking system during the transition and the establishment of market-based operations were part of Hungary’s economic transformation. While the institutional framework of a market economy was established, the earlier one-tier banking system was transformed into a two-tier system as part of the market reforms, while an increasing number of foreign strategic owners were entering the market and the proportion of indirectly state-owned banks was increasing.

### I.1. Retrospection: the evolution of the current ownership structure

In 1990, the proportion of foreign strategic ownership in the Hungarian banking system was a mere 5%, although it was constantly rising with the successive entries of “greenfield” – primarily Austrian, Italian, German and Benelux – banks. Nevertheless, mass privatisation only got under way following the collapse of the banking system in 1993.

The state loan, debtor and subsequent bank consolidation programmes implemented after the 1993 banking crisis improved somewhat the portfolio and capital position of majority state-owned credit institutions. The fact that state assets were insufficient to manage the accumulated problems (Ábel and Szakadát (1997)) facilitated the acceleration of the privatisation process from 1994. Privatisation with the participation of *foreign owners* was a necessity, arising from the deficiency of internal capital accumulation (Szapáry (2001)). On the other hand, sales to foreign *strategic investors* were justified by the anticipated “knowledge import”. In the early 2000s, the ownership share of foreign banks in the Hungarian banking system reached a level of around 70% (Chart 1).

Chart 1  
Developments in the ownership structure of the Hungarian banking system



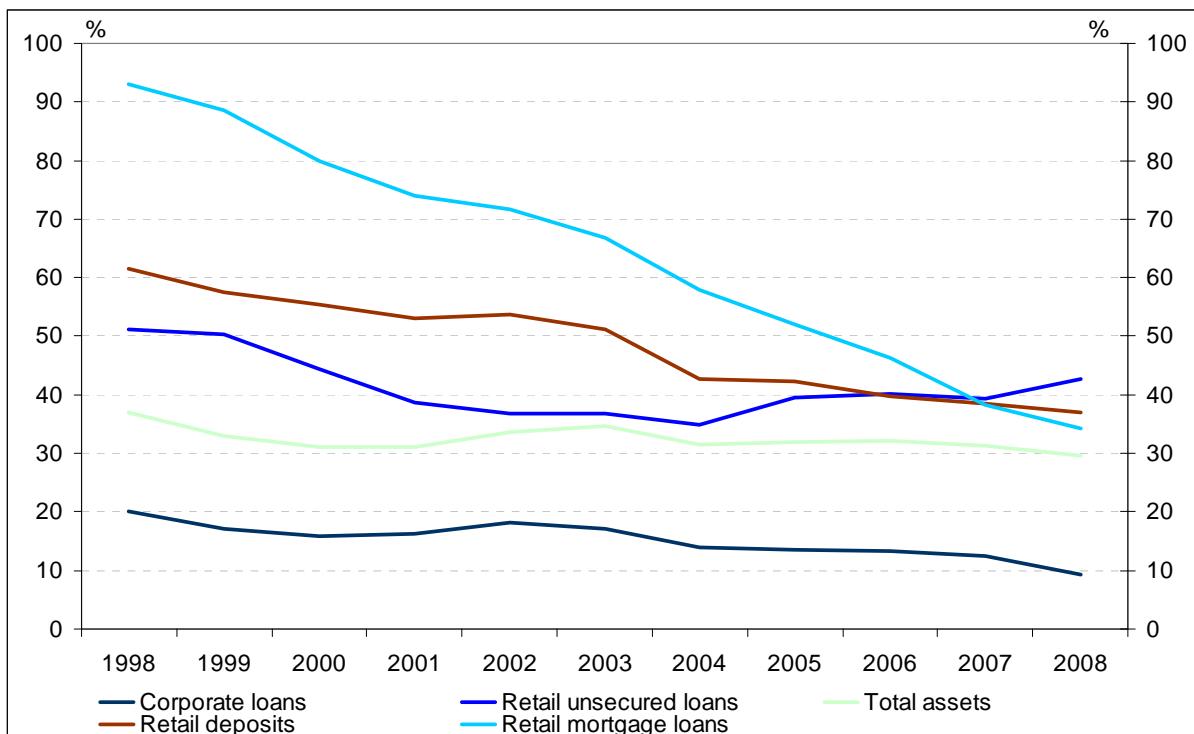
Note: We considered the OTP group as entirely domestic-owned.

Sources: Magyar Nemzeti Bank (MNB), PSZAF.

Expansion towards the east was part of western European banks' long-term strategy during the era of mass privatisation. The basic assumption was that Hungary, after getting through its transitional crisis, would continuously converge with western European countries and display rapid economic growth and, thus, rapid revenue growth. At the outset, foreign banks appeared primarily in the corporate segment, which required lower initial investment, and did not represent fierce competition in the retail segment until the early 2000s (Móré and Nagy (2004)). The entry of foreign banks into the retail segment was limited by numerous factors besides the inherited competitive edge of local banks. One such entry barrier was information asymmetry, which characterised household lending due to the short credit history of Hungarian households. This problem affected local banks to a lesser extent, as their continuous participation provided them with far more information about customers. The other important factor lies in the special needs of the household segment. In order to reach and adequately serve potential clients, a far more extensive branch network and staff capacity was needed compared to the corporate segment. The associated high costs prevented foreign banks from entering this market or from strengthening their presence for a long time.

Due to the retail market's high entry costs, foreign banks focused initially on the corporate segment. Expansion in the corporate segment was supported by the arrival of multinational firms, the appearance of similar "home-host" relations in the corporate segment and an upswing in external trade. Moreover, foreign banks, which did not inherit low-quality corporate portfolios from the pre-transition period and had experience in the field of commercial banking, could thus offer, overall, more favourable conditions to customers than their domestic competitors (Chart 2.)

Chart 2  
Market share of local banks based on certain balance sheet items



Source: MNB.

Thus, foreign banks gained ground within the Hungarian banking system following the transition, first as greenfield investors, then as privatisers. The major players were the Austrian banks Raiffeisen, Erste and Creditanstalt, the Italian banks Intesa and Unicredito, the German bank BLB and the Belgian bank KBC (and, before that, the Dutch bank ABN Amro).

However, OTP, the “national champion”, was not sold to foreign strategic investors, but instead privatised in 1995 via an initial public offering on the stock market. FHB Bank, founded in 1997 and with a main profile of mortgage-backed lending, was also kept from foreign acquisition by being privatised on the stock market in 2003, similarly to OTP. These two banking groups became the most significant players among the banks that have never been owned by a major strategic investor.

## **I.2. The credit boom on the retail market: non price-based competition**

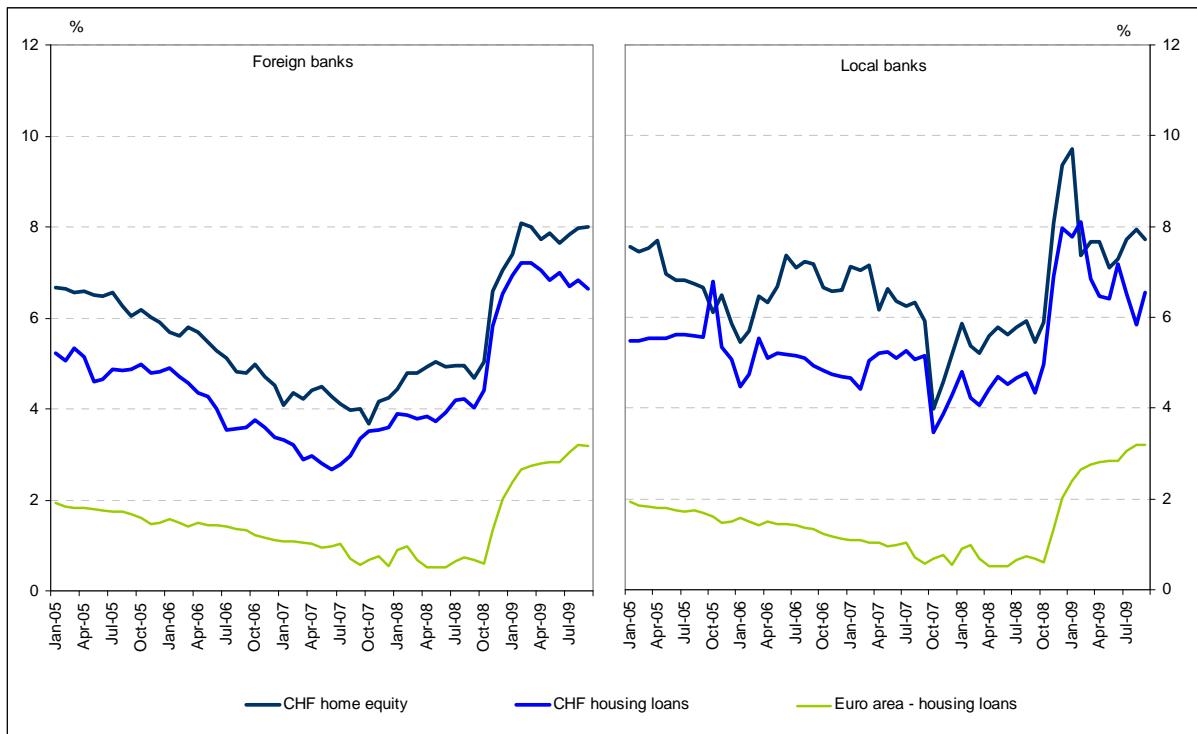
The end of the 1990s saw a change in the attitude of foreign banks. As the profitability of the corporate segment began to dwindle due to fierce competition, banks were more inclined to turn towards the retail segment. Meanwhile, households exhibited an increasing demand for bank products as a consequence of improving income growth prospects.

Throughout the entire pre-crisis period, “*price-based competition*” between banks was low.<sup>7</sup> Although local banks applied higher interest in the case of loans and lower interest in the case of deposits than their foreign competitors, the banking system as a whole was characterised by oligopolistic pricing (Várhegyi (2003), Krekó et al (2006), Horváth et al (2007)). Banks’ behaviour may have been influenced by the fact that Hungarian customers’ price sensitivity was low (Horváth, et al (2007)) and, therefore, price was not the most important factor in the acquisition of new customers. The business policy of banks was based on acquiring more customers at the price of higher costs or risks rather than by charging lower prices. This is supported by the fact that margins on retail loan products remained around twice as high as in the euro area over the entire period (Chart 3).

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<sup>7</sup> In the early 2000s, HUF-denominated state-subsidised housing loans were the major type of credit granted to households. The interest rate on housing loans and banks’ interest margin were not set by market mechanisms but rather by the rate of subsidy.

Chart 3  
Interest premiums on typical loans

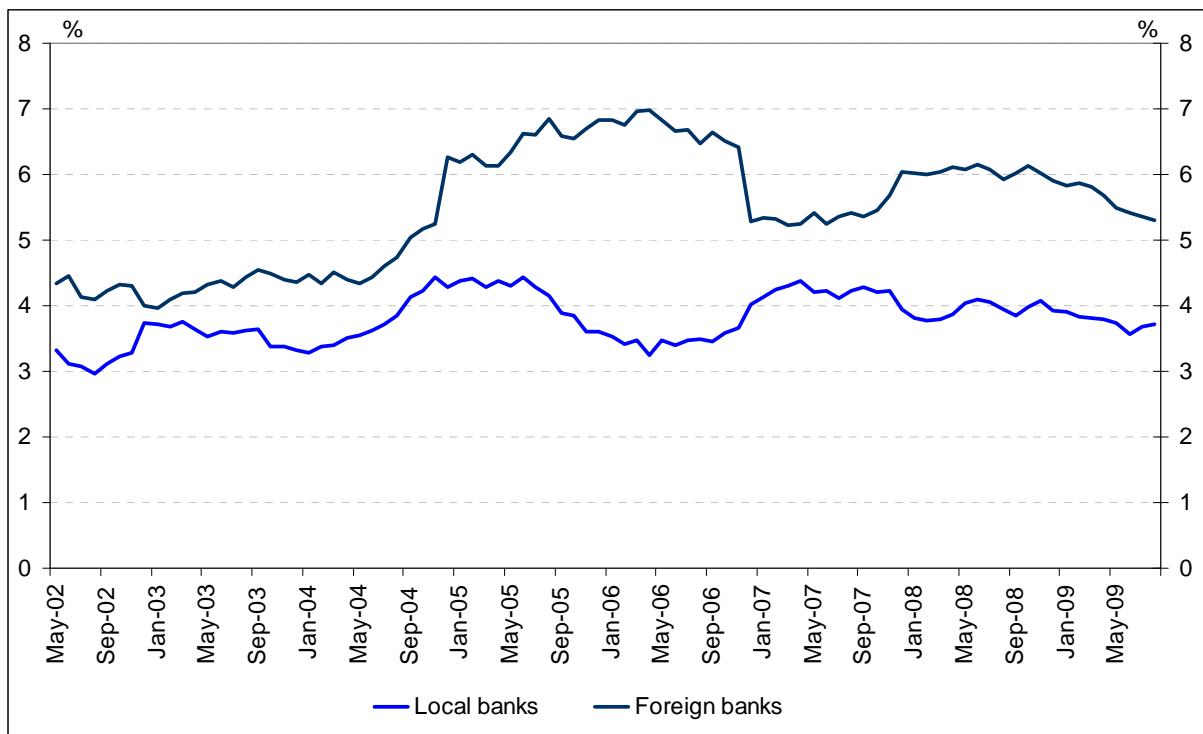


Note: We deducted the three-month CHF Libor from the APR of domestic retail mortgage loans and deducted the three-month Euribor from euro area housing loan interest rates.

Source: MNB.

Therefore, a different set of instruments emerged in customer acquisition. In the first phase of competition, priority was given to the expansion of sales channels – banks' marketing activity, networks and employee numbers thus grew substantially, as did the costs of this rapid expansion. In this so-called “*cost-based competition*”, there was a great discrepancy between local and foreign banks. Local banks had a competitive edge in the market compared to foreign banks, stemming from strong retail customer relationships, large branch networks and the establishment of mortgage banks. Mortgage banks refinanced banks within their group or other foreign banks. Thanks to this competitive edge, local banks did not take part in the rush to open branches and continued operating with the same number of employees and network units. Moreover, although marketing costs also increased substantially within this group, they nevertheless represented a much smaller proportion of local banks' operating costs in comparison to foreign banks (Chart 4). Despite less active cost-based competition, the initial strong market position of local banks allowed them to sustain their leading role in the competition of state-subsidised HUF loans.

Chart 4  
**Ratio of marketing costs to total operating costs**

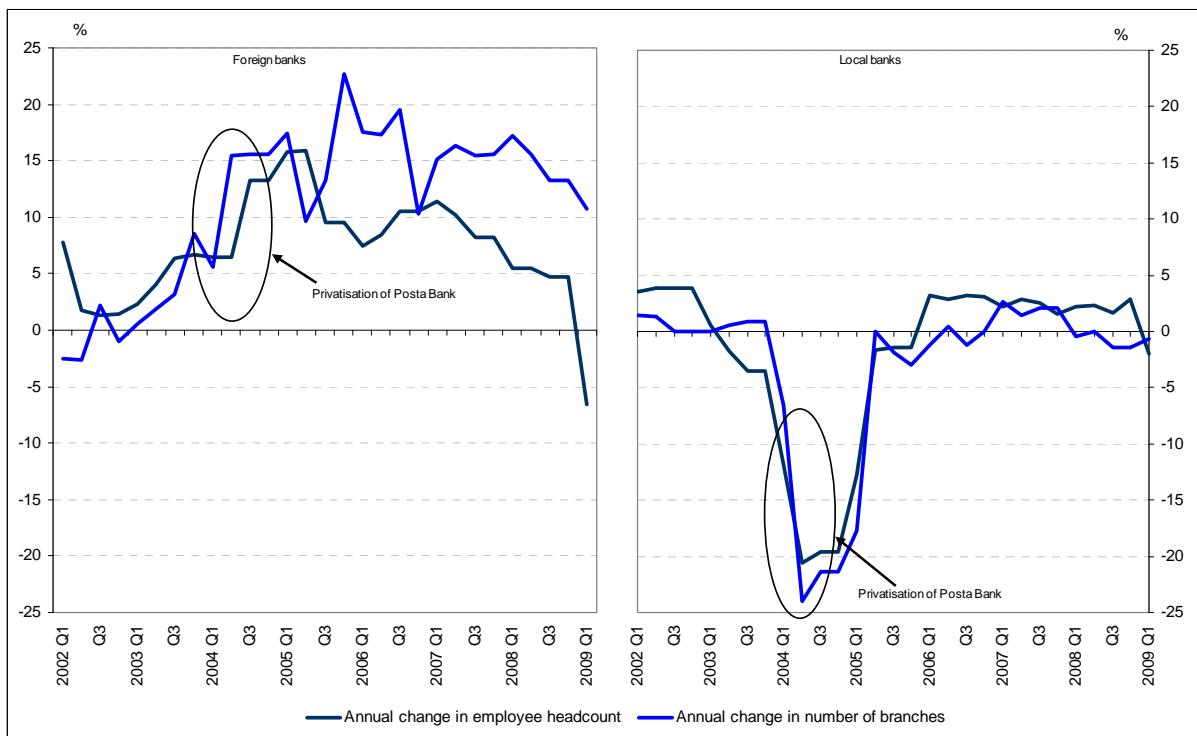


Source: MNB.

By contrast, foreign banks launched strong cost-based competition. Marketing costs rose sharply and the number of branches and ATMs, as well as the number of employees, increased. As competition intensified, foreign banks acquired a substantial market share in the mortgage loan segment but did not succeed in dethroning local banks from their market-leading position<sup>8</sup> (Chart 5).

<sup>8</sup> By increasing the number of branches, foreign banks obviously also strived to break into the deposit market in addition to selling loan products. Although the costs of entry were highest in this area, competition was also lowest and, therefore, interest margins were highest (Móré and Nagy (2004)).

Chart 5  
Annual change in numbers of employees and branches



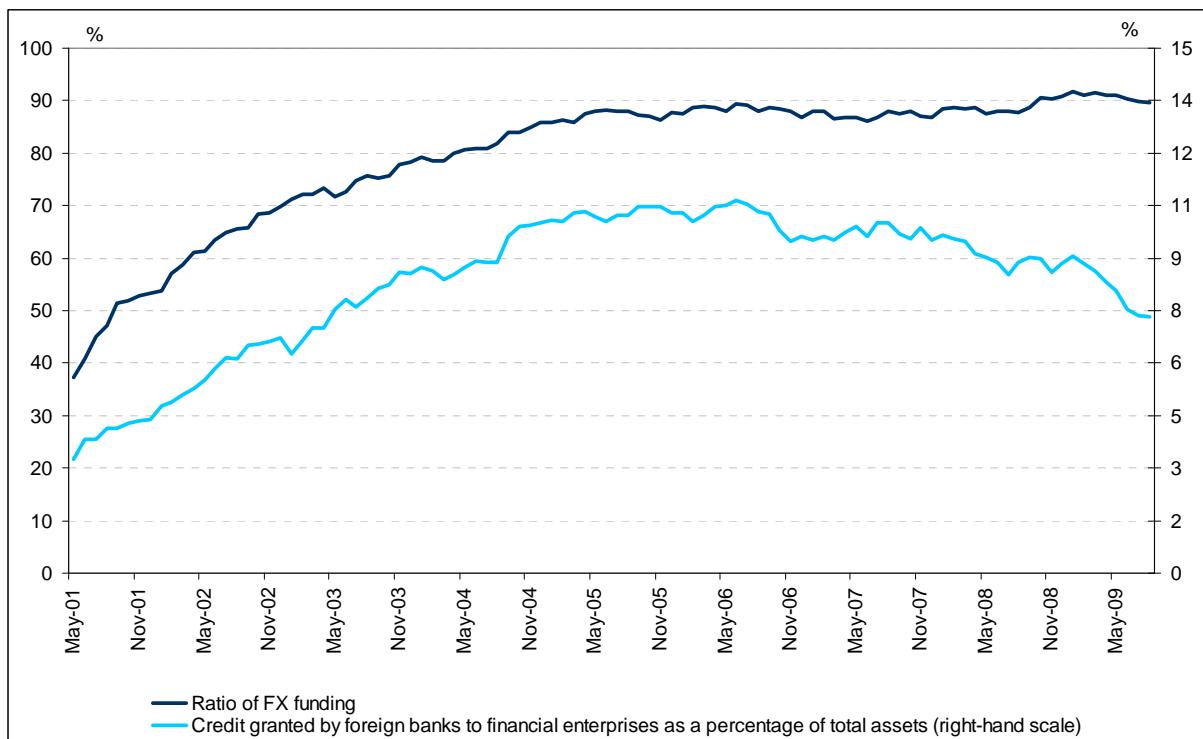
Source: MNB.

State subsidies of HUF-denominated housing loans were significantly cut back in 2003. Competition for retail customers thus took a new turn due to the drop in sales of HUF-denominated mortgage loan constructions. *"Risk-based competition"* emerged in parallel to *"cost-based competition"* and triggered a shift towards increasingly risky products and customers. The first sign of this was the appearance of FX-denominated loans.<sup>9</sup>

FX-denominated loans first appeared in 2001 in relation to financial enterprises, mainly in the field of vehicle purchase financing. The expansion of FX-denominated vehicle loans surfaced primarily among the financial enterprises of foreign-owned banks. Between 2001 and 2004, the ratio of financial enterprise financing compared to the balance sheet totals of owner banks tripled. By 2005, the ratio had reached 11% of the balance sheet totals of foreign banks and, despite the substantial rearrangement of banks' balance sheets as a result of the retail credit boom, it remained at around 8% prior to the crisis (Chart 6).

<sup>9</sup> For further reasons behind FX-denominated lending in greater detail, see Bethlendi et al (2005).

**Chart 6**  
**Developments in credit granted by foreign banks to financial enterprises**



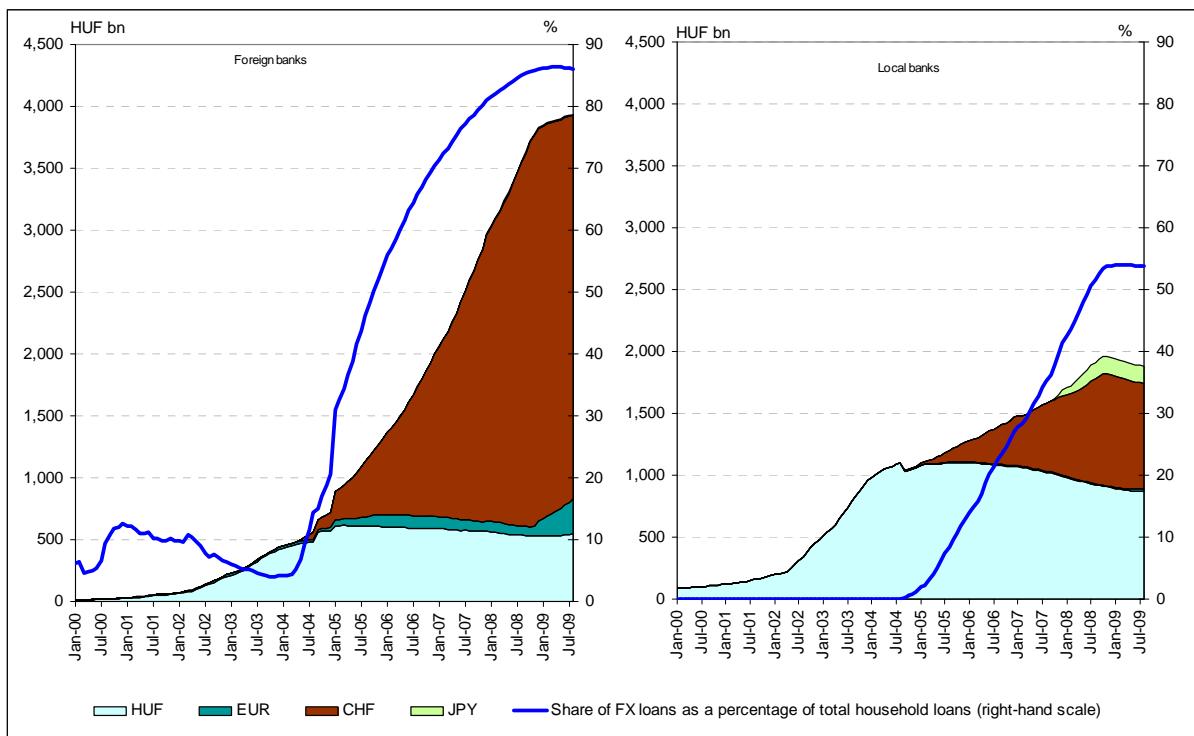
Note: The chart displays loans to financial enterprises as a percentage of banks' total assets and the denomination structure of this credit.

Source: MNB.

The popularity of FX lending did not remain confined to vehicle financing. With the drop in state-subsidised HUF-denominated housing loans, FX, particularly CHF-denominated financing, became predominant among mortgage – initially housing, then home equity – loans from the beginning of 2004. Until the onset of the crisis, such loans remained the main credit product of banks.

In the case of FX-denominated vehicle and mortgage loans, foreign banks were leaders, while local banks were followers. In retail mortgage lending, the ratio of FX loans began to increase as early as the beginning of 2004 among foreign banks, while this process only started at the beginning of 2005 among local banks (Chart 7).

Chart 7  
Currency structure of household mortgage loans



Source: MNB.

As one of the final chapters of risk-based competition, yen-denominated loans appeared as a new product in the shadow of the crisis. While foreign banks were unequivocally the ones to push CHF-denominated collateralised loans, in the case of yen-denominated loans, the “initiative” was local. Yen-denominated loans quickly became popular among households that were completely unaware of exchange rate risks, as these products were accessible with even lower instalments than CHF-denominated loans.

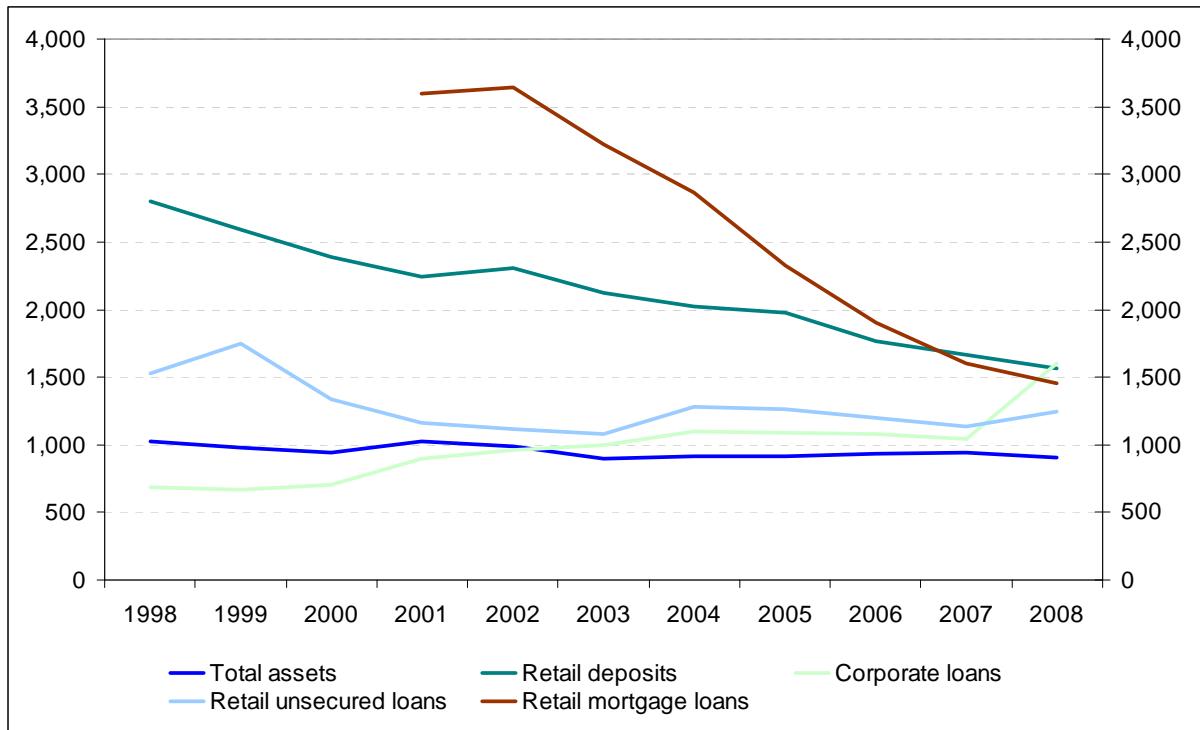
Besides the spread of FX lending, numerous other factors reflected the intensification of risk-based competition. Banks constantly eased their credit conditions and standards (MNB survey on banks' lending practices 2004–2008). The formerly conservative collateral requirements were continually loosened and banks applied high loan-to-value (LTV) ratios for an increasing proportion of loans.<sup>10</sup> Whereas at the end of 2004 the banking system's average LTV ratio for housing loans was only 50%, by the end of 2008 this ratio was approaching 70%. Furthermore, several banks registered significantly higher payment-to-income (PTI) ratios (between 2004 and 2008, households' debt service burden to their income increased from 8% to 13%). Finally, in 2007–2008, banks relied increasingly on agents – a significantly more efficient sales channel compared to branches. More than 50% of the mortgage loans granted in 2007 were sold through agents. Although agents significantly improved access to bank products, loans granted via their intermediation were characterised by default rates two to three times higher than those sold in branches.<sup>11</sup>

<sup>10</sup> Magyar Nemzeti Bank, *Report on Financial Stability*, April 2007, April 2008 and October 2008.

<sup>11</sup> Magyar Nemzeti Bank, *Report on Financial Stability*, October 2008.

The cost- and *risk-based competition* referred to above transformed the structure of the market. The substantial advantage of local banks in the retail segment eroded, while foreign banks gained ground. Between 1999 and 2009, concentration among retail products fell most rapidly in the case of retail deposits and mortgage loans. In 2008, the HHI (Herfindahl-Hirschman Index) level of mortgage loans was only barely higher than that of the corporate credit market (Chart 8). Nevertheless, local banks succeeded in reinforcing their leading market position, as their market share still surpassed 30% in retail products.

Chart 8  
Herfindahl-Hirschman Index for different segments of the Hungarian banking system



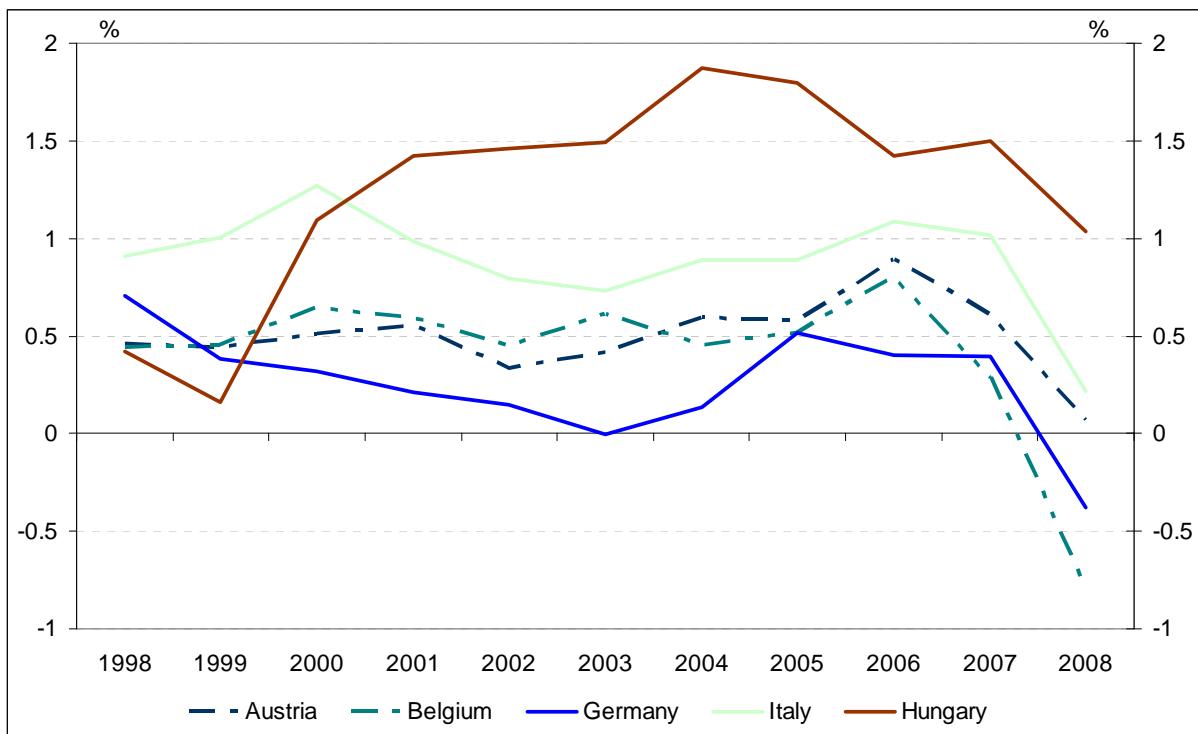
Note: In the case of collateralised retail loans, we consider the 2001 emergence of the market as the starting point.

Source: MNB.

### I.3. The consequences of high margins: high profitability and strong capital position

As a consequence of non-price-based competition for customers and the expansion of loans stemming from the growth of the economy, the profitability of the Hungarian banking system was considered outstandingly high over the past 10 years, not only in the region, but in the whole of Europe. Foreign banks not only benefited from the high profitability but also contributed to the economic boom and to even higher profitability. The profitability of the Hungarian banking system surpassed the performance of that of the parent bank countries by 50% and, in many cases, by as much as 100% (Chart 9).

Chart 9

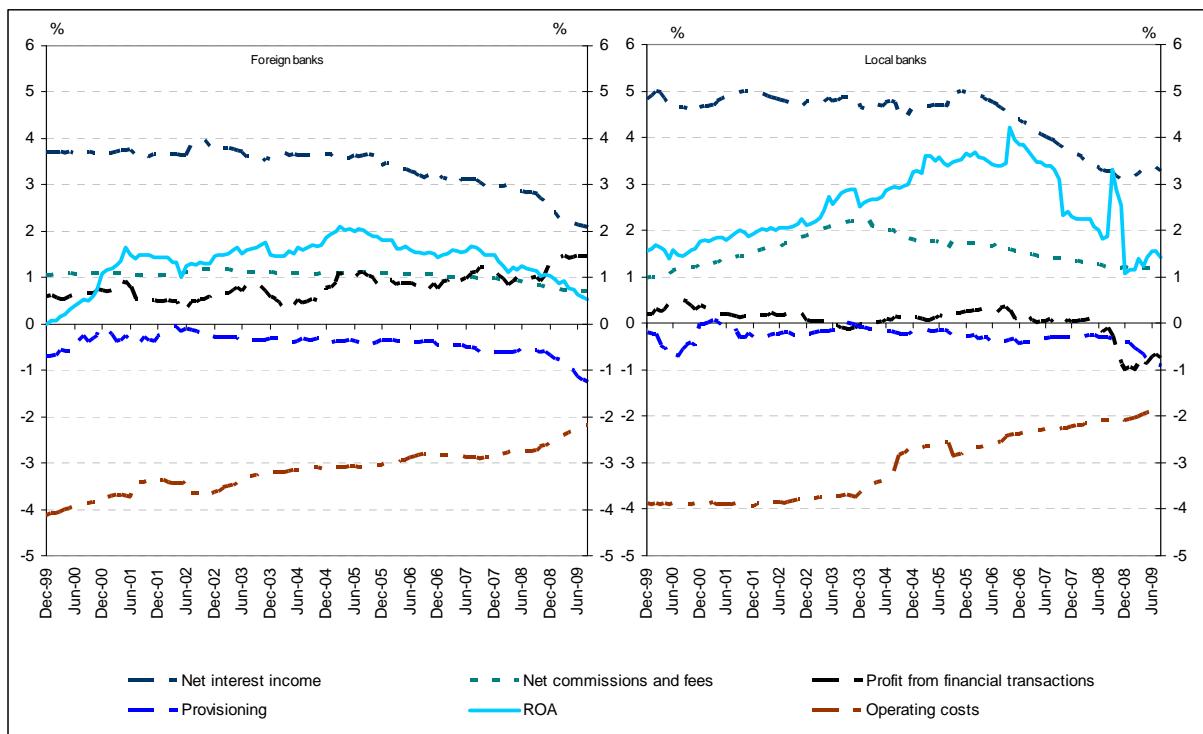
**ROA of foreign banks operating in Hungary and that of parent bank countries**

Sources: OECD, MNB.

The profitability of the Hungarian and western European banking systems differs not only in terms of scale, but also in terms of composition. Within the western European banking system, the main source of revenue is non-interest income. In contrast, the main source of revenue in the Hungarian banking system is the high interest income stemming from high interest margins. The efficiency of the banking system and the result of financial operations are lower, while the portfolio risk and the resulting credit losses are higher than in euro area banking groups.

In the course of the past 10 years, the return on equity (ROE) and return on assets (ROA) of local banks were almost twice as high as those of foreign banks (Chart 10). The ROE and ROA indicators – reflecting the profitability trend of the banking system – peaked at the end of 2004 in the case of foreign banks and have gradually dropped since then. In the case of local banks, profitability only peaked at the end of 2005 at a very high level, and plummeted sharply thereafter. Local banks – whose profit advantages were mainly based on the inherited, very broad retail customer base – consistently outperformed their foreign rivals from the end of the 1990s. Thanks to customers' low sensitivity to loan and deposit margins, the higher margins and fee income realised by the local banks maintained a significantly higher interest and commission income level than that of foreign banks. Expensive account management fees and payment charges also contributed to the higher commission and fee income. The income difference was only slightly mitigated by the fact that the profit realised by foreign banks on financial operations was higher all along than that of local banks due to their more active treasury and custodian activities.

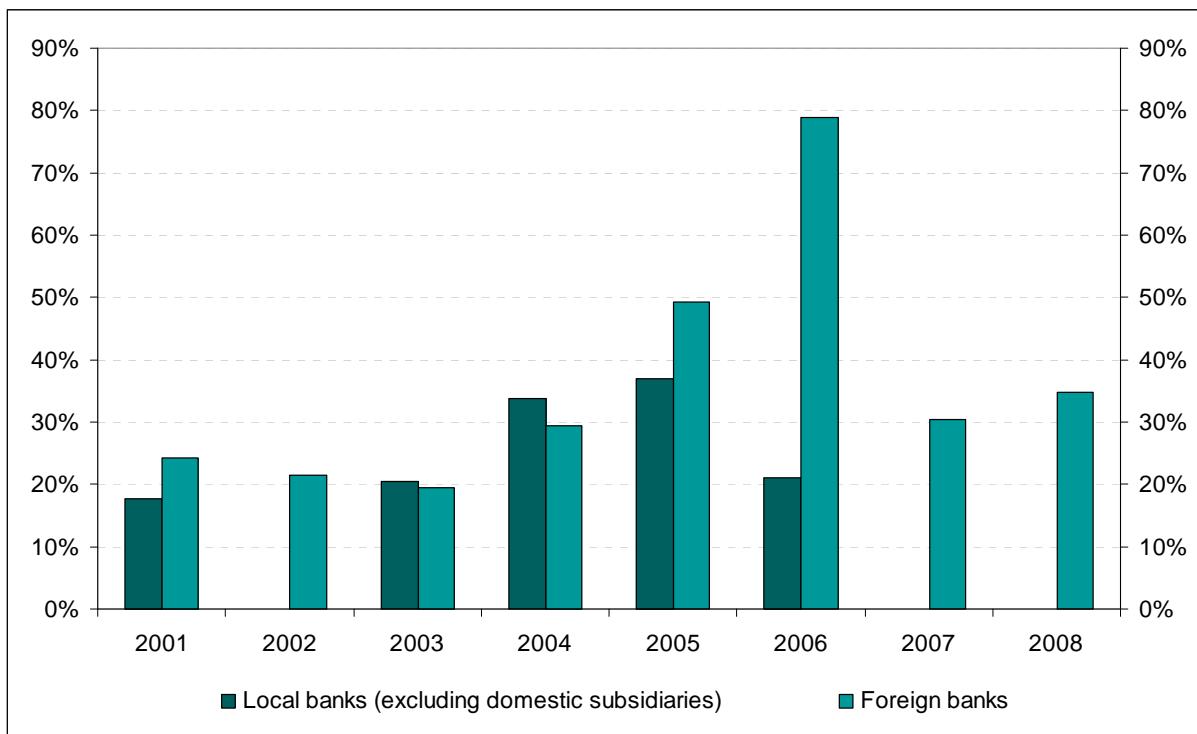
Chart 10  
Relevant profit items to the total assets



Source: MNB.

In terms of expenses, provisions at foreign and local banks were almost the same over the 10-year period. This is attributable to the fact that, although the portfolio quality of local banks was better, their coverage with provision was significantly higher than that of foreign-owned banks, ie they calculated a higher provision for a better quality portfolio. For example, in the case of household loans, the coverage with provision of local banks exceeded 40%, while the coverage of foreign banks was around 30% in the third quarter of 2009. However, a significant change took place in relation to operating expenses in the course of the past 10 years. While foreign banks' operating costs were higher than those of local banks until 2003, this situation reversed from 2004. The underlying reason can be attributed to the change in competitiveness. Since foreign banks had gained a greater market share, local banks were forced to spend increasing amounts on new technologies and the appropriate expertise ("negative spillover effect") in order to improve their competitive position. This largely contributed to the convergence of foreign and local banks' competitiveness. Later, though, the costs of foreign banks increased as local banks proved to be more competitive in selling retail products ("positive spillover effect") thanks to their strengthened market position and extensive branch network. Foreign banks' budgets were heavily burdened by the expansion of their networks (both branches and ATMs).

Chart 11  
Dividend payment rate



Source: MNB.

Of the profit realised in Hungary, 30–40% was repatriated by foreign banks, boosting the profits of parent banks. The other part of the profit – 60–70% (Chart 11) – was reinvested, which significantly contributed to subsidiary banks' sufficient capital adequacy and to sustaining their future growth and resulting high profits. The main source of local banks' high capital adequacy was also attributable to internal capital accumulation. In the period under review, the rate of reinvested profit was around 70–80%.

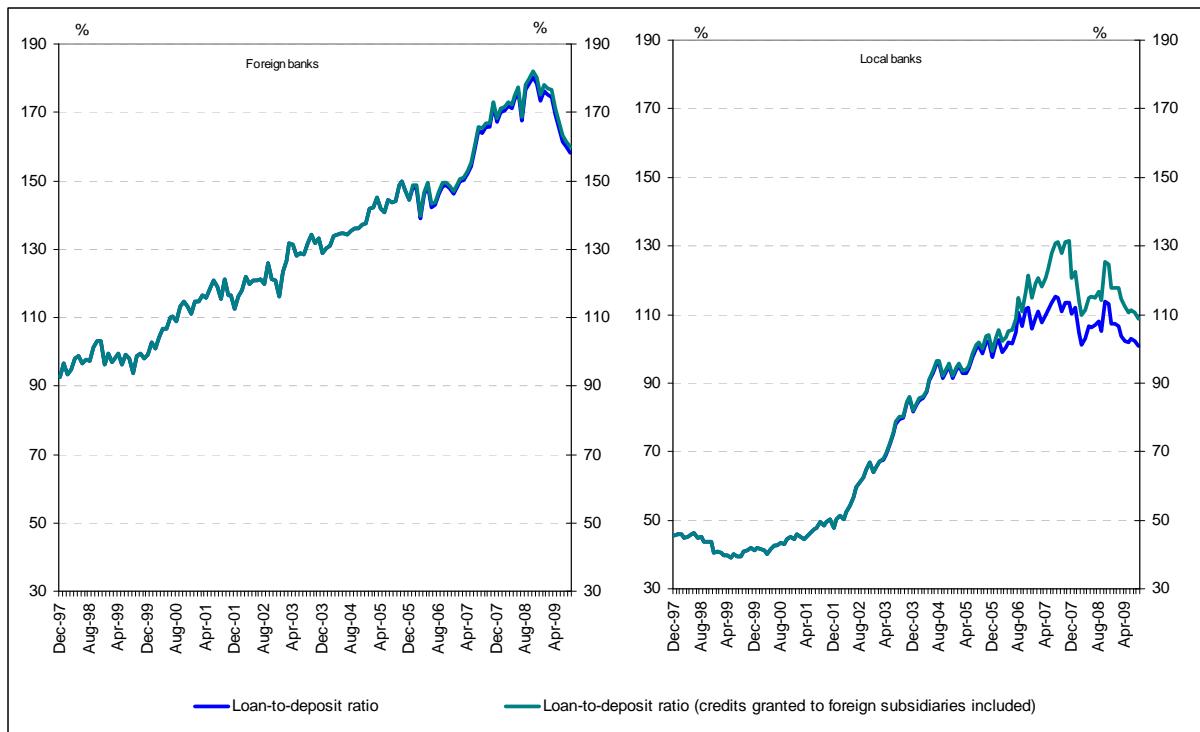
#### I.4. The price of sustaining high profitability: the emergence of liquidity and credit risks

The country's net foreign debt as a percentage of GDP quadrupled in the 10 years to 2008. Due to the overindebtedness of the public and private sectors, net external financial requirements were significant in every year. The majority of foreign funds flowed in through the financial intermediary system. From these foreign funds, the banking system primarily financed the loans taken out by the private sector and, to a lesser extent, the issuance of government securities. Government securities were financed for the most part by direct foreign purchases of assets.

During this period, global money markets were characterised by ample liquidity and cheap, easily accessible funding. At the same time, returns realised on investments dropped substantially in the years preceding the crisis leading to a hunt for yield and an increased risk appetite. One form of this was the central and eastern European expansion of banks, financed partly through capital investments and partly by the active refinancing of local affiliates. All of this essentially means that, over recent years, the savings of European parent banks acquired from the capital markets of different regions around the world have financed Hungary's convergence and the rapid loan expansion entailed by strong non-price-based competition.

Increasing funding risks are clearly indicated by the fact that, while the bank loan portfolio of households nearly tripled between 2004 and 2008, their bank deposits increased by only slightly over 40% during the same period. The loan portfolio of the private sector doubled in the same period, while deposits lagged far behind. Consequently, the loan-to-deposit ratio of foreign banks within the banking system already exceeded 100% in 2000 and continued to rise sharply with the escalation of lending, peaking at 180% at the end of 2008 (Chart 12). A total of 60–70% of the funds involved came from parent banks, while 30–40% was raised on the capital markets. Due to their size and superior credit rating, parent banks have access to funds with better conditions; subsequently, many banking groups' funding is centralised.

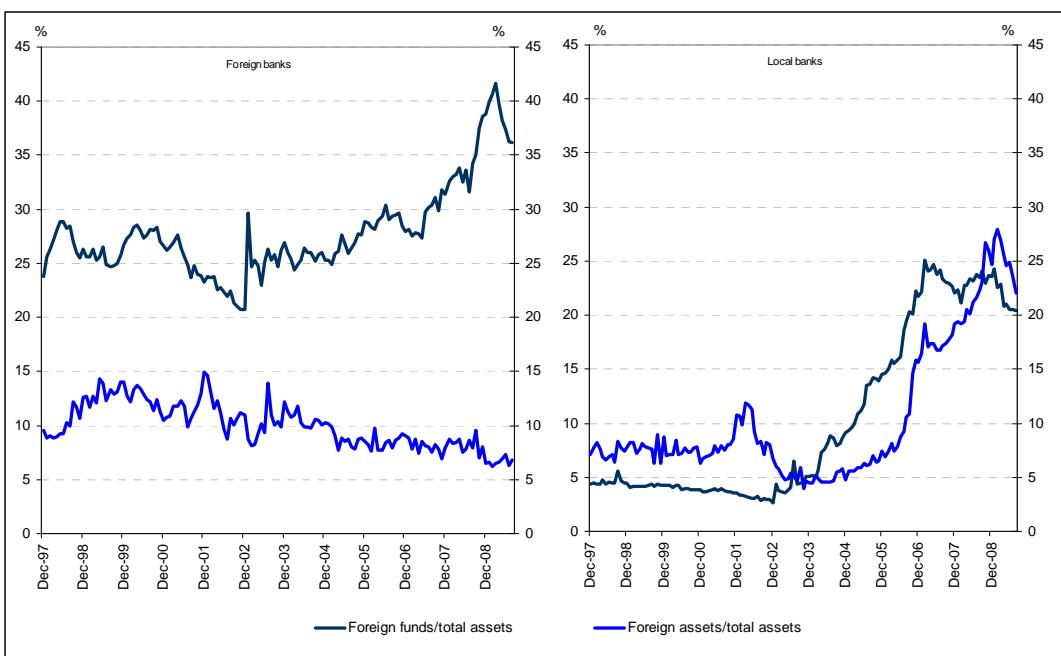
Chart 12  
Loan-to-deposit ratio  
(Exchange rate adjusted – exchange rate as at 31 August 2009)



Source: MNB.

The loan-to-deposit ratio at local banks was still very low at the end of the 1990s, falling below 50%. A total of 54% of retail savings was concentrated in this group of local banks, enabling them to finance the expansion of corporate lending until 2004 from their existing stable retail deposits, and subsequently to expand their vehicle loans and retail mortgages from 2000 through financial enterprises. However, the deposit growth rate could not keep pace with the loan expansion rate. Furthermore, the largest local bank began its regional expansion in the early 2000s. Hence, from 2004, local banks were also forced to turn increasingly to international funding. At that point, the loan-to-deposit ratio (LDR) exceeded 100% and continued to increase, peaking at around 130% at the end of 2008. The LDR of local banks, exclusive of the funds provided for their foreign subsidiaries, only just surpassed 100%, even in 2008 (110% in December 2008).

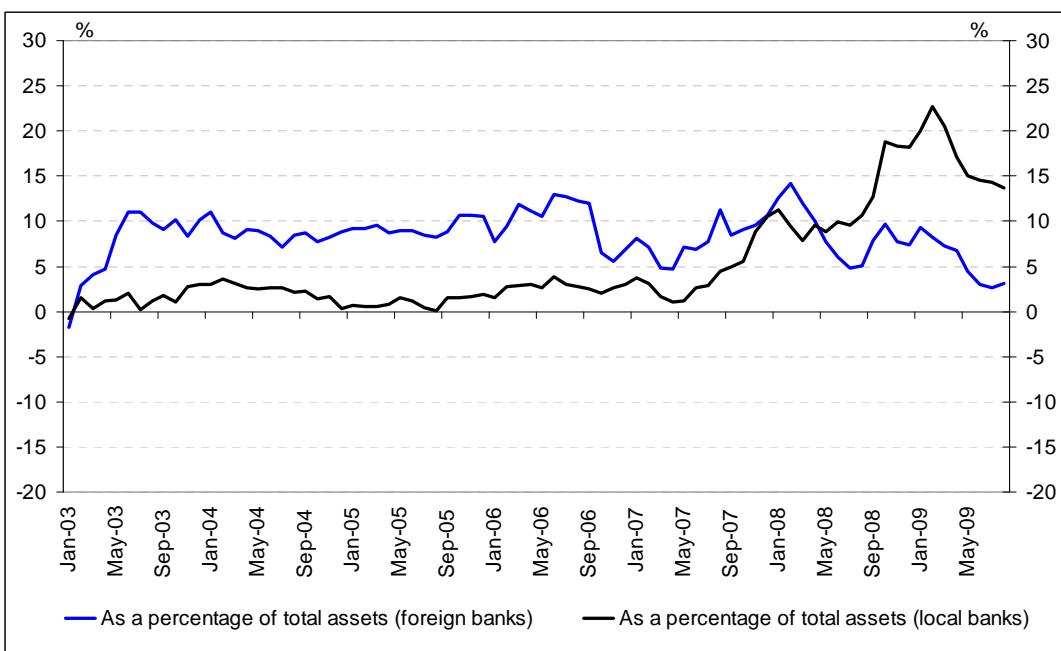
Chart 13  
**Ratio of foreign assets and liabilities to the balance sheet total**



Source: MNB.

After accumulating huge amounts of FX-denominated assets (Chart 13), banks closed their open FX positions in the balance sheet with off-balance sheet swaps. Between 2003 and 2007, the ratio of FX swaps to the balance sheet total fluctuated between 5 and 10% at foreign banks, while for local banks, this ratio did not even reach 5%; until autumn 2007 they secured foreign currency not by utilising their HUF liquidity through FX swaps, but rather by employing cheap, longer-term international funds (Chart 14).

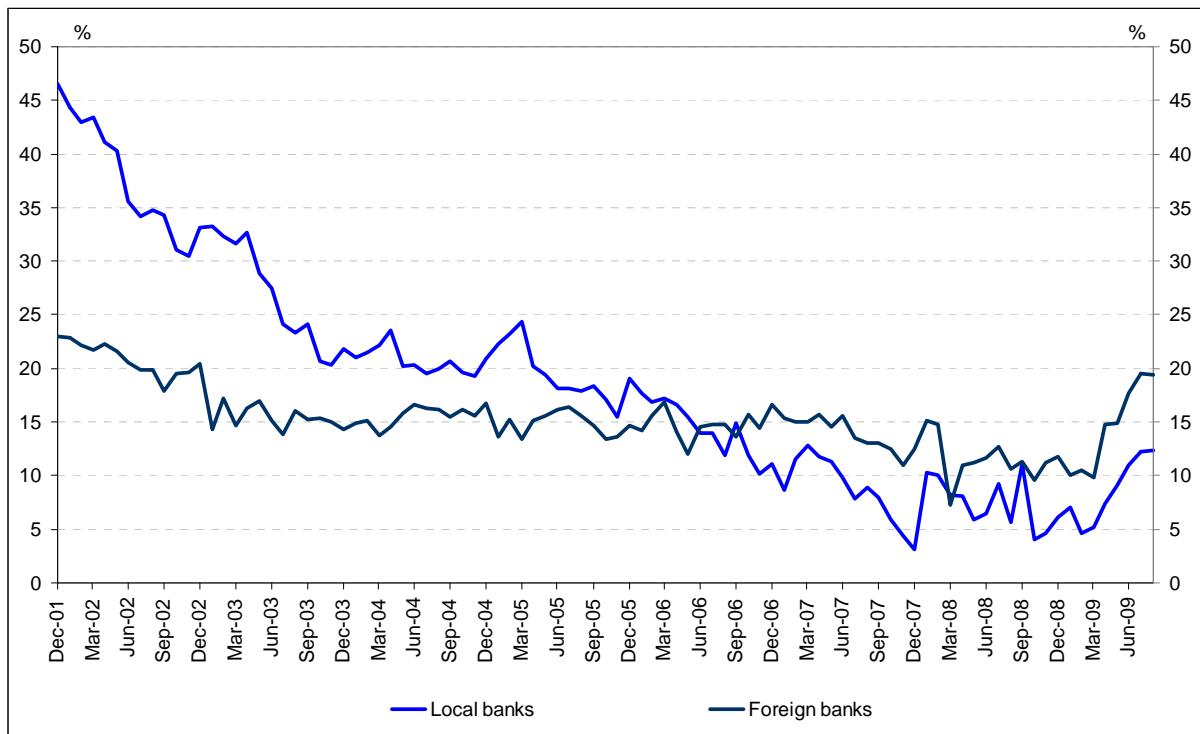
Chart 14  
**Developments in FX swap portfolios as a percentage of the balance sheet total**



Source: MNB.

Finally, it was not only funding risks but also liquidity risks on the asset side that increased (Chart 15). As a result of the credit expansion, the volume of liquid assets continuously decreased within the domestic banking system. This was especially evident in the case of local banks, where the ratio of liquid assets to the balance sheet total dropped from 50% to 5% between 2001 and 2007.

Chart 15  
Ratio of liquid assets to total assets



Source: MNB.

*Liquidity risks* were already evident prior to the onset of the crisis in 2008. As a result of turbulence in the international money markets in August 2007, cheap, long-term maturity international funds gradually disappeared, and short-term money market swaps played an increasingly important role in the financing of FX-denominated long-term loans through the utilisation of liquid assets.

Non-price-based competition – with the objective of continuously expanding the market position – thus resulted in a strong increase in liquidity risks. As a consequence of an LDR considered high even by international standards, the banking system became increasingly reliant on international funds. International interbank funds are typically short-term and a less stable form of financing than retail deposits. All of this entails high renewal risk (“maturity mismatch”). Moreover, as far as maturity mismatch is concerned, heavy reliance on the FX swap market also poses a key risk factor. In the event of disruption in the international interbank market and the FX swap market, liquidity tensions may arise. Moreover, if a bank is unable to renew its FX swap deals, then the foreign currency should be purchased on the spot market, which can in turn lead to substantial exchange rate fluctuations and a widening in the on-balance sheet net open position (on-balance sheet “currency mismatch”).

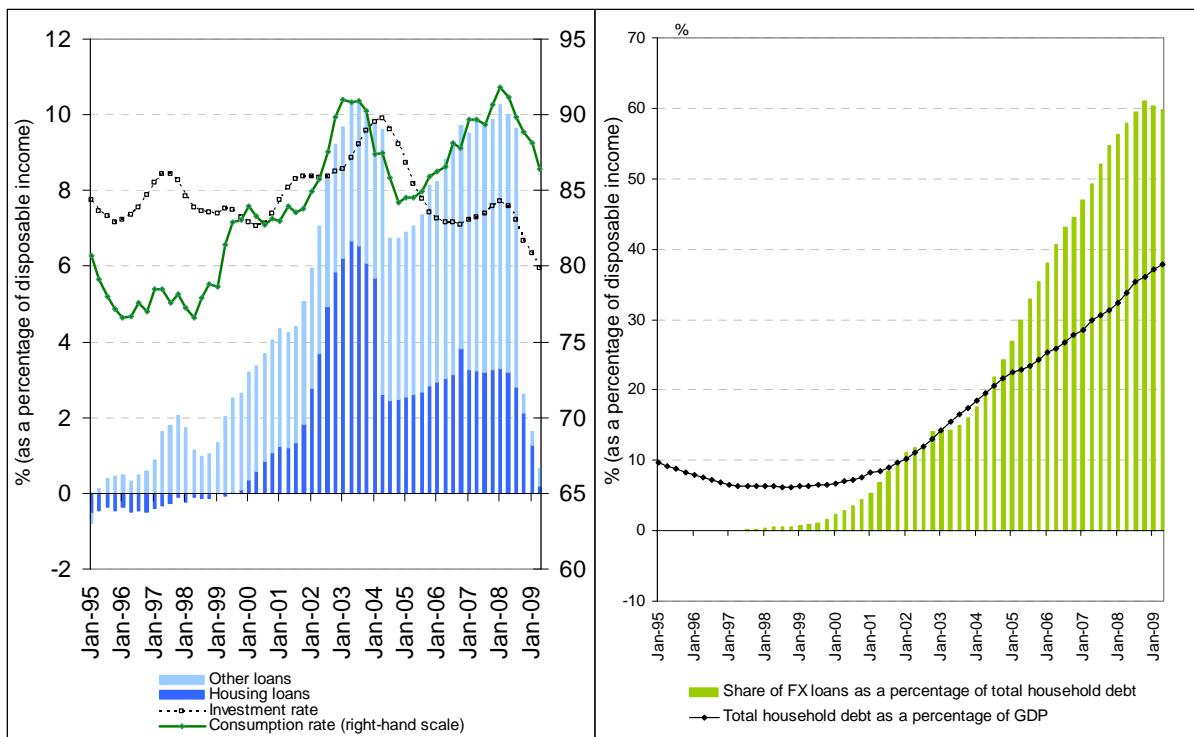
Although local banks’ LDR was substantially lower than that of foreign banks, their renewal risk was nevertheless higher. On the one hand, foreign banks had access to parent banks’ funding, which had a stabilising effect due to the owners’ long-term commitment. On the other hand, when the crisis unfolded, local banks had higher FX swap market exposures

than foreign banks. Finally, the small liquid assets portfolio also increased the liquidity risks of local banks.

Due to the risk-based competition of banks prior to the crisis, not only liquidity risks but also *substantial credit risks* accumulated, primarily on the retail market.

Chart 16

**The correlation between retail lending and the main real economic aggregates characterising households and the developments in retail loan volumes**



Source: MNB.

Over recent years, the fact that retail customers' borrowings in FX had lax credit conditions and that exchange rates seemed relatively stable (concealing the actual exchange rate risks) significantly contributed to the indebtedness of households ("retail capital mismatch"<sup>12</sup>). Excessive indebtedness is also reflected by the fact that the repayment burden of Hungarian households amounted to 13% of their disposable income, while the consumption rate was above 90% in 2008 (Chart 16). Both values exceeded the average for the euro area, while the ratio of retail loans to GDP (40%) remained well below average. The high indebtedness ensuing from a lower household income path and a lower household savings ratio clearly indicates an increasing credit risk.

Credit risk is also generated by passing on exchange rate risks (retail "currency mismatch"). While in 2004, the household sector did not have any net open exchange rate positions, by the end of 2008 the sector's GDP-proportionate net position reached 20%. As a result of this open position, a substantial exchange rate depreciation would considerably deteriorate the portfolio of commercial banks, quickly turning the exchange rate risk of customers into a credit risk of banks.

<sup>12</sup> IMF (2003): *The Balance Sheet Approach and its Applications at the Fund*.

Over the last decade, the credit risks of both foreign and local banks increased substantially. Nonetheless, the credit risk level of local banks can be regarded as relatively lower, as suggested by the lower rate of loans in default for over 90 days.<sup>13</sup>

## II. Adjustment during the crisis

As we have seen, the Hungarian banking system generated an outstandingly high profit level over the past 10 years. This high profitability was sustained at the cost of assuming both increasing credit risk necessitated by risk-based competition and increasing liquidity risk in order to fund such growth. These risks materialised as a consequence of the financial and subsequent economic crisis, and it has since become obvious that such high profitability cannot be sustained over the long term.

The period following the outbreak of the crisis can be split into two clearly distinct phases: liquidity risk emerged in the first phase (final quarter of 2008) to be followed by credit risk in the second phase (2009–10).

Although funding costs had been increasing in Hungary since August 2007 at the outbreak of the international financial crisis and it had become increasingly difficult to obtain long-term funding, the liquidity crisis only really began in Hungary in the post-Lehman era, ie following the events of October 2008. As a result of the dramatic narrowing of financing opportunities, the financial crisis threatened Hungary with a balance of payments crisis ensuing from the substantial public and private sector indebtedness. As a consequence of the country's significant need for international funding and the related extreme vulnerability, the exchange rate depreciated substantially as a result of the crisis, and key financial markets (mainly government securities, FX swap and interbank markets) dried up.

A number of steps were taken in order to manage the liquidity crisis. To protect itself against an exchange rate attack, the central bank raised its base rate by 300 basis points while also deciding to take on a number of measures aimed at expanding liquidity and stabilising the market: it operated the swap market, assumed the role of lender of last resort both in HUF and EUR, expanded the scope of acceptable collateral, announced HUF and FX credit tenders, cut its mandatory reserve rate and ensured that money markets remained operational. In order to ensure state financing and to replenish its diminished FX reserves, within three weeks the state reached an agreement with the International Monetary Fund (IMF) and with the European Union on a EUR 20 billion loan package. All of this contributed significantly to foreign investors' increased confidence.

The second wave of the crisis came in March 2009. During that period, it was not purely a country-specific but rather a region-specific problem that emerged, prompting foreign investors to quickly sell their assets. Due to the substantial contraction of regional economies and the high proportion of FX lending, the banking system's credit losses increased sharply, which in turn increased the threat of financial instability. Due to uncertainties surrounding the state of the banking systems, the currency exchange rate of several countries depreciated substantially, while in the Baltic countries the likelihood of abandoning the currency board and the pegged exchange rate system posed a real threat. This resulted not only in a loss of investor confidence, but also shook the confidence of households which manifested itself in the rapid, temporary outflow of deposits from the banking system. Confidence in central and eastern European countries was restored thanks to improving global economic prospects,

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<sup>13</sup> Local banks' regional expansion clearly increases lending risk. However, in this study, we focus mainly on the domestic operations of banks, as they show a different picture on a group level in connection with the foreign banks present in Hungary.

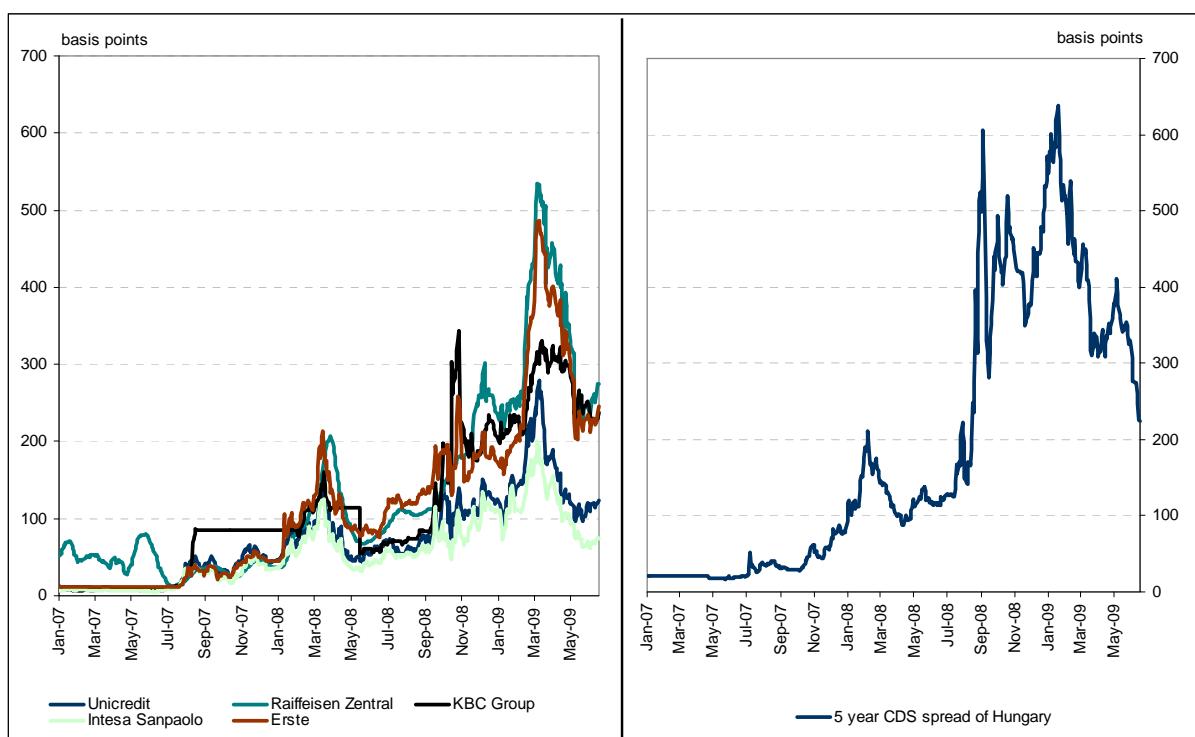
the successful foreign currency bond issuances of regional states and the better-than-expected shock absorbing capacity of the banking systems.

Between April and December 2009, confidence in the region and hence in Hungary, gradually improved, credit default swap (CDS) spreads decreased significantly, and money markets stabilised. The greatest challenge for the banking system was the continued balance sheet adjustment and the absorption of credit losses triggered by the deteriorating macroeconomic environment.

## II.1. Liquidity – during the crisis

In the period following the collapse of Lehman Brothers, nearly all investors fled from markets deemed to be risky. Due to the international money market turmoil and the high vulnerability stemming from the country's substantial external financing requirements, domestic CDS premia and government security yields increased significantly. Important domestic markets dried up (Chart 17). The interbank, FX, swap and government security markets experienced severe disruption. Besides state financing, the financing of the banking system was also threatened. The most important liquidity problem was how the Hungarian banking system, characterised by high FX claims, would secure adequate FX liquidity. It wasn't the price that mattered anymore, but rather the volume, due to the fact that interbank limits set very low – often at zero – price offers which had no significance.

Chart 17  
CDS premia on certain foreign banks with a prominent role in Hungary  
and Hungary's five-year CDS premium

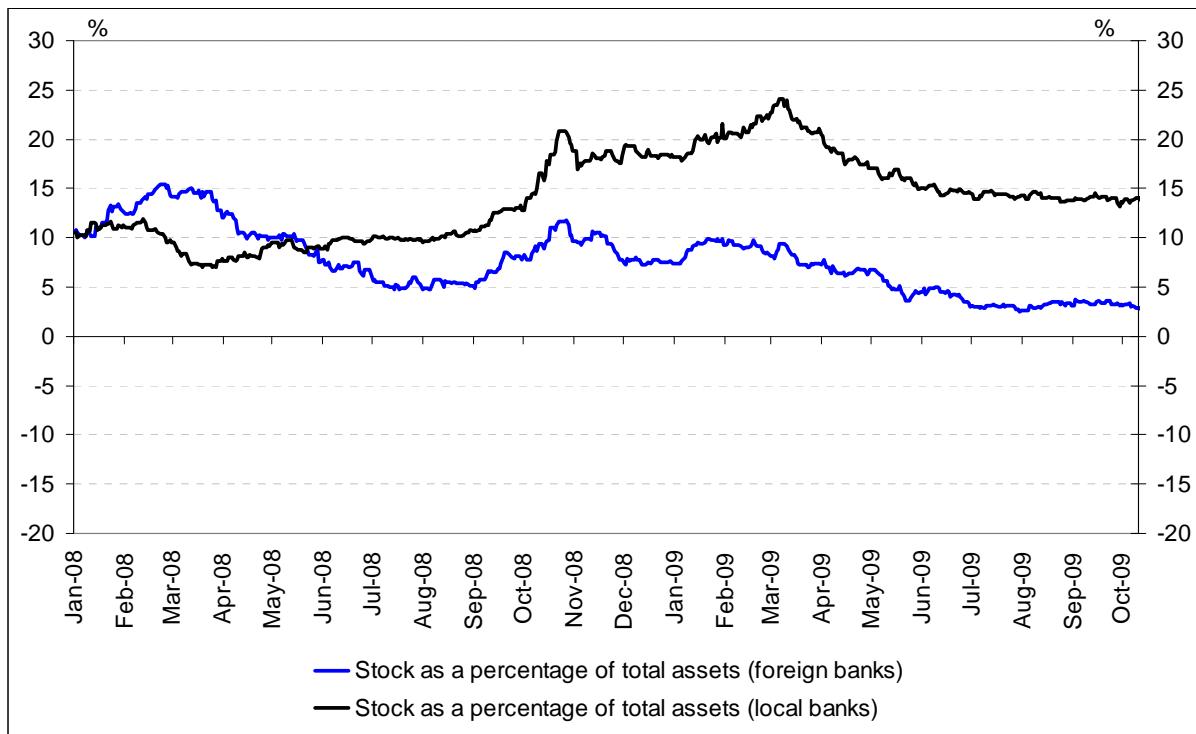


Sources: Bloomberg, Reuters, Thomson Datastream.

The international financial package, the liquidity provisioning measures of the central bank and the intervention of foreign parent banks played a key role in solving the problem. Without any parent banks to fall back on, local banks relied increasingly on central bank and state bailout packages. On the one hand, the rolling over of a substantial FX-swap stock became

difficult due to the drying up of the market and in turn due to narrowing partner limits (Chart 18). On the other hand, the rolling over of the increasing FX-swap stock required ever greater HUF liquidity, made almost impossible by the dwindling liquidity of the interbank market. Consequently, local banks were only able to obtain the required FX liquidity from the central bank. This was technically achieved by transforming the HUF liquidity provided by the central bank into FX liquidity through FX swaps which were also provided by the central bank.

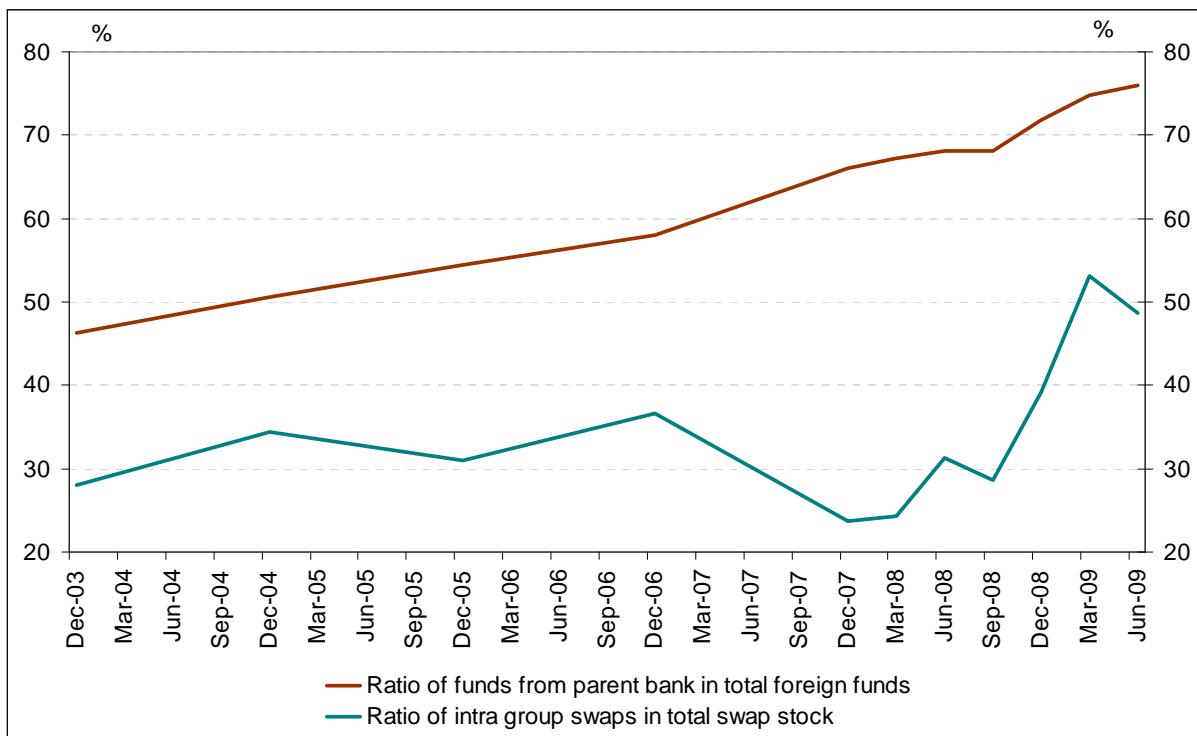
**Chart 18**  
**Daily developments in the FX swap stock as a percentage of the balance sheet total**



Source: MNB.

The FX liquidity position of foreign banks also deteriorated substantially, although parent banks assumed a key role in managing this problem (Chart 19). As markets for FX liquidity dried up, the subsidiaries of foreign banks operating in Hungary increasingly relied on their parent institutions for the necessary funding. In the final quarter of 2008, parent banks increased the funding of their subsidiaries by nearly EUR 3 billion in order to make them more resistant to the liquidity crisis. The role of parent banks also became more dominant on the FX swap market in ensuring FX liquidity.

Chart 19  
Developments in the ratio of parent bank funds



Source: MNB.

Rapid, large-scale action by the banks also contributed to the alleviation of the liquidity crisis. As a result of the financial crisis and the economic recession, the real economic sector scaled back its indebtedness and, consequently, the banking system's leverage, more precisely, the loan-to-deposit ratio, also decreased. The liquidity crisis, however, accelerated the scale and speed of deleveraging. Banks themselves recognised that the earlier credit expansion was unsustainable, and thus the era of risk-based competition came to an end. Initially, liquidity considerations – followed by a deterioration in portfolios – led to a drastic drop in risk appetite, which was reflected in a low willingness to lend. Decreasing the LDR and the reliance on foreign funds and FX swaps became a priority, which curbed the lending appetite of banks, making the operation of the banking system procyclical. Although the number of new household loans also dropped significantly, it was primarily in corporate lending where the adjustment was most apparent. On the one hand, as corporate loans have shorter terms, the adjustment may be initially reflected in the loan segment with shorter maturities. On the other hand, corporate loans have lower profit margins than household loans. Finally, compared to retail mortgage loans, corporate loans have a higher risk weighting and therefore represent a greater burden on capital.

As part of their adjustment strategy, market competition switched over from the asset side to the liability side. From the end of 2008, all major Hungarian banks began aggressive FX and HUF deposit-taking campaigns. As a result of fiercer deposit market competition, the banking system increased the propensity to save but at the same time drew a large amount of funds away from other forms of saving, primarily investment fund and cash-type savings instruments. Moreover, the state refinanced maturing HUF government securities (primarily from the IMF loan) in the first half of 2009. The liquidity released (investments in HUF government bonds) also flowed into the banking system in the form of deposits. All in all, both the asset and liability sides contributed to a decreasing LDR, with the deposit side nevertheless playing a more prominent role.

Regarding the pace and composition of the balance sheet adjustment, there are strong differences between the two banking groups. Banks in foreign ownership primarily decreased their activity on the loan side in the area of corporate lending. Competition for retail deposits contributed to an even larger extent to improving the LDR than loan side adjustment. As a consequence of competition, foreign banks increased their share of household deposits and thus the market share of local banks fell further.

The adjustment process of local banks differed from that of their foreign counterparts. Thanks to much lower initial levels, the LDR of local banks decreased less in absolute value and the structure of the decrease also differed. The adjustment for this group was mostly achieved through the inflow of deposits – mainly corporate and other funds (primarily originating from money market funds). In the case of local banks, the corporate loan portfolio did not decrease, while the household loan portfolio decreased only to a slight extent.

Parallel to the fall in the LDR, the reliance of the Hungarian banking system on foreign funding gradually declined in 2009. In the case of foreign banks, the volume of foreign funds decreased, while the rate of parent bank funding increased. Without parent banks to rely on, local banks replaced renewable foreign funds with state loans.

Adjustment to the liquidity crisis did not only lead to a lower LDR. As the adjustment primarily affected FX-based products both on the loan and deposit sides, the on-balance sheet open FX position of banks, and consequently their reliance on the swap market, also decreased. The fall in the swap stock was most apparent at local banks. By the end of 2009 – in large part thanks to the successful intervention by the central bank – the Hungarian swap market had stabilised; therefore, in parallel with the easing of liquidity tensions, interoperability between currencies also improved gradually.

Both foreign and local banks accumulated sufficient liquidity reserves to buffer themselves against possible future shocks. The ratio of liquid assets to the balance sheet total had increased by over 10% by the end of 2008.

From both a macroeconomic and financial stability perspective, it was essential to reduce liquidity and financing risks. The fact that banks adjusted excessively to liquidity risks presented a risk in itself. When liquidity risks materialised, cooperation between the government, the central bank and parent banks restrained an excessively rapid adjustment, thereby making it possible to avoid and mitigate financial acceleration and preventing the more than justified deepening of the recession.

## **II.2. Solvency in the spotlight**

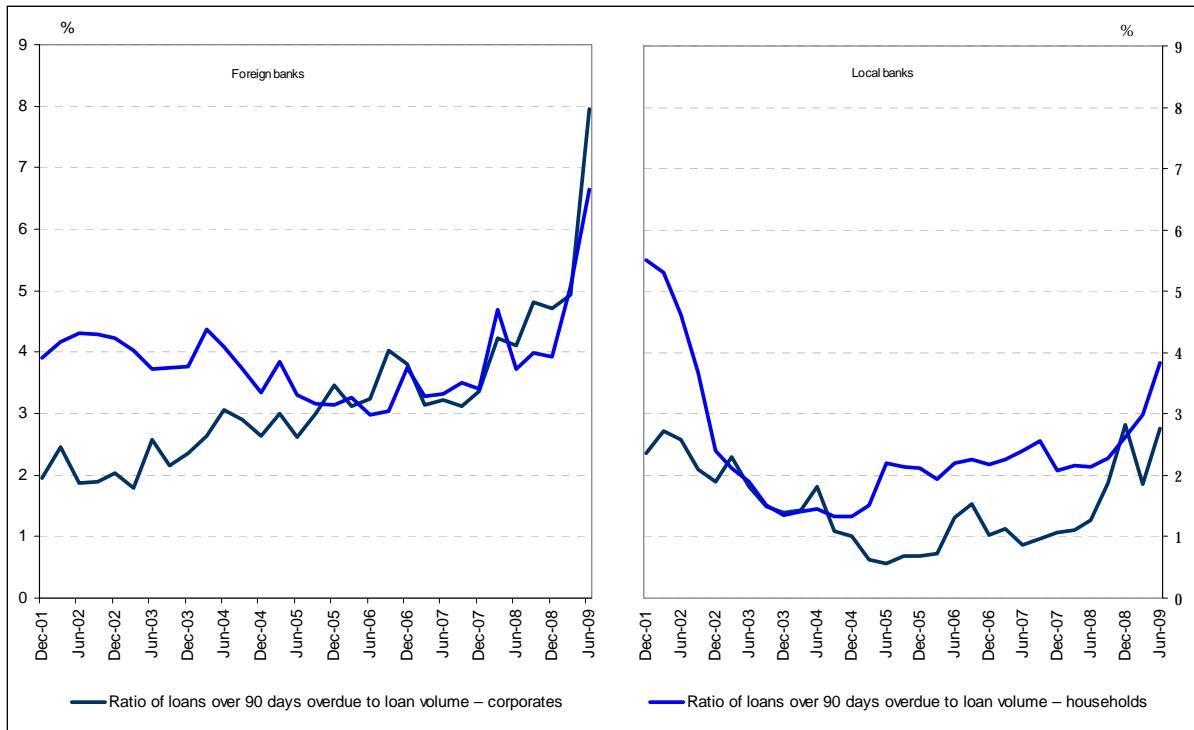
By the beginning of 2009, liquidity tensions in the global financial system seemed to ease, while the adjustment process led to a deep global economic recession. Due to its high trade integration, Hungary “imported” the recession affecting developed countries, but the rapid, forced adjustment referred to in the previous section led to a more severe economic contraction than in other countries, due to the decreased leverage of all economic agents.

In this radically changed financial and macroeconomic environment, many previously creditworthy firms suddenly found themselves cut off from funding and, furthermore, the narrowing of their main outlet markets led to a fall in demand for their products. The corporate loan portfolio thus began to deteriorate substantially for both banking groups. The extent of this deterioration in a relative sense was similar for both foreign-owned and local banks, but its level differed greatly. While for local banks, the ratio of corporate loans over 90 days overdue was around 3%, this figure stood at almost 8% at the end of H1 2009 for foreign banks.

The household loan portfolio also began deteriorating rapidly in 2009. The proportion of non-performing or overdue loans first increased in March 2009. Due to increased loan interest rates and substantial depreciation, households – with no natural hedging against exchange

rate risks – were less and less able to repay their loans (Chart 20). Following the stabilisation of the financial markets, the portfolio quality was undermined by the labour market adjustment of companies, taking the form of real wage cuts and increasing unemployment. The discrepancy between the portfolio deterioration of the two banking groups was significant. The non-performing loan ratio of local banks was 4%, much lower than the 7% of foreign banks in mid-2009. This is only partially explained by the fact that a large portion of the non-performing loans of the local banking group was sold to their own debt collection financial corporations.

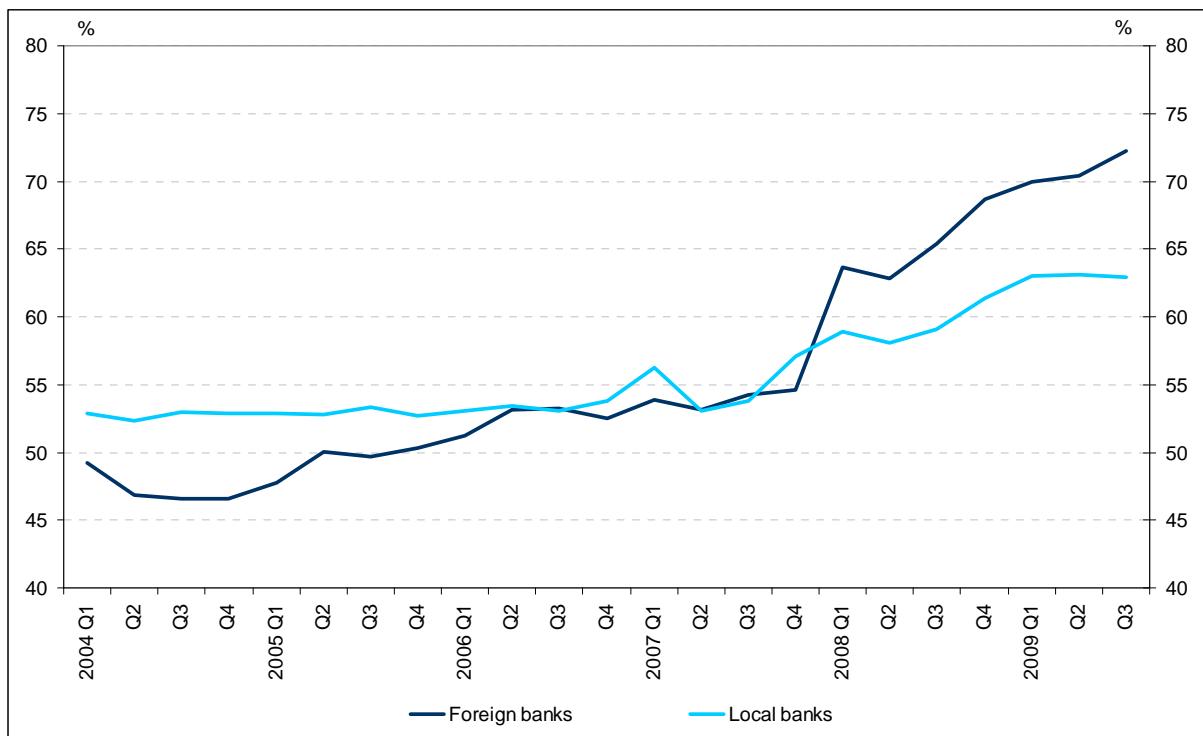
Chart 20  
**Ratio of loans over 90 days overdue to loan volume among firms and households**



Source: MNB.

One of the reasons for the discrepancy is that the loan-to-value (LTV) of local banks' household loan portfolios is lower: in 2009, the average LTV of local banks was under 65%, while that of foreign banks exceeded 70% (Chart 21). The other factor is that local banks are less active in the home equity mortgage market: while local banks hold one third of the total market share for household real estate-backed loans, their share is less than 20% in the case of home equity mortgage loans.

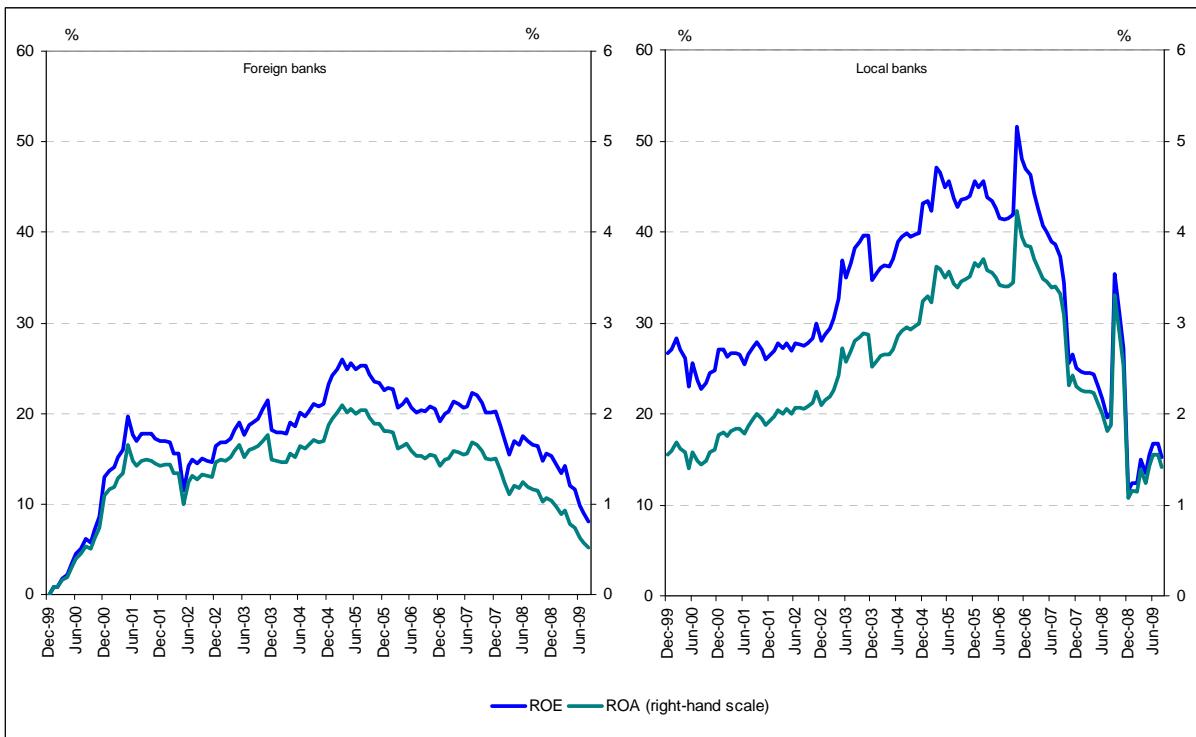
Chart 21  
**Developments in the average LTV of the household loan portfolio**



Source: MNB.

The crisis reduced the banking system's profitability primarily through credit contraction, narrowing interest margins due to higher financing costs, and loan losses and lost interest revenues stemming from deteriorating loan portfolios. The crisis began to affect profitability in 2008, with the banking system performing worse than in the previous quarter due to increased provisions. Despite this, both local and foreign-owned financial institutions closed with remarkably good results in an international comparison. Overall, foreign subsidiaries significantly outperformed the banking systems of their parent banks' countries, because while 2008 was a year of banks breaking even or experiencing losses in western Europe, in Hungary banks continued to post a significant profit. In several cases, foreign bank groups owed all of their profit to their subsidiaries in central and eastern Europe (Chart 22).

Chart 22  
**Developments in profitability indicators (12-month rolling result)**

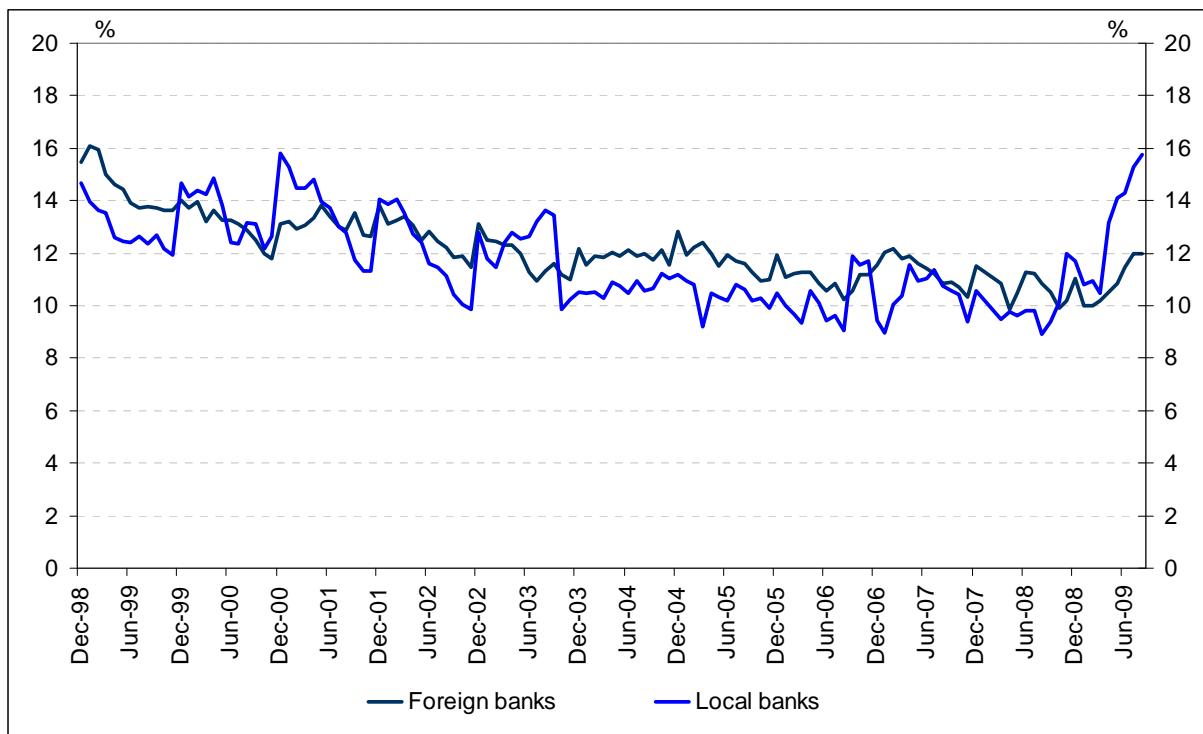


Note: The large shifts observed in the case of local banks (eg in 2006 or 2008) are due to one-off events.

Source: MNB.

Due to the losses expected as a result of the crisis, the capital position of institutions became a central issue everywhere, including in the Hungarian banking system. Not only was the capital adequacy indicator high overall in the Hungarian banking sector, but the partial reinvestment of 2008 profits and reduction in risk-weighted assets (RWA) due to the forced adjustment led to an improvement in this indicator during the crisis. This improvement primarily involved local banks, mainly due to their presence on the stock market and the higher capital adequacy expectations of investors (Chart 23).

Chart 23  
Developments in the capital adequacy ratio



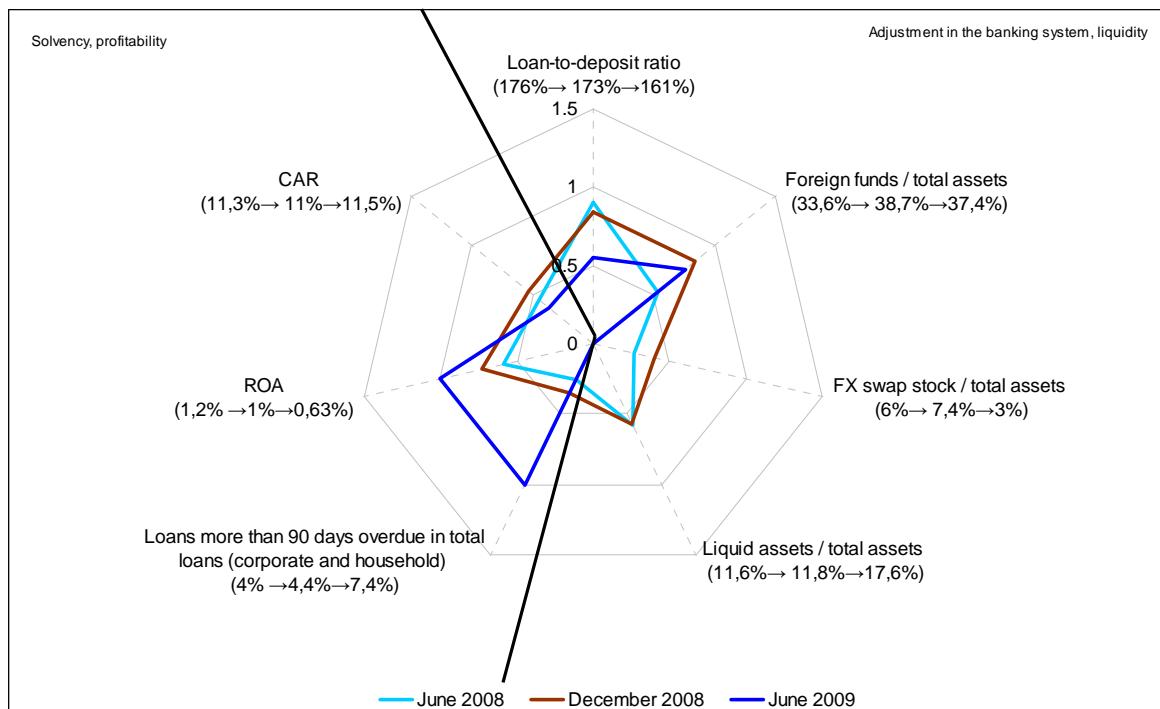
Source: MNB.

## Conclusions

Prior to the 2008 crisis, Hungarian banks realised outstandingly high profits. The main source of bank income was rapid credit growth and wide interest margins. In addition to the strong demand for credit from households due to their positive income expectations, fast credit growth was also the result of strong loan supply pressure from banks. Competition between banks intensified and the increasing competition did not result in decreasing prices. Cost-based competition was reflected in higher advertising spending and network building, while risk-based competition was reflected in the sales of increasingly risky products to increasingly risky customers. Interest margins remained high for an extended period precisely because of the weak price-based competition.

All of this led to the accumulation of ever increasing risks, which came at the price of sustaining high profitability. Rapid credit growth significantly pushed up financing risks, reflected in an elevated loan-to-deposit ratio and a strong reliance on foreign funding and the FX swap market. At the same time, banks' credit risks also increased due to the high level of indebtedness of households and mounting exchange rate exposure. Both foreign and local banks assumed substantial liquidity and credit risks. When comparing foreign and local banks, however, the latter had higher liquidity risks, while the former had higher credit risks.

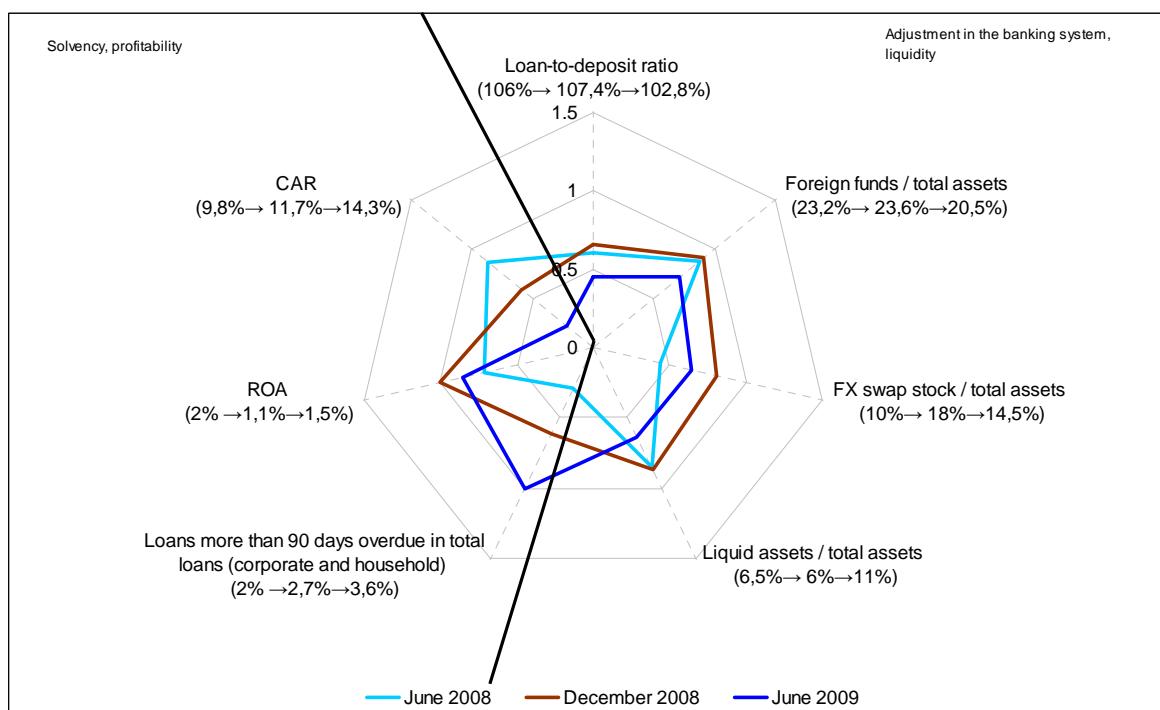
Chart 24  
Foreign banks' main risk indicators



Note: Values falling further from the centre of the web indicate an increase in risks.

Source: MNB.

Chart 25  
Local banks' main risk indicators



Note: Values falling further from the centre of the web indicate an increase in risks.

Source: MNB.

Following the onset of the crisis in Hungary in October 2008, these risks materialised. Due to the liquidity crisis, banks had to rely on substantial external assistance, albeit temporarily. In the case of local banks, this was provided by the central banks and the state, while in the case of foreign banks, it was provided by parent banks. The materialisation of financing risks forced all banks to adjust to the situation and restrain their activities. The sharp economic slump – exacerbated by the adjustment of the Hungarian private sector and the banking system – led to the materialisation of credit risks, while lending losses started growing – at a faster pace at foreign banks than at local banks (Charts 24 and 25).

The crisis showed that the higher the level of risk, the higher the real economic cost to the banking system to adjust to the shock. The 2008 financial crisis hit the Hungarian banking system, which had significant liquidity and credit risks, and Hungarian banks thus reacted with strong procyclical behaviour to the changed financial and macroeconomic environment. All of this, in conjunction with similarly procyclical fiscal and monetary policy, contributed to the Hungarian economy entering a deeper recession in 2009 than the rest of the region. In order to prevent or alleviate banks' procyclical behaviour, these risks must be reduced and new types of risks must be prevented from developing. The Hungarian banking system should not be allowed to once again become the source of risks which exacerbate the negative effects of an external shock.

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# **Impact of the international banking crisis on the Indian financial system**

Anand Sinha<sup>1</sup>

It would have been hard, even a few months prior to the collapse of Lehman Brothers, to anticipate the impact that the global financial crisis would have on the Indian economy. This is because the Indian banking system did not have any direct exposure to subprime mortgage assets or any significant exposure to the failed institutions, and the recent growth had been driven predominantly by domestic consumption and investment. And yet, the extent to which the global crisis impacted India was dismaying, spreading through all channels – the financial channel, the real channel and the confidence channel. The reason why India was hit by the crisis was because of its rapid and growing integration into the global economy.

Under the impact of external demand shock, there was a moderation in growth in the second half of 2008–09 compared to the robust growth of 8.8% per annum in the preceding five years. The deceleration was more noticeable in the negative growth in industrial output in Q4 2008–09 – the first decline since the 1990s. The transmission of external demand shock was severe on export growth, which deteriorated from a peak rate of about 40% in Q2 2008–09 to (–)22 per cent in Q4, ie the first contraction since 2001–02. Simultaneously, domestic aggregate demand also moderated due to a sharp deceleration in the growth of private consumption demand.

With regard to financial markets, India witnessed a reversal of capital inflows following the collapse of Lehman Brothers. Due to a heavy sell-off by foreign institutional investors (FIIs) there was a significant downward movement in the domestic stock markets. The withdrawal by FIIs and the reduced access of Indian entities to external funds exerted significant pressure on dollar liquidity in the domestic foreign exchange (FX) market. This created adverse expectations on the balance of payments (BOP) outlook, leading to downward pressure on the Indian rupee and increased FX market volatility. While the banking system was sound and well capitalised, some segments of the financial system such as mutual funds (MFs) and non-banking financial companies (NBFCs) came under pressure due to reduced foreign funding and a subdued capital market. Moreover, the demand for bank credit increased due to the drying up of external sources. Against this backdrop, the Reserve Bank of India stepped in with liquidity-supplying measures – both in the rupee and in foreign currency – and the government implemented fiscal stimulus measures, a more detailed account of which is given below.

## **Impact of the global financial crisis on local money markets, debt markets and foreign exchange markets**

Although the direct impact of the subprime crisis both on Indian banks and on the financial sector was almost negligible because of their limited exposure to the troubled assets, the prudential policies put in place by the Reserve Bank and the relatively low presence of foreign banks in the Indian banking sector, there was a sudden change in the external

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<sup>1</sup> Reserve Bank of India.

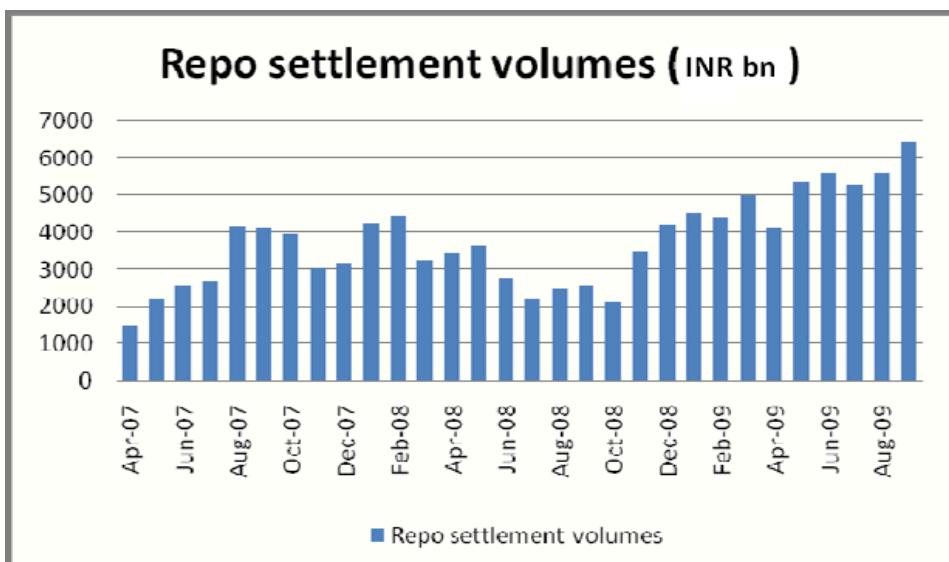
environment following the failure of Lehman Brothers in mid-September 2008. The knock-on effects of the global financial crisis manifested themselves not only as reversals in capital inflows but also in adverse market expectations, causing a sharp correction in asset prices on the back of sell-offs in the equity market by FIIs and exchange rate pressures. The withdrawal of funds from the Indian equity markets, as in the case of other emerging market economies (EMEs) and the reduced access of Indian entities to international market funds exerted significant pressure on dollar liquidity in the domestic FX market. With a view to maintaining orderly conditions in the FX market which had become very volatile, the Reserve Bank scaled up its intervention operations, particularly in October 2008. However, the FX market remained orderly in 2009–10 with the rupee exhibiting a two-way movement against major currencies.

Indian financial markets, particularly banks, have continued to function normally. However, the cumulative effect of the Reserve Bank's operations in the FX market as well as transient local factors such as the build-up in government balances following quarterly advance tax payments had an adverse impact on domestic liquidity conditions in September and October 2008. Consequently, in the money market the call money rate breached the upper bound of the informal Liquidity Adjustment Facility (LAF) corridor during mid-September–October 2008. However, as a result of the slew of measures initiated by the Reserve Bank (referred to in detail below) the money market rates declined and have remained below the upper bound of the LAF corridor since November 2008. In the current financial year, the call rate has thus far hovered around the lower bound of the informal LAF corridor.

The indirect impact of the global financial turmoil was also evident in the activity in the certificate of deposit (CD) market. The outstanding amount of CDs issued by scheduled commercial banks (SCBs), after increasing between March and September 2008, declined thereafter until December 2008 as the global financial market turmoil intensified. With the easing of liquidity conditions, the CD volumes picked up in the last quarter of 2008–09. The weighted average discount rate (WADR) of CDs, which had increased with the tightening of liquidity conditions, started declining from December 2008 onwards. Commercial paper market developments were similar.

As explained above, the rates in the unsecured (call) market went above the LAF corridor from mid-September to October 2008 as a consequence of the liquidity pressure in the domestic market. The rates in the collateralised money market – (Collateralised Borrowing and Lending Obligation (CBLO) and repo markets) – moved in tandem but remained below the call rate.

The Indian repo markets were broadly unaffected by the global financial crisis. Currently, only government securities are permitted for repo and a select set of participants (regulated entities) is permitted to participate in repos. All repo transactions are novated by the Clearing Corporation of India and settled on a guaranteed basis. The interbank repo markets continued to function, without freezing, during the period of global financial turmoil. During the period June–October 2008, the repo volumes fell marginally but subsequently recovered. There was no incidence of settlement failure during the global financial crisis.

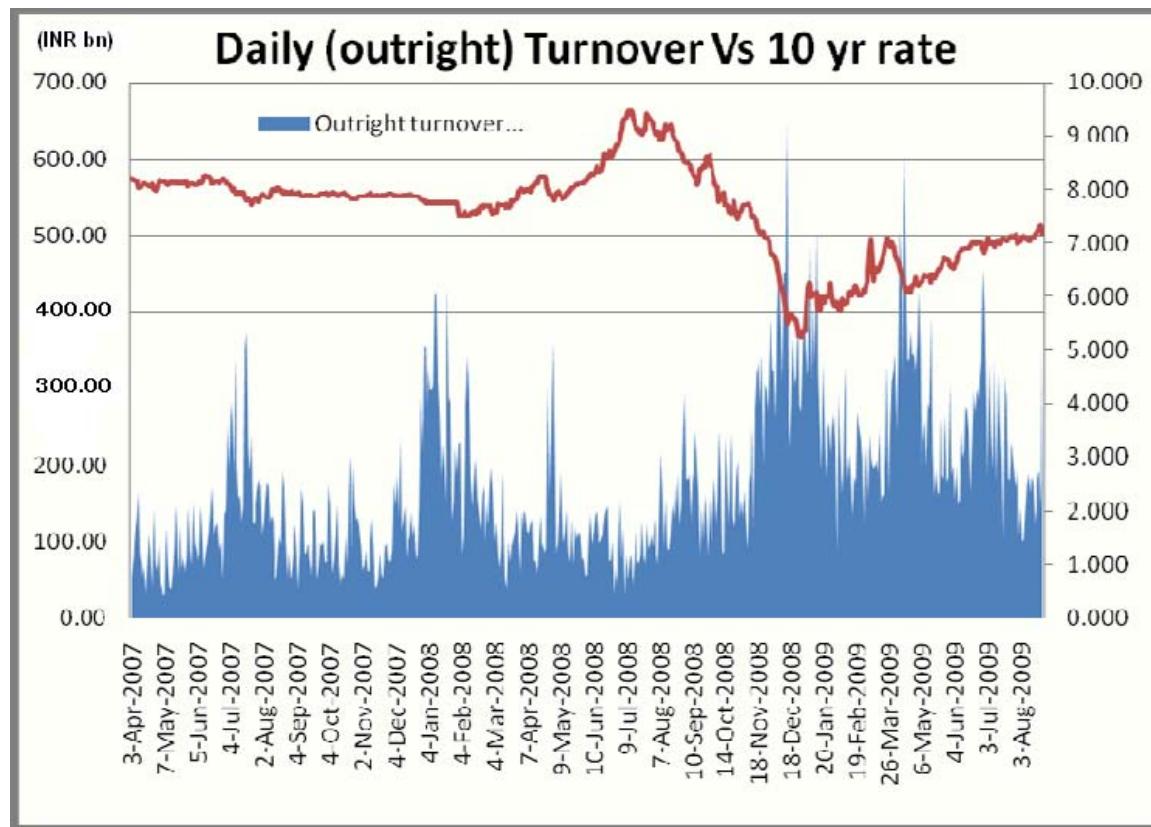


The total volume in the money market segments decreased during September and October 2008. In October 2008, the decrease was more pronounced in the collateralised segment compared to the uncollateralised segment. The volume in the call market actually increased in October 2008. Moreover, the average daily amount of liquidity injected into the banking system through the LAF increased substantially during September and October 2008. The total money market average daily volume increased after December 2008 and was around Indian rupee (INR) 800 billion in March 2009 and around INR 900 billion in October 2009.

The Indian government securities markets have been broadly insulated from the global financial crisis. There has been no incidence of settlement failure or default. The muted impact of the global crisis on the Indian government securities markets can be attributed, *inter alia*, to the calibrated opening of the markets to foreign players. Internationally, it has been observed that capital flows to EMEs dried up during the crisis period on account of the “flight to safety”, despite the interest rate differentials. In the Indian context, however, the investment limits for FIIs in the Indian government securities markets have been put in place to contain the volatility and are being revised in a calibrated manner, taking into consideration macroeconomic factors. Currently, the investment limit for FIIs is USD 5 billion and its utilisation is about 62.60% (as of 9 October 2009).

The yields began to firm up in March 2008, tracking the policy rates in the wake of inflationary pressures and the benchmark 10-year yield reached a peak of 9.48% in mid-July 2008 (see the chart below). The failure of Lehman Brothers and the subsequent global developments followed by sharp reductions in policy rates (the repo rate was reduced from 9.00% to 4.75% during the period October 2008–April 2009 and the reverse repo rate was reduced from 6.00% to 3.25% during the period December 2008–April 2009) resulted in a softening of government security yields coupled with higher turnover in the secondary market. However, the increased borrowing requirements by the central and state governments on account of various countercyclical fiscal measures taken to stimulate the economy resulted in a huge supply of government securities impacting on the interest rates. The benchmark 10-year yield, which had touched a low of 5.27% on 31 December 2008, rose to around 7.41% during early September 2009 on account of concerns over excess supply and inflationary expectations. The Reserve Bank subsequently employed a combination of measures involving monetary easing and the use of innovative debt management tools such as synchronising the Market Stabilisation Scheme (MSS) buyback auctions and open market purchases with the government's normal market borrowings and de-sequestering of MSS balances. By appropriately timing the release of liquidity to the financial system to coincide with the auctions of government securities, the Reserve Bank

ensured a relatively smooth conduct of the government's market borrowing programme, resulting in a decline in the cost of borrowings during 2008–09 for the first time in five years.



In 2008–09, the Indian rupee, with significant intrayear variation, generally depreciated against major currencies except the pound sterling on account of the widening of trade and current account deficits as well as capital outflows. The rupee exhibited greater two-way movements in 2008–09. For example, it moved between INR 39.89 and INR 52.09 per US dollar.

The FX market remained orderly during 2009–10, with the rupee exhibiting a two-way movement against major currencies. In the current financial year, the rupee appreciated by 9.7% against the US dollar and 2.6% against the Japanese yen, whereas it depreciated by 5.7% against the pound sterling and 3.2% against the euro. In terms of the real exchange rate, the six-currency trade-based real effective exchange rate (REER) (1993–94 = 100) moved up from 96.3 at end-March 2009 to 104.2 by 23 October 2009.

### Central bank instruments to deal with the crisis

Following the intensification of the global financial crisis in September 2008, the Reserve Bank implemented both conventional and unconventional policy measures in order to proactively mitigate the adverse impact of the global financial crisis on the Indian economy. The thrust of the various policy initiatives by the Reserve Bank since September 2008 has been on providing ample rupee liquidity, ensuring comfortable dollar liquidity and maintaining a market environment conducive to the continued flow of credit to productive sectors.

For this purpose, the Reserve Bank used a variety of instruments at its command such as the repo and reverse repo rates, the cash reserve ratio (CRR), the statutory liquidity ratio (SLR), open market operations, including the liquidity adjustment facility (LAF), the MSS,

special market operations and sector-specific liquidity facilities. In addition, the Reserve Bank used prudential tools to modulate the flow of credit to certain sectors consistent with financial stability. The availability of multiple instruments and the flexible use of those instruments in the implementation of monetary policy enabled the Reserve Bank to modulate the liquidity and interest rate conditions amid uncertain global macroeconomic conditions.

When the global markets became dysfunctional in September 2008, the macrofinancial conditions remained exceptionally challenging from the standpoint of the implementation of the Reserve Bank's policies, as it had to respond to multiple challenges, from containing inflation in the second half of 2008 to containing the deceleration in growth, preserving the soundness of banks and financial institutions, ensuring the normal functioning of the credit market and maintaining orderly conditions in the financial markets in the first half of 2009.

The Reserve Bank was able to restore normalcy in the financial markets over a short period of time through its liquidity operations in both domestic and foreign currency.

The evolving policy stance was increasingly conditioned by the need to preserve financial stability while arresting the moderation in the growth momentum. The Reserve Bank acted aggressively and pre-emptively on monetary policy accommodation, both through interest rate cuts and a reduction in reserve requirements in terms of both magnitude and pace.

- The policy repo rate under the liquidity adjustment facility (LAF) was reduced from 9.0% to 4.75%.
- The policy reverse repo rate under the LAF was reduced from 6.0% to 3.25%.
- With receding inflationary pressures and the possibility of the global crisis affecting India's growth prospects looming on the horizon, the Reserve Bank switched to an accommodative stance in mid-October 2008 when it reduced the CRR by 250 basis points from 9% to 6.5%. Between 11 October 2008 and 5 March 2009, the CRR was reduced by a cumulative 400 basis points to 5.0%.
- The statutory liquidity ratio (SLR), a legal obligation on banks to invest a certain proportion of their liabilities in specified financial assets including cash, gold and government securities (under Section 24 of the Banking Regulation Act 1949), was one of the instruments used during the crisis to modulate the liquidity conditions in the economy. Variation of the SLR has an impact on the growth of money and credit in the economy through the government debt market. Accordingly, on 1 November 2008, the SLR was reduced to 24% of net demand and time liabilities (NDTL) with effect from the fortnight beginning 8 November 2008. The liquidity situation remained comfortable from mid-November 2008 onwards, as reflected in the daily surplus being placed by banks in the LAF window of the Reserve Bank. In view of this, the SLR was restored to 25% of NDTL with effect from the fortnight beginning 7 November 2009.
- The key policy initiatives taken by the Reserve Bank in response to the developments after September 2008 to improve the availability of FX liquidity included the selling of US dollars in the market by the Reserve Bank, the opening of a new FX swap facility for banks and the raising of interest rate ceilings on non-resident repatriable deposits to attract larger inflows. A cumulative increase of 175 basis points in the interest rate ceilings on each of the aforesaid term deposits was effected between mid-September and November 2008.
- Banks were permitted to borrow funds from their overseas branches and correspondent banks to a maximum of 50% of their unimpaired Tier 1 capital or US\$ 10 million, whichever was higher. The systemically important non-deposit-taking non-banking financial companies (NBFC-ND-SI) and housing finance companies (HFCs) were permitted to raise short-term foreign currency borrowings. The ceiling rate on export credit in foreign currency was raised by 250 basis points

to Libor+350 basis points on 5 February 2009. Correspondingly, the ceiling interest rate on the lines of credit from overseas banks was also increased by 75 basis points to six-month Libor/euro Libor/Euribor+150 basis points.

- The policy on the premature buyback of foreign currency convertible bonds (FCCBs) was liberalised in December 2008, recognising the benefits accruing to Indian companies as well as to the economy on account of the depressed global markets. Under this scheme, the buyback of FCCBs by Indian companies was allowed under both the approval and the automatic routes, provided that the buyback was financed by foreign currency resources held in India or abroad and/or by fresh external commercial borrowings (ECBs) raised in conformity with the extant ECB norms and by internal accruals.
- Considering the continuing tightness of credit spreads in the international markets, the all-in-cost ceilings for different maturities were increased in respect of ECBs (150 to 250 basis points) as well as trade credit (75 to 150 basis points). Furthermore, the all-in-cost ceiling for ECBs under the approval route was dispensed with, initially until 30 June 2009, and later extended until 31 December 2009.
- Measures were also initiated to safeguard the interests of India's export sector which was affected by the global economic recession. The period of realisation and repatriation to India of the amount representing the full export value of goods or software exported was enhanced from six months to 12 months from the date of export, subject to review after one year. Similarly, as a relief measure to importers, the limit for the direct receipt of import bills/documents from overseas suppliers was enhanced from US\$ 100,000 to US\$ 300,000 in the case of imports of rough diamonds and rough precious and semi-precious stones by non-status holder exporters, enabling them to reduce transaction costs.

Other measures taken were:

- The institution of a special 14-day term repo facility for commercial banks up to 1.5% of NDTL.
- The establishment of a special refinance facility for scheduled commercial banks (excluding RRBs) up to 1.0% of each bank's NDTL as of 24 October 2008.
- The introduction of special refinance facilities for financial institutions (SIDBI, NHB and the Exim Bank).
- The introduction of a mechanism to buy back dated securities issued under the MSS so as to provide another avenue for injecting liquidity of a more durable nature into the system.
- The subsequent de-sequestering of balances under the MSS during March and May 2009. The MSS outstanding balance which stood at INR 880.77 billion at end-March 2008 had decreased to INR 187.73 billion at end-October 2009.
- For more effective liquidity management, the Reserve Bank widened the scope of open market operations (OMO) by including purchases of government securities through an auction-based mechanism. Total OMO purchases were around INR 460 billion during 2008–09 and around INR 570 billion during 2009–10.

Consequently, liquidity conditions have remained comfortable since mid-November 2008, reflected in the LAF window being generally in the absorption mode and the call/notice money rate remaining near or below the lower bound of the LAF corridor, consistent with the monetary policy stance. Other money market rates such as discount rates of CDs, CPs and CBLO have softened in tandem with the overnight money market rates. Most commercial banks have reduced their benchmark prime lending rates. An environment of ample liquidity

has increased the competitive pressure on banks to reduce lending rates. In addition, as the short-term deposits contracted previously at high rates mature and are repriced, room is opened up for banks to further reduce their lending rates. Total utilisation of the refinance/liquidity facilities introduced by the Reserve Bank have continued to be very low as the overall liquidity conditions remained comfortable throughout the recent period of financial turmoil.

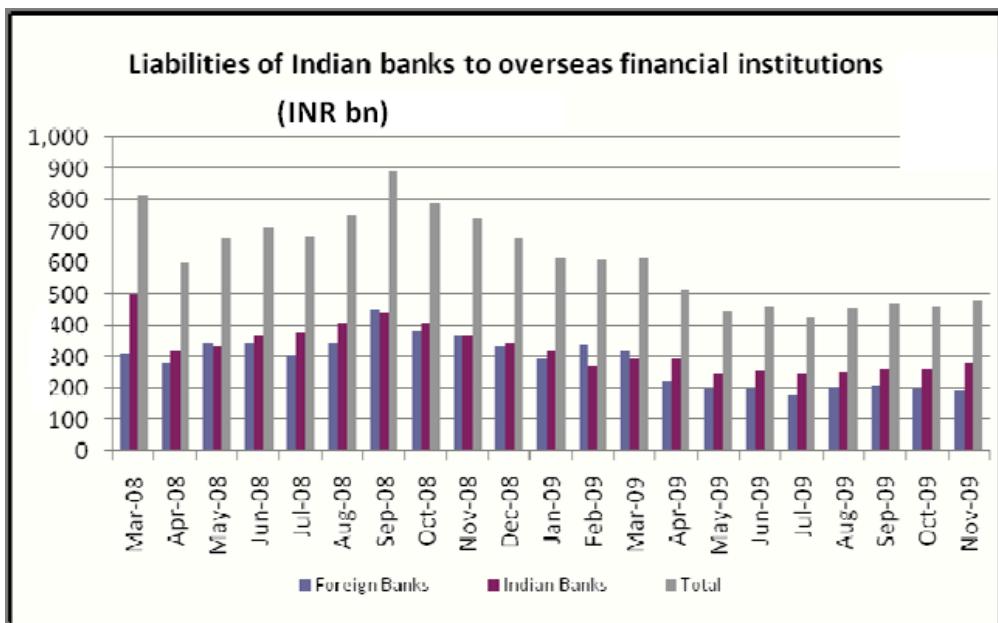
Keeping in mind the overall assessment of the liquidity situation in the economy, the Reserve Bank decided to keep the policy repo rate unchanged at 4.75%, the reverse repo rate unchanged at 3.25% and the CRR of banks unchanged at 5% of their NDTL. However, the following measures constitute the first "exit" phase:

- The SLR, which was reduced from 25% of NDTL to 24% in September 2008, is being restored to 25%.
- The limit for the export credit refinance facility, which was raised to 50% of eligible outstanding export credit, is being returned to the pre-crisis level of 15%.
- The two unconventional refinance facilities: (i) the special refinance facility for scheduled commercial banks; and (ii) the special term repo facility for scheduled commercial banks (for funding to mutual funds (MFs), non-banking financial companies (NBFCs) and housing finance companies (HFCs)) were discontinued with immediate effect (27 October 2009).

The Reserve Bank's exchange rate policy has been guided by the broad principles of careful monitoring and management of exchange rates with flexibility, without a fixed target or a pre-announced target or band, while allowing the underlying demand and supply conditions to determine exchange rate movements over time in an orderly way. This is coupled with the ability to intervene, if and when necessary. Subject to this predominant objective, the exchange rate management policy has been guided by the need to reduce excess volatility, prevent the emergence of destabilising speculative activities, help maintain adequate levels of reserves and develop an orderly FX market. This policy has withstood the test of time, including the current global financial crisis. It is worth mentioning that daily INR volatility was lower than that of major cross currencies and has remained largely in the range of other Asian economies since the onset of the current global financial crisis.

## **Cross-border bank lending to EMEs**

In the second half of 2008 and the first half of 2009, while there was domestic demand for credit from overseas banks, there was a significant decline in lending by overseas banks due to their constraints arising from a sharp fall in external market funding, their need to conserve capital and liquidity and a general reluctance to take on incremental credit and other counterparty exposures. There was also a steep increase in credit spreads. The following chart depicts the decline in lending by overseas financial institutions, including banks, to Indian commercial banks.

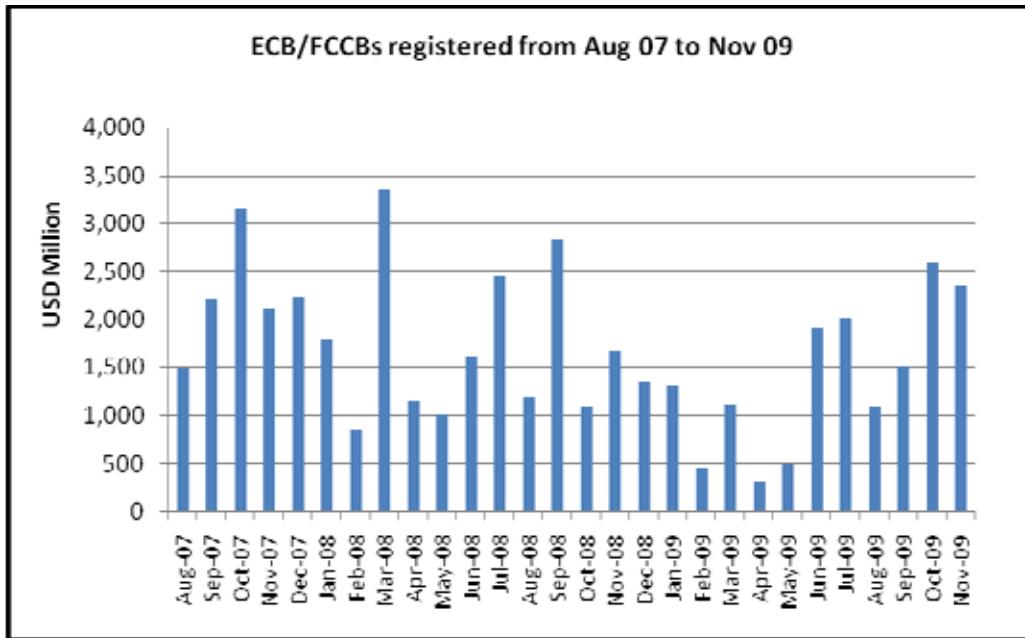


However, as 2009 progressed and the global financial crisis began to settle to some extent, the adverse effects of the global recession and the contraction in international trade on the domestic real sector were felt. Additionally, as a prudent measure, domestic borrowers had begun to prune inventory levels and defer capital expenditure. Falling commodity prices also contributed to lower credit demand. Hence, while the supply of external funds began to recover, domestic credit demand began to slacken. Further, banks hiked up their investment in debt mutual fund holdings which, in turn, invested in the corporate sector, leading to a substitution of direct bank credit to corporates. Private and foreign banks, in particular, reined in retail credit due to the perceived increased risk on account of the general slowdown. These factors resulted in a significant decline in overall domestic credit growth in 2009.

Hence, in the main, the decline in cross-border lending was associated with supply-related issues while, at a later stage, domestic demand factors also came into play even as external bank credit became available again and credit spreads began to ease.

Incidentally, as a consequence of the financial stimulus measures taken in India, the market observed a clear softening of INR funding rates, which increased the attractiveness of INR funding for Indian borrowers against foreign currency funding and, to some extent, the fall in cross-border bank lending was offset by an increase in domestic bank credit.

ECBs, including syndicated loans and FCCBs, registered a sharp decline, mainly due to supply side factors, as corporates increasingly turned to INR financing due to easy domestic liquidity considerations in order to safeguard their balance sheets from currency fluctuations. There has since been a resurgence in ECBs.



There was a sharp increase in the cost of borrowings from overseas institutions during the second half of 2008 and early 2009, which has now eased. During the peak of the crisis, overseas institutions were not interested in funding tenors beyond six months and there was almost no supply of funding with terms of one year or more. In general, banks are tending to lend for shorter maturities wherever feasible. There has also been less demand from smaller corporates for cross-border facilities compared to larger corporates.

While banks have not drastically changed their products on offer, their clients, over the past year, have generally migrated to simple, vanilla derivative products and there has been a general aversion to complex structures.

Banks have become more selective in terms of their clients and in pricing their derivative products. This has been largely driven by the credit standing of obligors, the need to use capital judiciously and also the ability to charge for risk appropriately given the increased market volatility. They have placed increasing emphasis on credit support protocols, ISDA agreements and margins/collateral, and have sharpened their focus on the risk management of the underlying credit exposures in derivatives transactions.

## **Domestic bank intermediation: domestically owned versus foreign-owned banks**

As a result of the various monetary measures taken, interbank markets remained flush with liquidity and attendant low interest rates. At the same time, banks' aggregate deposit growth, especially that of term deposits, remained robust. There was also an attenuation in credit demand, as referred to above. Thus, banks found themselves saddled with surplus liquidity. These factors resulted in their reduced dependence on funding from the interbank markets.

While domestic banks did not make any corrections in terms of lending, foreign banks reduced their long-term lending and shifted to short-term exposures. As mentioned above, banks that had aggressively grown their retail credit portfolios during the pre-crisis period significantly reduced their lending to this segment and tightened their credit underwriting standards, shifting the emphasis from volume to quality. Credit demand from the corporate sector also weakened for the reasons referred to above. A significant development in 2009 was the notable increase in banks' investment in debt mutual fund holdings.

Banks have used the ample liquidity available to them to make large investments in government securities. Consequently, commercial banks' investments in SLR securities (mostly liquid government securities) increased to 29.9% of their NDTL as of 23 October 2009, up from 27.4% the previous year. This was well above the then regulatory requirement of 24%.

As in the case of domestic banks, foreign-owned banks did not face any liquidity problems. However, while domestic deposits have been the major source of funds for domestic banks, foreign banks have relied heavily on purchased funds and funds from their head offices (HOs).

For foreign banks, the contraction in deposits/borrowings received from overseas banks/FIs was INR 254 billion during the period September 2008–June 2009. These liabilities, which include funding from their HOs, constituted almost 11% of their external liabilities as of March 2008 and fell to 5.2% in June 2009. As a result, such liabilities had declined by 27.5% by end-March 2009 before declining even more sharply by 42.0% by end-June 2009. As a consequence, advances by foreign banks contracted by INR 261 billion over the period September 2008–June 2009 (14%).

In contrast, loans by public sector banks (accounting for 75% of commercial bank advances) increased by INR 2,347 billion, contributing to a growth of INR 2,085 billion (11% annualised) in commercial bank advances during the same period.

Certain differences in the responses to the crisis by domestic and foreign banks are briefly described below:

- With regard to sources of funding, banks (domestic as well as foreign) began to rely mainly on deposits, especially term deposits, after September 2008.
- Foreign banks were constrained by diminished access to HO funds by way of capital and borrowings and a global flight to liquidity and risk aversion.
- Foreign banks heavily corrected their off-balance sheet (OBS) (mainly derivatives) exposure after the onset of the crisis. The proportion of their OBS exposure (notional principal) to total assets declined from 2,590.9% at end-September 2008 to 1,998.3% at end-December 2008 and further to 1,591.7% at end-June 2009. To some extent, the correction in OBS exposure of domestic banks was mainly observed in respect of the newer generation private sector banks.
- In order to mobilise more deposits, deposit rates (and accordingly lending rates) were increased by domestic as well as foreign banks. These subsequently reverted to pre-crisis levels.
- In contrast to domestic banks, some foreign banks resorted to resizing their headcount and expenses base.

# **Domestic bank intermediation: domestically owned versus foreign-owned banks in Israel**

David Marzuk<sup>1</sup>

## **1. The Israeli banking system – an overview**

### **A. The structure of the banking system and its scope of activity**

Israel has a highly developed banking system. At the end of June 2009, there were 23 banking corporations registered in Israel, including 14 commercial banks, two mortgage banks, two joint-service companies and five foreign banks.

Despite the spate of financial deregulation in recent years, the Israeli banking sector still plays a key role in the country's financial system and overall economy. It is also highly concentrated – the five main banking groups (Bank Hapoalim, Bank Leumi, First International Bank, Israel Discount Bank and Mizrahi-Tefahot Bank) together accounted for 94.3% of total assets as of June 2009. The two largest groups (Bank Leumi and Bank Hapoalim) accounted for almost 56.8% of total assets.

The sector as a whole and the large banking groups in particular are organised around the concept of "universal" banking, in which commercial banks offer a full range of retail and corporate banking services. Those services include: mortgages, leasing and other forms of finance; brokerage in the local and foreign capital markets; underwriting and investment banking; and numerous specialised services. Furthermore, until the mid-1990s, the banking groups were deeply involved in non-financial activities. However, a law passed in 1996 forced the banks to divest their controlling stakes in non-financial companies and conglomerates (including insurance companies). This development was part of a privatisation process which was almost completed in 2005 (with the important exception of Bank Leumi).

The privatisation of the Israeli banking system has received particular attention in recent years. The government sold almost all of its shares in Bank Hapoalim Ltd, the largest bank in the Israeli banking system, during the 1990s. In 2005, the state completed the sale of all its remaining shares in the bank and it therefore no longer has any holdings in Bank Hapoalim Ltd (Table 1).

In the last few years, Israel's banking system has been undergoing a slow, moderate process of mergers: small banks are being bought by large- and medium-sized banks in order to take advantage of economies of scale and scope. Thus, nearly all mortgage banks have been merged with their parent companies. In addition, there has been a process of ownership changes of special purpose banks: three subsidiaries of Bank Hapoalim (Bank Massad, Bank Yahav and Otsar Hahayal) have been taken over by medium-sized banks. These changes strengthen medium-sized banks at the expense of large ones, thereby increasing competition in the banking system. It appears that some, albeit weak, signs of this are visible in the slow downward trend in indices of concentration (H and CR2), evident since the beginning of 2006.

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<sup>1</sup> With the assistance of Herman Litman, Hany Perets, Merav Shemesh and Shlomo Yemini.

Table 1  
**Privatisation of major nationalised banks**

	Date of re-listing	December 1992	June 2009		
		Government	Government	Significant holders	Public
Bank Hapoalim	06/1993	99.9	–	25.74	74.26
Bank Leumi	09/1993	95.0	11.46	9.59	78.95
Israel Discount Bank	03/1996	87.0	25.0	26.0	49.0
Mizrahi-Tefahot Bank	06/1998	97.0	–	45.66	54.34
First International Bank	01/1993	–	–	80.86	19.14

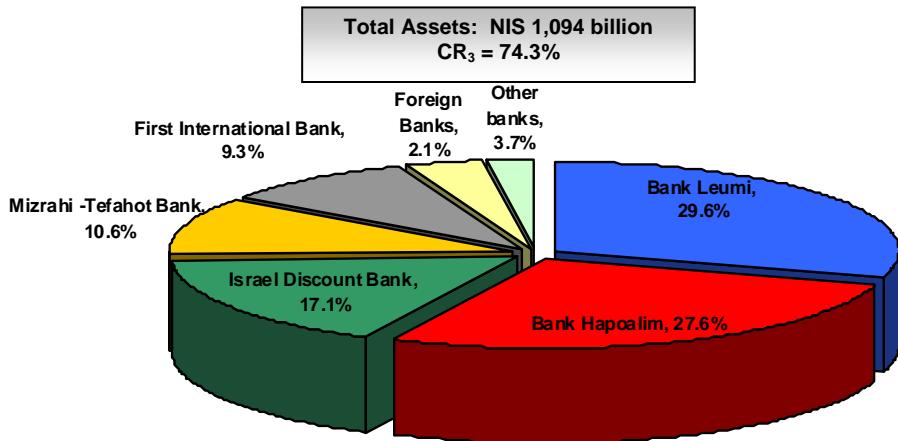
Five foreign banks are operating in Israel – although they have only entered the market over the last decade or so, two of them have been operating in Israel since the turn of the century (Citibank (United States) and HSBC (United Kingdom)). Those two banks were joined by a further two in 2006–07: BNP Paribas (France) and the State Bank of India. In addition to those four branches, a subsidiary of the international Dexia group is operating in Israel.

In January 2005, the Israeli Government sold 26% of the Israeli Discount Bank's equity to the foreign investor group Treetops Acquisition Group (Canada), led by Matthew Bronfman. This move created the third largest banking group in Israel held by a foreign entity. Although, under the terms of the Israeli Banking (Licensing) Law, this bank is considered a foreign-owned bank, it will be referred to in the present paper as a domestic bank.

Total consolidated assets of the banking system (including foreign banks operating in Israel), were new Israeli shekel (NIS) 1.09 billion as of end-June 2009, compared with NIS 1.07 billion at end-2008. The five major banking groups account for 94.3% of total assets, with similar shares of total loans and deposits. The share of other banks and foreign banks were 3.72% and 1.95%, respectively (Figure 1).

In addition to their classical banking intermediation activity, the banking groups also operate via their subsidiaries in areas that complement their commercial activities. The main activity complementing their classical banking activity is in credit cards, which has been continuously increasing over the last few years. Banks' capital market activity has shrunk considerably over recent years as a result of the limitations on investment coming into effect, which greatly restricted the permitted level of holdings, so that banks could not control underwriting companies. At the same time, banks started providing banking and financial services to all capital market players as well as pension consultancy to the general public.

Figure 1  
**The structure of Israel's banking system**  
(Consolidated basis, June 2009)



Note: Other banks include: Union Bank and Bank of Jerusalem.

Israeli banks own banking subsidiaries abroad, mainly in the major global financial centres. Previously, these companies had great difficulty in competing with the large local banks and, as a result, their profits were low. In the last few years, Israeli banks have extended their activity abroad, both because of the partial contraction of their activity in Israel and because of their desire to extend their profit sources, utilising the advanced knowledge and technology developed in the domestic market. They have done this mainly by buying local banks, especially in emerging markets, in the expectation that those banks would be better able to compete with other local banks.

In recent years, the government has sought to lessen the domination of banks over financial intermediation and increase competition in the financial market. Following the recommendations of the Bachar Commission in 2005, measures were introduced to encourage both intermediation through the capital markets and diversification in forms of wealth holdings. Consequently, non-bank sources now account for a rising share of credit to the business sector while the domestic bond and equity markets have expanded considerably. At the same time, the gains from increased competition at the retail end of the market have been less impressive.

The Israeli banking system is active in three indexation segments: the unindexed local currency (nominal) segment (which amounts to approximately 40% of the group's total assets), the indexed (to the consumer price index) segment; and the foreign currency (denominated or linked to the foreign exchange) segment. The share of the last two segments in the group's total assets is approximately 30% each.

## B. The global financial crisis and its effects on Israel

Israeli banks experienced a strong uptrend in profitability from 2003 until late 2007. Since then, Israeli banks have been negatively influenced by the global financial crisis and the subsequent series of developments that have forced them to make large provisions and have either reduced their profits or pushed them into an outright loss. Nevertheless, all banks have remained sound and stable and there have never been any concerns that a local bank might fail.

The developments began in late 2007 with the collapse of the special investment vehicles (SIVs), collateralised debt obligations (CDOs) and mortgage-backed securities markets that were not guaranteed by US government agencies and continued through to the collapse of Lehman Brothers in September 2008. Israeli banks suffered substantial losses from their exposure to Lehman Brothers as well as to other failed financial institutions.

During 2008, the crisis started to adversely affect Israel's real economy, mainly through a decline in the pace of economic and capital market activity, which suppressed the banks' revenues from lending and other activities. Banks also had to make higher provisions against their corporate loan portfolios, especially for companies active in overseas real estate markets.

In sharp contrast to most other countries, the Israeli banking system has at no time experienced liquidity shortages; on the contrary, the system has enjoyed a high level of liquidity in both local and foreign currency and was the beneficiary of net inflows of foreign currency during 2008.

Compared with other banking systems, the Israeli banking system exhibited resilience to the shocks in the global financial markets and to their implications on the real economy. This can be ascribed to the following: the local banking system does not depend on credit lines from abroad; the lack of advanced money markets and limited securitisation cushioned the impact of the global crisis on Israel; the banking system was not a significant counterparty investing in the structural products market in the United States and Israeli banks were not plagued by a confidence crisis from domestic or foreign investors; Israeli banks depend primarily on retail funding rather than wholesale funding from financial institutions and capital markets; and, as Israeli banks have a considerable net liquidity position in foreign currency, the Finance Ministry accepted their surpluses in the form of deposits in foreign currency. In addition, the favourable macroeconomic conditions of recent years have enhanced the financial system's ability to absorb losses. Banks' credit risks declined while their capital adequacy was maintained.

Although the exposure of the Israeli banking system to the global financial crisis was limited, the crisis has also affected the capital markets and non-bank financial institutions and put them under strain, as globalisation has created a high degree of correlation between Israeli capital markets and world markets. As a result of the financial crisis, the positive correlation between share indices in Israel and those in developed countries increased even further. Thus, the Israeli capital market was influenced by the major declines and increased volatility that characterised the global capital markets. The stock exchange fell sharply in September 2008 and the trend intensified during October and November. The corporate bond market was also characterised by a sharp decline in prices. Fears among investors regarding the redemption of bonds, together with the uncertainty in the financial markets, led to a preference for solid investment channels and a wave of withdrawals from bond funds. During the second half of the year, the financial crisis spilled over into real activity. The economy's rate of growth slowed following several years of prosperity and, during the last quarter of the year, the economy entered a recession, with negative GDP growth of 0.5%, annualised.

As the crisis worsened, the Supervisor of Banks enhanced surveillance by increasing the frequency of certain returns and by introducing a number of new reports in areas that were expected to be most affected by the crisis (for details, see section C below).

Additional measures taken by the government and the Bank of Israel include: the provision of government guarantees in the amount of NIS 6 billion for subordinated debt to be issued by banks – although this measure was taken to facilitate banks' ability to increase their Tier-2 capital at reduced cost, no bank has thus far found it necessary to use these guarantees; and the creation of investment funds ("leverage funds") to expand the supply of non-bank credit by NIS 5 billion – since the announcement of this programme at end-2008, the Tel-Bond 60 broad index of corporate bonds has gained more than 15%, taking it back to its pre-crisis level. Risk premia have narrowed and activity in the primary market has picked up:

issuance in the first half of 2009 amounted to NIS 16 billion, compared to NIS 22 billion for all of 2008; credit officers have been appointed to assist companies in dealing with the difficulties of rescheduling tradable bonds issued by them; and tax breaks have been established to encourage foreign investment in the Israeli economy and the inflow of funds from foreign companies controlled by Israeli residents into Israel. The government has created a defined safety net for pension savings with the goal of ensuring a basic pension for savers close to retirement whose pension savings have significant exposure to the capital market. In addition, the Bank of Israel has initiated a series of measures using monetary instruments with the goal of improving the liquidity situation in the economy and reducing costs for the business sector.

### **C. Banking Supervision Department – activity and reforms**

Maintaining the stability and resilience of the banking system in a changing economic environment is one of the Banking Supervision Department's principal goals. The Department's continuous and ongoing actions in pursuit of this goal, such as adopting the Basel II Directives, were augmented this year in view of the financial and real crisis in a series of special measures.

Prior to the global financial crisis and in light of it, the Supervisor of Banks implemented several measures in order to maintain confidence in the banking markets and enhance Israel's responsiveness in countering the adverse impact of this crisis.

- a. Israeli banking groups were expected to reach a total risk-based capital ratio of 12% by year-end 2009. This target is in line with the implementation of the Basel II regime in Israel. The Supervisor of Banks strongly encourages Israeli banks to continuously upgrade their risk management systems within the Basel II framework.
- b. The Supervisor of Banks established ad hoc task force teams to scrutinise banks' risk exposures and to monitor their operations and liquidity positions. In addition, banks were required to adhere to several guidelines and to enhance the transparency of their financial reporting. The Supervisor is taking a proactive approach in dealing with the crisis and is conducting reviews via the supervisory functions in the Banking Supervision Department.
- c. The Supervisor of Banks announced in January 2007 that Israel would adopt the Basel II regime by end-2009. It was anticipated that, during the preliminary phase of the Basel II regime, banks would implement the Standardised Approach to credit risk and the Basic Indicator Approach or the Standardised Approach to operational risk. The Supervisor promulgated temporary directives regarding the Basel II framework incorporating national discretions (including the advanced methods for credit risk but not the advanced methods for operational risk).

As mentioned above, in 2008, mainly in the second half of the year, the Banking Supervision Department addressed several important issues relating to the ongoing stability of the banking system amid the global and domestic financial and real crisis. It instructed banks to increase the frequency of some of their returns as well as introduce new ones:

- **Reporting exposures to foreign financial institutions and countries:** in September 2008, Israeli banks were instructed to report to the Banking Supervision Department more frequently regarding their exposures to foreign financial institutions wherever such exposures exceeded a certain percentage of the bank's equity.
- **Reporting large exposures directly affected by the global crisis:** Israeli banks were instructed to review, map and estimate their exposures to entities, other than foreign financial institutions, that were directly or indirectly exposed to the crisis.

- **Reporting large customers' exposures to non-bank entities:** Israeli banks were asked to provide special reports on large borrowers' exposures to non-bank entities.
- **Reporting large customers showing adverse indications:** Israeli banks were instructed to report to the Supervisor of Banks regarding any borrower that had issued at least one bond series which was subsequently traded at a yield to maturity greater than 15% and whose net indebtedness exceeded a certain percentage of the bank's capital base or sums to a certain amount. The report specified the borrower's indebtedness, credit rating and classification at the time of the review as well as the results of an examination of the borrower regarding the extent to which its non-banking debt affected its ability to settle its debts to the bank by means of a detailed analysis of its payback ability.
- **Reporting capital market exposures:** Israeli banks were asked to advise the Supervisor of Banks of all exposures originating in capital market activity, including credit exposures that surpassed a certain percentage of the bank's capital base.
- **Assessment of the quality of the credit given for the financing of acquisitions of controlling interest:** in view of the considerable disparities between the value of the collateral in terms of securities prices on the exchange and the credit that the banks had given to some borrowers for the acquisition of controlling interest, the Supervisor believed it necessary to apply much greater caution in weighing the classification of such credit as impaired debt or making provisions in that regard.

One of the reforms taken in recent years in the Israeli banking system refers to anti-money laundering. The Anti-Money Laundering Law was enacted in August 2000 and the sections pertaining to the obligations imposed on financial entities took effect in February 2002. In January 2001, the Governor of the Bank of Israel issued the Prohibition on Money Laundering Order. This Order includes requirements regarding identification, reporting and recordkeeping by banking corporations. The regulation regarding business customer identification and recordkeeping (a regulation that has been in effect since 1995) has been amended in light of the declaration of principles of the Basel Committee on Banking Supervision of October 2001 on "Customer due diligence for banks". The regulation now incorporates directives on customer acceptance policy and the management and monitoring of high-risk accounts such as private banking, correspondent banking accounts and politically exposed persons (PEPS).

The Banking Supervision Department conducts on-site examinations on an ongoing basis to determine banks' compliance with anti-money laundering laws and directives. A Sanctions Committee, authorised to impose financial penalties for infractions, commenced operations in April 2003. In early 2005, the Prohibition of Terrorism Financing Law came into effect and Israel's banking directive was modified to include combating terrorism financing. This modification stemmed from the international collaborative efforts in the areas of anti-money laundering and combating terrorism financing, which are reflected in the standards set by the Basel Committee (Consolidated KYC Risk Management, October 2004) and Israel's legislation.

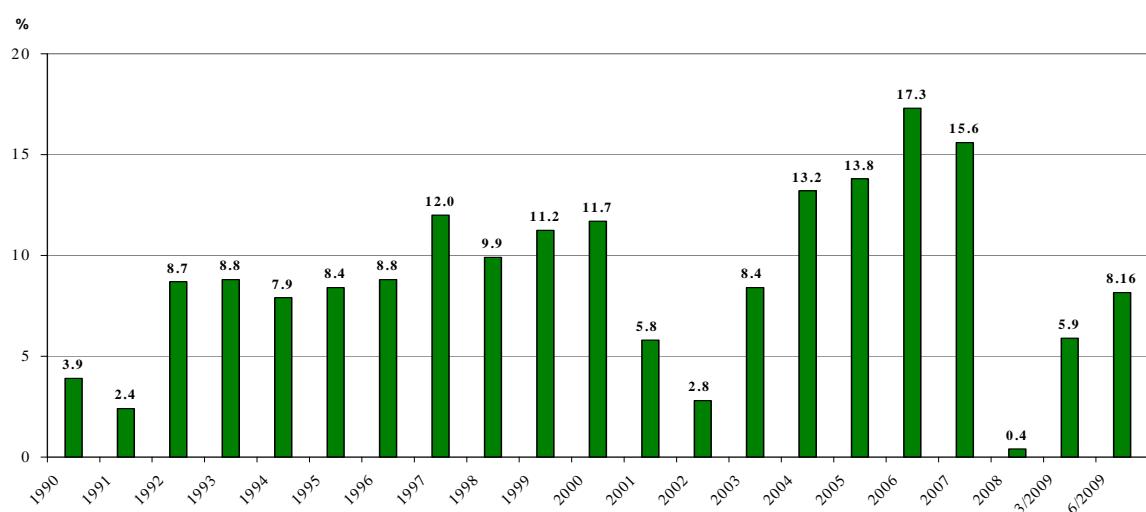
Additional steps in the fight against terrorism financing were taken in November 2006, when the Knesset approved an amendment to the Prohibition on Money Laundering Order and approved regulations on the Prohibition of Terrorism Financing. The Prohibition on Money Laundering Order was expanded and now requires financial institutions to check the identification of parties to a transaction against a list of declared terrorists and terrorist organisations, as well as obligations to report the type and size of transactions above NIS 5,000 whenever a high-risk country or territory is involved. The amended Order also requires credit card companies to identify the parties to transactions, report to the Israel Money Laundering Prohibition Authority and maintain records of transactions.

## D. Financial results – developments and trends

(The five largest domestic banking groups (Israeli banks)):

1. After five years of growth, the net return on equity (ROE) dropped sharply in 2008 to 0.4% compared with 15.6% in 2007 and 17.3% in 2006. The decline was a result of the realisation of losses in parts of banks' securities portfolios; writedowns due to the non-temporary nature of fair value adjustments of securities; and exposures to foreign financial entities and their adverse effect on the real economy. Until mid-2009, financial institutions, including Israeli banks, continued to exhibit resilience and banks became profitable again, with an ROE of 8.16% (Figure 2).

Figure 2  
**Annual return on equity (ROE) of the five major banking groups (Israeli banks)**  
(1990 to June 2009)<sup>1</sup>



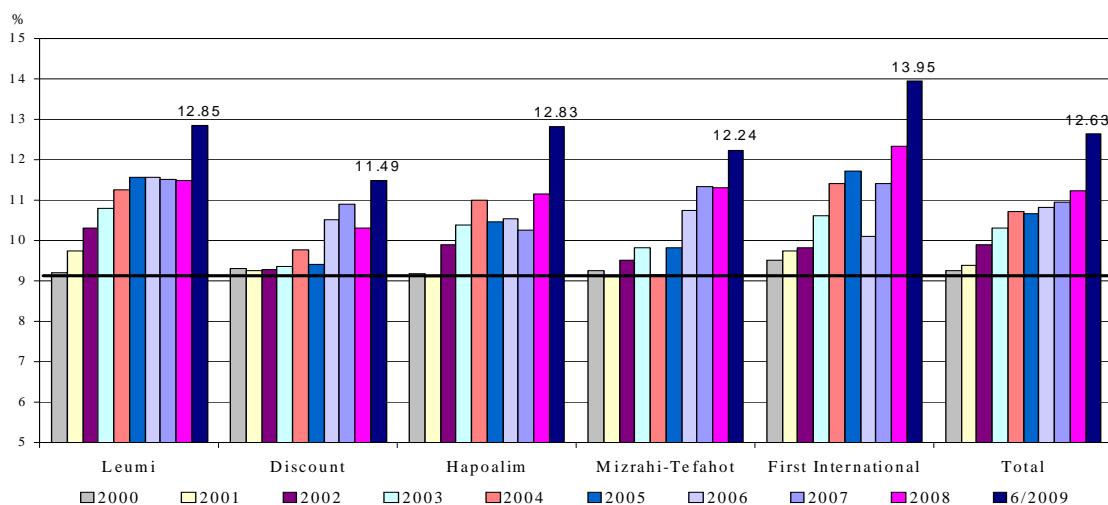
<sup>1</sup> As of 2005–07, banking corporations are required to calculate their ROE according to the method customary in the United States and other countries, ie as net income adjusted for the dividend for preference shares not recorded as expenditure in the profit and loss statement and declared in the reporting period only *divided by* the average equity. In this respect, the average equity is the total of all equity *minus* the average balance of external shareholders' rights *minus/plus* the average balance of losses/gains not yet realised from the adjustment of negotiable bonds at fair value, as well as the losses/gains from saleable bonds included in the equity.

2. Israeli banks' capital increased by 6.9% in June 2009 after decreasing by 1.5% at year-end 2008 for the first time since the recession years (2001–03). The decrease was caused by the substantial negative charge to the capital account of approximately NIS 5 billion attributed to provisions of a temporary nature due to adjustments made to the fair value of securities (primarily mortgage-backed securities guaranteed by US government and federal agencies). Dividend distribution was very sparse and only two large banks disbursed in the first half of 2008.

The total risk-based capital ratio reached 12.6% in June 2009 (Tier 1 ratio 7.9%), up from 11.2% (Tier 1 ratio 7.5%) at year-end 2008 (Figure 3). Having said that, the composition of Tier 1 capital exhibits a higher quality grade, as the Tangible Common Equity ratio is estimated to have reached over 6% in the last two years

due to the small amount of preferred shares and innovative instruments issued by Israeli banks.

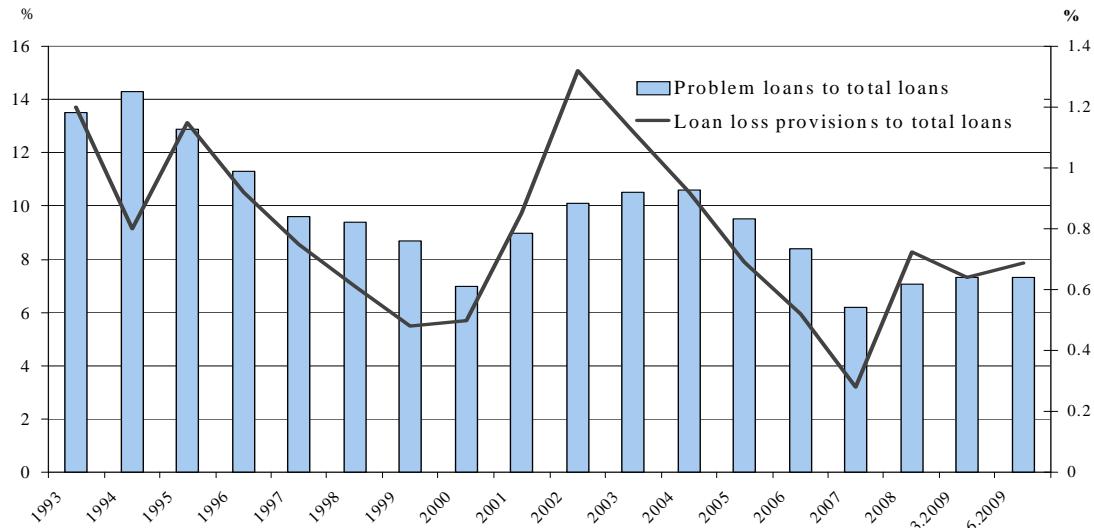
Figure 3  
**Risk-based capital ratio<sup>1</sup> of the five major banking groups (Israeli banks)**  
(2000 to June 2009)



<sup>1</sup> Minimum capital ratio since March 1999 (9%).

3. In 2008, Israeli banks incurred losses due to the depressed asset prices prevailing in the capital markets, which caused a decline in the income generated from the bond portfolio. This constituted a major factor in the 21.7% decrease in net interest income before loan loss provision expenses which amounted to NIS 17.9 billion in that year (down from NIS 22.9 billion in 2007). A significant component of that was a large bank's investment in the structured product market, particularly in mortgage-backed securities, which were not guaranteed by US government or federal agencies. This resulted in an NIS 3.9 billion loss during 2008 (an NIS 1.2 billion loss was recorded in 2007), which was reflected in the lower net interest income item. During the first half of 2009, the aggregate net interest income of Israeli banks increased by 31% compared with the corresponding period in 2008.
4. Israeli banks considerably increased their loan loss provision expenses during 2008, which rose by 186%, from NIS 1.78 billion in 2007 to 5.08 billion in 2008. The ratio of expenses to total loans amounted to 0.72% in 2008 compared with a mere 0.28% in 2007 (Figure 4). Most of the increase in expenses is attributed to loans to the construction and real estate, manufacturing and financial sectors. Notwithstanding the above, mortgage lending was resilient and problem loans to households increased by only 3.2%. The sum total of non-accrual loans amounted to NIS 10.3 billion after increasing by 10.8% in 2008. The ratio of non-accrual loans to total loans remained steady during 2008 at approximately 1.46%.  
During the first half of 2009, loan loss provisions remained high and rose by 100% compared with the corresponding period in 2008. The increase was a result of the adverse effect of the financial crisis on the real economy in general and the business sector in particular.

Figure 4  
**Ratio of loan loss provisions and problem loans to total loans  
 (balance sheet) of the five major banking groups**  
 (1996 to June 2009)



5. Israeli banks showed an increase in domestic activity in 2008 (a 13.5% rise in local currency) as credit to the public sector increased by 10.3%, a trend that demonstrated that credit markets in Israel were not suffering from the repercussions of the credit crunch that had emerged in some developed economies. This increase was partially due to the shifting of clients from the non-bank credit markets that had waned, while the cost remained substantially high due to the credit risk inherent in the non-bank credit markets. During 2009, that trend changed and credit to the public sector decreased by 1.4% as a result of the decline in economic activity and the recovery of the capital markets (ie the non-bank credit sector).
6. Due to the above – primarily the increase in loan loss provision expenses and the decrease in net interest income – Israeli banks' net income amounted to a diminutive NIS 205 million in 2008 compared with NIS 8.9 billion in 2007. In 2008, net profit from non-recurring items was NIS 815 million – half of the 2007 profit – thus, net operating profit was a negative NIS 610 million in 2008.

## 2. Domestically owned banks versus foreign-owned banks

### A. Foreign banks in Israel

Until the beginning of the decade, foreign banks showed little interest in Israel's economy for political as well as economic reasons including: the Arab boycott of companies with business relations with Israel and interests in Arab countries that acted to prevent companies engaging in activities in Israel even after the lifting of the boycott; the existence of an advanced banking industry which does not offer exceptional opportunities to the same extent as emerging economies; the lack of economic stability (high inflation, large deficits in the balance of payments and in the budget); and foreign exchange control.

Over the last decade, foreign banks have exhibited a growing interest in the possibility of opening representative offices or branches in Israel in the light of processes which were

reflected in Israel's improved credit risk rating, including: an improvement in Israel's macroeconomic features (lower inflation and budgetary restraint); the invitation to join the Organisation for Economic Co-operation and Development (OECD); and the liberalisation and deregulation measures taken to promote and refine the financial market in Israel, for instance the process of removing foreign exchange control, which enabled Israel to participate in the globalisation trend. In addition, the development of Israeli high-tech companies opened up business opportunities for foreign banks to offer their services to such companies as well as to provide private banking facilities to the directors and managers of those companies who had amassed great wealth, thereby broadening the potential customer base for such services in Israel.

Foreign banks' activity in Israel is still in its infancy. Their entry into the market is usually through the opening of branches and not through the purchase of a domestic bank. Possible explanations for that are, as mentioned above: the fact that foreign banks do not have a technological advantage over local banks; and that Israel is a small economy with closed borders, which limits foreign banks in their provision of banking services to the local population and their ability to benefit from using the activity in Israel as a centre for banking services to neighbouring countries.

Similarly to local Israeli banks, foreign branches operating in Israel did not experience severe shocks following the global financial turmoil and managed to remain sound. Nevertheless, foreign banks made some changes to their business strategies, most of which were needed, either due to the worsening conditions of the parent bank or to the economic environment in the home country, and were less affected by local factors. In addition, two groups expressed their confidence in the Israeli economy by making a business decision to expand their activity in Israel: Citibank – through the decision to allow two branches of the group to provide personal banking services in Israel, either through a branch or a representative office; and BNP Paribas – by opening a new representative office of the Swiss subsidiary (for more details see below). Unlike foreign banks operating around the world, most of the adjustments made by the foreign banks in Israel as a result of the crisis were made predominantly because of changes in the situation of either the parent bank or the home country and less because of factors related to the Israeli economy (the host country).

Though they remained stable, several branches made some adjustments to their business strategy and personnel in light of the new economic and financial reality. Citibank (United States) and, to a lesser extent, HSBC (United Kingdom), the two foreign banks with the most established presence in Israel, made some changes to their credit policy and reduced their credit vis-à-vis Israeli corporate borrowers in the first six months of 2009 (although total credit to the public sector continues to grow).

As for representative offices, Lehman Brothers (United States), which until its collapse was the foreign investment bank with the largest Israeli office, sold its Israeli business to Barclays Capital (United Kingdom). Barclays is now consequently expanding in Israel across a range of activities and may become more active in corporate lending when the environment improves. Merrill Lynch (United States) was also very active in Israeli investment banking; it remains to be seen whether its new owner, Bank of America (United States), will assume this role in the Israeli market. Other foreign banking groups active in Israeli investment banking such as UBS (Switzerland) and Deutsche Bank (Germany) have scaled back their activities as part of a global retrenchment.

It should be mentioned that the branches of foreign banks in Israel also facilitate the business of Israeli firms and other customers with branches and units of their parent group around the world. Therefore, local data do not reflect full activity.

A foreign bank can operate in Israel in three different forms: through a representative office, a branch or a subsidiary.

## 1. ***Representative office***

The representative office of a foreign bank in Israel may engage only in providing information and promoting the bank's business in Israel and in activities relating to a customer's request to open a bank account as determined periodically by the Supervisor of Banks.

No permit is required under the Israeli Banking (Licensing) Law to open a representative office in Israel. However, if the intention is to use the word "bank" or a derivative of it in the name of the representative office, it must obtain the consent of the Governor of the Bank of Israel. A representative office and its activity are not supervised by the Supervisor of Banks (unless a doubt arises regarding the nature of its activity). In the near future, as part of the process of joining the OECD, the regulations may change in a way that will allow banks incorporated in one of the OECD countries to open a representative office only by pre-notification to the Bank of Israel.

There are currently 10 representative offices of foreign banks in Israel (not including the offices of domestic banks' subsidiaries) which have received the Governor's consent to include the word "bank" as part of their name. There were previously another four such banks which ceased their activities as representative offices in Israel (one expanded its activities and opened a branch in Israel). The offices currently operating in Israel are:

- Bank Hapoalim (Switzerland) Ltd
- Bank Leumi le-Israel (Switzerland)
- Bank Leumi (Luxembourg)
- Bank Leumi (United Kingdom)
- Banque J Safra (Switzerland)
- Banque Privée Edmond De Rothschild (Luxembourg)
- Banque Safdie SA (Switzerland)
- CALYON, Corporate and Investment Bank, Credit Agricole Group (France)
- Credit Industriel et Commercial, CIC (CIC Banques) (France)
- HSBC Bank USA NA
- HSBC Private Bank (Switzerland) SA
- IDB Bank, Israel Discount Bank of New York
- IDB (Switzerland) Bank Ltd
- JPMorgan Chase Bank NA (United States)
- Union Bancaire Privée (Switzerland)

Foreign banks' growing interest in Israel resulting from the changes in Israel's geopolitical and economic environment has been referred to above. This interest is also reflected in the number of representative offices which have been opened: from 1994 to 1997 there was a slow trickle (on average one office a year), while in 1998 and 1999 the rate increased, and the Governor gave his consent to three and four a year, respectively. In 2000, only one representative office opened; nonetheless, there is continued interest from foreign banks. Since 2000, nine more financial institutions have been granted permission to open a representative office in Israel, of which three have already opened and operate a representative office.

In addition to the above, there has been a rise in activity in Israel by other foreign financial entities in the last few years, including banks in whose names the word "bank" does not appear. They engage in areas such as investment banking, including underwriting services

and advising Israeli companies issuing shares or bonds abroad or prior to acquisitions or mergers as well as brokerage services.

## **2. Activities via a branch**

When operating a branch in Israel a bank must meet the following criteria in addition to the requirements for setting up a subsidiary:

- Banking supervision in the home country must be performed on a consolidated basis, covering the branch to be opened in Israel, and in accordance with the international standards set by the Basel Committee.
- The bank must provide “endowment capital” to the branch to enable stability restrictions to be applied.

The permit granted to a foreign bank which meets the above criteria does not restrict the types of activities allowed in comparison with those allowed to domestic banks.

There are currently four branches of foreign banks operating in Israel: Citibank NA; HSBC Bank PLC; BNP Paribas SA; and the State Bank of India.

**Citibank NA** established a representative office in 1996 in Israel and in July 2000 became the first international bank with a full banking licence to offer a range of services to its clients in Israel. The branch offers large corporate finance, including underwriting and publicly distributing local corporate bonds, sales and trading, as well as cash management, import and export and trade finance solutions, and enjoys the advantage of Citigroup's wide international coverage. The global financial crisis and the changes in the group's management have not affected Citibank's business strategy in Israel thus far, and the branch has maintained its focus on capital market activities. The branch made a slight reduction in employee numbers as part of the group's policy to transfer some of the local activities to regional centres.

In 2009, two branches of the Citibank group decided to provide personal banking services in Israel, either through foreign bank branches or through representative offices.

In 2001, **HSBC Bank** opened a branch in Israel. HSBC operates in Israel in four areas: private banking, corporate banking, treasury services and investment banking services. The branch did not change its business strategy due to the global financial turmoil and, moreover, its scope of activity has extended in the last year. The branch is working to apply a new local risk management model – as required by the parent bank. No personnel changes have been made during that time. Outstanding loans have grown in the last three years and derivative activity is growing gradually, although it is not part of the branch risk, since it is recorded on London's books. In addition to the branch, the HSBC group also operates two private banking representative offices in Israel that cater to local customers wishing to open foreign accounts.

**BNP Paribas** group has operated in Israel since 1996, initially through a representative office (1998) and later through a banking branch (2006). The Israeli branch focuses on the following service activities: corporate and investment banking, as a trade centre and as a treasury platform. BNP Paribas Israel relies on the group's global network to support major Israeli corporations in developing their international business activities and to facilitate international clients' access to the local market.

Due to the global financial crisis, new instructions from the group to the Israeli branch changed its method for pricing transactions but, apart from this, no other adjustments were needed as a result of the crisis.

In 2009, one of the group's subsidiaries – BNP Paribas (Suisse) – opened a new representative office which is expected to promote private banking in Israel. In addition, the local branch is considering providing investment banking services to its local clients.

**The State Bank of India's** branch in Israel was opened in 2007. The branch focuses on: the firms operating in the diamond industry which are either affiliated to India or have economic relations with it; providing guarantees to Israeli industries working with the Indian Government; and providing discounted bills in export transactions by Israeli corporates to India.

### **3. Subsidiaries**

Banking activities can be performed in Israel by a foreign bank through a subsidiary either by establishing a new bank in Israel or by acquiring control of a domestic bank.

The policy towards establishing a bank in Israel does not distinguish between holders of controlling interests who are non-residents, including foreign banks, and Israeli residents.

There is one foreign-owned domestic bank currently operating in Israel – Dexia Israel Ltd bank. The bank is a subsidiary of the international Belgian–French Dexia group and began to operate in Israel by acquiring the local Israeli bank Otsar Hashilton Hamekomi through a privatisation process of the former which took place in 2001. The bank received a licence under the Israeli Banking (Licensing) Law in 2008, enabling it to provide a full range of banking activities in Israel; it has subsequently changed its name to Dexia-bank. One of the bank's core activities in Israel is to provide financial services to municipalities.

In October 2008, the branch's parent bank was nationalised by the French, Belgian and Luxembourg Governments, mostly due to the substantial losses of the group's subsidiary (FSA) in the United States. In November of that year, the new management conducted a transformation plan to minimise exposures to market risks, focusing on public sector financing, mainly in France, Italy, Luxembourg, Belgium and Spain, and shut down its activities in several other countries. As for Israel, the bank did not make any changes regarding the business strategy and policy of its Israeli subsidiary. Nonetheless, the bank has made clear to the local subsidiary that it must not lean on the parent bank for new funding and should finance itself independently. In addition, the criteria for granting indemnity for transactions greater than the single borrower limit have been tightened.

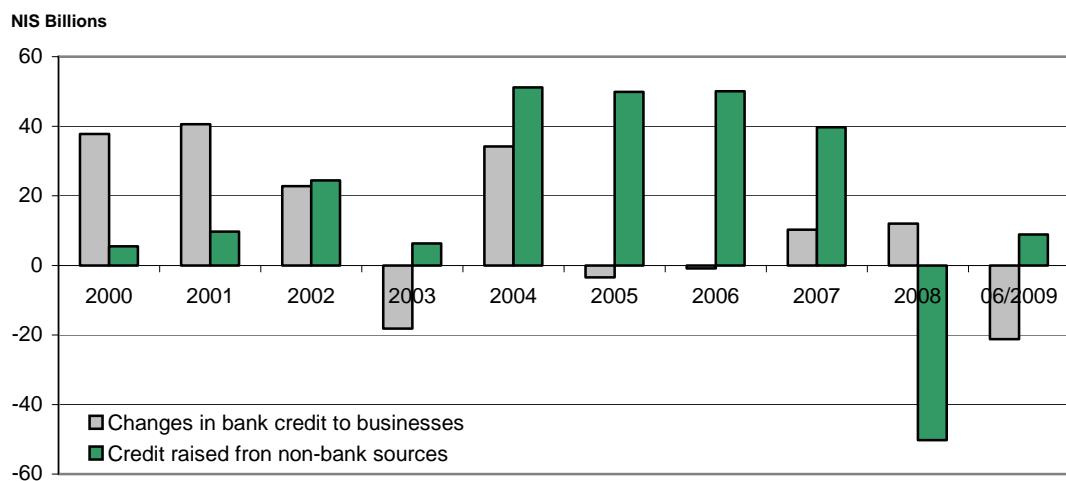
Two other subsidiaries operated in Israel until recently, both of which were acquired and merged into domestic banks: Bank Polska Kasa Opieki, a subsidiary of the Polish Bank Pekao (since 1999 the subsidiary has been part of the Italian bank UniCredito Italiano); and Investec Bank, controlled by the Investec group. Both banks were engaged in all types of banking activities.

### **B. Changes in bank lending**

The total balance sheet of the Israel banking system continued to expand during 2008 at a rate similar to previous years (about 5%). At end-2008, it stood at around NIS 1.07 trillion (including foreign banks). However, there were some significant changes in the composition of the balance sheet during 2008, which reflected an increase in classic financial intermediation, ie an expansion of bank credit and growth in bank deposits to the public sector, accompanied by a sharp decline in securitisation activities. This represents a reversal of the prolonged trend of disintermediation in recent years.

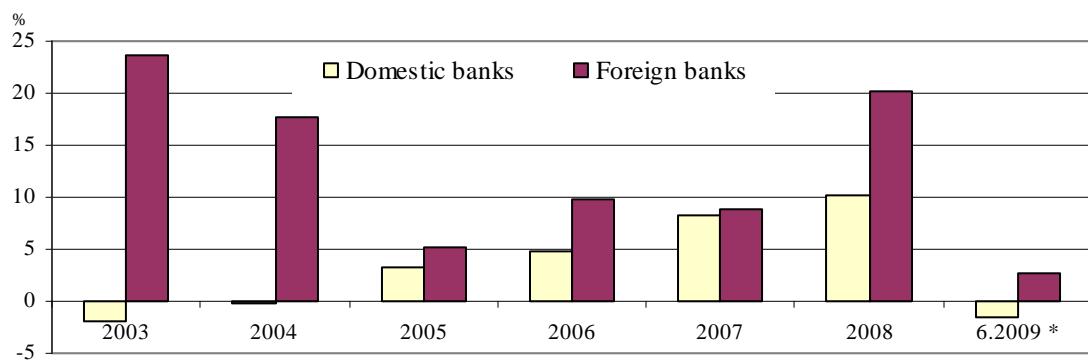
In 2008, the banking system's degree of dominance in economic activity increased as a direct outcome of the global financial crisis and the recession in 2008. Israeli non-bank lenders, notably provident funds and insurance companies, suffered heavy losses in the final months of 2008, as the price of many bonds, which they had eagerly snapped up during the boom period, collapsed. Bond issuance fell sharply, with many issuers and some entire sectors (such as real estate and construction) effectively frozen out of the market; the market for new equity issues closed almost entirely. Israeli banks enhanced the scrutiny of credit risk and, when the level of risk exceeded their risk preferences, they abstained from lending to corporate borrowers (Figure 5).

Figure 5  
**Changes in credit to the business sector from non-bank and bank sources**  
(2000 to June 2009)



During 2008, banks' securities portfolio shrank in size, both in terms of absolute value and as a proportion of the balance sheet. The drop in value was a result of both the sharp decline in asset prices as well as of the sale of parts of the portfolio. Simultaneously to the decrease in size of the securities portfolio, which reflects a reduction in non-classical financial intermediation, there was a major increase in bank credit to the public sector, which is a reflection of increased classical financial intermediation. Thus, total balance sheet bank credit to the public sector rose by 10% in 2008, its highest rate of growth in recent years (Figure 6).

Figure 6  
**Rate of change in credit to the public sector: domestic banks vis-à-vis foreign banks in Israel**  
(2003 to June 2009)



\* Six months' growth.

Both foreign and domestic banks' credit to the public sector grew substantially between 2003 and 2008 as a result of two factors: the enhancement of foreign banks' activity in Israel and the favourable macroeconomic conditions during those years (which were reflected in a growing demand for credit).

As a result of this development, the proportion of credit to the public sector in the balance sheet rose by a proportion similar to the drop in the securities portfolio. This rise in credit was also reflected in the provision of bank credit to industries which, in previous years, had not been major recipients of bank credit, such as the construction and real estate industry.

Outstanding bank and non-bank credit to the business sector remained practically unchanged in 2008. The slower pace of expansion in outstanding credit following three years of rapid growth – mainly in non-bank credit – was a consequence of the reduced supply of non-bank credit and the decline in bond prices caused by the increased assessment of risk in the financial market as a whole and in the corporate bond market in particular. The volume of business sector issues therefore fell heavily during 2008 overall. These issues ceased almost completely in the second half of 2008 and prices of CPI-indexed corporate bonds dipped significantly.

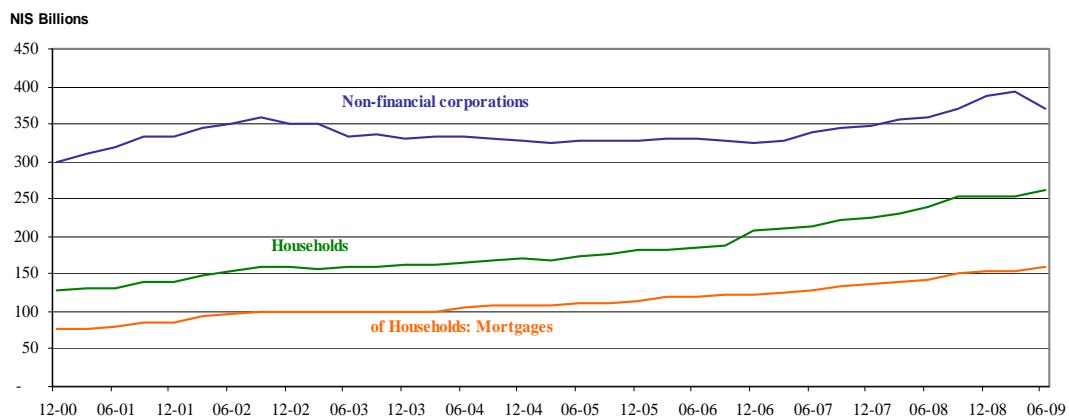
The growth in bank credit to the business sector differed between the various types of customers: while bank credit to large firms grew significantly in 2008, the growth in credit to small- and medium-sized businesses (SMEs) came to a standstill from the second quarter of the year.

The demand for credit during 2008 was affected by the downturn in the economy in two opposite directions: while the decline in investment reduced the demand for credit, the deterioration in firms' real position increased their working capital requirements. As a result, the number of companies financing constraints increased in the second half of 2008, particularly among smaller firms in the construction, transportation and commerce industries.

The rapid development of local non-bank credit during recent years (Figure 5) created an alternative channel to bank credit and led to a broader diversification of the credit risk in the economy, which could have contributed to the stability of the institutions extending credit as well as to the creation of a more competitive financial system. However, that was not the case, and the rapid growth actually led to an increase in the potential risk of the credit portfolio in the economy.

A significant part of the growth in total bank credit occurred in 2008 due to households, including both housing and consumer loans (Figure 7). This sector is considered to be less risky due to its high degree of diversification (indeed, the annual expenses due to the loan loss provision for this sector grew much less than for the business sector). The increase in demand for credit among households during the first three quarters of the year came to a halt during the fourth quarter – a trend parallel to that of private consumption, which is the main source of demand for credit.

**Figure 7**  
**Balance sheet bank lending: households vis-à-vis non-financial corporations**  
(December 2000 to June 2009)



The expansion of credit for housing in 2009 was a result of the public's desire to change the composition of its asset portfolio by moving away from financial assets to tangible assets. This trend appeared in 2008 as financial and capital market volatility intensified. A major portion of the funds withdrawn from provident funds was channelled into the housing market (which experienced a moderate rise in prices, primarily in areas of high demand).

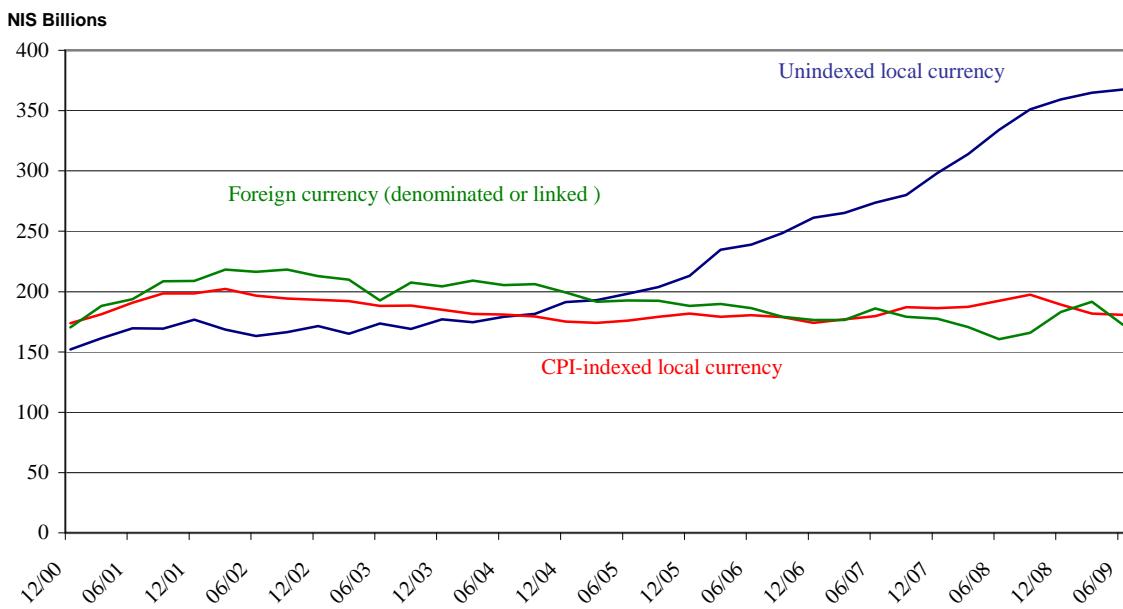
Despite the increase in the credit risk of borrowers last year, the activity in housing loans is still considered to represent a low credit risk. Evidence of this is the stability (and even slight reduction) in total accumulated arrears among mortgage holders during the course of 2008, despite the economic slowdown.

An examination of the breakdown according to indexation segment shows that most of the expansion in bank credit in 2008 occurred in the unindexed segment, including both the business sector and the retail and household sector (Figure 7). This increase is the continuation of a trend which is partly explained by the continuous reductions in the short-term monetary interest rates, as set by the Bank of Israel, which are the key interest rates for transactions in that segment.

Vis-à-vis the increase in total bank credit to the public sector in 2008, as mentioned above, the scope of banks' activity in securities declined substantially in 2008 (from NIS 163 billion to NIS 130 billion); this decline occurred after several years (2006–07) during which the banks had increased, stabilised and diversified the composition of their securities portfolio. The proportion of government bonds, which are low-risk assets, declined, while the proportion of other debt securities increased, mainly as a result of the purchase of asset-backed securities (ABS) issued by financial institutions and firms.

The sharp rise in bond spreads in Israel also led to a decline in the value of corporate bonds issued in Israel; however, thanks to the relatively small magnitude of this exposure (about NIS 6.6 billion), the effect on the risk of the securities portfolio was fairly minor. Unlike corporate bonds issued abroad, most of which are issued by the financial sector, investment in domestic bonds is characterised by a high level of diversification among the various business sectors.

Figure 8  
**Balance of credit to the public by indexation segment**  
(June 2000 to June 2009)



### C. Changes in bank funding

Banks operating in Israel raise most of their funds through offering short- and medium-term deposits and savings schemes to their household customers as well as through the issuance of bonds and notes on the domestic market or directly to institutions. The funds thus raised can be either unlinked or CPI-linked, and their composition will vary in line with current and expected inflation rates and the influence they have on both household and business demand for various types of funds and on banks' internal funding structure and needs.

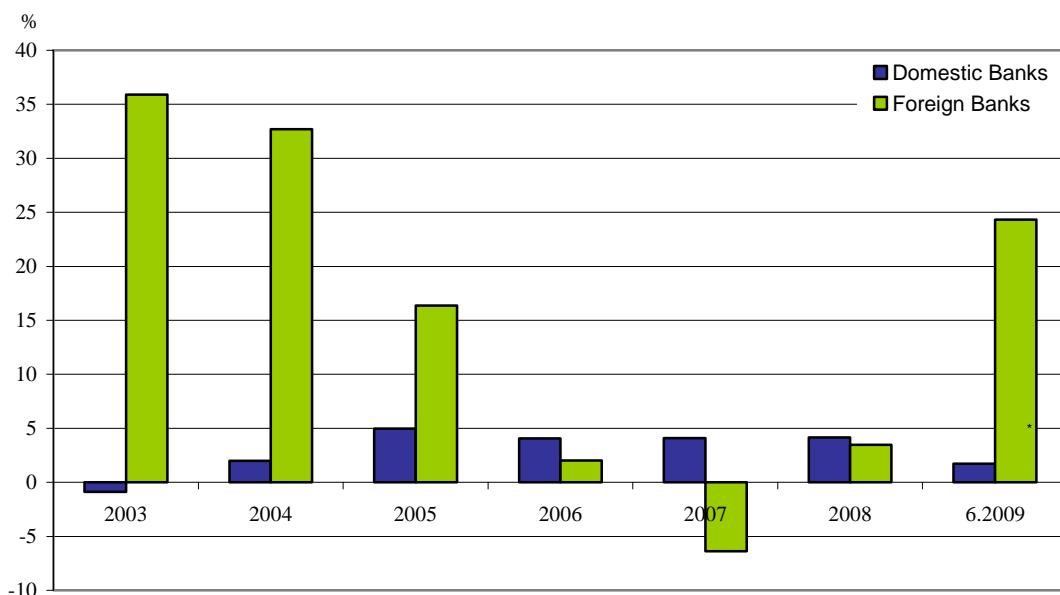
At the end of June 2009, total interest bearing liabilities of banks operating in Israel amounted to NIS 1.02 trillion, a 10% increase compared to the corresponding period in 2008, of which about 2% came from foreign banks and the rest from domestic banks. Deposits, which are the primary source of bank funding, constituted around 82.4% of interest bearing liabilities among domestic banks and a smaller share of 66.5% among foreign banks. While bonds and subordinated debt constituted around 7.2% among domestic banks, that figure was much lower among foreign banks and their share amounted to less than 1% of banks' interest bearing liabilities (among foreign banks, the only bank involved in raising funds through bonds and subordinated debt notes is Dexia-Israel). During the first six months of 2009, bond issuance and subordinated debt increased by NIS 5.6 billion (8%) among domestic banks, reflecting the direct continuation of the trend prevailing in recent years that had helped banks to increase their capital adequacy, as they were expected to reach a total risk-based capital ratio of 12% by year-end 2009. As required by the Basel Accord, the Supervisor of Banks in Israel limits the use of such notes to a maximum of 50% of the Tier 1 capital as eligible capital for the calculation of the risk-based capital ratio – a limit exploited by three of the five major banking groups in Israel (due to year-end 2008).

Total public sector deposits rose by 4.2% during 2008. After falling by 3% in the first six months of 2008, total public sector deposits increased sharply from June 2008 to June 2009 (9.3%), mostly during the last six months of 2008 (7.2%). This increase might be explained by the rise of risk assessments in the financial markets in the wake of the crisis, as volatility

increased and risk margins expanded. These assessments led to higher rates of withdrawals from provident funds during the year, which prompted the public to seek lower-risk forms of investment. In periods of uncertainty, investors have a diminished risk appetite and therefore prefer to minimise exposure through bank deposits, which are considered a “safe haven”, at least in the medium term.

Compared with domestic Israeli banks, which maintain a steady growth rate in total public sector deposits, the rate of change among foreign banks is more volatile. The high growth rate of the early years (2003–05) stemmed from the enhancement of their activity in Israel, and the low and negative rates of 2007–08 stemmed from the financial crisis, as foreign banks were perceived as less sound than domestic banks. In 2009, that trend changed with an increase of over 20% in deposits to the public sector among foreign banks (Figure 9).

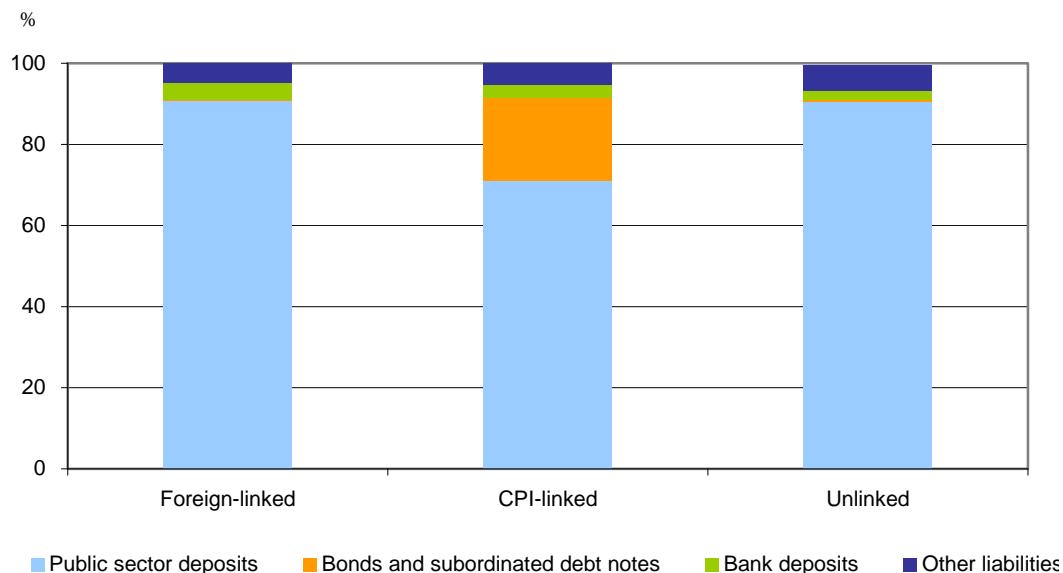
Figure 9  
**Rate of change in public sector deposits: domestic banks vis-à-vis foreign banks in Israel**  
(2003 to June 2009)



\* Six months' growth.

As with loans, deposits can be transacted in unlinked Israeli shekels, in CPI-linked Israeli shekels or in a foreign currency (including a foreign currency-linked clause), and each sector is influenced by different competitive and pricing forces. Unlinked shekel intermediation activity is a short-term activity, mostly up to a year. The primary fund sources in this sector are either the unlinked public sector deposits or the monetary loans provided by the Bank of Israel. Since December 2008, due to a liquidity surplus in the banking system, no monetary loans have been granted by the Bank of Israel and the share of unlinked deposits among total unlinked interest bearing liabilities was, as of June 2009, around 90% (Figure 10), an increase of 2 percentage points compared to June 2008.

Figure 10  
**Distribution of funds by indexation sector, Israeli banking system**  
(Unconsolidated data, June 2009)



\* Other liabilities include, among others: government deposits; creditors in respect of credit card activities; and credit balances due to derivative financial instruments (except for embedded derivatives).

The CPI-linked sector is characterised as a medium- to long-term activity. The primary fund sources are medium- to long-term linked public sector deposits or deposits in savings accounts, bonds and subordinated debt notes. Whereas the share of linked deposits and deposits in savings accounts in total linked interest bearing liabilities has not changed significantly since June 2008 (approximately 65%), the share of bonds and subordinated debt notes issued by banks has increased by 2 percentage points to 20.5%, amounting to NIS 34.4 billion in June 2009. Although banks have increased the funds raised through this channel, they have not used it to grant credit to the public sector, even though the purpose was to use these funds to increase capital adequacy, as mentioned above. Among foreign banks, all of the CPI-linked funds are raised by Dexia-Israel bank through institutional investors, deposits of municipalities and local authorities, public sector deposits (both corporate and retail) and bond issuance.

When referring to public sector deposits in Israeli banks, two unique features of the Israeli banking system should be highlighted: the first is its large non-resident foreign currency deposits, which are considered to be solid and firm and more than matched by assets. These non-resident deposits come from the large Jewish diaspora and have been stable for many years. The second unique feature is the absence of a formal deposit insurance scheme in Israel. However, the law specifies that the Governor of the Bank of Israel may decide to guarantee in whole or in part bank deposits in which it has intervened or other classes of bank liabilities. The guarantee may be for a limited or unlimited time, either subject to conditions or unconditional. The implicit government guarantee is a result of the precedent established in 1983 when the government saved the major Israeli banks by nationalising them. The authorities strengthened this precedent by guaranteeing the deposits of two small banks which failed in 1985 and 2002. The Governor of the Bank of Israel is empowered to guarantee deposits upon receiving the government's approval. In fact, the authorities have never permitted bank depositors to lose money and market participants believe that the

government has an implicit guarantee for all bank deposits. Except for the cases specified, no bank in Israel has required government intervention – including foreign banks operating in Israel (whether through subsidiaries or branches). In a recent pronouncement on this subject, the authorities indicated that there would be no discrimination between local and foreign banks if a formal deposit insurance scheme were to be established.

#### **D. Banks' balance sheet liquidity**

Liquidity risk is measured and managed in the Israeli banking system through internal models that monitor the liquidity situation using various indices and scenarios.<sup>2</sup> The internal models developed by the banks are differentiated by their working assumptions and methods of calculation and are derived from the characteristics of each bank's customer base. These models also take into account other factors, such as the dependence of the bank on large depositors, ie the degree of concentration among depositors, the bank's ability to obtain a credit line abroad and from the parent bank, and the bank's reputation, etc.

The banks use their internal models, based in general on statistical tests, to derive the rates at which to recycle their deposits (according to various segmentations: size, type and period of deposit, type of indexation, etc) and their ability to liquefy various assets. The models are also used to calculate the following liquidity indices on a daily basis: the liquidity gap according to the period to maturity (a day, up to a week, up to a month, up to three months, up to six months, up to 12 months and longer than 12 months) and the ratio of liquid assets to liabilities with a time to maturity of up to one month. In addition, liquidity indices are analysed for various scenarios, such as stress tests, that are related to a crisis at the bank or a general crisis (war, political upheaval, shocks to the financial markets, etc), and which demonstrate how the bank would continue to operate in a crisis at a reasonable cost for a one-month period. Since the crisis began in September 2008, most of the banking system has been operating according to extreme scenarios, which require the holding of larger reserves of liquid assets.

Although Israeli banks did not experience a liquidity crisis, liquidity risk has risen. In September 2008, in an effort to monitor the stability of the banking system and to enhance the transparency of financial reporting, banking corporations were asked to provide the Supervisor of Banks with newly formatted reports on liquidity risk. In addition, and as mentioned above, an ad hoc task force team was established by the Supervisor of Banks to scrutinise banks' risk exposures and to monitor their operations and liquidity positions.

The liquidity crisis led the Bank of Israel (Bol) to adopt a series of monetary measures:

- a. In April 2009, the Bol reduced the absorption of liquidity surpluses through the issuance of makam (1-year nominal T-bills). Since that time, excess liquidity has been absorbed primarily by allowing commercial banks to increase their deposits at the Bol (which are not considered part of the money base). This means that the public's portfolio has shifted from foreign currency and/or bonds to currency or deposits. Public sector deposits provide most of the liquidity to commercial banks, and banks do not use all the additional liquidity to offer loans – this liquidity, excluding a small fraction which they are required to hold as reserves, is absorbed by the Bol as commercial banks' deposits at the prevailing rate (0.5%). Consequently, the base expands only by a small amount while M1 expands considerably due to the very low interest rates.

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<sup>2</sup> Liquidity risk is measured and managed in the Israeli banking system using internal models and, therefore, banks are not obligated to achieve a ratio of 1, as required by the standard model in Directive no 342 of the Proper Conduct of Banking Business.

- b. Monetary loans of a longer maturity were added to those currently issued by tender to the banking system for durations of one day and one week.
- c. The spread around the Bol interest rate at the credit window (the “corridor”) and at the deposit window for commercial banks was lowered from  $\pm 1\%$  to  $\pm 0.5\%$ , and at the beginning of 2009 there was a further reduction to  $\pm 0.25\%$ .
- d. Repo tenders to commercial banks and financial institutions were offered for longer than the previous term of one week.
- e. The purchase of government bonds by the Bol has helped to reduce the yields on long-term government bonds. Additionally, the purchase of bonds has helped the capital markets to return to more normal functioning, particularly with regard to the renewal of issuances and the raising of capital by the business sector; the Bol ceased buying bonds in August 2009.

Other changes in Bol policy during 2008 which increased liquidity (although that was not their primary goal) included:

- a. The intervention by the Bol in the foreign currency market for the first time in 11 years, which involved the purchase of foreign currency (in the amount of NIS 55 billion thus far) and the corresponding injection of shekels.<sup>3</sup>
- b. The lowering of the interest rate five times during the last quarter of 2008 (two of which were inter-meeting decisions, ie not taken on the regular interest rate announcement dates), from 4.25% to 1.75%. Since the beginning of 2009, the Bol has continued to lower the interest rate to record low levels and in April it was lowered to a level of only 0.5%.<sup>4</sup> In September 2009, the interest rate was raised by 0.25 percentage points only, to 0.75%, a rise that stemmed from the need to bring inflation back to the target set by the government while at the same supporting the recovery of economic activity.

Since December 2008 and throughout 2009 there was a noticeable upward trend in the liquidity of the banking system, characterised by a basic liquidity surplus, and banks began placing deposits with the Bol. This is in contrast to the basic liquidity deficit prevailing until December 2008, during which the Bol offered banks loans by tender.<sup>5</sup>

As a result of the worsening of the crisis in September 2008, Israeli banks as well as foreign banks also took a number of steps aimed at maintaining a level of liquidity that was appropriate to the level of uncertainty. These included an increase in their deposits, both at local banks and at the Bol, as well as in their holdings of government bonds, which was carried out simultaneously with a reduction in deposits at foreign financial institutions and the shortening of their duration. Consequently, the ratio of liquid assets to liabilities with up to one month to redemption increased steadily from September 2008 to June 2009, both in Israeli and foreign banks and, as can be seen in Table 2, the increase among Israeli banks was more moderate compared to foreign banks.

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<sup>3</sup> The goal of the purchases was to halt the appreciation and to adjust foreign exchange reserves to the levels generally accepted in other countries.

<sup>4</sup> The main goal of lowering the interest rate was to keep to the inflation target and support real economic activity.

<sup>5</sup> Another development in 2008 that worked to reduce the liquidity risk implicit in the settlement process was the addition of the shekel as a currency cleared through CLS (Continuous Linked Settlement), an international interbank settlement system, in May 2008.

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Table 2

**Local currency and foreign currency liquidity indices, the standard model<sup>a</sup>  
(September 2008 to September 2009)**

(Ratio of liquid assets to liabilities with up to one month to redemption)

	<b>09/2008</b>	<b>12/2008</b>	<b>03/2009</b>	<b>06/2009</b>
<b>Domestic banks</b>	0.19	0.26	0.28	0.32
<b>Foreign banks</b>	0.31	0.39	0.49	0.61
<b>Banking system</b>	0.19	0.27	0.29	0.33

<sup>a</sup> The standard model as described in Directive no 342 of the Proper Conduct of Banking Business.

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# The Bank of Korea's policy response to the global financial crisis

Hee Chun Chung<sup>1</sup>

## 1. The impact of the global financial crisis on the Korean economy

Following the collapse of Lehman Brothers in September 2008, the financial and foreign exchange markets in Korea were thrown into turmoil. The real economy also shrank rapidly under the impact of the international financial market unrest and worldwide recession.

The Korean won (KRW) plummeted against major currencies because of the outflow of foreigners' investment funds and the deterioration of foreign currency borrowing conditions for domestic banks. As worries about credit risk mounted, credit crunches emerged in the financial markets.

The Korean won fell by 28.0% against the US dollar (from KRW/USD 1,089.0 at end-August 2008 to KRW/USD 1,513.0 on 24 November 2008), and the credit default swap premium marked a six-fold surge (from 116 basis points (bp) at end-August 2008 to 675 bp on 27 October 2008).

The credit spread on corporate bonds widened almost threefold,<sup>2</sup> and stock prices on the Korean stock price index (KOSPI) fell by 36.3% (from 1,474.2 at end-August 2008 to 938.8 on 24 October 2008).

The scale of the increase in small- and medium-sized enterprise (SME) loans shrank to a fifth of its previous level (from KRW 10.3 trillion in Q3 2008 to KRW 2.2 trillion in Q4 2008).

Domestic economic activity shrank by its greatest percentage since the 1997–98 foreign currency crisis (Q1 1998, –7.8%) as GDP growth registered a decrease of 5.1% in the fourth quarter of 2008 owing to the steep fall in exports and the sharp contraction of domestic demand. There was also a large-scale increase in unemployment (from 3.1% in August 2008 to 4.0% in March 2009).

## 2. The Bank of Korea's policy response

### Reduction of the base rate

The Bank of Korea (BoK) lowered its base rate<sup>3</sup> on six occasions between October 2008 and February 2009, by 3.25 percentage points altogether from 5.25% to 2.00%, the lowest level since the policy rate target began to be announced in May 1999.

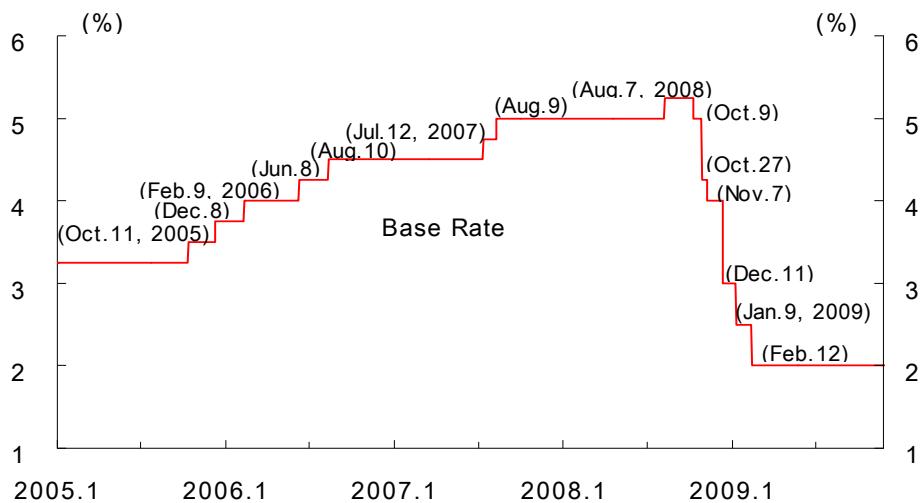
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<sup>1</sup> Director General, Monetary Policy Department, Bank of Korea.

<sup>2</sup> Corporate bond (AA–, three-year) yields – treasury bond (three-year) yields: from 157 bp at end-August 2008 to 465 bp on 9 December 2008.

<sup>3</sup> The base rate, ie the policy rate which the Monetary Policy Committee decides on every month, is the reference rate applied in transactions between the BoK and counterpart financial institutions such as repurchase transactions and liquidity adjustment loans and deposits.

Figure 1  
**The Bank of Korea base rate<sup>1</sup>**



<sup>1</sup> The overnight call rate target, until February 2008.

Source: Bank of Korea.

### Expansion of liquidity supply

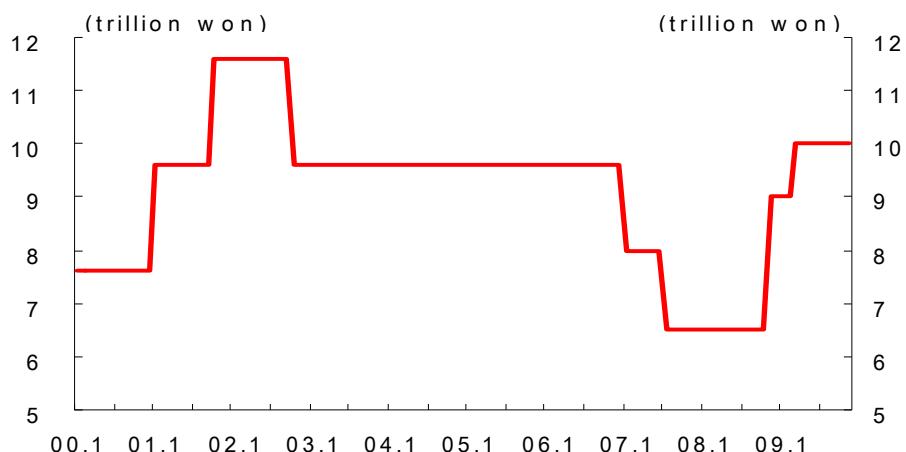
The BoK supplied liquidity totalling KRW 18.5 trillion (equivalent to around 28.5% of reserve money as of end-2008) by means of open market operations to ensure the seamless circulation of funds in the money and bond markets. In addition, by way of support for the setting up of a Bond Market Stabilisation Fund capitalised at KRW 5 trillion, the BoK provided KRW 2.8 trillion.

The BoK included bank debentures and certain government agency bonds as the securities eligible for use in open market operations, which originally included only treasury bonds, government-guaranteed bonds and monetary stabilisation bonds. The eligible counterparties for repurchase (RP) operations were also extended from the previous focus on banks (19 banks and two securities companies) to include an additional 12 securities companies.

### Support for the expansion of banks' credit supply capacity

To facilitate the supply of credit through banks, the BoK took various measures, such as raising its aggregate credit ceiling, paying banks' interest on their required reserve deposits, and helping banks to build up their capital.

Figure 2  
Adjustment of the aggregate credit ceiling



Source: Bank of Korea.

To increase the incentives for banks to lend to SMEs, the aggregate credit ceiling was raised by more than 50% (from KRW 6.5 trillion in November 2008 to KRW 10 trillion in March 2009). In order to help banks expand their credit supply by raising their BIS capital adequacy ratios, the BoK paid them one-off interest of KRW 0.5 trillion on their required reserve deposits. The BoK also provided KRW 3.3 trillion for the formation of a KRW 4 trillion Bank Recapitalisation Fund. This fund supported the enhancement of banks' equity capital through the purchase of related subordinated debt and hybrid bonds.

#### **Actions taken to stabilise the foreign exchange market**

The BoK undertook timely and effective actions to contain foreign exchange market unrest at an early stage and avoid it escalating into a foreign exchange crisis.

The BoK entered into a USD 30 billion swap arrangement with the US Federal Reserve and a 180 billion yuan/KRW 38 trillion swap arrangement<sup>4</sup> with the People's Bank of China. The BoK also expanded the ceiling of an existing currency arrangement with the Bank of Japan from USD 3 billion equivalent to USD 20 billion equivalent.<sup>5</sup>

<sup>4</sup> This is separate from the existing currency swap arrangement already entered into under the framework of the Chiang Mai Initiative (CMI).

<sup>5</sup> Apart from the currency swap arrangement within the framework of the CMI, the BoK and the Bank of Japan also entered into a bilateral won-yen currency swap for a non-crisis situation, the ceiling of which was expanded in December 2008.

Table 1

**Currency swap arrangements between the BoK and other central banks**

	<b>US Federal Reserve</b>	<b>People's Bank of China</b>	<b>Bank of Japan</b>
Ceiling	USD 30 billion	180 billion yuan	USD 20 billion equivalent
Date of announcement	30 October 2008	12 December 2008	12 December 2008
Expiry date	1 February 2010 <sup>1</sup>	3 years	1 February 2010 <sup>2</sup>

<sup>1</sup> The original expiry date was set at 30 April 2009, but the term of the swap arrangement was extended by six months (3 February 2009) and by a further three months (26 June). <sup>2</sup> The original expiry date was set at 30 April 2009, but the term of the swap arrangement was extended by six months (31 March 2009) and by a further three months (16 October).

Source: Bank of Korea.

The BoK provided a total of USD 26.6 billion in foreign currency liquidity to banks experiencing difficulties in raising overseas funding. Approximately USD 10 billion from the BoK's foreign reserves was provided to the swap market by way of competitive auction. In addition, a cumulative USD 16.4 billion was supplied through the competitive auction loan facility using the proceeds of currency swaps with the US Federal Reserve.

Besides these programmes, the BoK introduced the Foreign Currency Loans Secured by Export Bills Purchased scheme in order to provide incentives for banks to be active in handling trade financing for SMEs.

Table 2

**Bank of Korea foreign currency liquidity supply**

(in USD billions)

	<b>Plan</b>	<b>Supply</b>	<b>Period (numbers)</b>
Competitive auction	10	10.3	21 October to 16 December 2008 (7 occasions)
Swap facility			
Competitive auction	30 <sup>1</sup>	16.3	2 December 2008 to 20 January 2009 (5 occasions)
Loan facility			
Foreign currency loans secured by export bills	10	0.2	10 December 2008 to 25 February 2009 (7 occasions)
Total	50	26.8	

<sup>1</sup> The ceiling for the swap arrangement between the BoK and the US Federal Reserve.

Source: Bank of Korea.

### 3. The current Korean economic situation

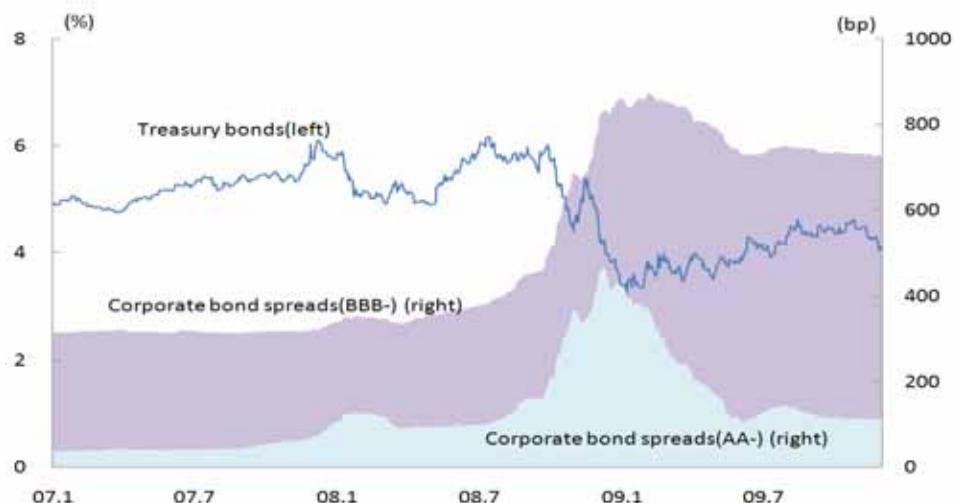
#### Financial and foreign exchange markets

Since Q2 2009 the Korean financial and foreign markets have been quickly regaining stability, while a progressively more pronounced recovery trend has also been apparent in the real sector.

With the waning of credit risk fears, the spread<sup>6</sup> between high quality (at least A rated) corporate bonds and treasury bonds has narrowed to its level prior to the collapse of Lehman Brothers.

However, the credit spreads<sup>7</sup> on sub-investment grade corporate bonds (BBB and lower) still remain at a high level, so the situation of credit differentiation persists.

Figure 3  
Bond yields and credit spreads



<sup>1)</sup> Compared to treasury bonds (3-year).

Source: Bank of Korea; Koscom Corp.

As regards the issuance of corporate bonds, although only top paper could be issued immediately after the failure of Lehman Brothers, there has recently been a substantial increase in the issuance of subprime corporate bonds.<sup>8</sup>

Stock prices (KOSPI) rose sharply from March 2009 onwards amid increasing anticipation of a recovery of business activity and foreigners' sustained, large-scale net purchase position. Consequently, KOSPI registered its highest level for the year to date of 1,719 points on

<sup>6</sup> Corporate bonds (AA-, 3-year) yields – treasury bonds (3-year) yields: from 157 bp at end-August 2008 to 465 bp on 9 December 2008 and 111 bp at end-November 2009.

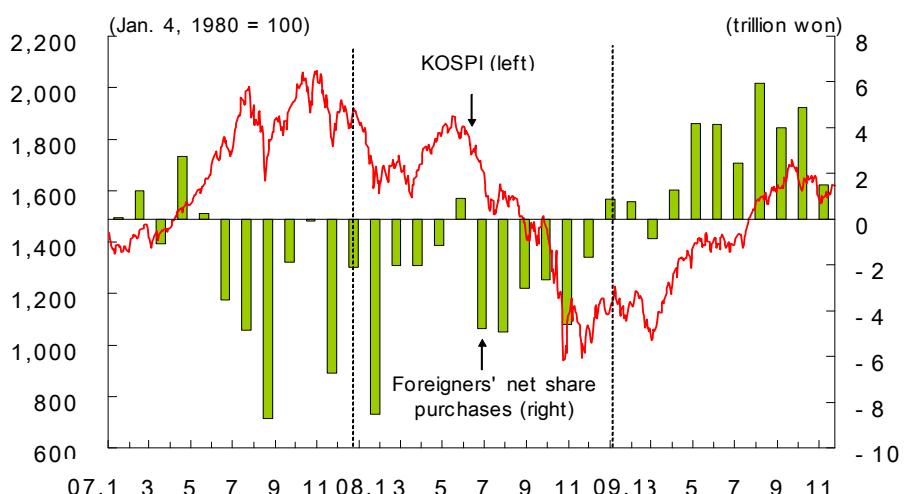
<sup>7</sup> Corporate bonds (BBB-, 3-year) yields – treasury bonds (3-year) yields: from 450 bp at end-August 2008 to 876 bp on 4 February 2009 and 726 bp at end-November 2009.

<sup>8</sup> Weight of subprime corporate bonds: from 0.2% in December 2008 to 14.0% in August 2009 to 20.3% in September 2009 and 32.5% in October 2009.

22 September 2009. In recent weeks, wide fluctuations have persisted under the burden of the sharp rise that occurred within a short period of time.

Foreign investors' net purchases reached KRW 30.2 trillion from March to November 2009. As a result, the foreign share in total Korean stock market capitalisation moved higher than prior to the collapse of Lehman Brothers (from 28.9% at end-August 2008 to 25.7% on 14 April 2009 and to 30.5% at end-November 2009).

Figure 4  
KOSPI and foreigners' net share purchases



Source: Korea Exchange.

The extent to which Korean stock prices have recovered lost ground (115.2%) stands at a high level compared with global markets (MSCI Global: 70.2%) and emerging markets (MSCI EM: 99.4%).

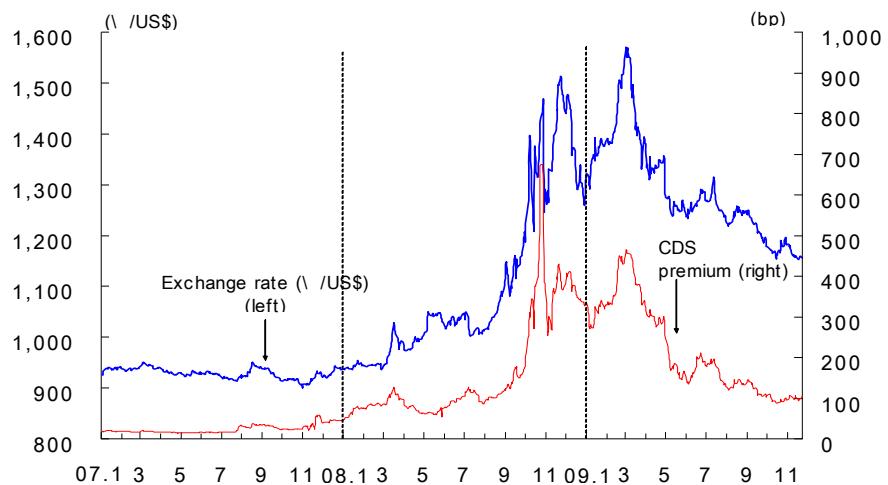
Table 3  
Stock prices

	End-August 2008	Lowest point after the crisis <sup>1</sup>	End-November 2009 <sup>2</sup>	Recovery ratio <sup>3</sup>
Korea KOSPI	1,474.2	938.7 (-36.3)	1,555.6 (+65.7)	115.2
MSCI Global	1,344.9	688.6 (-48.8)	1,149.0 (+66.9)	70.2
MSCI EM	956.3	454.3 (-52.5)	953.1 (+109.8)	99.4

<sup>1</sup> ( ) represents the rate of recovery of the level at end-August 2008 (%). <sup>2</sup> ( ) represents the percentage increase compared to the lowest point. <sup>3</sup> (end-November 2009 – the lowest point after the start of the crisis)/(end-August 2008 – the lowest point after the start of the crisis).

In the foreign exchange market, the Korean won has appreciated against major currencies thanks to the continuing current account surpluses (cumulative surplus February–October 2009, USD 37.3 billion) and to the net inflows of foreign portfolio investment funds. There has also been a marked improvement in foreign currency borrowing conditions for domestic banks.

Figure 5  
Exchange rate and CDS premium<sup>1</sup>



<sup>1</sup> Foreign Exchange Stabilisation Fund bonds, 5-year maturity.

Source: Korea Money Brokerage Corp; Bloomberg.

The credit default swap (CDS) premium<sup>9</sup> now stands at a lower level than prior to the collapse of Lehman Brothers, marking 106 bp as of end-November 2009.

The Korean won traded at 1,162.8 won to the US dollar as of end-November 2009. This represented a 35.0% appreciation of the Korean won against the US dollar from its lowest point (2 March 2009, 1,570.3 KRW/USD) following the collapse of Lehman Brothers, but it has not yet returned to the level prior to the onset of the crisis (end-August 2008, 1,089.0 KRW/USD).

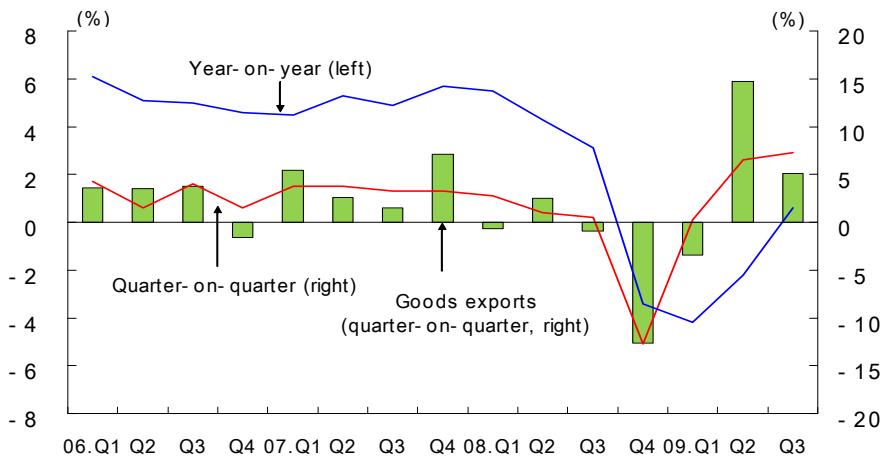
Similarly, domestic banks' foreign currency borrowing conditions have greatly improved, as rollovers of borrowings are proceeding smoothly and premium interest rates are steadily declining. Consequently, the foreign currency liquidity support provided to them by the BoK has been consistently redeemed.

### Real economy and prices

In the real economy, the GDP growth rate was 2.6% (quarter-on-quarter) for Q2 2009, and rose even higher, reaching 3.2% in Q3 2009 thanks to the continued recovery of exports and a constant increase in domestic consumption.

<sup>9</sup> It stood at 116 bp at end-August 2008, compared to 675 bp on 27 October 2008 and 106 bp on 30 November 2009.

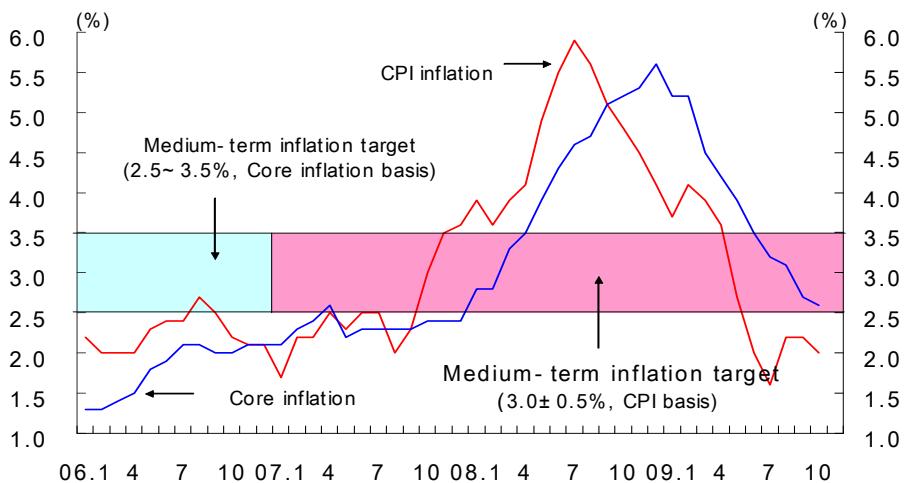
Figure 6  
GDP growth rate



Source: Bank of Korea.

The rate of consumer price increases remained stable within the inflation target range (2.5–3.5%), as demand-side pressures were weak owing to the economic downturn, and international oil prices remained lower than in the previous year.

Figure 7  
CPI and core inflation

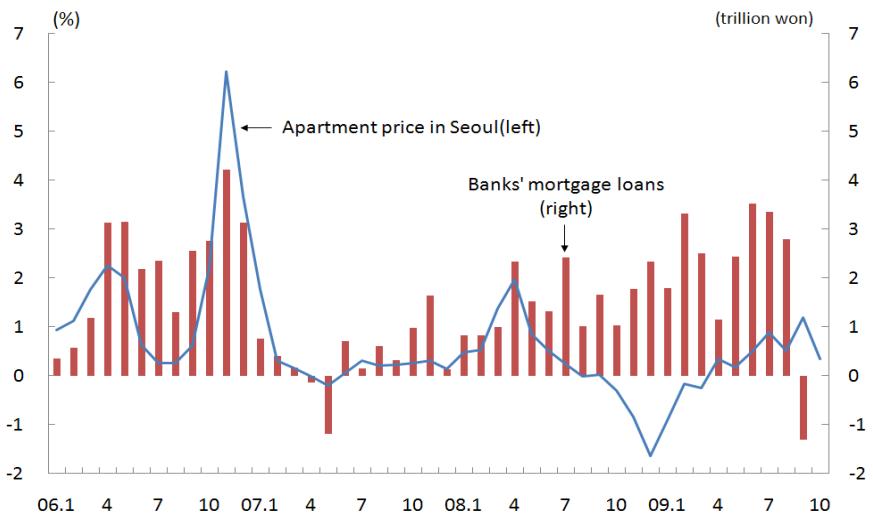


Source: Bank of Korea.

House prices regained an upward trend from April 2009, having fallen only slightly in spite of the financial crisis. House prices in major developed nations such as the United States and the United Kingdom fell by 20–30% compared to their peak levels, and their downward trend has persisted or exhibited only a very slight uptick. In contrast, house prices in Korea shifted to an upward trend after marking a decline of 2.1%. As of end-October 2009, the prices of apartments for reconstruction in the three Gangnam districts in Seoul were hovering above their September 2008 pre-Lehman Brothers levels.

Recently, however, the rise in house prices appears to have faltered somewhat, due to the prudential regulation of financial institutions by the government, including the extended application of debt-to-income (DTI) regulations.

Figure 8  
**House prices<sup>1</sup> and mortgage loans<sup>1, 2</sup>**



<sup>1</sup> Compared with the previous month.

<sup>2</sup> On the basis of commercial and specialised banks.

Source: Bank of Korea; Kookmin Bank.

#### 4. Assessment of the Bank of Korea's policy response

The steps taken by the BoK following the collapse of Lehman Brothers in September 2008 are considered to have played a very important role in stabilising the financial and foreign exchange markets and are accelerating the recovery of business activity.

In terms of timeliness, the BoK contributed to bringing a prompt halt to the spread of financial instability by putting in place the majority of its countermeasures immediately after the onset of the crisis. In particular, considering that the fiscal expansion policies could only fully come into effect from the beginning of 2009, the monetary policy response in the immediate aftermath of the crisis is thought to have played a vital role in lessening the impact on the economy. The foreign currency liquidity supply schemes worked as a firewall, preventing the worsening overseas funding conditions from evolving into a currency crisis, and contributed to Korea maintaining its international credibility. For example, international credit rating agencies, such as Standard & Poors, unanimously endorsed the BoK's and the government's<sup>10</sup> foreign currency liquidity supply measures as swift and adequate immediately after their announcement (17–21 October 2008) and maintained their current sovereign ratings for Korea.

<sup>10</sup> The government (Foreign Exchange Stabilisation Fund) also announced its own foreign currency liquidity supply measures amounting to USD 10 billion through swap trading, USD 14 billion through competitive auction loans, and USD 11 billion through support for trade finance, totalling USD 35 billion altogether. An additional USD 27.4 billion was supplied through the Export-Import Bank of Korea.

In terms of policy responses, advanced economy central banks have employed a wide array of unconventional measures. However, the BoK sought to minimise any negative side effects principally by making use of conventional policy instruments, such as the reduction of interest rates and the expansion of liquidity by means of loans and open market operations.

Efforts were also directed as far as possible in employing these conventional policy instruments in order to prevent them from becoming deeply entrenched. The expansion of liquidity, which was supplied principally through the purchase of long-term RPs (up to a 91-day maturity), has been withdrawn seamlessly at the maturity. Similarly, the extension of the securities eligible for use in open market operations was subject to a sunset clause.

The entry into currency swap agreements with the central banks of several major countries including the United States was extremely useful, not just in terms of resolving the foreign currency liquidity shortage problem but also in restoring investor confidence at home and abroad. The establishment of the currency swap arrangements themselves actually had a positive announcement effect in stabilising the financial market, as price variables have shown rapid recoveries, not just in Korea but also in countries experiencing similar financial unrest. The importance of international cooperation has been underlined through the response to the global shock of the financial crisis.

## 5. Future policy tasks

First, the simple interest rate policy and the unconventional measures taken as part of the response to the crisis need to be unwound step by step. If the stance of financial easing is unwound too rapidly, there is a concern that it could hamper the recovery of activity, and if it is not possible to shift to a pre-emptive policy stance, there is a high risk of asset bubbles and inflation. Pursuing exit strategies incrementally with appropriate timing while keeping an eye on the extent of the improvement in, and sustainability of, global financial and economic circumstances would therefore be the preferable course of action. It is also vital to strengthen communication efforts such as adequate advanced signalling to economic agents in order to minimise adverse impacts.

Second, monetary policy should take account of the expansion of credit and movements in asset prices in order to avoid a repetition of the financial crisis. In setting the policy rate, aside from the focus on prices and growth, greater attention should be given to credit conditions and movements of asset price variables such as real estate and share prices.

Third, international cooperation should be strengthened in order to counter the risk of the spread of advanced country economic unrest to emerging market countries and the risk of a sudden stop. For the Korean economy, foreign exchange market stability has improved greatly compared to the situation prevailing in 1997 during the foreign currency crisis, helped by the stability-oriented focus of macroeconomic policies and the building up of foreign exchange reserves. However, additional efforts are still required in view of the capital exodus and the foreign exchange market unrest experienced following the collapse of Lehman Brothers.

In particular, considering today's financial environment in which capital movement between countries has greatly expanded because of the globalisation of finance and economic activity, it is important to strengthen international policy cooperation with regard to the regulation of capital movements to overcome the problem of "original sin"<sup>10</sup> of emerging market countries.

Given that advanced country capital flows can heighten the volatility of financial markets and the real economies of emerging market countries, discussions concerning the regulation of advanced countries' hedge funds and the international regulation of both multinational financial institutions and the supervisory system should be expanded to incorporate the opinions of emerging market countries.

# Impact of the global crisis on Malaysia's financial system

Muhammad bin Ibrahim<sup>1</sup>

## 1. Introduction

Overall confidence and stability in the Malaysian financial sector has been preserved throughout the period of the global financial crisis, underpinned by a strong financial sector and negligible exposure to subprime-related assets and affected counterparties. Ample liquidity in the financial system also mitigated the risk of systemic contagion, thus allowing the financial sector to continue providing financial intermediation and services to the economy at large. Successful reforms of the financial sector following the Asian financial crisis have further reinforced the strong fundamentals supporting a sound financial sector in Malaysia.

As a highly open economy, Malaysia was, however, not insulated from the global economic downturn. The deterioration in global economic conditions and the major correction in commodity prices in the second half of 2008 saw Malaysia's GDP moderate to 0.1% in the final quarter of 2008. The domestic economy experienced the full impact of the global recession in the first quarter of 2009, declining by 6.2%. The concerted and pre-emptive measures taken by the Bank Negara Malaysia (BNM), through the accelerated implementation of fiscal stimulus measures, supported by the easing of monetary policy and the introduction of comprehensive measures to sustain access to financing and mitigate any impact of the heightened risk aversion among banks contributed towards stabilising the domestic economy in the second quarter and its subsequent recovery in the second half of the year. The economy resumed its growth momentum in the fourth quarter, growing by 4.4%. This resulted in the economy contracting by only 1.7% in 2009. Continued expansion in domestic demand and increased external demand led to the strong growth of 10.1% in the first quarter of 2010.

## 2. Impact of the banking crisis on bank intermediation

The financial intermediation process in the Malaysian financial system has remained orderly throughout the period of economic turbulence, with continuing flows of credit to the real economy. Outstanding loans expanded at an annual rate of 10.1% between July 2007 and July 2009. Similarly, outstanding private debt securities (PDS) grew by 10% annually during this period. The resilience of the banking system, which accounts for 59.7% of the total assets of the financial system, was a critical factor in ensuring the continued flow of funds into the economy and providing support to borrowers confronting temporary cash flow tightness (Table 1).

The level of capitalisation of the banking system in Malaysia was at its highest historical level at the onset of the crisis. Throughout the period 2007–September 2009, the risk-weighted capital ratio (RWCR) and the core capital ratio (CCR) of the banking system in Malaysia remained above 12.5% and 9.9%, respectively. Overall profitability as indicated by the return on assets (ROA) and return on equity (ROE) was also maintained at an average of 1.6% and

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<sup>1</sup> Bank Negara Malaysia.

20.8% in the period 2007–08, subsequently moderating to 1.2% and 13%, respectively, for the period January–September 2009, while remaining in positive territory as business conditions slowed significantly in tandem with the general contraction of the Malaysian economy.

During this period, the aggregate credit quality of the banking system's financing portfolios did not experience any significant deterioration. In contrast, total non-performing loans (NPLs) declined by 33.4%, while the net NPL ratio improved to 2.1% as at September 2009 from 4.6% recorded at the beginning of 2007. This can be attributed to the concerted efforts taken by the BNM to enhance the credit risk management infrastructure and underwriting practices in the period following the Asian financial crisis. In addition, banking institutions have been actively managing their balance sheets and asset quality through stringent provisioning policies and write-offs of irrecoverable loans. As a result, the financing loss coverage ratio for the banking system as a whole rose to about 90% of NPLs (2006: 64.6%) as at September 2009.

Table 1  
**Banking system: key financial indicators**

	1996	1997–98	2006	2007	2008	Jan–Sep 2009
Number of institutions	89	80–86	42	47	33*	33*
Average total assets per institution (USD)	2.8bn	2.1bn	11bn	11.2bn	11.7bn	11.9bn
Risk-weighted capital ratio	10.6%	10.5%	13.5%	13.2%	12.6%	14.5%
Core capital ratio	9.0%	8.9%	10.7%	10.2%	10.6%	12.9%
ROA	2.0%	–0.9%	1.3%	1.5%	1.5%	1.2%
ROE	27.5%	–12.3%	16.2%	19.8%	18.6%	13.0%
Net NPL ratio	3.0%	13.2%	4.8%	3.2%	2.2%	2.1%
Gross NPL ratio	3.9%	18.7%	8.5%	6.5%	4.8%	4.4%
Financing loss coverage ratio	N/A	55.1%	64.6%	77.3%	89.0%	89.7%

\* including nine domestic banking groups and three foreign banking groups.

Source: Bank Negara Malaysia.

In general, the Malaysian banking system entered the current global financial and economic crisis from a much stronger position compared to the Asian financial crisis. The consolidation and restructuring of the banking industry together with improvements in the governance structure, risk management framework, infrastructure and practices, as well as the capacity building undertaken as part of the banking sector reforms following the Asian financial crisis, have significantly strengthened the foundations for financial stability. Moreover, the Malaysian banking system operates within a diversified financial system, with a developed capital market. Total bonds outstanding accounted for 86% of GDP, providing an alternative funding source for the economy. The funding sources for businesses are evenly balanced between the equity and bond markets and the banking sector, thus diversifying credit risk concentration away from the banking system, which in turn provides the banking system with added capacity to withstand stress and shocks.

Another factor which prevented excessive risk-taking was the “originate and hold” business model adopted by banking institutions in Malaysia, where credit risks are retained within

institutions' balance sheets. This served to align incentives with prudent risk-taking and ensured that lending institutions continued to vigilantly assess the repayment capacity of borrowers and monitor the quality of the loan throughout its tenure. The increase in the risk weight of non-performing housing loans to 100% since March 2005 under the regulatory capital framework further strengthened incentives for banks to maintain high-quality loan portfolios. The legal requirement for all foreign institutions in Malaysia to be locally incorporated, with capital committed to support Malaysian operations and obligations, also limited any contagion effects of stresses faced by foreign-domiciled parent banks located in the countries severely affected by the crisis.

These combined conditions enabled the banking sector to continue performing its financial intermediary role. As at end-September 2009, outstanding loans were growing at an annual rate of 7.2%, with a loan approval rate<sup>2</sup> of 71.6% (Table 2). In particular, outstanding loans to businesses remained stable, amounting to USD 85.9 billion as at end-September 2009, while outstanding loans to households continued to record steady growth. This was also supported by the lower cost of financing following the 150 basis point (bp) reduction in the overnight policy rate (OPR),<sup>3</sup> which helped to sustain the demand for credit. With consumer confidence improving towards the second half of 2009, the purchase of big ticket items such as cars rebounded as more consumers took advantage of the lower cost of financing and the introduction of newer car models.

Table 2  
**Banking system: outstanding financing**

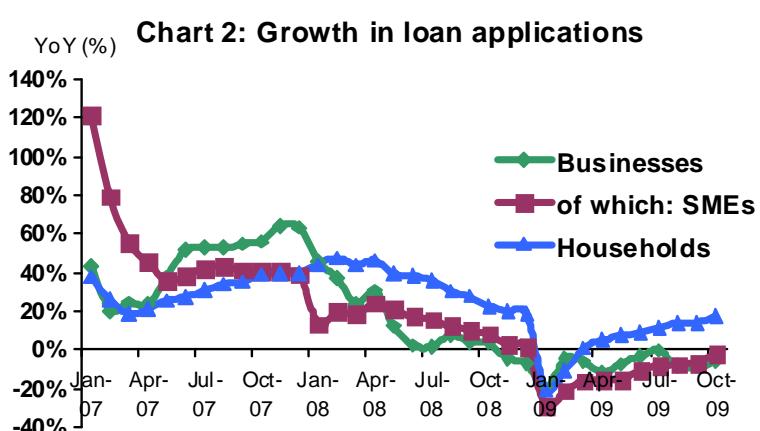
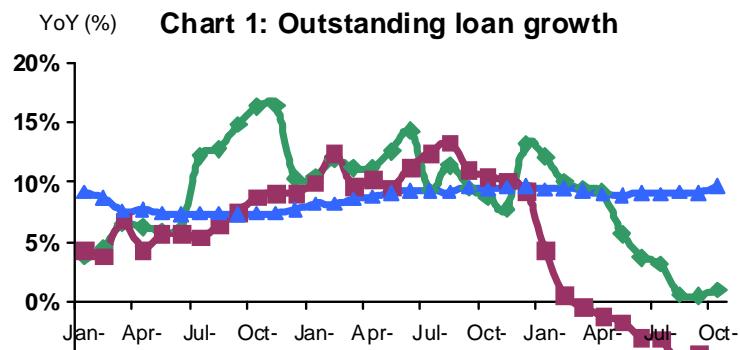
	USD billions		Annual change (%)	
	Sep 2009	Dec 2008	Sep 2009	Dec 2008
Total	219.8	209.7	7.2	12.8
Businesses	85.9	85.4	0.5	13.2
<i>Large businesses</i>	51.6	49.3	4.0	16.2
<i>SMEs</i>	34.4	36.0	-4.3	9.3
Households	120.7	113.5	9.1	9.7

Source: Bank Negara Malaysia.

Notwithstanding the progressive deterioration of global conditions and the heightened uncertainty in the domestic economic outlook, the banking sector in Malaysia was well-placed to maintain a "business-as-usual" posture with respect to risk management policies and standards. Risk mitigation responses were mainly pre-emptive in nature and largely took the form of more intensive surveillance and on-the-ground monitoring of small- and medium-scale borrowers, and the retail segments comprising credit cards and hire purchase facilities for cars, which were experiencing a slight uptick in the level of delinquencies. Banking institutions were also forthcoming in facilitating the rescheduling or restructuring of debt repayment obligations of deserving borrowers facing temporary cash flow constraints. These pre-emptive measures prevented premature defaults among such otherwise creditworthy borrowers.

<sup>2</sup> Loan approval rate = approved loans/(approved loans + rejected loans).

<sup>3</sup> Overnight policy rate = the interest rate set by the BNM at its monetary policy meetings. From November 2008 to February 2009, the rate was reduced three times from 3.5% to 2%.



Source: Bank Negara Malaysia.

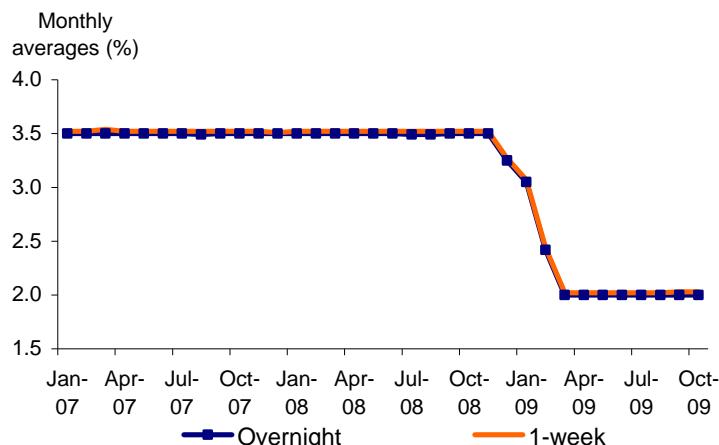
To ensure the undisrupted flow of funds to the real sector, the BNM intensified its engagements with various stakeholders, including financial institutions, trade associations and businesses, beginning as far back as the early part of 2008 when conditions in the global economy appeared to be worsening and increasingly fragile. These engagements proved to be particularly effective in bridging information gaps between financial institutions and businesses, and encouraging a better appreciation among financial institutions of the issues facing businesses. This in turn supported the rational credit decisions of financial institutions in relation to new and additional facilities as well as requests for the restructuring of outstanding facilities.

### 3. Impact on the domestic money and debt markets

#### Money market

Ample liquidity has been maintained in the domestic money market. Activities in the ringgit interbank market were unaffected, and the overnight and one-week domestic money market rates remained stable, ranging between 1.99% and 2% since April 2009 and within a tight spread (Chart 3).

**Chart 3: Interbank money market rates**



Source: Bank Negara Malaysia.

The funding structure of the Malaysian banking system is predominantly deposit-based (about 70% of total funding) and denominated largely in domestic currency. This is used to fund ringgit-denominated assets which support domestic real sector activities. The depositor base is equally balanced between wholesale and retail deposits, thus providing greater funding stability to banks. The banking system also maintains a comfortable loan-to-deposit ratio, which averaged 77.3% for the period July 2007–September 2009. Notably, banking institutions are now less dependent on the interbank market compared to the period prior to the Asian financial crisis. For most of the period July 2007–September 2009, banking institutions were net interbank lenders to the BNM, with average net interbank placements of USD 47.1 billion by the banking system, underscoring the ample liquidity in the system. As at September 2009, total net interbank placements with the BNM stood at USD 45.3 billion, which was available to banks to meet any liquidity needs.

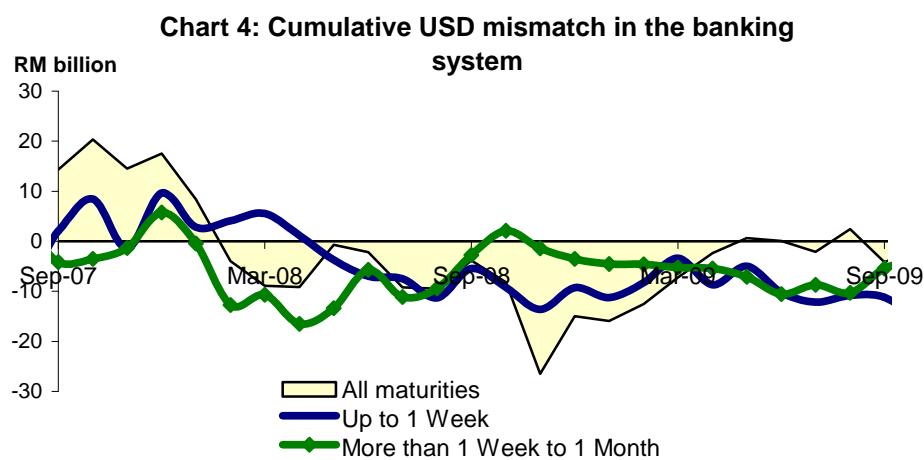
Banking institutions in Malaysia have, since 1998, been required to comply with dynamic minimum liquidity requirements. Under this requirement, all maturing assets and obligations are analysed by maturity buckets, with banking institutions required to maintain surplus liquidity of 3% for the one-week bucket and 5% for the one-month bucket after taking into account historical adverse behaviour assumptions. The overall liquidity buffer of the banking system remained well above comfortable minimum levels throughout the period July 2007–September 2009 (Table 3). In October 2008, as a pre-emptive measure, the BNM's ringgit liquidity facility was extended to all insurance companies and takaful operators to ensure that any surge in liquidity needs by insurance companies could be met in the event of an unanticipated increase in redemptions or surrenders of insurance policies. No insurance company or takaful operator has utilised this facility given the continued stability and confidence in the financial system. The extension of the blanket guarantee on all deposits by the government in October 2008 also provided added confidence to depositors, averting any unusual surge in deposit withdrawals.

Table 3  
Liquidity indicators

		Jun 07	Dec 07	Jun 08	Dec 08	Jun 09	Sep 09
Liquidity buffer (% of total deposits)	< one week	14.4	15.1	12.9	14.2	16.3	16.4
	< one month	18.9	21.2	18.9	16.7	17.7	16.6
Liquidity surplus (USD bn)	< one week	28.4	31.5	29.1	34.0	39.9	41.5
	< one month	37.3	44.3	42.5	40.2	43.3	41.8
Net interbank placements with the BNM (USD bn)		44.3	49.7	57.3	46.9	46.6	45.2
Loan-deposit ratio (%)		75.5	76.2	76.0	77.7	78.3	78.9

Source: Bank Negara Malaysia.

While ringgit liquidity was not a concern, the domestic financial system was affected by the global tightening in USD liquidity. The impact was, however, manageable, as holdings of USD-denominated assets by Malaysian banking institutions remained small and mostly in highly liquid USD treasury assets with exposures partly hedged through currency swaps. As at September 2009, the total (on-balance sheet) foreign currency assets of the Malaysian banking system stood at USD 24.1 billion, or 6.1% of total assets. In response to the tight USD liquidity environment, banking institutions actively trimmed down the size of their foreign currency denominated exposures in order to narrow the negative USD mismatch (Chart 4). As a result, the cumulative USD liquidity mismatch position of the banking system narrowed substantially from the peak observed in November 2008. The BNM also ensured adequate USD liquidity to facilitate trade-related transactions. The existence of bilateral and multilateral currency swap arrangements with regional countries, including a bilateral currency swap arrangement with the People's Bank of China, further supported the availability of sufficient liquidity for intra-regional trade and investment activities.



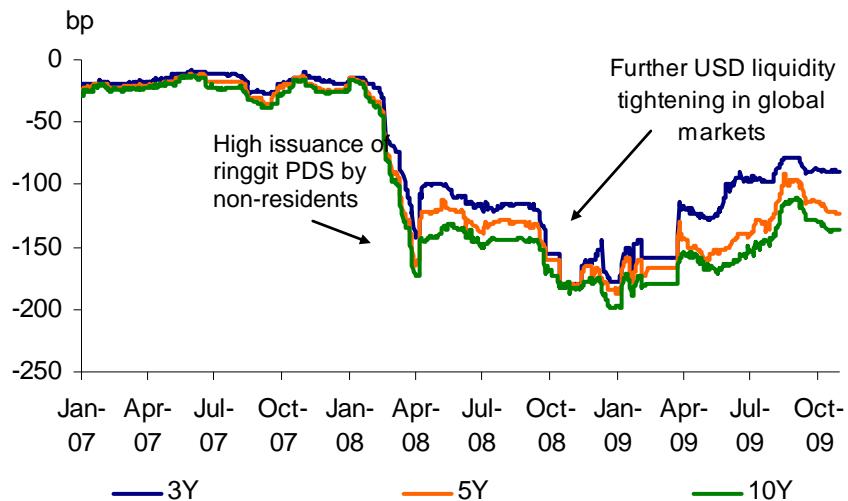
Source: Bank Negara Malaysia.

### Cross-currency interest rate swap market

Developments in the cross-currency interest rate swap (CCIRS) market reflected the global shortage of USD liquidity and increased USD borrowing costs. Higher demand for USD in early 2008 saw the significant widening of basis spreads with a greater number of

non-resident issuers turning to the domestic PDS market to take advantage of the overall lower cost of funds (Chart 5). Basis spreads normalised after April 2008 as some non-resident issuers deferred planned issuances of new PDS as rising yields and the higher cost of swapping to USD translated into higher overall issuance costs. Basis spreads widened further in September and October following the failure of several global financial institutions, which resulted in the accumulation of USD assets by global financial institutions and rapid deleveraging. This contributed to further USD liquidity tightening in international markets. In 2009, basis spreads eased but remained at elevated levels.

**Chart 5: MYR-USD cross-currency swap**



Source: Bloomberg.

### Debt securities market

In the domestic capital market, movements in yields were largely dictated by domestic considerations. Externally driven factors had a limited impact on yields.

### Government debt market

Developments in the government bond market in 2008 were influenced mainly by inflation expectations following higher commodity prices, the reduction in fuel subsidies by the government, and concerns over the growth outlook. Yields trended upwards during the first half of 2008 and peaked in the middle of the year anchored by expectations of monetary policy tightening. At the same time, the unwinding of portfolio investments by foreign investors kept yields at elevated levels. This trend reversed in September 2008 as inflation expectations eased substantially and concerns over the growth outlook domestically and globally resulted in heightened risk aversion among investors. For the rest of 2008, government bond yields continued to trend downwards, consistent with the reduction in the policy rate and "flight to quality" behaviour.

Government bond yields reversed in the early part of 2009, especially at the longer end of the curve, due to concerns over the potential oversupply of government bonds following the unveiling of two stimulus packages totalling USD 18.3 billion by the government. Nonetheless, demand for government debt issuances remained healthy, as evident in the firm bid-to-cover ratio for the papers (average H1 2009: 1.85 times, average H1 2008: 1.98 times).

## Private debt securities market

Movements in private debt securities (PDS) yields broadly mirrored that of government securities during the first half of 2008. In mid-2008, however, announcements on the proposed imposition of a windfall tax on independent power producers,<sup>4</sup> the potential reduction in toll rates and the possible cap on water concessionaires' profits, which would have affected around 25% of outstanding PDS in the domestic capital market, severely dampened investor sentiment. This caused market liquidity to decline and yields to heighten. Subsequent communications by the government which clarified the measures, as well as the withdrawal of the proposed windfall tax in early September 2009 improved investor sentiment, especially for higher-rated issuers.

Towards the end of 2008 and in early 2009, developments in the PDS market centred on concerns over the credit outlook of the corporate sector, leading to the widening of credit spreads. As risk aversion heightened, yields, especially for lower-rated PDS (A-rated and below), rose significantly (Chart 6). Despite the recent improvements in trading liquidity, credit spreads for A-rated PDS remained elevated due to concerns over the credit quality of lower-rated issuers.



\* MGS = Malaysian government securities.

Sources: Bloomberg; Bank Negara Malaysia.

## 4. Pre-emptive and comprehensive measures to bolster confidence, preserve financial stability and ensure continued access to financing

Given the high degree of interconnectedness between the Malaysian and the global financial system, Malaysia acted swiftly to implement pre-emptive and precautionary measures to preserve the stability of the financial system and ensure the continuity of credit flows. This included specific and targeted measures to preserve confidence and address the highly vulnerable segments and potential areas of stress:

<sup>4</sup> Independent power producers are privatised power producers, initiated by the government in 1995, to deliver the immediate national power security needed to maintain GDP growth.

- extending a blanket guarantee on all ringgit and foreign currency deposits with commercial, Islamic and investment banks and deposit-taking development financial institutions regulated by the BNM through the Malaysia Deposit Insurance Corporation. The guarantee is in force until December 2010 and extends to all domestic and foreign banking institutions operating in Malaysia;
- extending access to the BNM's liquidity facility to insurance companies and takaful operators regulated and supervised by the BNM;
- ensuring banks' accessibility to USD liquidity for trade financing purposes; and
- intensifying engagement with industry players, businesses and large corporate as well as trade bodies.

Efforts were mainly targeted towards ensuring that businesses and households continued to have adequate and uninterrupted access to financing.

### **Improving and broadening access to financing**

#### ***Support to small- and medium-sized enterprises (SMEs)***

Financing for the SME sector, which accounts for 99% of the total number of business establishments in Malaysia, is mainly supported by the domestic banking system. The share of SME financing currently accounts for 40% of total business financing granted by the banking system (1998: 27.1%). On average, SME financing expanded by 5.9% during the period 2007–September 2009.

The importance of the development of SMEs in supporting domestic-led growth has long been a focus of efforts to strengthen the resilience of the Malaysian economy. To this end, special funds were established to assist viable SMEs, provide continued support for enhancements in efficiency and productivity, and help them manage temporary cash flow problems (Table 4).

The facilities leverage on existing infrastructures and the distribution capabilities of financial institutions and special purpose institutions, such as the Credit Guarantee Corporation, established in 2005 to provide guarantees enabling SMEs to obtain credit facilities. The comprehensive institutional structure and facilities in place for viable SMEs to obtain access to financing on competitive terms have had a direct and significant impact on promoting financial inclusion in Malaysia as evidenced by Malaysia's highest global ranking by the World Bank for the last three consecutive years in terms of "Getting Credit".

As part of ongoing efforts to promote financial inclusion and improve the earning capacity of the low-income group, measures have also been taken to develop microfinancing and extend its reach and accessibility to wider segments of the population. These efforts have already yielded positive results. Outstanding microfinancing has grown by 38.2% annually since its inception in 2006, with continued growth in demand for microfinancing. Efforts are continuing to improve the accessibility of micro businesses to other financial services such as micro-takaful, micro-insurance, financial education and advisory services.

Table 4  
**Ensuring continued access to SME financing**

Facility	Amount (USD)	Established	Objective	Remarks
SME Assistance Facility	200m	Aug 2008	To assist viable SMEs facing financial difficulties to manage temporary cash flow problems due to rising costs	Fully utilised
SME Modernisation Facility	142m	Aug 2008	To provide financing to SMEs to modernise their operations, in particular to purchase or upgrade machinery and equipment, as well as for energy-saving equipment	Fully utilised
Micro Enterprise Fund	57m	Nov 2008	To enhance access to microfinancing for micro enterprises with viable businesses	Partly utilised
SME Assistance Guarantee Scheme	600m	Jan 2009	To assist viable SMEs adversely impacted by the economic slowdown to continue obtaining access to adequate financing	Replacement of the SME Assistance and Modernisation Facilities
Working Capital Guarantee Scheme	1.4bn	Apr 2009	To assist viable companies with shareholder equity of below RM 20 million to gain access to financing in order to maintain their operations amid the challenging economic environment	Government guarantees 80% of working capital funding from banking institutions, which were fully utilised
Industry Restructuring Loan Guarantee Scheme	1.4bn	Apr 2009	To promote investments: <ul style="list-style-type: none"> <li>• that increase productivity;</li> <li>• in high-value-added activities (such as research and development, and downstream agriculture activities);</li> <li>and to promote the greater application of green technology</li> </ul>	Government guarantees 50–80% of funding of long-term investments obtained from banking institutions, depending on the size of shareholders' equity

Source: Bank Negara Malaysia.

### Deepening capital market activity

The development of the Malaysian capital markets was one of the key strategic priorities during the 1990s and its importance was further emphasised in the aftermath of the Asian financial crisis, especially the importance of diversifying financing sources for the Malaysian economy. Led by a broad range of initiatives and policies implemented over the last decade,

Malaysian capital markets have expanded considerably since the Asian financial crisis. The ringgit bond market is now the third largest in Asia, with total bonds outstanding at 86% of GDP. The focus on Islamic finance has seen Malaysia emerge as the leading market for sukuk issuances (more than 60% of global sukuk outstanding) with a market share of 45% of total global issuances recorded for the period January–September 2009. The corporate bond market has assumed a significantly more prominent role as an alternative source of financing for the corporate sector, accounting for a quarter of total financing as at end-2008 (1997: 10%). To further enhance access to capital market financing, Malaysia established its first financial guarantee institution, Danajamin Berhad, in 2009 to provide credit enhancements to viable corporations and businesses.

### **Addressing potential borrower distress**

Arrangements and mechanisms to facilitate debt management and develop solutions also represent an important component of the supporting framework in Malaysia which ensures an orderly intermediation process. These mechanisms serve to avert premature defaults and the high cost of resolution of failed companies. In Malaysia, various institutional arrangements were established with specific objectives:

- **Credit Counselling and Debt Management Agency.** The agency was established in 2006 to provide assistance and advice in debt and money management as well as financial education to individuals.
- **Small Debt Resolution Scheme (SDRS).** The scheme was established in 2003 to facilitate loan restructuring and financing solutions for small businesses. In May 2009, the BNM expanded the scheme to include the debt resolution of distressed SMEs with multiple financial institutions. To date, more than 600 SMEs have benefited from this scheme.
- **Corporate Debt Restructuring Committee (CDRC).** The voluntary debt restructuring mechanism was first established during the Asian financial crisis to resolve corporate failures. In July 2009, the Committee was reinstated as a pre-emptive measure to facilitate corporate debt resolution. Given the structural change in the funding composition within the economy, the scope of the CDRC has been expanded to cover the restructuring not only of bank borrowings but also of debt securities. The expansion of CDRC's scope so as to cover the bond market is a reflection of the importance of the sector in financing the economy.

### **Accommodative monetary policy**

The measures to enhance access to financing were also supported by an accommodative monetary policy, which was principally aimed at reducing the cost of financing and providing support to domestic demand. Since November 2008, the OPR has been lowered by 150 bp to 2%. At the same time, the statutory reserve requirement was adjusted downwards by 3 percentage points to 1% to reduce the cost of intermediation. The monetary easing was also supported by a range of initiatives to ensure that the reductions in interest rates were passed on to the economy and continued access to credit was available to both existing and new borrowers.

## **5. Transformation of the financial system**

The Financial Sector Master Plan unveiled in March 2001 outlined the strategies to develop a resilient, diversified and efficient financial sector that not only supports but also contributes towards domestic growth. The benefits of the decade-long transformation are now being

reaped as evidenced by the relatively minimal impact of the current financial crisis and the continued resilience of the financial sector. The significant development of the Malaysian financial services sector over the last decade has spawned new financial innovations and services in support of economic activities. Apart from intermediating and supporting economic growth, the expansion of the financial sector has also played an instrumental role in generating value-added business, attracting investment and creating employment.

Malaysia has consistently adopted a careful and sequenced approach to financial liberalisation, supplemented with sufficient safeguards to ensure that the overall financial intermediation function and stability of the financial system remains intact. Supported by the progress and achievements of the implementation of the Financial Sector Master Plan, the strengthened financial sector fundamentals have positioned the financial sector to seize opportunities and embrace a more liberalised and competitive operating environment. In April 2009, the government announced a liberalisation package that included measures in both the conventional and Islamic finance sectors, which will contribute to the further development of the Malaysian financial sector and bring net benefits to the economy as a whole, while preserving financial stability.

The liberalisation measures taken by Malaysia are interesting from two aspects. First, the further opening up of the domestic market has been pursued amid the global financial crisis. Second, the policy was counterintuitive to the prevailing tendencies for countries to adopt more protectionist policies in the wake of the crisis. This was possible because of the successful reforms implemented in the financial sector in Malaysia. The liberalisation package encompasses measures that will significantly boost the financial sector's contribution to growth, including:

- the introduction of global market leaders and niche players in the domestic market through the issuance of new banking licences and takaful licences;
- higher foreign equity limits for investment banks, insurance companies and takaful operators to encourage greater participation of foreign players in domestic institutions; and
- greater operational flexibilities in the establishment of new branches by foreign institutions and in the employment of expatriates.

## 6. Conclusion

The impact of the current global crisis on the Malaysian financial sector has remained well contained. Efforts following the Asian financial crisis to develop effective regulatory, supervisory and surveillance frameworks, as well as the strengthened governance and risk management practices and the development of a robust financial infrastructure and safety nets have supported a resilient banking system that is well positioned to continue facilitating intermediation activities despite the difficult environment. These efforts have been further complemented by a more diversified financial system and a higher level of regional cooperation and collaboration in responding to crises. Underpinned by the strength of the financial system, the management of the current global crisis has focused on pre-emptive measures to ensure continued access to financing and to preserve confidence in the financial system.

At the same time, monetary policy has been directed at providing support for domestic demand to encourage economic recovery. In addition, fiscal policy measures have provided countercyclical support for growth and incentives aimed at stimulating private sector consumption and investment. These combined conditions significantly enhance the prospects for Malaysia to resume a strong and sustainable growth path once the global economic and financial conditions return to normal.

# The global financial crisis and policy response in Mexico

José Sidaoui, Manuel Ramos-Francia and Gabriel Cuadra<sup>1</sup>

## Introduction

The intensification of the global financial crisis, especially as of September 2008, had a significant negative effect on Mexico, which faced two shocks of considerable magnitude. First, the global economic recession, particularly that of the United States, led to a drop in Mexico's exports and a deterioration in its terms of trade. Second, the climate of extreme risk aversion among international investors and the global deleveraging process significantly constrained access to international financial markets.

There was a distinct possibility that at least part of those shocks could be of a permanent nature. For example, part of the fall in export demand was due to the necessary adjustment in the patterns of expenditure to sustainable levels in advanced economies. There were also concerns that the large increase in fiscal deficits and public debt levels in such economies, which was associated with the adoption of expansionary fiscal policies, an ageing population, and the implementation of financial support programmes, could reduce financing for emerging economies in the medium term.

Other emerging economies also faced similar external shocks. However, in the case of Mexico, the particular features of its economy magnified the impact of these shocks, which explains why Mexico entered into a deeper recession than other economies. Perhaps the most important of those features is its high dependence on exports to the United States, as well as their composition. Almost 80% of Mexico's total exports are destined for that market, and a considerable proportion of those exports are durable goods.

The deepening of the financial crisis following the collapse of Lehman Brothers led to a sudden currency depreciation, followed by an episode of extreme volatility in the foreign exchange (FX) market. The currency depreciation brought about considerable financial problems for a number of leading corporations that had speculated against peso depreciation with complex derivatives operations. These firms incurred significant losses, triggering a huge demand for US dollars. When market participants realised that those corporates could become insolvent, there was a widespread loss of confidence among them and, consequently, a rise in counterparty risk that disrupted the normal operation of the domestic financial markets. As a result, liquidity shrank significantly in those markets.

The country's fiscal position weakened because oil revenues fell, partly due to the drop in international energy prices brought about by the global recession as well as the decline in domestic oil production. These conditions, together with the downward rigidity in public expenditure, raised concerns about the sustainability of fiscal policy. In turn, the deteriorating outlook for external revenues generated doubts about the country's capacity to finance the growth in the current account deficit for 2009.

The economy had to adjust to a new external environment characterised by lower foreign currency revenues and limited access to external borrowing. Since the adverse external shocks were not temporary, the real exchange rate should have depreciated permanently.

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<sup>1</sup> Bank of Mexico. The opinions expressed are exclusively those of the authors and do not necessarily reflect the point of view of the Bank of Mexico.

The challenge was to stabilise the domestic financial markets and avoid a systemic risk episode and, at the same time, provide a macroeconomic policy stance consistent with real exchange rate appreciation. Thus, policymakers enjoyed a limited degree of freedom in providing economic stimulus through fiscal and monetary policies. The appropriate macroeconomic policy stance was a policy mix that led the economy through the necessary adjustment at the lowest cost possible in terms of inflation and economic activity.

A fiscal stance with lower levels of domestic absorption and demand for financing was required in order to produce an orderly depreciation of the real exchange rate. This made it difficult to implement an aggressive countercyclical fiscal policy, which would have tended to make the real exchange rate adjust in the opposite direction. As for the monetary policy stance, given the rise in the price level caused by the depreciation of the exchange rate, it was important to prevent inflation expectations from deteriorating, as this would have led to a further worsening of the inflation outcome. Thus, there was reduced scope to provide monetary stimulus.

This paper is structured as follows. The conditions prevailing in the Mexican economy at the onset of the global financial crisis are discussed in section 1. Section 2 describes the external shocks (both real and financial) that Mexico faced during the crisis and the global recession. Section 3 describes the measures implemented by the authorities to preserve the normal functioning of the domestic financial markets and the FX market, as well as to restore investors' confidence in the Mexican economy. Section 4 focuses on the macroeconomic policy stance adopted under an adverse external environment, and section 5 provides some final remarks.

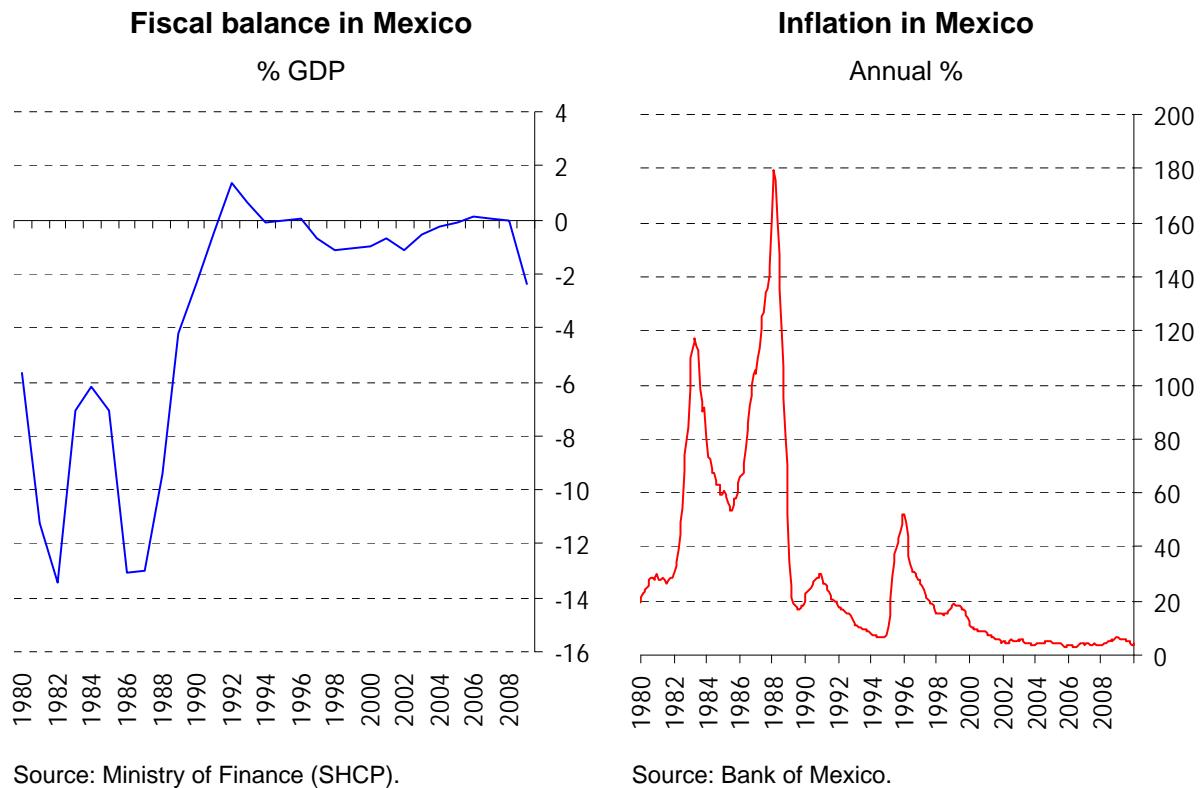
## **1. The Mexican economy at the onset of the global financial crisis**

When the international financial crisis emerged in 2007, the Mexican economy was in a relatively better position to withstand its effects than during past episodes of financial turbulence, mainly due to the following factors.

First, similarly to many other emerging economies, Mexico had reformed its macroeconomic policy framework over recent years and had therefore strengthened its fundamentals. For instance, prudent fiscal policy management had helped to eliminate the large and persistent budget deficit previously exhibited by Mexico (see Figure 1, left-hand panel), thereby contributing to a significant reduction in the public debt to GDP ratio. An active strategy of debt management had allowed for an improvement in its structure. As a result, when the financial crisis emerged in 2007, total public debt measured by the historical public sector borrowing requirements accounted for 28.1% of GDP, with total external public debt standing at 7.4%.

Since the early 1990s, several emerging market economies, including Mexico, have adopted flexible exchange rate regimes and introduced an inflation targeting regime as a framework to conduct monetary policy. This framework, supported by a balanced budget and a more than manageable public debt to GDP ratio, has helped to reduce both inflation and its volatility in Mexico, as well as to anchor inflation expectations (see Figure 1, right-hand panel). An inflation targeting regime allows monetary authorities to have some flexibility in the use of monetary policy as a tool to cope with shocks to the domestic economy.

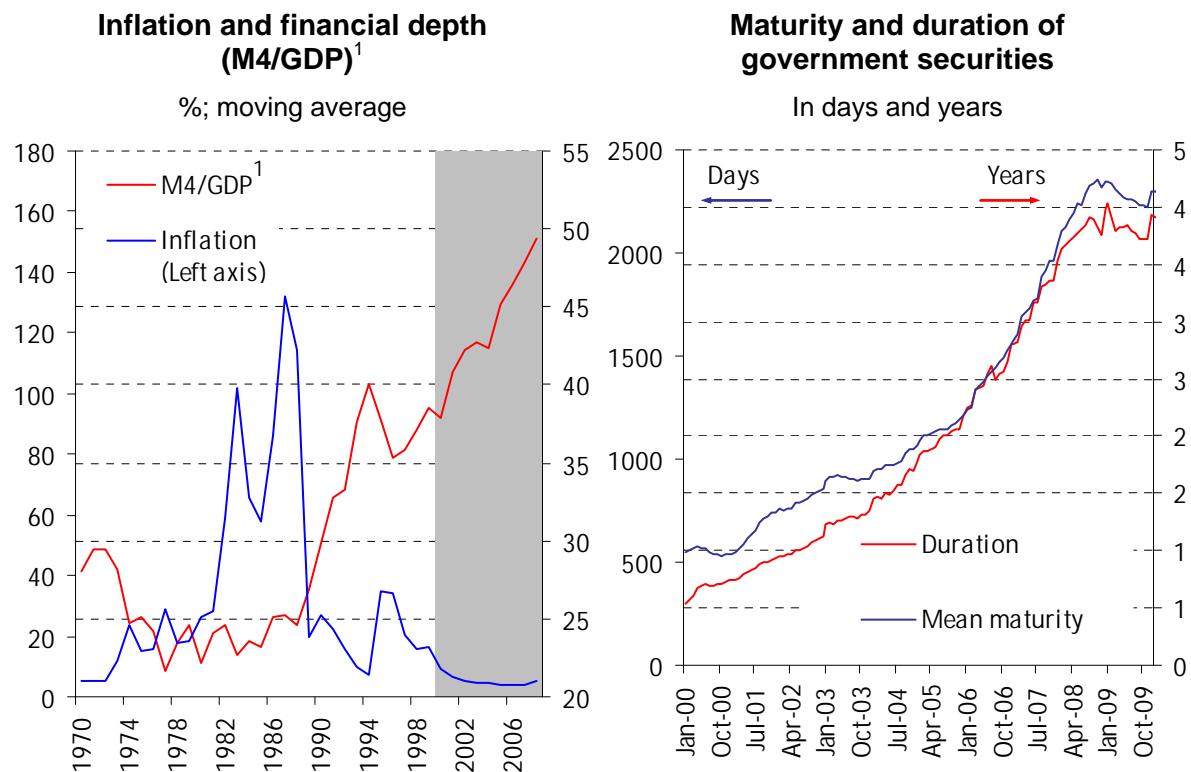
Figure 1



Second, a more stable macroeconomic environment contributed to the development of the domestic financial markets in Mexico (see Figure 2, left-hand panel). In particular, the greater certainty associated with low and stable inflation extended the planning horizons of economic agents, and made it easier for financial institutions to assess potential debtors' repayment capabilities by reducing the information problems present in financial transactions. As a result, the development of several markets, such as those for medium- and long-term financial instruments and derivatives markets, was possible. These factors made financial resources more easily available to the economy at better terms and with better conditions. Economic agents were therefore able to extend their debt maturities (see Figure 2, right-hand panel).

Deeper and more developed financial markets have allowed agents to pool and distribute risks more efficiently and have facilitated the allocation of savings to their most productive uses, thereby making the economy less vulnerable to adverse shocks. One example of the benefits of financial development has been the issuance of fixed interest 30-year peso-denominated bonds by the government. Moreover, in sharp contrast to the early 1990s, when mortgages were granted at floating interest rates and often in foreign currency, today, the development of the derivatives markets has allowed financial institutions to grant fixed interest 20- to 30-year peso-denominated mortgages. Another example is that, following the emergence of the financial crisis in 2007, when Mexican corporations found it difficult to obtain external financing, they were able to offset this restriction by issuing debt in the domestic markets. The domestic financial markets have therefore allowed companies residing in Mexico to substitute, at least partially, external borrowing for domestic borrowing.

Figure 2



<sup>1</sup> Moving averages are calculated at five-year intervals, centred in the reference year.

Source: IMF.

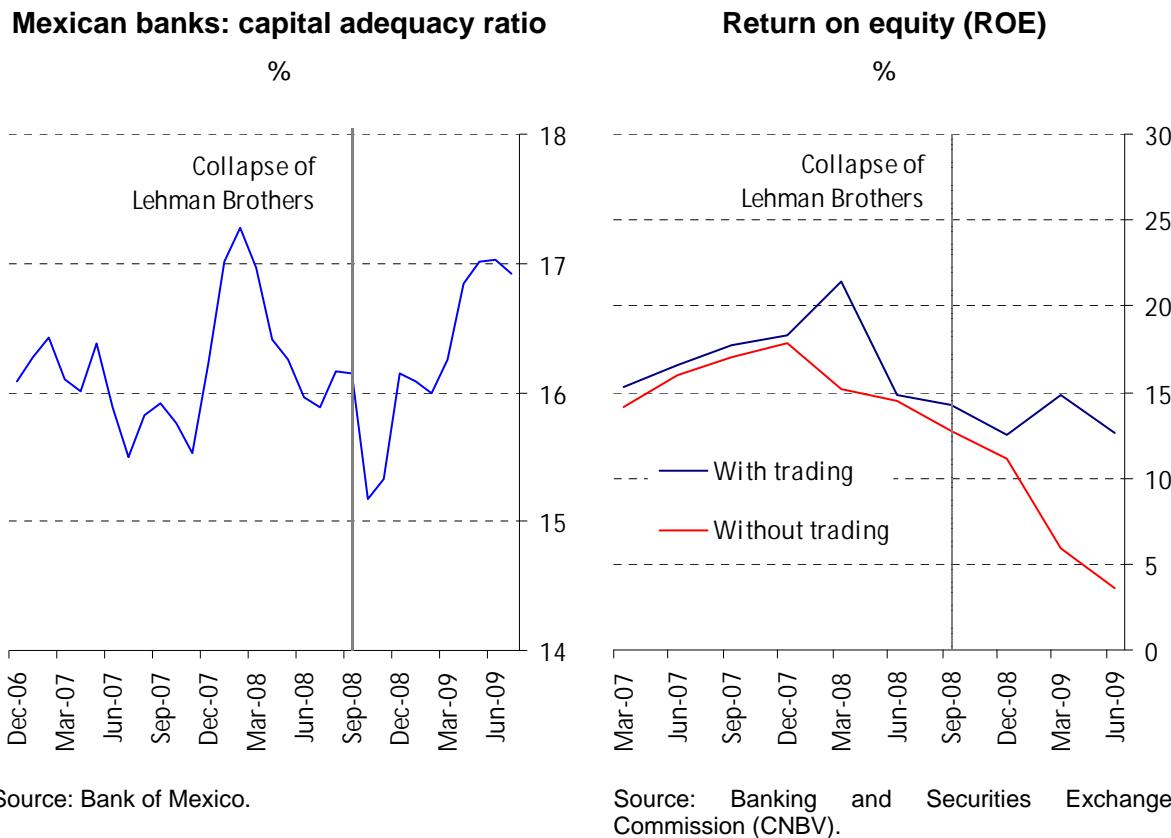
Third, local banks were in a solid position and, for all practical purposes, did not have exposure to “toxic assets”. Furthermore, although most banks in Mexico are subsidiaries of foreign financial institutions, the legislation sets rigorous credit limits to related parties, which restricts the possibility of domestic banks being asked to provide liquidity support to their parent banks.<sup>2</sup>

Several factors have contributed to the resilience of the banking sector:

- i. The banking system had adequate levels of capital when the episode of financial stress evolved into a full-blown crisis in 2008. Furthermore, banks have maintained high levels of capital adequacy despite the adverse conditions (see Figure 3, left-hand panel).
- ii. Leverage ratios were lower than those observed in advanced economies. In Mexico, total assets were between 10 to 11 times equity.
- iii. Banks continued to generate profits during the crisis, despite the adverse economic conditions. However, their profitability declined in 2008 compared with the high levels of 2007 (see Figure 3, right-hand panel).

<sup>2</sup> The Credit Institutions Law (Ley de Instituciones de Crédito) states that banks' operations with related parties must not exceed 50% of their Tier 1 capital.

Figure 3



These factors led to the perception that Mexico would not be significantly affected by the global crisis. Up until mid-September 2008, the financial conditions and economic activity in the country had not been severely affected by the episode of financial stress and economic slowdown prevalent in some major economies, especially in the United States.<sup>3</sup>

## 2. Intensification of the crisis and its impact on Mexico

A second, much more dangerous, phase of the international financial crisis began in September 2008. The deepening of the international financial crisis significantly deteriorated the perspectives of the global economy due to the collapse of the interbank funding market and the adverse feedback loop between financial conditions and economic activity. The Mexican economy was not immune to the climate of high risk aversion and to the worsening of economic prospects for the world's major economies. It faced two adverse shocks of considerable magnitude: a collapse in export demand and substantial constraints in accessing international financial markets.

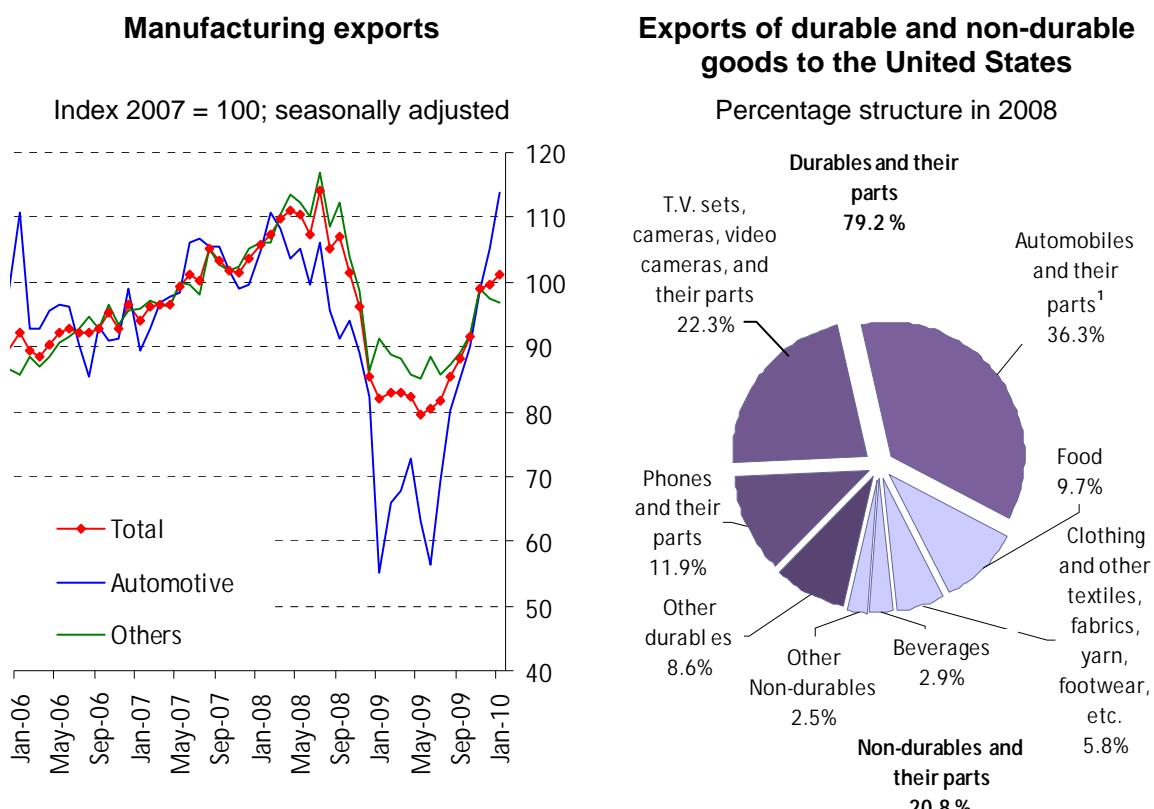
<sup>3</sup> Similarly, other emerging economies were also able to cope, albeit temporarily, with the financial turbulence in the international markets. The relatively good economic performance in Asia and Latin America up until September 2008 led several analysts to embrace the decoupling hypothesis, which argued that the business cycles of emerging markets had become detached from advanced economies. However, this hypothesis underestimated the possible channels of contagion. Financial and trade integration has increased significantly, leading to more interconnected economies around the world, which implies that adverse developments in advanced economies can be quickly transmitted to developing economies through several channels, some of which are not completely understood or have not been fully analysed.

## 2.1. Real shock

The deep recession in the global economy, predominantly in the United States, led to a drop in Mexico's export demand. Non-oil exports fell by 28% from May 2008 to May 2009.

Mexico's high economic dependence on the United States made the external demand shock particularly severe. In particular, the economic integration between the two economies has expanded since the North American Free Trade Agreement (NAFTA) came into force in 1994. Cross-border production-sharing intensified as labour-intensive segments of production processes were reallocated to Mexico, which explains the increasing importance of intermediate goods within the trade structure and the high correlation between exports and imports. Mexico has specialised in assembling and exporting manufactured products such as automobiles and other durable goods. Exports of these goods account for nearly 80% of total manufacturing exports to the United States (see Figure 4). Trade links constitute an important channel of transmission between the two economies.<sup>4</sup>

Figure 4



Source: Bank of Mexico.

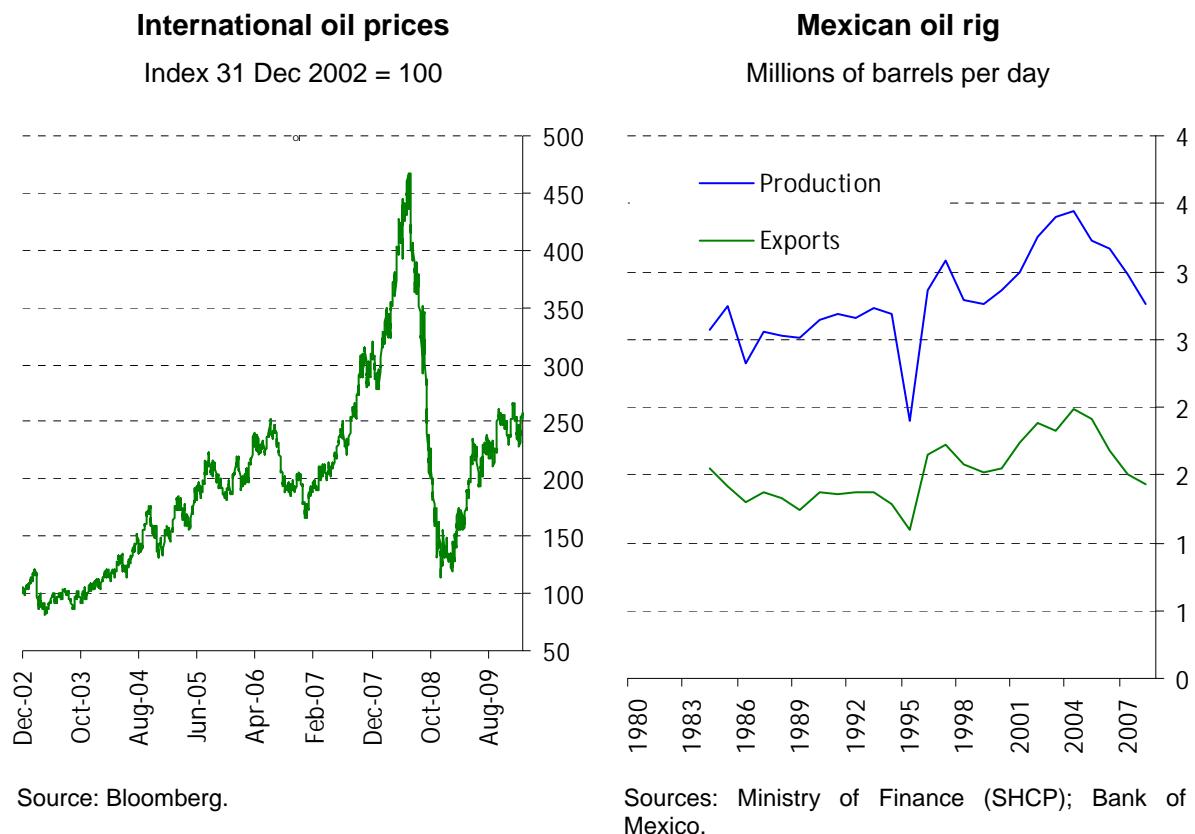
<sup>1</sup> Includes parts for trucks, tractors, buses and special-use automobiles.

Source: Estimated by the Bank of Mexico using data from the US Department of Commerce.

<sup>4</sup> Prior to the emergence of the current global crisis, the relative price of manufacturing goods had already experienced a decline. Since China joined the World Trade Organization in 2001, the growing supply of its exports has exerted downward pressure on the prices of durable consumer goods. If the effects of China's growing exports on these prices are permanent, the impact on Mexico's external revenues *ceteris paribus*, could indeed be significant.

The global recession also led to a drop in international energy prices, which has had an unfavourable effect on Mexico's foreign currency revenues. Although these prices recovered in 2009, they are still considerably below the levels observed in mid-2008, when oil prices reached maximum levels in July (see Figure 5, left-hand panel). There were concerns that the fall in oil revenues would be aggravated by a contraction in domestic oil production associated with the observed decline in proven reserves in the last few years.<sup>5</sup> The lower public sector revenues associated with the drop in oil revenues also represented a negative shock for public finances.

Figure 5



On the other hand, due to the recessive labour market conditions in the United States, immigrant workers faced greater difficulties in finding and keeping jobs, which negatively affected the flow of remittances to Mexico. Many Mexican immigrants work in the construction sector, which explains the close relationship between the flow of remittances and the performance in that sector.

To put the impact of a decline in remittances on the Mexican economy into perspective, it is important to note that they represented 3.9% of private consumption in 2007. Even though this figure does not seem high, the consumption of low-income families in the regions of Mexico with high migration rates depends heavily on the flow of remittances from the United States.

<sup>5</sup> It has been argued that, in the absence of a comprehensive energy reform, Mexico could become a net importer of oil in the not too distant future (see Figure 5, right-hand panel).

## 2.2. Financial shock

The sudden increase in risk aversion among institutional investors following the events of September 2008, along with the deleveraging process in advanced economies, led to a reversal in capital flows to emerging economies. The result was a massive liquidation of domestic assets such as government and corporate bonds in emerging economies. This led to currency depreciation, extreme volatility in the FX markets, a drop in liquidity in the domestic debt markets, and to even more stringent conditions in the international financial markets for domestic economic agents.

Although almost all emerging economies were negatively affected by the climate of high risk aversion, in Mexico the impact of the shock was magnified by the exposure of corporates to foreign currency through complex derivatives instruments. Most of those large corporations, which were listed on the stock exchange and were major participants in the domestic debt markets, had engaged in complex derivatives transactions speculating against a large and abrupt peso depreciation, which consequently brought a high degree of risk to their balance sheets.

The derivatives instruments generated profits for those companies as long as the exchange rate remained within a certain range. However, as soon as the peso began to fluctuate outside that range, significant losses would be incurred. A sharp depreciation of the US dollar – which was wrongly perceived by the involved firms as a very unlikely event – would lead to massive losses and to an enormous demand for US dollars. Therefore, when the environment of high risk aversion led to a significant depreciation of the peso, the exchange rate adjustment was exacerbated by an additional demand for US dollars that these derivatives had imbedded (details of such operations are presented in the Appendix).<sup>6</sup> These events triggered a depreciation of the peso of 22.8% from 15 September to 16 October and an increase in the implied volatility of FX (USD/MXN) options (see Figure 6). It should be noted that, prior to this episode of turbulence, the Mexican peso had enjoyed a prolonged period of low volatility.

The disclosure of losses generated an episode of high uncertainty in the domestic financial markets, since investors did not know to what extent these problems had become widespread among the corporate sector. The worsening in the credit rating of a number of these firms contributed to a further deterioration in the already negative scenario. The fact that important companies faced severe financial problems led to a significant increase in counterparty risk and a widespread loss of confidence among market participants.

As for the private debt markets, there was a sharp contraction in the demand for securities issued by private firms due to the sudden increase in counterparty risk and the consequent perception that some debtors would no longer be able to meet their financial obligations. Since corporations, small banks and non-bank financial institutions were unable to issue commercial paper, the cost of financing for these companies and financial institutions in the short-term debt market rose significantly.

Particularly affected were several non-bank financial institutions (Sofoles) that specialise in granting mortgages and that finance their operations through the issuance of short-term debt. Since a considerable proportion of mortgages in Mexico are granted by Sofoles, the financial problems of these institutions had a negative effect on the mortgage market.

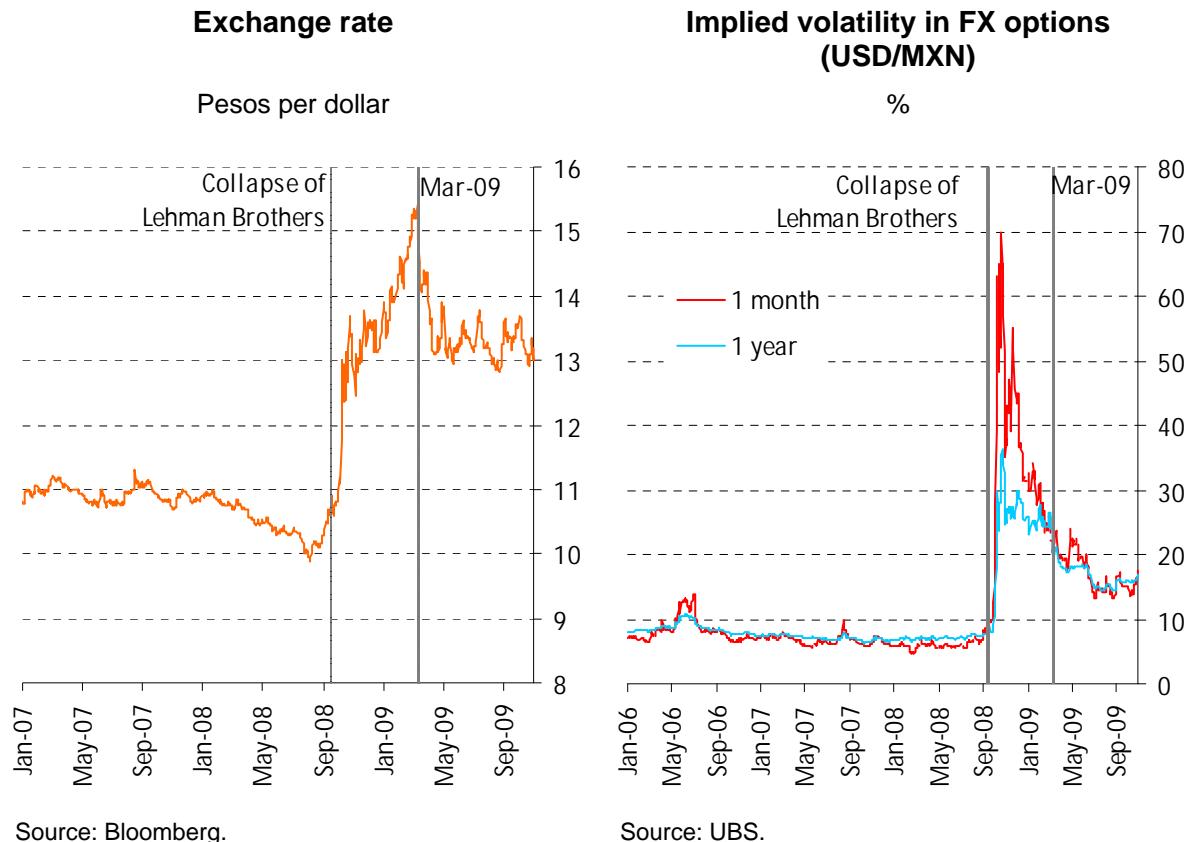
The decline in demand for commercial paper and the fall in liquidity in the secondary market had an adverse impact on mutual funds that invest in such instruments. The value of the

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<sup>6</sup> Under such a scenario, the increase in the demand for US dollars takes place even if corporations can no longer meet their obligations, given that their counterparties have to demand US dollars in order to meet their own foreign currency positions.

portfolios managed by these institutions suffered substantial losses associated with the decline in the price of their assets. Since mutual funds started facing an increase in the number of redemptions, their need for liquidity increased significantly. However, they also encountered increasing difficulties in selling their assets and obtaining such liquidity. As a result, had there been no policy intervention, asset fire sales could have occurred. In order to illustrate the scope of the problem, it should be noted that, up until September 2008, around one fifth of total voluntary financial savings was allocated to mutual funds.

Figure 6



The market for long-term bonds was also negatively affected. Among other factors, the reversal in capital flows was associated with a liquidation of these types of assets. Investors significantly reduced their demand for government securities such as fixed-rate peso-denominated bonds (Bonos M) and inflation-indexed bonds (Udibonos). The increase in interest rates and their volatility due to the climate of uncertainty had a negative impact on the value of these bonds since, clearly, long-term instruments are very sensitive to fluctuations in interest rates. Under these circumstances, there was a considerable increase in risk premia on these assets and a drop in liquidity in the secondary market. This had an unfavourable impact on the portfolio value of institutions such as pension funds (Afores) that invest heavily in these types of assets. As these funds began to report losses, both workers and Congress expressed growing concerns about the situation.

Even the deposit insurance agency (Instituto para la Protección del Ahorro Bancario (IPAB)), was negatively affected by the loss of confidence among market participants, which led to a decrease in the demand for savings protection bonds (BPAs), which are considered quasi-government paper.

The climate of high uncertainty and the adverse developments in the debt markets also threatened the normal operations of the interbank market. First, as the adverse confidence

shock led to a decline in the price of several securities, which, for practical purposes, also became highly illiquid, a number of them were no longer accepted as collateral. Second, the rise in counterparty risk also had a direct impact on this market. In particular, it posed a severe potential problem for the majority of new small commercial banks and some medium-sized banks, since they depend heavily on funding from the interbank market to finance their activities.

### **3. Policy actions to restore the orderly functioning of the financial markets**

Several measures were put in place in order to re-establish the functioning of these markets and restore investors' confidence.

#### **3.1. Foreign exchange market and policy response**

In light of the significant drop in liquidity in the FX market during the fourth quarter of 2008, the Foreign Exchange Commission, composed of officials from the Ministry of Finance and the Bank of Mexico, decided that the central bank should intervene in this market.

In October 2008, the Bank of Mexico began to allocate US dollars to the market through two types of auctions. First, through extraordinary auctions, a mechanism by means of which US currency was sold directly to the market. The purpose of these auctions was to provide liquidity to the market in a timely way in order to meet the demand for US dollars that emerged during the last quarter of 2008. Extraordinary auctions took place in October and the total amount sold through them was USD 11 billion.

Second, in order to reduce exchange rate volatility, on 9 October, the Bank of Mexico started to carry out three daily auctions for a cumulative amount of USD 400 million, with a minimum price of 2% above the previous working day's exchange rate.<sup>7,8</sup> Allocations through this mechanism amounted to USD 4.18 billion by the end of 2008. The total amount sold through both types of auctions during the last quarter of 2008 was USD 15.18 billion.

On 22 October 2008, the Bank of Mexico also started to remunerate US dollar deposits that domestic financial institutions could maintain at the central bank. It paid the US overnight interest rate minus 1/8. The purpose of this measure was to make US dollar deposits relatively more attractive and reduce the incentives to liquidate positions in Mexico and send the funds abroad.

In order to supplement foreign reserves, a foreign currency swap line with the US Federal Reserve for up to USD 30 billion was agreed on 29 October 2008.<sup>9</sup> The Federal Reserve established similar mechanisms with other countries. The purpose of this measure was to improve liquidity conditions in the international financial markets and mitigate the difficulties in obtaining US dollar funding in countries with sound economic fundamentals.

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<sup>7</sup> This mechanism was previously used from February 1997 to June 2001.

<sup>8</sup> The cumulative amount was reduced to USD 300 million on 9 March 2009, and the amount was readjusted to USD 250 million on 29 May 2009. These auctions were suspended on 12 April 2010.

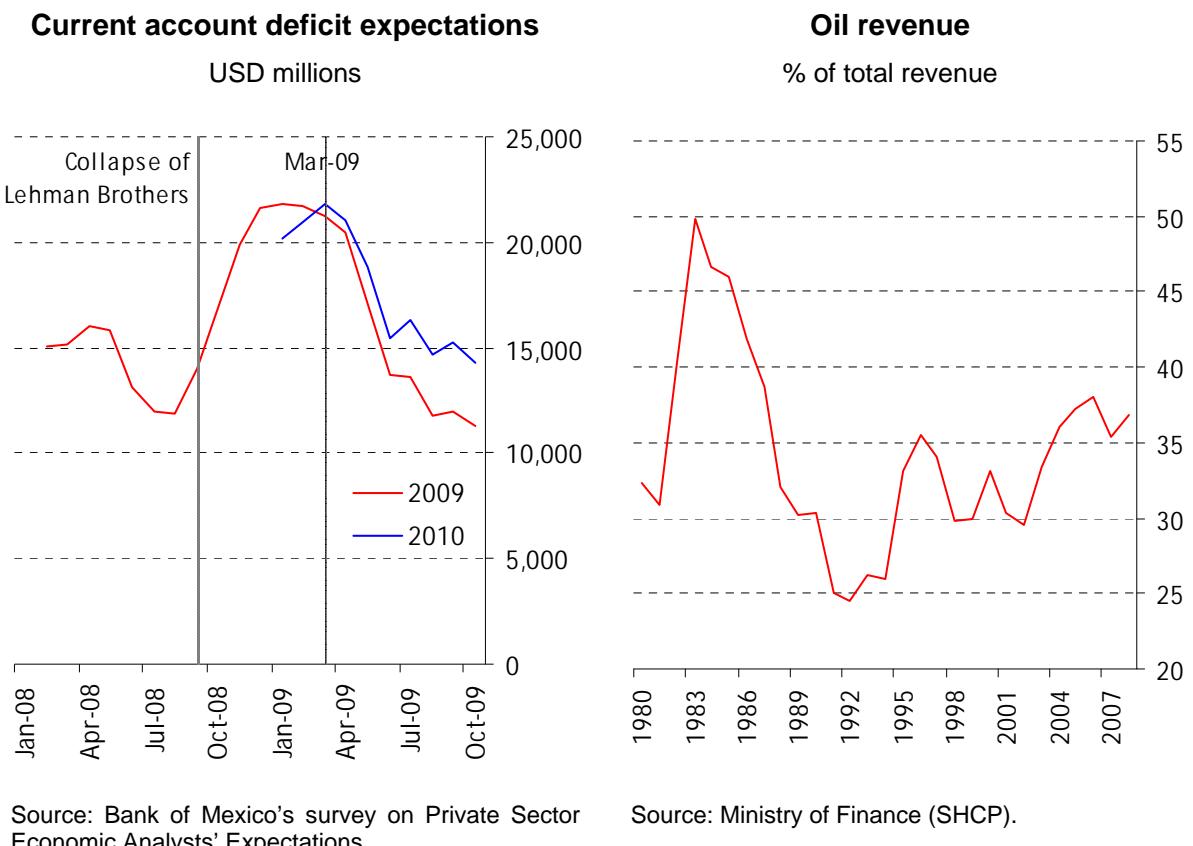
<sup>9</sup> This agreement was initially authorised until 30 April 2009. However, on 3 February 2009, the term was extended to 30 October 2009, and on 25 June 2009 it was further extended to 1 February 2010. The Bank of Mexico decided to activate the swap line in April 2009.

These measures contributed to a stabilisation of the FX market during the last months of 2008. However, in early 2009, the risk perception of the Mexican economy deteriorated, leading once again to market disruption. Given the illiquidity in the FX market, the Foreign Exchange Commission decided to restore the extraordinary auctions. These operations were carried out throughout February 2009 and the amount sold was USD 1.83 billion.

The total amount that the Bank of Mexico allocated to the FX market from October 2008 to February 2009, both through extraordinary auctions and through the programme of daily dollar sales (with a minimum price), was USD 28.01 billion.

By the end of the first quarter of 2009, the decline in international oil prices, and the expectation that those prices would not rise significantly in the medium term, together with the fall in domestic oil production led to a drop in government revenues (see Figure 7, right-hand panel), which raised concerns about the sustainability of Mexico's fiscal accounts. The deep contraction in economic activity in the first half of 2009 contributed to these problems, as it led to plummeting tax revenues. In addition, the deepening of the US recession also increased worries concerning both reduced foreign currency revenues for Mexico, which generated some doubts about the country's ability to finance even the moderate increase in the current account deficit expected for 2009 (see Figure 7, left-hand panel), and the possible impact on the central bank's foreign reserves, specifically after their partial depletion due to the adverse developments in late 2008 and the first two months of 2009.

Figure 7



In order to restore investors' confidence, on 5 March 2009 the Foreign Exchange Commission released a detailed analysis of the balance of payments outlook for 2009. The analysis included two important elements affecting the capital account:

First, the Ministry of Finance had adopted an oil price hedge programme for 2009. In particular, it had acquired put options on the price of the Mexican crude export mix, thereby

guaranteeing a price of USD 70 per barrel. At that time, given the fall in the price of oil, the government expected to receive close to USD 10 billion as a result of the programme.

Second, the federal government decided to increase its borrowing from international financial institutions (IFIs) such as the World Bank and the Inter-American Development Bank. In particular, the public sector was expected to borrow almost USD 13.8 billion from those institutions in 2009.

The analysis indicated that Mexico would not encounter any problems in financing the current account deficit, since the marginal increase in the deficit expected for 2009 would be more than sufficiently financed with funds from both the oil price hedge and IFIs' long-term financing. Furthermore, given the government's expected foreign currency revenues for 2009, the level of foreign reserves in that year was not expected to decline with respect to the level registered at the end of 2008.

The increase in the public sector's external revenues implied that the government would run a surplus in its foreign currency transactions. In turn, the private sector would have a deficit, mainly due to its reduced access to foreign financing. In order to use the public sector's foreign currency revenues to offset the private sector's deficit, the Foreign Exchange Commission established a mechanism to guarantee that a significant part of the forecasted accumulation of foreign reserves for 2009 would be allocated to the FX market. It began to sell USD 100 million daily through auctions without a minimum price.<sup>10</sup>

Two additional measures were adopted to ensure that, even in the event of a further deterioration in the global markets, there would be no major problems in financing the external accounts.

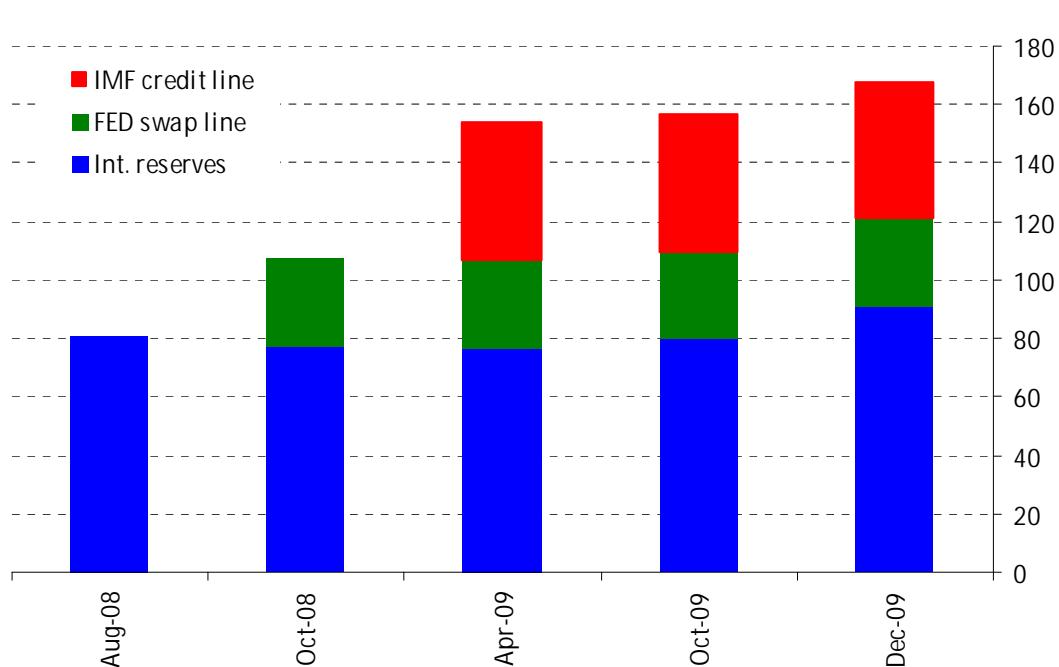
- i. On 3 April 2009, the Bank of Mexico announced its decision to draw on the foreign currency swap line with the Federal Reserve. On 21 April 2009, the Bank of Mexico carried out a US dollar auction for commercial and development banks, using dollars drawn from the swap line. In turn, these banks would provide dollars to corporations that required them in order to meet their foreign currency obligations. In total, USD 4 billion was auctioned, but only USD 3.22 billion was allocated.
- ii. On 17 April 2009, the IMF approved Mexico's access to its Flexible Credit Line facility (FCL) for an amount of 31.5 billion Special Drawing Rights (around USD 47 billion). The arrangement was for one year, with the possibility of renewal. Until now, the FCL has not been used by the Mexican authorities, although Mexico's access was renewed on 25 March 2010.

The aforementioned elements helped to normalise conditions in the FX market. Particularly relevant factors were, on the one hand, the publication of the projected balance of payments figures for 2009 by the Foreign Exchange Commission, which reassured markets that Mexico would have no trouble in meeting its obligations, and, on the other hand, the amount of the central bank's international reserves, which, together with the resources from both the Federal Reserve's swap line and the IMF's FCL (see Figure 8) were essential in restoring investors' confidence.

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<sup>10</sup> The amount for the auctions without a minimum price was later reduced to USD 50 million on 29 May 2009. Finally, the Foreign Exchange Commission announced on 1 September 2009 that these auctions would be carried out until 30 September 2009 and suspended on 1 October 2009.

Figure 8  
**IMF credit line, Federal Reserve swap line and international reserves**



Sources: Bank of Mexico; IMF.

### 3.2. Domestic financial markets and policy response

First of all, as a preventive measure to maintain the normal functioning of the interbank market and to address the potential funding problems that a number of small- and medium-sized commercial banks might face, in October 2008 the Bank of Mexico decided to establish a new liquidity facility, in addition to the one already operating. The new facility expanded the range of eligible assets to be used as collateral, thereby supporting the commercial banks that did not have the eligible collateral securities to obtain funding from the Bank of Mexico using the existing facility, and also lowered the applicable interest rate. Table 1 shows the financing conditions through the traditional and new liquidity facilities.

The government and the Bank of Mexico implemented several measures to restore the orderly operation of a number of domestic financial markets. As for the commercial paper market, on 29 October development banks specialising in promoting industry and foreign trade (Nafin and Bancomext) introduced a support programme to refinance securities issued by private corporations and non-banks, for up to MXN 50 billion in guarantees, in order to ensure that those sectors could continue having access to financing.<sup>11</sup> The guarantees insured up to 50% of the amount issued. These measures supported the rollover of commercial paper issued by several companies and had a positive effect on the risk premia of these instruments (see Figure 9, right-hand panel). It should be noted that firms had to pay a fee in order to have access to the guarantees, which helped to align their incentives.

<sup>11</sup> These guarantees were provided by two development banks (Nafin and Bancomext), which specialise in promoting industry and foreign trade.

Table 1

	Traditional liquidity facility	New liquidity facility
Maturity	One business day	One business day, renewable
Interest Rate	2 times the current overnight interbank interest rate	1.2 times the current overnight interbank interest rate
Collateral	Federal government bonds, BPAs, BREMs and deposits at Bank of Mexico	Federal government bonds, BPAs, BREMs, deposits at Bank of Mexico, and private and public AA-rated securities*
Valuation	According to prices and discounts determined by Bank of Mexico	According to prices and discounts determined by Bank of Mexico

\*Domestic currency denominated bonds with at least a AA-rating and issued by public firms, municipal and state governments, non-financial firms residing in Mexico, financial firms, and trusts which securitise mortgage portfolios

Source: Bank of Mexico.

To re-establish the normal operation of long-term government debt markets and to decrease the sensitivity of investors' portfolios to interest rate fluctuations, the authorities adopted a number of measures that contributed to a reduction in the risk premia on long-term government bonds (see Figure 9, left-hand panel), mainly by allowing investors to shorten the duration of their portfolios.

First, the federal government and the deposit insurance agency (IPAB) made changes in the auction schedule of their securities for the last quarter of 2008. The federal government reduced the issuance of fixed-rate long-term securities, and increased that of short-term bills (Cetes) in such a way that the total net domestic financing remained unchanged. In turn, IPAB reduced the issuance of its paper, thereby offsetting the reduction with higher financing from the banking sector. In general, these measures helped to reduce the adverse impact of a lower demand for long-term securities on the price of these assets and, at the same time, to meet the higher demand for short-term government securities.

Second, starting on 14 November, the Bank of Mexico implemented an interest rate swap auction programme for domestic financial institutions. Under the programme, the central bank would pay a floating rate (the 28-day interbank equilibrium rate (TIE)) and financial institutions would pay a fixed rate. There were two types of auctions: unique rate and multiple rate auctions. Under both types of auctions, financial institutions would bid the fixed rate and the nominal amount, and the Bank of Mexico would set the minimum fixed rate it was willing to pay and the maximum bound for the total nominal amount it was willing to accept. Financial institutions' bids were placed in descending order according to the fixed rate, and then allocated by the central bank in that order, without exceeding the maximum value for the total nominal amount specified by the Bank of Mexico. Under the unique rate auction, all financial institutions that entered the swap contract with the central bank would pay the same fixed rate, which corresponded to that of the last bid allocated. Under the multiple rate auction, each financial institution would pay the fixed rate it offered in the auction. By entering the swap programme, financial institutions were able to cap their payments and reduce the sensitivity of their portfolios to further movements in interest rates. The programme was for a total amount of up to MXN 50 billion for domestic financial institutions; however, the total amount allocated through this programme was MXN 4.40 billion.

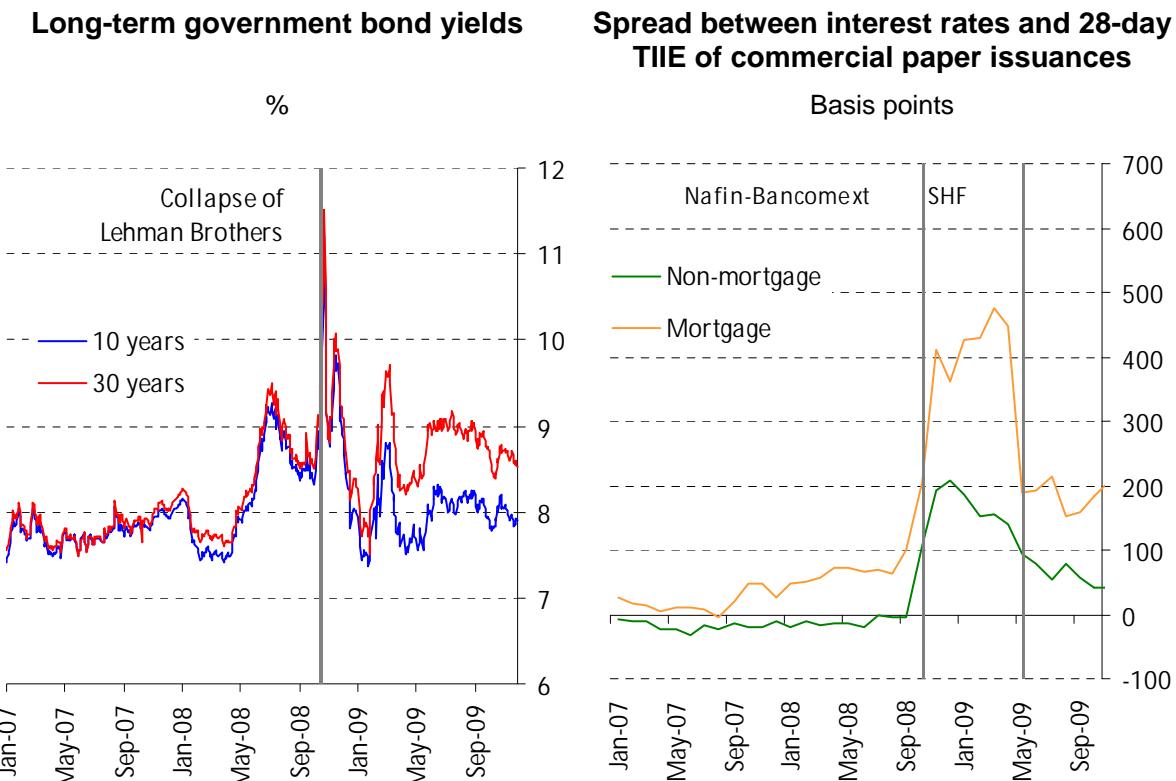
The government also put in place a programme to repurchase long-term government bonds in the secondary market for up to MXN 40 billion. This programme included both Bonos M

and Udibonos. The auctions were carried out in December 2008 by the Bank of Mexico. The auctions to repurchase Bonos M were for a total amount of up to MXN 33 billion, although only MXN 4.34 billion was allocated. As for the repurchase of Udibonos, the auctions were for up to MXN 6.95 billion, although only MXN 2.95 billion was allocated. In turn, the Bank of Mexico implemented a programme to repurchase securities issued by IPAB for an amount of up to MXN 150 billion. The total amount of securities purchased through this programme was MXN 146.7 billion.

In order for mutual funds to cope with the problem of having several of their clients withdrawing their resources from them, some regulatory forbearance was allowed. The Banking and Securities Commission (Comisión Nacional Bancaria y de Valores (CNBV)) issued a new rule that allowed financial institutions to carry out purchases and sales of government securities with mutual funds of the same financial group for a six-month period starting on 30 October 2008. This measure gave mutual funds more flexibility to restructure their portfolios, helping them to obtain liquidity and meet their clients' withdrawals.

In April 2009, the funding problems faced by the non-bank mortgage companies (Sofoles), further deteriorated due to defaults on securities issued by two Sofoles. In response, in May 2009 the Federal Mortgage Corporation (Sociedad Hipotecaria Federal (SHF)) began to guarantee 65% of the debt issued by Sofoles maturing between 2009 and 2012. This measure, which also required a fee to be paid by the Sofoles, contributed to the reduction of the funding costs for these institutions (see Figure 9, right-hand panel). To the extent that investors' confidence improved, companies were once again able to issue short-term debt without guarantees. These support programmes therefore helped to gradually restore the orderly functioning of the commercial paper market.

Figure 9



## 4. Macroeconomic policy stance

The negative shocks faced by Mexico and the subsequent deterioration of investors' confidence significantly constrained the policy options available to the authorities. First of all, in order to establish the correct policy stance, policymakers have to determine whether the shocks are permanent or transitory. On the one hand, part of the high global economic growth registered in the period prior to the financial crisis could have been associated with an untenable expansion of aggregate demand in a number of advanced economies such as the United States; therefore, economic activity in those economies would probably not return to the levels associated with that period of excessive credit expansion and "bubbles" in asset prices. Thus, the adverse external shock may not be a purely cyclical phenomenon and could last for quite some time.

On the other hand, the reduced access to external financing could very well not be a transitory shock either. For instance, the expansionary fiscal policies adopted in a number of developed economies as a result of the crisis have significantly deteriorated their fiscal outlook and could lead to a sharp increase in those governments' financial requirements over the medium term. The ratios of government debt to GDP are expected to continue growing in the next few years, even if the majority of advanced economies undergo an effort to consolidate their public finances. To the extent that the financing needs of advanced economies' governments further increase, the amount of financial resources available to Mexico and other emerging economies in the medium term will correspondingly be reduced.

Under this scenario, domestic absorption had to adjust to the adverse global environment characterised by a reduced amount of financial resources available to emerging economies and a decline in the country's external revenues, ie the real exchange rate had to depreciate. The macroeconomic policy stance thus required a policy mix that would lead the economy through the necessary adjustment in an orderly way. Consequently, the Mexican authorities had a narrow margin of manoeuvre to provide economic stimulus through fiscal and monetary policies.

### 4.1. Fiscal policy

In the years prior to the financial crisis, the Mexican Government had followed a balanced budget rule in line with the Federal Budget and Fiscal Responsibility Law (Ley Federal de Presupuesto y Responsabilidad Hacendaria (LFPyRH)). Thus, when the global crisis escalated in September 2008, the budget was balanced. However, there were a number of sources of vulnerability for the fiscal accounts. First, a high dependence of government revenues on oil income, given that between 30 and 40% of public sector revenue comes from crude oil exports. Second, the deterioration in the outlook for economic activity was expected to reduce tax revenues. Third, the rigid structure of public expenditures leaves little room to adjust them. In particular, Mexico had enjoyed a windfall of oil revenues for several years, and a significant part of those extraordinary revenues was used to increase public spending, for example in social programmes, which are extremely difficult to adjust.

As the crisis began to hit the poorest segments of society, the federal government made efforts to adopt measures to try to attenuate the adverse impact of the crisis on economic activity, particularly on low-income families. Those measures included increasing public expenditures on infrastructure, freezing household energy prices, decreasing industrial electricity tariffs, and implementing programmes to support employment. In order to implement such measures, the budget for 2009, set out in light of the LFPyRH, was modified, allowing it to shift from a balanced budget to a moderate deficit.

However, by mid-2009, the economic recession had turned out to be deeper than anticipated and oil prices were also lower than had been expected. Under those conditions, there was a substantial decline in public sector revenues. This situation, along with the aforementioned

downward rigidity of public expenditures, weakened the country's fiscal position, which limited Mexico's access to international credit markets to an even greater extent.

It thus became urgent to adopt measures to close the increasing gap in the fiscal accounts. At first, the federal government used non-recurrent revenue sources such as savings previously made in the oil revenue stabilisation funds and exercising the oil price hedging options. However, the government also expressed the need to implement fiscal reform in order to structurally strengthen public finances. The Mexican Congress approved fiscal tightening measures for 2010, including some public expenditure cuts and higher taxes. Among other things, these included a permanent increase in the general VAT rate, permanent and temporary increases in excise taxes, temporary increases in income taxes, and limits on tax deferral mechanisms for corporate groups. The fiscal effort amounted to approximately 2% of GDP.

This fiscal consolidation package was implemented under an extremely adverse environment, characterised by a sharp contraction in economic activity. However, it improved the country's fiscal position and was crucial in restoring investors' confidence. It is worth mentioning that the recent concerns about the sustainability of the fiscal accounts in a number of euro area economies highlight both the risk of weak fiscal positions, and the urgent need to implement corrective measures, even under extremely difficult conditions.

Fiscal consolidation also contributed to an orderly adjustment of the real exchange rate. In particular, since government spending is concentrated in non-tradable goods, the measures adopted exerted downward pressure on these prices, thus making the economy's adjustment less complicated. In sum, a fiscal policy implying lower levels of absorption and demand for financing was required, leading in turn to an orderly depreciation of the real exchange rate.

#### **4.2. Monetary policy stance**

The challenge for the central bank was to help restore the orderly functioning of a number of financial markets in order to prevent a systemic risk episode, and at the same time avoid a deterioration in inflation expectations, which could put price stability at risk.

During the first half of 2008, the sharp increase in the international price of commodities led to higher inflationary pressures in Mexico. At the time, economic activity had not been significantly affected by the crisis originating in advanced economies, and the Bank of Mexico decided to tighten monetary conditions. The target for the overnight interbank interest rate was raised from 7.5% in June to 8.25% in August. These actions were partly preventive, as they were implemented to avoid the increase in inflation from affecting inflation expectations.

As mentioned previously, in the second half of 2008 the global financial crisis escalated, negatively affecting economic activity and disrupting the normal functioning of the financial markets. The stabilisation of domestic financial conditions was, indeed, crucial. At the same time, the following factors contributed to a further worsening of inflation in the last few months of 2008:

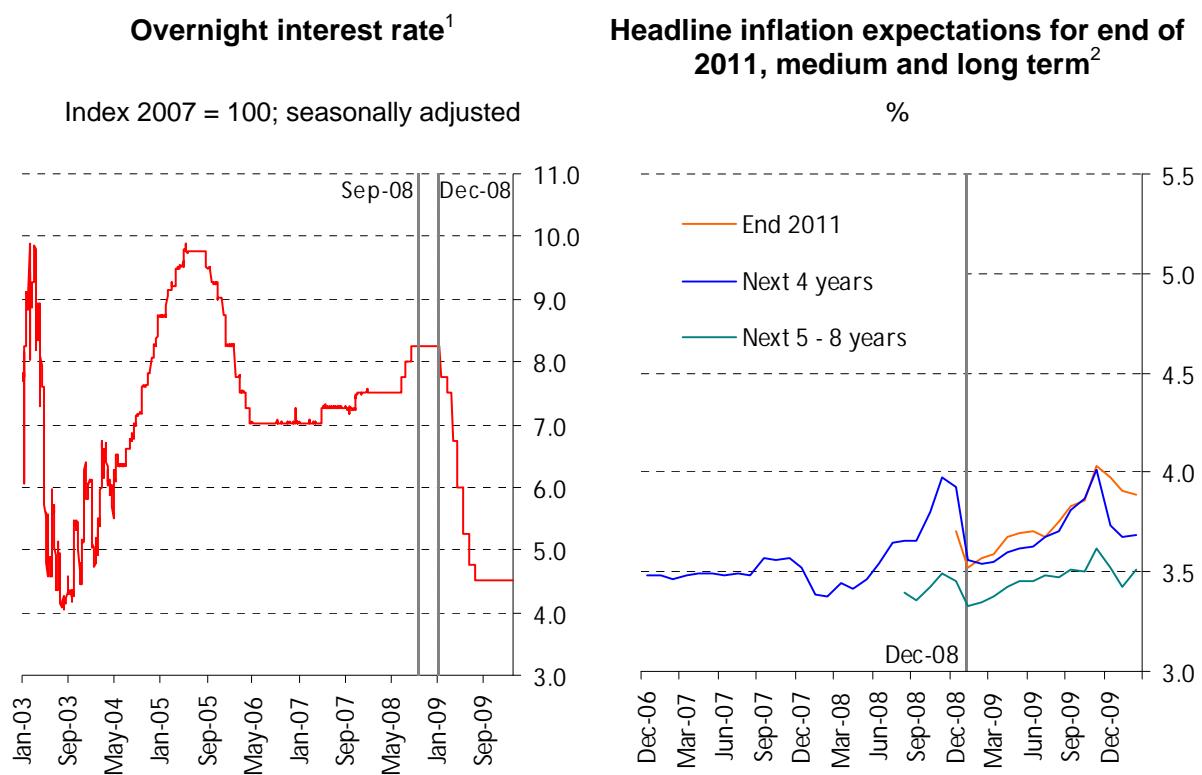
- i. Increases in international commodity prices affect domestic prices with a lag; consequently, their effects on consumer inflation remained present during the last quarter of 2008.
- ii. The domestic currency depreciation following the events of September 2008 also affected inflation.

Under this scenario, although the outlook for economic activity began to deteriorate, the Bank of Mexico decided to leave its policy rate unchanged, mainly in response to increasing concerns about inflationary pressures and their potential negative impact on inflation expectations. At the time, the central banks of advanced economies had already implemented aggressive policy rate cuts. Therefore, the Bank of Mexico's decision

contributed to widening the interest rate differentials among Mexico and developed economies, particularly the United States. This implied a further tightening of the monetary policy stance in Mexico.

By early 2009, inflation appeared to reach a peak and started to fall, while prospects for growth deteriorated. Lower food and energy prices and a wider output gap reduced inflationary pressures, although inflation remained higher than in advanced economies. The balance of risks deteriorated significantly, tilting towards the side of economic activity, while inflation expectations remained relatively well anchored. The weak economic activity during the first quarter of 2009 worsened in the second quarter of that year. This poor performance led to a downward revision in growth prospects for the year as a whole. A potential recession became the main cause for concern. Thus, the central bank began a loosening cycle, rapidly cutting the policy rate from 8.25% in January to 4.5% by July (see Figure 10). There were no further policy rate cuts in subsequent months mainly due to concerns about the potential effect on inflation of the fiscal measures proposed to Congress for 2010. Congress approved a rise in VAT and other indirect taxes, which led to a temporary increase in inflation. In spite of this, inflation expectations remained well anchored.

Figure 10



<sup>1</sup> The target for the overnight interest rate is shown since 21 January 2008.

<sup>2</sup> Monthly average from Infosel's survey.

Sources: Bank of Mexico's survey; Infosel's survey.

Source: Bank of Mexico.

## 5. Final remarks

The worsening of the international crisis, especially from September 2008 onwards, had a major impact on emerging economies, which were confronted with two adverse shocks: a

collapse in export demand related to the world recession, and reduced access to external financing resulting from the sudden increase in risk aversion and the global deleveraging process.

In the case of Mexico, the domestic financial markets and the FX market began to deteriorate following the events of September 2008 in the global economy. In particular, the domestic currency suffered a sharp depreciation and the volatility of the FX rate increased significantly. The losses incurred by some important Mexican corporations through derivatives instruments exacerbated the demand for foreign currency and gave rise to a widespread loss of confidence, leading to contagion in the other domestic financial markets. Consequently, there was widespread disruption in the domestic financial markets characterised by illiquidity and high volatility.

Policymakers faced the challenge of restoring orderly conditions in the financial markets: timely and decisive actions were needed. In particular, coordination among the different authorities was crucial, given the need to use different policy instruments. In this setting, several measures were implemented to provide liquidity in both domestic and foreign currency, as well as to restore the normal functioning of a number of domestic financial markets and reduce exchange rate volatility. The policy response in Mexico helped to contain the financial crisis and prevented the drop in liquidity from evolving into insolvency problems for some domestic financial institutions. This situation would have significantly threatened the stability of the Mexican financial system. The Mexican banking system ultimately proved to be very resilient to the shocks facing the global financial system. In fact, throughout the worst period of the crisis, Mexico continued to be in the black with capitalisation indices well above those required by law.

The Mexican economy had to adjust to an environment characterised by lower external revenues and reduced access to external financing. It seems that the fiscal and monetary policy mix used was the appropriate macroeconomic policy stance, as it led the economy through the required adjustment with the lowest cost. Furthermore, the tax reform approved by Congress improved the fiscal position of the country, which helped to reduce the risk perception of the economy, while also diminishing pressures on non-tradable goods inflation. Central bank actions were geared to restoring orderly conditions in the domestic financial markets and monetary policy was loosened as the balance of risks tilted towards economic activity. The use of monetary policy to support economic activity, however, was limited by the need to contain inflation expectations generated by the nominal exchange rate depreciation and the indirect tax hike.

As a result of these actions, the economy was able to transit through the international financial turmoil by avoiding a crisis and minimising moral hazard. The different actions to restore the domestic financial markets also seem to have been successful, as market conditions have gone back to normal, although the volume of operations has still not returned to its pre-crisis levels. Overall, the different measures undertaken by the Bank of Mexico have brought back liquidity and depth to these markets, and the efforts to structurally strengthen the fiscal position have paid off, as the recent episodes of global financial instability have not had a major effect on Mexican markets.

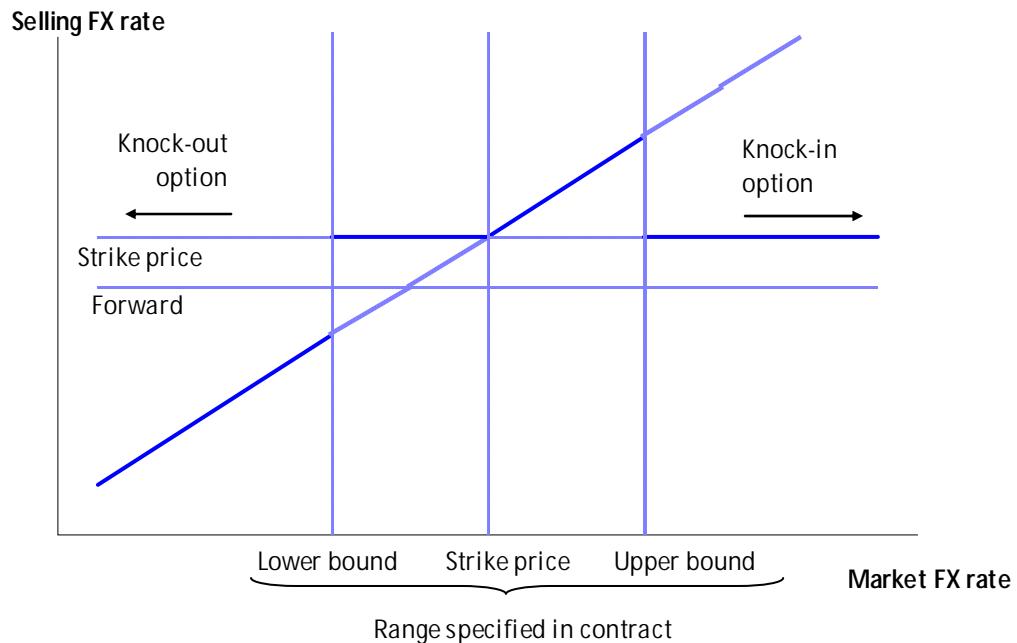
## Appendix: exotic options

Under the expectation of an appreciation of the domestic currency, a complex derivatives structure known as KIKO (knock-in knock-out) was used by a number of corporations in Mexico and some other countries (see Figure 11). This strategy operated as follows: the contract specified a strike price, higher than that implied by the forward rate, at which the firm could sell US dollars whenever the exchange rate remained within a certain range. Thus, as long as the peso appreciated moderately, that is, without moving out of the lower bound of the range, the firm would sell US dollars at the agreed-upon rate and obtain a gain.

However, if the domestic currency depreciated, two possible scenarios could emerge. If, despite the depreciation, the exchange rate remained below the upper bound of the range specified in the contract, the firm could sell US dollars at the market price; however, if the exchange rate moved beyond such bound, the firm would then be compelled to sell US dollars at the strike price and incur losses. Thus, a sharp depreciation could lead to great losses and put the solvency of firms at risk. The solid line in Figure 11 corresponds to the rate at which firms sell US dollars for different values of the FX rate.

In sum, these transactions in FX derivatives generated profits whenever the exchange rate remained within a defined range. However, in the event of a sharp depreciation of the peso, they could generate substantial losses.

Figure 11  
**Knock-in knock-out option**



Source: Bank of Mexico.

# Monetary policy during the global financial crisis of 2007–09: the case of Peru

Zenon Quispe and Renzo Rossini<sup>1</sup>

## 1. Introduction

In terms of the implications for emerging market economies, the recent global financial crisis has had two main stages. The first stage, between the last quarter of 2007 and the collapse of Lehman Brothers, was characterised by important capital inflows and the second, post-Lehman, stage was associated with a rapid and severe deterioration of external conditions. The management of the crisis by emerging market central banks required, in both stages, a combination of conventional and unconventional monetary policy measures due to the need to preserve the monetary policy transmission mechanism. It is interesting to note that in several countries, including Peru, the sequence of monetary policy adoption began with the set of unconventional measures due to the weakening of the interest rate channel during the high uncertainty period in the last quarter of 2008.

The combination and sequence of monetary policies showed the importance of keeping a high level of liquidity at three levels: international reserves at the central bank, liquidity of financial intermediaries and an adequate position of public debt in terms of its average maturity and currency composition. A comfortable level of liquidity allows the central bank to credibly provide sufficient funds in domestic and foreign currency so as to ensure a credit flow during the crisis. A high level of international reserves also allows the central bank to intervene in the foreign exchange (FX) market to prevent panic or excessive volatility that could lead to a financial crisis and, thus, to a recession.

## 2. Partial financial dollarisation

Peru's financial system has a long history of dollarisation of deposits and credits, which is explained by the severe macroeconomic imbalances of the 1970s and 1980s and the lack of instruments adjusted to the price index. Despite better economic conditions and stable macroeconomic fundamentals, inertia, transaction costs and an underdeveloped capital market explain the slow decline of the relative importance of deposits and credits in dollars. Chart 1 shows that the decline of the dollarisation ratio has been slow but steady, from a peak of 82% in 1999 to 50% in 2009.

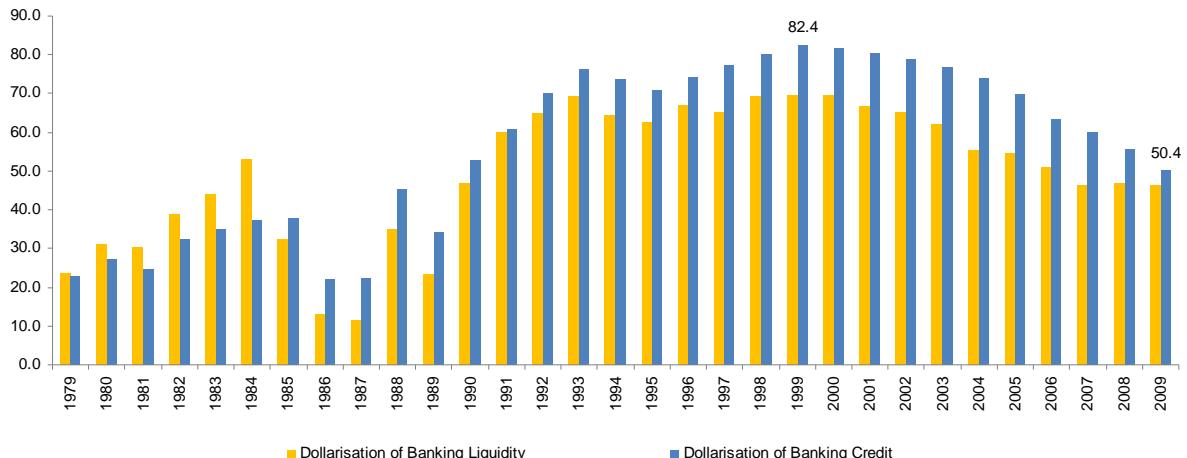
Dollarisation magnifies the reaction of financial intermediaries to sharp movements in their funding or to high exchange rate volatility. As a result, the economy is prone to credit booms and busts associated with: (a) the flows of foreign currency deposits or foreign credit lines; and (b) exchange rate movements that affect the quality of the credit portfolio. Thus, in cases of non-renewal of external credit lines or exchange rate depreciation, banks will react by shortening their lending to the private sector, which in turn will cause a negative impact on economic activity. Dollarisation therefore alters the transmission mechanism of monetary policy.

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<sup>1</sup> Central Reserve Bank of Peru. Research assistance was provided by Alex Contreras.

Chart 1

Peru: Banking Sector Dollarisation  
(As percentages of total liquidity and credit)



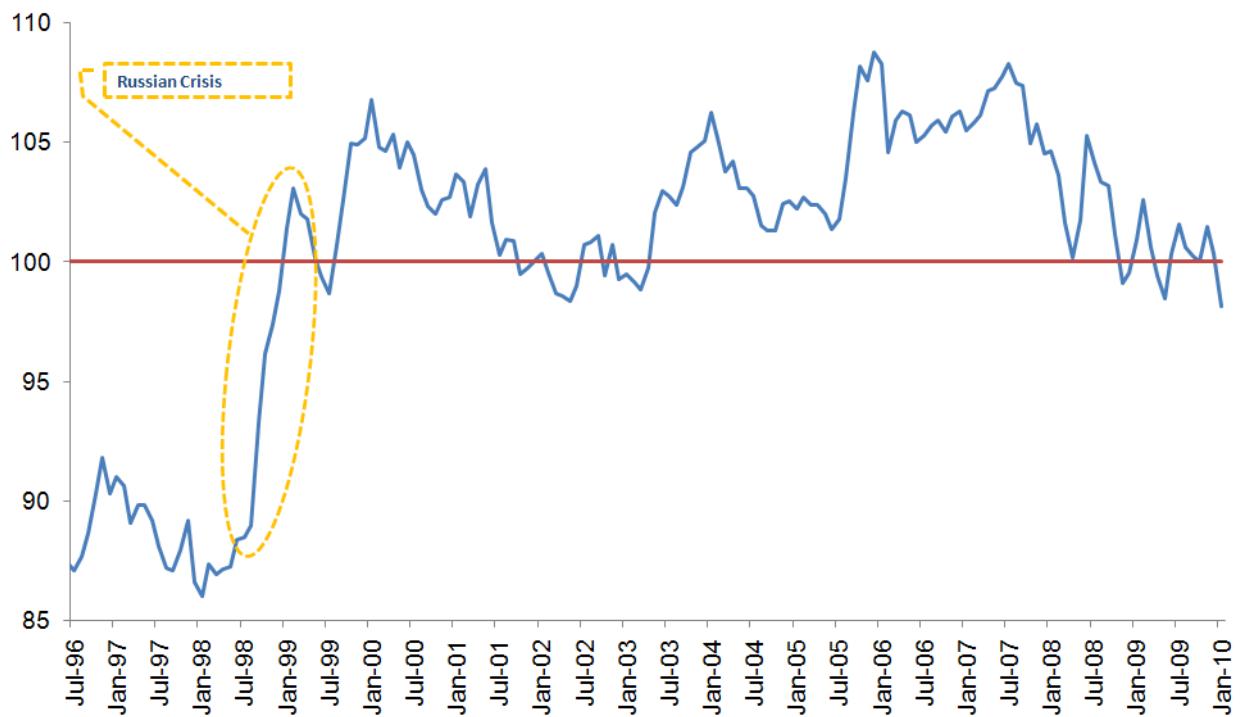
The Russian crisis of 1998 illustrates the vulnerabilities faced by economies with financial dollarisation. In the case of Peru, the sharp currency depreciation and the sudden stop of foreign credit lines induced by the Russian crisis (see Chart 2) resulted in a domestic credit crunch, with a severe and long-lasting impact on economic activity. In Berróspide and Dorich (2003), the credit contraction resulted from banks' reaction to the deterioration of loan quality. A summary of the effects of the Russian crisis on Peru's financial system is contained in Box 1.

**Box 1: Effects of the Russian Crisis: 1998-1999**

- Real currency depreciation: 13% September 1998-August 1999
- Balance sheet effect: Increase in the foreign currency non-performing loan ratio from 5% to 10%
- Sharp decline of short-term external credit lines: -50% in August 1999 (12-month rate of variation)
- Credit crunch: Credit growth in foreign currency declined from 26% in July 1998 to -4% in July 1999 (12-month rate of variation)
- Fear of the effectiveness of the central bank role as lender of last resort
- Financial crisis: the number of banks declined from 26 to 14

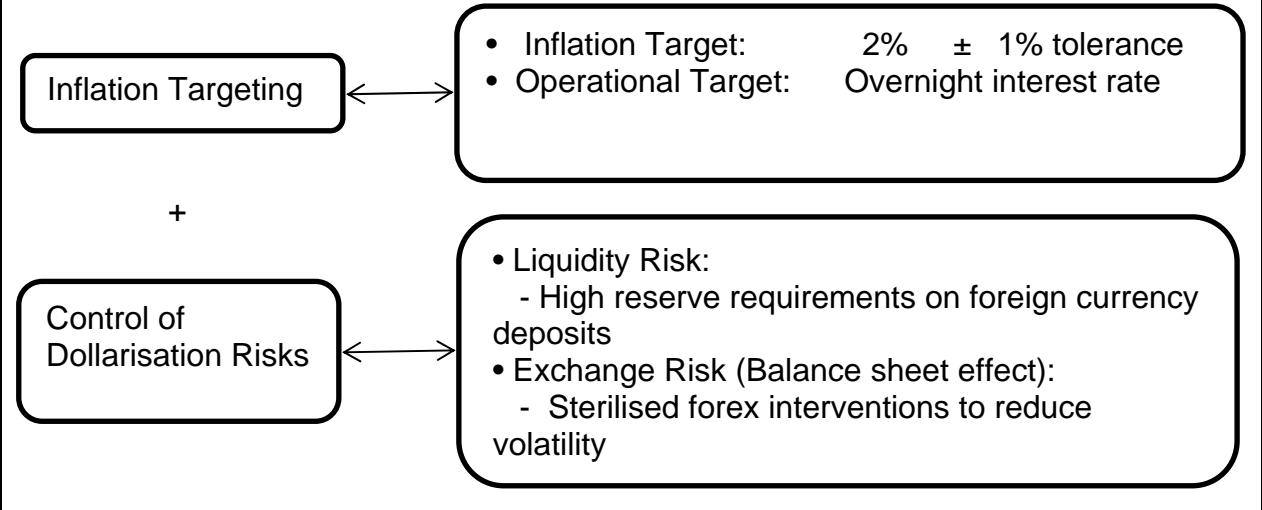
Chart 2

**Peru: Effective Real Exchange Rate Index**  
(December 2001= 100)



In order to reduce the risks involved with financial dollarisation, the Central Bank of Peru (BCRP) implemented a preventive policy framework based on reserve requirements on banks' liabilities and international reserve accumulation. Additionally, using the experience gained from various external shocks, especially the Russian crisis of 1998, the BCRP designed an action plan to prevent a credit contraction during crisis events. Therefore, the monetary policy framework in Peru, in addition to the common features of an inflation targeting (IP) regime, includes a set of measures to deal with the risks of financial dollarisation.

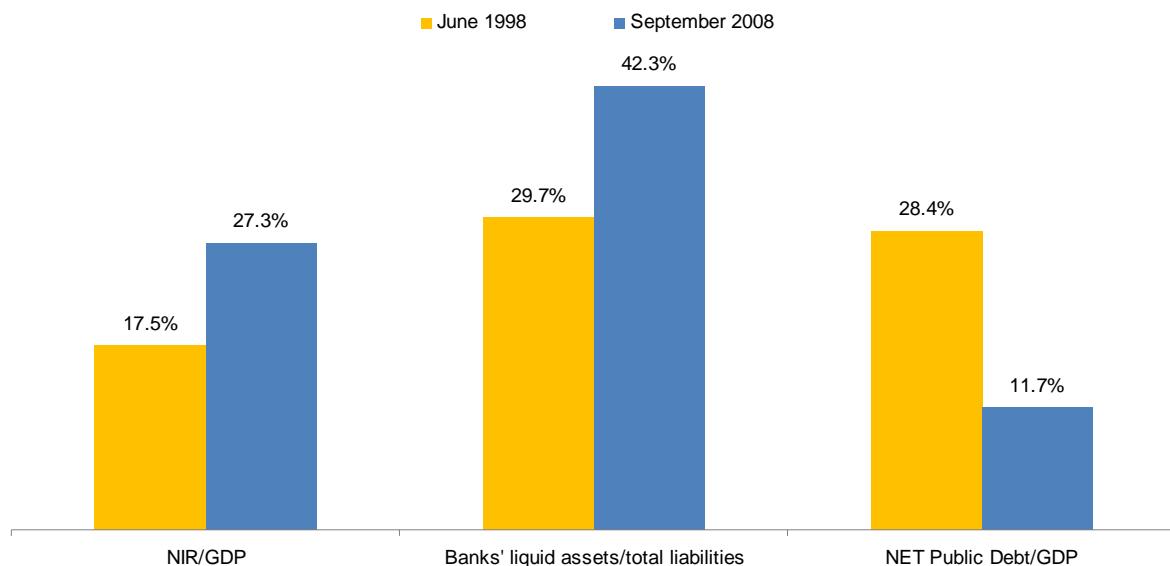
**Box 2: Hybrid inflation targeting**



The preventive measures to reduce the vulnerabilities related to financial dollarisation consider the possibility of a series of simultaneous shocks that could result in a financial crisis. Therefore, the strategy focuses on three levels of liquidity, as referred to above: (a) the accumulation of international reserves at the BCRP; (b) high liquidity requirements of financial intermediaries; and (c) a solid public sector financial position. Chart 3 shows the levels of these liquidity indicators for June 1998, just before the Russian crisis of 1998, and for September 2008, prior to the collapse of Lehman Brothers.

Chart 3

Peru: Preventive Liquidity Measures



The accumulation of the BCRP's international reserves has been crucial in creating a liquidity cushion against both negative simultaneous shocks in the foreign currency funding of banks and sharp currency depreciation. For this reason, the emphasis on an adequate level of reserves goes beyond the level of adequacy of international reserves compared with the stock of short-term liabilities, as shown in Chart 4, including the size of the banking system's domestic liabilities. By the end of 2009, the stock of international reserves represented 110% of total short-term foreign liabilities and M2 (Chart 5).<sup>2</sup>

The risks associated with dollarisation have also been reduced through prudential regulations,<sup>3</sup> including additional provisioning for credit extended to borrowers which does not generate revenues in foreign currency. Additionally, with improved asset-liability management, the public sector issued local currency debt with maturities of up to 30 years and extended the total public debt average maturity to 11 years.

<sup>2</sup> Obstfeld et al (2009) conclude that the scale of reserves needed to backstop emerging markets surpasses the resources of multilateral organisations and that international reserve accumulation in emerging economies helped those economies to face the severe stress period following the bankruptcy of Lehman Brothers. They highlight the fact that countries with a higher ratio of reserves to M2 were able to prevent currency depreciation.

<sup>3</sup> The Superintendence of Banks, Insurance Companies and Pension Funds Associations is in charge of the supervision and regulation of the financial system in Peru.

Chart 4

**Latin America: Net International Reserves / Short Term Liabilities**  
(Number of times)

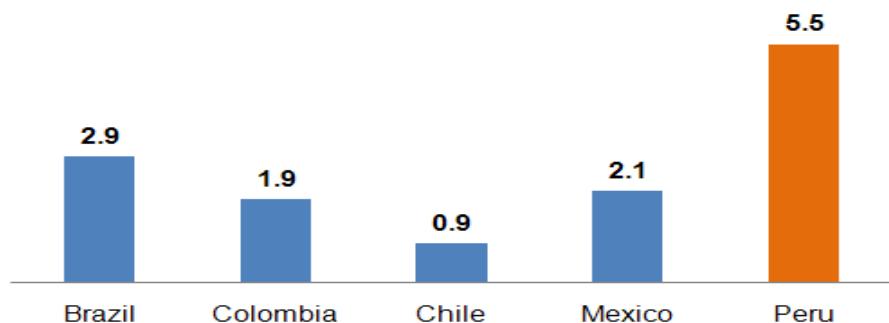
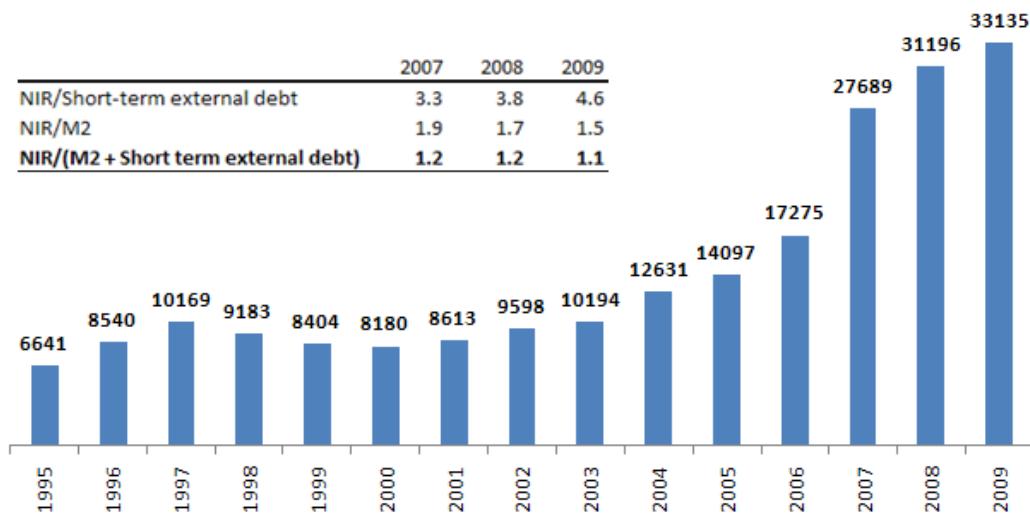


Chart 5

**PERU: NET INTERNATIONAL RESERVES**  
(Millions of US\$)



### 3. Unconventional central bank measures in emerging market economies

According to Ishi et al (2009), the unconventional monetary measures used by emerging economies during the recent global crisis have been mainly foreign and domestic currency short-term liquidity easing measures. Other unconventional measures, such as credit easing and quantitative easing,<sup>4</sup> were not necessary given the limited stress faced by emerging economies during this episode.

<sup>4</sup> Credit easing is the direct or indirect provision of credit by the central bank to targeted borrowers, possibly in need following the breakdown of credit markets. Frequently, the aim is to reduce credit spreads in specific sectors, such as housing loans that may be of high macroeconomic importance. Quantitative easing involves the direct and unsterilised purchase of government securities. The aim in that case is to lower the benchmark yield curve and boost economic activity. It is almost always used when monetary transmission is seriously impeded and the policy rate is declining towards zero.

During the recent global financial crisis, central banks from advanced economies relied first on conventional monetary measures, reducing the policy rate to levels close to zero, switching afterwards to a variety of unconventional monetary measures. In the case of Peru, and other emerging economies, the sequence was reversed – liquidity easing measures were implemented first, followed by policy rate reductions when the FX and money markets had stabilised.

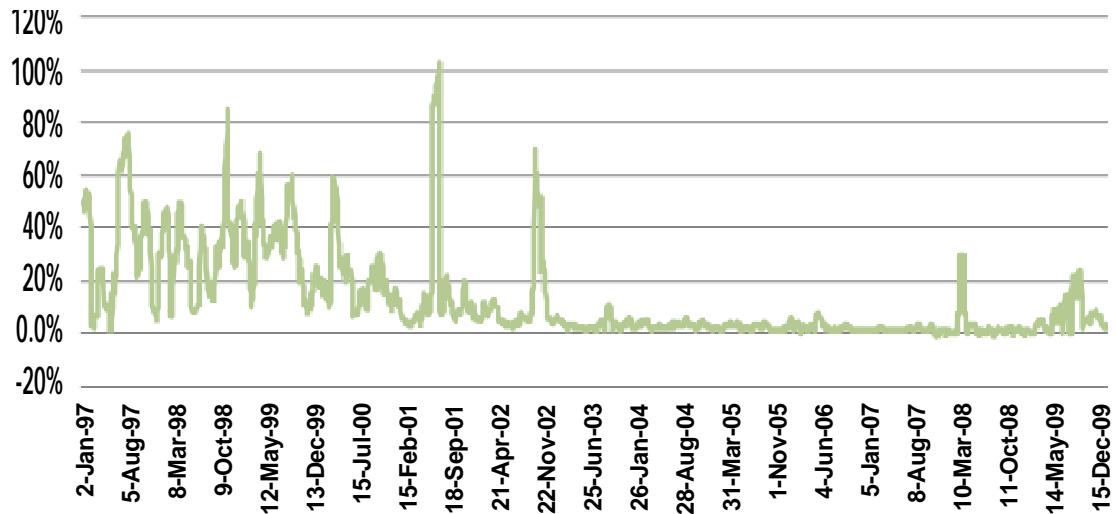
Ishi et al (2009) find that almost all emerging economies implemented liquidity easing measures in domestic currency and most of them injected FX liquidity. One of the unconventional measures for liquidity injection used by emerging economies has been the **relaxation of reserve requirements**, including cuts in the reserve requirement ratios and increases in exemption thresholds. In most cases, the easing of reserve requirements was not accompanied by a decrease in the policy interest rate, suggesting that central banks were aiming at easing liquidity rather than changing their monetary policy stance. They used **systemic domestic liquidity arrangements**, easing terms of existing standing and market-based liquidity-providing facilities (extending maturities, lowering collateral haircuts, increasing the frequency of auctions). Eligible collateral was considerably broadened in many cases; several central banks provided domestic liquidity to targeted institutions which were expected to distribute it among the market. **Foreign exchange liquidity injection** was used by many central banks to ease the terms of existing FX facilities (extending maturities, broadening collateral, etc) and introduce new FX liquidity facilities, such as dollar repo and swap facilities. In addition, FX intervention can be used as a channel to inject foreign currency liquidity and, in this regard, is considered an unconventional monetary policy tool.

Emerging markets, including Peru, were actually tightening their policy stance, raising policy rates until September 2008, after which they implemented unconventional policy measures followed by conventional ones. Prior to September 2008, emerging economies were facing capital inflows and inflationary pressures. They initiated unconventional measures in September 2008 in response to the sudden tightening of global liquidity. As stress in the global dollar markets intensified, the foreign exchange available in local markets quickly dried up. Emerging market economies seemed to rely mostly on direct instruments, such as easing reserve requirements, compared to advanced economies. The postponement of policy interest rate reductions is associated with the risk of further exchange depreciation and the disconnection of other interest rates with the policy rate. Thus, emerging market central banks concentrated their actions on ensuring market liquidity and avoiding a credit crunch.

Despite concerns regarding exchange rate volatility, on this occasion the emerging market central banks did not increase the policy rate during the crisis, preferring instead to implement an independent and anticyclical monetary policy. In part, the greater level of international reserves allowed them to smooth the markets first, keeping the policy rate unchanged, and then implement a stimulatory monetary policy. The rise of a more independent monetary policy can be confirmed by the reduction of interbank interest rate volatility relative to exchange rate volatility (Chart 6).

Chart 6

## Peru: Relative Volatility of the Interbank Interest Rate and the Exchange Rate, 1997-2009



### 4. Monetary policy during the subprime crisis

The global financial crisis has involved two main stages appearing sequentially since the initial response of developing countries' central banks in the last quarter of 2007. The first stage, pre-Lehman Brothers, was characterised by important capital inflows towards emerging markets, and the second stage, post-Lehman Brothers, was associated with a drain of international liquidity from emerging markets.

#### 4.1 Pre-Lehman Brothers stage of the global financial crisis (August 2007–September 2008)

During the first stage, the enormous amount of liquidity provided by the central banks of mature economies pushed up the trade surplus in emerging markets and, more importantly, generated a great amount of capital flows, appearing in the economy both as assets in foreign and domestic currency. In Peru, this first stage coincided with certain indicators of increasing domestic demand. The assessment of external conditions pointed to a temporary situation, with a downward risk that eventually emerged. The policy combination during the first stage of the crisis included conventional and unconventional measures with a contractive stance in order to prevent the overheating of the economy, as described in Box 3.

**Box 3: Pre-Lehman Brothers Policy Actions**

**Monetary Policy Responses: August 2007-August 2008**

- Reserve Requirements as a first line of defence
  - Higher reserve requirements in domestic and foreign currency
  - 120% marginal reserve requirement on domestic currency deposits of non-residents
- Sterilised FX intervention
  - Purchases of USD 8,4 billion
  - Sterilisation with central bank certificates and fiscal surplus
- Conventional monetary tightening
  - Increase of the policy rate by 200 bps to 6,5%

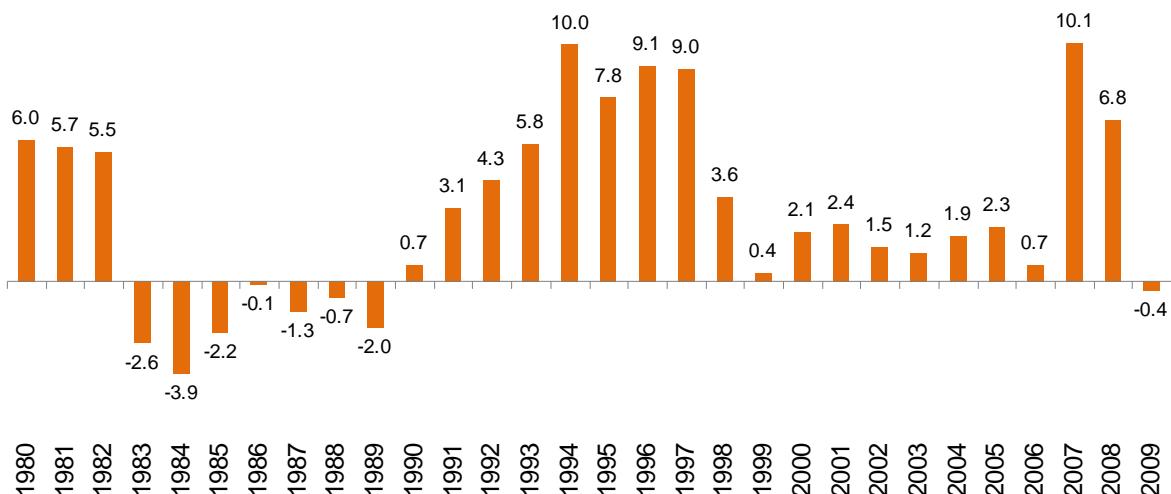
#### 4.1.1 *Unconventional policy responses*

As mentioned above, the pre-Lehman Brothers period was characterised by important capital inflows to emerging market economies. In the case of Peru, a significant inflow of short-term capital was observed in the market of local currency instruments in January 2008.

These capital inflows were reflected in an important increase in domestic securities (central bank certificates, Treasury bonds and bank deposits) held by non-resident investors, which increased from US\$ 2.8 billion in December 2007 to US\$ 4.5 billion in January 2008. After reaching a maximum level of US\$ 6.3 billion in April, they started to decline in May. Chart 7 shows the important increase of capital flows to Peru at an unprecedented 10.1% of GDP in 2007 and a high level of 6.8% in 2008.

Chart 7

**Peru: Private Capital Flows**  
(as a percentage of GDP)



In order to neutralise these capital flows that threatened to expand liquidity in the financial system in an undesired manner, the BCRP raised reserve requirements in domestic and foreign currency, combining this policy with a series of other measures aimed at discouraging

holdings of central bank instruments by non-resident investors. The rate of marginal reserve requirements in domestic currency was raised from 6.0% to 25% (Chart 8), the rate of reserve requirements for deposits of non-residents was raised to 120% and the rate of marginal reserve requirements in foreign currency was raised from 30% to 49% (Chart 9). These measures also allowed the high growth of credit in soles and dollars to be offset, thereby controlling domestic demand and its impact on inflation.

Chart 8

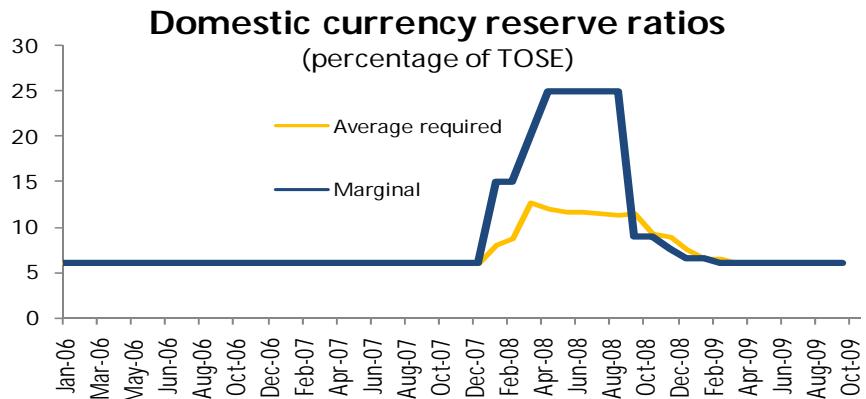
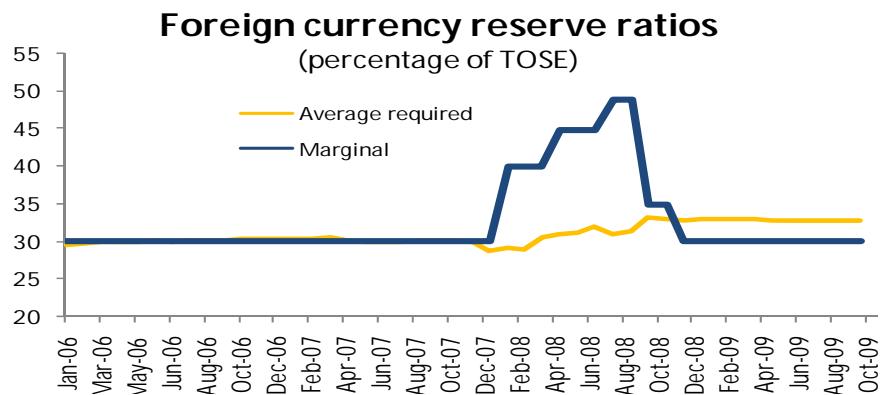


Chart 9



It is worth mentioning that in September 2007, the BCRP adopted an unconventional measure, eliminating reserve requirements for external loans with two-year or longer maturities with the purpose of inducing the credit structure of the local financial system to be less vulnerable to external shocks. This measure changed the structure of the banking system's foreign currency funding sources from short to longer term maturity of over two years) reducing their vulnerability to sudden stops in short-term capital flows. The longer-term external funding of banks increased from 17% of total external funding in October to 50% in December 2007.

The BCRP also increased the pace of interventions in the FX market, purchasing US\$ 8.4 billion to prevent the balance sheet effect that implies excessive exchange rate volatility. Banks' liquid position in soles increased significantly, generating a much wider spread between the interbank interest rate and the monetary reference interest rate.

#### 4.1.2 Conventional policy responses during the pre-Lehman Brothers stage

A series of domestic and external supply shocks affected the dynamics of inflation and pushed up the expected inflation. This led the BCRP to gradually adjust its monetary policy stance in order to help maintain price stability. Thus, between September 2007 and

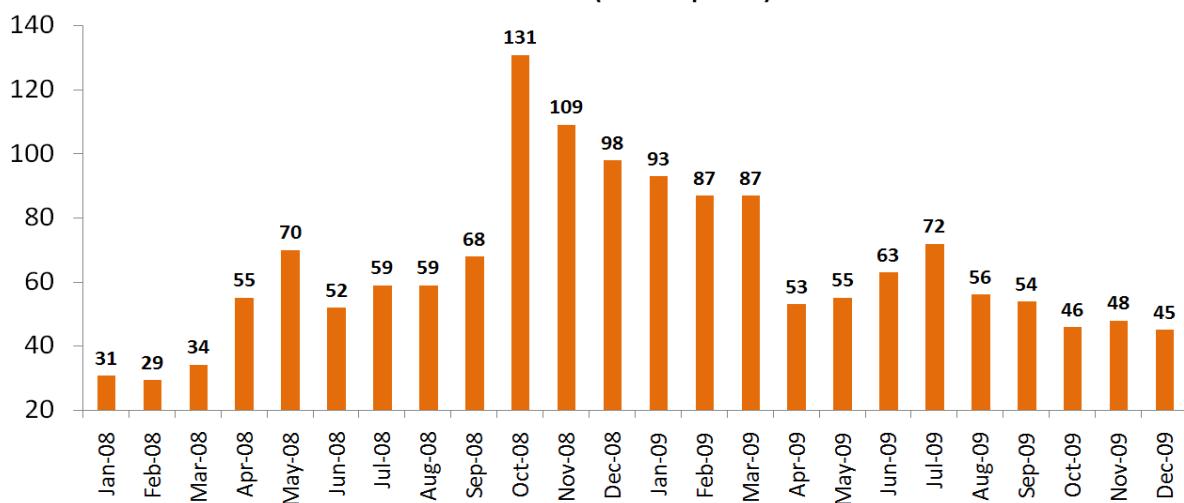
September 2008, the BCRP raised the reference interest rate on six occasions (25 basis points each time), from 5% in September 2007 to 6.5% in September 2008, so that inflation would gradually converge towards the target range and reach the 2% target by end-2009, as expected.

Following the collapse of Lehman Brothers in September 2008, the uncertainty and risk generated by the deepening of the global financial turmoil interrupted the transmission mechanism from the policy rate to the market rates and to the behavioural macroeconomic fundamentals. This situation can be clearly observed in the significant increase in the market interest rate spreads (see Chart 10). The domestic currency lending prime rate spread against the policy rate increased from 59 basis points in August 2008 to 131 basis points in October of the same year. These higher spreads persisted within the credit markets until February 2009.

#### 4.2 Post-Lehman Brothers stage of the global crisis

During the second stage of the global financial crisis, liquidity conditions in emerging economies, including Peru, became tighter as a result of the deepening of the crisis and generalised uncertainty, as reflected in the reduced number of transactions carried out in the money market and economic agents' greater preference for liquidity.

Chart 10  
Peru: Spread of the Prime 90 day lending rate and the Central bank Policy Rate  
(In basis points)



As shown in Box 4, the first measures to be implemented during this second, post-Lehman Brothers, stage were oriented towards providing liquidity in domestic and foreign currency. The BCRP activated its full monetary policy operational procedures, principally those advocated to extend the maturity term of the liquidity provisions to the financial system, as well as to ease the reserve requirement ratios, and when it was clear that the FX and money markets had become more stable, the BCRP started to reduce its policy rate in February 2009.

#### Box 4: Post-Lehman Brothers Policy Responses

##### Monetary Policy Responses: September 2008-December 2009

- Liquidity support
  - Reduction of reserve requirements in domestic and foreign currency
  - Increase of the amount and maturity of the central bank's REPO (to 1 year)
  - New central bank swap facility
  - Reduction of the stock of sterilisation instruments
- Intervention in the FX market
  - Sale of USD 6,9 billion
  - Issue of certificates indexed to USD
- Conventional monetary stimulus
  - Reduction of the policy rate by 525 bps to 1,25%

#### 4.2.1 *Unconventional policy responses: recovering the transmission mechanism*

During this period of stress, with a collapse of worldwide trading activity, a weakened global economy and a reduction in commodity prices, the high degree of uncertainty induced important capital flows from emerging economies to the Treasury bills market of the United States. The generalisation of this behaviour broke the links between policy rates and money and credit market rates around the world.

In normal circumstances, reductions in the policy rate signal the easing of monetary and credit conditions, enhancing expenditure and economic activity as inflation expectations are anchored to the long-term target level. However, in crisis scenarios, the financial stress and higher risk aversion block the policy rate transmission channels, significantly reducing its signalling power. Moreover, in partially dollarised economies, the fluctuation of the exchange rate exerts even greater stress on the balance sheet of economic agents, with the risk of accelerating the recessive impacts of the crisis. In these circumstances, the second best option is to adopt unconventional monetary policy actions. Following the failure of Lehman Brothers, the BCRP actively used unconventional policy measures in order to provide liquidity to the domestic financial market, guaranteeing the smooth functioning of payment systems, reducing the interest rate spreads in the money and capital markets and, most importantly, avoiding a credit crunch.

As of October 2008, the BCRP interrupted the process of gradual adjustments to its monetary stance and reoriented its efforts to providing liquidity to the domestic financial system and reducing extreme exchange rate volatility to neutralise possible balance sheet effects in the economy, without neglecting its role of preserving price stability.

During the first stage of the global financial crisis, the increases implemented in the reserve requirement rates in PEN soles and US dollars allowed financial entities to accumulate liquid assets in both currencies in a context of important capital inflows. Given the severe constraints of international financial liquidity characterising the second stage of the global crisis (after the failure of Lehman Brothers), these liquid assets accumulated as reserve requirements were made immediately available in order to guarantee normal operations in the money market. The BCRP reduced the reserve requirement ratios from 25% to 6% and from 49% to 30% in domestic and foreign currency, respectively – levels similar to the ratios observed before the start of the global financial crisis.

The actions during the first stage of the crisis helped to improve the level of international liquidity and provided greater credibility for the second stage of policy intervention. After the collapse of Lehman Brothers, the main goal of monetary policy was to prevent a credit crunch caused, as in the Russian crisis of 1998, by an overreaction of financial intermediaries to the non-renewal of foreign credit lines or to a possible deterioration of the quality of the loan portfolio. The size of the full range of instruments deployed in the first six months after the failure of Lehman Brothers was equivalent to 9.6% of GDP (Table 1).

Table 1: Total Liquidity Injection  
**Peru: Monetary Operations of the Central Bank**  
(in millions of PEN)

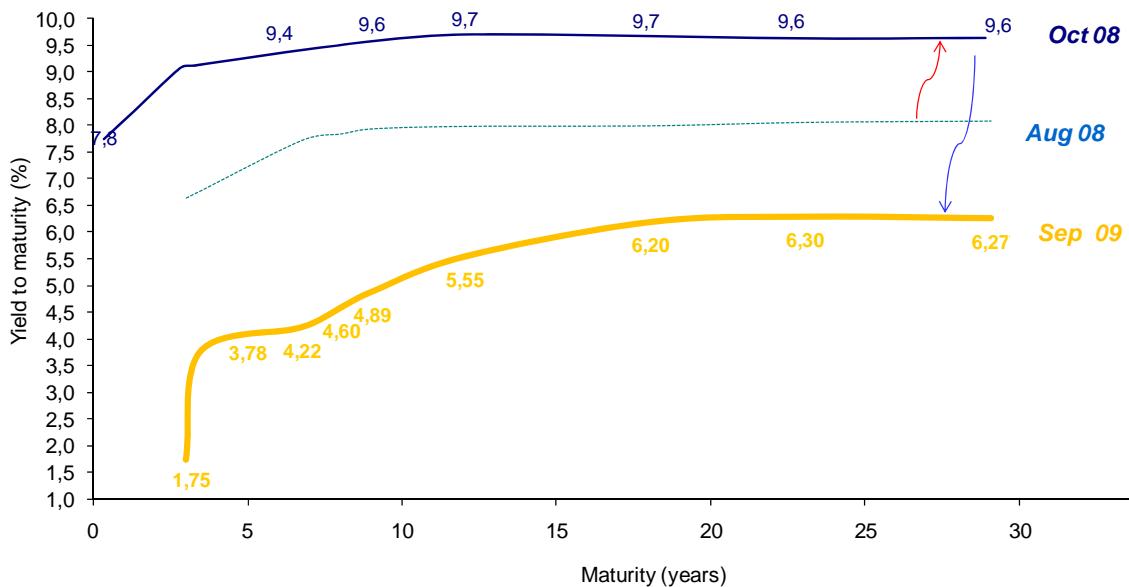
	Flows Sep-2008- Mar-2009	As a percentage of GDP
1. REPO	5 989	1.6
2. Central bank certificates	26 688	7.2
3. Central bank swaps	735	0.2
4. Reserve requirements	2 334	0.6

Additionally, the BCRP increased its range of monetary operations to allow the financial system more flexible liquidity management in domestic and foreign currency. Furthermore, since October 2008, the BCRP has reduced reserve requirements in soles and dollars and external credit lines have been exempt from reserve requirements.

Another unconventional monetary policy action was implemented to preserve the market liquidity of the system in order to maintain the collateral value of the assets for money market operations and to act as a benchmark for longer-term bank lending operations. Parallel to the BCRP certificate repurchases, the public sector also bought the central bank's Treasury bills in the capital markets.

The BCRP was one of the first to adopt this measure (October 2008). These unconventional monetary policy actions allowed the gradual return of market interest rates – the interbank market, BCRP certificates and treasury bonds (BTP) – to levels observed before the deepening of the financial crisis in August 2008. For example, the yield on 30-year Treasury bonds, which rose from 8.1% at end-August to 10.2% on 28 October, declined to 7.6% in January 2009 and 6.7% in September 2009 (Chart 11).

Chart 11  
Secondary market for sovereign bonds<sup>1/</sup>



1/ Monthly average.

Supported with appropriate levels of international liquidity which had been built up as a pre-emptive measure during the pre-Lehman Brothers phase of the crisis, the unconventional policy actions of the BCRP prevented the global financial crisis from having any major impact on the Peruvian financial system, thereby preserving its domestic liquidity levels and minimising deviations of market interest rates from the policy rate, as well as minimising any balance sheet effect associated with the financial dollarisation of the economy and preserving the dynamism of credit markets by guaranteeing normal flows to the real economy.

In this way, the initial impact of the international financial crisis on the Peruvian financial system was mitigated because of the adequate levels of international liquidity of the local financial system and the timely monetary policy actions. These measures not only prevented a balance sheet effect in the economy, which might have generated a negative impact on the evolution of credit and economic activity, but also the deterioration of liquidity levels of financial entities, as well as interest rate deviations from the reference rate established by the BCRP.

The international liquidity restrictions during this phase of the crisis exerted pressure on the FX market and, in order to prevent any balance sheet effects from reducing extreme exchange rate volatility, the BCRP, from September 2008, sold foreign currency for a total of USD 6.8 billion and issued dollar-indexed certificates for a total of US\$ 3.3 billion (PEN 7.9 billion). As shown in IMF (2009), the BCRP's FX intervention is geared towards reducing exchange rate volatility and not fixing a path (Chart 12). In general, the Peruvian currency has been one of the currencies with lower volatility in the region (Chart 13).

Chart 12

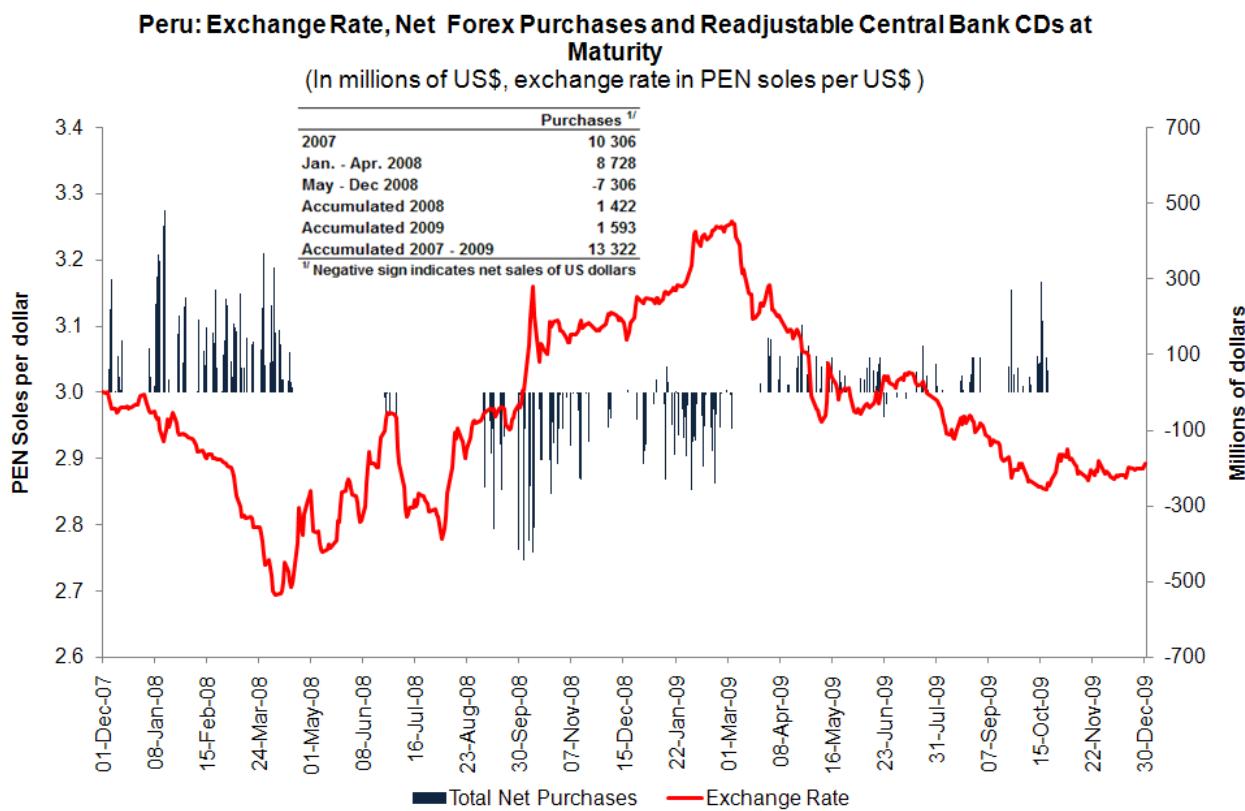
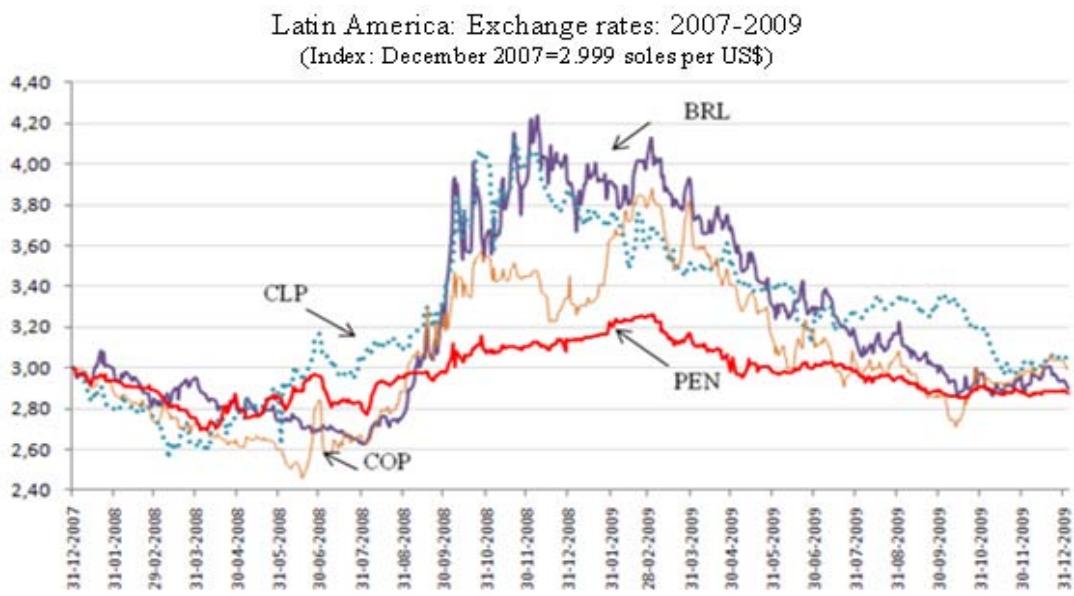


Chart 13



#### 4.2.2 Conventional policy responses during the post-Lehman Brothers phase of the crisis

In February 2009, as soon as the balance of risks became favourable, the BCRP launched a series of policy rate reductions from 6.5% to 1.25% in August 2009. The risks were associated with higher exchange rate volatility, which may have generated negative balance

sheet effects due to the high degree of financial dollarisation and persistent high inflation expectations.

Given the lower inflationary pressures in a context of reduced global economic growth and the decline of the international price of food and fuel, the Board of the BCRP started loosening the monetary policy stance in February 2009. The policy rate was reduced from 6.5% to 6.25% in February and to 6.0% in March with further reductions of 100 basis points each time from April to July 2009 and 75 basis points in August, reaching the current level of 1.25%. These actions are consistent with the primary goal of preserving price stability; the current state of the economy reflects inflation levels below the target of 2% with forecasts of 2.2% for 2010.

## 5. Results

The activation of the full monetary policy operational procedures of the BCRP, ie adopting both unconventional monetary policy measures in order to guarantee the funding and market liquidity of the financial system as well as conventional measures in accordance with monetary stability goals, maintained the dynamism of credit from the financial system to the private sector during the entire period of the global financial crisis. Chart 14 shows the evolution of the seasonally adjusted credit in domestic currency which, after following a stable expansionary pattern over the last eight years, kept its pace, albeit at a slower speed than the average, but without displaying periods of booms or busts. In addition, banking credit by component showed positive rates of growth in 2009: corporate (5.9%); small firms (23.4%); consumption (8.1%); and mortgages (17.1%). The main cause of deceleration in credit growth can be attributed to the decline of the financing of exports and imports.

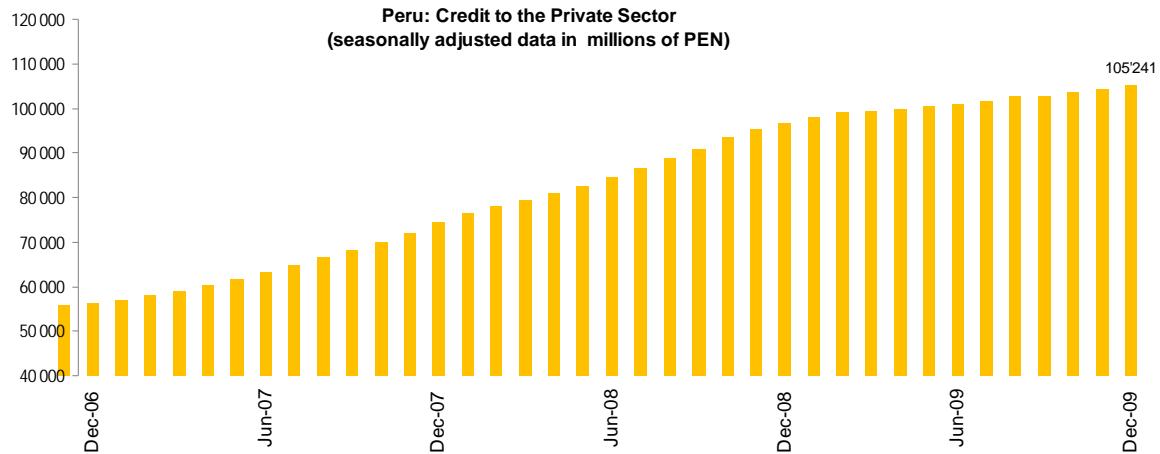
Table 2

### Peru: Credit to the Private Sector

(Annual percentage rate of growth)

	2008	2009
<b>Total</b>	<b>29.9</b>	<b>9.4</b>
Corporate	28.7	5.9
<i>of which: Foreign Trade</i>	15.7	-29.6
Small Firms	52.9	23.4
Consumption	27.1	8.1
Mortgage	23.4	17.1
<b>Note:</b>		
Real GDP growth	9.8	0.9

Chart 14



The credit access index, an early indicator of a credit crunch, has been always in the “easy-access” zone, showing that the flow of credit continued during the crisis (Chart 15). Similarly, non-performing loans of commercial banks have been around their lowest ever levels, with a slight increase following the collapse of Lehman Brothers, passing from 1.3% in 2008 to 1.6% in 2009 (Chart 16).

Chart 15

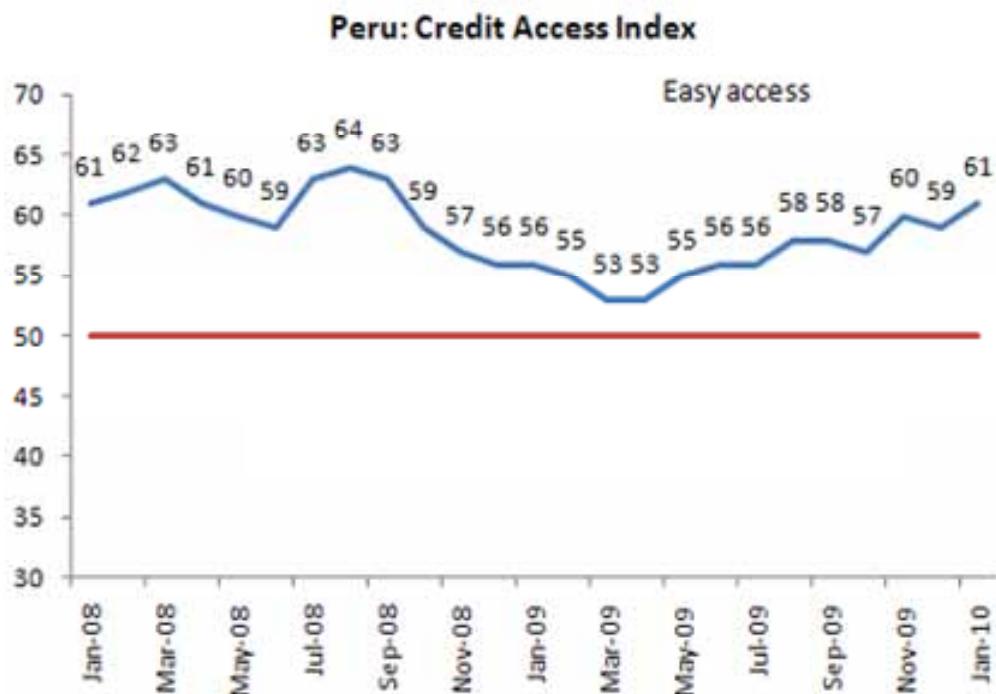
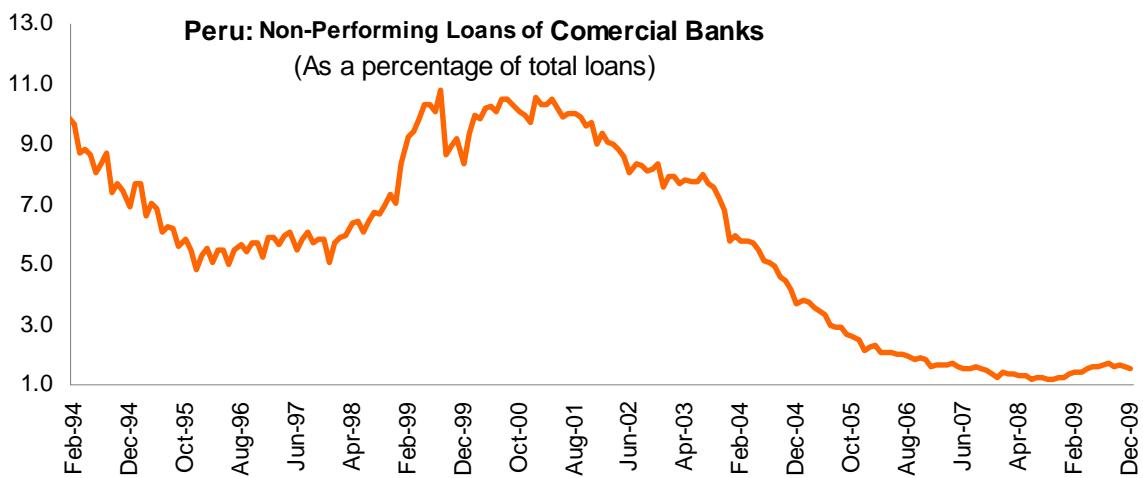


Chart 16



## 6. Conclusions

The recent global financial crisis posed two different scenarios which appeared sequentially in two main stages, the pre-Lehman Brothers stage (September 2007–September 2008), which was characterised by important capital inflows and upward pressures on commodity prices and terms of trade; and the post-Lehman Brothers stage, characterised by international liquidity constraints. The management of the crisis by the central banks of emerging markets required, in both stages, a combination of conventional and unconventional policy measures due to the necessity to re-establish the monetary policy transmission mechanism.

In both scenarios, the BCRP initially used unconventional measures to smooth liquidity. During the first stage, monetary policy emphasised the sterilisation of capital inflows, using increases in reserve requirements and a preventive accumulation of international reserves. In the second stage of the global financial crisis, following the failure of Lehman Brothers, the BCRP's monetary policy dealt with the extreme international liquidity constraint, first providing liquidity in domestic and foreign currency by reducing reserve requirements, introducing new instruments of liquidity provision and intervening in the FX market. The aim of the monetary policy was to preserve the dynamism of the domestic money and capital markets and avoid a credit contraction that could emerge from sharp currency depreciation and a sudden stop of capital flows. This strategy is rooted in the experience of crisis management in a financially dollarised economy.

The policy actions implemented by the BCRP during the pre-Lehman Brothers stage of the global crisis, characterised by important capital inflows to the Peruvian economy, and during the post-Lehman Brothers stage, characterised by the global drain of liquidity, maintained financial stability and the strength of Peru's macroeconomic fundamentals. Peru is one of the few economies registering GDP growth in 2009, 0.9%, and the consensus forecast of GDP growth for 2010 is 7.8%. Inflation was 0.25% in 2009, below the target (1-3%), and the consensus forecast for 2010 implies a rate inside the target range (2.2%).

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# The impact of the global financial crisis on the Philippine financial system – an assessment

Diwa C Guinigundo<sup>1</sup>

“The problem in politics is this: you don’t get any credit for disasters averted.”

Henry M Paulson Jr, Former US Treasury Secretary

## I. Introduction

The crisis that originated from the US subprime mortgage market escalated into a global phenomenon. Earlier debates on “decoupling”<sup>2</sup> died down as the crisis’ contagion effects proved headstrong, cascading to the financial markets of advanced and emerging economies and unleashing a full-blown systemic crisis. Aside from causing huge wealth destruction, this development eroded confidence in financial institutions and markets worldwide, causing intensified concerns over liquidity, as well as a plethora of bankruptcies, forced mergers and massive monetary intervention from financial authorities, thereby leading to a drastically reshaped financial landscape.<sup>3</sup>

Nonetheless, East Asia in particular was in a much better position to weather a financial crisis compared to a decade ago. At the time of the crisis until today, its economic fundamentals have been generally stronger. Banking systems in the region have, in general, become more resilient, sound and stable. The region has accumulated high levels of foreign reserves that have also helped it to absorb shocks well. The adoption of conservative financial policies has paid off. In addition, regional economic integration and open global markets have expanded and deepened East Asia’s production networks and export markets.<sup>4</sup>

In the case of the Philippines, the conservative attitude of Philippine banks led to only marginal exposure to derivatives/structured products. Adequate information disclosure practices and the implementation of banking reforms are now yielding fruit, particularly in terms of better risk management and consolidated supervision. These have contributed to the limited impact of the crisis on Philippine financial markets.

This paper examines the extent of the impact of the financial crisis on emerging Asia’s financial system, namely the equity markets, bond market, foreign exchange market, money market, and the banking sector, with a focus on the Philippines. The paper also analyses the Bangko Sentral ng Pilipinas’ (BSP) responses to the challenges that emerged as a result of the recent global financial turmoil.

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<sup>1</sup> Deputy Governor, Monetary Stability Sector, Bangko Sentral ng Pilipinas.

<sup>2</sup> At the onset of the crisis, many believed that emerging market economies would avoid the negative spillovers of the US subprime fallout as they had already broadened and deepened to the point where they were less dependent on the United States and other advanced economies. (27 January 2008: “Decoupling: theory vs reality”, *International Herald Tribune*.)

<sup>3</sup> Loser, C M (2009): “Global financial turmoil and emerging market economies: a major contagion and a shocking loss of wealth?”, Asian Development Bank.

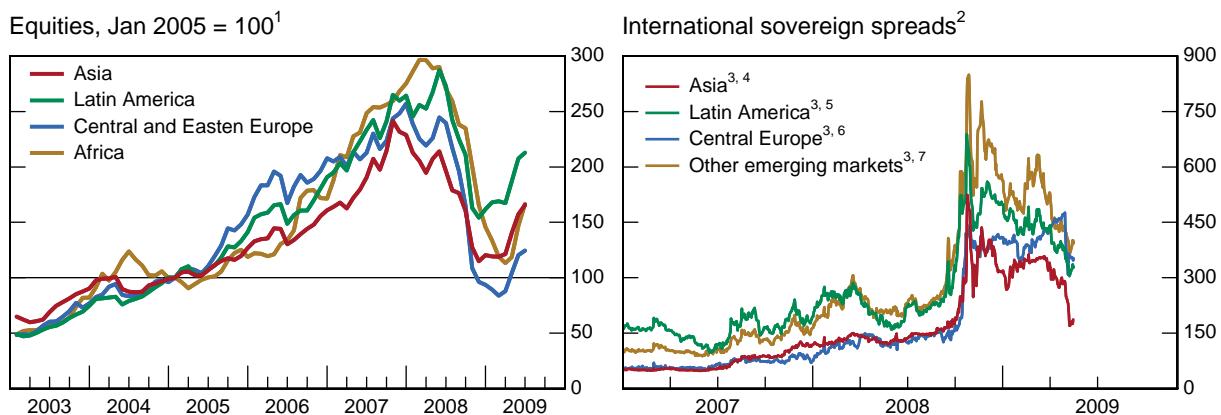
<sup>4</sup> Soesastro, H: “Policy responses in East Asia to the global financial crisis” (11 December 2008).

## II. Spillover effects in emerging Asia

Although emerging Asia has not been at the core of the crisis, negative developments in the global financial and macroeconomic environment spilled over to the region. This was primarily due to Asia's greater market integration with the rest of the world, which necessarily amplified the magnitude of the cross-country transmission of shocks.<sup>5</sup>

While financial markets in emerging Asia had relatively limited exposure to subprime-related instruments, increased global market integration meant that the deleveraging process in advanced economies led to a substantial liquidation of assets in emerging Asian markets and large capital outflows. These developments, in turn, contributed to a sharp decline in the Asian equity markets, the widening of sovereign bond spreads, the depreciation of regional exchange rates and the decline in offshore bank lending in the region.<sup>6</sup>

### Asian equity markets and debt spreads



<sup>1</sup> Morgan Stanley Capital International equity indices; total return indices. <sup>2</sup> JPMorgan EMBI Global (EMBIG) sovereign spreads over US Treasury yields (for Korea and Thailand, CMA five-year credit default swap premia), in basis points. <sup>3</sup> Median of the economies listed. <sup>4</sup> China, Hong Kong SAR, Indonesia, Korea, Malaysia, the Philippines and Thailand. <sup>5</sup> Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. <sup>6</sup> Hungary and Poland. <sup>7</sup> Russia, South Africa and Turkey.

Sources: Datastream; JPMorgan Chase.

After the collapse of Lehman Brothers in September 2008, global investors reduced their exposure to the region amid heightened concerns over counterparty risks.<sup>7</sup> From July 2007 to August 2009, Asian stock markets fell between 38% and 62%, with the largest market declines coming from Singapore (27%), Thailand (21%) and the Philippines (21%).<sup>8</sup> Meanwhile, sovereign bond spreads peaked in the region as concerns over a slowing global economy intensified in the final quarter of 2008. Among the emerging economies in Asia, Indonesia experienced the largest increase in spreads, with the Emerging Market Bond Index (EMBI)+ spread jumping from 168 basis points (bp) in July 2007 to more than 928 bp in

<sup>5</sup> "Recent financial turbulence – course of action", presented at the 44th SEACEN Governors' Conference on 30 January 2009, Bank Negara Malaysia.

<sup>6</sup> Ibid.

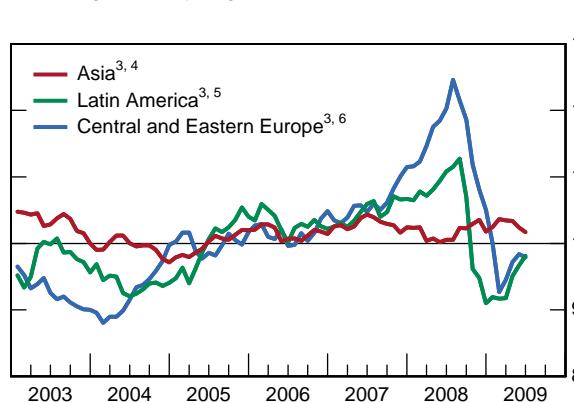
<sup>7</sup> Kato, T: "Implications for Asia from the global financial crisis and policy perspectives", Harvard Asia Business Conference, 14–15 February 2009.

<sup>8</sup> Goldstein, M and D Xie, P: "The impact of the financial crisis on emerging Asia", Peterson Institute for International Economics, 20 October 2009.

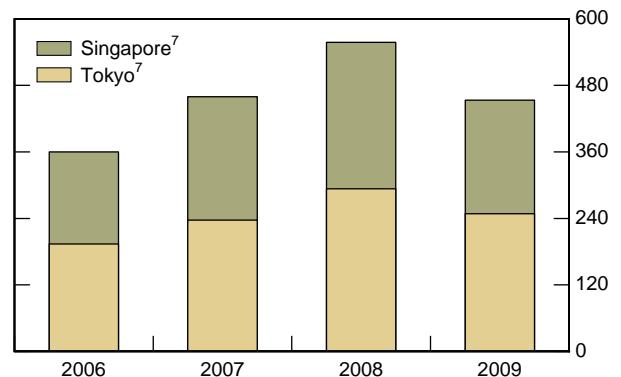
December 2008. On the other hand, China experienced a spread increase of about 270 bp from the start of the crisis up to 8 October 2008.<sup>9</sup>

## Foreign exchange market

Exchange rate by region<sup>1</sup>



Total foreign exchange transactions<sup>2</sup>, average daily volume in billions of US dollars



<sup>1</sup> Nominal effective exchange rate; 2005 = 100. <sup>2</sup> Annual April survey results; include spots, forwards and swaps. <sup>3</sup> Weighted average of listed economies based on 2005 GDP and PPP exchange rates. <sup>4</sup> China, Chinese Taipei, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. <sup>5</sup> Argentina, Brazil, Chile, Mexico, Peru and Venezuela. <sup>6</sup> The Czech Republic, Hungary and Poland. <sup>7</sup> Transactions include spots, forwards, and swaps. Japan and Singapore account for 11 percent of global foreign exchange trading, BIS Triennial Survey 2010.

Sources: Tokyo Foreign Exchange Market Committee's Survey of Tokyo FX Market and the Singapore Foreign Exchange Market Committee Survey of Singapore Foreign Exchange Volume; BIS.

The currencies of emerging Asian countries weakened as investors sought the safe haven of the US dollar while a slowdown in world economic growth also limited export earnings of member countries. Among the currencies in East Asia, it was the Korean won that depreciated the most by end-2008, along with the Indonesian rupiah, the Malaysian ringgit, the Philippine peso and the Thai baht, which fell in the range of 4–15% against the US dollar. On FX turnover, FX transactions across two major Asian foreign exchange markets, namely Tokyo and Singapore, managed to show some increase in volume in 2008. However, by April 2009, average monthly FX turnover had declined sharply by around 15.3 percent in Tokyo and 22.5 percent in Singapore. The shrinkage in FX swap transactions reflected higher risk aversion. Moreover, trade financing tightened in the wake of lower growth prospects leading to a further squeeze in the FX markets.

## International bank lending

Offshore banking in emerging Asia declined as a result of the crisis.<sup>10</sup> From the third quarter of 2008, international bank credit flows turned negative in Asia as accelerating losses pushed developed economies to reduce their exposure to developing countries.

<sup>9</sup> Ibid.

<sup>10</sup> Based on the BIS' international banking statistics, loans to developing countries fell from US\$ 514 billion in 2007 to US\$ 109 billion in 2008.

<b>Cross-Border Loans of BIS Reporting Banks<sup>1</sup></b>						
<b>In billions of US dollars</b>						
	2007	2008	2008		2009	
			Q3	Q4	Q1	Q2
Cross-Border Loans to Developing Countries of which: Asia-Pacific	514	109	45	-204	-102	-13
	126	-47	-13	-134	-52	3

<sup>1</sup>External loans of BIS reporting banks vis-à-vis individual countries, estimated exchange rate adjusted changes.

Source: Bank for International Settlements

The cause of the decline in cross-border bank lending was two-pronged. On the supply side, it reflected the virtual drying up of credit following the panic in financial markets. Massive deleveraging on the part of international banks, accompanied by the increase in bank losses and resurgence of cost savings constrained their credit operations. The Institute of International Finance (IIF) noted in its report dated October 2009 that new regulations requiring banks to hold high-risk-based levels of capital were expected to prod international banks to retrench from emerging market lending. Meanwhile, on the demand side, bank lending was also expected to decline due to the limited demand for loans resulting from the recession.

Private sector companies with high levels of external debt due for rollover were particularly hard hit by the reduced access to international markets. Creditors were reluctant to rollover these debts for fear that borrowers would not be able to service their debts. In addition, private borrowers from emerging economies faced the prospect of being “crowded out” by the huge borrowing needs of governments to finance fiscal stimulus packages implemented to avert a recession in their countries.

Given this scenario, the corporate sectors in emerging markets faced difficulties in raising capital, as they were limited to local borrowing and internally generated funds to meet their obligations. In 2009, the corporate sectors from emerging economies needed US\$ 200 billion to refinance their external debts. The corporate challenges faced by emerging market economies (EMEs) included revenue shortfalls, refinancing needs and volatile investor sentiment.<sup>11</sup>

### III. Impact on Philippine financial markets

Like their neighbouring countries in Asia, Philippine financial markets were not spared from the ripple effects of the crisis.

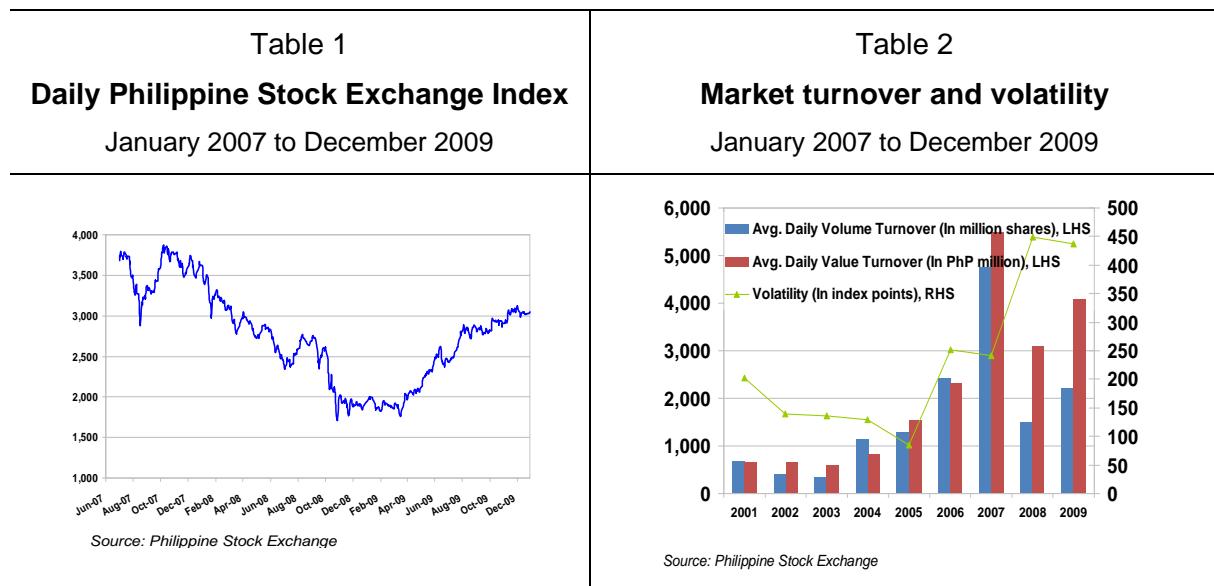
#### Equity market

The Philippine equity market came under considerable stress in 2008 amid a deteriorating global economic outlook. Concerns over the global financial turmoil and the related

<sup>11</sup> See [www.rgemonitor.com/22](http://www.rgemonitor.com/22). RGE Monitor: “EM corporates: financing outlook 2009” (released on 9 December 2009).

slowdown of the global economy resulted in heightened risk aversion and uncertainty, which saw investors, both foreign and domestic, either unload their holdings of stocks or stay in the sidelines awaiting better news. Subsequently, the ability of the stock market to raise fresh capital declined during the year.

Following the collapse of Lehman Brothers, the benchmark Philippine Stock Exchange Index (PSEi) dropped, on 16 September 2008, by 9.3% or 224.3 index points to 2,421.7 from the 12 September level of 2,646.1 (Table 1). The index had been on a downtrend since early September 2008 following reports of the Freddie Mac and Fannie Mae bailouts by the US Federal Reserve. The downtrend continued, and on 28 October, the composite index fell to a record low of 1,704.41 index points, the lowest level since January 2007. By end-December 2008, the PSEi had declined by 48.3%, year-on-year, to close at 1,872.85 index points. This reflected the movement of equity prices worldwide as risk aversion and uncertainty over the earnings of listed firms intensified.

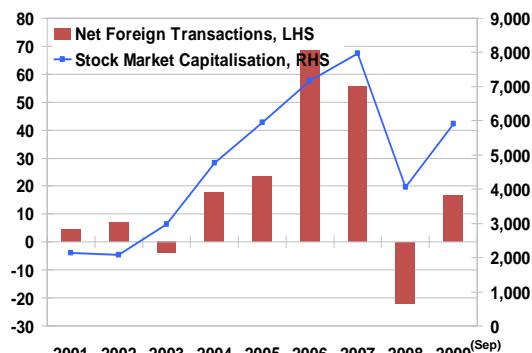


Investor sentiment on the Philippine stock market turned sharply cautious, especially at the height of the crisis in 2008. Market capitalisation reached PHP 4.1 trillion at end-2008, nearly half of the PHP 8.0 trillion registered in December 2007 (Table 2). Meanwhile, foreign investors posted net sales amounting to PHP 22.2 billion in 2008, a reversal of the net buying activity of PHP 55.6 billion posted in 2007 (Table 3). The price to earnings (P/E) ratio also declined to 9.42 in 2008 from 15.49 in 2007, indicating that investors were expecting lower future earnings growth (Table 4). Likewise, market volatility, measured as the standard deviation of daily stock indices, nearly doubled to 448 index points in 2008 relative to the previous year's level of 242 index points.

Table 3

**Net foreign transactions and market capitalisation**

January 2007–September 2009

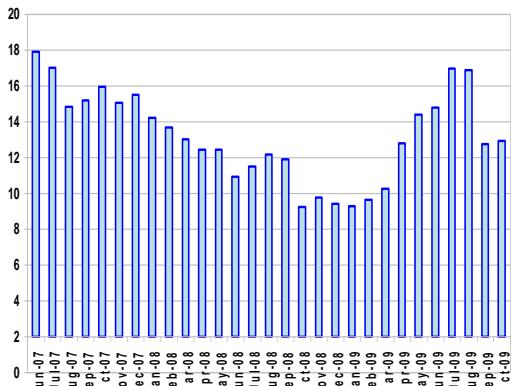


Source: Philippine Stock Exchange

Table 4

**Price/earnings ratio**

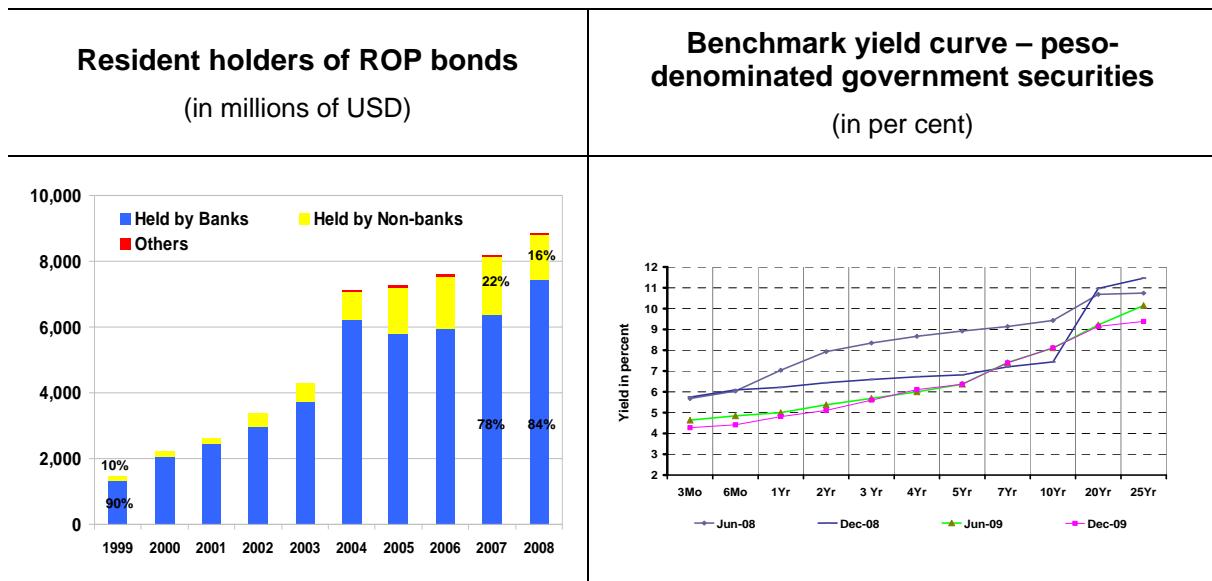
January 2007 to October 2009



Source: Philippine Stock Exchange

In the first quarter of 2009, investors' appetite remained weak amid deepening concerns that the global recession would pull down domestically listed firms' earnings. Withdrawal from the equity market continued and net selling reached PHP 7.4 trillion from January to March. The composite index closed at 1,986.2 index points at end-March, which was higher by 6.1% on the year-to-date level but lower by 33.4% year-on-year. However, starting from the second quarter until end-2009, the equity market's performance improved as investor confidence gradually increased, perceiving that the global recession was bottoming out in major economies and that the Philippines was generally resilient in withstanding the equity shocks. Foreign investors posted a net buying activity of PHP 13.5 billion by end-November 2009, while the PSEi composite index closed at 3,052.7 index points at end-December, higher by 70% relative to the end-2008 level, but lower by 17% compared to the end-2007 level.

## Government bond market



Government securities (GS), which have been the key feature of the Philippine debt market, continued to dominate in 2008, accounting for 89% or PHP 998 billion of the total bond issuances in 2008.<sup>12</sup>

Non-residents remained the major holders of the Republic of the Philippine (ROP) bonds, holding 58% of the total outstanding issuances as of end-2008. This was, however, lower than the previous year's level of 62%, reflecting heightened investor risk aversion in the global market. On the other hand, resident holdings of ROPs increased in 2008, amounting to US\$ 8.9 billion or 42% of the total outstanding ROPs. Of the total resident ROP holdings, Philippine banks accounted for the bulk or 84% (US\$ 7.5 billion). Banks were also the primary buyers/holders of peso-denominated GS.

The cost of borrowing funds initially rose in the primary market in 2008. The Bureau of the Treasury (BTr) sold less than half its programmed T-bill and fixed-rate Treasury bond (FXTB) issuances for the year as it rejected bid rates, which carried high premia caused by rising inflation, BSP rate hike concerns and the global financial crisis that exploded in the third quarter of the year. The government's reported comfortable cash position, however, enabled the BTr to award bids that it deemed reasonable. Rates of accepted tenders subsequently dropped in the fourth quarter as the BSP cut its policy rates in light of the improving inflation picture as well as the need to support economic growth.

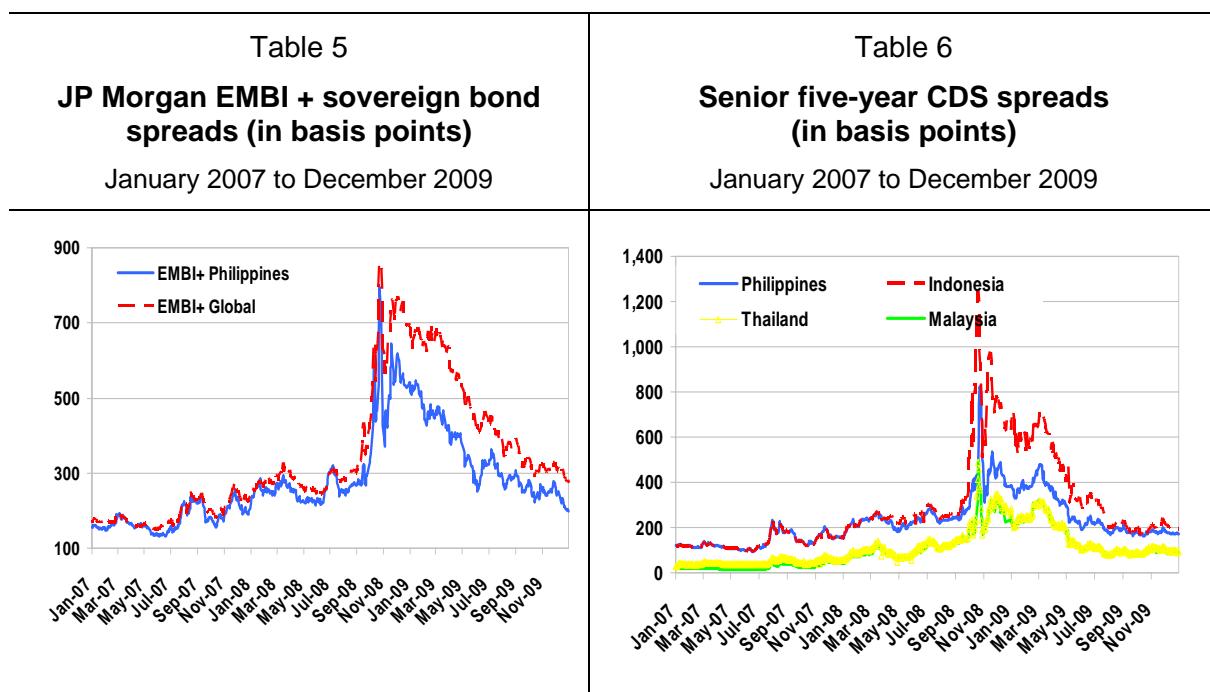
In the secondary market, the cost of borrowing funds likewise increased. In the first half of 2008, investors demanded higher premia for holding government securities as they were priced according to lower short-term growth prospects and the possibility of higher inflation in the long term. After a brief recovery wherein yields fell in July and August, GS yields rose again, starting in September, as investors' worries intensified with the collapse of major investment banks and growing signs of economies going into recession. However, the BSP's measures to provide liquidity to the market starting in the fourth quarter of 2008 helped ease the market's bearishness and caused yields to fall. The deceleration in inflation rates towards

<sup>12</sup> Corporate bond issuances comprised the rest of the domestic debt market in 2008 at PHP 125.0 billion, capturing 11% of total issuances, an improvement from the 9% share posted in 2007.

the end of the year was also a source of optimism as it gave the monetary authorities the flexibility to reduce their policy rates which, in turn, led to the easing of GS yields in the secondary market.

In 2009, the downward shift in the yield curve continued with yields dropping faster at the shorter end following the monetary easing by the BSP.

## Sovereign spreads



Spreads in dollar-denominated ROP bonds have remained on the high side since mid-2008. The extra premium for holding Philippine bonds over US Treasuries, as measured by the EMBI+ Philippines spread, rose by 335 bp during the year. Sovereign spreads peaked in October–November 2008 as depressed risk appetite and associated pressures in developed economies spilled over into the emerging financial market. As of 30 June 2009, the EMBI+ Global spread narrowed to 424 bp from the average of 481 bp recorded in May 2009. The EMBI+ Philippines spread likewise tightened to 323 bp by end-June compared to the previous month's average of 330 bp. By end-December 2009, both the EMBI+ Philippines and EMBI+ Global spreads had further narrowed to 198 and 274 bp, respectively (Table 5).

The trend in the ROP spreads closely followed the CDS spread which significantly swelled to 825 bp on 24 October 2008 (Table 6).<sup>13</sup> By the end of the year, the Philippine CDS spread had retreated to 386 bp. Against neighbouring economies, the Philippine CDS spread remained below Indonesia's CDS level at 691 bp. However, the cost for holding Philippine bonds was higher than in Malaysia and Thailand with CDS spreads at 230 bp and 255 bp, respectively.

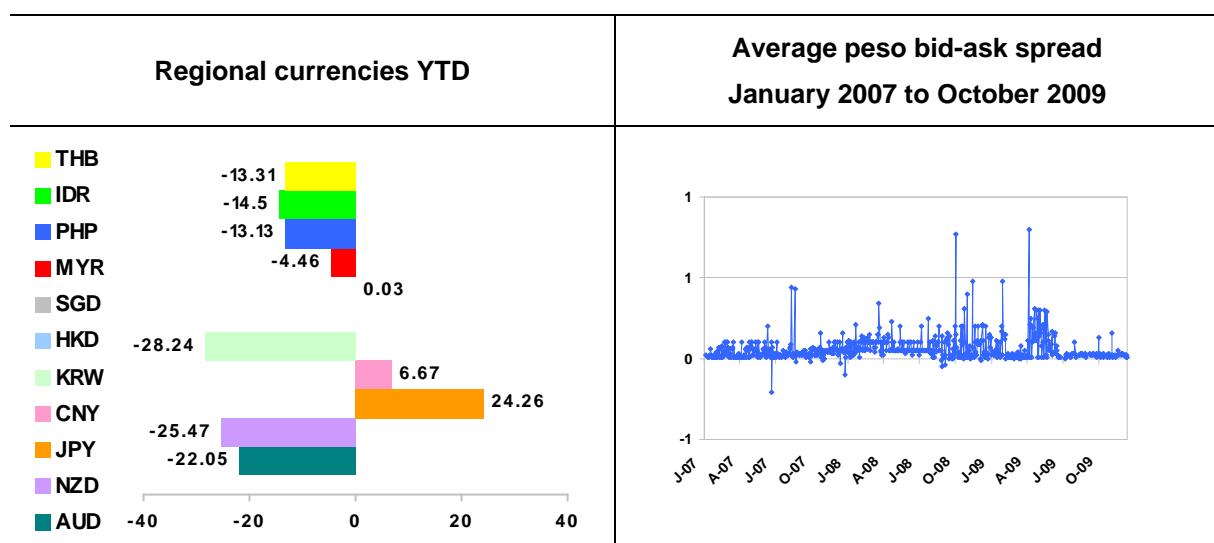
As of 30 June 2009, the Philippine CDS spread narrowed to 216 bp. This was lower than Indonesia's 310 bp, but remained higher than Malaysia and Thailand with CDS spreads at 108 and 111 bp, respectively. Relatively weak economic data and corporate earnings reports

<sup>13</sup> This means that it costs US\$ 825,000 to insure US\$ 10.0 million of Philippine sovereign debt from default.

and the resulting expectations of rising defaults contributed to the relatively higher spreads.<sup>14</sup> However, by end-December 2009, CDS spreads had eased to 173 bp.

### Foreign exchange market

Against the backdrop of the global financial crisis that was characterised by massive financial deleveraging and heightened risk aversion, the peso, like the other regional currencies, started to depreciate in March 2008 to an average of PHP 41.25/US\$ 1, from PHP 40.67/US\$ 1 in February, particularly following the bailout of Bear Stearns on 14 March 2008. The intensification of the financial crisis in September 2008 following the collapse of Lehman Brothers and the sharp deterioration in economic prospects in emerging countries led to the further depreciation of the peso to an average of PHP 46.69/US\$ 1 during the month.



The resulting large capital outflows by portfolio investors exerted pressure on the FX market. Reflecting the increased demand for dollar liquidity amid the massive capital outflows in 2008, the average daily volume of transactions in the FX market rose from US\$ 583.5 million in March to US\$ 777.0 million and US\$ 876.2 million in September and October 2008, respectively. Likewise, the average bid-ask spread quoted in 2008 reflected market strains as the spread widened to an average of PHP 0.08 during the year from PHP 0.04 in 2007, suggesting increased pressure in dollar liquidity in the FX market following the onset of the financial crisis.

The peso continued to weaken against the US dollar in the last three months of 2008 as risk aversion rose further due to market concerns over the contagion effect of the US financial turmoil and its impact on the global economy. Volatility, as measured by the coefficient of variation, rose from 1.6 in October to 1.8 in December 2008.

The peso regained stability in 2009 as the Government, together with the monetary authorities, implemented several measures to mitigate the impact of the global financial crisis. On a year-to-date basis, the peso appreciated against the US dollar by 2.9% to close at PHP 46.20/US\$ 1 in 2009. In 2009, the average peso-dollar bid-ask spread tightened to PHP 0.05, indicating improvements in FX market liquidity. Moreover, the peso's volatility declined to a monthly average of 0.7% in 2009.

<sup>14</sup> BIS Quarterly Review, March 2009.

The developments in the global market during the global financial turmoil were also reflected in the interbank transactions in the Philippines. In particular, this was observed in the movement of the Philippine Interbank Reference Rate (PHIREF), which is the implied Philippine peso interest rate derived from all completed US dollar/peso swap and forward transactions.

The PHIREF for overnight swap transactions declined markedly in the last three months of 2008, which indicated strong demand for the US dollar as a result of the financial turmoil. The demand for dollars rose sharply during this period, such that market participants were willing to pay more in terms of pesos (or, conversely, they were willing to receive negative returns for their peso funds) just to obtain the required financing in US dollars. This drove the PHIREF rate down to zero and then to negative territory.

On 24 September 2008, for example, the PHIREF for daily overnight swap transactions reached  $-7.55\%$ , the lowest rate in the interbank swap market since the start of the US subprime crisis. Moreover, the volume of overnight swap transactions on 24 September reached US\$ 431.5 million, significantly higher than the US\$ 335.7 million in 2008.

Nonetheless, as market sentiment improved and following several reductions in the BSP's key policy rates, the overnight PHIREF adjusted towards its normal level.<sup>15</sup> In 2009, the PHIREF averaged  $4.21\%$  while the average daily volume of transactions reached US\$ 309.9 million.

### **Domestic money market**

The money market continued to be generally liquid in 2008 despite the global financial turbulence that had escalated during the year. The weighted average interest rate (WAIR) on money market transactions declined from  $6.1\%$  in 2007 to  $5.4\%$  in 2008.<sup>16</sup>

The volume of money market transactions (inclusive of placements with the BSP, interbank call loans, interbank swap transactions and Treasury bills) aggregated PHP 84,259 billion in 2008, 23% higher than the previous year's level and the highest volume recorded in the last nine years. Growth was driven primarily by increased short-term placements with the BSP which rose markedly by more than 20% to PHP 76,217 billion. This notable rise in short-term placements with the BSP reflected banks' preference to remain liquid amid generalised risk aversion and cautiousness given the challenging economic conditions. It could also be explained by the reduced demand for loans because of lower growth prospects. During the year, repurchase agreements (RP) were the most actively traded instrument in the money market, comprising 75% of the total volume of money market transactions.

Banks' placements with the BSP started to grow in April and rose to an average of PHP 7,955 billion in July. From August to November, transactions remained elevated, averaging PHP 6,634 billion per month.

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<sup>15</sup> The BSP reduced its policy rates six times from December 2008 given an easing inflation outlook. On 18 December 2008 and 29 January 2009, the BSP reduced its key policy rates by 50 bp on each occasion while on 5 March, 16 April, 28 May, and 7 July 2009, the BSP's key policy rates were reduced by 25 bp. These policy reductions brought the overnight borrowing or reverse repurchase (RRP) facility and the overnight lending or repurchase (RP) facility to  $4\%$  and  $6\%$ , respectively. The decision to reduce the policy rates was expected to help bring down the cost of borrowing, thus relieving corporates' and households' financial burden and promoting wider access to domestic financing amid tight external financing conditions.

<sup>16</sup> The computation for the weighted average interest rates is based on money market transactions on interbank call loans, promissory notes, repurchase agreements, commercial papers, Treasury bills and other government securities. The sources of basic data used in the analysis/text (unless otherwise stated) come from the daily money market reports of banks and other financial institutions with quasi-banking functions submitted to the Department of Economic Statistics (DES).

Loans at the interbank call market also increased, rising by 41% to PHP 1,710 billion in 2008. The average interest rate in this market dropped to 5.5% during the year compared to the 7.2% posted in 2007, indicating that banks had sufficient liquidity.

On a month-on-month basis, however, interbank call loan (IBCL) transactions fell steadily, indicating banks' reluctance to lend. Banks' cautiousness to lend was likewise reflected in the call rates which rose to a peak in August in tandem with the BSP's earlier tighter monetary policy stance to address the build-up of inflationary pressures brought about by the continued rise in commodity and oil prices during the latter period of 2007 and the early period of 2008.

During the first half of 2009, placements in the BSP's facilities continued to be the preferred money market instrument, accounting for 88% of total money market transactions. As for the interbank market, the total volume of transactions fell by 62% relative to the same period in 2008, suggesting that there was sufficient liquidity in the system.

The continued rise in repo transactions in 2009 indicated that banks remained cautious over a possible lengthening of crisis conditions that could drain liquidity in the short-term funding market. Banks' further reluctance to lend to each other, as evidenced partially by the decline in interbank lending transactions, as well as the drop in the commercial paper and short-term government securities transactions in the secondary market, reflected the persisting elevated uncertainties over lending to counterparties other than the government.

### **Domestic banking**

The Philippine banking system<sup>17</sup> has remained resilient despite the heightened level of global financial distress. This is primarily due to several factors: first, the limited exposure of domestic banks to the US subprime fallout and other related securitised assets, which accounted for only 0.4% of the banking system's total assets as of 30 June 2008; second, its relatively strong bank balance sheets with a return to profitability; third, improvements in risk and liquidity management; fourth, strengthening of supervisory and regulatory systems; and fifth, moves by banks into more profitable domestic business lines such as consumer lending.<sup>18</sup>

In fact, in the first half of 2009, local banks managed to register respectable growth in their key balance sheet accounts. During the period, banks were able to provide higher provisions for credit losses, plough back undivided profits to reinforce their capital base and achieve greater efficiency in their operations on account of greater maximisation of e-banking technologies. Philippine banks recorded solid performances in terms of asset quality, capital position and profitability. Overall, the system was able to maintain net profit despite the decline in treasury-related operations due to substantial revaluations of unrealised gains from banks' FX transactions.

### **Funding**

Prior to the crisis, the domestic banking system was focused on the traditional banking business of accepting deposits and making loans. In addition, banks' composite asset and funding mix were mainly domestic-oriented. The prudential measures put in place after the Asian crisis (geared towards maintaining a strong banking system, strengthening bank

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<sup>17</sup> For the purposes of this paper, the Philippine banking system refers to the Philippine universal and commercial banking system (UKBs), unless otherwise specified. The UKBs accounts for the bulk (89.5%) of total resources of the Philippine banking system as of the fourth quarter of 2008, and generally drives developments for the whole system.

<sup>18</sup> "Impact of the global financial and economic crisis on the Philippines", J T Yap et al.

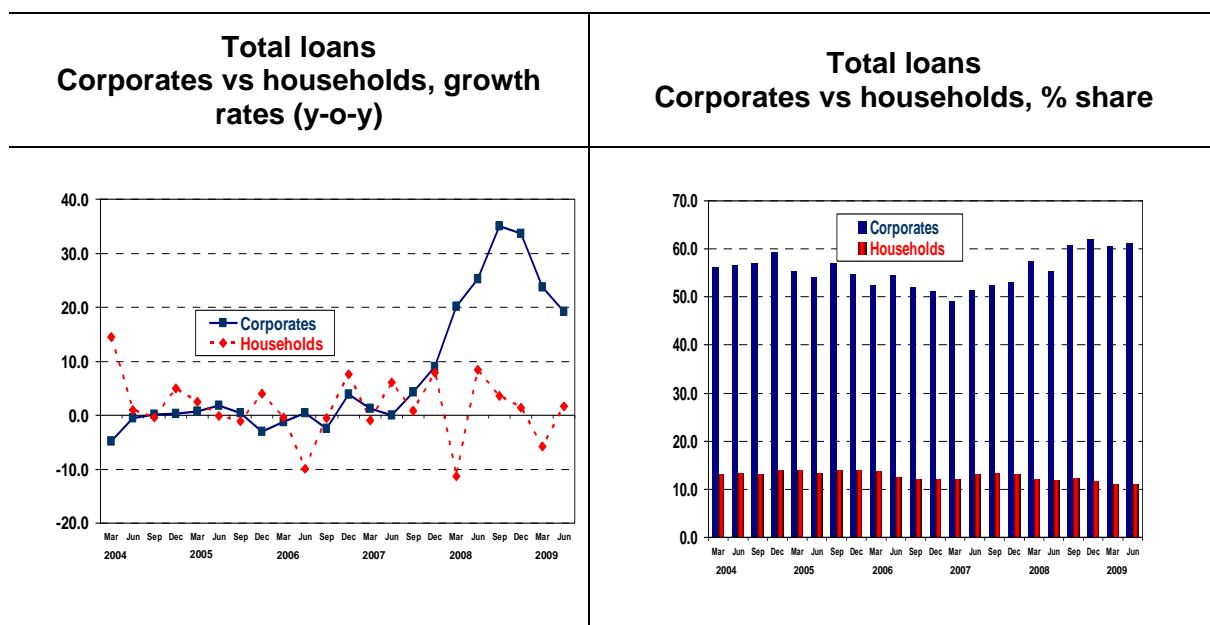
balance sheets, promoting corporate governance and transparency, upgrading risk management standards and improving consumer protection) helped to curb excessive risk-taking of domestic banks. These factors helped to insulate them to a considerable degree from the negative impact brought about by the credit crisis.

Deposits have remained the main funding source of banks, making up more than 82% of total liabilities as of end-September 2009 from 83% for the whole year of 2008. Meanwhile, retail deposits made up more than half of total deposits at 56%.

Meanwhile, in response to heightened concerns over liquidity, domestic banks increased their reliance on short-term funding (with maturities of up to one year) in 2009. From 86% in September 2008, the share of short-term funding to total funding increased to 89% in September 2009. In contrast, the share of long-term funding (with maturities over five years) to total funding decreased to 5% from 10% in the same period.

## Lending

Even amid the global financial crisis, the total loan portfolio of the domestic banking system grew by 7.7% and 1.4% in the third quarter of 2009 year-on-year and quarter-on-quarter, respectively. In the same period, loans to the corporate sector grew by 19.2% relative to the level of the previous year. Likewise, total loans to the household sector grew modestly by 0.6% compared to the third quarter level of 2008. As of June 2009, loans to the corporate sector comprised 61.2% of total loans. Meanwhile, loans to households made up 11.0% of total loans.

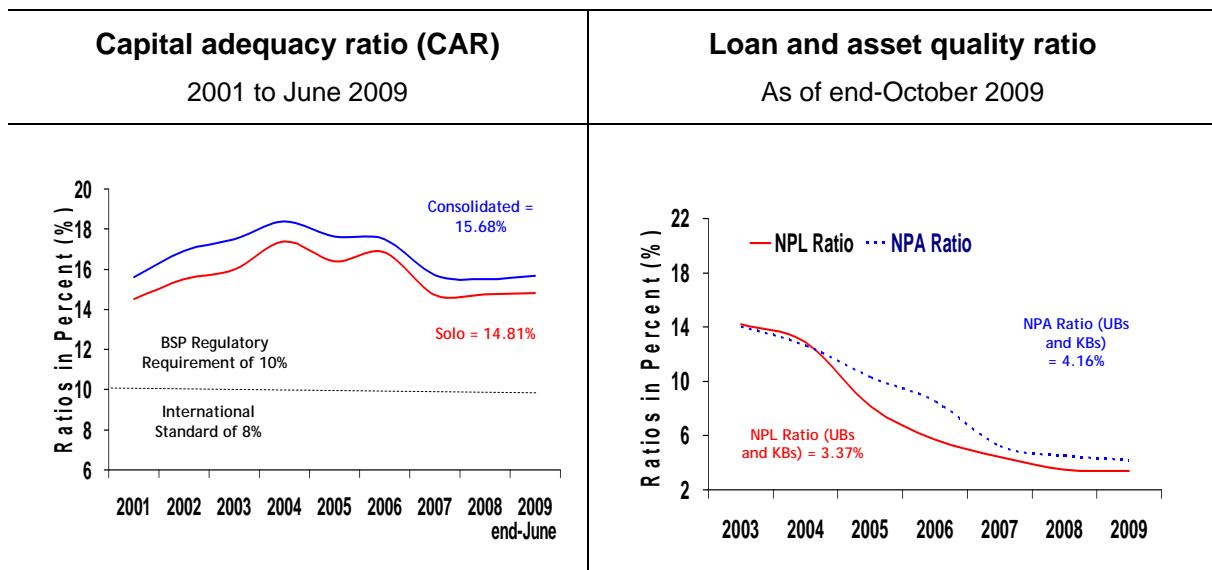


Since 2007, the proportion of corporate sector loans in the banking system's loan portfolio declined from a high of 67% immediately after the Asian crisis to a low of 49% in 2007, as excess production capacity dimmed the appetite for corporate borrowing. The proportion of such loans partially recovered at 61% as of June 2009. Besides financial intermediation and the interbank market, the top three loan recipients were real estate, manufacturing and agriculture-related sectors. Meanwhile, the proportion of household loans to total loans likewise showed a general downtrend during the same period.

Similarly, there were some changes in banks' loan structure in terms of the types of maturity issued and profile of counterparties transacted with. In terms of maturity, the proportion of short-term lending (with maturities of up to one year) to total lending declined from 72% as of

end-June 2008 to only 61% as of end-September 2009, indicating the shift of banks' lending activities to longer-term maturities in the face of the uncertain environment during the period.

### Asset quality



In 2009, the banking system's capital adequacy ratio (CAR) remained above regulatory and international standards at 14.8% on a solo basis and 15.6% on a consolidated basis. This indicates that local banks had adequate capital buffers to absorb potential losses.

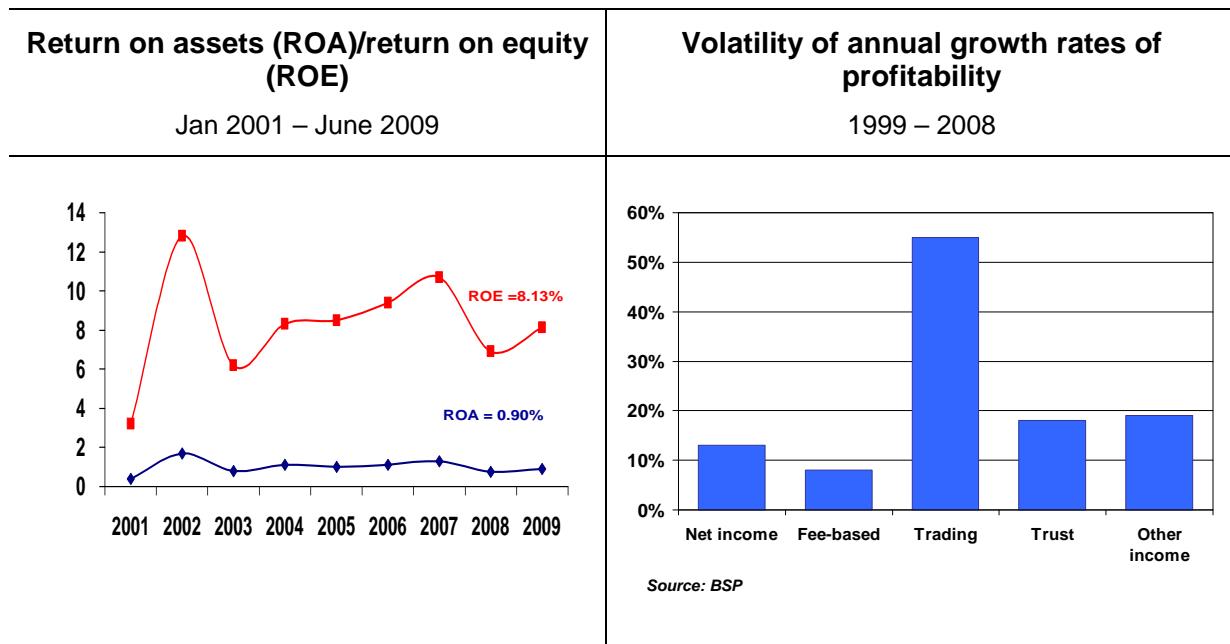
In the first half of 2009, non-performing loans (NPLs) decreased by 10.0% from PHP 94.1 billion in the previous year to PHP 84.6 billion. This consequently brought down the banking system's NPL ratio to its eleven and a half-year low of 3.4%. As a corollary, non-performing assets (NPAs) decreased by 5.9% in the same period at PHP 225.5 billion from PHP 239.7 billion in the previous year. Both NPL and NPA ratios further eased to 3.37% and 4.16% respectively by end-October 2009.

Lastly, total resources of the banking system rose by 7.2% to PHP 6.1 trillion as of end-October 2009 from the previous year level of PHP 5.7 trillion. The increase was mainly due to the rise in debt securities. U/KBs continued to account for almost 90% of the total resources of the banking system.

### Profitability

The banking system's profitability improved during the first quarter of 2009. Net income after tax (NIAT) was at PHP 14 billion, reflecting an increase of 101% and 5% compared to the previous quarter and a year ago levels, respectively. The increase in NIAT could be attributed to the decline in the cost-to-income (CTI) ratio at 66% in end-March relative to 69% in the previous quarter and 70% in the previous year. The decline in CTI was driven by the reduction in compensation/fringe benefits and other administrative expenses.

Meanwhile, return on equity (ROE) and return on assets (ROA) increased to 8.13% and 0.90% in the first three months of 2009 from 6.86% and 0.78%, respectively, in the previous quarter.



## Liquidity

Liquidity, next to capital adequacy, is key to financial stability. The reduction in reserve requirements (19% of peso deposit liabilities/substitutes effective 14 November 2008 pursuant to Circular no 632 dated 13 November 2008) and prudent credit allocation (loan-to-deposit ratio stood at 63.0% as of end-September 2009) of banks led to ample liquidity in the system. Parallel to this, the BSP implemented other liquidity management measures to ensure liquidity in the system (ie peso and dollar repo windows).

The ratio of banks' liquid assets to total assets increased to 30.6% as of end-September 2009 from the previous year's ratio of 29.7%. Investment in government securities and amounts due from banks comprised total liquid assets at 53% and 41%, respectively. The loan-to-deposit ratio remained modest at 63.0%. Excluding lending to and deposits from banks, the loan-to-deposit ratio was even lower at 47.0%.

## Foreign banks

While domestic banks registered positive growth in assets, loans and liabilities, foreign-owned banks suffered a general decline in their balance sheets. Foreign-owned banks' assets plummeted by 12.0%, loans by 15.0% and liabilities by 13.0% year-on-year as of September 2009.

It would seem that foreign banks were still risk-averse regarding the financial markets, since 94% of the decline in their loan portfolio was accounted for by the drop in their interbank loans (IBL) and repurchase (repo) activities. It should be noted that foreign banks are significant players in the IBL and repo markets, accounting for 31% and 24% of the total of these markets (this is quite large given that foreign banks only account for around 13% of banks' total assets). The decline in total IBLs can be attributed mainly to one foreign bank's IBL transactions, which decreased by PHP 21.6 billion.

This was in sharp contrast to the IBL and repo activities of domestic banks, which increased by 45% and 71%, respectively. Domestic banks appeared to regain their confidence in the financial markets sooner than foreign banks (domestic banks' IBLs dropped in 2008 and early 2009). This was expected given the vulnerability of foreign banks' head offices.

Foreign-owned banks' loan portfolios remained the bulk of their assets. As of September 2009, their loan portfolio share to total assets was 57%, 10 percentage points higher than that of domestic banks. The contraction in foreign-owned banks' loan portfolios offset the 50% growth in their investment portfolios, which comprised 15% of total assets in the same period. Investments in government securities comprised 68% of total investments. Meanwhile, domestic banks' investment portfolios, which made up 29% of their total assets, grew by 25%.

Like domestic banks, deposits have remained the core source of foreign-owned banks' funding. As a share of total liabilities, deposits of foreign-owned banks went up from 58% in September 2008 to 65% in September 2009.

Foreign-owned banks posted an increase in their liquidity ratio from 23.4% in September 2008 to 27.0% in September 2009, due mainly to the 12% decline in their total assets. Liquid assets per se increased by only 1%. This ratio, however, was lower than domestic banks' liquidity ratio at 31%.

#### **IV. The BSP's response to the crisis**

In response to the global financial turmoil, the BSP carefully considered opportunities for monetary policy easing amid the potential tightening of financial conditions while remaining faithful to its core mandate of maintaining price stability. The BSP pursued policies that would infuse appropriate levels of liquidity to maintain the efficient functioning of the financial markets and help avert the shrinkage of domestic markets while keeping its eye on price developments.

Because the Philippine economy did not experience as deep a crisis as the advanced economies, monetary easing by the BSP was of a relatively smaller magnitude and thus involved conventional measures.

In many ways, the BSP's interest rate easing and liquidity provision measures were confidence-building moves, signalling the BSP's commitment to ensuring ample money supply in order to fuel the economy's growth engine and maintaining low interest rates to reduce the cost of borrowing to firms and households and therefore support investment and consumption growth.

##### **Policy rate reduction**

With easing price pressures due to muted demand pressures, the BSP moved to cut policy rates by 200 bp from December 2008, bringing the overnight borrowing or reverse repurchase rate to 4.0% and the overnight lending or repurchase rate to 6.0%. The rate reductions were intended to help stimulate economic growth and/or dampen the slowdown in economic activity by reducing the cost of borrowing, thereby reducing the financial burden of firms and households. Reduced policy rates also helped to mitigate the negative feedback loop between weakening economic conditions and a more cautious financial sector. The action also helped to boost business and consumer confidence.

<b>Policy rate reductions</b>	
18 December 2008	50 bp reduction
29 January 2009	50 bp reduction
5 March 2009	25 bp reduction
16 April 2009	25 bp reduction
28 May 2009	25 bp reduction
7 July 2009	25 bp reduction

### **Liquidity-enhancing measures**

With the growing concern that local banks could encounter problems in sourcing dollars, the BSP implemented several measures to help infuse dollar liquidity into the domestic financial system. The BSP opened a US dollar repo facility to augment dollar liquidity in the FX market and ensure the ready availability of credit for imports and other legitimate funding requirements. For this facility, the Monetary Board (MB) approved the use of foreign-denominated sovereign debt securities (ROP) as collateral for loan availments. The guidelines were amended the following month to limit the facility only to banks with legitimate foreign currency-denominated funding needs, provided that the borrowing would be for the account of the applicant bank and would not be used to fund the liquidity requirements of foreign branches, affiliates or subsidiaries.

In addition to the foreign currency refinancing measures, the BSP implemented the following liquidity support measures for the purpose of pre-emptively providing ample liquidity and credit in the banking system:

<b>Other liquidity support measures</b>	
7 November 2008	Increased the rediscounting budget from ₱20B to ₱40B
14 November 2008	Reduced the reserve requirement by two percentage points
2 March 2009	<p>Increased further the rediscounting budget from ₱40B to ₱60B. A larger rediscounting budget would enable banks to refinance more loans extended to their clients</p> <p>Liberalised rediscounting guidelines to enable banks to rediscount more loan papers and therefore have access to additional funds that they could lend to the public. These included:</p> <ul style="list-style-type: none"> <li>• Aligning the peso rediscount rate with the BSP's RRP rate, less 50 basis points.</li> <li>• Increasing the loan value of all eligible rediscounting papers from 80% to 90% of the outstanding balance of a borrowing bank's credit instrument.</li> <li>• Lifting the requirement to execute a Surety Agreement (SA) by any single stockholder, natural or juridical, owning more than 50% of the voting stocks of a bank with approved rediscounting lines with the BSP.</li> <li>• Lifting the imposition of a ceiling on the outstanding papers that a bank may rediscount equal to the rediscounting bank's single borrower's limit.</li> <li>• Easing the NPL ratio requirement.</li> </ul>

Lastly, the BSP launched the Credit Surety Fund Programme (CSFP) in the second half of 2008 to help ensure that small businesses had access to financing. The CSFP is a credit enhancement scheme that allows micro, small and medium enterprises (MSMEs) that are members of cooperatives to borrow from banks even without collateral. Loans granted by banks under the Programme are eligible for rediscounting with the BSP through the Department of Loans and Credit (DLC).

### **Regulatory forbearance**

Complementing the aforementioned measures, the BSP also responded to the global financial crisis with regulatory forbearance. To safeguard confidence in the banking system, on 30 October 2008 the Monetary Board approved the guidelines allowing financial institutions to reclassify financial assets from categories measured at fair value to those measured at amortised cost. Financial institutions were allowed to reclassify their investments in debt and equity securities from their “held for trading” or “available for sale” categories to the “held to maturity” or the “unquoted debt securities classified as loans” categories. Likewise, the maximum deposit insurance coverage was increased to PHP 500,000 from PHP 250,000.

### **Cooperation and communication**

Lastly, in response to the BSP’s call for a coordinated domestic response to the global financial turmoil, the Bankers’ Association of the Philippines (BAP) adopted several measures by way of a gentlemen’s agreement at end-October 2008. For example, banks agreed to voluntarily halve their purchases or “overbought” position in the FX market to US\$ 25 million (or 10% of unimpaired capital) from the prevailing US\$ 50 million (or 20% of unimpaired capital), which helped to ease pressure on the demand for dollars. Moreover, the BSP further strengthened engagements with regional peers to share information, discuss emerging developments and pool resources, if necessary – even FX reserves.

In responding to the crisis, the BSP also found it important to improve transparency and communicate its near-term policy objectives. Communicating to the market and the public that the BSP is committed to ensuring that there is ample liquidity to keep the financial markets functioning and to helping fund the growth requirements of the economy has helped to stabilise financial markets and anchor inflation expectations going forward. Markets have, for instance, reacted positively to monetary policy actions that reassure them of the BSP’s commitment to keeping inflation in check. Clear communication will also avoid confusion about the BSP’s monetary policy stance going forward.

## V. Effectiveness of the BSP's policy response

### Selected economic and financial indicators

	2007	2008	2009
Real GDP growth (%)	7.1	3.8	1.1
Headline inflation (%)	2.8	9.3	3.2
Domestic liquidity, M3			
In billions of pesos	3,174.4	3,668.4	3,971.5
(%)	10.6	15.6	12.0
8.3			
Bank average lending rates (%)	8.7	8.8	8.5
T-bills 91 days (%)	3.4	5.4	4.2
Outstanding loans of universal and commercial banks, net of RRPs (in billions of pesos)	1,618.6	1,907.3	2,098.3
(%)	8.3	17.8	10.0
End-of-period exchange rate (Peso/US\$ 1)	41.28	47.52	46.20
Balance of payments			
In billions of USD	8.6	0.1	5.3
Current account			
In billions of USD	7.2	3.9	8.6
As a percentage of GDP (%)	4.9	2.3	5.3
Gross international reserves			
In billions of USD	33.8	37.6	44.2
Months of imports	5.7	5.9	9.0

Evidence suggests that the BSP's policy responses have proven to be effective.

Reduced policy rates boosted business and consumer confidence for economic expansion. As a result, real GDP continued to grow, albeit slower, at 1.1 % for 2009. Year-on-year growth can be traced to personal consumption expenditure and general government expenditure.

Year-on-year headline inflation averaged 3.2% for the whole of 2009, well within the Government's target range of 2.5–4.5% for the year. The subdued inflation environment has allowed the BSP to reduce its policy rates to support the economy.

Market interest rates have trended downwards following the policy rate cuts by the BSP, as banks have passed on reduced lending rates to their borrowers. The average bank lending rates for all maturities for 2009 averaged 8.5% from 8.8% in 2008. The average interest rate for the 91-day T-bill rate went down to 4.2% from 5.4% in 2008.

Sustained liquidity growth was recorded in 2009, indicating that ample funds were available to support the credit needs of firms and households. Domestic liquidity grew steadily at 8.3% year-on-year in 2009.

Outstanding bank lending as of December 2009, net of banks' reverse repurchase placements with the BSP, continued to grow by 10% year-on-year. Loans for production activities expanded year-on-year by 9.9% in December.

The peso-dollar exchange rate has remained generally steady. On a year-to-date basis, the peso appreciated by 2.9% against the US dollar as it closed at PHP 46.20/US\$ 1, on 29 December 2009. The peso strengthened due to the increased risk appetite for emerging market assets and continued inflows of OF remittances.

The overall BOP posted a surplus of US\$ 5.3 billion in 2009 on the strength of an improved current account balance. This resulted in the build-up of the country's gross international reserves (GIR), which reached US\$ 44.2 billion, equivalent to 9.0 times the country's imports of goods and services.

**TABLE 1**  
**Philippine Daily Stock Composite Index**  
**2007 to 2009**  
 (end of period)

<b>2007</b>	Jan	3239.27
	Feb	3067.45
	Mar	3203.55
	Apr	3270.73
	May	3474.67
	Jun	3660.86
	Jul	3501.20
	Aug	3365.29
	Sep	3572.90
	Oct	3758.97
	Nov	3578.55
	Dec	3621.60
<b>2008</b>	Jan	3266.00
	Feb	3129.99
	Mar	2984.67
	Apr	2749.77
	May	2827.44
	Jun	2459.98
	Jul	2577.10
	Aug	2688.09
	Sep	2569.65
	Oct	1951.09
	Nov	1971.57
	Dec	1872.85
<b>2009</b>	Jan	1825.09
	Feb	1872.22
	Mar	1986.22
	Apr	2103.50
	May	2389.31
	Jun	2437.99
	Jul	2798.33
	Aug	2884.18
	Sep	2800.82
	Oct	2908.50
	Nov	3044.97
	Dec	3052.68

*Source: Philippine Stock Exchange (PSE)*

**TABLE 2**  
**STOCK MARKET CAPITALISATION** <sup>1</sup>

**2006-2009**  
**end of period**  
**in million pesos**

		<b>Financials</b>	<b>Industrial</b>	<b>Holding Firms</b>	<b>Services</b>	<b>Property</b>	<b>Mining &amp; Oil</b>	<b>SME</b>	<b>Total</b>
2007	Jan	4,429,614.13	762,381.44	698,783.15	944,644.71	534,461.91	67,475.28	322.68	7,437,683.29
	Feb	4,492,380.32	788,248.32	654,902.47	890,486.84	535,920.50	70,841.59	335.28	7,433,115.32
	Mar	4,554,201.89	802,566.61	679,770.78	923,985.21	562,832.09	80,249.68	300.28	7,603,906.55
	Apr	4,627,118.47	810,929.61	699,621.08	934,578.98	577,595.28	87,844.97	325.48	7,738,013.87
	May	4,654,013.88	858,471.82	790,855.12	966,161.01	642,006.26	98,786.27	364.68	8,010,659.04
	Jun	4,721,304.22	907,382.85	839,617.81	988,172.77	771,977.12	97,752.11	342.28	8,326,549.17
	Jul	4,525,377.09	907,414.92	824,962.33	1,017,014.94	744,075.45	101,532.93	473.76	8,120,851.34
	Aug	4,614,380.62	889,202.58	757,637.65	1,025,498.37	670,340.91	91,473.24	13,791.91	8,062,325.28
	Sep	4,686,128.15	863,168.12	792,615.89	1,093,661.32	679,198.92	109,616.89	17,706.61	8,242,095.89
	Oct	5,062,323.45	897,663.46	856,838.94	1,160,267.12	703,781.14	120,311.53	12,082.61	8,813,268.25
	Nov	4,499,508.22	810,899.02	770,988.07	1,138,511.05	635,575.34	115,961.06	4,370.09	7,975,812.86
	Dec	4,395,322.87	861,904.18	793,275.75	1,146,800.86	638,256.04	122,320.49	4,509.43	7,962,399.62
2008	Jan	3,882,841.31	769,339.87	672,306.73	1,069,857.82	572,377.76	105,911.04	2,973.28	7,075,607.82
	Feb	4,045,855.79	779,939.09	647,194.80	1,041,518.30	518,692.71	110,284.15	3,047.90	7,146,532.74
	Mar	3,794,323.45	738,969.06	608,321.32	1,015,826.66	473,115.94	105,753.69	2,868.56	6,739,178.68
	Apr	4,065,506.37	721,037.12	559,053.84	944,290.27	432,955.45	101,109.93	2,967.56	6,826,920.53
	May	4,178,254.30	799,704.86	585,867.69	958,264.56	452,117.92	109,192.25	2,878.21	7,086,279.79
	Jun	3,773,537.41	752,396.43	510,276.59	892,387.19	386,759.62	98,981.49	3,218.25	6,417,556.97
	Jul	3,762,959.15	780,191.91	536,039.80	908,183.50	394,710.76	97,852.86	3,173.48	6,483,111.46
	Aug	3,583,045.20	791,106.70	580,575.91	949,090.98	423,368.35	100,148.74	2,716.98	6,430,052.86
	Sep	3,710,188.11	855,182.82	481,583.42	958,267.03	417,062.87	84,497.79	2,331.66	6,509,113.69
	Oct	2,656,212.86	706,803.19	349,653.86	743,731.83	322,782.86	54,880.57	1,699.36	4,835,764.53
	Nov	2,207,099.00	648,048.01	314,831.75	812,541.14	307,269.26	52,673.08	1,328.91	4,343,790.95
	Dec	2,000,833.70	631,743.85	326,037.48	738,512.44	319,220.55	50,652.42	2,226.28	4,069,226.70
2009	Jan	2,069,172.04	657,815.79	327,497.33	736,839.43	310,137.67	53,216.19	1,546.53	4,156,224.99
	Feb	1,937,366.97	710,256.98	327,259.19	746,493.00	296,596.66	56,566.90	1,550.35	4,076,090.05
	Mar	1,733,749.03	765,267.25	345,839.82	793,354.33	299,653.94	59,720.67	1,550.35	3,999,135.38
	Apr	2,072,093.99	781,503.27	393,805.45	791,051.17	364,305.26	59,974.88	1,645.87	4,464,379.90
	May	2,321,772.71	858,348.15	581,478.05	865,727.94	397,742.66	81,820.97	2,094.55	5,108,985.03
	Jun	2,409,080.24	906,873.75	530,622.45	894,179.14	389,327.77	83,132.51	341.52	5,213,557.38
	Jul	2,897,835.35	1,055,562.87	606,293.72	962,376.66	455,961.57	94,655.17	341.52	6,073,026.85
	Aug	2,799,579.58	1,051,844.19	641,303.46	977,218.87	509,235.60	111,406.48	341.52	6,090,929.69
	Sep	2,697,591.63	1,013,625.57	603,538.86	964,922.37	504,235.93	123,783.52	1,023.52	5,908,721.39
	Oct	2,608,186.21	1,015,427.67	616,859.90	967,462.50	486,673.72	152,102.29	836.71	5,847,548.99
	Nov	2,477,699.79	1,068,549.90	622,505.91	979,039.09	498,920.60	194,944.04	332.33	5,841,991.67
	Dec	2,603,594.14	1,109,753.24	632,024.01	996,670.43	499,477.05	187,227.43	335.44	6,029,081.74

<sup>1</sup> As of January 31, 2006 new sector classification was implemented.  
Source of data: Philippine Stock Exchange (PSE)

**TABLE 3**
**PSE Foreign Transactions Value, 2007 - 2009**  
**(in Philippine Pesos, current prices)**

	Foreign Buying	Foreign Selling	Net Foreign Transactions
2007 Jan	54624482460.52	42799836584.00	11824645876.52
Feb	60348568452.96	57685291927.79	2663276525.17
Mar	57764292641.44	44942845215.13	12821447426.31
Apr	42423483237.04	35977257317.38	6446225919.66
May	65152113300.33	52344613055.95	12807500244.38
Jun	78117861385.16	60281672927.28	17836188457.88
Jul	88773900947.40	74311396231.55	14462504715.85
Aug	61280748349.08	63712137319.42	-2431388970.34
Sep	43591533123.61	47823694669.05	-4232161545.44
Oct	50456675289.31	50399856496.89	56818792.42
Nov	43935164107.63	52475885636.91	-8540721529.28
Dec	33858361421.76	42004476071.56	-8146114649.80
<b>Total</b>	<b>680327184716.24</b>	<b>624758963452.91</b>	<b>55568221263.33</b>
2008 Jan	33861538532.55	45760706791.30	-11899168258.75
Feb	31691841444.11	33393265845.17	-1701424401.06
Mar	27373456180.72	30484718546.94	-3111262366.22
Apr	26164040548.26	30554343562.43	-4390303014.17
May	36473471424.88	34191071678.34	2282399746.54
Jun	30043182716.40	26397603083.67	3645579632.73
Jul	53207922751.70	52793292084.20	414630667.50
Aug	17348560925.64	22518299949.34	-14759547993.43
Sep	21888434612.93	28630403453.08	-6741968840.15
Oct	22755088855.15	32564915725.78	-9809826870.63
Nov	21541270239.59	18425057936.11	3116212303.48
Dec	38663920067.63	27457672938.48	11206247129.15
<b>Total</b>	<b>361012728299.56</b>	<b>383171351594.84</b>	<b>-22158623295.28</b>
2009 Jan	114111151991.89	13854622160.43	-2443470168.54
Feb	15118606687.18	13803356445.37	1315250241.81
Mar	19393219617.80	25634925928.37	-6241706310.57
Apr	43402464010.67	26540437959.92	16862026050.75
May	62937270762.98	64826112157.08	-1888841394.10
Jun	25461857519.60	24776139494.84	685718024.76
Jul	26173450243.72	26626967169.41	-453516925.69
Aug	20417010612.13	21700958689.54	-1283948077.41
Sep	31614603245.50	21692011565.04	9922591680.46
<b>Total</b>	<b>255929634691.47</b>	<b>239455531570.00</b>	<b>16474103121.47</b>

*Source: Philippine Stock Exchange (PSE)*

**TABLE 4**  
**Price Equity Ratio**  
**2007 - 2009**

2007	Jan	15.97
	Feb	15.45
	Mar	16.01
	Apr	15.79
	May	16.58
	Jun	17.90
	Jul	17.03
	Aug	14.85
	Sep	15.20
	Oct	15.94
	Nov	15.08
	Dec	15.49
2008	Jan	14.21
	Feb	13.67
	Mar	13.01
	Apr	12.43
	May	12.43
	Jun	10.95
	Jul	11.53
	Aug	12.16
	Sep	11.92
	Oct	9.23
	Nov	9.76
	Dec	9.42
2009	Jan	9.29
	Feb	9.65
	Mar	10.27
	Apr	12.81
	May	14.42
	Jun	14.78
	Jul	16.97
	Aug	16.90
	Sep	12.77
	Oct	12.92

**TABLE 5**  
**JP Morgan EMBI+ Sovereign Bond Spreads**  
*(End-month period, In basis points)*

		<b>EMBI+ Philippines</b>	<b>EMBI+ Global</b>
2007	Jan	157	172
	Feb	179	185
	Mar	165	166
	Apr	164	164
	May	138	153
	Jun	154	175
	Jul	215	219
	Aug	220	236
	Sep	183	201
	Oct	171	186
	Nov	228	246
	Dec	206	239
2008	Jan	252	273
	Feb	272	291
	Mar	272	308
	Apr	228	264
	May	220	243
	Jun	302	295
	Jul	250	283
	Aug	267	299
	Sep	321	414
	Oct	427	629
	Nov	544	718
	Dec	541	690
2009	Jan	473	633
	Feb	446	649
	Mar	428	636
	Apr	381	529
	May	305	460
	Jun	323	424
	Jul	300	389
	Aug	296	382
	Sep	264	327
	Oct	258	323
	Nov	274	330
	Dec	198	274

**Table 6. Senior 5-Year CDS Spreads***(End-month period, In basis points)*

	<b>Philippines</b>	<b>Indonesia</b>	<b>Thailand</b>	<b>Malaysia</b>
31-Jan-07	121.328	119.600	35.989	18.133
28-Feb-07	123.097	123.450	41.108	18.000
30-Mar-07	120.476	119.665	41.514	17.055
30-Apr-07	108.100	106.990	37.350	13.000
31-May-07	100.643	99.400	37.929	14.257
29-Jun-07	110.675	110.260	38.314	16.225
31-Jul-07	206.300	208.900	59.150	36.160
31-Aug-07	180.799	181.940	62.233	37.365
28-Sep-07	143.056	141.264	43.099	24.497
31-Oct-07	132.401	125.563	41.990	23.926
30-Nov-07	159.634	159.003	62.472	45.431
31-Dec-07	153.335	152.830	54.833	41.993
31-Jan-08	209.794	211.827	89.637	72.332
29-Feb-08	241.726	240.041	102.087	82.959
31-Mar-08	240.421	245.033	110.432	98.500
30-Apr-08	195.099	224.997	69.797	65.627
30-May-08	223.208	250.404	80.038	77.244
30-Jun-08	261.647	281.647	132.254	111.914
31-Jul-08	222.495	241.774	105.888	97.759
29-Aug-08	242.769	261.299	135.000	127.505
30-Sep-08	286.383	360.177	169.934	168.325
31-Oct-08	482.575	564.454	189.364	167.199
28-Nov-08	417.657	773.845	334.447	310.825
31-Dec-08	386.213	691.364	255.264	230.058
30-Jan-09	379.925	604.868	238.771	231.320
27-Feb-09	446.650	642.947	295.356	296.389
31-Mar-09	378.300	573.225	242.488	240.850
30-Apr-09	294.63	402.975	187.324	176.7
29-May-09	229.175	333.037	121.682	115.99
30-Jun-09	216.422	310.482	110.698	108.452
31-Jul-09	178.961	199.163	79.832	75.99
31-Aug-09	188.652	213.683	93.973	96.998
29-Sep-09	178.558	186.469	88.524	83.992
30-Oct-09	179.308	191.173	100.129	94.616
30-Nov-09	191.461	229.475	111.004	110.74
31-Dec-09	173.067	192.007	94.6	88.372

Source: Bloomberg

**TABLE 7**  
**Peso Per U.S. Dollar Rate**  
**2007 to 2009**  
**(Monthly Average)**

<b>2007</b>	Jan	48.91
	Feb	48.38
	Mar	48.52
	Apr	47.82
	May	46.81
	Jun	46.16
	Jul	45.63
	Aug	46.07
	Sep	46.13
	Oct	44.38
	Nov	43.22
	Dec	41.74
<b>2008</b>	Jan	40.94
	Feb	40.67
	Mar	41.25
	Apr	41.82
	May	42.90
	Jun	44.28
	Jul	44.96
	Aug	44.88
	Sep	46.69
	Oct	48.03
	Nov	49.19
	Dec	48.09
<b>2009</b>	Jan	47.21
	Feb	47.58
	Mar	48.46
	Apr	48.22
	May	47.52
	Jun	47.91
	Jul	48.15
	Aug	48.16
	Sep	48.14
	Oct	46.85
	Nov	47.03
	Dec	46.42

Source: Reference Exchange Rate Bulletin, Treasury Department, BSP

# **The international banking crisis and domestic financial intermediation: the experience of Poland**

Witold Kozinski<sup>1</sup>

The Polish banking sector has remained relatively unaffected by the direct impact of the global financial crisis due to its rather traditional banking activity model. Local banks were not engaged in investing in complex structured financial instruments and, therefore, the size of financial institutions' exposure to US subprime market risks, either in the form of holding structured financial instruments or other instruments issued by the largest investment banks, was negligible.

Additionally, the Polish banking sector entered the period of global financial turbulence and economic slowdown in a comfortable position in terms of profitability and capital adequacy (see Table 1). In fact, in 2008, Polish banks reported record high earnings, which provided them with a buffer to absorb the negative effects of the global crisis.

Despite the lack of direct exposure to Lehman Brothers, Polish banks were adversely impacted by its collapse as a result of a major increase in the risk aversion of global financial market participants. As a significant number of Polish banks are members of global or regional banking groups, the turbulence in the global market caused a major fall in mutual confidence between them, which may be denoted as an "imported" confidence crisis. As a result, liquidity in the local money and foreign exchange (FX) markets decreased significantly. Tensions in the money market were also caused by the increased risk aversion of global investors resulting in a "flight to quality" and the withdrawal of capital from emerging markets.

The above-mentioned tensions in the local interbank market were quickly addressed by the National Bank of Poland (NBP). The introduction of a repo facility, combined with the maintenance of absorbing operations, redistributed zloty (PLN) liquidity between banks, and the introduction of FX swaps enabled banks to hedge against FX risk resulting, *inter alia*, from significant portfolios of foreign currency denominated mortgage loans. Although the above instruments were not widely used, they restored confidence in the markets and helped to avoid a potential systemic crisis.

The macroeconomic channel proved to be a major source of contagion of the global crisis for the Polish banking sector. The economic slowdown adversely impacted the economic standing of borrowers and, consequently, the quality of banks' credit portfolios deteriorated. The irregular loan ratio had stabilised throughout 2008 at its historical minimum, at 4.4%. The amount of irregular loans, however, started to grow, triggering an increase in provisions for "bad" loans. The amount of irregular loans grew by 64% in the first three quarters of 2009 and the irregular loan ratio jumped to 7.0% at the end of September. The increase in irregular loans was concentrated in corporate and consumer loans (see Table 2). The quality of the mortgage portfolio remained high and stable – at the end of September only 1.4% of such loans were impaired.

Throughout 2009, banks continued to tighten their lending policies that started towards the end of 2007. The scale of lending policy tightening was largest at the turn of 2008 and 2009.

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<sup>1</sup> National Bank of Poland.

In the second quarter of 2009, the changes in lending standards were less severe than in the preceding periods.

The results of the quarterly survey<sup>2</sup> conducted in banks suggest that the main reason for the changes to lending policies (lending conditions and criteria) was the deteriorating economic situation and uncertainty regarding future economic developments, both of which increased the credit risk associated with new lending but also hindered its proper assessment. The decreasing credit portfolio quality and capital constraints were other major reasons behind the tightening of lending policy; however, the importance of the latter factor diminished in the second half of 2009 as banks increased their capital base, mainly by retaining 2008 profits.

The tightening of banks' lending policies, accompanied by a lower demand for loans, adversely impacted credit growth (see Graph 1). Lending growth to non-financial customers in November 2009 amounted to 7.1% after adjusting for exchange rate differences. The strongest slowdown was observed in corporate lending, where credit growth became negative. Consumer lending decreased the least, as banks shifted their lending to this market segment due to the fact that margins were highest in this segment and banks sought to offset higher funding costs by enhancing high-margin products in their credit portfolios.

The current crisis has caused a change in the funding structure of banks operating in Poland. In the fourth quarter of 2008, the amount of funding obtained by banks from the Polish interbank market decreased (a fall of PLN 10.3 billion between August 2008 and December 2008; data adjusted for exchange rate movements). The fall was offset by transactions with non-residents, mostly parent companies (a rise of PLN 27.1 billion in the same period; data adjusted for exchange rate movements). The value of funding from foreign sources stabilised at December 2008 levels and has risen slightly in recent months (see Graph 2), while the funding raised from the domestic interbank market has fallen further.

During the last quarter of 2008 and the first quarter of 2009, banks competed fiercely for stable sources of funding, especially household deposits. This was visible in interest rates on new household deposits which, in the first half of 2009, were slightly above the interbank rate.

The increase in credit risk and funding costs adversely impacted banks' profitability (see Table 1). Return on assets (ROA) and return on equity (ROE) in the first 11 months of 2009 were lower than in the corresponding period of the previous year (annualised ROA amounted to 0.72% in November 2009 and 1.78% in November 2008, and annualised ROE amounted to 9.5% and 24.0%, respectively). It should be emphasised, however, that the majority of foreign-owned banks in Poland reported higher profitability than their foreign parent entities and their business model – based on credit-deposit activities and limited engagement in financial instruments – makes their earnings more stable and less prone to adverse market developments.

The majority of Polish banks followed the NBP's and the Financial Supervision Authority's recommendations and retained 2008 profits in order to increase their capital base. As a result, the average capital adequacy ratio in the banking sector increased to 12.5% at the end of November 2009 (compared to 11.2% at the end of 2008) (see Table 1). Stress tests conducted by the NBP<sup>3</sup> indicate that banks have sufficient capital buffers to absorb potential losses resulting from even very strong adverse economic developments.

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<sup>2</sup> Senior loan officer opinion survey on bank lending practices and lending conditions, 2008 and 2009 editions.

<sup>3</sup> *Financial Stability Report*, December 2009.

## Appendix

**Table 1**  
**Profitability and capital adequacy of the Polish banking sector**

	12–2006	12–2007	12–2008	6–2009	11–2009
Net earnings (PLN billions)	10,697	13,651	13,737	4,549	8,330
ROA*	1.70%	1.85%	1.53%	0.97%	0.72%
ROE*	22.2%	24.9%	20.5%	12.8%	9.5%
Capital adequacy ratio	13.2%	12.0%	11.2%	12.5%	12.5%

\*Annualised.

Source: NBP.

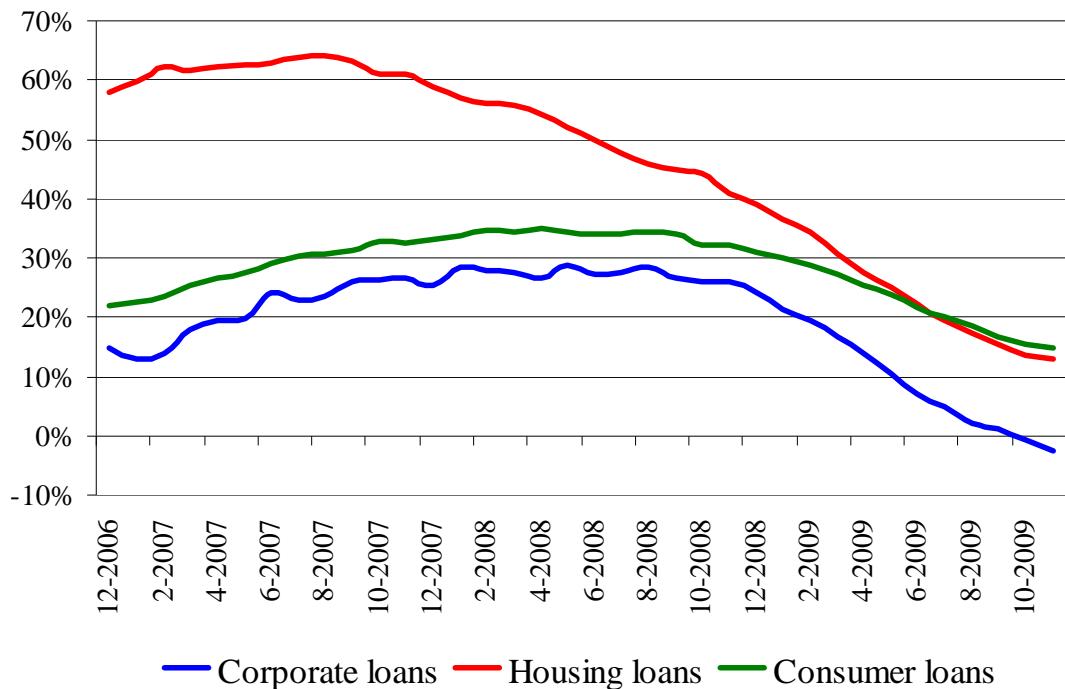
**Table 2**  
**Profitability and capital adequacy of the Polish banking sector**  
(in per cent)

	12–2006	12–2007	12–2008	3–2009	6–2009	9–2009
Non-financial sector	7.4	5.2	4.5	5.3	6.3	7.0
Households' housing loans	1.8	1.2	1.0	1.1	1.2	1.4
Households' consumer loans	7.9	6.6	6.6	7.3	8.0	9.4
Corporate loans	9.7	6.9	6.2	7.9	10.0	10.8

Source: NBP.

Graph 1

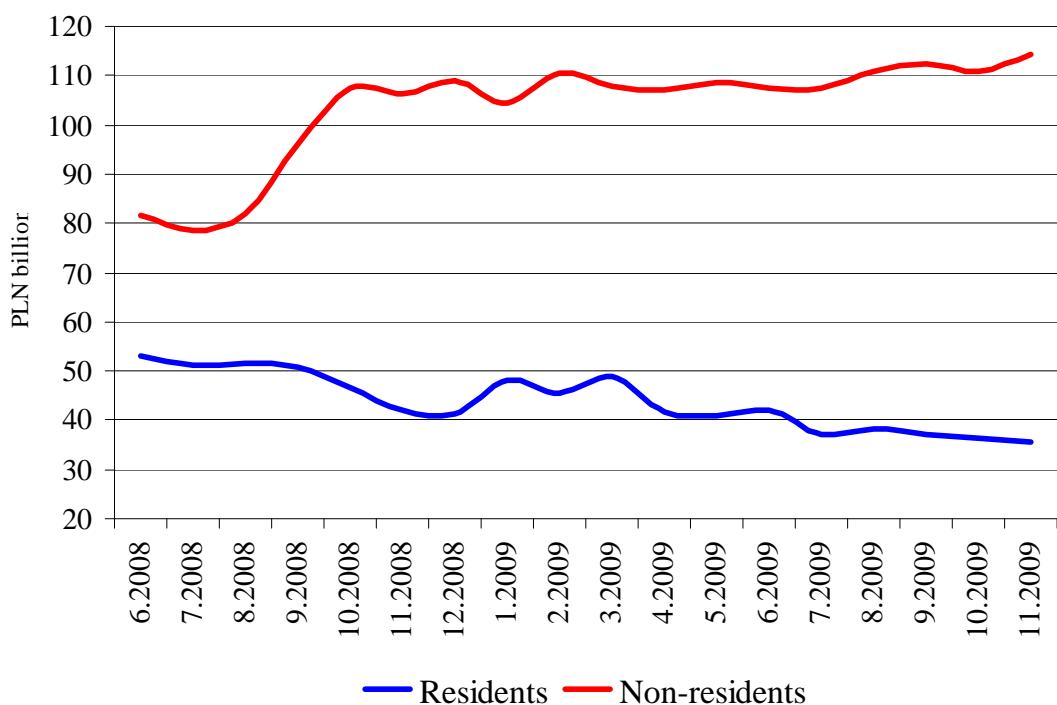
**Annualised credit growth in the banking sector (data exchange rate adjusted)**



Source: NBP.

Graph 2

**Banking sector liabilities towards resident and non-resident monetary financial institutions (exchange rate adjusted)**



Source: NBP.

# The global financial crisis: impact on Saudi Arabia

Abdulrahman Al-Hamidy<sup>1</sup>

## 1. Introduction

This note was prepared for the BIS Meeting of Deputy Governors of Emerging Market Economies held in Basel from 28 to 29 January 2010. It captures the experience of the Saudi Arabian banking system during the global financial crisis, which has ravaged the global financial markets since mid-2007. The paper focuses on international banking and the role of domestic financial intermediation – the main subject discussed at the meeting.

In this context, it is important to note that, due to the structure of its economy, its sound economic conditions, prudent and conservative supervisory framework, countercyclical fiscal and banking system policies, and other macroeconomic reasons, Saudi Arabia was not materially affected by the global financial crisis. In fact, while many economies around the globe, especially developed countries, were severely and negatively affected by the crisis in 2008 and 2009, the Saudi economy continued to show resilience and strong economic growth. Consequently, the Saudi Arabian experience of international banking and domestic financial intermediation during this tumultuous period was relatively positive. Although Saudi banks were moderately affected by the deteriorating conditions in the global financial markets, the Saudi domestic financial market continued to function effectively and efficiently without any hiccups.

## 2. Economic developments in Saudi Arabia in 2008 and 2009

To put this paper in its proper context, it should be noted that during the five-year period 2004–08, the Saudi Arabian economy fared well by international standards, with an average real GDP growth rate of 4.4%, and an average government fiscal surplus of 19%. This mini boom propelled all economic sectors, but especially the banking sector, which benefitted greatly from surging economic activity and a high rate of government spending. In summary, these positive economic conditions underpinned the strong performance of the banking sector in 2008 and 2009, the highlights of which are as follows:

- Real GDP grew by 4.5% in 2008 (3.3% in 2007), on the back of strong oil sector growth of 4.8%. The non-oil private sector, which represents 47% of GDP, also grew at a healthy rate of 4.7%.
- Saudi Arabia enjoyed a current account surplus of 28% of GDP in 2008 and a record trade surplus of 45% of GDP.
- The country continued to be a total net external creditor; external debt, according to BIS statistics, is estimated to be 15.4% of GDP. However, there is no external government debt.
- During 2008 and 2009, inflationary pressures continued to decline, with inflation in 2008 at 9.87%, subsequently declining on a year-on-year basis to 4.4% by September 2009.

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<sup>1</sup> Vice Governor, Saudi Arabian Monetary Agency.

### **3. The strength of the Kingdom's banking sector**

A major factor affecting the experience of international and Saudi banks during the tumultuous period of 2008 and 2009 was the sound performance of the Saudi banking sector, which continued to show strong profitability and growth during that period. The rate of return on average equity for 2008 was 20%, and for the nine months to September 2009 it stood at 16%. These solid returns in a period of turbulence and volatility are very positive and satisfactory.

Saudi banks are well-capitalised by international standards, and showed an average Basel capital adequacy ratio of 16% in 2008 (15.9% in September 2009). It is noteworthy that almost all the capital of Saudi banks is Tier 1 capital. In addition, the quality of Saudi banks' assets remained strong, with non-performing loans (NPLs) amounting to 1.4% of total loans and advances at end-2008, while provisions coverage was at 153%. NPLs remained below 3% at September 2009. Banks continued to be highly liquid, with liquid assets representing an average of 34% of total customer deposits in 2008. The healthy situation prevailing at end-September 2009 has continued unabated, with a liquidity ratio at over 30%.

### **4. Cross-border lending to and from Saudi Arabia**

There is not much evidence of a decline in lending to Saudi Arabia from international banks reporting to the BIS. The BIS statistics contained in the March 2009 *BIS Quarterly Review* showed a strong growth (92%) in extension of credit to Saudi banks in 2007, when total credit reached USD 69 billion from USD 36 billion at end-2006. Thereafter, the growth rate (7%) tapered off and the credit extended to Saudi banks increased to USD 74 billion by end-September 2008. Loans to the non-banking sector increased from USD 17 billion in December 2006 to USD 31 billion at end-2007 (growth of 82%), subsequently tapering off to USD 36 billion by September 2008 (growth rate of 16%) (BIS data are not yet available after this period).

On the liabilities side, international banks' deposits from Saudi Arabia grew rapidly from USD 105 billion (December 2006) to USD 185 billion by September 2008 (growth of 76%) (BIS data for the period September 2008–September 2009 are not yet available). Nevertheless, the above information reflects the expected conditions of the international market in that:

- a. Financing by international banks of banking and non-banking counterparties in Saudi Arabia grew strongly in 2007 but, due to the deteriorating conditions in the global financial markets, they tapered off in 2008 and 2009.
- b. Saudi counterparties continued to place deposits or invest with international banks. In fact, the increase in deposits reflects the conditions of excess liquidity in the domestic market, which was being channelled to the international markets.

The BIS statistics are confirmed by the Saudi Arabian Monetary Agency's (SAMA) banking system statistics, which indicate a decline in funding provided by international banks to Saudi banks (domestic operations only). There was a reduction from SAR 64 billion (December 2007) to SAR 40 billion (September 2009) (see Annex 1, Table 1). This decrease in funding can be attributed to the following:

- On the supply side, following the collapse of Lehman Brothers, international banks became reluctant to fund even the strongest emerging market banks due to their own need to build up liquid assets. In fact, during 2008, major international banks were replenishing their liquidity from overseas, including many emerging markets. Consequently, it was hard to find dollar liquidity in the global and regional interbank markets during the first half of 2008. By end-2008, the situation had eased somewhat, and while the cost of dollar liquidity remained high, it was available for shorter maturities and with sizeable risk premia.

- On the demand side, the need for international funding was in turn affected by the fact that Saudi banks had excess liquidity due to high levels of government expenditure, as well as by the slowing down of growth in domestic credit extension and the few opportunities for Saudi banks to invest in turbulent international markets. These factors led to a significant increase in bank funds placed with the SAMA. It was evident that, in 2008, Saudi banks did not need international liquidity, which had become very expensive.
- There is anecdotal evidence that the funding from international banks to Saudi counterparts changed in terms of maturities (eg interbank funds from a 90-day to a 30-day maturity) and the cost of USD funds increased by between 150 and 300 basis points (bp) to reflect the additional risk premia. There is no evidence of other significant changes in terms of demand for more collateral, guarantees or margins for derivatives contracts, etc.

## 5. Domestic bank funding

Notwithstanding the global financial crisis, domestic funding of Saudi banks continued to be strong, with total deposits growing by 16% in 2008 and 10% (per annum) up to September 2009 (see Annex 1, Table 2). There was significant growth in deposits from households and non-financial corporations. The underlying reasons for this include:

- As part of its expansionary fiscal policy, the Saudi Government continued to spend at a high level in 2008 and 2009, thereby providing funds to local market participants. Furthermore, due to the buoyant economic conditions, Saudi banks were taking advantage of the opportunities in the domestic economy and were therefore maintaining liquid assets within the local economy.
- Many corporations and companies had slowed down or cut back their international investment programmes due to uncertainties in the global financial markets and a lack of suitable investment products and opportunities.
- These enterprises, which were flush with liquidity, had become more risk-averse and consequently preferred to place their excess liquidity with domestic banks.
- Funding from other domestic financial institutions increased from SAR 16 billion (at end-2007) to SAR 26 billion (60% growth) at end-2008, and to SAR 39 billion (50% growth) by September 2009, mainly due to the increase in the number of new financial institutions licensed as securities firms and insurance companies. This also indicates that the domestic financial institutions had decided to park their funds with Saudi banks which were less risky than international and regional counterparts.

## 6. Domestic bank lending

On the bank lending side, the increase was spectacular in 2007 (growth of 20%) and 2008 (growth of 25%), but levelled off in the first three quarters of 2009 (growth of only 1%) (see Annex 1, Table 3).

Household lending in the Kingdom was stable during the period September 2007–09 at between SAR 180 billion and SAR 190 billion due to domestic factors following the adjustment in the local stock market in 2006. Other factors include regulatory changes and stricter lending criteria applied by banks. Consequently, there was no noticeable growth in household lending during the period 2007–09.

Corporate sector lending by banks rose sharply during the period 2006–08 from SAR 274 billion to SAR 529 billion, a growth of almost 93% over a three-year period. This was due to a variety of reasons, including rapid economic growth in the oil sector and non-oil private sector. The overall economy was buoyant, reflecting conditions of positive growth, and bank lending to the corporate sector was booming. There was strong growth in lending to almost all sectors, which showed high growth percentages: commerce (68%); manufacturing and processing (120%); transport and communications (400%); services (95%); and building and construction (45%). The only sector where there was a significant downturn in lending was the financial companies sector, which declined by 70%.

However, lending conditions changed in the nine months from January to September 2009, during which the overall growth in corporate loans was less than 2%. This turnaround reflected the shifting sentiment in the banking sector due to the deteriorating conditions affecting the global markets. Consequently, both the supply and the demand sides were affected in 2009.

The factors affecting the demand side were as follows:

- a. There was a slowdown in demand for credit from the corporate sector as many companies in 2008/09 were re-evaluating their business strategies and plans in light of reduced global demand for their products and services.
- b. There was also a slowdown in certain industrial sectors such as steel, transport and consumer products due to lower consumer demand in the domestic and regional markets.
- c. Additionally, there was a slowdown in demand for credit from mega projects, many of which re-estimated their spending plans in 2008/09 in light of the global financial crisis, economic slowdown and higher costs of securing international financing. This had implications on their requirements for financing from local banks.
- d. The decline in the cost of raw materials in the global markets also incentivised businesses and mega projects to rework their estimates and budgets, leading to delays in the planning and implementation of projects, which resulted in a reduced need for credit.

On the supply side, banks also became stricter in their lending criteria: they re-evaluated their existing credit lines and revised their pricing upwards in line with global and regional trends and also shortened their maturities for loans.

The picture of domestic lending would not be complete without reference to a few public credit institutions that also stepped up their efforts to support credit availability. The Saudi Government announced plans to inject SAR 40 billion into specialised credit institutions in 2008 to ease credit conditions as private sector banks reassessed their credit extension in light of global market conditions. Of this amount, SAR 25 billion was granted to the Real Estate Development Fund over a five-year period, starting in 2008, to help the nascent housing market, and SAR 10 billion was provided to the Saudi Credit and Savings Bank (non-deposit taking institution) to be used as loans for low-income citizens.

## 7. Foreign bank lending in Saudi Arabia

The share of foreign bank branches in the Saudi banking system is still not significant: their total assets at end-September 2009 stood at 2.5% of the total assets of the banking system. While foreign bank branches were vigorously competing for business with Saudi banks in 2009, they were also affected by funding constraints and guidance on stricter lending criteria from their head offices (HOs). In addition, on the demand side, they reviewed their relationships and credit lines, increased their prices and reduced the maturity of loans, etc.

The supply side constraints of foreign bank branches also affected their extension of credit in 2009. There is some anecdotal evidence that cross-border funding in 2009 was negatively impacted as international banks showed a reluctance to lend. Additional factors such as price and maturity also became far more significant in 2008. International banks were reluctant to fund projects and enterprises with longer-term debt and, on average, the pricing of USD loans went up by between 200 and 300 bp.

## **8. Impact on local money and debt markets**

### **Steps taken by the central bank in the domestic market**

There were no significant changes in the domestic interbank market due to ample SAR liquidity availability. The steps taken by the Saudi Government in the wake of the global financial crisis went a long way to restoring full confidence in Saudi banks, the banking system and the Saudi interbank market. Saudi banks continued to provide liquidity to each other and to international banks at competitive rates. In general, the interbank rates were low, as they were affected by the following measures taken by the SAMA:

- Reducing the statutory deposit ratio for demand deposits to 7% in October–November 2008 against 13% in September 2008, and maintaining the ratio for time and savings deposits at 4%.
- Gradually reducing the repo rate from its previous level of 5.50% to 2% from October 2008 to January 2009, and the reverse repo rate from 2% to 0.25% from October 2008 to June 2009.
- Reducing the pricing of treasury bills by 50 bp lower than the Saudi interbank deposit rate (SIBID) – the bills remained priced at 80% of the interbank rate in Q2 2009.
- Creating cash deposits, not only in domestic currency but also in USD, in the domestic money market in order to enhance liquidity through the placement of time deposits with domestic banks.
- Placing time deposits with domestic banks for a relatively long period on behalf of government agencies and institutions and in coordination with them. Since such deposits are considered to be customers' deposits included within the ratio of loans to deposits, this measure was designed to help banks expand credit.
- A major factor affecting the local interbank market was the announcement made by the Supreme Economic Council that the Government was continuing to guarantee the safety of local bank deposits. This went a long way to assuring all depositors and assuaging any negative sentiment relating to Saudi banks.

In the global interbank market, there was a shortage of dollar liquidity in 2008 and 2009 due to the global money market squeeze. SAMA therefore injected dollar liquidity through foreign exchange (FX) swaps and direct deposits with local banks. In line with global developments, the domestic money market remained somewhat distorted, with wider bid-ask spreads. However, it was evident that SAMA's liquidity injections were helpful in mitigating the impact of global events on the local market. Additionally, there was no liquidity shortage in the local currency as banks remained flush with SAR liquidity.

With regard to derivatives, the requirements of Saudi banks in this market revolve around several simple instruments such as interest rate swaps and futures, and currency-related spot forwards and futures. These are generally considered to be vanilla products and are neither complex nor sophisticated. Saudi banks reported no change in the types of derivatives products being sold in the Saudi market, and there were no significant changes in the terms and conditions of these products related to collaterals, guarantees or margins, etc.

Parent bank financing of their branches in the Kingdom displayed the following trends:

1. In general, inward funding from HOs or associated banks was stable, and in some cases it stopped altogether.
2. In a few cases, it was observed that HOs withdrew funds from their branches in Saudi Arabia in order to shore up their overall liquidity.

### **Impact of the crisis on the local debt market**

The financial crisis did not have any impact on the local currency debt market due to the policy followed by the government prior to the crisis to redeem its outstanding debt and to investors' preference to keep such debt on its books. The corporate bond market was still at an early stage of evolution and was therefore not affected in any way.

## **9. Some lessons learned from the central bank instruments used to deal with the financial crisis**

### **Instruments at the disposal of the central bank**

This section examines the SAMA's general views on this subject. In abnormal times, conventional monetary policy tools often prove insufficient to achieve the central bank's objective for two reasons.

First, the economic shock can be so powerful that the nominal interest rate needs to be reduced to close to zero. At that level, cutting policy rates further is not possible, so any additional monetary stimulus can be undertaken only by resorting to unconventional monetary policy tools. Broadly speaking, the additional monetary stimulus, which is needed when the policy interest rate is close to zero, can be achieved in three complementary ways: (i) by guiding medium- to long-term interest rate expectations; (ii) by changing the composition of the central bank's balance sheet; and (iii) by expanding the size of the central bank's balance sheet. All these measures have one element in common: they are designed to improve financing conditions beyond the very short-term interbank interest rates.

Second, non-conventional measures may be warranted even when the policy interest rate is above zero if the monetary policy transmission process is significantly impaired. Under these circumstances, central banks have two (not necessarily mutually exclusive) alternatives, namely: (i) to reduce the short-term nominal interest rate even further than in normal conditions; and (ii) to act directly on the transmission process by using non-conventional measures.

The experience of the past year and a half – a very stressful time for the global financial system – has shown that non-conventional tools might be needed even before policy rates have been cut to their lower bounds. When the financial turmoil started in summer 2007 and central banks worldwide stepped in to provide additional liquidity to financial markets, it appeared that conventional measures would still suffice. Although markets were not operating normally (far from it), tensions in the euro area interbank market were considerably eased by supplementary longer-term refinancing operations. But things changed as the crisis intensified in September and October 2007. Shortly after the collapse of Lehman Brothers, the spread between the three-month Euribor and the overnight interest rate EONIA – which in normal times would, on average, be around 10 bp – rose to an all-time high of 156 bp on 13 October 2007. Market liquidity virtually dried up, and the sudden loss of confidence among market participants threatened to have a lasting effect on the orderly functioning of the euro area money market.

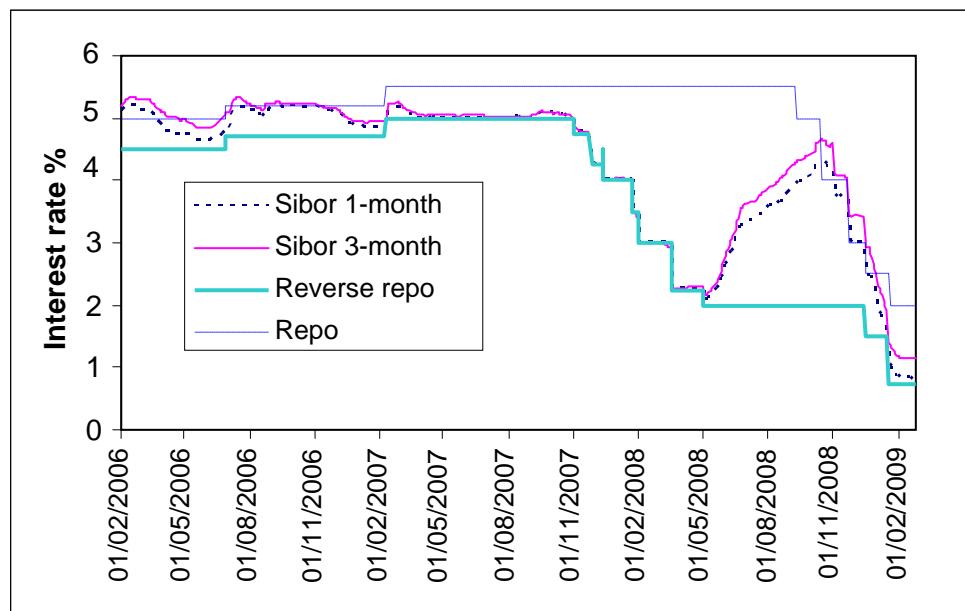
In summary, interest rates alone cannot address the liquidity problem. This is because lower-bound zero interest rates fail to trigger bank lending in a liquidity trap. Hence, central banks adopted qualitative and credit easing (QE/CE) to ease up money market liquidity and stabilise the credit market.

## 10. Monetary policy measures taken to support the local interbank market

Given its global dimension, the current crisis has posed enormous challenges for policymakers on many fronts. Financial and price stability are critical to macroeconomic stability. In the past two decades, monetary policy aimed at low and stable inflation and, surprisingly, the success of monetary policy turned out to be part of the problem. This is because perverse incentives (created by the continuation of low interest rates and low inflation) led to a higher appetite for risk-taking, thereby destabilising the economy in the longer term. In normal times, excessive or rapid currency depreciation would warrant the maintenance of high interest rates. The main policymaking objective during the current crisis was to avert deflation/depression. The currency factor did not constrain central banks' zeal to lower interest rates as part of their reflationalary objective.

Although there was no subprime mortgage crisis in Saudi Arabia, the financial turmoil in global markets raised fears and created some uncertainty in the Saudi interbank market. Consequently, the Saudi interbank offer rate (Sibor) rose sharply in the aftermath of the collapse of Lehman Brothers, reaching a level of more than 200 bp above the reverse repo rate, as seen in Chart 1. Furthermore, there were fears that the evaporation of liquidity in the international interbank markets would be passed on to the whole of the financial system.

Chart 1  
Sibor vs repo



Thus, the SAMA had to intervene quickly to restore confidence in the local financial market by reducing the repo rate several times consecutively from 5.5% in October 2008 to 200 bp in January 2009, and reducing the reverse repo rate from 200 bp in October 2008 to as low as 25 bp in June 2009.

The impairment of the interbank market in local currency varied among countries. Generally, interbank lending in local currency was less of a problem due to the significant central bank support measures provided through repos, direct placements and, where applicable, the buying of money market instruments by central banks. In Saudi Arabia, system liquidity was abundant due to government debt redemption and brisk government spending.

### **Instruments that proved effective during the crisis**

The extraordinary nature of the crisis required extraordinary measures. As central banks exhausted conventional instruments (ie lowering interest rates and cutting reserve requirements), they resorted to QE/CE by buying government and non-government debt as well as by broadening the scope of eligible collateral. At the global level, the US Federal Reserve's FX swaps with various central banks were timely in addressing the dollar liquidity squeeze. The application of QE/CE has been instrumental in providing liquidity to the system and reducing market stress. As for monetary policy, the crisis implies that financial stability considerations should be taken into account when formulating policy aimed at preserving price stability over the medium term. This means close monitoring/analysis of asset price movements, monetary and credit developments and the emergence of systemic risk.

In addition to some of the above measures, the SAMA also reduced the ratio of statutory reserve requirements on demand deposits on a number of consecutive occasions in a two-month period (October–November 2008), from 13% to 7%. Furthermore, the SAMA directly intervened in liquidity provision by placing deposits with commercial banks on behalf of government institutions. Finally, in the fourth quarter of 2008, the treasury bill rate was set to 50 bp lower than the Sibor, with the ceiling of commercial banks' investments in those bills reduced to SAR 3 billion a week in order to encourage banks to lend to their individual and corporate customers.

### **Role of foreign exchange reserves and interventions**

In the wake of the financial crisis, the primary goal of regulatory agencies worldwide has been to strengthen international regulatory standards, enhance transparency in global financial markets and ensure that all those markets, their products and participants are appropriately regulated or subject to oversight, depending on their circumstances. In addition to sound market integrity regulation, a macroprudential approach is advised in which national and international coordination between financial institutions is essential to ensure a system-wide approach to financial regulation in order to deal with systemic risk. The last thing that regulators want is another situation where they need to resort to non-conventional monetary (and fiscal) policies, which are costly and, thus, not sustainable. Therefore, future changes to the regulatory framework should focus on minimising those risks, which were not incorporated in previous regulations.

Saudi Arabia did not have to take any measures to support the foreign currency refinancing of banks/corporations; this is because Saudi Arabia is a net capital exporter and Saudi banks' asset/liability management is relatively conservative. The SAMA only conducted FX swaps with domestic banks to provide dollar liquidity in order to meet the financial system's demand for FX.

There is an ongoing debate regarding the maximum appropriate amount of FX reserves. Some critics say that the accumulation of FX reserves far in excess of the historic norm gives rise to external imbalances and asset price distortion. Asian central banks built up their FX reserves as an insurance policy following the Asian financial crisis in the late 1990s. In fact, this approach helped Asian economies to confront the recent dollar liquidity squeeze. In Saudi Arabia, the FX reserve position is a reflection of oil market developments and the pattern of government spending.

FX intervention is a stopgap measure; when used to engineer the exchange rate, it results in reserve accumulation. Initially, interventions can be fully sterilised but as reserves grow, it becomes harder to sterilise successive reserves, in addition to the cost implications of issuing government debt to mop up domestic liquidity at higher interest rates. In Saudi Arabia, FX intervention has rarely been used, as the objective has been to stabilise occasional distortions in the forward market linked to exchange rate speculation.

**Table 1**  
**Structure of the domestic banking system**  
In domestic currency (SAR billions)  
End of year (or latest available month for 2009)

	2006	2007	2008	2009 <sup>2</sup>
Total assets	861	1,075	1,302	1,351
Private domestic banks	845	1,043	1,264	1,304
Foreign-owned banks				
Subsidiaries	–	–	–	–
Branches	16	32	38	47
State-owned banks	–	–	–	–
Other (eg cooperative banks, saving banks, etc)	–	–	–	–
Total capital				
Tier 1 capital as a % of total assets	10.1%	9.8%	10.4%	11.7% <sup>3</sup>
Memo items <sup>1</sup>				
Total assets of non-bank financial institutions	N/A	N/A	N/A	N/A
Stock market capitalisation	1,226	1,946	924	1,230

N/A – Not available.

<sup>1</sup> Total for the economy. <sup>2</sup> Data as at 30 September 2009. <sup>3</sup> Data as at 30 June 2009.

**Table 2**  
**Bank funding**  
In domestic currency (SAR billions)  
End of year (or latest available month for 2009)

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009<sup>1</sup></b>
Total liabilities	746	939	1,141	1,164
Foreign funding	59	105	112	98
By maturity				
Short-term liabilities	44	92	99	87
Long-term liabilities	15	13	13	11
By source				
Banks	22	64	45	40
Other foreign financial institutions	10	8	9	7
International money market instruments	—	—	—	—
International bonds issued by banks	6	6	6	6
Domestic funding				
Total deposits	591	717	846	911
Households <sup>2</sup>				
Non-financial private <sup>2</sup> corporations	475	573	668	695
Government and public sector corporations	116	144	178	216
Other				
Domestic market funding				
Borrowing from other domestic financial institutions	12	16	26	39
Money market instruments	—	—	—	—
Domestic bonds issued by banks	1	1	1	1

<sup>1</sup> Data as at 30 September 2009. <sup>2</sup> These balances are for household and non-financial private corporations.

**Table 3**  
**Bank lending**

In domestic currency<sup>1</sup> (SAR billions)

End of year (or latest available month for 2009)

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009<sup>4</sup></b>
Total assets	861	1,075	1,302	1,351
Total loans	497	594	744	750
Holdings of bonds <sup>2</sup>				
Domestic				
Government	114	127	91	78
Other	13	20	22	25
Foreign	36	66	40	69
Holdings of short-term debt securities <sup>3</sup>				
Short-term	9	17	119	83
Long-term <sup>5</sup>	N/A	N/A	N/A	N/A

<sup>1</sup> Including foreign currency loans, where applicable. <sup>2</sup> Debt securities held by banks with a fixed interest rate and maturity greater than one year. <sup>3</sup> Including holdings of floating rate, longer dated paper by banks.

<sup>4</sup> Data as at 30 September 2009. <sup>5</sup> This information is not available.



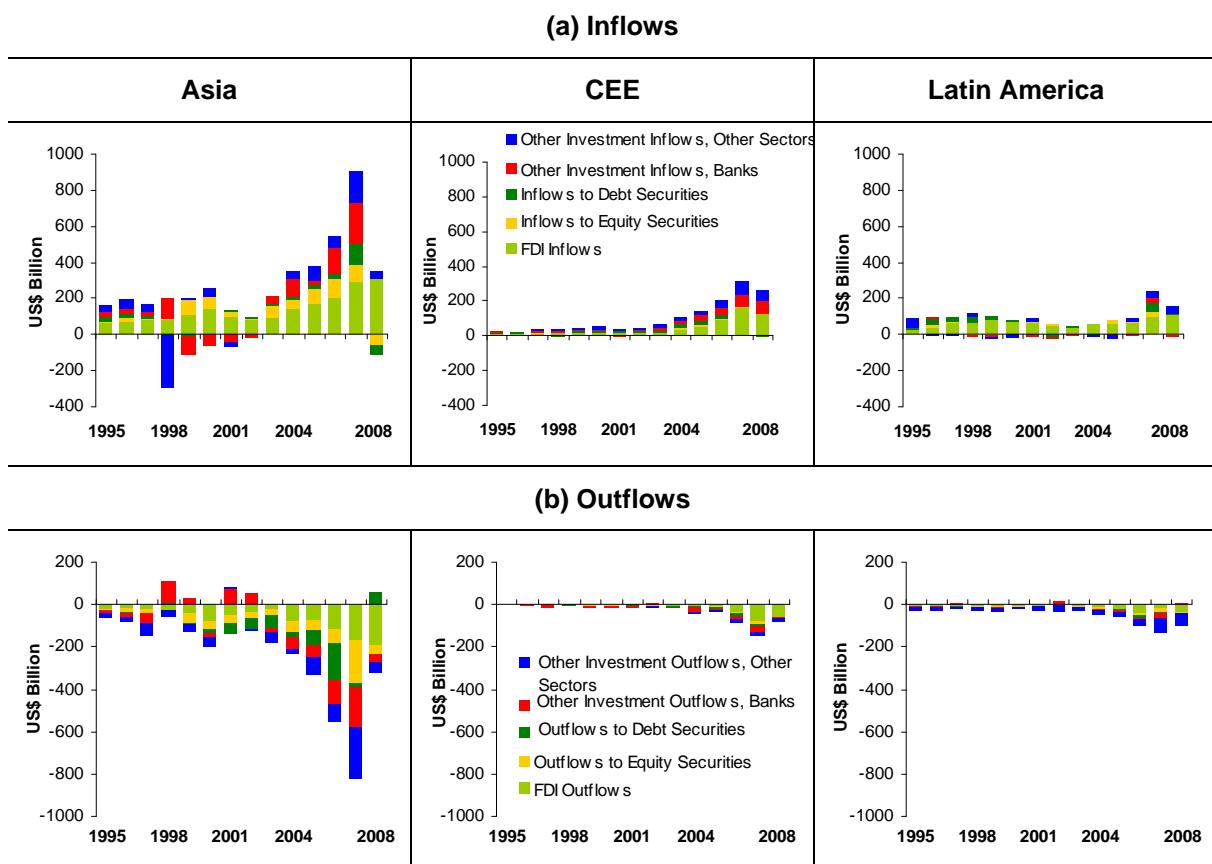
# The international banking crisis: effects and some key lessons

Ong Chong Tee<sup>1</sup>

## A. Trends in capital flows during the crisis

The recent increase in capital inflows to some emerging market economies (EMEs) followed a period of strong growth in such flows from 2002 to 2007 and then a sharp contraction during the global financial crisis of the past two years. Between 2002 and 2007, gross capital inflows to EME regions increased more than seven times in absolute terms. This was accompanied by an equally large increase in outflows over the same period (Chart 1).

Chart 1  
Composition of gross capital flows in EME regions



Source: IMF Balance of Payments; MAS estimates.

<sup>1</sup> Monetary Authority of Singapore.

The composition of gross capital flows has also changed. Foreign direct investment (FDI) continues to be a key driver of both capital inflows and outflows but portfolio investment and cross-border lending flows have become more important drivers, contributing to the bulk of the rapid increase in capital flows between 2002 and 2007 and the sharp retrenchment in 2008 (Chart 1). In Asia, gross capital flows continued to contract in Q1 2009. Since Q2 2009, however, there has been a revival of gross capital flows, as global risk appetite returned and Asia's economic recovery proved sharper and faster than expected. Portfolio investment flows have been particularly strong.

To the extent that capital flows reflect different economic prospects and take the form of long-term FDI, they contribute to economic efficiency and stability by reallocating resources from capital-rich to capital-deficient regions. However, as noted above, cross-border lending flows have become more important in EME regions in recent years.

## **B. Domestic vs cross-border financial intermediation**

Cross-border funding together with domestic financial intermediation in EMEs helps to integrate global financial markets by moving funds from countries with excess savings to those that need them. Capital markets can also play a similar role but there is a segment of borrowers and savers that capital markets will not be able to reach. Cross-border funding is also able to achieve the following benefits:

1. Efficiency: banks can raise funds from the most abundant (cheapest) source and lend to the areas with the highest demand (return).
2. Centralised liquidity management: banks pool liquid assets globally to avoid maintaining excess liquidity. To ensure that there are sufficient pooled liquid assets, stress tests (some specified by home regulators) are conducted.
3. Risk management: local funding means that they need to keep dealing, risk management and settlement desks in many locations. This is potentially costly.

Local funding can be less efficient because it requires banks to set up more funding desks locally (with the attendant support facilities) as well as a distinct pool of liquid assets. The absence of financial intermediation may also create more systemic risks to the extent that it restricts banks' ability to diversify their risks and creates asset bubbles in countries with excess savings. In broad terms, the unintended restriction of cross-border inter-regional flows would lead to "trapped liquidity" in surplus countries and consequent asset price inflation pressure in those countries. Conversely, capital-importing regions losing the benefit of inbound cross-border capital allocation would, over time, see increased funding costs for the economy as a whole, translating into lower potential trend growth. Depending on the specific nature of the regulatory cross-border funding safeguards, there could also be inadvertent limitations, or more costly capital structures, for banking groups to diversify their exposure to different geographical and asset markets.

However, it should be acknowledged that cross-border funding, as demonstrated by the international banking crisis following the collapse of Lehman Brothers, can involve maturity and currency mismatches that should be monitored. Banks should, for example, be required to conduct rigorous stress tests on their liquidity needs. This would help to reduce idiosyncratic risk that could otherwise pose systemic challenges. However, because idiosyncratic risk cannot be reduced to zero, even if regulations are tightened sharply, central banks may have to consider the use of cross-border central bank facilities to mitigate extreme events.

## C. Differences in addressing idiosyncratic and systemic tail risk

The matrix below is one illustration of how risks and implications could be categorised in order to be addressed by relevant regulatory/central bank bodies based on their respective mandates.

	National	Cross-Border
Idiosyncratic Risk	Home-Host Supervisory Arrangements	Supervisory Colleges / Regulatory Review of Treatment of Cross-Border Risk
Systemic Tail Risk	Central Bank Lender of Last Resort	Policy Instruments Needed

Anecdotal evidence suggests that the cross-funding market generally, and the foreign exchange (FX) swap market in particular, did not seize up for endogenous reasons. There was a distinct upstream trigger arising from the impairment of banks' assets, which resulted in a breakdown in credit lines, leading in turn to a scramble to secure funding in collateralised markets such as the FX swap market. Initiatives are therefore currently being developed by regulatory colleagues to ratchet up measures to manage individual financial institutions' (FI) idiosyncratic risk.

Better management of institution-specific risk is important. By definition, however, idiosyncratic risk cannot be uniform from one institution to another. As such, to limit the probability of any institution entering distress to a near zero or even negligible likelihood would require the substantial tightening of regulatory measures. While the appropriate magnitude of such measures is for competent authorities to address, it is important to note that even a sharp tightening of measures targeted at idiosyncratic risk cannot reduce the probability of the incidence of a system-wide event to zero.

This can be seen in the domestic context where each jurisdiction imposes capital and liquidity requirements on relevant FIs. Despite this, there is broad consensus that a back-stop in the form of the pertinent central bank's lender of last resort function is still necessary and indeed crucial. Taking the analogy to a cross-border setting, the lesson learned is that, beyond cross-border regulatory collaboration and international FI group-wide supervision, improved policy instruments are needed to act as a back-stop to address cross-border or cross-currency systemic risk events.

## D. Key lessons learned from the international banking crisis – the need for a cross-border policy back-stop

There are three non-mutually exclusive options that central banks can consider adopting in their repertoire of policy instruments:

- a. use of official foreign reserve (OFR) assets;
- b. FX swap lines between central banks;
- c. cross-border collateralisation arrangements between central banks.

### **Deployment of foreign reserve assets**

Central banks with foreign reserve assets were able to channel some liquidity into the FX swap markets during the crisis. This was achieved by making USD available through FX swaps in routine market operations, as in Singapore's case, or by putting in place non-routine facilities accessible to market participants in need. This is helpful in ameliorating liquidity needs but is ultimately limited to OFR resources.

One issue that has arisen concerns the potential for unintended signals. Using OFR to improve market liquidity essentially involves a redistribution of USD and other foreign currency placements among market operation counterparties or otherwise determined eligible participants. This takes care of idiosyncratic needs but does not change the net supply of foreign currency liquidity in the system as a whole. The concern is that the market could misinterpret the central bank's redistribution of its foreign currency deposits among its counterparties as a statement regarding the creditworthiness of one or more FIs.

There is also a balancing of objectives between the OFR's purpose, on the one hand, as a balance of payments item to be used for *intervention* in managing FX market volatility with a view to macroeconomic stability, and, on the other hand, as a tapped item to be *lent* to support foreign currency liquidity. Analysts could choose to interpret the latter usage as circumscribing a jurisdiction's ability to deploy OFR for the former purpose.

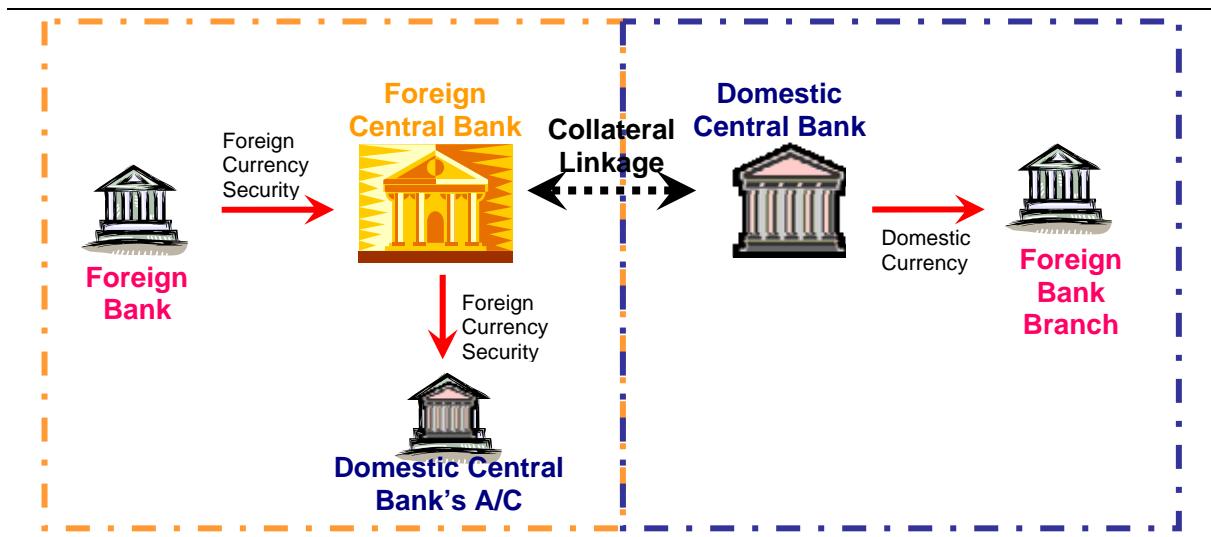
### **FX swap lines**

Experience has shown that the establishment of currency swap arrangements in the course of 2008 made a decisive difference in calming cross-border liquidity requirements. Prior to that, major central banks' auction mechanisms to inject USD liquidity into the market had successfully eased some of the USD Libor strain, but the liquidity remained largely within each centre.

By allowing other central banks in different time zones to swap their currencies in order to obtain USD liquidity to lend to a wider pool of banks on a collateralised basis, USD liquidity strains were more successfully addressed across time zones. The observation, and subsequent private sector feedback, was that even the assurance of access to USD liquidity in itself in the Asian dollar market was sufficient to bolster market confidence and smoothen volatility. This was important from the experience gained during the crisis, whereby fragile sentiment could flow into European time, and aggressive funding needs that were not sufficiently allayed could have a snowball effect as the global trading day progressed.

### **Cross-border collateralisation arrangements**

Another policy instrument being explored in various forms by certain central banks is cross-border collateralisation arrangements. Such arrangements involve central bank A in jurisdiction A providing its domestic currency liquidity to an FI against collateral placed by that bank's headquarters (or collateral-rich branch) in jurisdiction B, to be held in central bank A's account maintained with central bank B. This is illustrated in the following diagram.



In essence, this allows central banks the additional policy instrument of providing a back-stop cross-border bridge to support funding requirements in either jurisdiction in the event that interbank cross-border intermediation becomes impaired. This has the added advantage of giving both central banks access to “private market information” on where the strain in cross-border flows might be, at the point at which an FI accesses the facility, which can be made available at a penal rate.



# **The international banking crisis and domestic financial intermediation in emerging market economies: issues for South Africa**

South African Reserve Bank

## **Differences between South Africa and other emerging market economies (EMEs) during the crisis**

South Africa has not been directly affected by the financial crisis due to a mixture of historical, fundamental and circumstantial factors. In general, South African financial institutions have had fairly limited exposure to foreign structured finance products, and have been subjected to fairly conservative financial regulation and risk management practices, within the context of sound macroeconomic policies.

As a result, in contrast to central banks in the industrialised world, the South African Reserve Bank (SARB) has not experienced any pressure to alter its monetary operations since the onset of the financial crisis. The fluctuations in the amounts of liquidity provided in its refinancing auctions, even though subdued, were exaggerated by the relatively small money market shortage, which fluctuated between South African rand (ZAR) 9 billion and ZAR 14 billion. The SARB did not have to respond to any shortage of liquidity by increasing the amounts offered in its monetary operations.

The SARB, in accordance with its inflation targeting framework, implemented a tightening monetary policy stance from June 2006, in reaction to a deteriorating inflation outlook at the time. The repurchase rate was increased from 7.0% to a peak of 12.0%. In December 2008, the Monetary Policy Committee of the SARB reduced its policy rate by 50 basis points (bp), followed by further cuts to the current all-time low level of 6.5%. However, as explained in the monetary policy statements, these reductions were facilitated by an improved inflation outlook against a backdrop of slowing economic growth and declining commodity prices. Consistent with the SARB's exchange rate policy of non-intervention, the rate changes were not intended to influence the level of the exchange rate, which is left to be determined by market forces, nor were they changed to assist the banking sector or to react to the global financial crisis. South Africa's banking sector and financial markets continued to operate effectively during the crisis.

In South Africa, the spread between the market rate (as measured by the South African Benchmark Overnight Rate (Sabor) on deposits) and the SARB's repurchase rate continued to fluctuate within its usual range. The spread also remained negative, that is, market rates remained below the policy rate, indicating an absence of extraordinary upward pressure on overnight rates. Volumes of overnight interbank lending activity in South Africa also continued as usual. If anything, volumes increased somewhat towards the end of 2008, but not to the extent that the volumes indicated any underlying trend or problem in the interbank market.

The level of the SARB's gross reserves declined by around USD 500 million to USD 33.8 billion as at the end of February 2009. However, this decline can essentially be attributed to valuation changes, as the price of gold declined and the US dollar appreciated. The SARB reduced its borrowed reserves from USD 3.5 billion in 2006 to around USD 640 million as at the end of February 2009. This reduction in borrowed reserves was a strategic decision taken due to the fact that South Africa's foreign reserves position had become healthier, and was not due to the financial crisis. In line with its exchange rate policy of non-intervention, the SARB did not use its reserves to influence the ZAR exchange rate

and has not been required in any way to use its reserves to support the stability of the financial system.

This is not to say that the South African financial system is not at risk of the second-round effects of a dwindling global economy, or that the crisis will not highlight some financial sector weaknesses that have to be resolved. South Africa is therefore very much part of the global reform agenda and is totally committed to finding ways to strengthen the global financial system without placing unnecessary burdens on countries that have no need for the measures needed in others.

## Stylised facts

### 1. Cross-border bank lending to EMEs

#### (a) Supply versus demand factors

In our view, most of the decline (both in value and in number of transactions) relates to demand factors (primarily the severe contraction in international trade). In our chosen EMEs, the competitive banking landscape remains strong and certain institutions have taken the opportunity, given the strains on certain global banking institutions, to increase their market share.

Banking institutions globally have, since mid-2008, repriced risk more appropriately, which has contributed to the decline of cross-border EME lending. There is adequate supply from banks, however, at a significantly increased cost. Banks made strategic decisions to withdraw from specific markets and products, which also affected the supply/demand balance.

As a result of the crisis, international banks' available capital was eroded and capital requirements increased, as did the cost of funding. With the expected stepping up of financial regulations globally, where banks will be required to hold more capital against their risk-weighted assets, there will be further constraints on the amount of lending globally and the terms of lending that banks will be prepared to undertake.

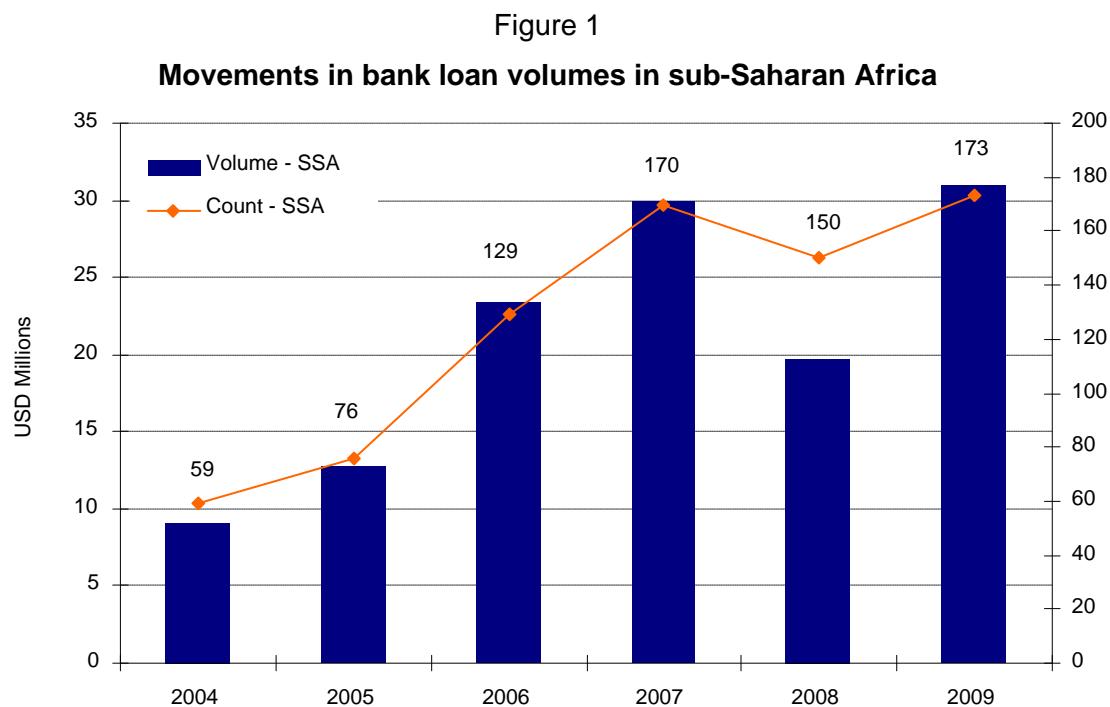
The hypothesis that there has been a decline in cross-border bank lending to EMEs is not necessarily true for sub-Saharan Africa, as the region has seen an increase in bank lending. Figure 1 below shows that there was a decline in 2008 in line with the global markets but an increase in 2009.

South African financial institutions are forming funds to enable them to lend to finance sub-Saharan African transactions. There has also been an increase in loans from development finance institutions (DFIs) such as the International Finance Corporation (IFC), Deutsche Investitions- und Entwicklungsgesellschaft (DEG)/Kreditanstalt für Wiederaufbau (Kfw) to South African institutions for projects on the continent.

Some possible reasons for the decline in cross-border funding levels in 2008 could be attributed to:

- Reduced appetite for riskier sectors overall (see section (b) below).
- Increased oversight by parent banks of subsidiary lending, resulting in a reduction of overall lending exposure.
- Expensive pricing levels have deterred companies from coming to market; those companies prefer instead to wait until the markets re-stabilise.

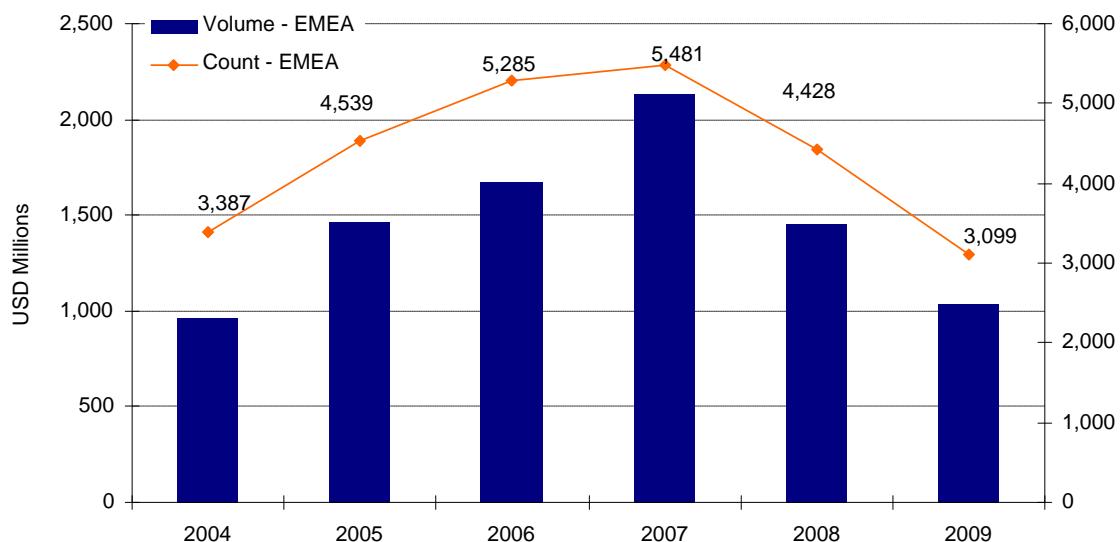
- Increased focus on maximising total return on equity (ROE), resulting in a rationalisation of absolute numbers of clients banked.
- The decline in volume was also partly due to the long execution timeline of transactions in sub-Saharan Africa. In project finance specifically, projects require government or parliamentary sign off. Projects for parastatals take longer to finalise in terms of structuring, approvals and development to bankable stage, contributing to a perceived decline in the number of deals executed.



Source: Dealogic, SSA bank loan movements, 11 January 2010

Figure 2 illustrates the decline in cross-border lending in Europe, the Middle East and Africa (EMEA) global syndicated lending activity. The decline was most likely due to the financial conditions prevailing at international banks and the subsequent policies imposed or adopted after the onset of the crisis. Banks have continued to prioritise limited available capital for existing clients offering specific ancillary business opportunities. In addition, banks have limited their exposure to northern/eastern European names in general, and have broadly stuck to their areas of expertise. There has been a reduction in the number of European institutions due to European government restrictions or the conditions pertaining to the bailout funds received during the crisis. Some representative offices and branches have been closed down due to EU Commission discussions and guidance. The contraction in the number of European institutions on the African continent has presented an opportunity for South African and other African banks to increase their market share of business.

**Figure 2**  
**Movements in bank loan volumes in EMEA**



Source: Dealogic, EMEA bank loan movements, 11 January 2010

In summary, it can be said that South African banks are not heavily dependent on foreign funding, and cross-border bank lending is generally low. During the crisis, South African banks' general experience was that, although the price and maturity of cross-border bank lending was affected, it was still possible for the large South African banks to obtain the lending they required. Any decline in cross-border lending was therefore caused by a mixture of supply and demand factors, ie the foreign lending banks increased the price, whether for risk management reasons or because of their own balance sheet weakness, and the South African domestic banks also took on less funding due to the decline in their own lending as a result of the economic contraction.

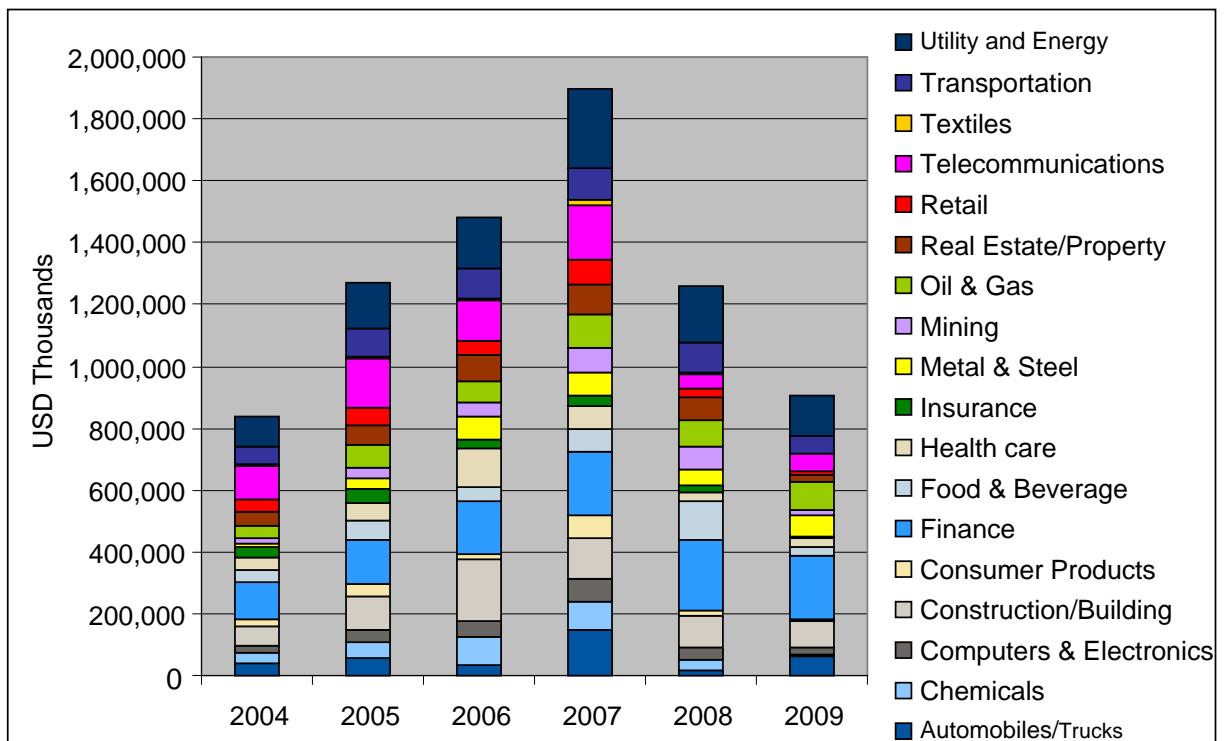
#### **(b) Types of lending that have been hardest hit**

There has been a general "flight to safety" both in terms of credit quality and collateral. This has benefited the sovereign issuers and highly rated corporate issuers. Longer-dated financing and hard currency financing have been constrained due to the availability of term funding and the related (higher) cost of borrowing in hard currencies.

Tier 2, unsecured and mezzanine lending has all but evaporated, while investor appetite for securitised assets has declined significantly. Furthermore, certain project financings, particularly in the resources sector, have been delayed given the uncertainty in the global economy. Trade finance continues to be available, although the decline in international trade has impacted this market. The majority of export letters of credit (L/Cs) volumes are received from EMEs, mostly from the Far East.

The top five hardest hit industries in sub-Saharan Africa were the insurance, food and beverage, mining, property, and textile industries, each lending significantly less in 2009 than in 2008, as illustrated in Figure 3 below.

Figure 3  
Sub-Saharan Africa credit extension



Source: Dealogic, sub-Saharan Africa credit extension, 11 January 2010.

In South Africa, the financial services sector has been significantly affected by the financial crisis, as well as property finance – specifically hotels and the leisure sector due to their dependency on consumer demand. Banks have not ventured into significant sub-Saharan property lending and do not have comparable history.

Microfinance institutions' funding sources dried up because international DFIs significantly reduced their funding to domestic DFIs in order to shore up their own balance sheets. Small- and medium-sized enterprises and borrowers seeking new money have suffered, as existing credit relationships have been given priority.

#### (c) Evidence of changes in cross-border lending terms

There has been a general tightening of lending criteria in all respects for cross-border lending, largely driven by the higher liquidity cost of hard currency funding plus the perceived deterioration of counterparty risk. Banks have also sought to reduce their exposure to various types of other risks.

Generally, maturities have shortened, spreads have widened significantly and there has been a shift towards better-rated counterparties and collateral. The upward shift in credit margins reflects both the pricing of risk and the liquidity premium now demanded. This is a material shift in practice where liquidity was previously taken for granted and excluded from pricing considerations.

#### (d) Changes in the terms of derivatives contracts offered by international banks

There have been no significant changes in the product offerings or terms relating to derivatives contracts. There has, however, been a trend towards improved contract enforceability and better collateral. In this regard, banks are now only willing to transact

against formal International Swaps and Derivatives Association (ISDA) agreements and require settlement to be through continuous linked settlement (CLS). Most banks have also reviewed and changed the collateral threshold requirements under the related credit support annex (CSA) agreements (ie exposure limits have been reduced).

There is, however, a general move towards lower thresholds in margining agreements. Thresholds are negotiated in line with the bank's external credit rating. In most instances, the threshold would reduce to zero should the counterparty be rated sub-investment grade. The margining agreements only provide for the posting of cash in EUR, USD and GBP as collateral.

There have been no significant changes in the approach of international banks to the four largest South African banks, although, generally, all parties have been pushing for tighter CSA requirements with financial institution (FI) counterparties in line with international trends.

#### **(e) Parent financing to affiliates versus financing to unrelated parties**

“Home bias” appears to be a strong theme at the moment and banks have been more inclined to direct capital towards business areas in markets where they have a very strong presence and well-established franchise. In this regard, affiliates that are not contributing materially to the group income statement or long-term group strategy have seen capital withdrawn by parent banks only to be reallocated to areas where client business is substantial and strategic.

This changing trend is a consequence of the changing risk appetite, “back to basics” banking and a smaller pool of available bank capital following significant balance sheet impairments.

## **2. Domestic bank intermediation: domestically owned versus foreign-owned banks**

### **Changes in bank business models in the domestic market**

#### **(a) Changes in bank funding**

Domestic banks' response to the crisis was less drastic than that of foreign-owned banks, but there is evidence of a contraction in lending and a shortening of maturities. Domestic banks voluntarily increased their holdings in statutory liquid assets noticeably over a sustained period.

The interbank market was not severely affected by the crisis and continued to function normally, but with slightly increased caution and an increased preference for shorter-term funding. Sources of funding remained unchanged, and wholesale funding from Asian countries became more accessible.

It should be noted that the maturity of South African domestic bank funding is generally short, with up to 50% of funding being short-term. It may have shortened further as a result of the crisis. Nevertheless, the interbank market never ceased to function, and there were no instances of banks being unable to fund themselves due to hoarding in the market. The retail component of South African bank funding is also generally quite small, with up to 50% of funding being wholesale, ie interbank and other FIs' deposits with the banks. This may also have worsened as a result of the crisis, as the savings of individuals dwindled due to layoffs. Nevertheless, it is a fairly “closed” system as a result of the long period of exchange control and, therefore, excess funds always tend to end up with the banks. While contractually short-term and wholesale, much of the bank funding is in practice constantly rolled over, so the de facto maturity is much longer.

### (b) Changes in bank lending

Domestic banks' lending contracted over the crisis period. Banks became much more risk-averse and tightened their credit criteria. Demand from the household sector declined over the period owing to the high levels of indebtedness and the aftermath of the high interest rates.

Corporate bond origination ceased almost entirely over the period while loans experienced subdued demand.

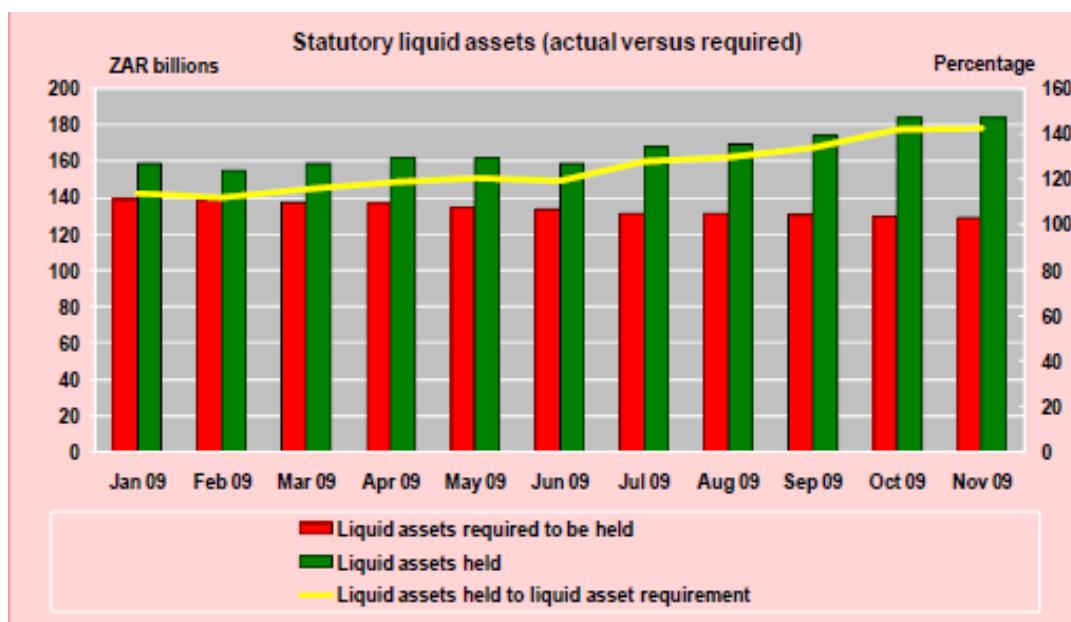
Generally, the most significant change in bank lending was a rapid decline in the rate of growth in almost all types of lending. South African banks experienced a long period of high lending growth despite the fact that lending standards were never lowered to the same extent as in the United States, for instance. When the financial crisis occurred, the South African financial system was not directly affected, but when the world economy started to slow and exports began to decline, bank lending growth all but disappeared. This was due both to the procyclical behaviour of banks and the shrinking demand from retail borrowers in particular, who had "learnt their lesson". The loan to value ratio for mortgage lending was lowered, resulting in more secured lending. Corporate lending decreased in proportion to household lending due to the economic contraction. South African banks' exposure to debt securities did not change significantly during the crisis, and is generally low.

### (c) Liquidity of banks' balance sheets

There is evidence of a build-up in liquid assets as banks have placed money in short-term instruments that qualify as liquid assets. Figure 4 below shows how the liquid assets held by the banking sector have increased.

Figure 4

Banks' holding of statutory liquid assets



Regarding the shortening of lending maturities, banks generally contracted their lending activities. Lending commitments were generally either formally withdrawn or not honoured. In addition short-term assets matched with shorter-term funding.

Changes to South African banks' balance sheets were not as dramatic and rapid as in other countries. Banks deleveraged under the pressure of international expectation by shrinking lending books, holding back on dividends, and general cost cutting. South African banks' leverage was rather low in comparison to other jurisdictions, around 17 times, and has improved even further following the crisis. Liquid assets as a percentage of total assets remained conservative and well within the regulatory requirements throughout the crisis period. It is likely, however, that banks shortened the maturity of their loan books as a result of the crisis.

**(d) *Responses of foreign-owned versus domestically owned local banks***

Foreign-owned banks include Absa Bank Limited (Absa), which is the second largest bank in South Africa and specialises primarily in domestic retail and wholesale operations. However, Absa responded to the crisis in a similar manner to domestic banks and, therefore, the analysis of the response of foreign-owned banks does not include Absa.

As a result of the crisis, foreign-owned banks contracted their lending activities in an effort to maintain short, matched positions. Simultaneously, funding from their head offices dried up and local long-term funding became scarce, while spreads on shorter-term funding were increased. Foreign banks' exposures were concentrated mainly in the corporate sector. A number of locally originated derivatives transactions were booked or transferred abroad to regional head offices.

The main difference in the two responses was that foreign-owned banks with head offices in the worst-affected countries experienced greater funding difficulties following their head offices' withdrawal of excess funding and their decision to stop the provision of new funding.

Ever since their return to South Africa following the divestments of the 1980s, foreign-owned banks have not really re-entered the retail lending market and, therefore, any differences in their response did not affect the household market. Local banks continued to express confidence in the South African economy and seemed both confident and cautiously optimistic about their ability to weather the storm. Foreign-owned banks operating locally were impacted by the news about their principals and/or owners abroad, which, if bad, emphasised their de-linkage and independence, and which, if good, stressed the willingness of their parents to stand by them. Generally, mergers and acquisitions (M&A) activity and initial public offerings (IPOs) dwindled to almost nothing and, combined with the fact that trade-related financing activity all but disappeared, foreign-owned banks were generally either closing down or merely riding out the storm as best they could.

### **3. Impact on local money and debt markets**

**(a) *Effects of the crisis on liquidity in various segments of EME foreign exchange markets and the implications for domestic money markets***

Although several countries reported severe foreign exchange (FX) shortages, this was not the case in South Africa. Movements in the spot exchange rate of the South African rand were related to movements in the currencies of developed economies and were not due to any direct impact of the global crisis on South African markets. This was also the case in the FX forward market. Temporary month-end liquidity shortages resulted in movements in forward rates at month-end, but these rates generally stabilised after month-end.

There were, however, changes in the turnover in the various components of the FX market. The rate of growth in total FX turnover declined significantly in 2008 in light of the credit crisis. In the South African context, total turnover in the FX market increased by 62% between 2003 and 2007, and grew by 1.8% in 2008. FX swap and forward turnover declined in 2008, while spot turnover increased. The share of spot turnover increased to 25% from

22%, that of swaps declined to 68% from 70% and the share of forward exchange turnover remained unchanged at 7.0%.

The turnover figures referred to in the previous paragraph include the SARB's participation in these markets. However, the SARB's share is relatively small, and the impact on the domestic money markets was therefore also relatively small.

The events surrounding the collapse of Lehman Brothers had an impact on sentiment in the domestic markets, but movements in these markets were mainly due to domestic factors rather than the consequences of direct exposures by local institutions to events occurring as a result of the global financial crisis.

International financial integration and financial market liberalisation sharply increased the supply of FX to South African markets in the pre-crisis period. In addition, South Africa experienced strong capital inflows linked to both foreign direct investment and portfolio investment over the same period. This increasing inflow of foreign capital increased the volume of transactions in the spot, forward and swap markets and positively affected the ZAR exchange rate. There were no severe liquidity problems arising from the crisis in any of these markets. The domestic money market also continued to operate normally, with only normal fluctuations in rates and spreads.

However, there is no denying that the crisis increased the risk of a sudden slowdown or reversal of capital inflows driven by global deleveraging and flight to safety, in addition to the collapse in export demand associated with the global recession.

#### **(b) Effects of the crisis on local money markets**

The impact of the global credit crisis on the domestic money markets was not as pronounced as in developed countries. South Africa experienced only negligible increases in domestic money market rates at the time when Libor rates increased significantly. The marginal increases happened only occasionally when local institutions that would otherwise have obtained funding from international markets resorted to domestic markets. In general, the local interbank market functioned effectively.

Generally, the increased supply of capital flows fed into and added to the liquidity supply in the domestic money markets. It contributed to the challenge facing financial authorities to drain the inflow of foreign capital from the domestic markets, and added to the cost of such sterilisation. Nevertheless, broadly speaking, the local money market operated normally throughout the crisis period.

#### **(c) Effects of the crisis on secured and unsecured lending (local currency) between banks**

The local interbank market experienced no disruptions as a result of the global crisis. South African banks were largely shielded against the direct effects of the crisis due to a sound regulatory framework and the fact that domestic banks had not invested heavily in high-risk securities and had very little exposure to foreign markets in their loan books. Furthermore, there were no indications that the interbank market in repurchase transactions had been adversely impacted.

In South Africa, interbank lending continued to function more or less normally, and there were no reported incidents where ostensibly sound banks were refused loans by other banks. There was no reason for the authorities to provide additional liquidity to the market or emergency liquidity assistance to any bank. In addition, the SARB did not have to guarantee any bank debt.

**(d) Difficulties in the domestic government debt market**

Causes of significant difficulties in the domestic government debt market during the crisis were:

- Large-volume selling of local shares and bonds by non-resident investors due to increased risk aversion.
- Increased budget deficit which necessitated increased government debt issuances. The South African Government had to issue a further ZAR 70 billion in domestic debt to finance the borrowing requirement (the budget deficit was revised upwards to 7.6% of GDP in 2009/10 from 1.0% in 2008/09, due to growth in government expenditure and lower projected revenue.)
- The SARB did not increase its holdings of government bonds to inject liquidity into the interbank market.

The broader economic context for the government debt market was a general rise in risk aversion, increasing concerns about the economic prospects and vulnerabilities of emerging markets, the negative impact of rising fiscal deficits linked to fiscal stimulus packages and the lack of appetite for government debt (sovereign risk).

The reality in international financial markets is that emerging market debt is significantly affected during a crisis. Thus, bond spreads and premia generally soar for EME government debt, especially for local currency government debt and where there is significant exchange rate volatility, which increases exchange rate risk.

South Africa did not experience the same level of difficulties as other EMEs, and even succeeded in the midst of the aftermath of the crisis to issue further debt that was oversubscribed and at favourable rates to South Africa. This is attributable to good investor confidence in the government's macroeconomic policies.

**4. Central bank instruments to deal with the crisis**

**(a) Instruments at the disposal of central banks to deal with the domestic repercussions of an international financial crisis**

The SARB did not have to implement unconventional monetary policy measures to dampen the impact of the global financial and economic crisis on the South African banking system. It did, however, introduce some flexibility in the execution of its inflation targeting mandate. Without sound banking and other financial regulations, the domestic financial markets would have been more severely and directly impacted by the global financial market turmoil. Capital controls pertaining to residents also contributed to the insulation of the domestic financial system from the global financial markets.

The SARB nevertheless has sufficient instruments at its disposal to deal with the impact of an international crisis, but each comes with a cost. The view of the SARB is that it is sometimes more difficult, but better in the long term, to do nothing rather than to react in a knee-jerk way. So, as the international financial crisis erupted, the SARB focused on pragmatic contingency arrangements such as consideration of the broadening of the definition of securities qualifying as liquid assets and eligible as collateral for emergency liquidity assistance. Other steps taken were the intensification of supervisory contact with the large financial institutions and keeping up to date with their conditions, risks and challenges. In addition, the SARB intensified its monitoring of international developments and became active in the various forums to evaluate the impact of the crisis and discuss measures to strengthen the financial system. This was considered important due to the different experience of South Africa and several other countries, and the need to ensure that the

debate was balanced and that inappropriate reform measures were not imposed on countries where they had no relevance.

**(b) Monetary policy responses**

The SARB has adopted inflation targeting as a framework for monetary policy. This is very much a forward-looking approach and has informed monetary policy decisions since its inception in 2000. The South African economy is an open, commodity-based economy and, as such, is dependent on developments in the international economy. Although the well-regulated domestic banking system was relatively well-insulated from the fallout of the global financial crisis, the domestic economy was affected by the international economic downturn, and the resulting domestic recession required appropriate fiscal and monetary policy responses.

Apart from these concerns, the SARB has also focused on maintaining and improving its domestic market operations. Liquidity in the domestic and international interbank markets is carefully monitored. Although contingency plans were put in place and communicated to the banking counterparties, it was not necessary to provide any additional or special liquidity to domestic banks beyond the normal daily operations.

In general, the response of monetary policy to an international crisis should be determined by the long-term macroeconomic cost of the potential impact on the economy. If there is a possibility that disruption in the domestic financial system could have social costs of a magnitude greater than the private costs, then the monetary authority would be justified in using all means at its disposal to prevent the disruption or restore stability. This is because sustained price stability, which is without question the primary aim of the monetary authority, is either unattainable or of no value if there is chaos in the financial system. It is unattainable because an efficient financial system is the conduit for executing monetary policy, and it is of no value because price stability is of no consequence if intermediation failure damages the real economy beyond repair.

The SARB regularly considers possible currency depreciation as a factor in determining policy rates, whether before, during or after a crisis. However, it believes that only supply and demand in the international currency market can determine the value of the South African rand. The most it can do is to try and smooth out excessive technical volatility in the short term through open market operations within the current inflation targeting framework.

Consequently, although inflation was outside the target range of 3 to 6%, the monetary policy stance was loosened significantly in the face of an expected moderation in inflation and a weakening economy. Nevertheless, some upside risks to the inflation outlook are still prevalent and have constrained the monetary policy response somewhat.

**(c) Measures taken to support (or replace) interbank lending in local currency**

The interbank market in local currency continued to function effectively. It was not necessary at any stage during the crisis to introduce any additional or unconventional measures to maintain market functionality.

**(d) Measures taken to support foreign currency refinancing of banks/corporations**

The SARB's prevailing policy on intervention in the FX market consists of purchasing FX to fund foreign payments on behalf of clients and, depending on market conditions, to accumulate foreign reserves. However, the SARB did not intervene in the FX market to support the level of the currency.

In conclusion, the SARB believes that the value of the currency should be determined by the demand and supply of FX in the market and that it should not endeavour to change these conditions.

**(e) Other available instruments**

While no unconventional measures were contemplated by the SARB during the crisis period, should the need arise, South African regulatory authorities have established an approach to deal with liquidity management, both in normal times and in times of distress. At the financial market level, the liquidity-related interventions of the SARB are primarily in the form of providing liquidity through repurchase agreements, which can be collateralised by eligible liquid assets as prescribed by the SARB. In addition to providing market liquidity, temporary liquidity problems in solvent banks during crisis times can be addressed by the SARB through the provision of liquidity assistance against the pledge of suitable assets under certain conditions.

An insolvent bank will not usually be assisted in this way and an orderly exit plan will be followed, unless it is systemically significant. If an insolvent bank is regarded as systemically significant, the potential knock-on effects of settlement defaults on the financial system could have consequences far beyond the costs to the stakeholders of the ailing bank. In those cases, the government may decide to assist such a bank in the interest of protecting the financial system.

**(f) Lessons learned from the crisis regarding the role of FX reserves and interventions**

Over the past few years, the SARB has managed to substantially increase the level of official gross gold and FX reserves. Although the level is still below that of some peer economies, it is perceived to have contributed substantially to reducing the country's external vulnerability.

Lessons learned from South Africa's previous experiences and from various other countries are that it remains a severe risk for central banks in EMEs to intervene in the FX markets to influence the level of the exchange rate.

The crisis has not, therefore, changed the view of the SARB – for a small but open economy such as South Africa's, the level of FX reserves needed to guarantee that interventions will succeed in every case would be too onerous and costly for its economy to maintain.

# **The international banking crisis: impact on Thailand's financial system and policy responses**

Bank of Thailand

## **1. Impact on the banking system**

The direct impact of the global financial crisis on the Thai banking system has been very small in terms of the decline in lending of foreign banks operating locally and cross-border lending. This is due to Thailand's very low reliance on foreign sources of funding as well as its low exposure to foreign assets. Foreign banks operating locally account for only 10% of the total assets of the banking system, while foreign funding accounts for only 3.5% of the total liabilities of the banking system. Stable domestic deposits form the core of the Thai banking system's funding source, at around 77% of total liabilities. Moreover, 95% of bank loans to households, corporations, and the government sector were in local currency, thus mitigating any risk of currency mismatch.

The lessons learned from the 1997 financial crisis, together with the strengthened risk-based supervision and risk management of banks, the countercyclical macroprudential measures in place since around 2003, and the removal of the fixed exchange rate regime in 1997, all contributed to reducing Thailand's vulnerability and exposure to contagion associated with the global financial crisis. As can be seen from Table A below, the external debt of the Thai banking system is very small, at USD 7.7 billion, and the external debt to asset ratio of the banking system has fallen significantly from 18.8% in 1996 to 2.5% currently. In addition, banks have few foreign investment holdings, accounting for only 1% of total assets, while loans to overseas financial institutions and non-residents account for around 2.4% of total assets.

The Thai banking model is not overly complex, comprising, predominantly, retail commercial banks, rather than the wholesale investment banking model, with a low leverage ratio and very low exposure to complex products or market risk. Most derivatives tend to be plain vanilla and are linked to underlyings such as international trade; thus, risk exposure is controlled through effective risk management.

Foreign bank branches operating in Thailand were also resilient to the effects of the global financial crisis, as their head offices were robust, or they received strong support from their home regulators and government. Nevertheless, from industry dialogue carried out with these branches in the context of a financial stability review, it appears that, at the height of the crisis, just after the collapse of Lehman Brothers, foreign bank branches became increasingly risk-averse as part of the growing trend manifested by their head offices towards reducing global risk in order to conserve capital. This increased caution tended to be in terms of reducing exposure to new clients as well as corporates which were not at the top credit tier. However, this did not have a noticeable impact on credit availability for the local economy since most of the clients of foreign bank branches were multinational corporations with a very strong credit standing (eg automobiles, electronics, ICs). Since foreign bank branches were not the major source of bank credit to local companies, the increased caution in lending had little impact on local firms.

Table A  
Thailand's profile

	1996	2001	Q3/2009
L/D ratio of banks	129.0 <sup>1</sup>	84.8	85.4
Corporate D/E ratio <sup>2</sup>	1.4 <sup>1</sup>	0.8	0.8
External debt (bn USD)	108.7	67.5	65.9
Of which, short-term	47.7	13.4	24.1
Of which, banking system	41.9	9.4	7.7
(% total bank assets)	18.8	6.3	2.5
Of which, non-banking system	50.1	29.9	44.8
External debt (% GDP)	65.9	56.1	25.8
Reserve to short-term debt (times)	0.8	2.5	5.5

<sup>1</sup> Q2 1997. <sup>2</sup> The median of D/E ratios of non-financial institutions listed on the Stock Exchange of Thailand.

However, foreign banks are important players in the local over-the-counter (OTC) market for plain vanilla derivatives such as foreign exchange (FX) swaps and interest rate swaps, which were important for the risk management of local banks. Overall, however, derivatives contracts offered by foreign bank branches have not been significantly affected by the crisis, although the development of new products, ie structured products, has slowed down somewhat. However, structured products form only a very small part of Thai banks' business, which may be partly due to the Bank of Thailand's cautious policy with regard to the scope of permissible derivatives business even prior to the global crisis.

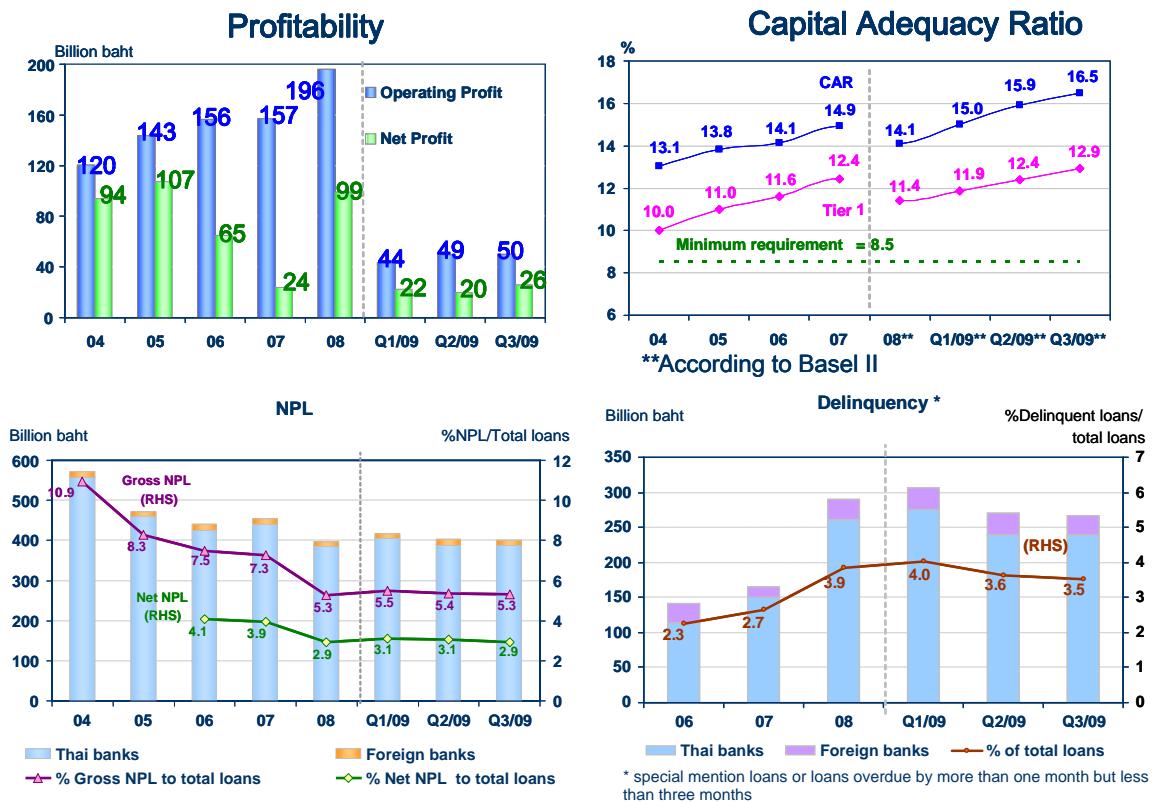
The outstanding volume of derivatives transactions across all banks in Thailand decreased slightly as of Q3 2009 compared to 2008, in line with both the contraction in key underlying transactions, namely the volume of exports and imports, and with international trade.

### 1.1 Oversight of the stability of financial institutions' systems and markets

To ensure market stability and integrity, the Bank of Thailand (BOT) engages in close monitoring of and dialogue with the banking industry, both from the perspective of the BOT's monetary policy and market operation conduct, as well as from the prudential supervision perspective. Its aim is to ensure that the market has adequate liquidity and capital, as well as the risk management ability to handle potential stress. The BOT also uses stress tests as an important tool to enhance the dialogue with the banking industry. This process, along with the adequate liquidity in the market, the robust condition of local banks and the fact that foreign banks operating in Thailand were resilient to the crisis either due to the robustness of their head offices, or because they were strongly supported by their home regulators and government, all contributed to the resilience of the local market. Of course, a key element of this resilience was the robust macroeconomic conditions prevailing in Thailand, particularly the current account surplus and strong international reserves position, which helped to underpin confidence in liquidity.

All these factors have contributed to a more resilient banking sector. The Thai banking system continues to record a profit with robust capital, a greater provisioning cushion in line with the adoption of IAS39 for the fair valuation of non-performing loans (NPLs), and stable asset quality, and, in addition, the NPL and delinquency loan ratios continue to decline, though at a slower rate.

Figure 1



## 1.2 Indirect impact via slowdown in global growth

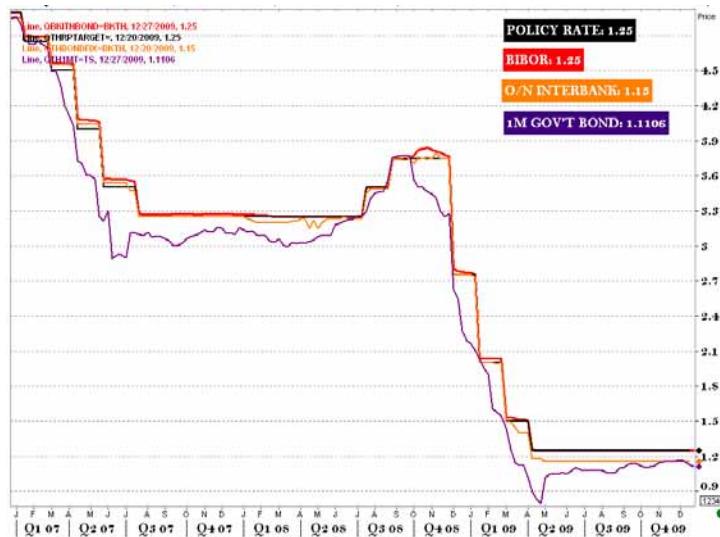
The negative impact of the global financial crisis came from the contraction in global growth and world trade, which caused a contraction in the Thai economy and loan growth. The economic slowdown led to a contraction in banking credit growth; loan growth decreased from 11.4% at end-2008 to -3.1% at end-September 2009, on a year-on-year basis. Corporate loans, which constitute 73.1% of total loans, contracted by 6.5%, in tandem with the economic slowdown. In contrast, consumer loans continued to grow, although decelerated somewhat to 7.3%.

Given the global economic uncertainty, the BOT has asked banks to conduct stress testing to ensure that they are both alert to the potential impact of downside risks and are forward-looking in their risk management approach. Recent stress testing, which covers credit, market and liquidity risks linked to macroeconomic scenarios, has confirmed the resilience of the Thai banking sector.

## 2. Impact on local money and debt markets

As the Thai banking system had become more prudent following the 1997 financial and economic crisis, the recent global financial turmoil did not directly adversely affect the health of the banking system. There was no obvious direct negative effect on the domestic money market either. Thai baht (THB) liquidity remained abundant and short-term interest rates continued to stabilise around the policy rate (Figure 2).

Figure 2  
Money market rates



Despite the limited impact on THB liquidity, there were some spillover effects on the FX swap market related to tightened USD liquidity conditions overseas. Reluctance to lend USD to other financial institutions due to credit risk concerns resulted in remarkably low implied THB swap rates during the first half of October 2008 (Figure 3). This unusual situation was temporary and did not destabilise the local FX market as the Thai private sector did not rely mainly on external debt financing (Figure 4).

As for the unsecured lending market, during the peak of the crisis period, interbank transactions dropped slightly owing to heightened credit risk concerns among market participants. The daily average interbank volume decreased from THB 24 billion during the first half of 2008 to THB 13 billion in the second half. However, given the structural liquidity surplus in the Thai financial system, there were no difficulties in raising funds in the uncollateralised market and since January 2009 the daily average interbank volume has increased to THB 19 billion (Figure 5).

Figure 3  
Three-month implied THB rate

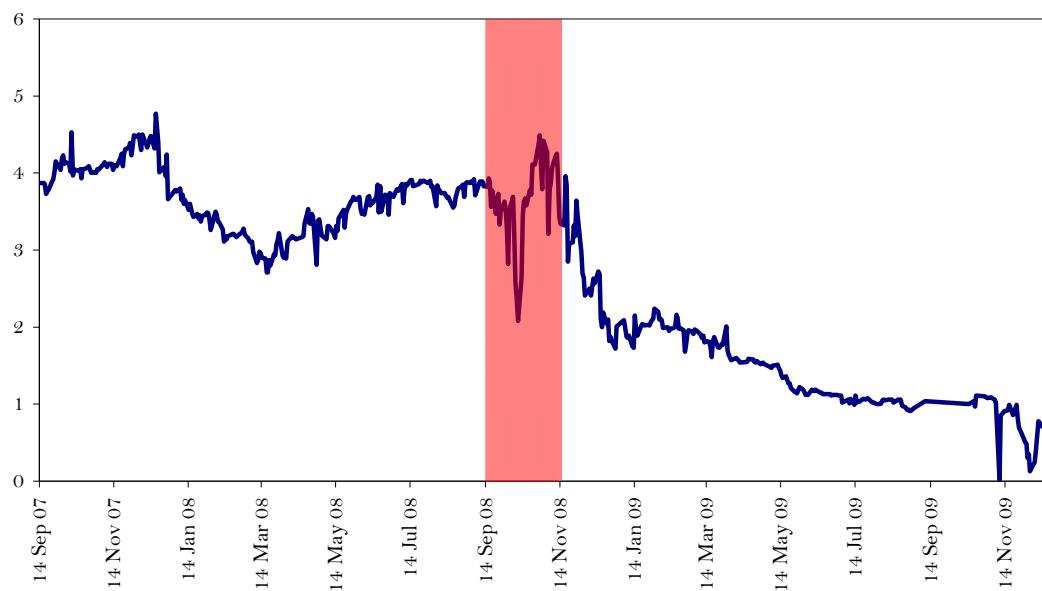


Figure 4  
Foreign investment in Thailand

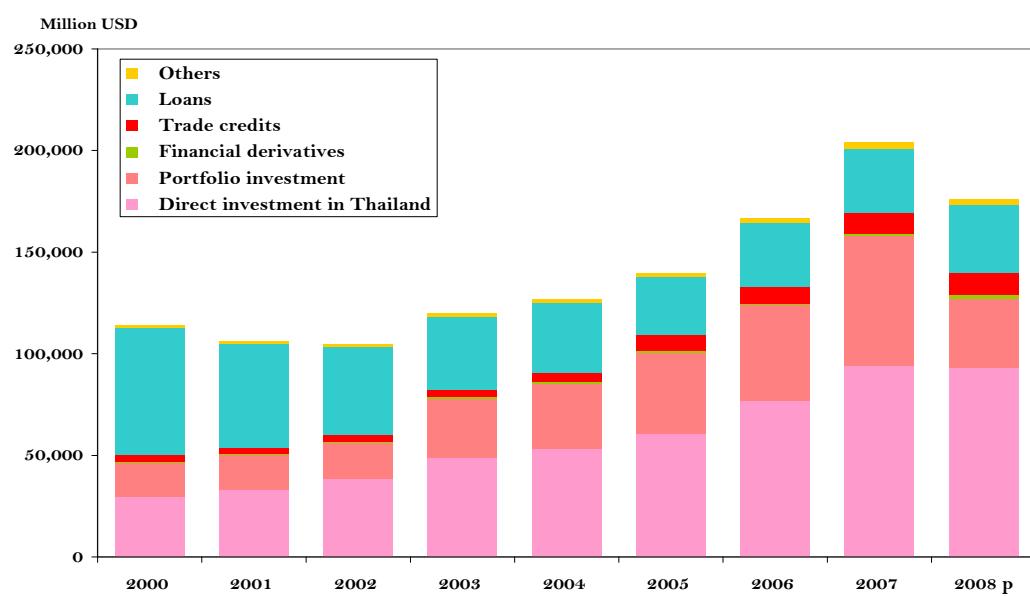
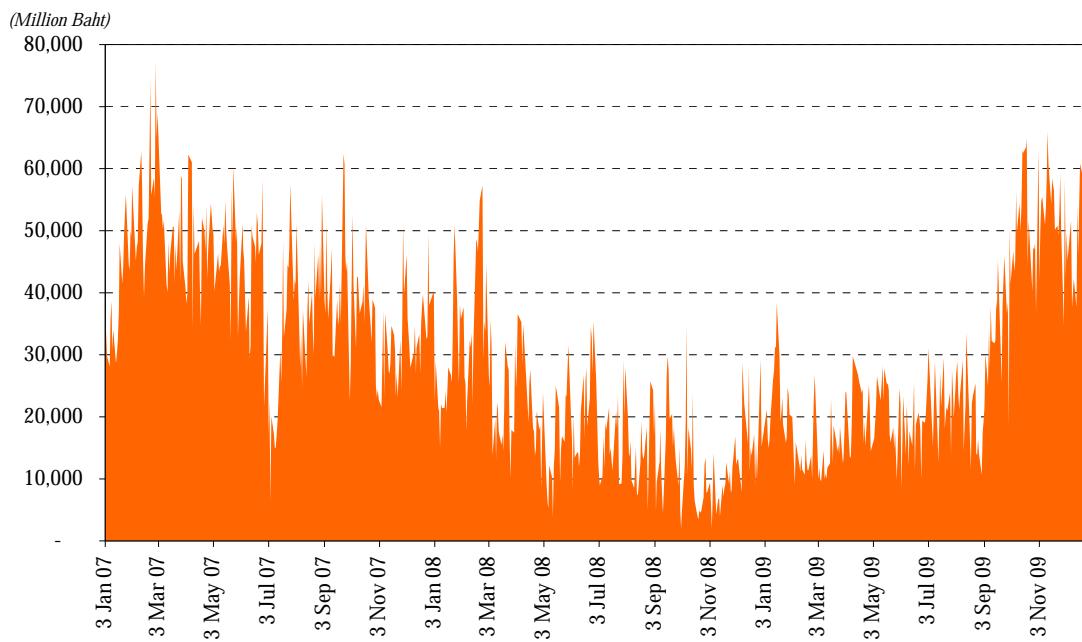


Figure 5

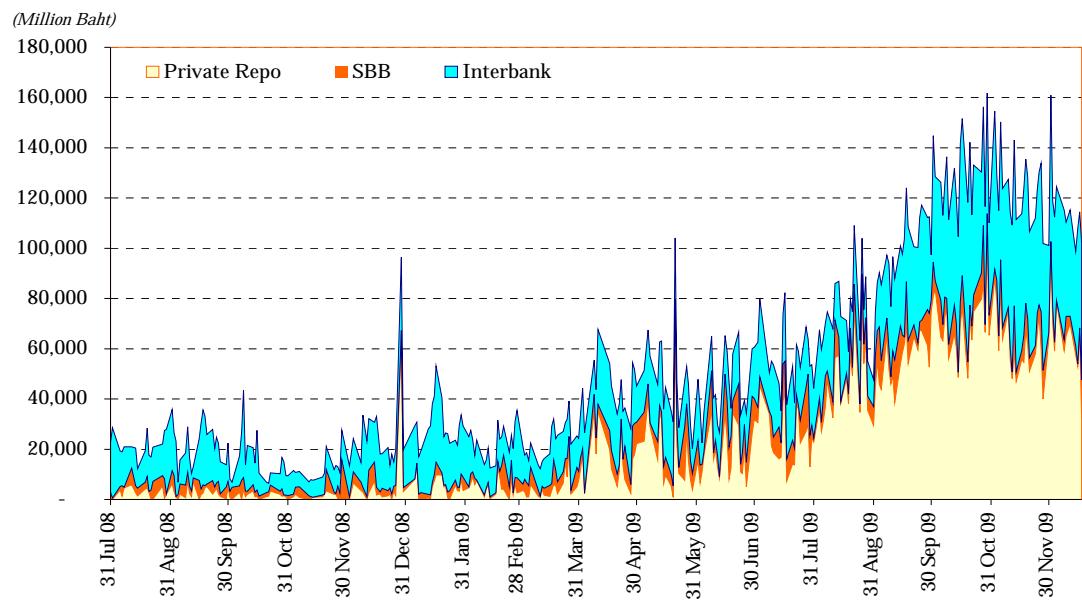
**Daily interbank transactions**



Conversely, secured lending transactions (private repo and sell–buyback), increased moderately towards the end of 2008. They have continued to grow significantly since mid-2009 onwards, mainly due to the BOT's plans to enhance the development of the private repo market (Figure 6).

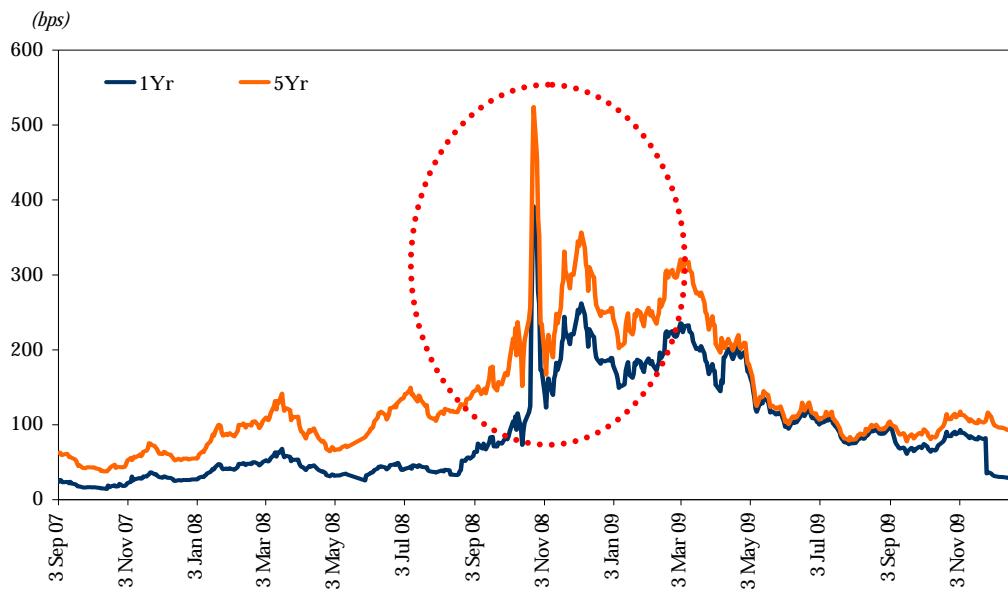
Figure 6

**Daily secured and unsecured lending transactions**



Regarding the local debt market, the Thai Government had no difficulty in raising funds through the domestic bond market. However, heightened credit risk concerns led to higher risk premia, as evidenced by the rising credit default swap (CDS) spreads. Nonetheless, regional countries' sovereign bond spreads subsequently stabilised and retreated back to the normal range in mid-2009 (Figure 7).

Figure 7  
CDS spreads – sovereign bonds



### 3. The central bank's policy responses to the recent crisis

#### 3.1 Central bank instruments to deal with the crisis

During the recent crisis, the BOT did not implement additional monetary measures to inject THB liquidity into the financial system. Thailand's open market operations and end-of-day standing facility under the existing framework functioned rather effectively in managing money market liquidity, as reflected by short-term money market rates moving in line with the policy rate.

As regards the end-of-day standing facility under the existing framework, this liquidity adjustment window was designed to meet frictional funding needs both for normal and stressed market conditions. It is accessible to a wide range of counterparties, virtually all of which are deposit-taking institutions. The BOT has emphasised to market participants that there is no stigma attached to the use of the facility.

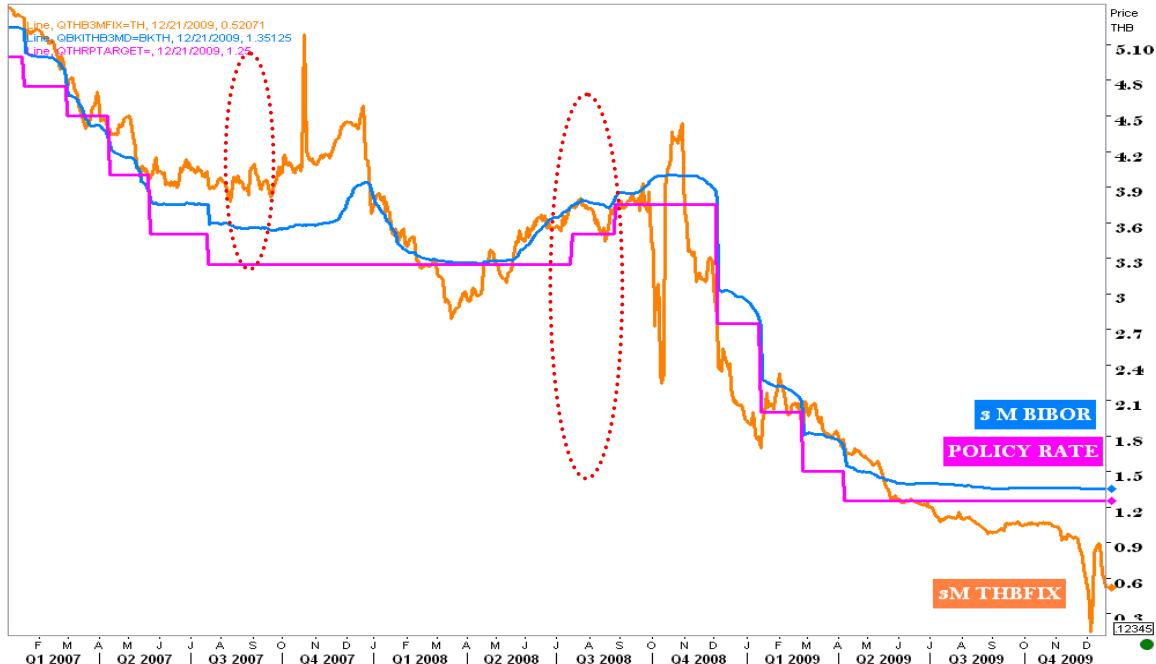
In addition, the BOT has prepared the contingency liquidity provision plan to ensure that there is sufficient liquidity for financial institutions.

#### 3.2 Measures taken to support interbank lending in local currency and/or to support foreign currency refinancing of banks/corporations

Due to USD scarcity in the global market and unreliable indicators for USD funding costs, the market began to move away from using a FX swap rate; i.e. THB/USD reference rate. Instead,

major market participants began to use the Bangkok interbank offered rate (Bibor) more actively as a short-term benchmark because it was more stable and reliable (Figure 8).

Figure 8  
Policy rate, three-month THBfix and three-month Bibor



In addition, the BOT has continually encouraged the development of private repo markets as it deems that a collateralised repurchase transaction imposes better risk management on participants' financing activities in terms of credit, legal and market risk arrangements. It is also more consistent with international practice.

As for measures to support foreign currency funding, the BOT has established bilateral swap agreements with other regional central banks, namely the Bank of Japan, the Bank of Korea and the People's Bank of China, within the Chiang Mai Initiative (CMI), in order to help facilitate short-term liquidity management in case of an emergency among regional countries. The facilities have not yet been activated as Thai financial institutions are not highly dependent on foreign financing and hence were not severely impacted during the recent crisis. However, the financial turmoil has highlighted the importance of bilateral swap arrangements among central banks.

### 3.3 The BOT's monetary policy responses to an international financial crisis

The BOT has made it clear to the market that the monetary policy stance would be shifted should the turmoil impose threats on the real economy and the economic growth outlook. Therefore, when economic data in the third quarter of 2008 pointed towards a noted slowdown in economic activity and a much weaker economic outlook via a significant decline in exports, the Monetary Policy Committee (MPC) decided to lower the policy rate, initially by 100 basis points (bp) and altogether by 250 bp over a period of four months from December 2008 to April 2009.

Moreover, the crisis did not put notable depreciation pressure on the Thai baht. Incidentally, the Thai currency was relatively stable compared to major and other regional currencies

because capital outflows were only moderate. Thai banks and corporations were neither heavily leveraged nor significantly exposed to foreign liabilities. Consequently, there were no concerns over excessive THB depreciation, and the issue did not act as a constraint to interest rate cuts.

### **3.4 The BOT's view on the role of FX reserves and interventions**

The BOT's view on the role of FX reserves and interventions remains unchanged. The response to FX market volatility is consistent with the managed floating exchange rate regime adopted under the inflation targeting framework. FX intervention, which resulted in excess domestic liquidity, is fully sterilised to avoid any inflationary effect. Thus far, despite prolonged excess liquidity conditions, inflation developments have been well contained and core inflation remains well within the target band.

Moreover, the recent crisis has shown that FX reserves played a vital role as the first line of defence to help ease the impact of an exchange rate shock.

### **3.5 Other government measures**

The Thai Government also implemented various measures to support financing for both bank and non-bank corporations. For instance, in order to restore public confidence in the Thai banking system, the government decided on 28 October 2008 to extend the *blanket deposit guarantee scheme* to August 2011. Initially, the blanket deposit guarantee scheme that had been in place since February 2008 was to be gradually replaced by a partial guarantee scheme beginning in 2010.

On 17 February 2009, through the Small Business Credit Guarantee Corporation (SBCG), the government approved the *portfolio guarantee scheme* for small- and medium-sized enterprises (SMEs). Under this scheme, the SBCG partially guarantees commercial banks' SME loan portfolios. The credit guarantee limit is set at THB 40 billion for a period of five years with a fee of 1.75%, which is waived for the first year. The loss incurred by the SBCG will be compensated by the government within a limit of THB 2 billion.

Moreover, on 5 August 2009, the Cabinet approved the *credit fast track project*, the aim of which is to accelerate the credit approval procedures of seven state banks in order to offset the reduction in commercial banks' credit extension. Total credit for 2009 under this project is targeted at THB 927 billion. The government also set out its plans to recapitalise certain government specialised financial institutions (SFIs) in order to enhance their credit extension capacities.



# The effects of the global financial crisis on the Turkish financial sector

Mehmet Yörüköglu and Hakan Atasoy<sup>1</sup>

## 1. Introduction

In order to understand the recent global financial crisis and to see what impact it will have on the future of the world economy, it is important to study the changing world economic landscape over the last two decades. The global economic landscape will continue to change in the same direction at an even faster rate in the post-crisis era. The forces that have been reshaping the world economy, and which are just gaining momentum, are rapid technological change, mainly due to the information technologies, globalisation and convergence processes, and changing world demographics. There is an asymmetry in the way, the timing, and the magnitude with which both advanced and emerging economies have been affected by these forces. This asymmetry has the potential to become even more pronounced in the future.

The productivity gains provided by the rapid technological change, globalisation and convergence processes were an important factor in the creation of the era of Great Moderation. During that era, countries, one by one, starting with advanced economies, achieved a low, stable level of inflation together with rapid growth performance. It was a perfect environment for central bankers since they had the best of two worlds – low inflation and rapid growth – at the same time. Inflation volatility and output growth significantly shrank for more than two decades up to the current crisis. With the help of rapid productivity gains and the introduction of many new goods to the world economy, central banks had no difficulty in keeping interest rates at historically low levels when global economic activity was booming. In turn, low inflation and real interest rates, combined with high economic growth over a substantial period of time, created strong upward pressure in global asset prices. One of the main implications of the classical growth theory is the so-called convergence process. Capital would flow from the richer to the poorer countries where the marginal product is higher. Initially, poorer countries, having higher marginal productivity, would grow faster than the richer ones until convergence was achieved. However, the instances where this process was observed were so rare that the countries actually achieving this were seen as having achieved a miracle, as Lucas' (1993) seminal work "Making a miracle" suggests. This was the case until the last two decades – successful examples have now become more common.

The financial sector has been one of the sectors that has benefited most from the advances in computer and information technologies. The rapid innovation of new instruments together with the decreasing transaction costs facilitated by these new technologies have significantly changed the risk structure of this sector. As a result, on the one hand, idiosyncratic risks are better diversified but, on the other hand, excessive systemic risks were accumulated and greatly underpriced.

The recent global economic developments led to a rapid contraction in the world economy and financial markets and a deceleration in trade volume. Starting from the last quarter of 2008 in particular, the developments in the global financial markets had a considerable impact on Turkey. The Turkish banking and financial sector has been quite robust: unlike

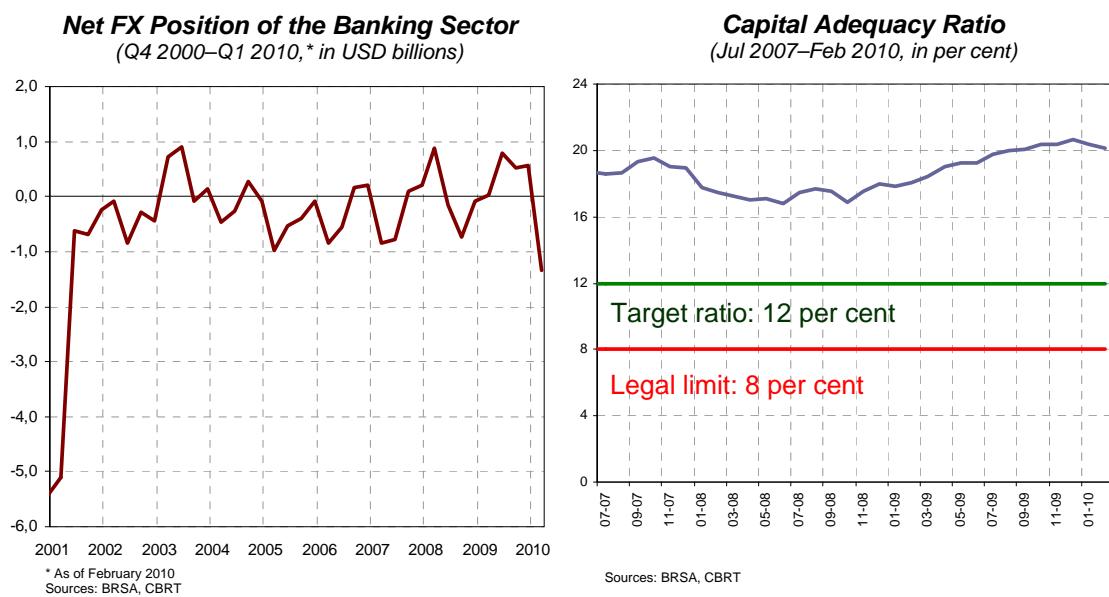
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<sup>1</sup> Central Bank of the Republic of Turkey.

many economies, Turkish financial institutions have not required any capital support. In fact, the average capital adequacy ratio in the Turkish banking sector has risen during the crisis, currently fluctuating at around 20%, well above the target level of 12% and the legally required level of 8%. The profitability of Turkish banks generally increased in 2008 and 2009, and a significant increase in profitability is expected for 2010. Turkey is one of the few countries whose credit rating has improved significantly during the crisis.

The net foreign exchange (FX) position of the banking sector (see Figure 1) has been close to zero, indicating that Turkish banks carry no significant FX risk. The main factor enhancing the Turkish economy's resilience to the crisis has been its sound and stable banking sector structure.

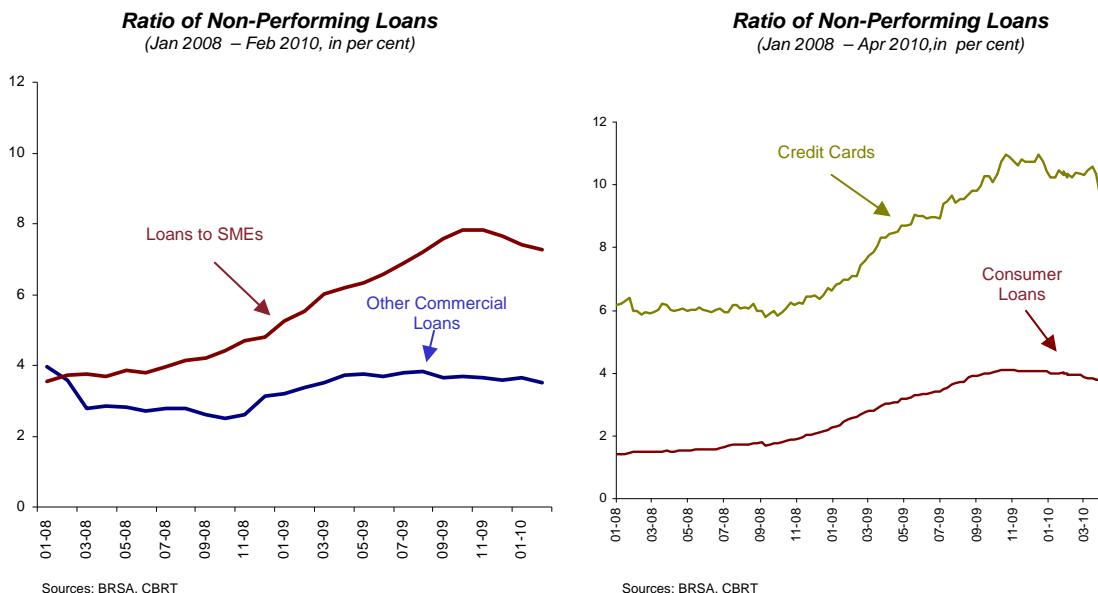
Figure 1:  
Banking Sector is Standing Tall



The financial strength index of the banking sector in Turkey, which is computed from sub-indices on a monthly basis by the Central Bank of the Republic of Turkey (CBRT), shows that the sector has remained relatively strong during the crisis.

Although the banking and financial sector has remained relatively robust during the crisis, the real economy has been significantly affected, mostly through the international trade channel. External demand contracted rapidly in the last quarter of 2008 and the first quarter of 2009. The annual volume of exports amounted to USD 136 billion as of September 2008 but dropped to USD 100 billion as of September 2009. Likewise, the annual volume of imports dropped to USD 139 billion from USD 212 billion over the same time frame. In the same period, the current account deficit decreased from USD 48 billion to USD 13 billion. Capital inflows turned from USD 49 billion into an outflow of USD 4 billion. After peaking in the last quarter of 2009, the ratio of non-performing loans (NPLs) has been gradually declining (see Figure 2).

Figure 2  
Improvements in loan quality



The following figures show the dramatic growth in the Turkish export sector prior to the crisis. Between 2002 and 2008, the average annual growth rate of Turkish imports and exports was more than 25%. During the same period, Turkish exports and imports measured in US dollars almost tripled. The Turkish economy used to be a more closed economy, but in less than one decade, international trade has become an important factor. The change in the sectoral composition of exports has been even more dramatic. Figure 4 shows that, before 2002, textiles, yarn, and food-related sectors dominated Turkish exports, whereas by 2008, sectors such as automobiles and parts, electrical machinery and appliances, and industrial machinery started to become more important. This reflects the rapid transformation achieved by the Turkish production and export sectors in the last decade. The Turkish production sector rapidly climbed the technology ladder during that period. However, this outstanding success also increased the sensitivity of Turkish exports to business cycles. The sectors that have become more dominant are demand-sensitive sectors such as investment and durable goods. It is estimated that if overall demand falls by 1%, the demand for textiles and food products will fall by around 1–2%, while the demand for durable goods, including automobiles, will fall by around by 4–5%. The Turkish export sector has also become more specialised over time. For instance, Turkey's average export bundle is much closer to the average domestic consumption bundle in 2002 when compared to the average export bundle and domestic consumption bundle in 2008. When external demand for Turkish export products shrinks, the specialisation in the export bundle leads to a sectoral shock as opposed to an overall demand shock in the economy. Studies have shown that sectoral shocks negatively affect resource utilisation in the economy since they require significant resource reallocation between sectors. Therefore, following a sectoral shock, capacity reallocation and unemployment are disproportionately negatively affected. As a result, the unemployment rate in Turkey rapidly increased during the early phase of the global financial crisis: it was 10.3 % in September 2008, but increased to 16.1 % in February 2009. The unemployment rate began to fall, reaching 12.8% in July 2009, partly due to the effect of the tax reductions implemented in certain sectors and partly due to seasonality factors. Compared with the same period in the previous year, the unemployment rate had increased by 2.9 percentage points as of July 2009.

Figure 3  
Foreign Trade

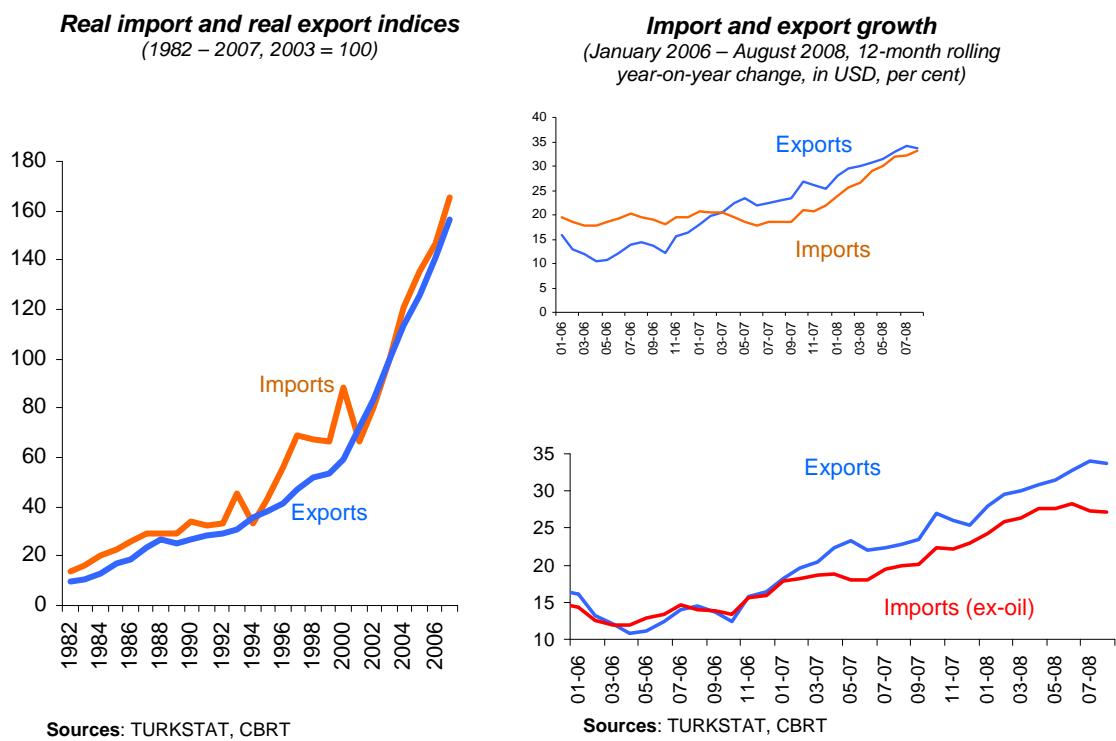
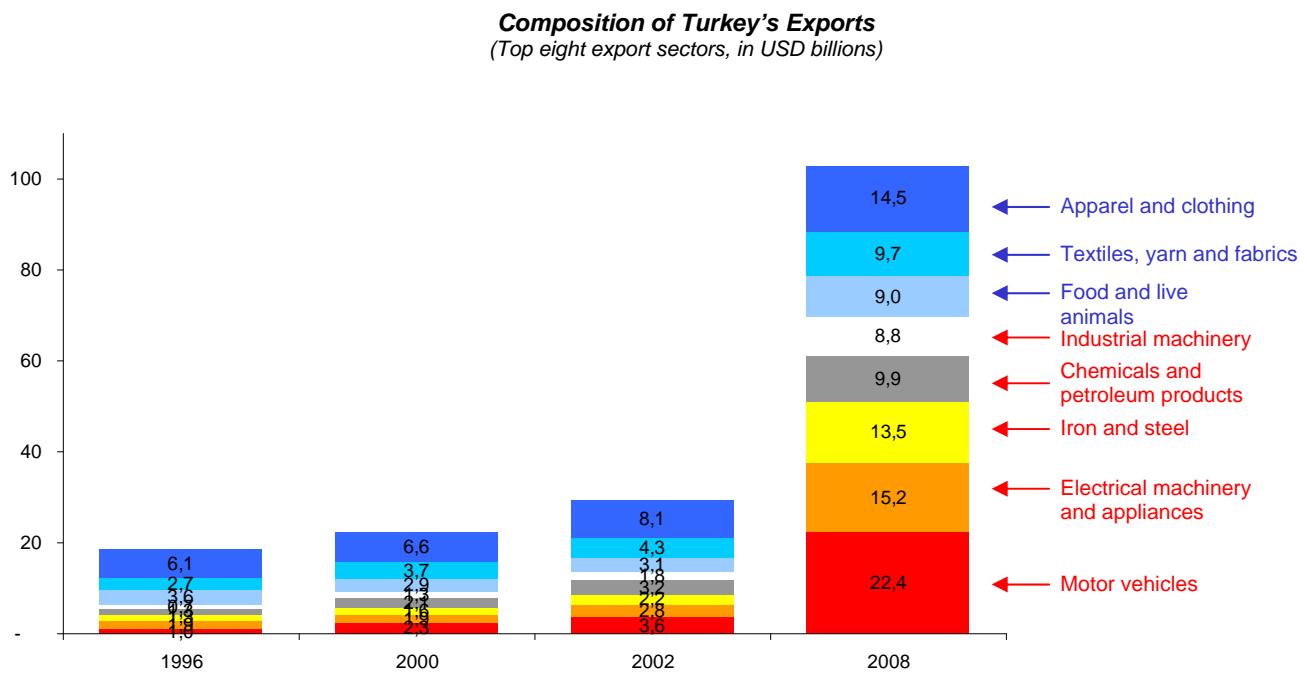


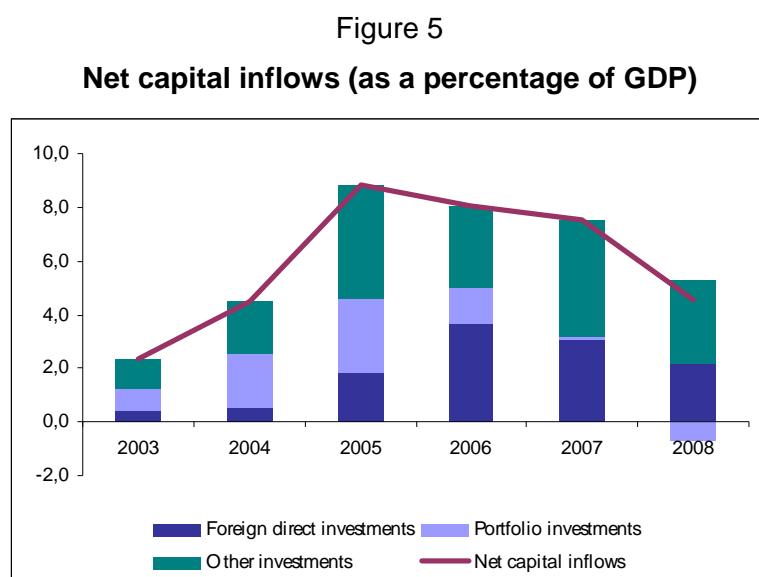
Figure 4  
Export performance



Due to the global economic developments, the external borrowing possibilities for banks and non-bank entities became more limited. Demand for banking services decreased sharply as a result of the contraction in economic activity, and bank intermediation slowed down. This paper examines these two effects in detail. In the second section, cross-border lending to Turkey before and during the crisis is analysed. In the third section, we look at how the crisis led banks operating in the domestic markets to change the key aspects of their business models. Section four examines whether the foreign banks operating locally responded differently during the crisis. Finally, the fifth and sixth sections explain the impact of the financial turmoil on the local money and debt markets and the CBRT's interventions to deal with the crisis.

## 2. Cross-border lending

Turkey benefited most from the recovery in foreign direct investment and other investments, which mainly covers bank-related inflows after 2002.



Sources: BRSA, CBRT.

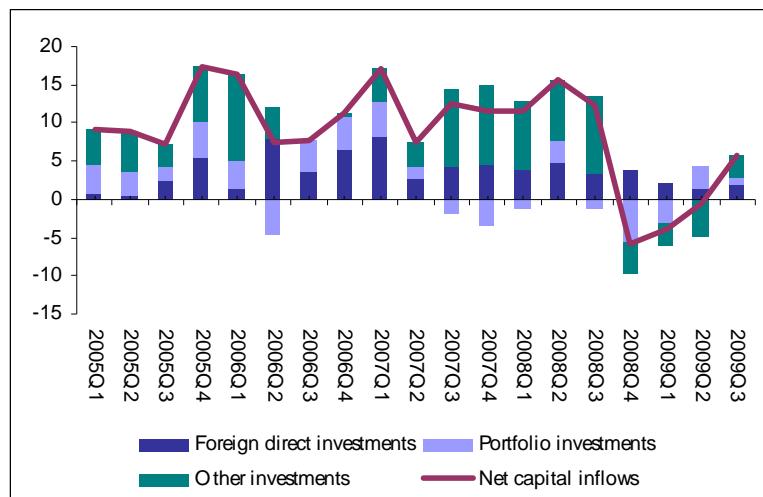
However, net capital outflows started to occur in late 2008 after the onset of the global crisis due to the decline in portfolio investments and other investments. In the second quarter of 2009, although portfolio inflows started to rise, net capital flows were subdued by other investment outflows until the end of the second quarter. The contraction in other investment flows that reflected a decline in external debt rollovers both for banks and for corporates appeared to be reversing gradually in the third quarter.

Over the nine-month period to September 2009, net capital inflows were only USD 1.4 billion. During that period, foreign direct investment amounted to USD 5.3 billion and net portfolio investments totalled USD 0.9 billion. On the other hand, outflows in other investments amounted to USD 4.8 billion.

Over the past five years, the external debt of both financial and non-financial entities has risen significantly. The total external debt of private entities to GDP increased by 9.3 percentage points, reaching 25.3% in 2008. The financial sector's external debt accounted for 8.6% of GDP and that of non-financial entities accounted for 16.7% of GDP.

As tensions in the financial markets began to increase, international credit to Turkey, as in other emerging markets, was trimmed, and the outstanding amount of external liabilities started to decline. The total external debt of the private sector dropped to USD 177.0 billion in the second quarter of 2009 from USD 185.9 billion in 2008.

Figure 6  
Net capital inflows (in billions of US dollars)



Sources: BRSA, CBRT.

Private sector statistics regarding the international investment position and outstanding loans received from abroad give detailed information about the type of borrowing instruments as well as more timely information regarding the external liabilities of the private sector. According to these statistics:

- Long-term external credit to banks rose to USD 30 billion in 2008 from USD 3.1 billion in 2003. However, a USD 2.4 billion fall in long-term external credit to banks was registered in the first eight months of 2009 and long-term external credit to banks declined to USD 27.6 billion as of August 2009.
- Short-term external credit to banks reached USD 9.5 billion in 2008 from USD 5.3 billion in 2003. It subsequently dropped by USD 3.7 billion, standing at USD 5.8 billion as of August 2009. This implies that interbank deposits, which do not require collateral and are assumed to be more liquid than loans, replaced short-term external credit to banks.
- Cross-border deposits increased to USD 15.3 billion in 2008 from USD 4.4 billion in 2003. They continued to increase in 2009 and rose by USD 3.6 billion in eight months, reaching USD 18.8 billion as of August 2009.
- Thus, total external liabilities, including both loans and deposits, which showed a USD 42 billion increase over the past five years (33.1% average annual growth), dropped by USD 2.5 billion during the first eight months of 2009 (4.8%).
- Regarding non-financial entities, long-term external credit to non-financial entities rose to USD 99.5 billion in 2008 from USD 24.8 billion in 2003. However, a fall of USD 3.7 billion in long-term external credit to non-financial entities was registered in the first eight months of 2009 and long-term external credit to non-financial entities declined to USD 95.8 billion as of August 2009.

Table 1  
External debt of the private sector

(in billions of US dollars)	2003	2008	2009Q2
Short-term external debt	18,8	45,4	43,0
Financial entities	8,4	21,9	21,2
Banks	8,4	21,6	20,9
Non-banks	0,0	0,2	0,3
Non-financial entities	10,5	23,5	21,8
Long-term external debt	30,1	140,6	133,9
Private sector	30,1	140,6	133,9
Financial entities	5,3	41,1	37,4
Banks	3,1	30,0	27,8
Non-banks	2,2	11,0	9,6
Non-financial entities	24,8	99,5	96,5
Total external debt of the private sector	48,9	185,9	177,0
Financial entities	13,6	63,0	58,6
Banks	11,5	51,7	48,7
Non-banks	2,2	11,3	9,9
Non-financial entities	35,3	123,0	118,4

- The amount of short-term credit to non-bank entities was small and has not changed substantially over the past few years. It stood at USD 1.7 billion as of August 2009, USD 1.4 billion of which was related to non-financial entities.
- Trade credits rose to USD 22.7 billion in 2008 from USD 9.1 billion in 2003 but fell by USD 1.5 billion in the first eight months of 2008, decreasing to USD 21.2 billion in August 2008.
- Thus, total external liabilities, which includes both loans and trade credits and which showed an increase of USD 88.3 billion over the past five years (28.5% average annual growth), fell by USD 5.2 billion during the first eight months of 2009 (4.3%).
- Long-term external credit to non-bank financial entities rose to USD 9.6 billion in 2008 from USD 2.2 billion in 2003. However, a fall of USD 2.1 billion in long-term external credit to non-bank financial institutions was registered in the first eight months of 2009, and long-term external credit to non-bank financial institutions declined to USD 8.9 billion as of August 2009.
- Looking at the creditor side, foreign banks' long-term credit claims rose to USD 77.2 billion in 2008 from USD 16.4 billion in 2003 and fell to USD 72.3 billion in August 2009.

All in all, before the crisis, both financial and non-financial entities raised their outstanding amount of external liabilities due to the abundant global liquidity. After the crisis, the refinancing of the private sector's total external liabilities became difficult. The private sector started to become a net payer. During that period, banks and non-financial entities were not reluctant to add new loans to their balance sheet because of the low investment needs

related to the contraction in domestic and external demand. Their main concern was only to rollover the existing debt. In addition, banks abroad started to become more conservative and did not want to take on more risk related to the financial difficulties in their home country. As a result, the outstanding amount of the private sector's external liabilities fell. However, it should be underlined that the total decline was not as substantial as expected at the beginning of the crisis.

### **3. Banking intermediation**

Banking intermediation grew mainly due to the sustained credit expansion over the previous five years, during which double-digit real growth rates were observed in the size of banks' balance sheets. The average real growth rate of banks' total assets stood at 13.8% between 2003 and 2008 and the ratio of total assets to GDP grew from 54.9% to 77.1%. During that period, the growth rate of loans was more than double that of total assets, and the ratio of total loans to GDP rose to 38.7% from 14.6%.

The asset structure of the banking sector changed in favour of loan portfolios. While the share of loans in total assets rose to 50.2% in 2008 from 26.5% in 2003, the share of securities declined to 26.5% from 42.8%. Over recent years, the concentration of the banking sector's loan portfolio in segments related to households increased. In addition, while the share of foreign currency denominated loans decreased, the maturity of the loan portfolio lengthened. In 2003, the share of loans to households was 19.4%, the share of foreign currency loans was 45.4% and the share of short-term loans was 55.8% of total outstanding loans. At the end of 2008, the corresponding percentages were 32.1%, 28.7% and 42.9%, respectively. Household loans were in domestic currency. Turning to the structure of the securities portfolio, 97.3% of total securities included national government debt instruments, the share of which has not changed significantly over recent years.

Banks did not rely heavily on market funding in Turkey and continued to fund their balance sheets mainly through customer deposits, which were assumed to be more stable in most circumstances. In 2003, deposits accounted for around 62.2% of total liabilities, with funding from other banks and repo transactions accounting for 14.9%. The corresponding percentages were 62.1% and 18.2%, respectively, in 2008. The increase in borrowings from banks and repo funding was mainly against the share of capital in total assets. The share of capital in total assets dropped to 11.8% in 2008 from 14.9% in 2003. Thus, banks' leverage expanded rapidly from 2003 to 2008, mainly through borrowings from other banks, which covered most of their external liabilities. The outstanding amount of external liabilities increased to USD 55.4 billion in 2008 from only USD 13.2 billion in 2003, indicating an average annual increase of 33.1% in US dollars. During that period, long-term loan borrowings from abroad rose to USD 30.6 billion from USD 3.5 billion, indicating an average annual increase of 53.9% in US dollars. The share of long-term loan borrowings in total external liabilities increased to 63.3% in 2007 from 26.5% in 2003, subsequently declining to 55.2% in 2008. Thus, although the total outstanding amount of external liabilities did not decline in 2008, the structure of the amount started to change in favour of short-term loans and deposits.

The maturity of deposits in banks was very short. The amount of deposits that were due in three months constituted 91.2% of total outstanding deposits in 2008. The longer-term loan borrowings from abroad contributed to extending the maturity of loans granted during that time. The magnitude of loans did not surpass that of deposits in most banks, which decreased the funding liquidity risk. However, the loan to deposit ratio rose significantly to 81.6% in 2008 from 48.2% in 2003.

Banks' asset quality improved and has remained strong over the past few years. Non-performing or doubtful assets, while increasing, tended to drop as a share of total loans

mostly due to the strong growth of the loan portfolios. The share of NPLs in total loans decreased to 3.7% in 2008 from 11.5% in 2003. Measures of capital adequacy for the banking sector showed an overall decline in recent years. The decline in the overall solvency ratio was mainly due to the expansion in lending activities. The solvency ratio decreased to 18.0% in 2008 from 30.9% in 2003.

Over the past few years, another important observation was related to the de-dollarisation of banks' balance sheets. The share of foreign currency assets in total assets declined to 34.0% in 2008 from 44.6% in 2003. Turning to the liability side, the share of foreign currency liabilities in total liabilities declined to 34.7% from 44.7%. During that period, when the global financial developments began to affect the banking system, banks' currency risk remained very limited.

As the stress in the financial markets unfolded, the growth of total assets decelerated in comparison with previous years. The rate of growth in real terms during the first nine months of 2009 was only 6.7%. Two significant developments took place that affected the total assets of credit institutions: a drop in the outstanding amount of loans and an increase in the financing of government borrowing needs. In the fourth quarter of 2008, banks' aggregate loan portfolio started to decrease. As the intensity of the crisis became evident, banks were becoming increasingly risk-averse and tightened their lending conditions. In addition to supply constraints, the demand for loans also decreased as a result of weakening external and domestic demand and rising unemployment. As a result, loans granted to firms and households were curtailed. As of September 2009, loans increased by only 0.1% in real terms, compared to the previous year-end. Rising demand for funds from the government also lead to the slowdown in bank lending activity. While loans were declining, the growth rate of securities investments, which consisted mainly of government debt instruments, rose by 21.8% in real terms from December 2008 to September 2009. Consequently, while the share of loans in total assets dropped to 47.1% in September 2009 from 50.2% in December 2008, the share of securities in total assets rose to 30.2% from 26.5%. Regarding the distribution of the loan portfolio, the share of loans to households in total loans increased to 33.1% in August 2009 from 32.1% in the previous year-end. This was due to the fact that loan growth remained on a downward path in the case of non-financial corporations, while in the case of households, the earlier downward movement in loan growth levelled off in recent months. Turning to the maturity and currency structure of the loan portfolio, the share of short-term loans in total loans decreased slightly (42.7%) and foreign currency loans continued to decline (26.6%).

During the crisis, borrowings from other banks, which consisted mainly of external liabilities, seized up and the growth rate of deposits slowed down, leading to a sharp decline in leverage. As of September 2009, the share of deposits in total liabilities decreased slightly to 61.2% from 62.1% at the end of 2008 and the share of funding from other banks dropped to 10.7% from 12.7%. The outstanding amount of external liabilities decreased to USD 53.0 billion in August 2009 from USD 55.4 billion in 2008 and the share of long-term loan borrowings in external liabilities continued to decline and stood at 53.6% as of August 2009. Total syndication and securitisation loans decreased by USD 3.7 billion in the first nine months of 2009, amounting to USD 20.0 billion by the end of September 2009. Banks partly offset the decline in borrowings from other banks by increasing the funding from repo markets. The share of repo funding in the balance sheet rose slightly to 6.9% in September 2009. As a result, the capital to asset ratio increased to 13.2% from 11.0%.

Due to the decline in lending to households and non-financial corporations, the loan to deposit ratio, a measure of funding liquidity risk, decreased to 81.2% in September 2009 from 83.9% in 2008. The average credit quality of borrowers deteriorated as a result of the general economic slowdown. As of September 2009, NPLs increased rapidly, with their share in the loan portfolio moving up from 3.7% to 5.3%. The deterioration was mainly in the segments of loans to households and loans to small- and medium-sized enterprises.

Regarding the dollarisation of the balance sheet, the share of foreign currency funding and foreign currency assets in the balance sheet continued to decline (32.9% and 31.4%).

As of September 2009, the capital adequacy of banks improved compared with the previous year-end. The overall solvency ratio of banks amounted to 20.1%, mainly on account of the high profits gained during the first nine months of 2009 and the decrease in risk-weighted assets. Over the past five years, the average return on equity (ROE) and return on assets (ROA) were 2.1% and 15.8%, respectively. As of September 2009, despite the high impairment charges due to the rise in problem loans, the annualised figures for ROE and ROA rose to 2.6% and 20.4%, mainly due to the increase in net interest margins and gains from trading activities. The decrease in interest rates led to a rise in net interest margins due to the maturity mismatch in the balance sheet. The sharp decline in interest rates also contributed to the valuation gains for treasury securities.

All in all, the global crisis also affected the banking sector in Turkey. Demand for banking services decreased sharply as a result of the contraction in economic activity. Banks were rather conservative in their lending due to the increased risks and the slowdown in loan demand as well as the rising demand for funds from the government. Credit risks also increased as the ratio of NPLs to total loans rose. Due to the global economic developments, the external borrowing possibilities for banks became more limited. However, the global crisis affected the Turkish banking sector to a relatively limited extent in comparison with many other countries because of its high capital adequacy ratio and low leverage and currency risks. Despite the high loan growth rates over the past few years, customer deposits still remained the main funding source, and the amount of deposits were higher than the amount of outstanding loans. The share of foreign currency loans, which could have caused an indirect credit risk during the crisis, was also limited, especially for households. Nevertheless, the interest risk was higher due to a maturity mismatch caused by long-term assets against short-term liabilities. The rapidly falling interest rates had a positive effect on interest margins and profitability. Finally, it should be underlined that there were no bank failures or public support programmes for the Turkish banking sector during the crisis. Although some key aspects of banking sector operations in Turkey changed, the banking sector remained resilient during the crisis.

Table 2  
**Financial situation of banks before and during the crisis**

	<b>Before the crisis</b>	<b>During the crisis</b>
Loan growth	Increase	Decrease
Share of loans to households	Increase	Increase
Share of foreign currency loans	Decrease	Decrease
Share of short term loans	Decrease	Decrease
Investment in government debt securities	Decrease	Increase
Loan to deposit ratio	Increase	Decrease
Non-performing loan ratio	Decrease	Increase
Share of customer deposit funding	No change	No change
Share of external liabilities due to banks	Increase	Decrease
Leverage	Increase	Decrease
Capital adequacy ratio	Decrease	Increase
Dollarisation	Decrease	Decrease

#### 4. Domestically owned versus foreign-owned banks

Foreign banks expanded their presence in Turkey quite significantly during the last five years. However, the market share of foreign-owned banks in total assets, loans and deposits was only 17.0%, 20.2% and 15.5%, respectively, as of September 2009. The proportion of foreign banks in the Turkish banking sector was not very large in comparison with many other emerging countries.

The proportion of customer loans in total assets for foreign banks remained above that of domestic banks while the share of securities was below. Loans to households accounted for a higher share for foreign banks and the share of loans to small- and medium-sized enterprises was close to that of private domestic banks. Looking at the liabilities side, customer deposits were the most important funding source for foreign banks. Liabilities due to banks represented a substantial part of funding sources in comparison with domestic banks. However, funds raised from repo markets were not as important for foreign banks.

Table 3  
Ratio analysis – domestic versus foreign banks

	2008/12			2009/9		
	Public	Private	Foreign	Public	Private	Foreign
Asset structure (% of total assets)						
Loans	41,3	52,2	59,6	40,4	47,5	59,1
Securities	38,2	24,0	13,1	40,6	28,5	15,3
Liability structure (% of total assets)						
Deposits	69,9	59,3	56,5	67,2	58,4	58,6
Due to banks	5,7	14,6	19,1	5,2	12,5	15,8
Repo	5,0	7,2	1,5	7,7	8,1	1,5
Currency structure (%)						
Foreign currency assets to total assets	23,0	37,0	23,0	21,6	32,8	21,6
Foreign currency loans to total loans	21,5	35,9	18,1	21,6	33,7	15,3
Foreign currency liabilities to total liabilities	23,6	39,0	42,4	21,8	37,0	38,7
Foreign currency deposits to total deposits	25,2	40,3	41,6	24,3	41,2	40,3
Leverage (%)						
Capital to assets	12,1	11,3	12,9	12,7	13,1	14,6
Liquidity (%)						
Loan to deposit ratio	61,4	91,3	110,0	62,8	85,9	108,1
Asset quality (%)						
Non-performing loans to total loans	3,7	3,5	4,1	4,3	5,4	6,7
Loans to households to total loans	29,7	30,9	38,3	30,6	32,0	39,0
Loans to SMEs to total loans	18,6	25,3	23,2	17,3	23,5	23,8
Profitability (%)						
Return on equity	17,6	15,8	11,3	23,1	20,2	16,2
Return on assets	2,1	1,8	1,5	2,9	2,6	2,3
Capital adequacy (%)						
Overall solvency ratio	22,9	16,4	16,9	23,9	18,9	18,5

With regard to the currency structure of foreign banks' assets and liabilities, the share of foreign currency balance sheet liability items tended to be highest among foreign banks. Borrowing in foreign currency was more typical for foreign banks. On the other hand, the share of foreign currency assets in total assets and the proportion of foreign currency denominated loans as a percentage of total loans were not substantial in foreign banks. The loan to customer deposit ratio was higher than 100%, unlike the other banking groups, which made them more vulnerable to funding liquidity risks. Looking at the differences in profitability performance across banking groups, foreign banks did not outperform domestic banks. For foreign banks as a whole, the ratio of NPLs and other doubtful loans as a percentage of total loans was high compared to domestic banks.

As regards banks' capital structure and solvency measures, for foreign banks as a whole, the overall solvency ratio remained close to that of private domestic banks and the leverage was lower than for all domestic banks.

One of the potential concerns related to foreign ownership is that foreign banks may react differently from domestic banks to adverse changes in business cycle conditions – either at home or in a host country – or in the case of a host country banking crisis. There may be various explanations for such destabilising behaviour. Parent banks may reallocate their capital across regions or countries on the basis of expected risks and returns. Differences in business cycle conditions may cause activities of subsidiaries in low-growth countries to be scaled down substantially in favour of other countries. Similarly, deteriorating economic conditions in the home country may force parent banks to downsize their operations abroad. On the other hand, parent banks may provide financial support for their subsidiaries during crisis times in host countries, thereby ensuring a smoothing effect on their subsidiaries' credit supply.

The potentially destabilising behaviour did not hold for Turkey during the crisis. As of September 2009, the real growth rates of loans had declined to 0.3% compared with the previous year-end for foreign-owned banks. In the meantime, private domestic banks' loan portfolio amount shrank by 4.6% in real terms. Therefore, both private and foreign-owned banks decelerated their loan growth during the crisis, but the deceleration was higher for private domestic banks. However, public ownership in Turkey had a stabilising effect on credit supply. The real growth rate of public banks' loan portfolios increased by 10.1% in nine months. Looking at the liability side, there was no evidence that foreign banks were more successful in refinancing their liabilities to other banks than domestic banks. Foreign banks tried to replace borrowings from banks with retail deposits. The leverage and loan to deposit ratios decreased for foreign banks as a whole, similarly to private domestic banks. Though the credit quality deteriorated across all banking groups, the NPL ratio for foreign banks increased more than for domestic banks during the crisis.

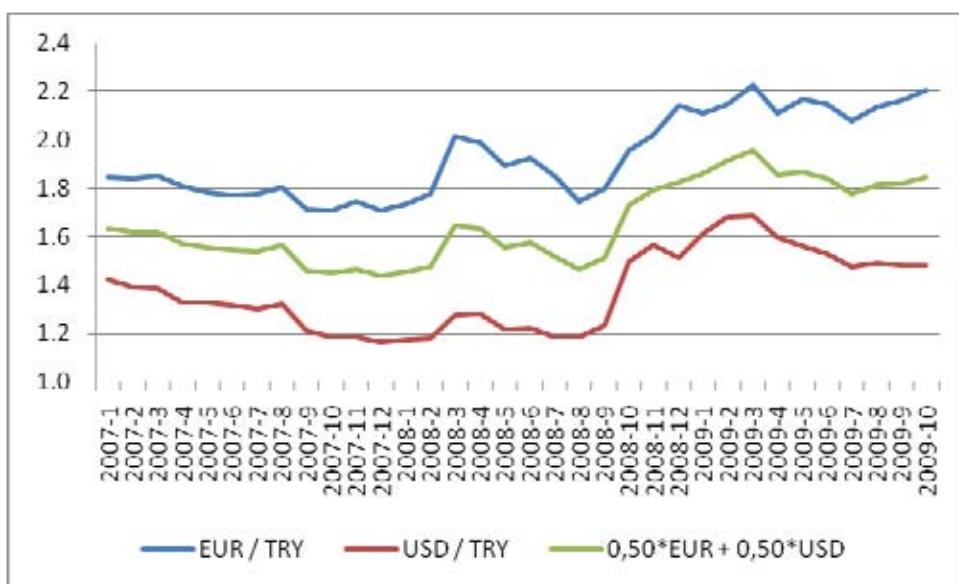
## 5. Local money and debt markets

The floating exchange rate regime, implemented as a precondition for the inflation targeting regime since 2001, has made a significant contribution to the stability of the Turkish economy. Under the floating exchange rate regime, the exchange rate is neither a target nor a policy tool and is determined by the supply and demand conditions in the market. Nonetheless, by closely monitoring exchange rate developments, the CBRT can directly intervene in the markets in case of speculative transactions leading to unhealthy price formation and excess volatility in the FX market due to a decrease in depth. However, the CBRT has not directly intervened in the FX market since the selling intervention in June 2006. The Turkish lira depreciated 27.5% against the euro and 42.8% against the US dollar during the period between August 2008 and March 2009. The financial markets started to recover in the second quarter of 2009 and the Turkish lira appreciated against the major

foreign currencies. Between March and October 2009, the appreciation was 12.2% against the euro and 5.8% against the US dollar.

Although there is no exchange rate level to be maintained in a floating exchange rate regime, holding a strong FX reserve position is very important for emerging economies like Turkey to eliminate the unfavourable effects of potential internal and external shocks and to boost investors' confidence in the country. Therefore, the CBRT holds FX buying auctions to build up reserves at times when the FX supply increases relative to the FX demand. The CBRT has been buying FX via transparent FX buying auctions with preannounced terms and conditions. However, with the aim of maintaining liquidity in the system, which was being permanently withdrawn from the FX market through the auctions, the FX buying auctions were suspended as of October 2008. Meanwhile, as unhealthy price formations were witnessed due to a decrease in the depth of the FX market, the CBRT started to inject FX liquidity into the market through FX selling auctions as of October 2008. However, after they were held on two working days, the FX selling auctions were suspended as a result of the easing concerns pertaining to the depth of the market. The CBRT resumed FX selling auctions from March to April 2009. In the beginning of August 2009, it was observed that, as a result of the positive expectations related to the global economy, the liquidity and risk appetite had regained strength, capital flows to Turkey had increased (as in other emerging markets), and the FX market had become relatively stable. Having determined that this process had contributed to a suitable environment in which the CBRT could build up FX reserves, the FX buying auctions were resumed as of August 2009.

Figure 7  
Exchange rates

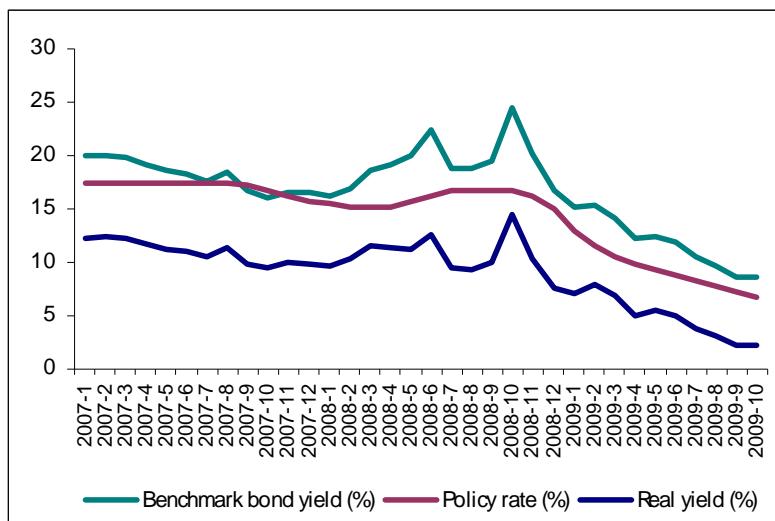


Sources: BRSA, CBRT.

Due to negative perceptions about the global financial crisis and its effects on the Turkish financial system, the benchmark government bond yield rose to 24.42% in October 2008 from 16.26% in early 2008 and 18.83% in August 2008. During that time, the CBRT raised the policy rate by 125 basis points to 16.75%. Starting from November, the CBRT began easing its monetary policy in an attempt to support the Turkish financial market and economy in addressing the spillovers from the global financial crisis. The policy rate fell by 1,000 basis points and stood at 6.75% as of October 2009. The 1,000 basis point fall was reflected in the government bond yields, which dropped to 8.70% in October 2009. Thus, in the early stages of the global crisis, interest rates first rose substantially and then started to decline as a result

of the CBRT's rate cuts and the low inflation expectations engendered by the weak external and domestic demand. Banks increasingly invested in government debt securities in order to minimise the risks associated with extending credit to the private sector, leading to the reduced interest rates during this period.

Figure 8  
Interest rates



Sources: BRSA, CBRT.

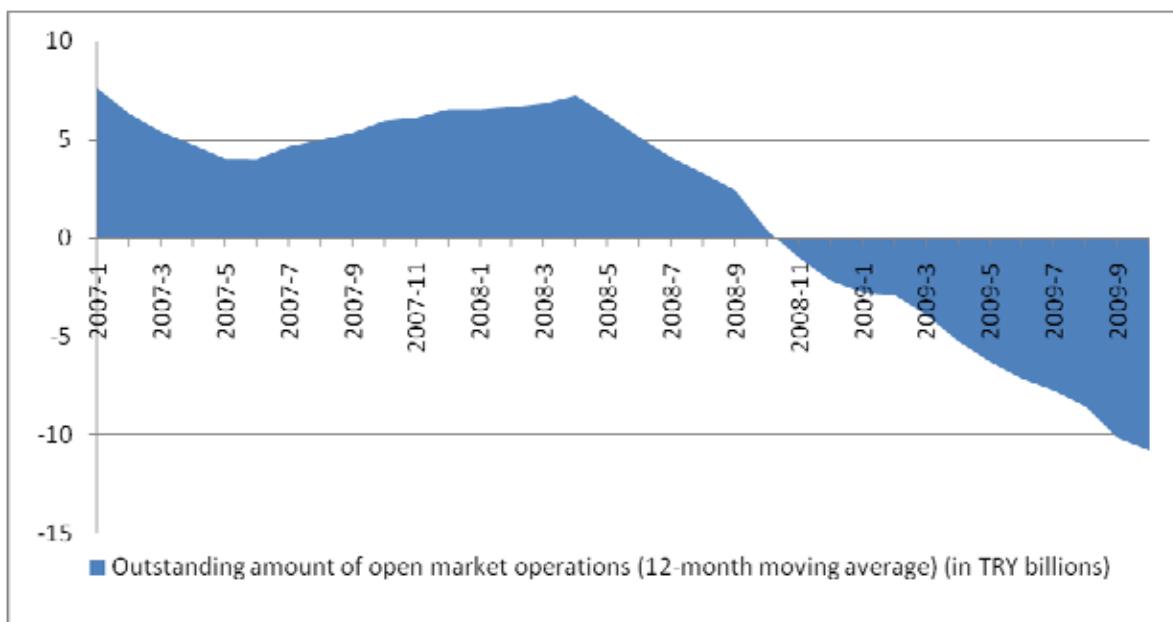
Finally, it should be added that the CBRT started repo auctions after May 2008 due to the unbalanced distribution of liquidity in the Turkish financial system. These auctions were intended to provide an efficient and stable functioning of the money markets by preventing excessive volatility in the short term. The interest rates materialised in the repo markets were close to the policy rates.

## 6. Central bank instruments to deal with the crisis

The authorities and organisations adopted a series of measures to ease the negative effects of the global financial crisis on Turkey.

- The CBRT cut its interest rates and extended the maturity in the FX deposit market in order to prevent a possible FX squeeze in the financial market. Accordingly, the lending rate was reduced to 5.5% from 7.0% for USD and to 6.5% from 9.0% for EUR. The maturity of interbank transactions was extended to three months from one month.
- The CBRT resumed its activities as an intermediary in the FX deposit market until the removal of uncertainties in the international markets.
- The CBRT raised its transaction limits twofold to USD 10.8 billion and extended the lending maturity to one month from one week in the FX deposit market.
- It also adopted a strategy to use FX reserves to primarily support the FX liquidity needs of the banking system.
- The reserve requirement ratio was lowered to 5% from 6% in TRY liabilities, and to 9% from 11% in FX liabilities. With this measure, the CBRT provided additional liquidity of TRY 3.3 billion and USD 2.5 billion to the banking system.

Figure 9  
Open market operations



Sources: BRSA, CBRT.

- It increased the export rediscount credit limit by USD 500 million to USD 1 billion in order to contain the effects of the global crisis on various industry sectors. Additionally, the rules and principles applicable to the export rediscount loan limit were rearranged in order to facilitate the use of these loans. Therefore, the condition setting forth the assignment of the reserves for letters of credit to the CBRT was repealed.
- The Central Bank Regulation on the Liquidity Support Facility governing the principles and procedures for the utilisation of credit facilities as stipulated in subparagraph (c) of paragraph (I) of Article 40 of the Central Bank Law was published. Accordingly, the loans will be available:
  - As advance payments, with one-month maturities for a maximum one-year period;
  - At the lending rate set for the intraday transactions carried out at the Interbank Money Market; bearing in mind the principle that interest rates applicable to credits of this nature are higher than those applicable to normal central bank open market transactions;
  - Against collateral accepted in the interbank money market;
  - Being limited to an amount equal to twice the size of the equity capital of the applying bank.

## 7. Banking regulation in Turkey

In this section we will discuss the macroprudential policy framework in Turkey. Following the establishment of a separate supervisory and regulatory agency (the Banking Regulation and Supervision Agency (BRSA)) for banks in September of 2000, the Law on the Central Bank of the Republic of Turkey was amended to state that the CBRT's main goal is "achieving and

maintaining price stability". To facilitate this objective, under the terms of its Law, the CBRT has also been assigned with the mandate of taking necessary measures to "safeguard financial stability". Thus, pre-emptively identifying and minimising any major risk that may endanger financial stability is one of the CBRT's main objectives. Additionally, the CBRT's vital function as a lender of last resort and its role in the management and supervision of payment systems can also be considered significant reasons to effectively focus on macroprudential surveillance. In the same context, with its macro perspective and ability to analyse the effects that macroeconomic developments have on the financial sector, the CBRT is in a better position to detect imbalances or cycles in the system that might cause excessive risk-taking by some market participants and which might eventually lead to a system-wide failure. In this respect, in its financial stability report published twice a year, the CBRT shares its views and concerns with the public on issues that might adversely affect market conditions and endanger financial stability.

The CBRT and other relevant authorities work in close cooperation on issues related to financial stability. In that regard, according to Article 99 of the Banking Law, the Financial Sector Commission, which consists of representatives of the BRSA, the Ministry of Finance, the Undersecretariat of the Treasury, the CBRT, the Capital Markets Board (CMB), the Savings Deposits Insurance Fund (SDIF), the Competition Board, the Undersecretariat of the State Planning Organisation, the Istanbul Gold Exchange, the securities stock exchanges, the futures and options markets and the associations of institutions under the body of the BRSA, ensures the exchange of information, cooperation and coordination among institutions, proposes joint policies and expresses views regarding matters that relate to the future of the financial sector, with a view to establishing and ensuring confidence and stability as well as development in the financial markets. In Turkey, non-monetary measures that are prudential in nature consist of discretionary variations of regulatory requirements by the authorities. Such variations were not specifically designed to tackle the recent crisis, but they were already in place. And we believe that such variations, which are intended to avoid the origination of systemic risk and any further deterioration in financial conditions, are significant macroprudential instruments.

The measures in place in the Turkish financial regulatory system include the Regulation on Measurement and Evaluation of Capital Adequacy of Banks, published on 1 November 2006, which sets the minimum standard capital adequacy ratio at 8% and the minimum Tier 1 capital ratio at 4% for banks operating in Turkey. Additionally, since November 2006, the BRSA requires banks to hold a target ratio of 12%, which is stipulated as a prerequisite to opening a new branch. This policy might be considered a variation of a capital buffer by recognising that more capital is required in good times if a bank tends to exploit favourable market conditions by opening new branches. On the other hand, during periods of unfavourable economic conditions, this prerequisite becomes a slack condition since banks will have less incentive to open a new branch.

Another more macro-based approach is to adjust the risk weights assigned to assets in order to control credit. To this end, to control the credit supply for credit cards, the risk weights for credit card limit commitments were increased from 50% to 100%, which pushed down the capital adequacy ratio, thereby encouraging banks to decrease the limits they assigned to credit cards. Additionally, in order to curb the risk arising from instalments of credit card receivables, the risk weights for receivables with a remaining maturity of six–12 months and of more than 12 months, which used to be 100%, were increased to 150% and 200%, respectively, leading to an increase in the required capital. Thus, these amendments to the risk weights can be considered an indirect limitation on the instalments of credit card expenditures.

According to the Bank Cards and Credit Cards Law, which became effective on 1 March 2006, the total credit card limit determined for all cards of a customer should not be greater than two times his or her average net total monthly income for the first year and four times for the second year. The customer should supply the necessary documents, which are

confirmed by related institutions, as evidence of his or her monthly income. Otherwise, the total limit for all the customer's cards is set at TRY 1,000. Such controls on credit card limits are intended to curb systemic risk by forestalling households' exposure to excessive risk.

The loan to value ratio applicable for mortgage loans is another effective macroprudential tool. Based on the Law Amending the Laws Related to the Housing Finance System, dated 6 March 2007, the loan to value ratio is set at 75% for receivables secured by authorised residential property and 50% for receivables secured by other authorised real estate. As an additional measure, in 2008 and 2009 the BRSA temporarily made the distribution of banks' profits subject to permission in order to contribute to the strengthening of banks' capital structure. This may also be considered a tool for increasing banks' resilience to vulnerabilities. In fact, 20% of the profit for 2008 was distributed, whereas this rate decreased to 15% for 2009, when the Turkish banking sector enjoyed significant profits.

Loan loss provisioning is another tool to ensure that banks build up buffers against their loans. Although the current provisioning system in Turkey is not "dynamic" in nature, by changing the required provisioning rates it is possible to control the cyclical nature of the loan supply. Three liquidity ratios that are used to measure and assess the liquidity adequacy of banks can also be considered among the macroprudential instruments implemented by the CBRT. These ratios were put into effect in 2007 and, therefore, Turkish banks have been operating within the framework of liquidity regulations, which the Basel Committee is currently trying to implement at an international level; these ratios had a strong positive effect on the resilience of Turkish banks when facing the global financial stress.

Reserve requirements are a monetary policy instrument that can also be used for macroprudential policy purposes. They are used to manage liquidity in the market and control credit expansion in order to prevent asset price bubbles. The reserve requirement ratio may be increased or decreased if there is a surplus or shortage of funds, or a permanent liquidity surplus or shortage in the market. Thus, it is one of the countercyclical measures that can be implemented by the central bank. Reserve requirements are used in a discretionary way, when necessary, taking account of the liquidity and credit supply conditions in the market. As an example, in order to support the upward trend in credit growth by way of reducing intermediation costs and injecting permanent liquidity into the market, in addition to the measures already implemented by the CBRT, the Turkish lira (TRY) required reserve ratio, which stood at 6%, was reduced by 1 percentage point to 5% in October 2009. Changes in policy interest rates, even though they are made for monetary policy purposes, may also be regarded as macroprudential tools, since they can affect the credit channels.

As a tool to discourage excessive risk-taking, a risk-based deposit insurance premium tariff model, which obliges credit institutions to pay risk premia in line with the risks they pose to the banking system, was designed by the SDIF and put into effect as of January 2009 by an amendment on the Regulation on Deposits and Participation Funds Subject to Insurance and Premia to be collected by the SDIF. One of the macroprudential instruments that may be used to affect credit expansion and capital inflows into Turkey is the Resource Utilisation Support Fund (RUSF), which can be seen as a tax-like charge on loans. RUSF may be used: (i) to lessen (or expand) the loan demand by increasing (or decreasing) the cost of loans via RUSF rate changes; or (ii) to restrict capital inflows by increasing the RUSF rate on loans received from abroad.

As a measure to limit currency mismatch and ensure that banks maintain their FX positions in line with their own funds, according to the Regulation on the Calculation and Implementation of the Foreign Currency Net General Position, the absolute value of the weekly simple average of the ratio of the foreign currency net general position to the bank's own funds cannot exceed 20%.

In addition to the Bank Loans Tendency Survey, published every three months, the recently initiated project on a survey to monitor price movements in the real estate sector can be used

to detect the cyclicalities in this sector within the framework of the CBRT's macroprudential surveillance. There is also a Business Tendency Survey (BTS) and Real Sector Confidence Index, as well as a Consumer Tendency Survey and Consumer Confidence Index, both of which are published every month. The CBRT and BRSA regularly perform macro stress tests in order to assess the resilience of the banking sector to several shocks and publish the results in their reports as a tool for communicating macroprudential risk assessments. Additionally, the CBRT has an extensive risk centre database, which provides feedback to banks about their customers' default history.

Finally, with a recent amendment dated June 2009 to Decree no 32 on the Protection of the Value of Turkish Currency, in order to avoid FX risk, households are prohibited from using foreign currency or foreign currency indexed loans. All the above-mentioned instruments are intended to avoid failures that might adversely affect the entire financial system. They are general and are applied to all institutions with no distinctions between size or systemic importance.

## **8. Concluding remarks**

The recent global developments led to a rapid contraction in the world economy and financial markets and a deceleration in trade volume. The global crisis affected the Turkish economy mainly through four channels, the first of which was the trade channel – exports declined substantially. The second was the expectations channel. With the financial turmoil, households' expectations worsened, thereby reducing their consumption. The third was the foreign capital flows channel – cross-border lending abated during the crisis period. The last one was the credit channel, as banks trimmed their lending during the crisis, the result of which was a sharp fall in economic activity and a rise in unemployment.

As a result of the global financial developments, the external borrowing possibilities for banks and non-bank entities became more limited. The outstanding amount of the private sector's external liabilities declined. However, it should be underlined that the total decline was not as substantial as expected at the beginning of the crisis. The contraction in other investment flows, which reflected a decline in external debt rollovers both for banks and for corporates, appeared to be reversing gradually in the third quarter.

As the intensity of the crisis became evident, banks became increasingly risk-averse and tightened their lending conditions. In addition to supply constraints, the demand for loans also decreased as a result of weakening external and domestic demand and rising unemployment. As a result, loans granted to firms and households were curtailed. Loan growth remained on a downward path in the case of non-financial corporations, while in the case of households, the earlier downward movement in loan growth has levelled off in recent months.

Banks did not rely heavily on market funding in Turkey and continued to fund their balance sheet mainly through customer deposits, which were assumed to be more stable in most circumstances. In addition, the share of foreign currency loans, which might have caused an indirect credit risk during the crisis, was also limited, especially for households. During the crisis, borrowings from other banks, which consisted mainly of external liabilities, seized up and the growth rate of deposits slowed down, leading to a sharp decline in leverage.

The number of foreign banks in the Turkish banking sector was relatively small in comparison with many other emerging economies. Loan growth in both private and foreign-owned banks decelerated during the crisis. However, public ownership in Turkey had a stabilising effect on credit supply. Looking at the liability side, there was no evidence that foreign banks were more successful in refinancing their liabilities to other banks than domestic banks.

Finally, although the recovery in the real economy was gradual, the financial markets started to recover in the second quarter of 2009. As of November, the CBRT began easing its monetary policy in an attempt to support the Turkish financial market and economy in addressing the spillovers from the global financial crisis. The interest rates declined in line with the policy rates during this period. The CBRT took various measures to eliminate the adverse effects of the problems in the global financial markets on the stability of the domestic financial system and to ensure the orderly functioning of the FX and credit markets.