

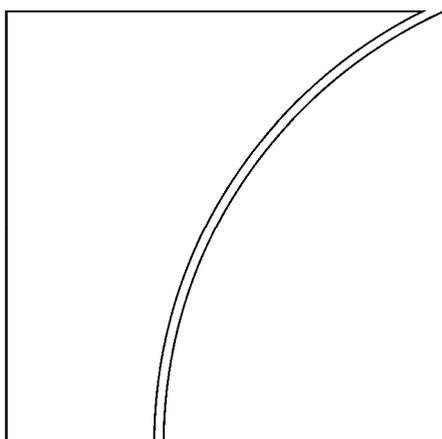


BANK FOR INTERNATIONAL SETTLEMENTS

BIS Quarterly Review

June 2009

International banking
and financial market
developments



BIS Quarterly Review
Monetary and Economic Department

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Note from the Editorial Committee

The Editorial Committee is introducing a modified format for the Statistical Annex in the print version of the *BIS Quarterly Review*. Over time this Annex, which presents data largely collected by central banks under the aegis of the Committee on the Global Financial System (CGFS), had grown to more than 100 pages of tables, representing about half the size of each issue of the *Quarterly*.

Beginning with this issue, we are ceasing publication of the detailed tables in the Statistical Annex of the print version. Instead, we are providing a set of concise tables summarising the most recent data at a fairly aggregate level along with graphs displaying their evolution over the past four years. The web version of the *Quarterly* will continue to feature the full set of detailed tables and access to the underlying data. Printed copies of the detailed tables are available on request from Philippe Mesny (e-mail to: philippe.mesny@bis.org).

BIS Quarterly Review

June 2009

International banking and financial market developments

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Notations used in this Review

e	estimated
lhs, rhs	left-hand scale, right-hand scale
billion	thousand million
...	not available
.	not applicable
–	nil
0	negligible
\$	US dollar unless specified otherwise

Differences in totals are due to rounding.

Overview: risk appetite rebounds on stabilisation hopes

Glimmers of hope that the worst of the financial crisis and economic downturn had passed sparked a rebound in risk appetite among investors in the period between end-February and end-May. As a result, equity prices gained sharply, credit spreads narrowed and implied volatilities fell. This budding optimism emerged even as key economic indicators remained at depressed levels. Investors focused instead on incipient signs that economic conditions were deteriorating less rapidly than before, while intensified policy actions to counter the crisis and better than expected earnings announcements helped bolster confidence.

A number of policy measures contributed importantly to the improvement in investor sentiment. The publication of details on US and UK bank rescue plans reduced uncertainty, as did the results of the bank stress tests administered by the US Federal Reserve. The latter led, in particular, to a narrowing of US bank credit spreads. Moreover, investors initially took heart from further fiscal stimulus packages and from the coordinated action announced following the April G20 summit.

In addition, central banks took further steps to ease monetary conditions. Apart from rate cuts – where still possible – a number of central banks announced new and unconventional measures, including expanded credit easing actions and purchases of large quantities of government bonds. While such measures initially led to a drop in treasury yields, long-term interest rates displayed a general upward trend during the period as rebounding risk appetite reduced the flight to safe government bonds. Growing concerns about mounting government debt added to the upward pressure on yields, in particular towards the end of the period under review. In parallel, long-horizon forward break-even inflation rates rose, possibly reflecting investors' worries about the long-term inflationary implications of the ongoing expansion of public sector commitments.

Despite the turnaround in markets, by end-May conditions in many market segments remained some way off the levels seen before the bankruptcy of Lehman Brothers in September 2008. This was the case in equity markets, where, even after the recent sharp rallies, most indices were still 20–30% below where they had stood in mid-September. In credit markets, where spreads narrowed considerably from the peaks reached in early 2009, they had

in general not fully returned to where they had been in mid-September. Sub-investment grade and sovereign CDS spreads, in particular, were still significantly higher. However, in interbank markets, where the most extreme dysfunctions were seen in the aftermath of the Lehman collapse, conditions continued to gradually improve, and by end-May key money market spreads had returned to pre-Lehman levels.

Bond yields rise as flight to quality abates

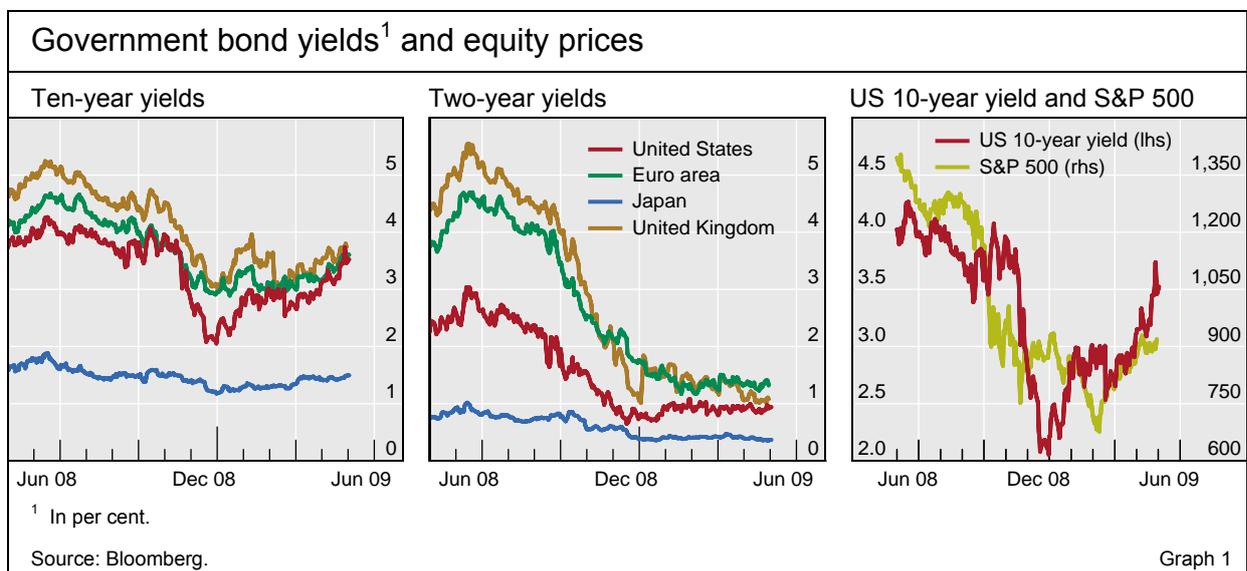
Long-term government bond yields in advanced economies rose considerably during the period under review, reflecting a combination of hopes that the pace of deterioration in the global economy was slowing and concerns about accelerating fiscal deficits. Between end-February and end-May 2009, the 10-year US bond yield rose by almost 45 basis points to around 3.45%, while corresponding euro area and Japanese yields increased by about 45 and 20 basis points, to around 3.60% and 1.50%, respectively (Graph 1, left-hand panel). Meanwhile, short-term yields were little changed, reflecting expectations of relatively stable policy rates in the near term (Graph 1, centre panel). As a result, yield curves steepened considerably.

Much of the rise in long-term bond yields was driven by growing perceptions among investors that the worst of the financial crisis and the economic slump might have passed. As was evident from other markets – in particular equity markets – such hopes sparked a rebound in risk appetite. As the demand for risky assets increased, pressures in government bond markets due to a flight to safety and liquidity began to ease, thereby pushing yields higher. Accordingly, the pickup in bond yields accelerated in March as the rise in equity prices gathered pace (Graph 1, right-hand panel).

Yields rise on recovery hopes ...

Investors' nascent optimism drew on a combination of confidence-building measures announced by various authorities and macroeconomic data that were less bad than had been anticipated. Actions by official authorities that appeared particularly important in bolstering market confidence included the publication of details on the UK Asset Protection Scheme and on the US

... fuelled by government actions ...



Selected events over the period under review	
26 February	The UK authorities inject another £13 billion into RBS and insure £325 billion of the bank's assets under the Asset Protection Scheme.
3 March	The Federal Reserve announces the launch of the Term Asset-Backed Securities Loan Facility (TALF) to lend up to \$200 billion.
5 March	The Bank of England cuts its policy rate by 50 basis points to 0.5% and announces the £75 billion Asset Purchase Facility. The ECB cuts the main refinancing rate by 50 basis points to 1.5%.
7 March	Lloyds Banking Group participates in the Asset Protection Scheme to insure £260 billion of assets.
10 March	A Citigroup internal memo suggests that the bank sees the best profit performance in over a year.
12 March	The Swiss National Bank intervenes in currency markets. General Electric is downgraded by S&P.
18 March	The US Federal Reserve announces plans to purchase up to \$300 billion of long-term US Treasuries and to increase its purchases of agency debt and agency MBS. The Bank of Japan increases JGB purchases from ¥16.8 trillion per year to ¥21.6 trillion. Unicredit applies to both the Austrian and Italian authorities for aid.
23 March	The US Secretary of the Treasury unveils details for the Public-Private Investment Program.
2 April	G20 summit. The ECB cuts the main refinancing rate by 25 basis points to 1.25%.
6 April	HSBC completes a record £12.5 billion rights issue.
7 April	Ireland announces plans to establish a National Asset Management Agency to take over bad loans.
9 April	Wells Fargo preannounces record first quarter profits. Japan unveils a ¥15.4 trillion fiscal stimulus package.
15 April	UBS preannounces large first quarter losses of about CHF 2 billion.
20 April	Bank of America reports \$4.2 billion earnings in the first quarter but also an increase in provisions.
22 April	Morgan Stanley reports a \$578 million loss in the first quarter.
28 April	BBVA reports a 14.2% year-on-year decline in net profits in the first quarter.
30 April	Chrysler LLC files for Chapter 11 protection under the US Bankruptcy Code.
7 May	The US authorities release bank stress test results. The Bank of England increases the size of the Asset Purchase Facility by £50 billion to £125 billion. The ECB cuts the main refinancing rate by 25 basis points to 1% and announces its intention to purchase around €60 billion of covered bonds.
21 May	S&P revises the outlook on the United Kingdom's AAA credit rating from stable to negative.

Sources: Bloomberg; *Financial Times*; *The Wall Street Journal*. Table 1

Public-Private Investment Program, the G20 London summit at the beginning of April and the outcome of the US bank stress tests (Table 1).

... and less gloomy data

Incoming macroeconomic data turned out to be less gloomy than expected, particularly for the United States – despite a 6.1% annualised first quarter fall in GDP. Data on US non-farm payrolls suggested that the loss of jobs had stopped accelerating, and while the April release was still bleak at –539,000 jobs, it nevertheless beat expectations, in part due to a large one-time increase in government employment. More forward-looking indicators, such as business and consumer confidence surveys, rebounded from depressed levels. The euro area also saw some signs of stabilisation, with improving consumer confidence and a rebound in the German Ifo index. By contrast, positive news remained scarce in Japan. Survey data on growth expectations reflected the overall picture: although the three largest economies were expected to shrink in 2009, recent revisions generally showed some signs of stabilisation (Graph 2, left-hand panel).

In addition to the actions taken by governments around the world to stimulate their economies, central banks continued to ease monetary policy. Where rate cuts were still possible, official policy rates were reduced further.

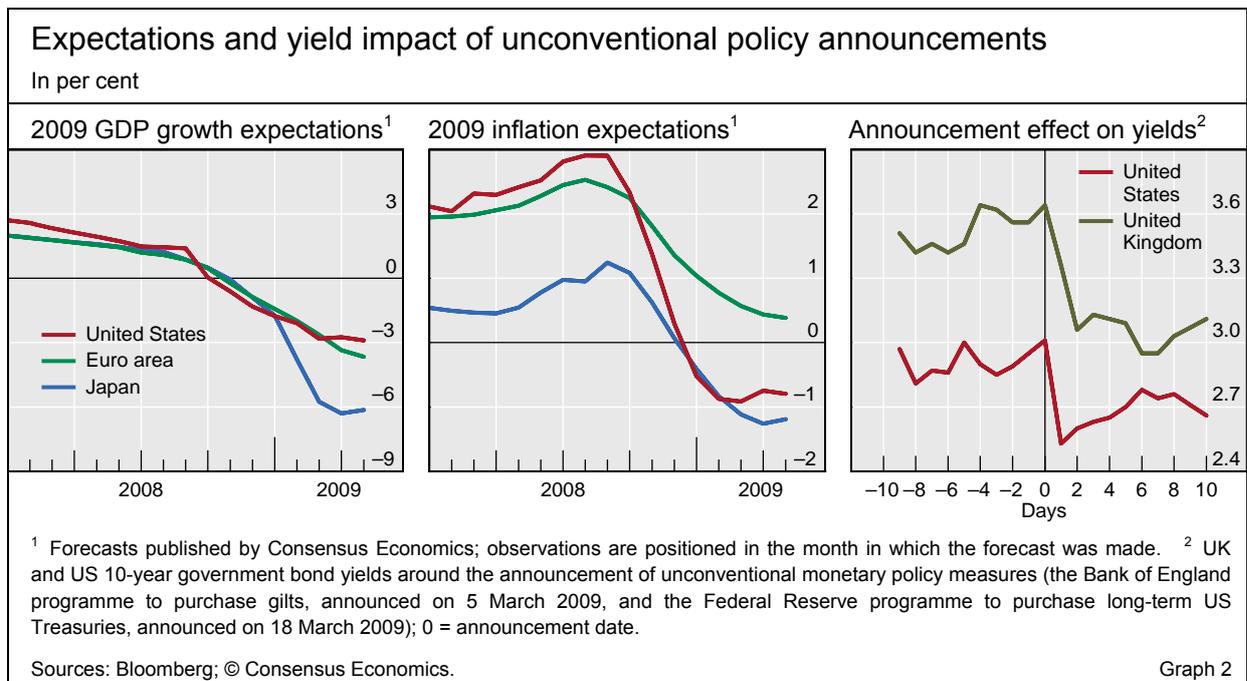
The ECB cut the main refinancing rate by a total of 100 basis points in March, April and May, to a record low 1%, and reduced the interest rate on the deposit facility to 0.25%. The Bank of England cut the Bank rate by a further 50 basis points to 0.5% in March, which also represented a historical low. In the United States and Japan, where key interest rates were already close to zero, official rates remained unchanged. The pricing of forward money market contracts indicated that these decisions were well anticipated, and, moreover, that no major changes were expected in the months ahead (Graph 3).

With official interest rates close to zero in many economies, major central banks announced and began to implement unconventional policy measures to further ease monetary conditions (see box and Table 1). The Bank of England announced on 5 March that it would start injecting money directly into the economy in order to meet its inflation target, by undertaking £75 billion worth of direct purchases of gilts and private sector assets (subsequently increased to £125 billion in early May). Expanding its existing programme to improve conditions in credit markets, the US Federal Reserve announced on 18 March that it would purchase up to \$300 billion of longer-term Treasury securities over the next six months. The Bank of Japan expanded its programme for purchases of Japanese government bonds by ¥4.8 trillion per year (see also the special feature by McCauley and Ueda in this issue). Finally, on 7 May, the ECB announced its intention to purchase around €60 billion of euro-denominated covered bonds issued in the euro area.¹

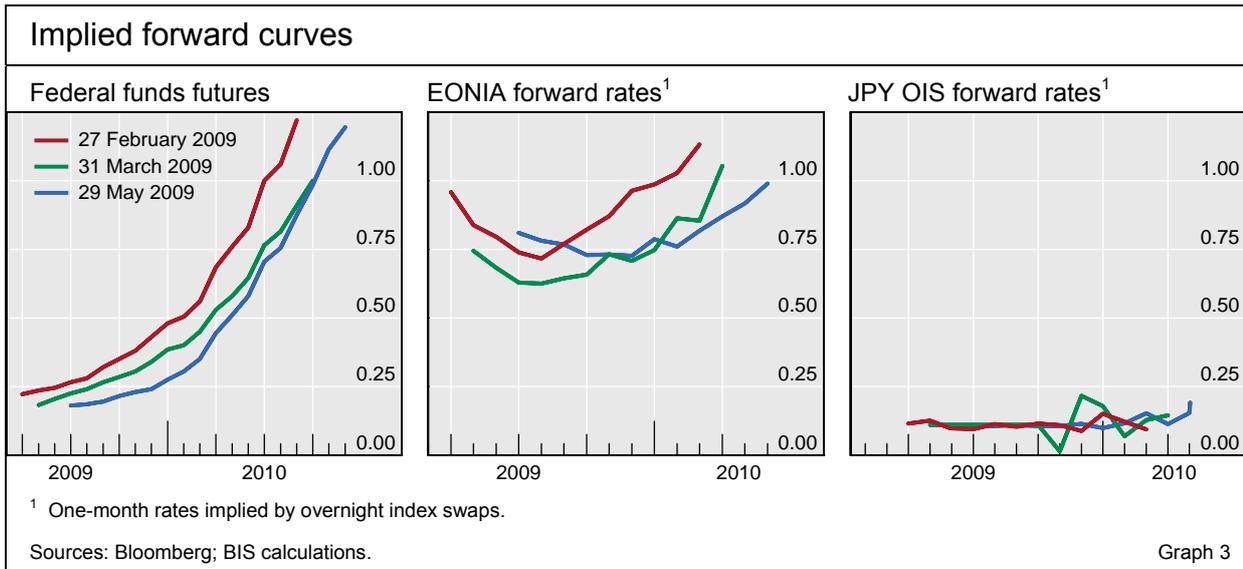
Central banks introduce unconventional policy measures ...

In immediate response to announcements of treasury purchases, government bond yields fell substantially, in particular in the United Kingdom and United States (Graph 2, right-hand panel). US 10-year Treasury yields

... that push down yields ...



¹ See the special feature by Packer et al in the September 2007 *Quarterly Review* for a discussion of covered bond markets.



... for a while

dropped by almost 50 basis points following the Federal Reserve's announcement, while UK 10-year gilt yields plummeted by almost 60 basis points after that by the Bank of England. Yields in the euro area also fell following these announcements, as speculation intensified that the ECB would unveil similar measures. Nonetheless, the dampening effect on yields did not last and long-term yields soon began to rise. While this could largely have been due to other factors, as discussed above, the adoption of unconventional monetary policy measures may, paradoxically, have contributed as well. Specifically, it could have added to the strengthening of investor confidence and the rise in risk appetite, thereby reducing flight to safety pressures in government bond markets.

Concerns about rising deficits place upward pressure on yields

A further factor that exerted upward pressure on yields was persistent concerns about the supply of government debt. The combination of large-scale fiscal stimulus plans, financial rescue packages and rapidly falling tax revenues led to accelerating fiscal deficits across the globe, and, consequently, greatly increased issuance of government bonds. As markets appeared to grow increasingly concerned about the readiness of investors to absorb vastly larger volumes, bond yields rose. Moreover, sharply rising deficits have led to concerns about the sustainability of public finances and the ability of some governments to fulfil their enlarged obligations. The resulting increases in real or perceived sovereign credit risk may in some cases have induced investors to require higher compensation to hold government debt, thereby pushing bond yields higher.

The prominence of these factors was highlighted by Standard & Poor's decision on 21 May to place the AAA credit rating of UK sovereign debt on negative outlook over the medium term. The decision was based on the agency's view that the UK government debt burden could reach 100% of GDP in the medium term. Immediately following the announcement, yields on 10-year gilts rose by around 10 basis points. Meanwhile, the five-year UK credit default swap (CDS) spread rose by 8 basis points on the day of the announcement. The decision also appeared to contribute to rising yields

Unconventional monetary policy in the current crisis

Piti Disyatat

In response to the global financial turmoil and the subsequent sharp downturn in economic activity, major central banks have cut policy rates aggressively and initiated several measures that have been loosely referred to as unconventional monetary policy. This box provides an overview of such measures and highlights how they can be viewed within the overall context of monetary policy implementation.

A framework for reviewing unconventional monetary policy

The conduct of monetary policy comprises two core elements: i) signalling the desired policy stance, nowadays generally done through announced targets for very short-term interest rates; and ii) liquidity management operations, defined broadly to encompass various aspects of the operating framework – related to the terms and conditions under which central bank liquidity is provided – that supports the desired stance by keeping the relevant market rate consistent with the policy rate. Typically, liquidity management operations are designed and implemented carefully to ensure that they influence only the specific market rate targeted by policy. As such, they play a supportive role, neither impinging upon nor containing any information relevant to the overall stance of policy.

In certain situations, however, liquidity management operations are accorded an elevated role and used deliberately to influence specific elements of the monetary transmission mechanism. The basic thrust of this complementary approach involves the active utilisation of liquidity operations to influence certain asset prices, yields and funding conditions *over and above* the impact of the policy rate. In this case, liquidity operations no longer simply play a passive role but become an integral part of the overall monetary policy stance. Since on these occasions such operations generally result in substantial changes in central banks' balance sheets – in terms of size, composition and risk profile – they can be referred to as *balance sheet policy*.^①

The various forms of balance sheet policy can be distinguished by the particular market that is targeted. The most common, familiar form is foreign exchange intervention. Here, purchases or sales of foreign currency seek to influence the exchange rate separately from the policy rate. In the current crisis, balance sheet policy has also been employed to target term money market rates, long-term government bond yields and various risk spreads. While the justification, underlying mechanics, channels of influence and balance sheet implications are analogous to the case of foreign exchange intervention, the choice of market is atypical and in some cases unprecedented. It is the latter that renders recent central bank actions “unconventional”, not the overall approach of seeking to influence specific elements of the transmission mechanism over and above the policy rate. From this perspective, “quantitative easing” and “credit easing”, as used, respectively, to describe operations by the Bank of Japan during 2001–06 and the Federal Reserve in the current episode, can be viewed as simply references to a particular kind of balance sheet policy.^②

An important feature of balance sheet policy is that it can be implemented regardless of the prevailing level of the policy interest rate. Foreign exchange interventions, for example, are routinely carried out in this manner. So long as central banks possess the capacity to carry out offsetting operations on reserve balances, neither the expansion of asset holdings nor their composition will necessarily impinge on central banks' ability to maintain interest rates close to target.^③ This separation also holds in reverse. Unwinding balance sheet policy and shrinking the central bank's balance sheet are not preconditions for raising interest rates. For example, central banks that pay interest on excess reserves simply have to raise this rate along with the policy rate to effect a tightening of monetary conditions. As such, discussions of exit strategies can also be delineated along the two separate dimensions of the appropriate level of interest rates on the one hand and the desired central bank balance sheet structure on the other.

Overview of central bank responses

In the current crisis, there have been two broad categories of balance sheet policy (see table). The first group of measures, prominent early on in the crisis, centred on alleviating strains in wholesale interbank markets. In particular, to reduce term spreads, the provision of term funding was increased considerably and a number of initiatives introduced to address potential impediments to the smooth distribution of reserves. These included the broadening of eligible collateral and

Balance sheet policy introduced so far

Objective	Measures adopted	Fed	ECB	BoE	BoJ	BoC	RBA	SNB
Influence wholesale interbank market conditions	Modification of discount window facility	✓ ¹		✓				
	Exceptional long-term operations	✓	✓ ²	✓	✓	✓	✓	✓
	Broadening of eligible collateral	✓	✓	✓	✓	✓	✓	✓
	Broadening of counterparties	✓		✓	✓	✓	✓	
	Inter-central bank FX swap lines	✓	✓	✓	✓	✓	✓	✓
	Introducing or easing conditions for securities lending	✓		✓	✓	✓		
Influence credit market and broader financial conditions	CP funding/purchase/collateral eligibility	✓ ³		✓ ⁴	✓ ⁵	✓ ⁶	✓ ⁷	
	ABS funding/purchase/collateral eligibility	✓ ⁸	✓ ⁹	✓ ⁴			✓ ⁷	
	Corporate bond funding/purchase/collateral eligibility			✓ ⁴	✓ ¹⁰	✓ ⁶		✓
	Purchase of public sector securities	✓ ¹¹		✓ ⁴	✓ ¹²			
	Purchase of other non-public sector securities				✓ ¹³			✓ ¹⁴

✓ = yes; blank space = no.

¹ Reduce rate and expand term on discount facility; allow participation of primary dealers (Primary Dealer Credit Facility). ² Including fixed rate full allotment operations. ³ Finance purchase of short-term certificates of deposit, commercial paper (CP) and asset-backed CP (ABCP) (Money Market Investor Funding Facility, Asset Backed Commercial Paper Money Market Mutual Fund Liquidity Facility and Commercial Paper Funding Facility). ⁴ Asset Purchase Facility. ⁵ Increase frequency and size of CP repo operations and introduce outright CP purchases. ⁶ Term Purchase and Resale Agreement Facility for Private Sector Instruments. ⁷ Acceptance of residential mortgage-backed securities (MBS) and ABCP as collateral in repo operations. ⁸ Finance purchase of asset-backed securities (ABS) collateralised by student, auto, credit card and other guaranteed loans (Term Asset-Backed Securities Loan Facility). ⁹ Purchase of covered bonds. ¹⁰ Expand range of corporate debt as eligible collateral and introduce loan facility against corporate debt collateral. ¹¹ Purchase Treasury debt as well as direct obligations of and MBS backed by housing-related government-sponsored enterprises. ¹² Purchase of Japanese government bonds to facilitate smooth money market operations; not intended to influence bond prices. ¹³ Purchase equity held by financial institutions. ¹⁴ Purchase foreign currency securities.

Source: National data.

Table A

counterparty coverage, the lengthening of the maturity of refinancing operations, and the establishment of inter-central bank swap lines to alleviate funding pressures in offshore markets (mostly with respect to dollar funding). In addition, many central banks introduced or eased conditions for lending out highly liquid securities, typically sovereign bonds, against less liquid market securities in order to improve funding conditions in the money market.

The second group of policy responses, which received more emphasis as the turmoil in financial markets deepened, focused on directly alleviating tightening credit conditions in the non-bank sector and easing broader financial conditions. Prominent measures included the provision of funds to non-banks to improve liquidity and reduce risk spreads in specific markets – such as commercial paper, asset-backed securities and corporate bonds – as well as direct purchases of public sector securities to influence benchmark yields more generally.

On the whole, such interventions by central banks have helped to ease severe liquidity strains and have been associated with tangible improvements in a number of key markets (as noted in this Overview). Ultimately, however, the effectiveness of central bank actions in attenuating the impact of the crisis and restoring the functioning of markets depends on the extent to which they have a catalytic effect on private sector intermediation. Thus the ultimate success of central bank interventions depends on the appropriate design and forceful implementation of policies that address directly the fundamental weaknesses in bank balance sheets.

① See Chapter VI in the BIS's *79th Annual Report*, June 2009 (forthcoming). ② Quantitative easing aims to ease overall monetary conditions through the expansion of bank reserves, leaving the corresponding asset to be acquired unspecified. Credit easing, on the other hand, focuses on influencing specific market segments through interventions in the relevant asset class, with no particular reference to how such operations are funded on central bank balance sheets. ③ Indeed, many Asian central banks that intervened actively in foreign exchange markets in recent years have been able to attain their official interest rate targets despite sizeable expansions in their balance sheets.

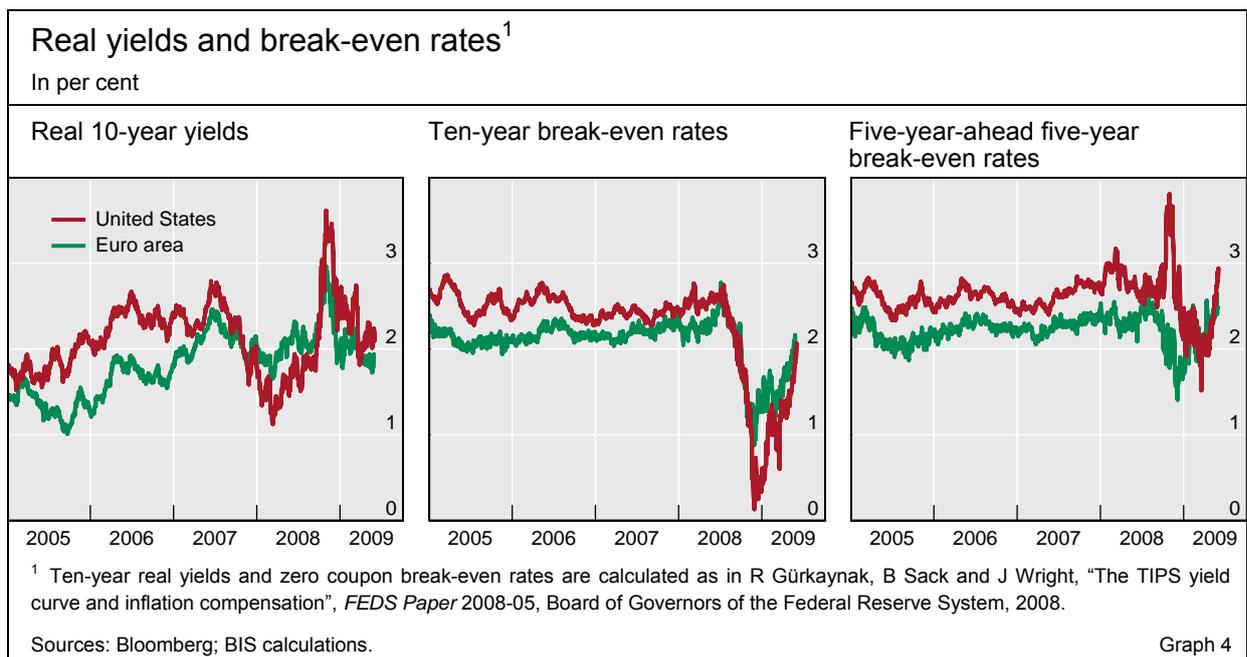
elsewhere, in particular in the United States, as investors reassessed the risk that sovereign debt ratings of other major economies could be downgraded.

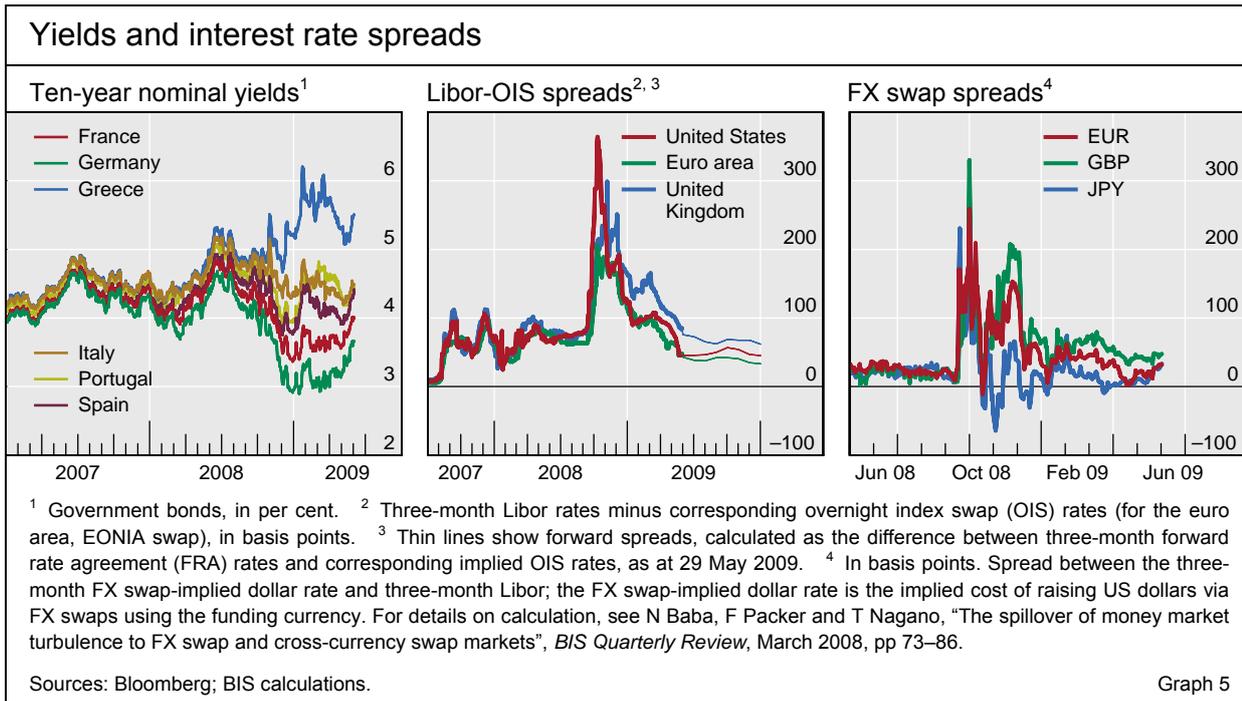
With a sense of cautious optimism emerging about economic conditions, break-even inflation rates continued to rise from the exceptionally low levels reached at the end of 2008 (Graph 4, centre panel). In part, this may have reflected expectations of decelerating or easing downward pressures on consumer prices in the near term, consistent with the picture emerging from survey forecasts for 2009 inflation rates (Graph 2, centre panel) and with rebounding energy prices. However, as when break-even rates fell sharply in late 2008, much of the recent rise is likely to have reflected other factors (see the box in the March 2009 Overview), not least a reversal of safe haven demand for the liquidity of nominal treasury bonds. A drop in real yields, probably due to falling liquidity premia in index-linked bonds, added to this (Graph 4, left-hand panel). With such factors typically being less important for forward rates, implied five-year forward break-even rates five years ahead consequently rose somewhat less than 10-year rates (Graph 4, right-hand panel). However, the fact that long-horizon forward break-even rates did rise significantly could reflect growing concerns among investors that the ongoing build-up of public sector commitments might result in rising inflation in the future.

Break-even rates rebound from depressed levels ...

Other market segments also showed signs of gradual improvement. For example, spreads between yields on German bunds and on government bonds of other euro area countries, which had been widening almost continuously since mid-2008, began to narrow somewhat (Graph 5, left-hand panel). In the absence of any factors suggesting converging sovereign credit risk among euro area countries, the narrowing of yield spreads seemed clearly to reflect improving market liquidity and recovering risk appetite. Developments in interbank markets were in line with this. For example, Libor-OIS spreads and foreign exchange swap spreads continued to narrow gradually. By end-May, in

... while other markets continue to normalise





many cases, they had returned to levels below those seen immediately before the Lehman bankruptcy (Graph 5, centre and right-hand panels). However, the pricing of forward rate agreements and OIS contracts suggested that further improvements in interbank markets were expected to be limited for the remainder of the year.

Equity markets rally on hopes of financial sector stabilisation

Equity markets turn around in early March

Major equity markets turned around during the period under review. The rally began in early March and continued into late May, punctuated only occasionally by brief spells of doubt or specific negative news. Although economic data releases mostly continued to reflect weak real activity, market participants seemed to focus on signs that economic conditions were deteriorating less rapidly than before or even stabilising in some cases. Even concerns emerging in late April over the prospect of an influenza pandemic did not leave a lasting dent in confidence. Between end-February and end-May 2009, the S&P 500 index rose by 25%, retracing all of the losses incurred since the start of the year. Major bourses in the euro area and Japan also recovered to similar degrees, while in the United Kingdom the FTSE 100 rose by 15% during the same period (Graph 6, left-hand panel).

Better earnings, especially in the financial sector, fuel the rally

Corporate earnings expectations, which rebounded in March, underpinned the recovery in equity markets (Graph 7, left-hand panel). In particular, financial sector shares, which had led the equity market sell-off earlier in the year, spearheaded the rally. Better than expected first quarter results from a number of major financial firms on both sides of the Atlantic provided some tangible evidence that the financial sector may have stabilised (Table 1). Interest income was supported by steepening yield curves and wider market spreads, while a revival in investment banking activity also contributed

significantly to bank revenues, especially given the surge in debt issuance in the first few months of this year. Against this backdrop, the S&P 500 financial sector sub-index rebounded from its lowest levels in 17 years and surged by 96% between early March and end-May (Graph 6, centre panel). Financial sector shares in the United Kingdom and on other European bourses rose by around 90% during the same period. Japanese financial shares also recovered, albeit to a smaller degree.

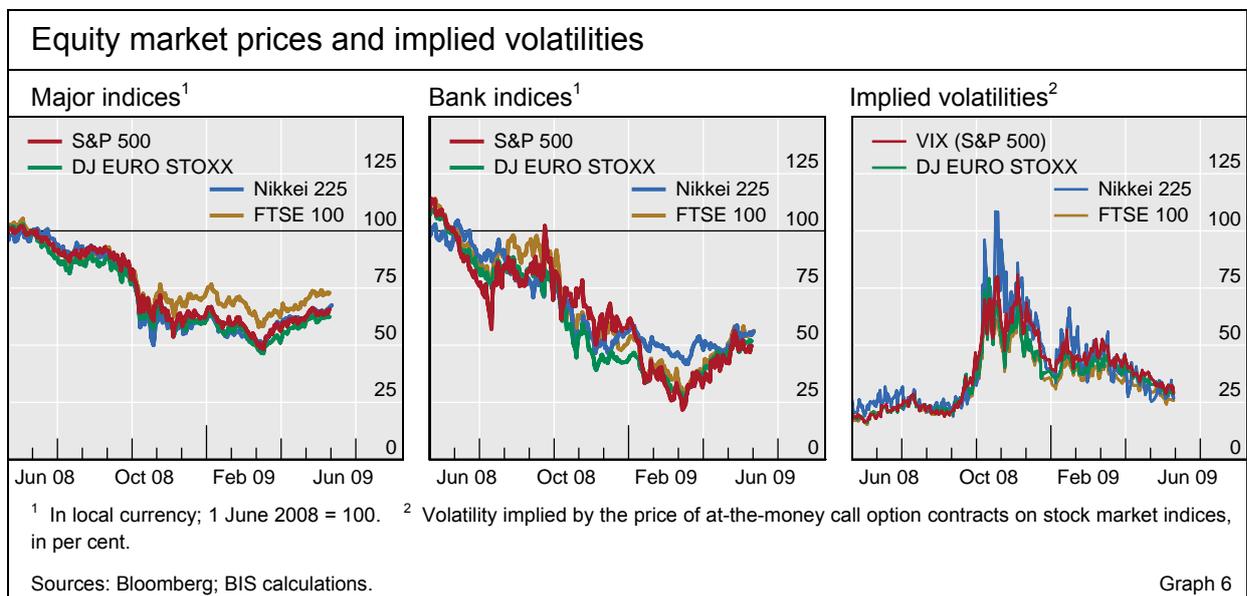
Nonetheless, there were questions regarding the quality and sustainability of banks' profitability. First, the new US guidelines on mark to market accounting, introduced in early April (but applicable retroactively to reporting periods ending 15 March 2009), may have given US banks a temporary boost in their first quarter figures by giving them more flexibility in determining fair values of assets when there is no active market or when prices reflect distressed sales. Second, the choice of some banks in the United States and Europe to reclassify certain assets from "trading" to "hold to maturity" in the second half of 2008 allowed them to avoid fully recognising valuation losses in their 2009 first quarter statements. Third, the surge in fee revenue associated with bond underwriting could prove to be transitory should issuance activity tail off in subsequent months. Most fundamentally, expectations of further credit losses in coming quarters remained a cause for concern.

Doubts remain regarding bank profitability ...

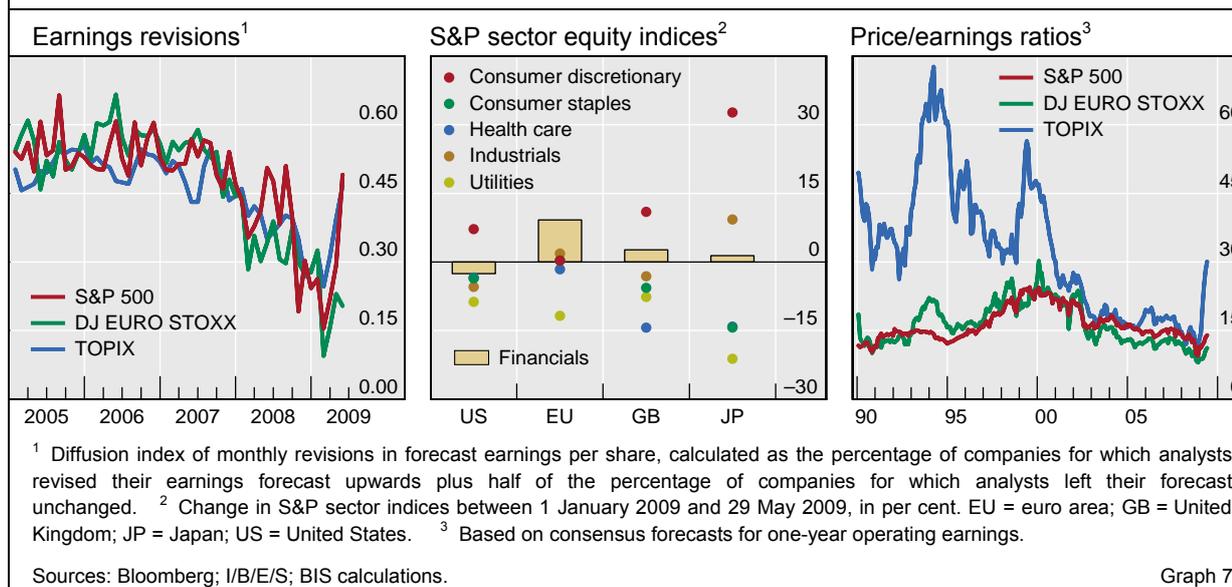
Reflecting these doubts, there were cases in which positive headline results met with negative market reactions. For instance, Bank of America's share price fell sharply on 20 April, underperforming its peers, even as the bank reported first quarter net income of \$4.2 billion and diluted earnings per share of \$0.44, up from \$1.2 billion and \$0.23, respectively, in the same quarter in 2008. Moreover, a number of major financial institutions continued to announce sizeable losses (eg UBS on 15 April, Morgan Stanley on 22 April; see Table 1).

That said, further efforts by the authorities to address financial sector problems did ease uncertainty to some extent. The implementation in late February of the UK Asset Protection Scheme limited the downside risks borne

... but uncertainty over financial sector stability seems to have receded



Earnings, equity prices and price/earnings ratios



by shareholders. Under this scheme, the Treasury provided protection to each participating institution against credit losses (in excess of an agreed first loss amount) in one or more defined asset portfolios. The eagerly awaited announcement on 23 March of details of the new US Public-Private Investment Program met with very positive market reactions, while the release of the US stress test results on 7 May also provided relief. Ten out of the 19 participating institutions were found to need to raise a total of \$74.6 billion in capital to cushion themselves against potential losses up to end-2010 under the “more adverse” scenario. As the shortfall was seen as manageable, financial sector shares rallied (see also the credit market section below). Improved equity market conditions also made it easier for banks to raise capital – Morgan Stanley and Wells Fargo raised over \$12 billion in common equity in the market immediately on 8 May. In the following days, several other banks, including some that were deemed to have adequate capital by the stress test, also announced plans to offer common shares (or to convert preferred shares to common shares) and to repay previously received government funds.

Implied volatilities
retreat towards pre-
Lehman levels

The reduction in uncertainty in the financial sector was reflected in the decline in volatility measures implied by equity options (Graph 6, right-hand panel). The VIX index, for instance, which had breached 40 by 8 April, dipped below 30 on 19 May for the first time since the collapse of Lehman Brothers. However, the index did not decline further in late May.

Beyond the financial sector, equity prices in other cyclical sectors such as industrials and consumer discretionary also rebounded during the period under review. By contrast, equity prices in non-cyclical sectors such as consumer staples, health care and utilities continued to show year-to-date losses, most notably in Japan (Graph 7, centre panel). Overall, price/earnings ratios rose but remained at low levels by the standards of the past two decades (Graph 7, right-hand panel).

Credit markets in search of stabilisation

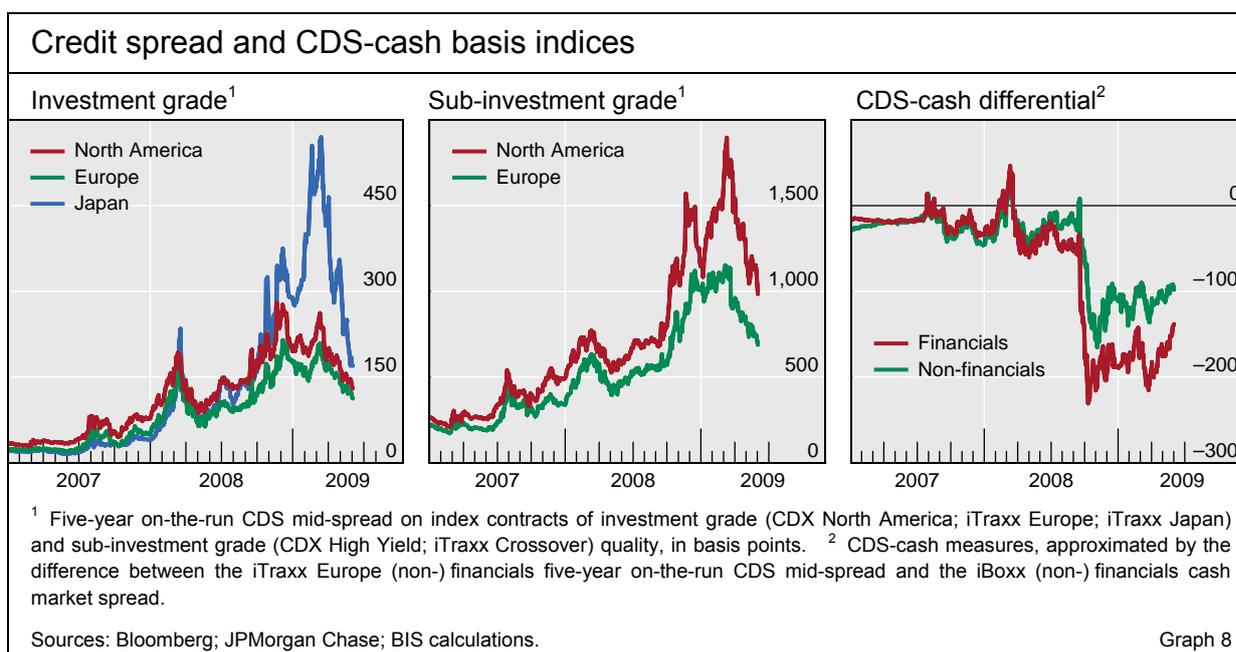
Following the rebound of equity prices, credit markets rallied from mid-March to end-May, as further policy actions and signs of financial system stabilisation raised confidence also among credit market investors (see the government bond and equity markets sections above). US bank credit spreads tightened markedly when the general tone of the US stress test results became apparent ahead of the official release in early May. Indicators of investor risk tolerance showed a notable recovery over the period, in tandem with forecasts of lower future default rates. However, spreads were still broadly higher than those observed before the collapse of Lehman Brothers. Weakness was also evident in issuance activity, particularly in the markets for asset-backed securities (ABS) and commercial paper (CP).

Credit markets rally following equity markets

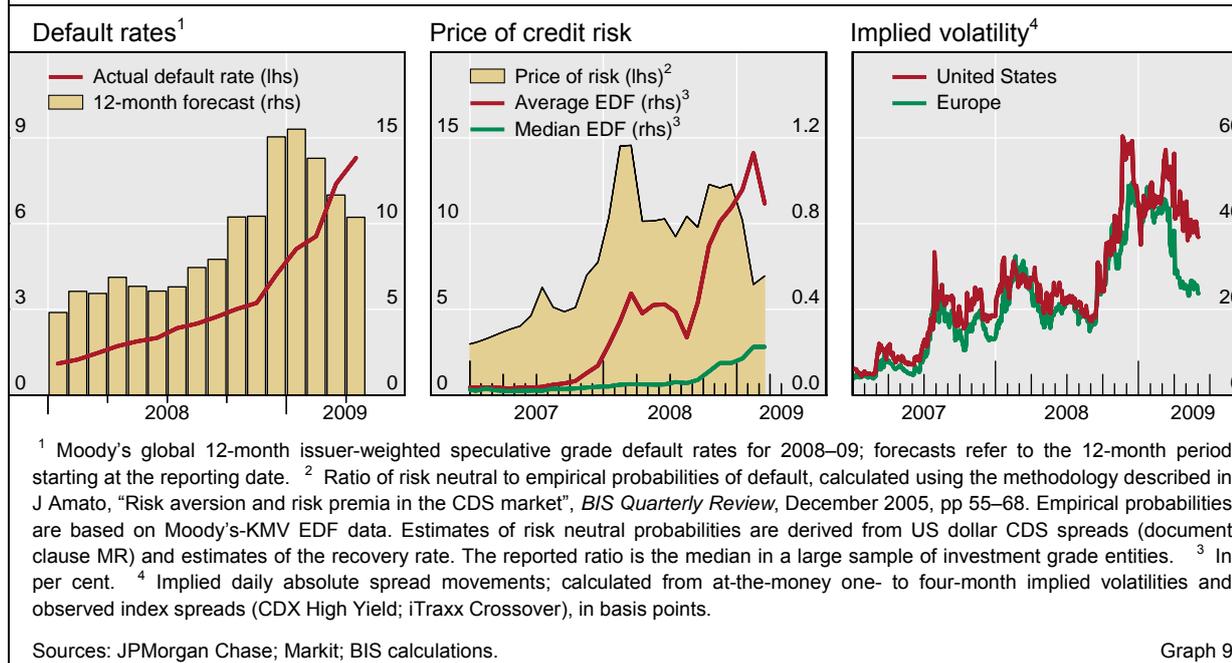
Sub-investment grade spreads, which had reached a historical high in early March, tightened more than investment grade spreads over the period (Graph 8, left-hand and centre panels). This reflected in part an improving outlook for defaults. While actual default rates continued to rise from the very low levels observed in early 2008, market forecasts of future default rates began to decline in early 2009, supported by incoming economic and earnings data that were less gloomy than expected (Graph 9, left-hand panel). Tightening spreads also coincided with a recovery in indicators of investor risk tolerance. Implied volatilities from CDS index options, particularly European ones, fell sharply into the second quarter, indicating less uncertainty about short-run credit spread movements (Graph 9, right-hand panel). Moreover, an estimate of investor risk tolerance in credit markets, calculated as the ratio of credit spread-implied (risk neutral) to empirical default probabilities of investment grade issuers, improved substantially in early 2009 (Graph 9, centre panel).

Risk tolerance recovers ...

By end-May, the US five-year CDX high-yield index spread had tightened substantially, by about 820 basis points from its record high of around



Default rates, price of risk and credit volatility



1,900 basis points in early March (Graph 8, centre panel). Despite this narrowing, it was still well above the pre-Lehman failure level. Corresponding investment grade spreads narrowed by about 125 basis points to 138 basis points, almost equivalent to the pre-Lehman level (Graph 8, left-hand panel). European CDS indices also saw a significant tightening, with sub-investment grade spreads again outperforming those of higher-quality issuers. Japanese investment grade spreads, which had widened substantially through early March due partly to rapidly weakening economic data, narrowed by 395 basis points from their peak in early March to 175 basis points.

... but market dysfunction remains

Despite general improvements in credit market conditions, the so-called CDS-cash basis for major indices, ie the pricing differential between CDS contracts and corresponding cash market bonds, improved only modestly from early March and remained deep in negative territory (Graph 8, right-hand panel). This suggests that potentially large arbitrage opportunities were left unexploited due to market dysfunction.

US bank spreads tighten on stress test results

Financial sector spreads, particularly subordinated spreads of major banks, tightened sharply from mid-March, in line with the rebound of equity prices (Graph 10, right-hand panel). That said, deep-rooted concerns about the quality and sustainability of banks' profitability continued to affect the credit spreads of US banks more than their equity prices, despite the combined capital injections of more than \$900 billion since the third quarter of 2007 (see the equity markets section above). US bank spreads stayed wide until early May, chiefly reflecting uncertainty about the possible outcome of the US bank stress tests (Graph 10, left-hand panel). As the general tone of the stress test results became apparent ahead of the official release on 7 May, US bank spreads rallied markedly (Graph 10, left-hand and centre panels). By contrast, European bank spreads narrowed throughout the period.

During the period under review, the authorities announced further policy measures in connection with credit and other related markets (Table 1; see also the government bond markets section above). On 3 March, the Federal Reserve launched the Term Asset-Backed Securities Loan Facility (TALF) to lend up to \$200 billion to eligible owners of AAA-rated ABS backed by auto and credit card loans, student loans and small business loans. On 18 March, in addition to plans to purchase Treasuries, the Federal Reserve announced its intention to purchase an additional \$750 billion of mortgage-backed securities, as well as to increase its purchases of agency debt by up to \$100 billion. In Europe, the Bank of England announced purchases of private sector assets on 5 March and the ECB released its plan to purchase covered bonds on 7 May.

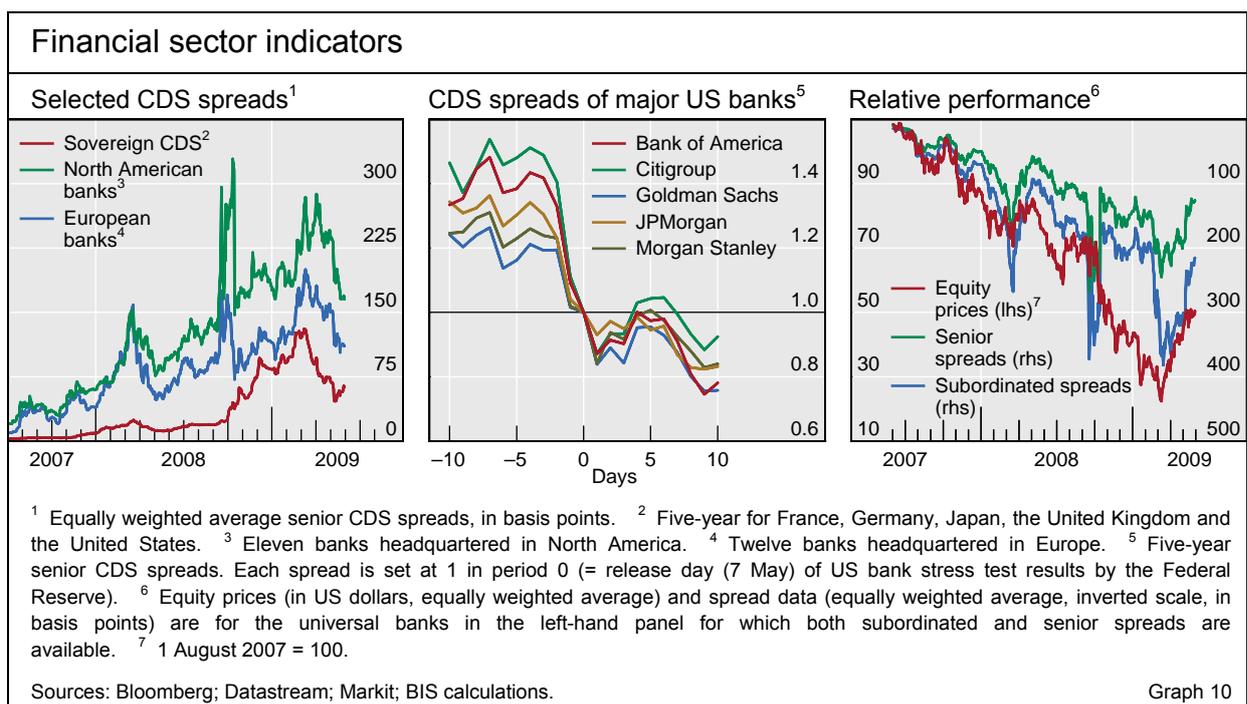
The policy-driven nature of financial stabilisation was evident particularly in the pricing of US mortgage and securitisation instruments. Mortgage rates for 30-year conventional mortgages fell further to around 5% (Graph 11, left-hand panel). Against this backdrop, qualifying borrowers increasingly moved to refinance into lower-rate mortgage loans. Mortgage-backed agency spreads, which had been on a downward trend from late November following the Federal Reserve's announcement of outright purchases of agency securities, reached an all-time low in late May (Graph 11, left-hand panel). A similar tendency was observed in ABS markets based on consumer loans. That said, SIFMA data show that total issuance of ABS in the United States dropped by more than 70% on a year-on-year basis to less than \$15 billion in the first quarter of 2009, while mortgage-related issuance showed a much more modest decline, of about 6% to \$366 billion on the same basis.

Weakness remained evident in other markets as well. In the primary debt markets, gross issuance of non-guaranteed syndicated debt securities by financial companies decreased markedly in April by more than 60% on a year-on-year basis to \$156 billion, while issuance by non-financial companies

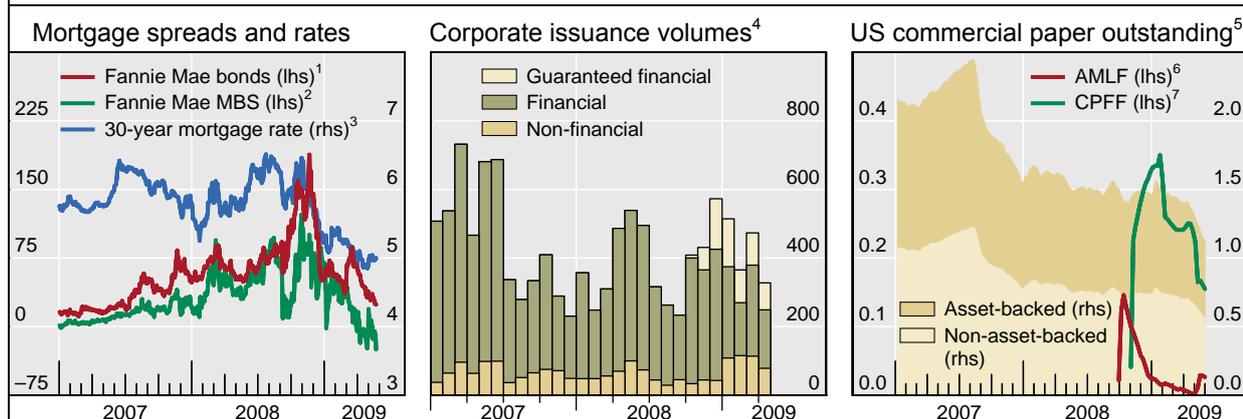
Policy measures drive stabilisation ...

... but ABS issuance remains weak

Debt and CP markets also stagnate



US mortgage, corporate bond and commercial paper markets



¹ JPMorgan index; two-year on-the-run spread to Treasuries, in basis points. ² JPMorgan index; option-adjusted spreads over Libor, in basis points. ³ Fixed rate conventional; national average, in per cent. ⁴ Syndicated international and domestic debt securities placed by private issuers, in billions of US dollars. Sectoral allocation reflects characteristics of immediate issuer. ⁵ In trillions of US dollars. ⁶ Asset backed commercial paper money market mutual fund liquidity facility. ⁷ Net portfolio holdings of commercial paper funding facility.

Sources: Federal Reserve Bank of New York; Bloomberg; Dealogic; JPMorgan Chase.

Graph 11

showed an increase of around 11% on the same basis (Graph 11, centre panel). In addition, activity in the CP market stagnated further, with the total amounts outstanding reaching about \$1.3 trillion in late May, a level last seen back in late 2004 (Graph 11, right-hand panel).

Policy measures continued to fill liquidity needs in the CP market, albeit to a lesser degree. CP holdings under the Federal Reserve's Commercial Paper Funding Facility (CPFF) declined further from about \$240 billion in late February to about \$150 billion in late May, reflecting easing tensions in the overall money market (Graph 11, right-hand panel; see also the government bond markets section above). By contrast, usage of the Federal Reserve's Asset-backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) spiked in early May to \$29 billion, a level last seen in December 2008. This followed Standard & Poor's decision to place more than 20 US financial institutions' credit ratings on negative watch in early May, reacting to the change in eligibility criteria by the Federal Reserve in late April to exclude those on negative watch from the eligible pool of ABCP with A1, F1 and P1 ratings.

Emerging markets bolstered by multilateral commitments

Investor appetite for emerging markets recovers

Investors also regained their appetite for emerging market assets. Between end-February and end-May 2009, the MSCI Emerging Markets equity index rose by 38%, outperforming the World index of mature equity markets by 15 percentage points. Emerging market credit also tended to outperform mature markets. By late May, the sovereign credit spreads for many emerging markets had retreated to levels close to those observed just prior to the failure of Lehman Brothers, though only a very few had narrowed to pre-Lehman levels (eg Malaysia, the Philippines, Thailand and Turkey for five-year sovereign CDS).

Among emerging markets, central and eastern European markets, which had sold off heavily in January and February, recovered the most. The MSCI Emerging Markets Eastern Europe index, which covers Czech, Hungarian, Polish and Russian equities, surged by 58% between end-February and end-May, compared to the 43% and 32% rise in the Asia and Latin America indices, respectively (Graph 12, left-hand panel). Easing market tensions were also evident in the recovery of the region's currencies as well as the significant narrowing of sovereign credit spreads (Graph 12, centre panel). Among the first events that contributed to the improved conditions were the verbal intervention from the three central European central banks and the pledge from the European Union to assist individual member countries in need (Table 2).

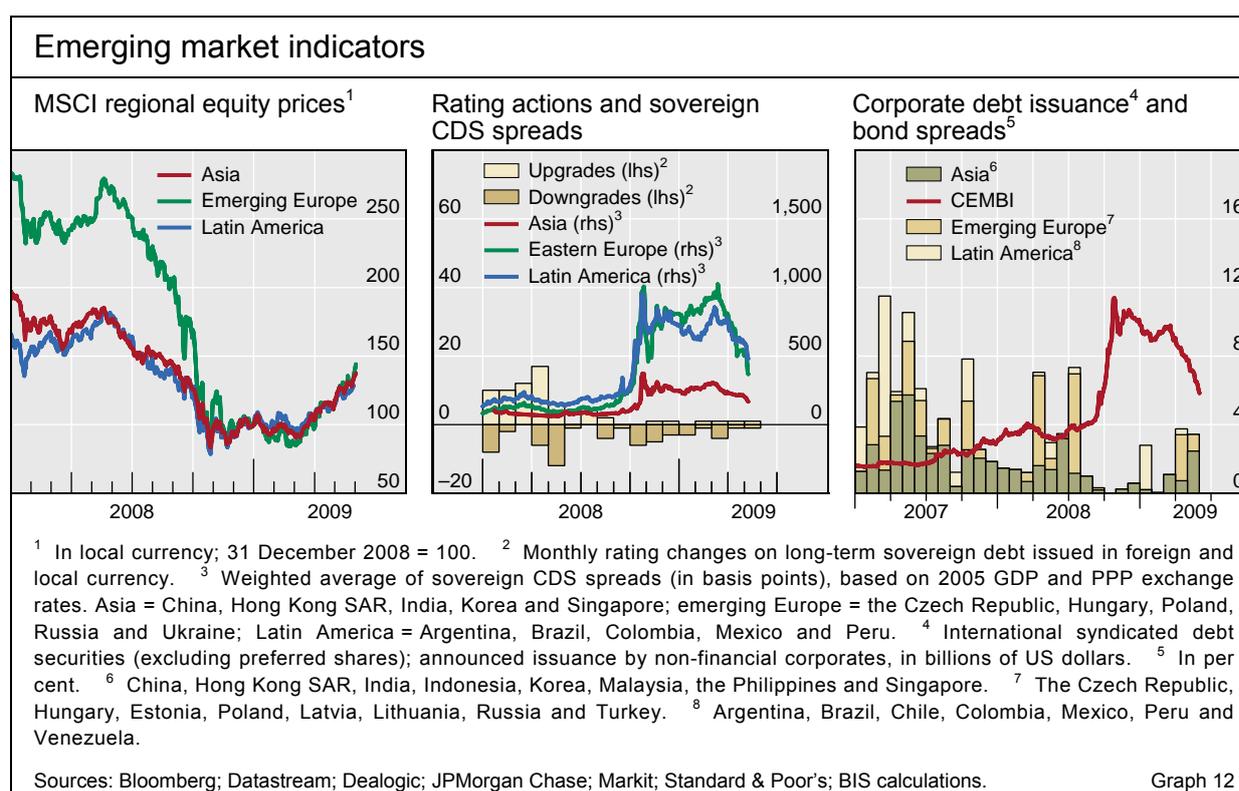
Tensions ease in emerging Europe

Investors' confidence in emerging markets more broadly was also bolstered by the G20 agreement to increase the IMF's resources to help it better cope with the potential needs of emerging and developing economies in the current crisis. Among its various new initiatives, the Fund's new Flexible Credit Line (FCL), which aims at offering timely support free of onerous conditions for economies with sound policies, was welcomed by emerging markets and investors alike. Within a month of the introduction of the FCL, three countries (Colombia, Mexico and Poland) had already signalled interest and had subsequently been granted credit lines worth over \$77 billion in total. A number of other multilateral agencies also sought to step up their capacity to provide support to emerging and developing economies (Table 2).

Commitments by multilateral agencies bolster confidence

Apart from the enhanced commitment from multilateral agencies, emerging markets also took actions to fortify other insurance mechanisms. For instance, the Chinese central bank established another three bilateral swap

Emerging markets also strengthen other insurance mechanisms



Selected emerging market events over the period under review	
23 February	The Czech, Hungarian and Polish central banks verbally intervene.
27 February	A group of multilateral investors and lenders pledge to provide up to €24.5 billion to help central and eastern European banking systems. Indonesia sells \$3 billion in sovereign bonds in a dual-tranche transaction, the biggest deal from Asia excluding Japan since November 2003.
1 March	EU summit: governments vow to extend help to eastern European states on a country-by-country basis and respect the rules of the single market.
5 March	The Chinese premier says China will meet its goal of 8% economic growth this year but does not announce any new spending beyond the CNY 4 trillion investment plan unveiled in November.
11 March	The central banks of China and Belarus announce the establishment of a three-year bilateral currency swap arrangement of CNY 20 billion/BYR 8,000 billion, the fourth such swap arrangement since December 2008.
12 March	Central European currencies appreciate sharply against the Swiss franc.
23 March	The Chinese and Indonesian central banks announce the establishment of a three-year bilateral currency swap arrangement of CNY 100 billion/IDR 175 trillion.
24 March	The IMF Executive Board approves a major overhaul of the IMF's lending framework, including the introduction of a new Flexible Credit Line (FCL).
25 March	The IMF Executive Board completes the first review of Hungary's performance under the Stand-By Arrangement, enabling the immediate disbursement of SDR 2.11 billion (about €2.35 billion). Romania announces that it expects a €20 billion support package from multilateral agencies.
29 March	The Chinese and Argentine central banks sign an agreement to establish a three-year bilateral currency swap arrangement of CNY 70 billion/ARS 38 billion (formally announced on 2 April).
1 April	Mexico becomes the first country to signal interest in the IMF's new FCL (a one-year arrangement of \$47 billion is subsequently approved on 17 April). The Asian Development Bank (ADB) agrees to an expansion of its trade finance programme, to generate up to \$15 billion in support until 2013.
2 April	The G20 agrees to make available an additional \$850 billion of resources through the IMF and the multilateral development banks to support growth in emerging and developing economies.
3 April	The Bank of Mexico announces that it will activate its \$30 billion swap line with the Federal Reserve and conduct an auction of \$4 billion in 264-day funds on 21 April.
7 April	South Korea aims to raise about \$2 billion in its first sovereign debt sale in three years.
14 April	Poland expresses interest in the FCL (a \$20.6 billion one-year arrangement is subsequently approved on 6 May). Russia signals its intent to borrow on international markets for the first time in a decade.
20 April	Colombia expresses interest in the FCL (a \$10.5 billion one-year arrangement is subsequently approved on 11 May).
30 April	The ADB plans to pump an extra \$3 billion into economies struggling to respond to the financial crisis and to boost its project lending by \$10 billion over the next two years, after shareholders approved a trebling of its capital base.
1 May	Mexico begins a five-day shutdown in response to the H1N1 flu outbreak.
3 May	ASEAN Plus Three Finance Ministers announce their agreement on all the main components of the \$120 billion Chiang Mai Initiative Multilateralisation (CMIM).
4 May	The IMF Executive Board approves a 24-month SDR 11.4 billion (about €12.9 billion) Stand-By Arrangement for Romania.
8 May	The IMF Executive Board completes the first review of Ukraine's performance under the Stand-By Arrangement and approves the immediate release of SDR 1.9 billion (about \$2.8 billion).
Sources: ASEAN; IMF; <i>Financial Times</i> ; Reuters; national central bank websites.	
Table 2	

arrangements in March (with Argentina, Belarus and Indonesia) in a bid to reduce reliance on major currencies in settling international trade. The ASEAN Plus Three countries also agreed to multilateralise the Chiang Mai initiative, which had until then been a collection of bilateral swap agreements. The new

multilateral facility will pool together \$120 billion and will be governed by a single contractual arrangement.

The resilience of emerging markets during the period under review was also demonstrated by the limited impact of the outbreak and spread of H1N1 influenza in late April. Although Mexico, being the epicentre of the outbreak, saw its main stock market index fall by as much as 5% and the peso weaken by over 4% against the US dollar on 27 April, the negative market response proved only transitory. By 4 May, both the stock market index and the peso exchange rate had recovered to levels observed prior to the escalation of the outbreak.

Resilience of emerging markets ...

Against this more benign background, debt issuance by emerging markets picked up. Several sovereigns returned to the international markets (or announced their intention to do so) during the period under review (Table 2). However, international placements by emerging market corporate issuers apparently still lagged behind (Graph 12, right-hand panel). Syndicated debt securities issuance by non-financial corporates rose significantly in March and April, albeit driven mainly by placements in domestic markets. Issuance by financial firms remained relatively subdued.

... is accompanied by a pickup in debt issuance ...

Financial flows into emerging markets also reflected the return of risk appetite. Monthly balance of payments data from Brazil, for example, show that the large net outflows in portfolio and other (mostly bank) investment by non-residents in the final quarter of 2008 abated in the first three months of 2009. Net flows into other investment and equity investment even turned positive in February and March, respectively. An easing in net outflows and recent signs of net inflows were also recorded in some other markets, such as Korea and Poland (see also the feature by Jara et al in this issue).

... and an easing in net financial outflows

Highlights of international banking and financial market activity¹

The BIS, in cooperation with central banks and monetary authorities worldwide, compiles and disseminates several datasets on activity in international banking and financial markets. The latest available data on the international banking market refer to the fourth quarter of 2008. The discussion on international debt securities and exchange-traded derivatives draws on data for the first quarter of 2009.

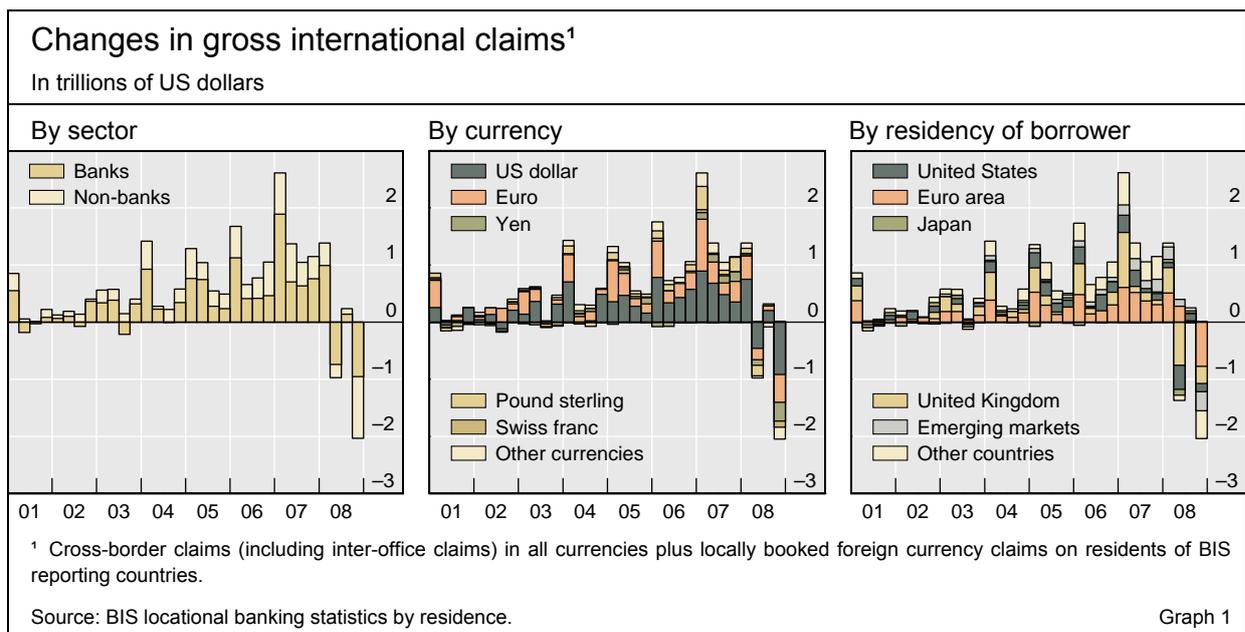
The international banking market

In the wake of the failure of Lehman Brothers in mid-September 2008, banks' international balance sheets contracted by record amounts during the fourth quarter. The decline in both interbank claims and claims on non-banks (particularly in the United States) reflected reduced lending, disposal of assets and writedowns (Graph 1, left-hand panel). The fourth quarter fall pushed the year-on-year growth in total international claims down to -4% , from 5% in the previous quarter and a peak of 22% in the third quarter of 2007.

Banks' funding pressures intensified early in the quarter, prompting an unprecedented policy response from governments and central banks. Interbank borrowing contracted in all currencies during the quarter (Graph 1, centre panel), and other sources of bank funding also came under pressure. Residents of reserve-accumulating and oil-exporting countries withdrew a significant amount of deposits placed in commercial banks. For some countries, this was driven by central banks drawing down their deposits of foreign exchange reserves. By the end of the quarter, funding pressures had subsided somewhat, as evidenced by considerably lower Libor-OIS spreads relative to their earlier peak.

Banks trimmed their cross-border credit to emerging markets, but their local operations in many of these countries remained stable. Reporting banks' cross-border claims on all four emerging market regions decreased in the fourth quarter by a combined \$282 billion (10%), with claims on Asia-Pacific

¹ Queries concerning the banking statistics should be addressed to Patrick McGuire and Goetz von Peter, and queries concerning international debt securities, exchange-traded derivatives and over-the-counter derivatives statistics to Jacob Gyntelberg.



dropping the most. In contrast to banks' cross-border claims, their claims extended from their foreign offices to local residents in local currency remained stable overall and actually increased in many countries.

Balance sheets contract amidst funding pressures

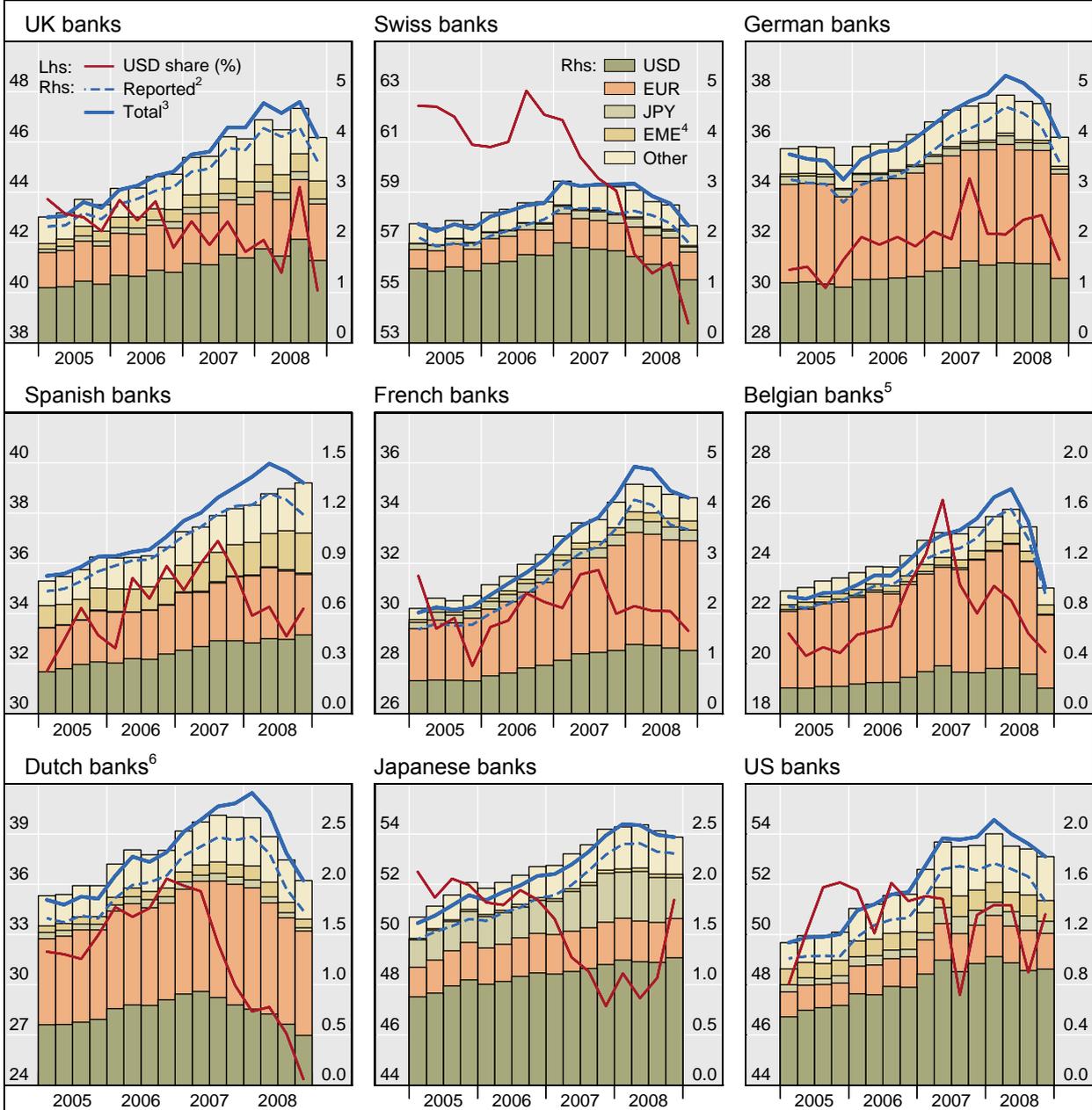
The stresses in the financial system in September 2008 carried over into the fourth quarter, contributing to the largest decline in banks' foreign positions on record. The BIS consolidated banking statistics (ultimate risk basis), which track the outstanding stock of foreign claims² of national banking systems,³ show that, overall, total foreign claims fell by \$3.2 trillion (–11%) to \$25 trillion in the fourth quarter of 2008. The decrease is partly explained by the significant appreciation of the US dollar against many currencies during the quarter, which leads to a fall in the outstanding stock of non-US dollar positions when expressed in US dollars (Graph 2).⁴

² Foreign claims comprise *cross-border* claims and *local* claims, ie positions booked by banks' foreign offices vis-à-vis residents of the host country. Local claims are denominated either in the local currency of the host country (*local-in-local*) or in foreign currencies (*local-in-foreign*). The sum of cross-border and local-in-foreign claims is called *international* claims.

³ "National banking system" refers to the set of large internationally active banks *headquartered* in a particular country (eg US banks, German banks, Swiss banks, etc), as opposed to banks *located* in a particular country.

⁴ While the BIS consolidated statistics do not include a currency breakdown of banks' foreign assets, a breakdown can be estimated by splicing together the BIS consolidated banking statistics and the BIS locational banking statistics by nationality (see "The US dollar shortage in global banking", *BIS Quarterly Review*, March 2009, for detail). This breakdown is available for banks' total foreign claims (solid blue line in Graph 2), which in this context comprise the foreign claims reported by each banking system (dashed blue line) plus their foreign offices' cross-border claims on residents of the home country.

Foreign claims by currency¹

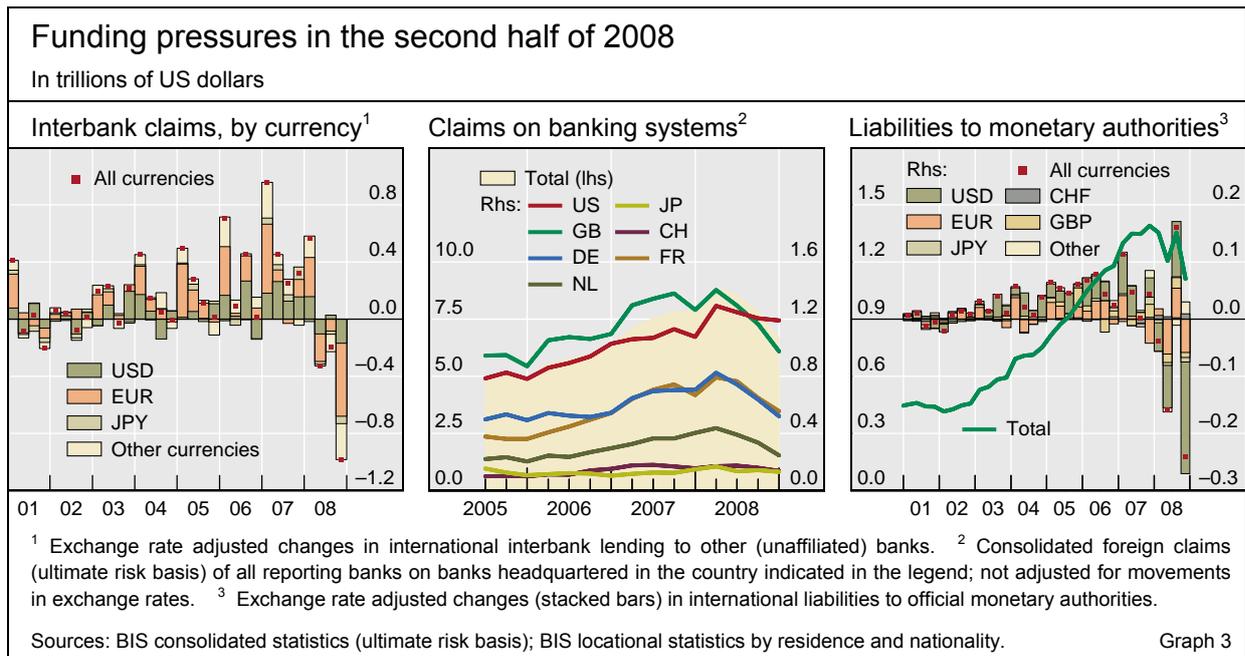


¹ Stacked bars are estimated outstanding stocks of foreign claims in trillions of US dollars expressed at constant end-2008 exchange rates. These estimates are constructed by splicing the BIS locational banking statistics by nationality with the consolidated banking statistics (immediate borrower basis), which yields a currency breakdown for banks' total foreign claims. See "The US dollar shortage in global banking", *BIS Quarterly Review*, March 2009, for details. ² Foreign claims as reported in the BIS consolidated banking statistics (immediate borrower basis); not adjusted for changes in exchange rates. ³ Foreign claims (as reported) plus banks' foreign offices' claims on residents of the home country; not adjusted for changes in exchange rates. ⁴ Emerging market currencies. ⁵ The contraction in positions in the last quarter of 2008 in part reflects the restructuring of Fortis. ⁶ The contraction in positions in the second half of 2008 in part reflects the sale of some business units of ABN AMRO.

Sources: BIS consolidated statistics (immediate borrower basis); BIS locational statistics by nationality; BIS calculations. Graph 2

Largest contraction on record, despite US dollar appreciation

While most major banking systems reported declines, European banks' positions fell the most. The stacked bars in Graph 2 track the outstanding stock of banks' foreign assets, broken down by currency, expressed at constant end-2008 exchange rates. The actual contraction in foreign claims in the fourth quarter, when adjusted for exchange rate movements, is considerably less than the nominal decrease (\$2.5 trillion compared to \$3 trillion for the banking



systems included in Graph 2) but is still the single largest quarterly decline on record. German, Swiss and UK banks' foreign claims fell the most in the fourth quarter, primarily their US dollar-denominated claims. Spanish banks' foreign assets actually increased once valuation effects are removed, in part reflecting the acquisition of foreign banks.

Banks' funding sources showed signs of instability in the wake of the Lehman Brothers bankruptcy. By the end of the fourth quarter of 2008, international interbank claims had shrunk by a record amount (\$953 billion, excluding inter-office claims). Euro-denominated claims fell the most, primarily reflecting reduced intra-euro area interbank lending (Graph 3, left-hand panel). By banking system, the BIS consolidated banking statistics indicate that European banks, notably Dutch, Swiss, German and UK banks, reported the largest reductions in their interbank positions. As shown in Graph 3 (centre panel), this resulted in reduced interbank credit to UK banks, followed by German and French banks.

Other sources of funding came under pressure during the quarter as well. Following a surge in the third quarter of 2008, reporting banks' liabilities to official monetary authorities dropped by \$265 billion (23%) in the fourth quarter (Graph 3, right-hand panel), primarily reflecting the withdrawal of foreign exchange reserves from UK, German, Swiss and Belgian banks.⁵ In addition, residents of Russia, Libya, Nigeria and other oil-exporting countries repatriated deposits placed in commercial banks during the quarter, driving a record reduction in reporting banks' liabilities to emerging Europe and to Africa and the Middle East (Graph 6).

Facing funding pressures ...

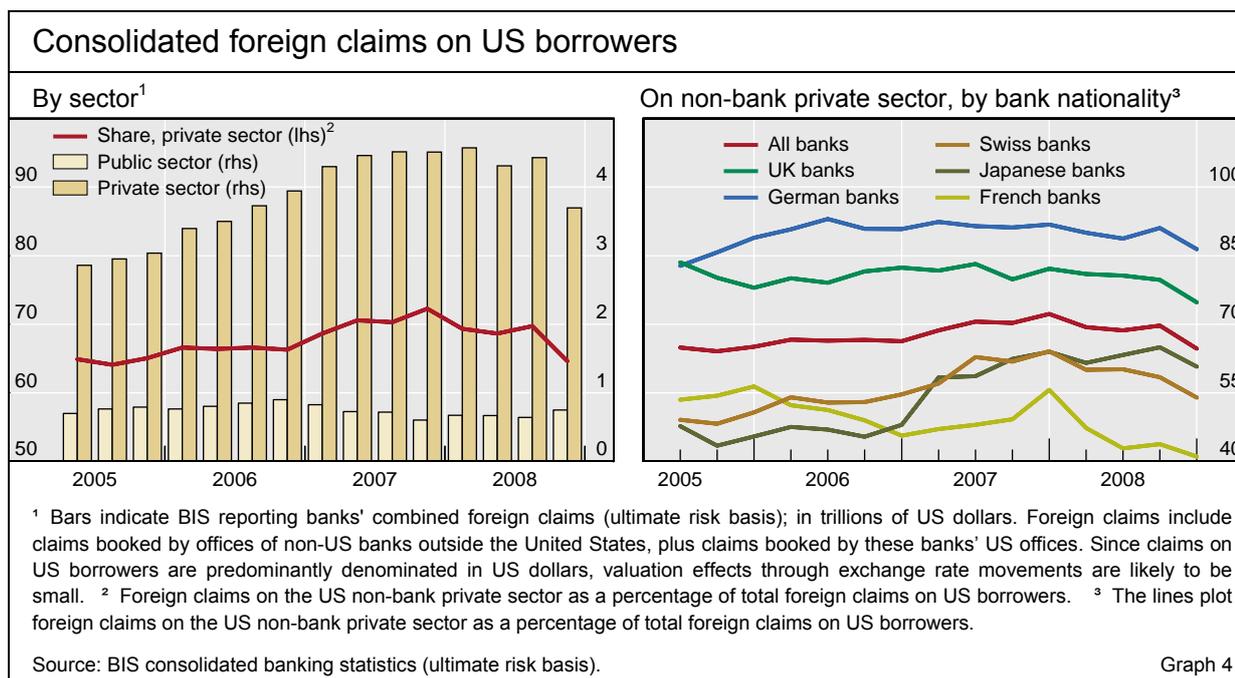
⁵ Data from the IMF reported by 63 monetary authorities indicate that many central banks (in particular those of India and Russia) reduced their placements of foreign exchange reserves in commercial banks in the fourth quarter, by a combined \$137 billion. These withdrawals occurred even as other central banks took actions to provide banks with funds; US dollar swap lines between the US Federal Reserve, the ECB, the Bank of England and the Swiss National Bank (among others) became unlimited early in the quarter (13 October).

... banks unwind their non-bank positions ...

Amidst these funding pressures, outstanding claims on non-banks fell sharply, particularly vis-à-vis non-bank borrowers in the United States.⁶ This contraction includes writedowns and mark to market losses, making it difficult to distinguish outright asset disposal from valuation changes. Overall, the outstanding stock of international claims on non-banks declined by \$1.1 trillion (Graph 1, left-hand panel). Nearly half of this was accounted for by reduced cross-border claims on US non-banks (–\$424 billion, or –15%),⁷ followed by reduced claims on non-banks in developed Europe (–\$151 billion) and on the Cayman Islands (–\$142 billion).⁸ Since the start of the crisis, the reduction in claims on US non-banks has led to a reversal in the *net* flow of funds to US borrowers (see box).

... particularly vis-à-vis the United States

The BIS consolidated banking statistics (ultimate risk basis), which contain a finer counterparty sector breakdown, shed more light on banks' exposures to the US *non-bank private* sector (Graph 4, left-hand panel). Non-US banks' foreign claims on these borrowers, which include both their cross-border positions and positions booked by their US offices, have declined by \$880 billion since the first quarter of 2008, with the largest fall (\$734 billion) occurring in the fourth quarter. Most major banking systems reported a shift out of the US non-bank private sector (Graph 4, right-hand panel), and into holdings of US Treasury and other government securities.



⁶ Claims on non-banks include banks' international retail and corporate lending, and lending to hedge funds, as well as holdings of securities ranging from Treasury and agency securities to structured products.

⁷ Debt and equity securities claims on US non-banks dropped for the fourth consecutive quarter, this time by \$69 billion, while reduced loan claims made up the difference.

⁸ Data on signings of syndicated loans, available up to the first quarter of 2009, show that total signings worldwide fell to their lowest level (\$166 billion) since 1995, roughly one third of the volume in the first quarter of 2008. Signings for borrowers in the euro area and the United States fell the most sharply.

Banks also recorded large changes in their off-balance sheet positions. The outstanding stock of (unused) credit commitments fell from nearly \$5 trillion in early 2008 to \$4 trillion by end-year (Graph 5, left-hand panel). At the same time, the face value of guarantees – which include credit protection sold via credit derivatives – contracted by an unprecedented 23% to \$6.3 trillion (Graph 5, centre panel). Although exchange rate effects exaggerate the extent of this contraction, it does indicate that international banks in general, and Italian and Swiss banks in particular, reduced their contingent liabilities arising from third-party defaults, especially vis-à-vis entities in the United Kingdom and the United States.

By contrast, the market value of banks' derivatives positions grew markedly in the fourth quarter of 2008, reflecting the changes in interest rates and greater market and exchange rate volatility. Banks, in particular Dutch, Swiss and UK institutions, reported a remarkable increase of 47% (\$2.3 trillion) in the positive market value of their derivatives holdings (Graph 5, right-hand panel). This reflects the extent to which these positions moved “into the money” following the coordinated interest rate cuts during the quarter, as well as exchange rate movements and the general rise in volatility in all asset markets.

Derivatives positions surge, reflecting market volatility

Capital flows via banks reverse direction during the crisis

The financial crisis has led to significant changes in the flow of funds via banks across countries. The top panels of Graph A map the cumulative net transfer of funds between countries through the international banking system during the six quarters before and after the onset of the crisis. The estimated net capital flows, depicted by the thickness and direction of the arrows, take into account changes on the assets and liabilities side of the balance sheets of banks located in both countries in each bilateral pair.

Prior to the crisis, banks facilitated international capital flows out of surplus regions. This is illustrated by the arrows emanating from Japan and the euro area, as well as from Asian financial centres and oil-exporting countries. Banks routed funds from these regions via offices in the United Kingdom and in Caribbean financial centres, ultimately transferring funds to borrowers in the United States (a cumulative \$492 billion between the first quarter of 2006 and second quarter of 2007).

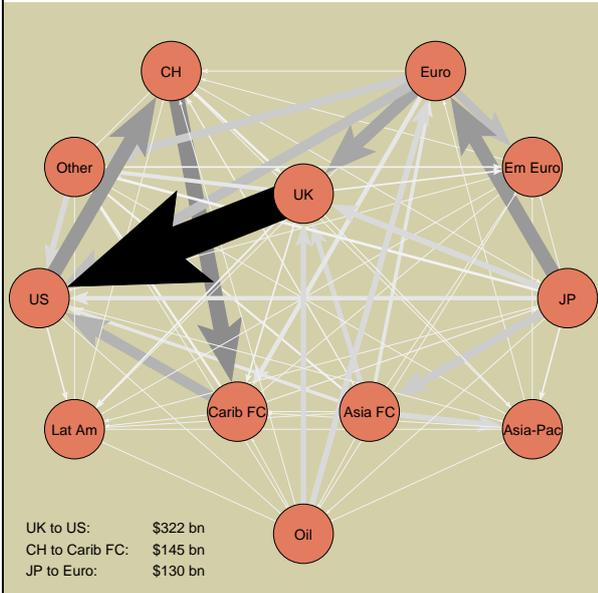
During the crisis, the direction of the bilateral flow of funds between several of the largest economies reversed. Between the second quarter of 2007 and fourth quarter of 2008, the cumulative net flows from the United States to the United Kingdom totalled \$482 billion, and those to Caribbean financial centres \$213 billion. Similarly, flows from oil-exporting countries, which mainly reflected deposits placed with banks in the United Kingdom and euro area, reversed as residents of these countries repatriated deposits.

The determinants of these flows differ for each bilateral pair. The bottom panels of Graph A break down by sector the cumulative flows for three bilateral linkages with the United States. Negative (positive) values represent flows into (out of) the United States. By far the largest swing since the start of the crisis has been the rapid rise in net flows to the United Kingdom, the result of reduced claims on non-bank entities in the United States booked by banks located in the United Kingdom (blue line, bottom left-hand panel). This is the result of reduced lending and writedowns of positions vis-à-vis US residents by the London offices of the major European-headquartered banks.

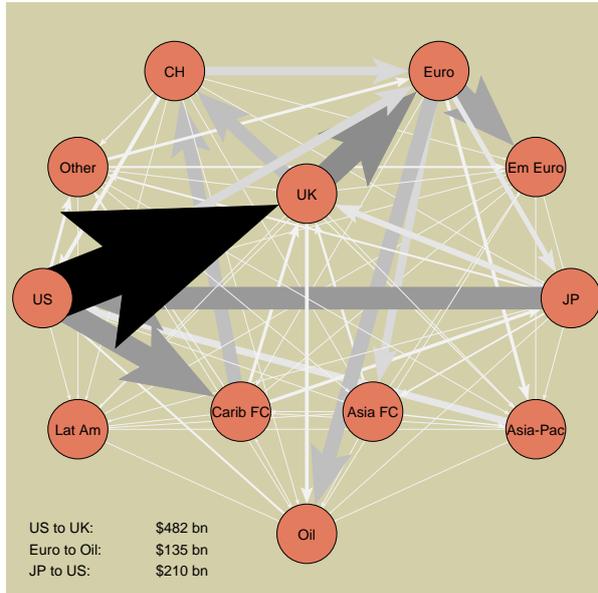
In contrast to the US-UK bilateral pair, the net flow of funds between Japan and the United States overall did not change direction. Throughout the crisis, banks in Japan have continued to channel money to US non-banks (blue line, bottom centre panel). At the same time, interbank flows reversed direction (red line), as Japanese banks transferred a net \$120 billion to their US offices since the start of the crisis. The BIS consolidated banking statistics (immediate borrower basis) show that Japanese banks' locally booked US dollar positions vis-à-vis residents of the United States increased by a similar amount, in part reflecting greater claims on the US public sector.^①

Net flows of funds through the international banking system¹

Cumulative net flows Q1 2006 – Q2 2007

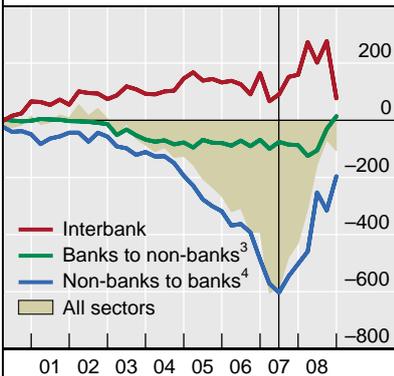


Cumulative net flows Q3 2007 – Q4 2008

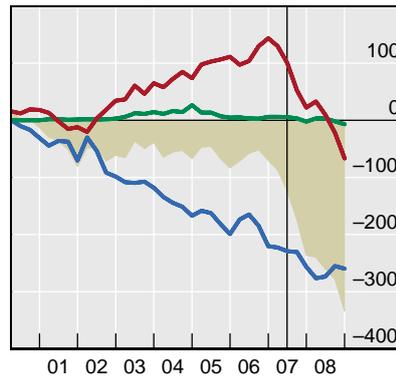


Cumulative net flows, by counterparty sector²

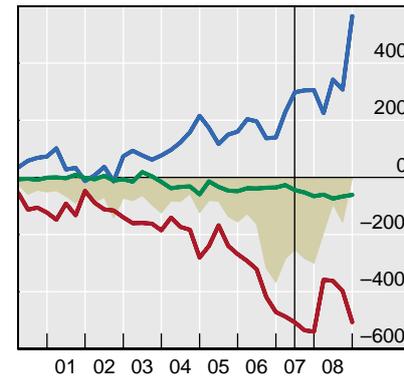
From US to UK



From US to JP



From US to Carib FC



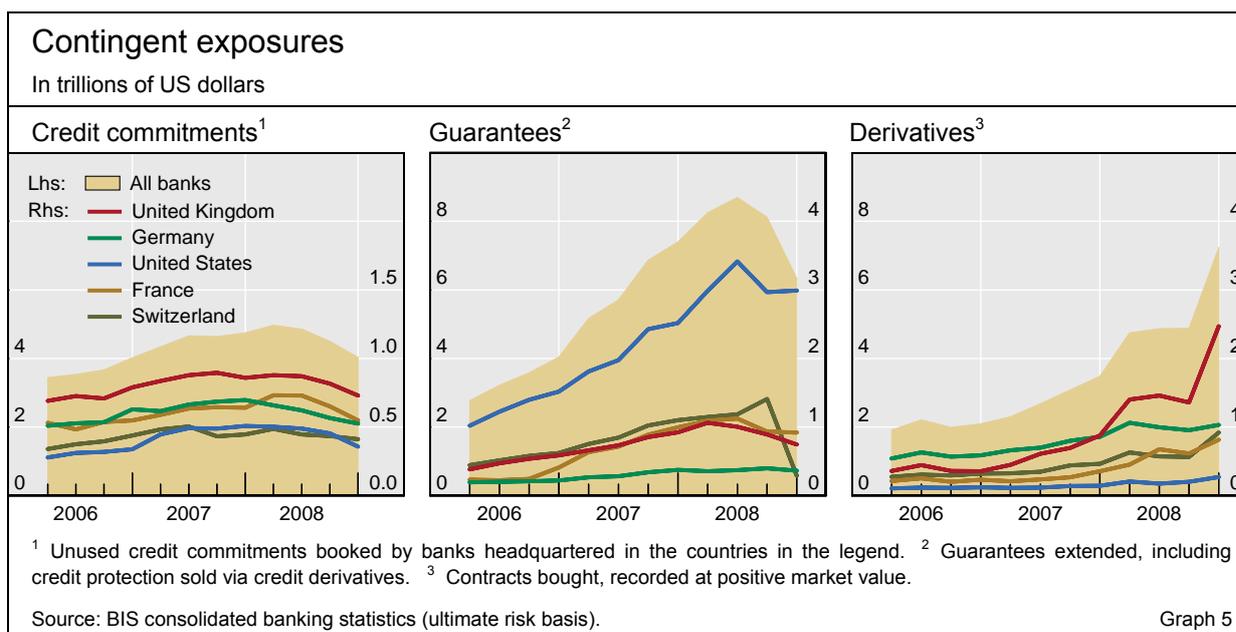
Asia FC = Asian financial centres (Hong Kong SAR, Macao SAR and Singapore); Asia-Pac = China, Chinese Taipei, India, Indonesia, Korea, Malaysia, Pakistan, the Philippines and Thailand; Carib FC = Caribbean financial centres (Aruba, the Bahamas, Bermuda, the Cayman Islands, the Netherlands Antilles and Panama); CH = Switzerland; Em Euro = emerging Europe (Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, Turkey and Ukraine); Euro = euro area member states excluding Cyprus, Malta, Slovakia and Slovenia; JP = Japan; Lat Am = Argentina, Brazil, Chile, Colombia, Mexico and Peru; Oil = OPEC member states (excluding Indonesia) plus Russia; Other = Australia, Canada, Denmark, New Zealand, Norway and Sweden; UK = United Kingdom, Guernsey, the Isle of Man and Jersey; US = United States.

¹ Exchange rate adjusted flows, expressed at constant end-Q4 2008 exchange rates. The thickness of an arrow is proportional to the amount of net bank flows between countries/groups, and is comparable across panels. An arrow points from A to B if net flows in this direction are positive, calculated as changes in net interbank claims (assets minus liabilities) of banks in A on banks in B, plus net claims of banks in A on non-banks in B, minus net claims of banks in B on non-banks in A. (This last component is missed if B is not a reporting country.) See "Tracking international bank flows", *BIS Quarterly Review*, December 2006. ² Cumulative flows broken down by counterparty sector. Positive (negative) flows indicate funds being sent from (received by) US residents. The vertical black line indicates the approximate start of the financial crisis (end-Q2 2007). ³ Cumulative net flows from banks in the United States to non-banks in the country in the panel heading. ⁴ Cumulative net flows from non-banks in the United States to banks in the country in the panel heading.

Source: BIS locational banking statistics by residency.

Graph A

^① The consolidated banking statistics (ultimate risk basis) show that \$45 billion of the \$60 billion increase in Japanese banks' worldwide claims on the US public sector in the fourth quarter of 2008 was booked by Japanese banks' offices in the United States.



Emerging markets feel the pinch

Cross-border credit to emerging markets showed clear signs of strain in the fourth quarter of 2008, although banks' local operations remained relatively stable. Reporting banks' cross-border claims (locational banking statistics) declined by an exceptional \$282 billion (–10%), with significant reductions in claims on all four emerging market regions for the first time (Graph 6). Cross-border credit to borrowers in Asia-Pacific decreased the most (by \$159 billion or 18%, roughly half the cumulative percentage decline seen during the Asian crisis). Banks' cross-border lending to emerging Europe also fell, mainly due to reduced credit to Russia, Turkey and, to a lesser extent, Poland. Offsetting the decline in lending, residents of many emerging markets drew down their deposits in BIS reporting banks (–\$194 billion), driving an overall net inflow to emerging markets (+\$23 billion).

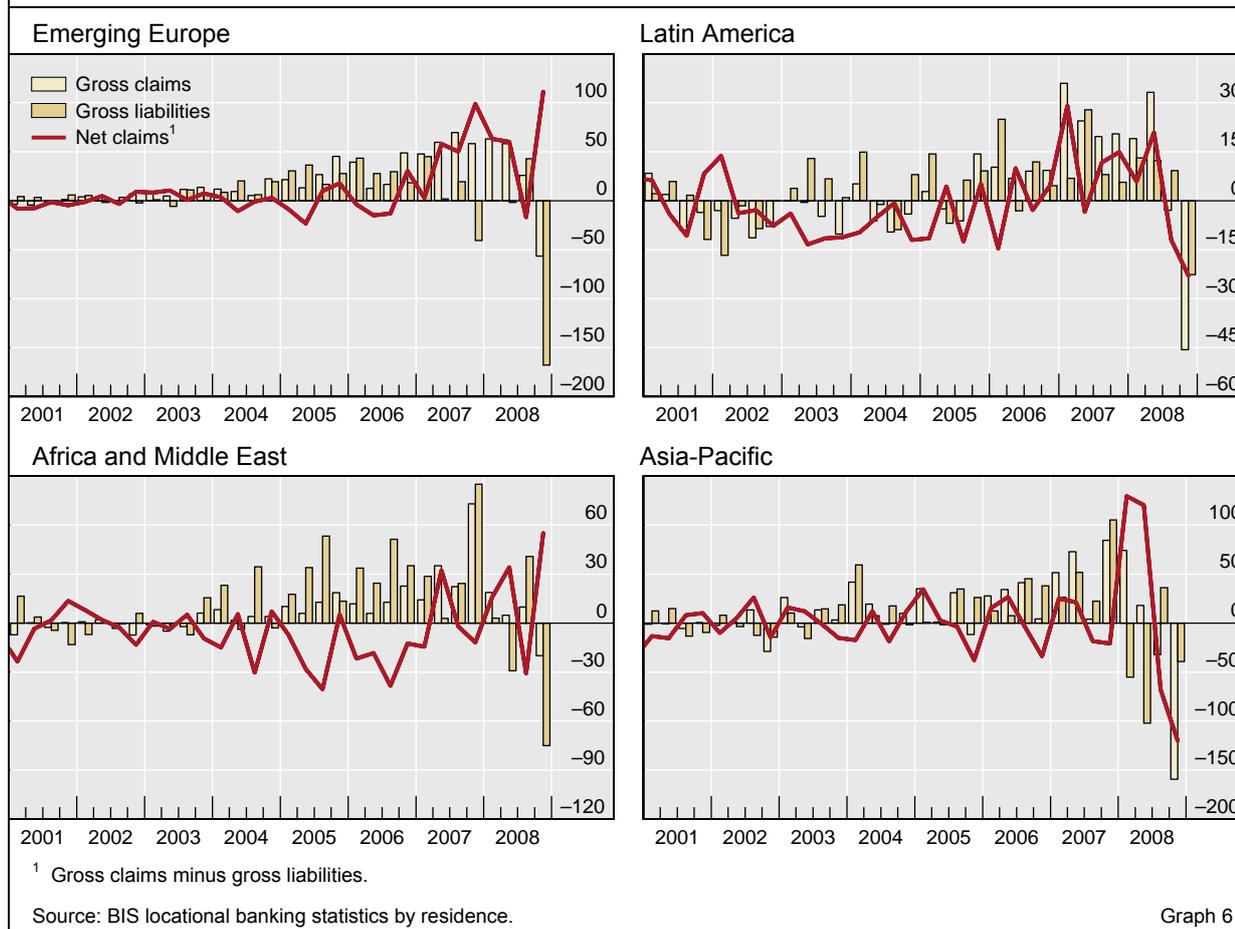
Cross-border lending declines sharply ...

Tracking the changes in banks' *foreign* exposures to emerging markets, which include their local positions, is more difficult because of the significant movements in many emerging market exchange rates during the quarter. The BIS consolidated banking statistics indicate that (unadjusted) international claims on emerging markets fell by \$268 billion (10%) in the fourth quarter.⁹ Across all emerging economies, nearly 80% of this reduction resulted from reporting banks running down their short-term claims (with a residual maturity of one year or less), lowering the share of short-term claims in the stock outstanding to 44%. International claims on Asia-Pacific, a large part of which is denominated in US dollars, fell by \$155 billion, primarily vis-à-vis borrowers in China and Korea (Graph 7). By contrast, much of the international bank credit to emerging Europe is denominated in euros, and thus the

⁹ In the BIS locational banking statistics, cross-border claims are broken down by currency, and can thus be corrected for valuation effects related to exchange rate movements. In contrast, the BIS consolidated banking statistics do not contain a currency breakdown for international claims.

Changes in cross-border positions vis-à-vis emerging markets

In billions of US dollars



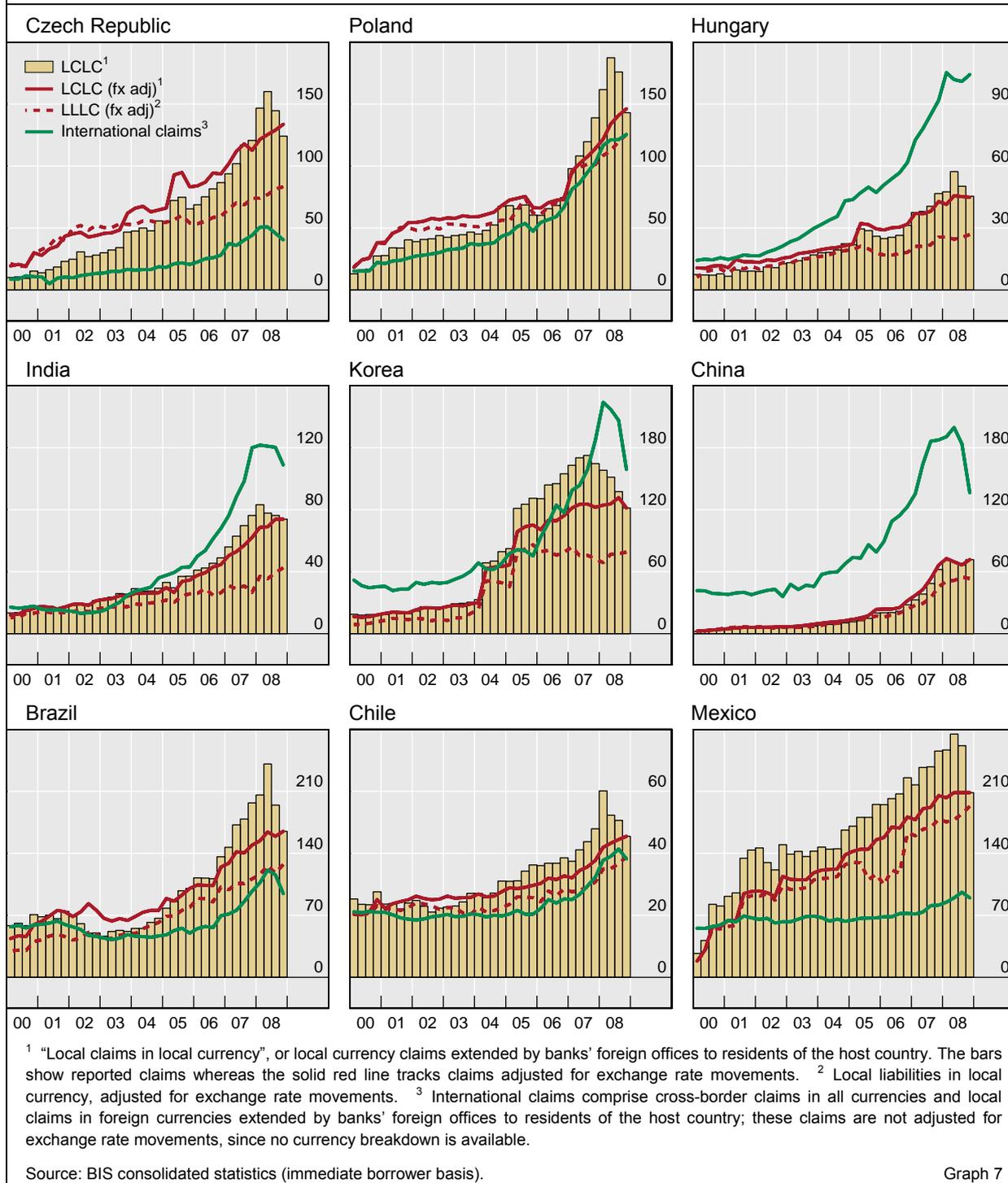
\$45 billion contraction in banks' reported international claims overstates the true size of the retreat. A simple correction using the currency shares of banks' cross-border positions suggests that exchange rate movements may have masked a small expansion in international claims on emerging Europe.

... while local positions remain stable

In sharp contrast to cross-border claims, banks' local positions booked by their offices in emerging markets have remained stable throughout the crisis (Graph 7). Indeed, at constant exchange rates, reporting banks' local claims in local currencies continued to rise in many emerging markets. Local-in-local claims tend to be funded locally, and thus may be more stable than cross-border claims (or local-in-foreign currency claims), which are typically funded outside the borrowing country. Local-in-local claims now account for a greater share (57%) of foreign claims on emerging markets than was the case in late 2007 (55%).

International and local claims in local currencies, by borrower country

In billions of US dollars



Derivatives markets

OTC derivatives

In the second half of 2008, the financial crisis resulted in a decline in the total notional amounts outstanding of over-the-counter (OTC) derivatives to \$592 trillion at end-year (Graph 8, left-hand panel), an indication of reduced

Crisis results in lower notional amounts outstanding ...

market activity. This is the first decline since data collection began in 1998. Foreign exchange and interest rate derivatives markets both recorded their first significant contractions. Against a background of severely strained credit markets and efforts to improve multilateral netting of offsetting contracts, credit default swap (CDS) markets continued to contract, with outstanding amounts decreasing by more than 25%. Facing significant price drops, outstanding commodity and equity derivatives also declined notably.

... and notably higher market values

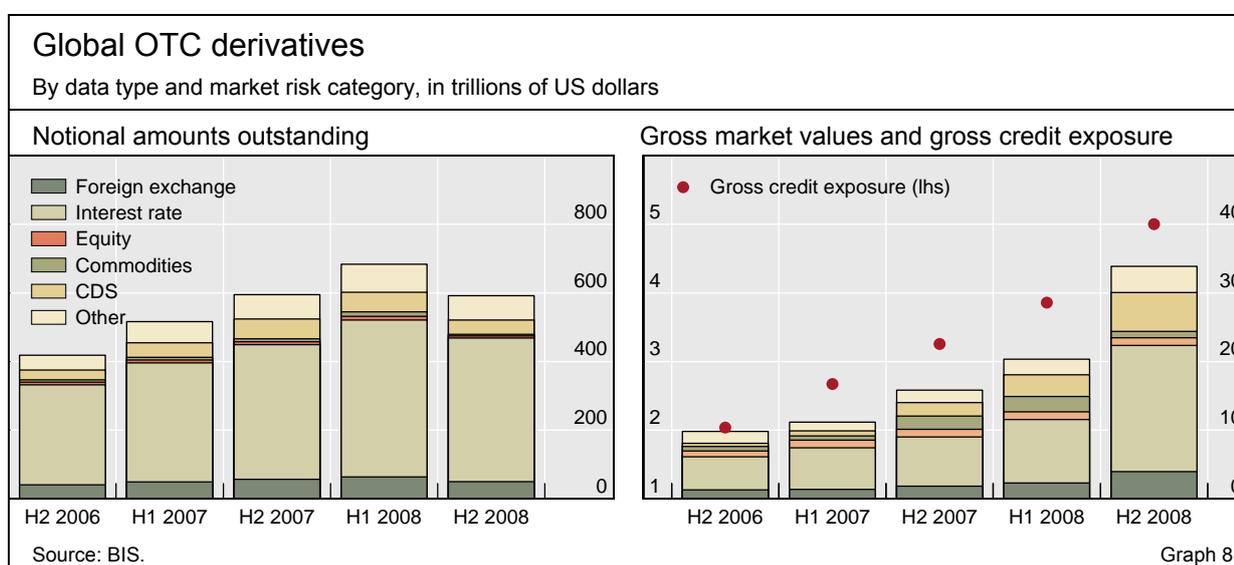
Despite the drop in amounts outstanding, significant price movements resulted in notably higher gross market values, which increased to \$34 trillion at end-2008 (Graph 8, right-hand panel). Gross market values, which measure the cost of replacing all existing contracts, can be used to capture derivatives-related exposures. The higher market values were also reflected in gross replacement costs after taking into account bilateral netting agreements, also referred to as gross credit exposures, which grew by nearly one third to \$5 trillion.

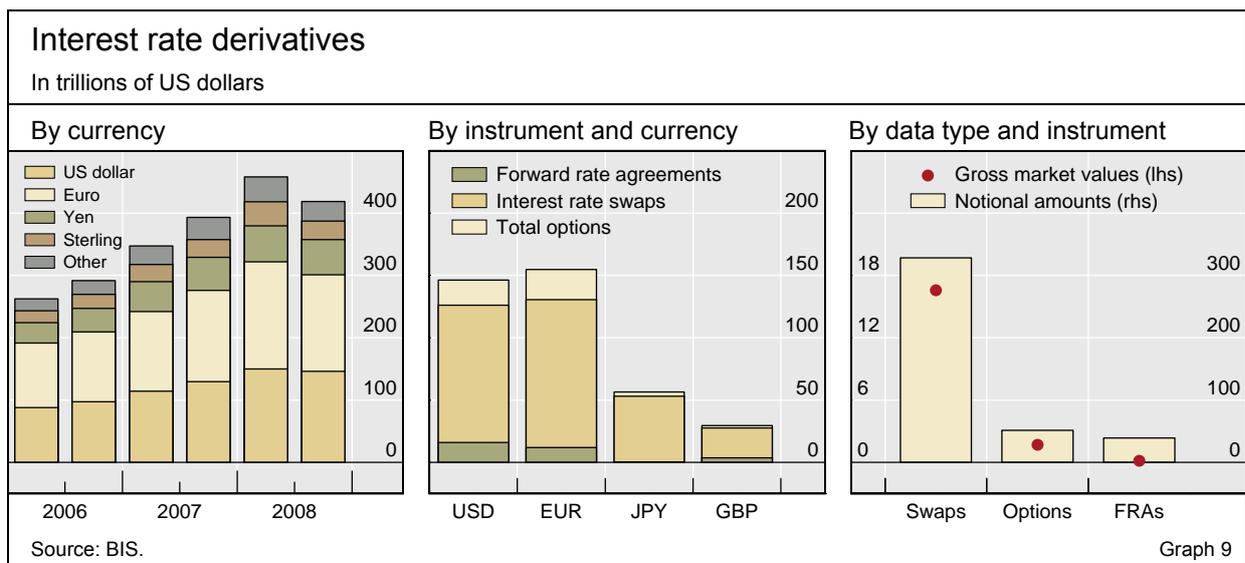
The market for interest rate derivatives contracted for the first time in the second half of 2008, with notional amounts outstanding of these instruments falling to \$419 trillion (Graph 9). Nonetheless, declining interest rates resulted in almost a doubling of the gross market value. The gross market value of interest rate swaps, by far the largest market segment, reached \$17 trillion. The most significant increase took place in the US dollar swap market, where the gross market value nearly tripled.

Credit market strain and netting of contracts ...

Amounts outstanding of CDS contracts fell to \$42 trillion against a background of severely strained credit markets and increased multilateral netting of offsetting positions by market participants. This was a continuation of the developments which began in the first half of 2008. Single-name contracts outstanding declined to \$26 trillion while multi-name contracts, including CDS indices and CDS index tranches, saw a more pronounced decrease to \$16 trillion (Graph 10, left-hand panel). The composition of market activity across counterparties also changed in the second half of 2008. Outstanding contracts between dealers and other financial institutions as well as between dealers and non-financial institutions saw large declines relative to the inter-

...lead to drop in outstanding CDS contracts



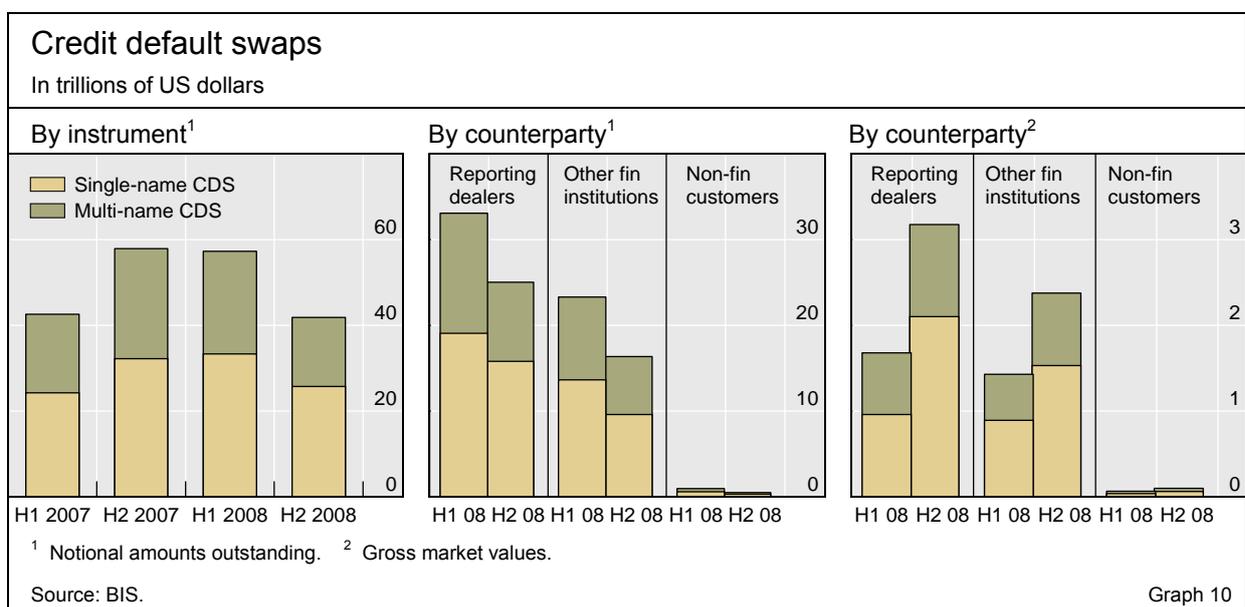


dealer market (Graph 10, centre panel). Despite the lower outstanding amounts, the gross market value of CDS contracts also increased significantly as a result of the credit market turmoil (Graph 10, right-hand panel).

Notional amounts outstanding of foreign exchange derivatives decreased to \$50 trillion, while their gross market value rose to \$4 trillion. The dollar and the euro remained the most important vehicle currencies, followed by the yen and the pound sterling.

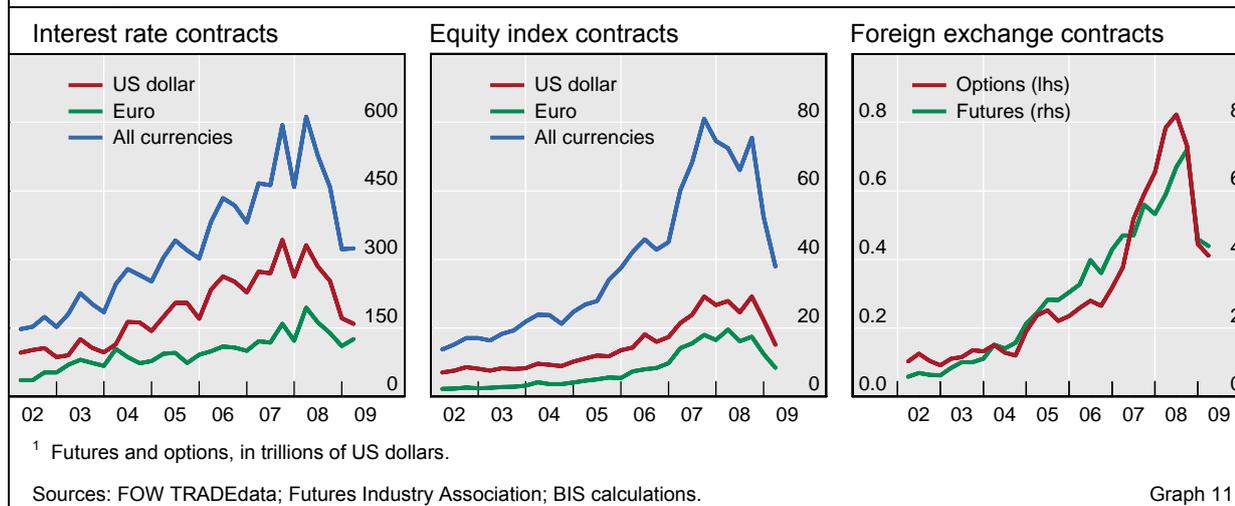
Amounts outstanding of commodity derivatives fell by two thirds to \$4.4 trillion. The continued declines in commodity prices during the second half of 2008 also had a substantial impact on the gross market value of commodity contracts, which fell to \$1.0 trillion.

Outstanding equity derivatives decreased to \$6 trillion, well below the levels seen in recent years and a notable change of pace from the increase in the first half of 2008. Reflecting lower outstanding positions and significantly lower equity prices, the gross market values of outstanding equity derivatives saw only a moderate decline.



Turnover of exchange-traded derivatives¹

Quarterly data, notional amounts



Graph 11

Exchange-traded derivatives

Turnover continues to decline

The first quarter of 2009 saw a continued but limited decline of activity on the international derivatives exchanges (Graph 11). Total turnover based on notional amounts decreased further, to \$367 trillion from \$380 trillion in the previous quarter.¹⁰ Consistent with a gradual return of risk appetite, however, trading activity on a monthly basis did start to increase towards the end of the quarter.

Overall turnover in interest rate derivatives remained largely unchanged at \$324 trillion compared to the previous quarter (Graph 11, left-hand panel). The moderate change in overall turnover nonetheless reflects differences across regions, with turnover in North America declining notably relative to the previous quarter, while European turnover increased.

In contrast to interest derivatives markets, equity derivatives turnover fell for all contract types and all major currencies, including the euro. Against a background of negative economic growth and uncertainty about growth recovery, activity in equity index derivatives declined significantly to \$38 trillion (Graph 11, centre panel).

Turnover in AUD and NZD futures increases as carry trade returns

Foreign exchange derivatives turnover also continued to slide (Graph 11, right-hand panel). The decrease in activity among the main currencies was most pronounced for the yen and US dollar segments. Turnover in Australian and New Zealand dollar futures, possibly driven by renewed interest in FX carry trades, increased substantially relative to the previous quarter.

¹⁰ Data on fourth quarter 2008 notional amounts outstanding and turnover have been revised. As a result, most levels have declined compared to data published in the March 2009 *BIS Quarterly Review*.

The international debt securities market

Reflecting a gradual return of confidence in credit markets, borrowing via international debt securities issuance increased in the first quarter of 2009. Against a background of significant gross issuance, net issuance increased to \$670 billion, up from \$519 billion in the fourth quarter of 2008 (Graph 12, left-hand panel). Net bond and note issuance rose by 17% to \$740 billion, while money market borrowing remained in negative territory with net repayments of \$71 billion.

Higher issuance as confidence returns

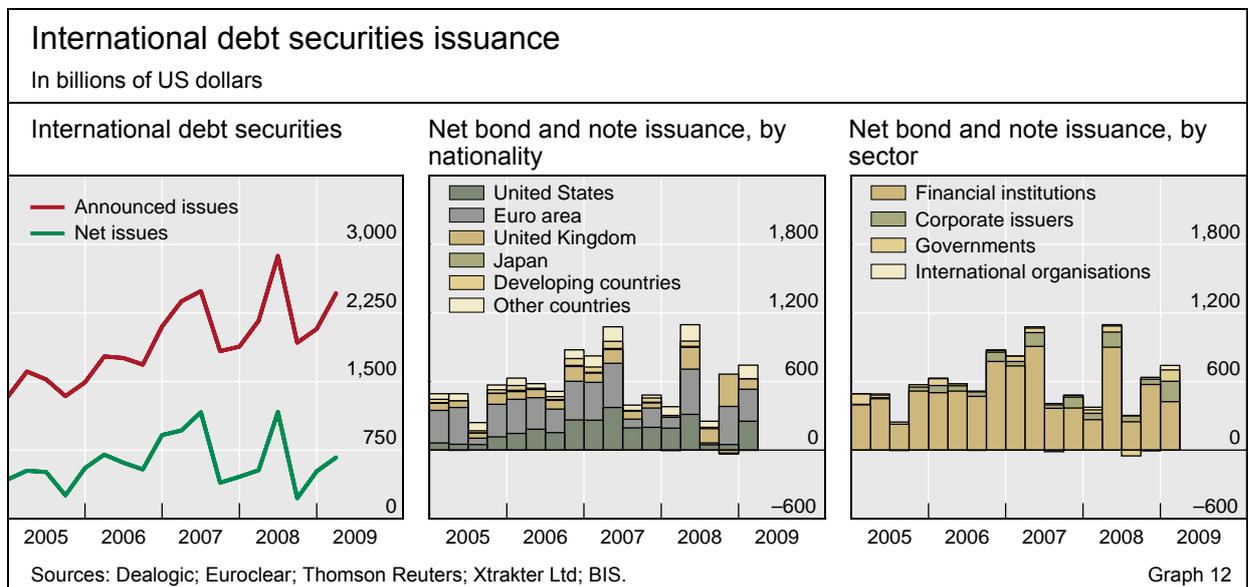
By nationality, borrowing via bonds and notes was dominated by the United States (Graph 12, centre panel). US borrowing increased dramatically to \$252 billion after very limited issuance in previous quarters. In contrast, UK net issuance dropped from \$285 billion to \$90 billion. This pattern was also reflected in the currency composition of issuance. US dollar-denominated issuance rose sharply to \$344 billion from \$61 billion in the previous quarter. In contrast, net sterling issuance fell from \$234 billion to \$104 billion. Borrowing in euros contracted to \$279 billion, compared to \$344 billion in the fourth quarter of 2008. The yen saw \$8 billion in net repayments.

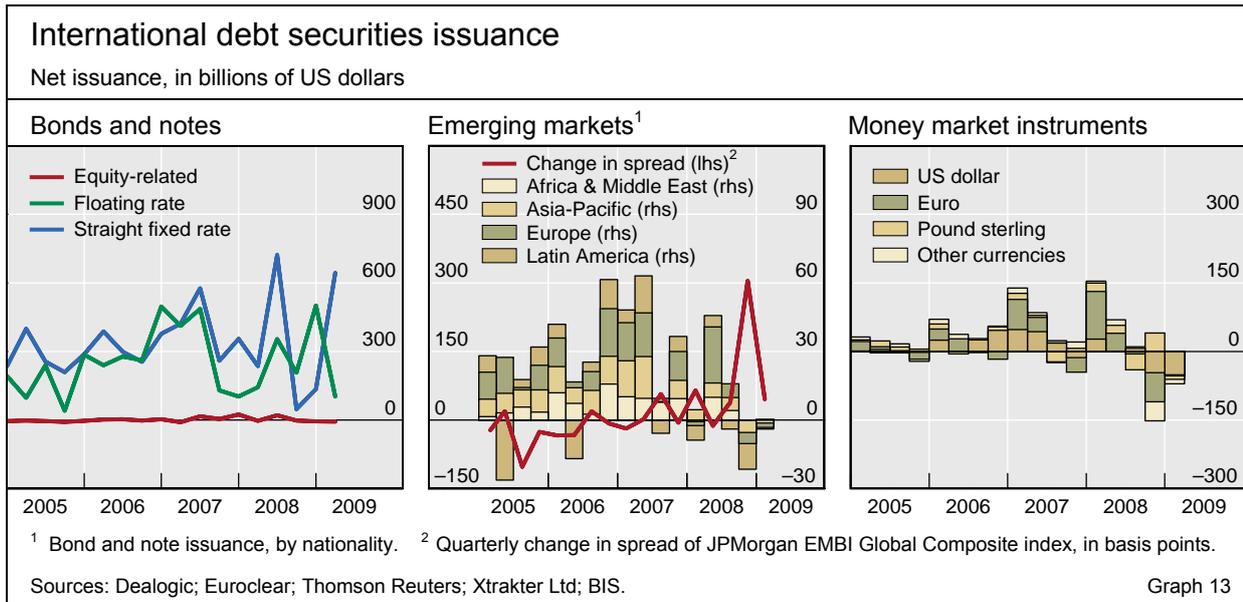
US borrowing increases dramatically ...

By sector, governments recorded the largest relative borrowing increase, from -\$6 billion to \$98 billion in the first quarter (Graph 12, right-hand panel). Among European governments the most active borrowers were Finland, Greece, Ireland and Spain. Governments from several other European countries, including Austria, Belgium, Denmark and Portugal, also tapped markets. Borrowing by corporations increased significantly from \$45 billion to \$179 billion. US corporates alone issued \$119 billion, compared to \$48 billion in the previous quarter.

... as corporate borrowers return to market

Financial institution borrowing, despite the continued support of government guarantee schemes, fell to \$423 billion from \$575 billion. Following significant mortgage bond issuance in the previous quarter, net issuance by financial institutions dropped significantly in Germany, Italy and the United Kingdom. International organisations' net issuance increased to \$40 billion, reflecting gross issuance of \$62 billion and repayments of \$22 billion, after





having been very limited in previous quarters. The main issuers were the European Investment Bank and the World Bank.

Fixed rate bonds dominate

With overall bond and note issuance being dominated by fixed rate issues, there was also a notable shift from floating to straight fixed rate borrowing relative to the previous quarter (Graph 13, left-hand panel). Both governments and corporate borrowers actually repaid floating rate debt while at the same time borrowing at fixed rates. This is consistent with borrowers seeking to lock in low interest rates. In contrast, around 80% of funding in the previous quarter was floating rate.

Emerging economies continue to repay debt ...

Despite credit markets becoming more stable, emerging economies still repaid a net \$4 billion in bonds and notes in the first quarter of 2009, after having repaid a net \$22 billion in the previous one (Graph 13, centre panel). Both Indonesia and Korea were significant net borrowers. The Indonesian government issued \$3 billion, \$1 billion in the five-year and \$2 billion in the 10-year segment. For Korea, the positive net issuance mainly reflected two \$2 billion bond issues by the Export-Import Bank of Korea and the Korean Development Bank.

... and money markets continue to contract

Borrowing via international money market instruments, which include euro commercial paper and other short-term instruments such as certificates of deposit, continued to decline. Net repayments in the money market were \$71 billion in the first quarter, compared to \$111 billion in the previous one (Graph 13, right-hand panel). In terms of currency, the largest net repayments were in the US dollar- and sterling-denominated segments. In contrast, there was net borrowing in euro- and yen-denominated commercial paper and in money market instruments denominated in Swiss francs. For other money market instruments, only international organisations were net borrowers.

Government debt management at low interest rates¹

Debt management can be used at low interest rates to lower bond yields, to provide bank assets and thereby help maintain broad money growth, or to save on interest payments. The US example in the 1930s and the recent Japanese case suggest that this tool was not fully exploited in either case.

JEL classification: E50, E51, E52, E58, E60, E61, E63, E65, H63.

The advisability of central banks' extraordinary buying of government bonds is much debated. However, the question of how treasury debt management can contribute to maintaining the growth of bank assets, lowering long-term government bond yields or reducing net government interest payments is rarely posed. The Bank of England's and Federal Reserve's March 2009 announcements of outright purchases of gilts and Treasury bonds drew more attention than the respective treasuries' announcements of large issues of bonds around the same time. Inattention to debt management in the context of proposals to alter the duration of government debt in private hands is puzzling. After all, the government balance sheet tends to bulk large in relation to that of the central bank. As a result, a substantial change in the central bank's assets can be offset by a small change in government liabilities.

This feature first discusses the objectives of debt management and monetary policy and the complementarities and tensions between them, especially at low interest rates. It then reviews the interaction of central bank purchases of government bonds and debt management in the United States in the 1930s and Japan in the last 10 years. A discussion of recent initiatives in the United Kingdom, Japan and the United States follows.

Interactions between debt management and monetary policy

A government with sizeable financial obligations must choose its debt composition: fixed-rate or short-term/variable rate; domestic or foreign

¹ The authors thank Naohiko Baba, Claudio Borio, Brendan Brown, Michael Cross, Jacob Gyntelberg, Richard Koo, Kenneth Kuttner, Hiroshi Nakaso, Akira Otani and Frank Packer for discussions, and Jhuvish Sobrun for assistance. Any errors remain those of the authors. Authors' views are not necessarily shared by the Bank for International Settlements.

currency; nominal or price-indexed. These choices comprise debt management. Nowadays, debt management generally aims to minimise cost, to limit variability of interest payments and bunching of cash flows, to offset variation in taxes and spending, or to achieve some combination of these. Not so long ago, debt management was given a role in stabilising the economy, alongside, or even as a part of, monetary policy.

Monetary policy seeks to stabilise prices and economic activity by influencing spending by firms and households. When activity strains an economy's capacity, policy restrains spending. When activity falls short, policy attempts to stimulate spending. In many countries, monetary policy had come to focus on hitting an inflation objective by setting a short-term interest rate.

The goals and conduct of debt management and monetary policy can complement each other, but can also give rise to tensions. The traditional view was that the cost of debt service was secondary to the need to "fund" the debt, that is, to issue fixed-rate debt so long-dated that banks would not hold it (or it would not serve as near money for non-banks). Structurally, skilful debt management aids monetary policy in producing a deep, liquid and resilient market for operations. However, debt management aimed only to minimise costs might create tensions with monetary policy by relying on short-term debt (given the normal upward slope of the yield curve). Over the business cycle, debt management can "get in the way" of monetary policy, for instance, if bonds are issued heavily when the central bank is easing.

The scope for interaction and even tensions depends on how the economy works and how monetary and debt management policies are implemented. In terms of the economy's functioning, this scope is minimal if the mix of bills and bonds does not matter for the shape of the yield curve or the economy at large. Private investors may treat treasury bills and bonds as perfect substitutes, pricing bonds as an average of expected bill yields over the bond's life. In this case, the mix of bills and bonds will not affect yields.² For the scope for interaction to be minimal, debt composition must also not affect firm and household spending through its effect on broad money (Box 1).

Until recently, the way monetary and debt management policies were implemented had narrowed the scope for their interaction. As noted, monetary policy entailed setting the overnight interest rate in response to inflation and growth forecasts. Though details differed, central banks operated at the short end in secondary markets or against collateral and thus left the mix of government bills and bonds in private hands unaffected. In this sense, monetary policy left debt management policy to the debt manager. For their part, debt managers had generally opted to "regularise" debt by issuing steadily and predictably to minimise costs (Garbade (2007)). Such debt management hardly enters into the central bank's forecast.

The interaction of debt management and monetary policy ...

... depends on how the economy works and how the policies are implemented

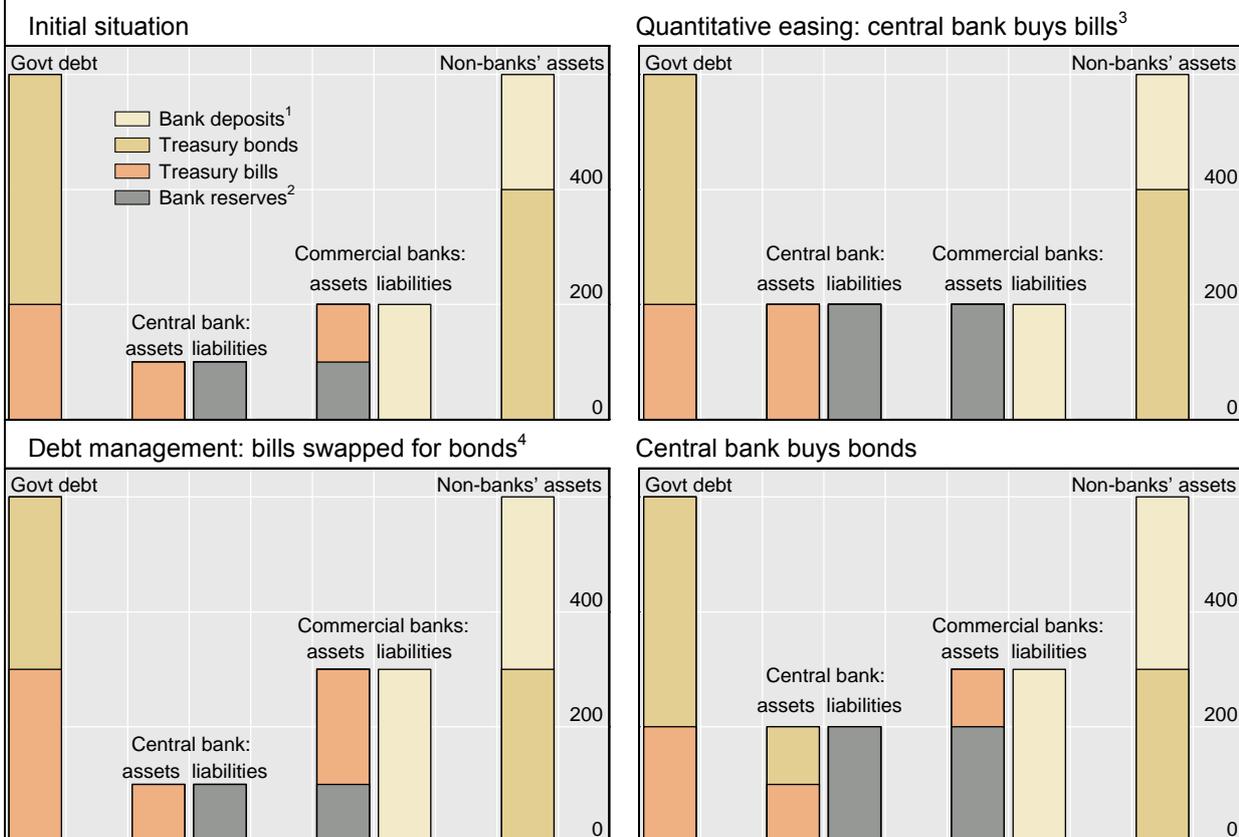
² For a recent discussion of the case of perfect substitutability, see Clouse et al (2003), and the evidence in Baba et al (2005) and Oda and Ueda (2007). For imperfect substitutability, see Bernanke et al (2004) and Kuttner (2006).

Box 1: Bond buying and debt management: a quantitative view

Following Congdon (2003), this box simplifies the economy's balance sheet to show the quantitative differences among various operations that can be carried out at very low interest rates. The upshot is that a central bank's purchase of government bonds can be seen as a compound of quantitative easing, defined as the central bank injecting funds into the banking system, and a debt management exchange of treasury bills for treasury bonds. This graphical "T-account" exercise is consistent with King's (2009) emphasis on the purchase of gilts from the "wider economy", and not just banks, as well as the Bank of England's purchase of gilts of five to 25 years' residual maturity, usually held by non-banks.

In the initial situation (Graph A, top left-hand panel), the government has a mix of bill and bond liabilities. The bills are held by the central bank and the commercial banking system. The non-bank private sector holds bonds and deposits in the banking system. Cash holdings are abstracted away, so that bank deposits comprise the stock of money. The corporate and household sectors as borrowers from banks and issuers of bonds are also abstracted away.

Stylised monetary and debt management policy



¹ Held by the private sector. ² Commercial banks' deposits with central bank. ³ The central bank buys 100 bills from commercial banks. Their cash reserves increase by 100. ⁴ The government sells 100 in bills to the commercial banks and buys 100 in bonds.

Sources: Congdon (2003); authors' calculations.

Graph A

In this simple schema, one can represent quantitative easing as an operation between the central bank and the commercial banking system (Graph A, upper right-hand panel). The central bank buys treasury bills with its liabilities, and bank reserves increase. Not much happens: the banks hold fewer treasury bills paying essentially no interest but more similarly unremunerative bank reserves. This simplifies the Bank of Japan's operations, which used a wide set of instruments and counterparties, and the range of holders of bank reserves (which included holdings of foreign banks that had swapped dollars for yen), but it captures the disconnect between rapid growth of bank reserves and muted growth of the money supply that was observed in Japan.

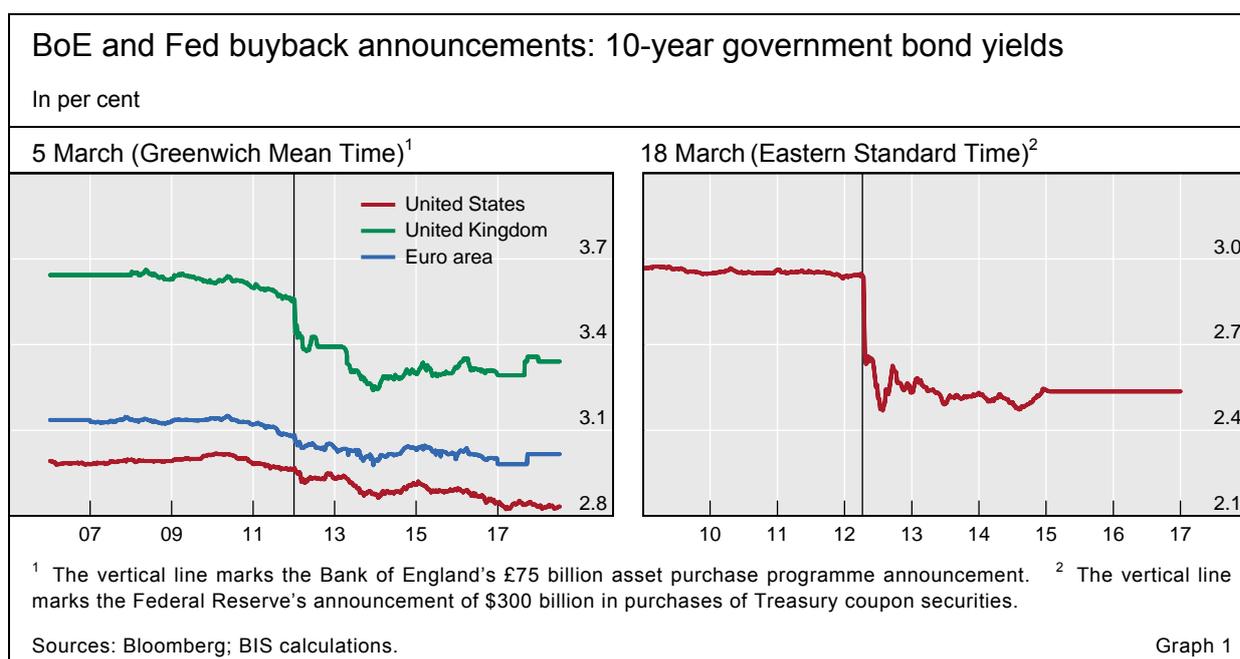
A debt management operation can in principle have greater effect, at least in this simple financial system (Graph A, bottom left-hand panel). The Treasury sells bills to commercial banks and buys bonds from non-bank investors with the proceeds. The non-bank private sector holds less risky treasury bonds and more bank deposits (more money). (Bank reserves are assumed to be a non-binding constraint.)

A central bank that buys treasury bonds basically combines these two operations (bottom right-hand panel). The central bank credits the bank of the seller of the bond with bank reserves, and the bank credits the non-bank investor with a deposit. Money holdings increase, as with the debt swap of bills for bonds, but banks hold more excess bank reserves rather than bills.

In the real world, the results in this simplified financial system may not follow through. The non-bank private sector has in fact borrowed from the commercial banks. Thus, purchases of government bonds by the government or central bank might finance non-banks' repayment of such bank debt rather than boosting broad money (UK House of Commons (2009)). (In particular, an institutional investor might sell a government bond and purchase a newly issued corporate bond, and the issuer might repay a bank loan.) Finally, even if broad money can be increased, it is not clear that would necessarily increase spending by firms and households.

There is some mapping between institutional arrangements and the interactions of the two policies. A generation ago, the Bank of England and the Reserve Bank of India both served their governments as debt managers, consistent with a concept of monetary policy as embracing debt management. Subsequently, as the Bank of England focused on inflation targeting through short-term rate setting, debt management was moved to a separate dedicated office (Bleijer (1999)). Many governments in the euro area have also set up debt management offices (Kalderen and Blommestein (2002)), given Eurosystem monetary operations that advance against broad collateral rather than buying government debt outright. In the United States, where the central bank's mission remained broader, the Treasury and the Federal Reserve have continued to cooperate in debt management as principal and agent.

The scope for interaction between monetary policy and debt management today has widened. In part, this is due to the tide of opinion, which has been running against the view that bond yields approximate the average of future



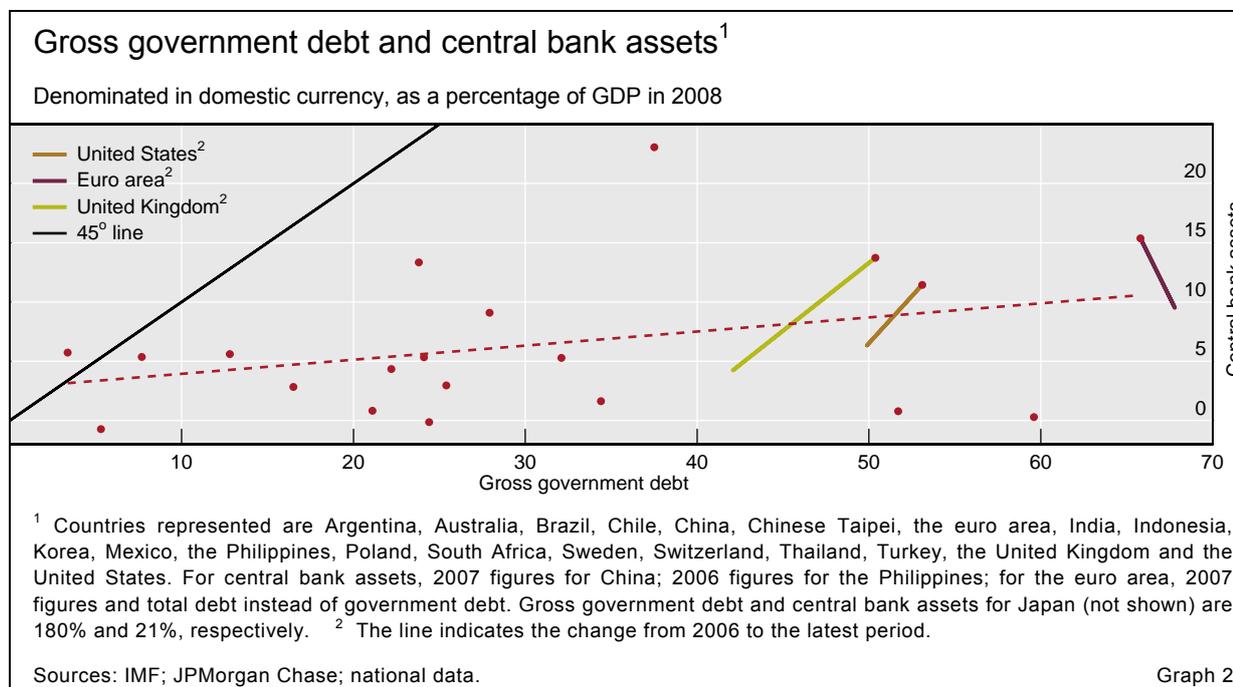
short-term rates, rendering bills and bonds perfect substitutes. The sceptics of this perfection point to the market reactions to the Bank of England's and the Federal Reserve's surprising announcements in March, when yields fell by about 40 basis points in each case (Graph 1). Moreover, bond market anomalies during the financial crisis have heightened doubts about the power of arbitrage and speculation along the yield curve.³ To many other observers, however, these market reactions amounted to no more than a spasm of short covering subject to reversal over weeks.

Interaction growing because central banks are mobilising their balance sheets ...

More fundamentally, the scope for interaction has increased in three ways with the extraordinary policy responses to the current financial crisis. First, short-term yields near the zero limit have led central banks to use their balance sheets to affect quantities and yields (BIS (forthcoming, Chapter VI)). As the room for manoeuvre with policy rates shrank, central banks advanced funds and bought assets in size, originally shedding government debt in some cases, but now including government debt. Domestic assets on central bank balance sheets have risen in some cases to double digit percentages of GDP, though still generally well below the government's domestic currency liabilities (Graph 2).

... treasury bills and central bank liabilities are becoming close substitutes ...

Second, as short-term interest rates approach zero, central bank liabilities and treasury bills become very close substitutes (Ueda (2001)).⁴ As a result, when money yields nothing, central bank purchases of government bonds and the government debt manager's swapping of bills for bonds are "indistinguishable" (King (2004, p 11)). Box 1 traces graphically the similarity in



³ Anomalies include the inversion of swap yields below government yields at long maturities, implausible deflation indications from price gaps between benchmark bonds and illiquid inflation-indexed bonds, and the pricing of floating rate notes in the JGB market (see below).

⁴ Payment of interest on excess reserves or issuance of interest-bearing central bank bills makes central bank liabilities close substitutes for treasury bills even at positive yields.

terms of balance sheets and holdings of broad money.

Third, the central bank is often urged to take actions that are the province of the debt manager. For instance, Auerbach and Obstfeld (2005) suggest that the central bank reduce the net cost of government debt service by buying bonds at yields stuck at levels well above zero short-term rates. This proposal draws on the long-standing notion that debt management can be used to hedge macroeconomic risks and associated variation in tax receipts and expenditures (Missale (1999)). In particular, reliance on short-term or floating rate debt will save on interest payments if the economy remains weak and subject to deflation, while higher taxes will offset higher interest payments in case of an economic rebound. Such proposals may be well taken or not, but there is no necessary central bank role unless debt management is on autopilot.

... and distinctions between the roles of monetary policy and debt management are becoming blurred

In sum, starting from a situation in which monetary and debt management remained in their respective corners, current circumstances have brought them closer. What can we learn from a review of two episodes in which the central bank bought government bonds even as the treasury managed the debt?

US debt management in the early 1930s and Fed bond purchases

There are two accounts of the monetary policy mistakes of the early 1930s in the United States. They agree that bank deposits (the money supply) should have kept growing, but they differ on how this should have been done.

US monetarists say that the Federal Reserve erred in not buying more Treasury securities in order to increase bank reserves held at the Federal Reserve (Friedman and Schwartz (1963), Meltzer (2002)). Large, sustained Treasury purchases, either bills or bonds, would have pushed short-term interest rates to zero and provided banks with large excess reserves. At some stage, they would have made loans and thereby sustained bank deposits. (In terms of Graph A in Box 1, these US monetarists leave it unclear whether their recommended policy is the top or bottom right-hand panel.)

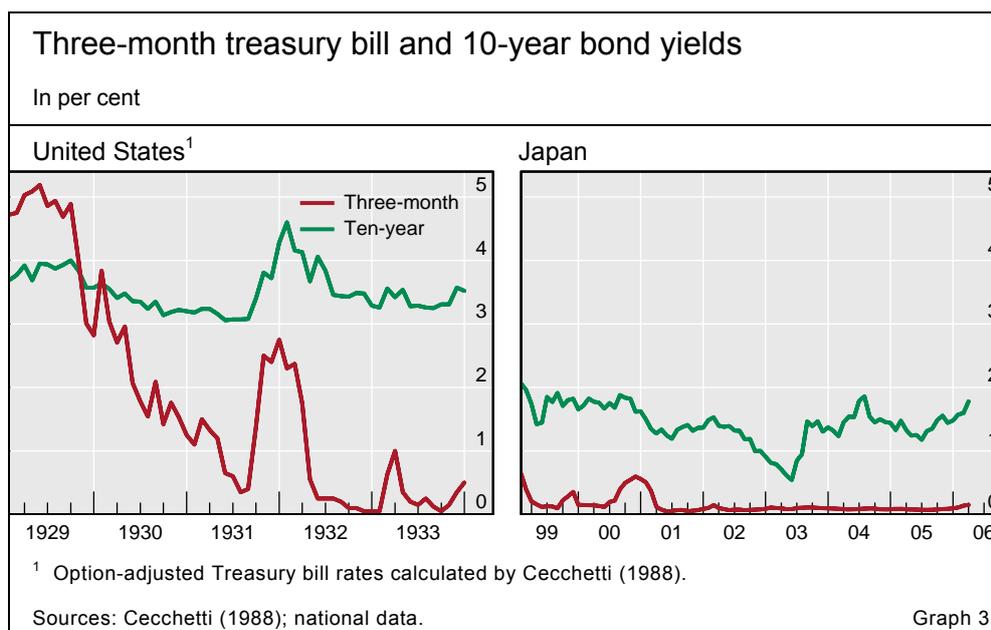
Should the Fed have bought Treasuries ...

Others say that the Treasury erred by not supplying bills in exchange for bonds in order to maintain bank assets and thus bank deposits (Culbertson (1957)). After the collapse of share and commodity prices, private borrowers paid down securities credit and non-real estate loans, and banks thereby lost the bulk of their liquid assets. Banks could have replaced these private advances with holdings of Treasury bills, introduced in 1929 (Garbade (2008)). Instead, the Treasury rolled over maturing World War I bonds with new bonds and left a vacuum on bank balance sheets. (In terms of Graph A in Box 1, this account corresponds to the bottom left-hand panel.)

... or should the Treasury have swapped bills for bonds?

These two arguments agree in their support for increased private sector holdings of highly liquid claims, either excess reserves at the central bank or Treasury bills. They disagree in that the US monetarists see bills and bonds as perfect substitutes, and as a result do not specify whether the Federal Reserve should have purchased (or did purchase) one or the other. To them, bank reserves ("high-powered money") differ from Treasuries, and, in sufficient amounts, eventually lead to credit and broad money growth. On the other side, bills and bonds are considered as different and held in different portfolios so

The choice might have had different quantity effects ...



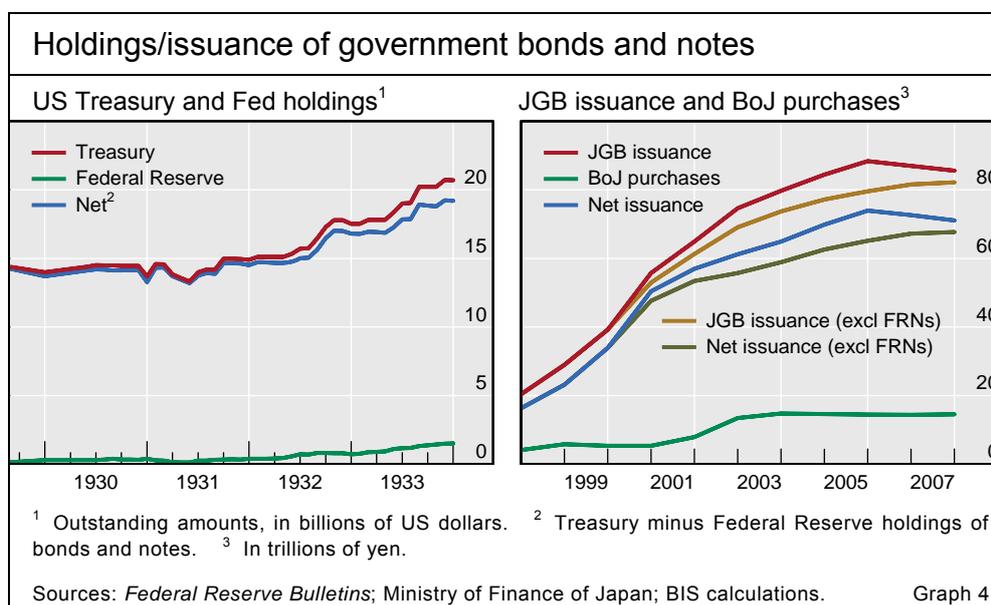
that a shift toward bills tends to boost broad money growth. In this view, when short-term interest rates are near zero, exchanging excess bank reserves for Treasury bills is seen as not helpful (as in the top right-hand panel of Graph A in Box 1).

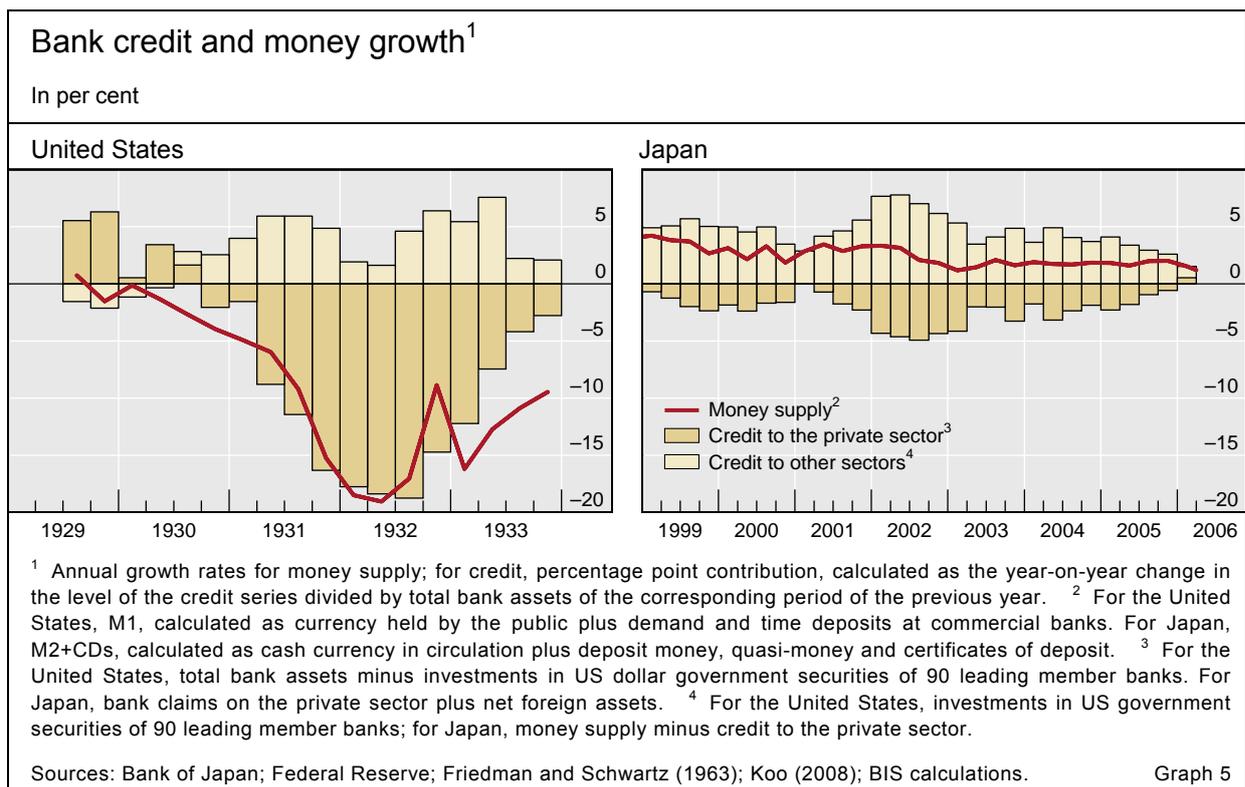
... price effects ...

In terms of price effects, at least some Federal Reserve officials at the time believed that their buying of Treasury bonds could raise the price and bring down their yields. For instance, in June 1930, Governor Harrison of the Federal Reserve Bank of New York argued to his fellow governors that purchases of Treasury bonds could “lower long-term rates, increase loans to foreigners and thus stimulate exports” (Meltzer (2002, p 307)).

... and fiscal effects

In terms of fiscal effects, if Treasury bills had been substituted for bonds (or the Federal Reserve had bought Treasury bonds in size), the immediate interest savings could have been substantial. It is remarkable how little long-





term Treasury yields responded to the decline in Treasury bill rates through the first half of 1931 (Graph 3). Even if Treasury bond yields had not fallen owing to a shift from bonds to bills, interest costs could have been lower.

In the event, Federal Reserve purchases of Treasury securities barely reduced the amounts of bonds held by private investors through 1932 (Graph 4, left-hand panel). In particular, the bond purchases of the summer of 1930 are hardly visible. The *Federal Reserve Bulletin* reports Treasury debt in millions of dollars, but the Federal Reserve balance sheet in thousands. And except in the summer of 1930, the Federal Reserve generally held more Treasury bills (and certificates) than bonds.

In the event, little effect of Fed bond purchases on private holdings

Broad money shrank as the decline in bank credit to private borrowers was not offset by increased holdings of Treasury securities. Even given the lack of an expansive fiscal policy that would have increased the supply of Treasury securities, the Treasury's choice to replace maturing bonds with new bonds failed to provide the banking system with safe and liquid assets. The result, hardly affected by Federal Reserve bond purchases, was that overall assets and bank deposits declined (Graph 5). Such was not the recent experience in Japan, where bank purchases of government securities kept broad money growing.

Japanese debt management since 2000 and BoJ JGB purchases

At the bottom of the Japanese recession in the early 2000s, there was discussion in some quarters on the possible contribution of debt management to macroeconomic stabilisation. For example, Kuroda (2002), then the Vice Minister of Finance for International Affairs of the Ministry of Finance (MoF),

expressed his view that the scope of debt management could possibly be “widened so as to pursue price stability more explicitly”. However, he recognised that this “might mean a compromise with the traditional objective of debt management”. The stated general purpose of the MoF’s debt management (2008) is to “maintain markets’ confidence in the capacity of the government to manage stable issuance of JGBs [Japanese government bonds] and Financing Bills and to repay its outstanding debt”. The report’s Japanese language version is more pointed: “lowering interest payment cost on JGBs is a serious policy goal”. Given this, it might have been difficult to refrain from issuing long at historically very low bond yields, albeit with a potential for tensions with monetary policy.

Debt management at zero short-term interest rate mooted ...

Some argued in the early 2000s that debt management might contribute to price stability by concentrating issuance at the short end, where yields would be held down by Bank of Japan (BoJ) policy. This would leave less issuance of JGBs at the long end and might allow longer-term bond yields to fall further. At its extreme, such an approach might have meant to “target” bond yields in an attempt to lower them and to stimulate the economy. The idea did not become policy probably because of doubts about the practicality of controlling bond yields by merely changing the composition of debt.

Even in the pursuit of the goal of interest cost minimisation, officials struggled to respond to the environment of near-zero short-term interest rates. This was the case especially after 1999, when the BoJ adopted the so-called zero interest rate policy (ZIRP). Some argued for much larger issuance of financing bills and short-term bonds, while others recognised the rollover and interest rate risks inherent in such a strategy. In the event, they adopted a middle of the road approach. In the MoF’s cost-at-risk analysis, an optimal debt issuance structure is determined by the trade-off between cost minimisation and interest rate risks, especially when short-term rates are unusually low (Ministry of Finance of Japan (2008)).

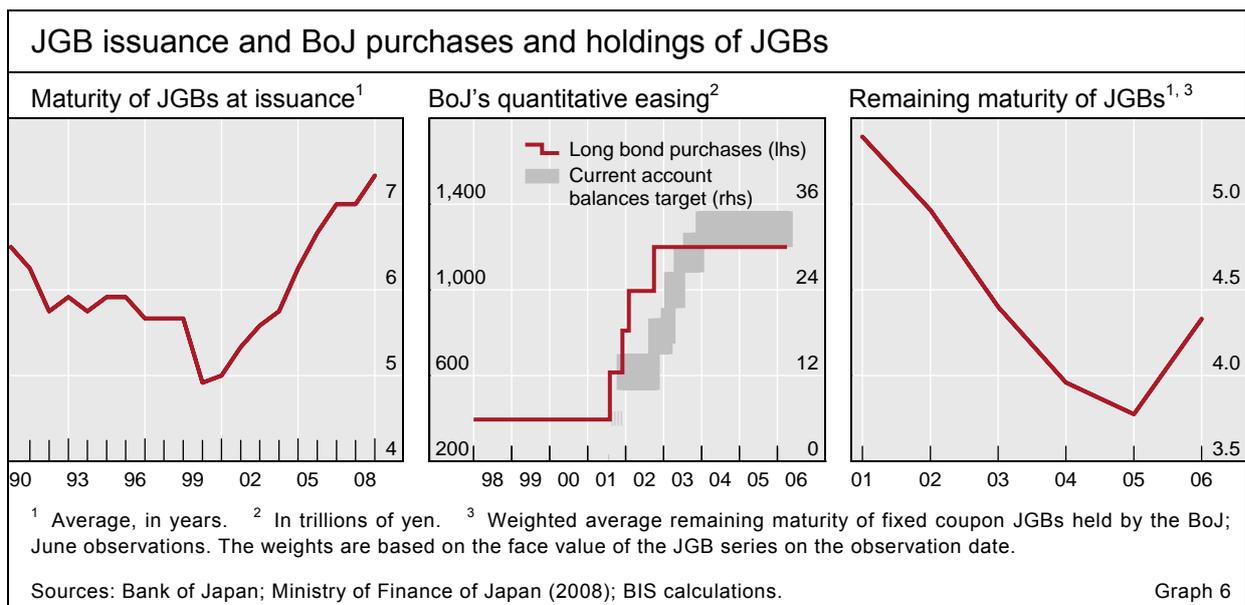
Thus, fiscal years 1999 and 2000 saw a shortening of the maturity of JGBs issued, perhaps in response to the ZIRP (Graph 6, left-hand panel). The next few years (2000–03) seem to have been a period in which the MoF, in an attempt to maintain stable issuance of JGBs in the face of ballooning budget deficits, introduced various new types of debt instruments: 15-year floating rate notes (2000), three-year discount bonds and five-year coupon bonds (2000), and JGBs for individuals and inflation-indexed bonds (2003). These innovations helped to limit the tension with monetary policy. In 2003–04, however, the economy and tax revenue subsequently rebounded and the MoF’s attention shifted to medium-term control of interest payments. Hence, the average maturity of issuance lengthened during this period.⁵

... but in the end JGBs issued at longer maturities

Bank of Japan buys government bonds

When long-term government bond yields began to rise sharply from the end of 1998, some politicians called for the BoJ to revert to the abandoned

⁵ The MoF has bought back large amounts of existing JGBs using funds from the special account of the Fiscal Investment and Loan Plan since 2002. It has carried out interest rate swap transactions since 2006, in common with many debt managers, which has certainly complicated the relationship between the maturity structure of debt and the yield curve.



practice of underwriting government bonds (Tomita (2002, p 5)). As a means to achieve the step-ups in current account balances that were at the centre of the its quantitative easing starting in 2001, the BoJ ramped up its monthly outright purchases of JGBs from 400 billion yen to 1.2 trillion yen in four steps over 14 months (Graph 6, centre panel). There was no reference to these purchases' affecting bond yields. In fact, the BoJ set a rule for buying JGBs, which starting in June 2001 included medium-term (two-, four-, five- and six-year) as well as 10-year JGBs, that resulted in its purchase of JGBs of fairly short remaining maturity.⁶ As a result, the remaining maturity of the BoJ portfolio declined from over five years in 2001 to under four years in 2005 (Graph 6, right-hand panel). Broadly, the rule permitted market participants to choose which bonds to discount in price in order to sell to the central bank. In particular, on the day of the bond buying, the BoJ would accept JGBs with the widest gap between the offered yield and the yield curve at the end of the previous day.

In limiting its purchases of government bonds, the BoJ set a maximum at the note issue, which was seen as giving rise to a permanent need to supply funds; up to this limit JGBs could be held to maturity. Outside observers suggested risk management alternatives. Congdon (2003) urged that the government exchange bills for bonds in the market instead of central bank purchases of government bonds, which run the risk of central bank losses from a rise in bond yields. If the central bank were to purchase government bonds, he proposed that the government offer an indemnity against any losses (see UK policy below). When proposals for the BoJ to buy JGBs in quantity were met with the objection that the resulting holdings would risk central bank losses, Bernanke (2003) proposed that the government replace the fixed-rate bonds held by the BoJ with floating rate debt. Implicitly or explicitly, both proposals pointed to debt management.

⁶ In addition to the change in policy to purchase medium-term bonds, the expectation of persistently low policy rates may also have led to bonds of relatively short remaining maturity being tendered to the BoJ.

Box 2: Operation Twist revisited

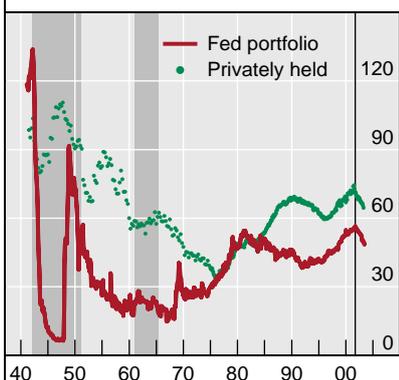
In the early 1960s, the US economy was thought to need elevated short-term rates to defend the US dollar and lower bond yields to encourage investment. The Federal Reserve engaged in Operation Twist, departing from the earlier bills-only policy to buy Treasury bonds and to sell Treasury bills.

This policy experiment is often thought to have been a failure. In fact, the experiment never happened. The Treasury's extension of maturities overwhelmed the Federal Reserve sale of bills and purchase of bonds (Graph A). "In the four years 1961–64, net purchases outside the 1-year area amounted to only \$6.9 billion, of which only \$2.3 billion represented over-5-year maturities. For every dollar of intermediate- and long-term bonds purchased by the System, the Treasury has sold many times that amount" (Beard (1965, p 59)). Moreover, the way that the Federal Reserve bought bonds minimised any impact on rates: "Typically, the Manager did not solicit offerings from dealers, but only purchased some of the intermediate- and long-term securities offered at the dealers' initiative" (ibid, p 60).

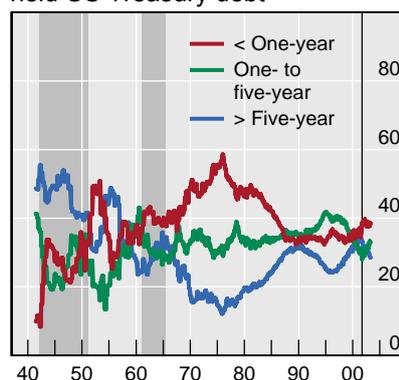
As described by Roosa (1963), the Treasury's strategy was to boost issuance of Treasury bills in which central banks then invested their US dollars. At the same time, advance refundings of coupon securities approaching maturity reduced outstanding debt in the "belly" of the curve, ie in the one- to five-year maturities. In current parlance, the Treasury was issuing in "barbell" fashion – at three months and beyond five years. It is not clear that studies that related a 10-year Treasury bond yield to a three-month bill rate took proper account of the Treasury strategy.

Residual maturity of US Treasury debt and Federal Reserve holdings of Treasuries¹

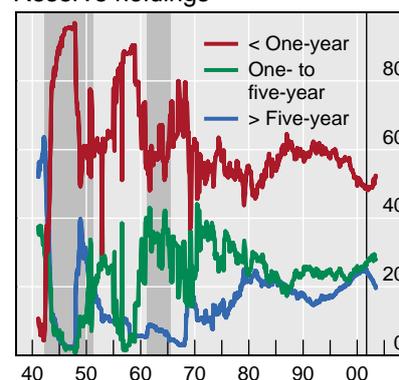
Average maturity, in months



Distribution by maturity of privately held US Treasury debt^{2,3}



Distribution by maturity of Federal Reserve holdings²



¹ The shaded areas indicate World War II and postwar interest rate caps (March 1942–February 1951) and the Operation Twist period (February 1961–June 1965). The vertical line indicates the cancellation of the 30-year bond (October 2001). ² In per cent. ³ Includes foreign central banks.

Source: Kuttner (2006).

Graph A

In the event, how did the step-up in BoJ purchases of Japanese government bonds affect JGB holdings by private parties? First, recall that the central bank stepped up JGB purchases against the backdrop of a *lengthening* of issuance in 2001 and 2002 by the debt managers (Graph 6). This recalls the experience with Operation Twist in the United States in the 1960s (Box 2).

Second, despite the step-up in central bank purchases, JGB issuance to be absorbed by investors other than the central bank continued to grow. When government issuance is juxtaposed with central bank buying, the net supply of JGBs no more than decelerated owing to the BoJ purchases (Graph 4, right-hand panel). The introduction of floating rate notes helped, but did not change the outcome qualitatively (Box 3). In retrospect, although attention focused on the central bank purchases of JGBs, issuance policy determined the outcome.

The growth of JGBs in the hands of other investors slows but does not halt

Box 3: Japanese 15-year floating rate notes

An important innovation in debt management took place in Japan in this century. Debt managers hesitate to shorten the duration of government debt because it can increase rollover risk. This risk is usually neglected for top-rated sovereigns, but prudent debt managers cannot be indifferent to large financing requirements. Fitch (2009) recently warned that “sizeable and sustained increases in governments’ reliance on short-term funding would entail additional risks”, recalling the downgrade of Belgium in the 1990s when financing requirements hit a third of GDP.

The Ministry of Finance (MoF) limited such rollover risks by introducing a 15-year bond (the CMT) in 2000. Its coupon, payable every half year, is set equal to half the average 10-year JGB auction yield over the prior six months less an issue-specific number of basis points (alpha). This ranged from 81 basis points in the first auction, to a peak of over 100 basis points in 2005, to 40–50 basis points in 2007. The floating rate notes reduced the supply of fixed-rate debt significantly (Graph 4, right-hand panel). Nevertheless, like the central bank purchases, issuance of floating rate notes only slowed the growth of issuance of fixed-rate debt.

Since mid-2007, market pricing of these floating rate bonds has fallen below their “theoretical” values, by as much as 10% in late 2008, and the MoF cancelled issuance for the balance of the 2008–09 fiscal year. It is said that these bonds had come to be heavily held by hedge funds speculating on a convergence between the market price and the higher theoretical price (Bank of Japan (2008, pp 58–9; 2009, p 45)). The widening of the gap between the market and theoretical price is thought to reflect the recent shrinkage and deleveraging of hedge fund positions.

Views on these purchases’ effect on bond yields vary. Baba et al (2005) and Oda and Ueda (2007) find that BoJ purchases had little effect on long-term yields. It is hard to distinguish the partial effect of central bank bond purchases from the powerful effect of the central bank’s commitment essentially to keep the overnight rate at zero until the return of inflation (the so-called policy duration effect). Bernanke et al (2004, pp 70–1) find that a few surprises (measured, inter alia, by a market participant’s forecasts of BoJ bond-buying announcements) had a small but significant effect on JGB yields. Some JGB market participants put weight on the scale of purchases.

Effect on yields debated ...

Notwithstanding their reliance on JGBs, debt managers’ issuance of medium-term bonds sufficed to allow banks to maintain their assets in the face of debt repayment by businesses (Graph 5, right-hand panel). As a result, M2 plus certificates of deposit continued to grow even as the private sector continued to deleverage by paying down bank debt (Shirakawa (2001)). Moreover, because the BoJ commitment to keeping short-term interest rates near zero held down medium- to long-term interest rates, the opportunity cost of not selling more short-term or floating rate debt was limited (Graph 3, right-hand panel). On both counts, the recent experience in Japan compares favourably to that of the United States in the early 1930s.

... but enough medium-term JGB issuance for banks to grow their assets and deposits

Still, debt management in Japan may have missed opportunities in recent years in leaving much duration to be absorbed by the private sector. The debate over the role that the Bank of Japan could in effect play in debt management may have crowded out a broader debate over the course of debt management more generally.

Recent debt management and monetary policy

Central banks make similar announcements ...

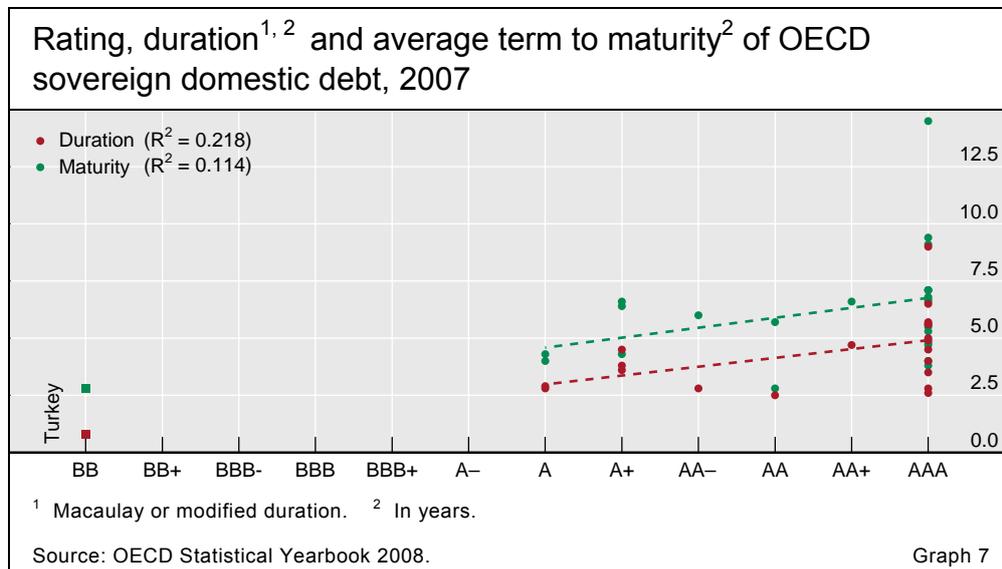
In March 2009, the UK, Japanese and US central banks all announced or enlarged programmes to buy government debt. The context for these policies, and the policies themselves, showed some similarities and differences.

In all three cases, huge fiscal deficits and purchases of financial assets require financing. What maturity should the debt have? Apart from a debate in the United Kingdom (eg Booth et al (2008)), discussion of the contribution that debt management might make with interest rates very near zero has been notable by its absence. Instead, the three debt managers seem intent on relying on longer-duration debt, as well rated sovereigns tend to do (Graph 7). To be sure, the US Treasury shortened its debt when it sold bills in late 2008 to help the Federal Reserve sterilise the dollar funding extended to other central banks. However, following legislation allowing the Federal Reserve to pay interest on bank reserves, the US Treasury is stepping up long bond issuance.

... with different goals and relationships to debt management

Despite the similar timing of the policy changes in March, the goals of the central bank purchases of government bonds and their relationship to debt management show some differences (Table 1). The Bank of England's objectives include both quantity (faster money growth) and price (a lower bond yield) (Dale (2009)). Indeed, the quantitative goal guided the choice of £75 billion in initial gilt purchases, which amounts to 5% of broad money (UK House of Commons (2009)). The Bank of Japan's objective is to take the burden off of short-term operations. The Federal Reserve's goal in buying Treasury bonds is "to help improve conditions in private credit markets" (Board of Governors (2009)).

The central bank bond purchases also interacted with debt management in different ways. The Bank of England acted before the Debt Management Office announced its provisional plan of gilt sales for the new fiscal year. The Governor asked for and obtained a promise from the Chancellor that the Office would not alter its plan in the light of central bank decisions on the size, scope and timing of gilt purchases (Bank of England (2009), UK Chancellor of the Exchequer (2009a)). In Japan, the government's large supplementary budget



Overview of three central bank policies to buy government bonds, 2009			
	Bank of England	Bank of Japan	Federal Reserve
Date	5 March, 7 May	18 March	18 March
Action	Initial purchase of £75 billion of gilts and corporates over three months, to £125 billion in May, £52 billion purchased by 6 May.	Monthly purchases of JGBs raised from ¥1.4 to ¥1.8 trillion	Purchase of \$300 billion in Treasury bonds over six months, \$92 billion bought as of 6 May
Relevant debt stock/flow	£300 billion outstanding in five- to 25-year bonds as of 6 May; issuance of seven- to 15-year gilts in April 2009–March 2010, £70 billion	¥679 trillion at end-2007	\$4.4 trillion Treasury notes and bonds outstanding on 30 April; borrowing for current fiscal year estimated at \$1.3 trillion
Rationale	Boost nominal demand by increasing broad money (bank deposits), lowering gilt yields and improving corporate credit markets	Take burden off of short-term operations	Improve the terms of private credit
Market reaction	40–60 basis points on gilt yield and 30 basis points on corporate bond yield (Dale (2009))	2–3 basis points	40 basis point immediate reaction
Risk management	Exchange of letters between Chancellor and Governor; indemnity for any Bank of England losses	JGB holdings by BoJ limited to note issue; JGBs to be purchased in specific brackets of residual maturity to control the maturity of BoJ's portfolio	No reference in Board of Governors (2009b)
Sources: UK Debt Management Office (2009); US Treasury (2009); Bank of England; Bank of Japan; Federal Reserve. Table 1			

for 2009 implies an issuance of about 17 trillion yen of JGBs in addition to the amount already planned in the initial budget. This is expected to shift the focus of debt management policy back towards the goal of stable issuance of JGBs. The Bank of Japan has not referred to any interaction with the government's debt plan in its own announcements. Similarly, the Federal Reserve, acting after the first Treasury refunding announcement in the first days of the new administration, made no reference to the government's funding plan.

Conclusions and prospects

Government debt management may have a role to play amid private deleveraging and very low policy rates. Some observers emphasise the potential to lower bond yields by swapping treasury bills for bonds in private hands, reinforcing the effect on bond yields of the prospect of sustained low policy rates. Monetarists emphasise that ample issuance of short- and medium-term government debt (including state-guaranteed bank debt) would allow banks to maintain deposit growth even as households and firms pay down their debt. Widespread deleveraging of financial firms' balance sheets may strengthen either argument. Despite the expansion of some central bank balance sheets, treasuries continue to enjoy more scope to alter the weight of bills and bonds held by private investors. For now, treasuries can issue long-term debt with interest rates tied to short-term bill rates in the confidence that monetary policy will keep bill yields low. In doing so, treasuries stand to benefit from interest cost savings as long as short-term rates remain low. When

economic activity quickens and interest rates rise again, they stand to benefit from higher taxes in compensation for higher debt servicing costs.

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The global crisis and Latin America: financial impact and policy responses ¹

The financial impact of the global crisis on Latin America has in some respects been less severe than in previous crises. This reflects in part the development of domestic bond markets and improved net balance sheet positions of the economies, which for a period have allowed gross capital inflow reversals to be partially offset by reductions in gross capital outflows. In addition, policy responses have helped to ease both external and domestic financial conditions. Nevertheless, considerable risks remain due to the ongoing economic downturn.

JEL classification: E44, E50, E66, F21, F34, F40, G15, O16.

The financial effects on Latin America of the global crisis which began in summer 2007 were initially limited but intensified after the bankruptcy of Lehman Brothers in mid-September 2008. Global deleveraging in the international banking system and diminished investor risk appetite resulted in falling demand for emerging market assets and a sharp depreciation in the currencies of emerging market economies (EMEs). Gross capital inflows reversed and financing conditions tightened, reducing liquidity in foreign exchange and domestic money markets, and raising bond yields in both international and local currencies.

Episodes of financial stress are not unknown in Latin America.² However, some features distinguish the current episode from the crises of the late 1990s (eg the Asian crisis) or the Argentine and Brazilian episodes in the early 2000s. First, the shock originated in the financial sector of advanced economies rather than in Latin America or another emerging market region. Second, the significant reduction of Latin American *public* external debt gave governments more leeway to play a stabilising role for *private* markets, where external debt had remained high. Finally, new kinds of vulnerabilities have surfaced, mainly

¹ The views expressed in this article are those of the authors and do not necessarily reflect those of the BIS. We thank Claudio Borio, Már Gudmundsson, Patrick McGuire, Frank Packer and Agustín Villar for useful comments and Sergio Vargas for excellent research assistance.

² The analysis that follows focuses mostly on Brazil, Chile, Colombia, Mexico and Peru. There is some discussion of Argentina and Venezuela, but certain characteristics make their financial systems less comparable with the other five countries.

associated with financial innovation and integration rather than with macroeconomic imbalances or banking sector weaknesses.

Policy responses have also differed this time around, as they sought to smooth the flow of both external and domestic financing. Central banks took steps to provide liquidity in foreign exchange and domestic money markets and facilitate the extension of credit. To supplement their foreign reserves, Brazil and Mexico agreed to open a currency swap line with the US Federal Reserve. More recently, Colombia and Mexico have sought access to the IMF's newly established Flexible Credit Line (FCL). Finally, central banks have been able to adopt a countercyclical monetary policy stance, thanks to flexible exchange rate regimes, a limited exchange rate pass-through to inflation and the greater credibility built up by policymakers.

The rest of the article is structured as follows. In the next section we analyse the impact of global financial shocks on Latin American financial markets, comparing the current crisis with previous shocks and paying particular attention to capital flows, international bank and securities financing, exchange rate adjustment and the cost of foreign and domestic currency financing.³ In the subsequent section, we focus on the policy responses, examining in particular the provision of foreign currency liquidity as well as measures taken to stabilise domestic money and capital markets. The conclusion summarises the key policy lessons to be drawn.

The financial impact of the crisis in Latin America

External financing dries up

Up to the onset of the financial turmoil in August 2007, Latin America had experienced an unusually benign external environment. A combination of net capital inflows and current account surpluses had contributed to significant foreign reserve accumulation (Graph 1, left-hand panel). Gross inflows and outflows were at record highs, with foreign direct investment (FDI) as the main source of external financing (BIS (2009), Jara and Tovar (2008)).

A benign external environment at the onset of the crisis ...

However, gross capital inflows to Latin America began to contract significantly in the third quarter of 2008. Over the year as a whole, gross portfolio inflows declined by \$76 billion (Graph 1, centre panel).⁴ FDI was more stable, but is expected to fall in 2009. Current account surpluses have also declined or turned to moderate deficits. Several factors have contributed to the abrupt reversal in gross capital inflows: the increase in international risk aversion, efforts by financial institutions in developed countries to boost liquidity or shore up their balance sheets, high currency volatility, the terms-off-

... followed by a reversal in gross capital inflows

³ For a related discussion, see Caruana (2009). For an overview of the impact of the crisis on the real sector in Latin America, see IADB (2009) and IMF (2009b).

⁴ Other gross inflows (mainly banking flows) also decreased sharply, especially in Brazil, where they fell by more than \$18 billion. As discussed below, however, special factors accounted for much of the decline in Brazil.

Box 1: Derivatives-related exposures in the corporate sector: the case of Mexico and Brazil

In Latin America, on-balance sheet foreign currency mismatches have decreased substantially since the implementation of flexible exchange rate regimes during the 1990s (IMF (2008)). However, the low currency volatility and the nominal appreciation trend observed in several countries before August 2008 led some corporations to increase their off-balance sheet foreign exchange exposure through derivative positions. As a consequence, a number of companies in Brazil and Mexico started betting against the depreciation of their currencies by selling foreign exchange options in the offshore market. These contracts allow corporates to sell US dollars at a favourable rate when the exchange rate rises above a “knock-out” price (ie the domestic currency appreciates), but force them to sell dollars at an unfavourable rate if the exchange rate falls below a “knock-in” price (the domestic currency depreciates), offering financing and currency trades at favourable rates, but with the drawback of having to deliver dollars at a loss if the domestic currency depreciates past a certain threshold.

The sharp currency depreciation observed in Latin America after mid-September 2008 resulted in large losses for some of the top companies in Brazil and Mexico when the exchange rate triggered the “knock-in” provision, forcing them to sell double the amount of US currency at the higher price.^① In Mexico, derivatives losses reached \$4 billion in the fourth quarter of 2008, while in Brazil, where official figures have not been released yet, losses are expected to be as high as \$25 billion. A major food retailer (Comercial Mexicana), which sought bankruptcy protection on 9 October 2008, lost up to \$1.1 billion on non-deliverable forward (NDF) contracts it had made with international banks.^②

The complexity of such deals and the fact that they were done privately highlights the lack of transparency in these markets, as many of these companies did not disclose any information on their derivative positions.^③ One result was a review of derivatives exposures across the region as policymakers realised that these exposures could pose systemic risk. Looking forward, policymakers will need to balance financial stability against market development in considering possible regulation of corporate derivatives risk.^{④, ⑤}

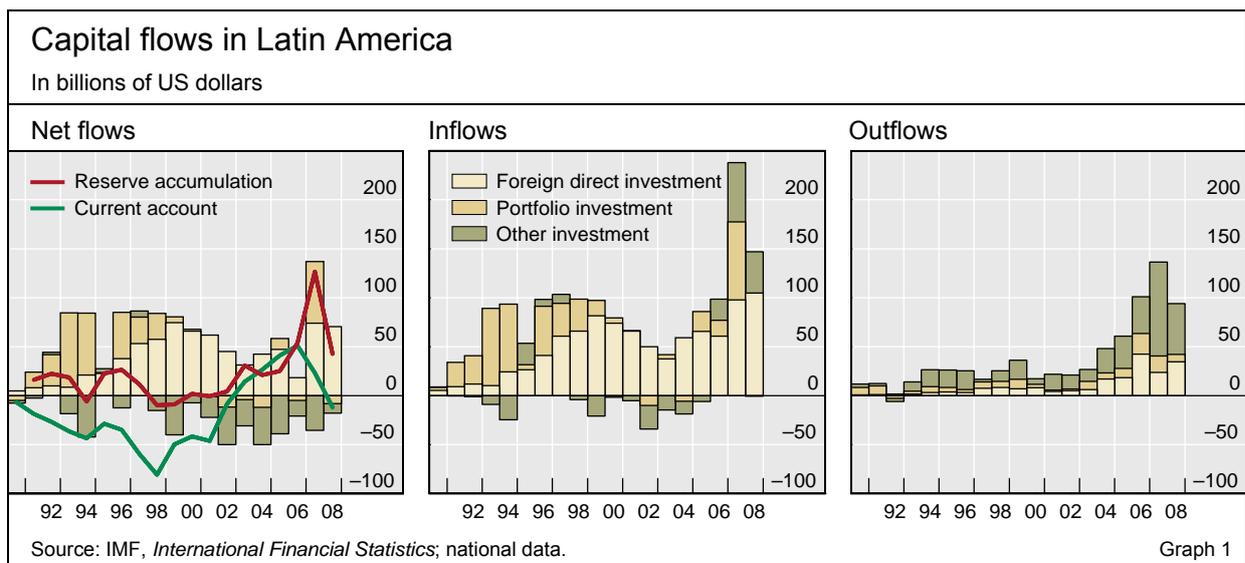
① One month after the Lehman Brothers default, in Mexico and Brazil the currency depreciated by more than 30%. ② Gruma SA, the world's largest maker of corn flour, and Alfa SAB, the world's largest maker of aluminium engine heads and blocks, also suffered from considerable mark to market losses on derivative instruments during this period. On 10 October glass maker Vitro SAB announced that a large part of its \$227 million of derivatives losses had come from natural gas forwards. ③ Comercial Mexicana was rated AAA on a local scale when it first filed for bankruptcy. ④ In Colombia, for example, the central bank established in May 2007 a maximum leverage position on forwards over the financial entities' net worth, a measure that was widely criticised but later proved to reduce the impact of the crisis. ⑤ In some cases corporate derivatives have contributed to reducing financial vulnerabilities, as shown by the use of oil price hedge and currency swaps by the Mexican state-owned petroleum company (Pemex), which helped it to stabilise its 2009 budget.

trade collapse and the derivatives exposure of some large corporations in Brazil and Mexico (see Box 1).

One difference in the current situation is that in this decade the region has accumulated large gross (non-reserve) assets invested abroad (\$180 billion by end-2007); such assets were almost non-existent in previous crises (Graph 1, right-hand panel).⁵ The partial repatriation of those assets during 2008 helped stabilise the external financial position of the region during the current crisis. In 2008, gross outflows decreased by almost \$42 billion and net flows amounted to \$53 billion (Graph 1, left-hand and right-hand panels).⁶

⁵ See Jara and Tovar (2008) for a detailed discussion.

⁶ This largely reflected the repatriation of banking flows into the region. Portfolio decisions of institutional investors may also have played a role. However, some data suggest that repatriation might not have continued in some countries in 2009.



Cross-border bank financing and bond issuance

Cross-border bank financing fell after mid-September 2008 as international banks reduced new credit and refused to roll over existing loans. This was reflected in a sharp decline of signings of syndicated loans and cross-border financing in the region (Graph 2, left-hand and centre panels). Cross-border claims on Latin America declined by \$46 billion in the fourth quarter, compared to \$56 billion for emerging Europe and \$160 billion for Asia and the Pacific. In percentage terms, cross-border bank claims on Latin America dropped by 40% on an annualised basis during the fourth quarter, comparable to contractions experienced during previous crises in the region.

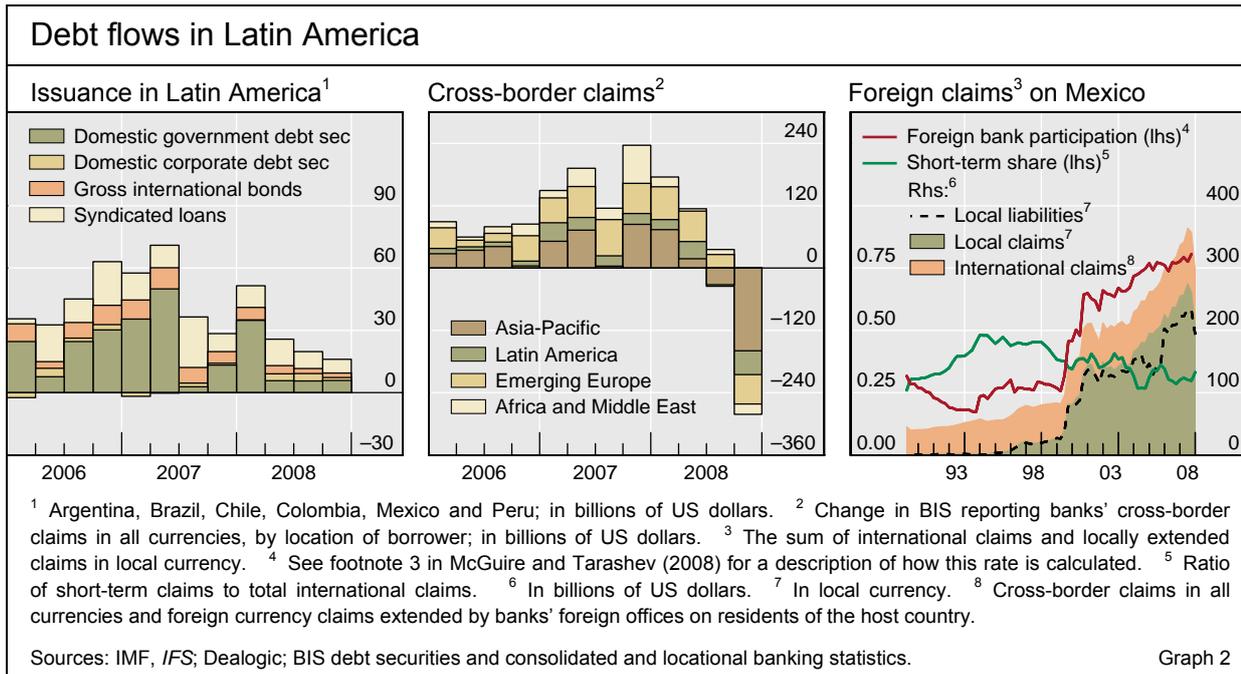
Lower cross-border bank lending ...

A noteworthy development is that a large proportion of foreign banks' operations are now local rather than international. For example, in Mexico there is a large foreign bank presence and most foreign bank credit takes the form of local claims (Graph 2, right-hand panel). By contrast, earlier in this decade Latin America had a relatively large share of international claims. Locally booked claims in the region tend to be funded locally (ie in the borrowing country), and could therefore be more stable than (external) cross-border financing (Moreno and von Kleist (2007), Jara and Tovar (2008), McGuire and Tarashev (2008)).⁷ Indeed, recent experience suggests that the shift may have stabilised financing in the region: as noted in the Highlights section in this issue, exchange rate adjusted local claims in local currency have remained relatively stable in many EMEs, including Chile and Mexico, even as international claims have declined sharply.

As for international bond financing, issuance plummeted (Graph 2, left-hand panel), particularly for borrowers in the corporate sector, which have the

... and a plunge in international bond financing

⁷ Peek and Rosengren (2000) document great volatility of cross-border flows in the Latin American case before 2000.



greatest external refinancing needs.⁸ However, in some countries, such as Chile and Colombia, there was some continued issuance of local bonds. This is consistent with the view that local capital markets may have to some extent acted as a “spare tyre” during the crisis, reducing vulnerabilities to declines in international bond finance (see Box 2 for further discussion).

Currency depreciation

Sharp currency depreciations ...

The significant reversal in capital flows, the collapse in commodity prices and the deterioration of confidence following the Lehman Brothers bankruptcy triggered sharp currency depreciations and higher costs of external financing across the region (Graph 3, left-hand panel). Currency dynamics in Brazil and Mexico were particularly volatile, fuelled by the increased demand for dollars as some large corporations sought to close unhedged foreign currency positions, often incurring large losses as they did so (see Box 1). Depreciation was not quite as steep in countries such as Chile, where firms were not exposed to such losses, or Colombia, where firms were constrained by law in the risks they could take in the foreign exchange derivatives market.

The size of the exchange rate adjustment was very large. However, four features may have dampened any disruptive effects: (i) the widespread use of flexible exchange rate regimes², which reduced incentives for speculative attacks; (ii) the limited exchange rate pass-through to inflation; (iii) lower currency mismatches, as well as the lower levels of dollarisation across the region; and (iv) the greater credibility of central banks, which may also have contributed to curbing destabilising speculation and limiting the exchange rate

⁸ External refinancing needs for the corporate sector in Latin America are estimated at 8% of GDP. This compares favourably with Asia (9%) and emerging Europe (23%). See IMF (2009a).

Box 2: Performance of domestic bond markets during the current crisis

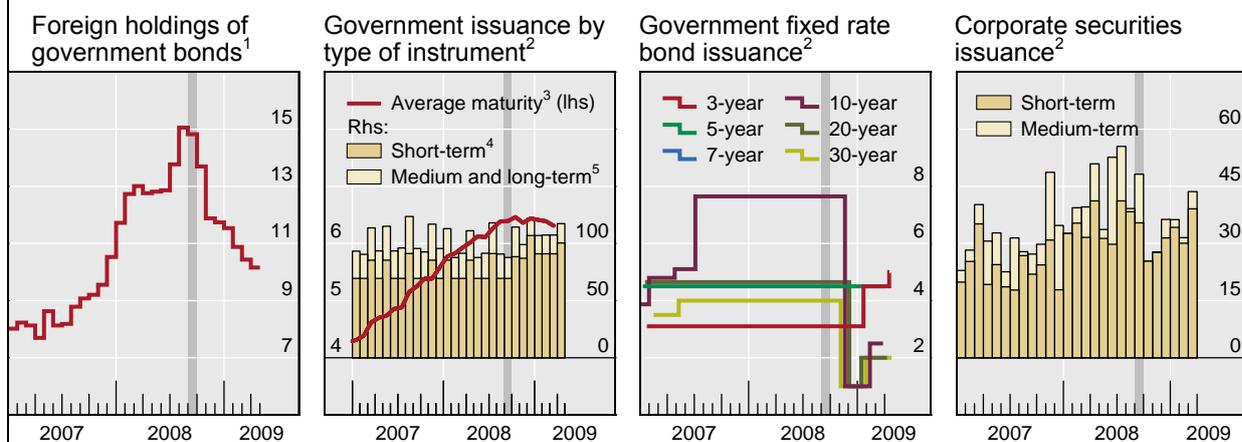
It has been argued that domestic bond markets could provide a “spare tyre” to offset the withdrawal of external financing during periods of financial stress. However, the performance of these markets during the current crisis has been mixed. On the one hand, domestic government bond markets have provided a financing alternative and have exhibited as much resilience as international bond markets. On the other hand, foreign investors have tended to reduce their bond holdings and there has been a shift towards shorter-maturity instruments.^①

Financing alternative for governments. Although domestic bond issuance in most of the region fell during autumn 2008, it later resumed at lower levels. Most governments have been able to roll over short-term debt, swap maturing for longer-maturity debt, or sell new debt.

Resilience of domestic government bond markets. While domestic bond returns became more volatile during the episode of stress that followed the Lehman episode, their volatility was lower than that for international bonds, and is now at levels comparable to those before the episode. To be sure, recent policy efforts to supply liquidity and to stabilise domestic bond markets may have played a role in the decline in volatility. Such performance suggests that, from the point of view of a Latin American resident whose revenues and expenditures are to a large extent in local currency (eg a government), there are advantages to relying on domestic markets for financing.^②

Lower foreign investor holdings. This is illustrated by the experience of Mexico, which has one of the most developed and open domestic bond markets in Latin America. The share of foreign holdings of government bonds declined abruptly after the Lehman bankruptcy. The market was disrupted, and there was a sharp increase in bond yields, particularly at longer maturities (Graph A, first panel). To satisfy the demand for short-term instruments and counter the rapidly falling demand for long-term bonds, the Mexican Treasury reduced long-term bond issuance during the fourth quarter of 2008 (both for fixed rate and inflation-indexed instruments) and increased the issuance of shorter-term instruments (Graph A, second and third panels).

Features of domestic government and corporate debt securities in Mexico



The shaded area indicates the month of September 2008.

¹ As a percentage of total government bonds outstanding. ² In billions of pesos. ³ Of outstanding government securities, in years. ⁴ Cetes. ⁵ Bondes-D (variable rate), UDI bonds (inflation-linked) and fixed rate bonds.

Source: Bank of Mexico.

Graph A

Shift towards shorter maturity instruments. In Mexico, private domestic issuance (financial and non-financial) was disrupted. No medium-term bond issues were made during October and November (Graph A, fourth panel). The issuance of short-term securities also declined, but remained at levels comparable to those seen during 2007. Across the region there have been some exceptions in which highly rated corporates placed new debt at relatively long maturities. For instance, this is the case of private banks in Colombia (eg Bancolombia and Davivienda).

Overall, the performance of local currency bond markets as an alternative to international bond financing during this crisis has been mixed. This may reflect a less advanced stage of development

and the severity of the global shock. An important issue for policy is that local currency funding for the government appears to have been more stable than funding for corporations.

^① Over the past decade bond markets in the region have deepened, becoming the main source of debt financing. In 2008, outstanding domestic debt securities reached an average of 37% of GDP, compared to 9.6% for international debt securities. For an overview of the development of these markets, see Tovar and Quispe-Agnoli (2008), Jeanneau and Tovar (2006, 2008), BIS (2007) and Scatigna and Tovar (2007). ^② The comparison may not be entirely fair because efforts to supply liquidity and to stabilise domestic bond markets may have helped reduce volatility in domestic bond markets.

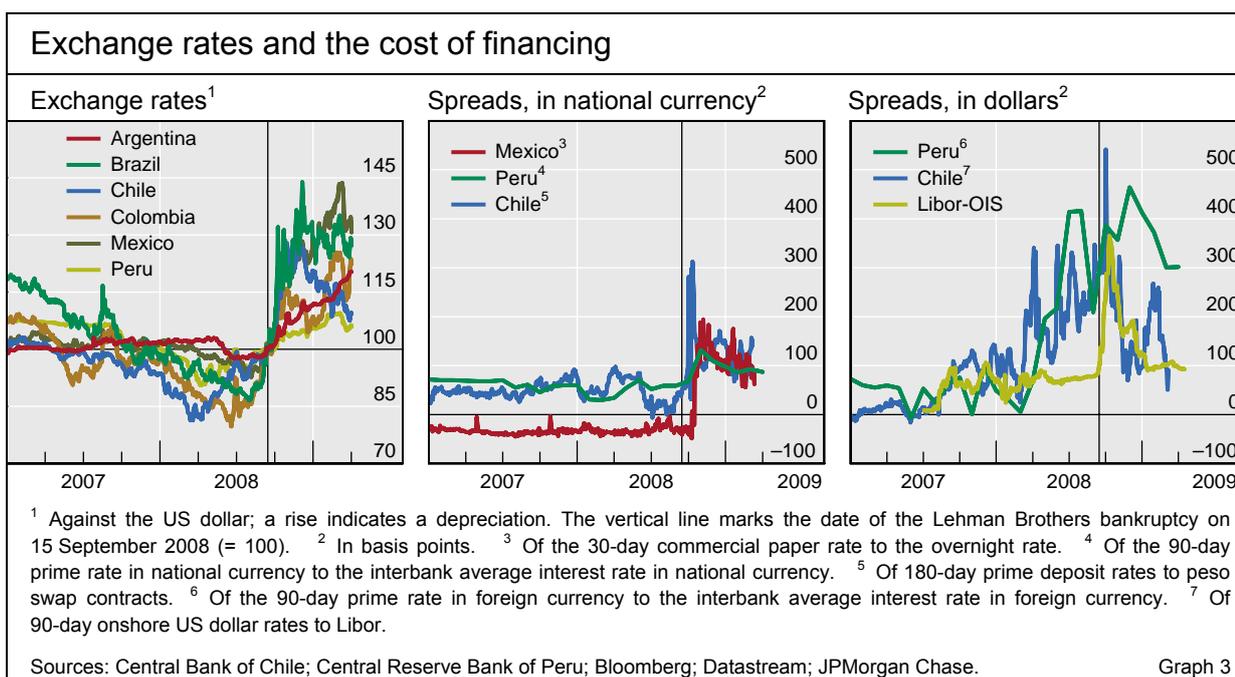
pass-through to inflation. These factors facilitated the policy responses discussed below.

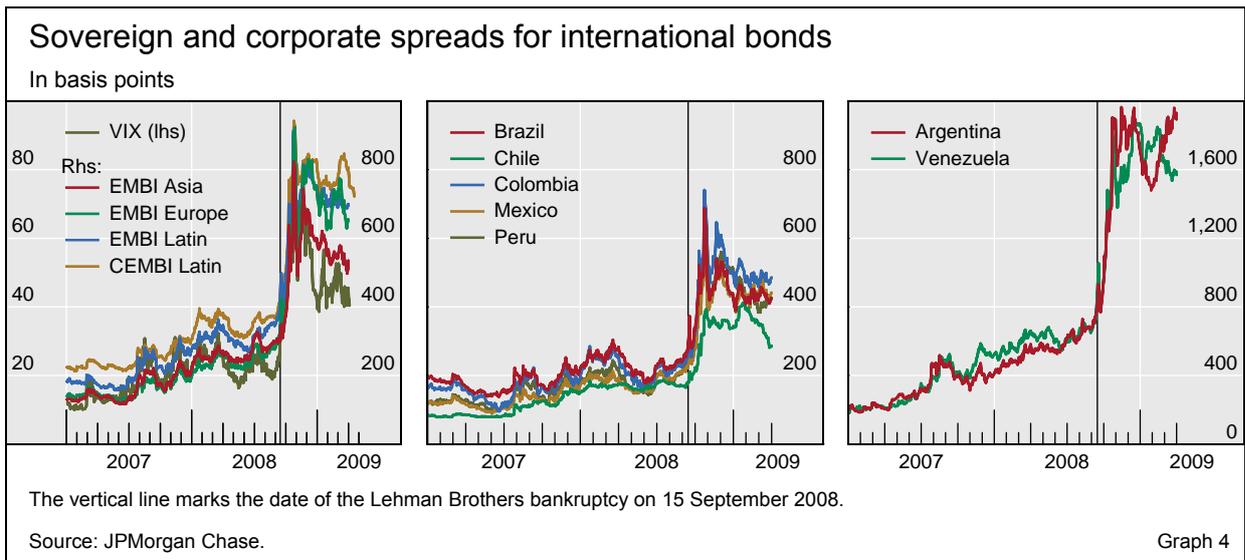
Higher costs of foreign currency financing

... and tighter financing conditions

The increase in the cost of external financing – usually denominated in US dollars – took several forms. For example, in Peru, the 90-day prime rate in foreign currency rose relative to the interbank average interest rate in foreign currency (Graph 3, right-hand panel). In Chile, the spread between the US dollar rates implied by the foreign exchange swap market rose sharply, reaching over 500 basis points above Libor. This reflected disruptions in the FX swap markets. Furthermore, dollar-denominated liquidity lines that small banks used to onlend to exporter clients dried up or became too expensive.

Spreads on Latin American sovereign external debt widened to a peak of 914 basis points after the Lehman bankruptcy, an increase of 135%, and have remained at decade-high levels since (Graph 4). The widening in spreads was highly synchronised across emerging markets and appeared to be correlated with fluctuations in the VIX index, a widely used proxy for risk aversion. However, country-specific factors also played a role. Spreads widened the most in Argentina and Venezuela, two economies which followed heterodox economic policies during the boom years (Graph 4, right-hand panel).



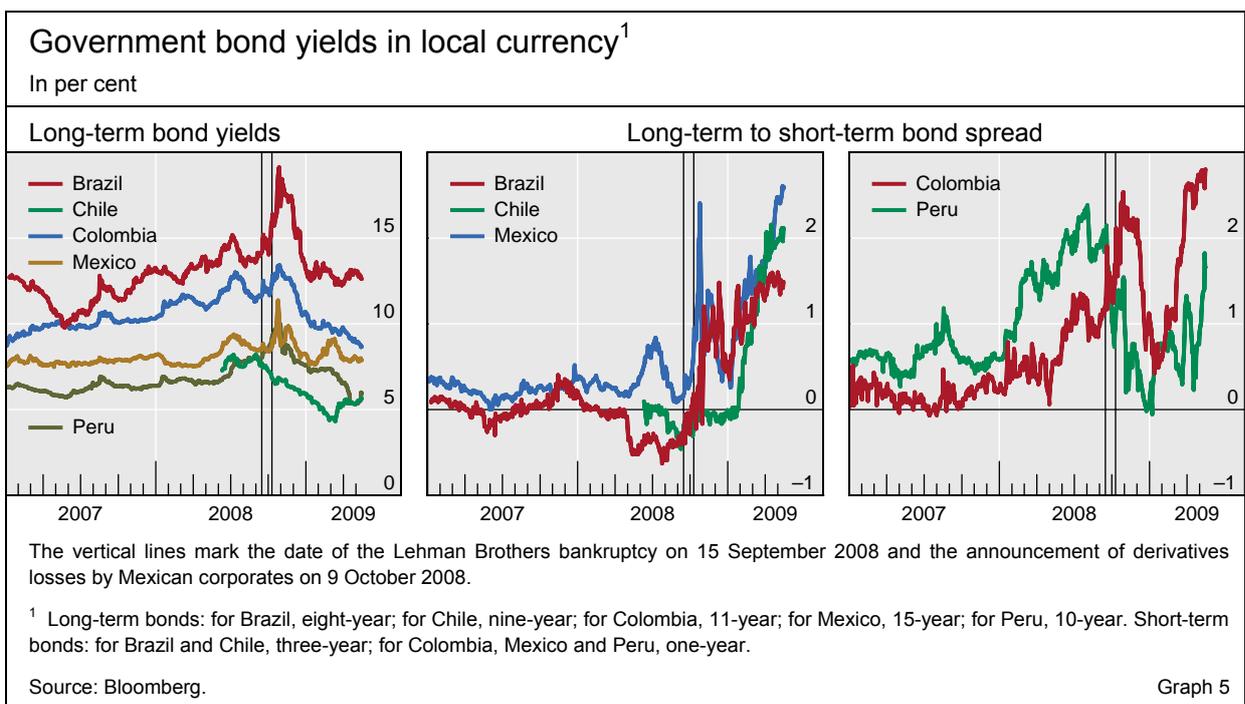


Furthermore, as might be expected, countries with lower sovereign ratings experienced larger increases in spreads.

Tightening in domestic funding markets

Domestic funding markets were greatly affected by the crisis as well. In Argentina, the three month interbank-overnight spread widened. In Mexico, there were sharp increases in commercial paper rates, reflecting a drying-up of financing in that market segment. In Chile, local peso money markets were subject to significant pressure, as seen in the widening spread between prime deposit rates and the implicit interbank term rate in swap contracts (Graph 3, centre panel).⁹ In Brazil, domestic interest rates for small and medium-sized

Domestic financing costs increase



⁹ See García (2009) for a detailed account of this episode.

banks increased as local asset managers moved their deposits to larger banks in search of higher-quality deposits. More recently, funding markets have remained strained, notwithstanding some reductions in rates at short maturities.

Longer-term government bond yields also increased for all maturities (Chile being the main exception). In Brazil, Colombia and Mexico yields rose sharply, particularly at the long end of the curve, reflecting the fact that investors felt more secure in shorter-dated securities. However, bond yields then fell across the region starting in late 2008, largely in response to expectations of monetary easing, which were driving the short end of the curve. Thus, domestic market interest rates are currently well below the levels they reached ahead of the Lehman failure (Graph 5, left-hand panel). In spite of these declines, the spreads between long-term and short-term bond yields have risen (Graph 5, centre and right-hand panels).

Policy responses and issues

Policymakers
 provided liquidity ...

As they entered the current crisis, many Latin American sovereigns had reduced or stabilised their external debt, but private external borrowing had either increased or remained high. Central banks thus sought to provide foreign currency liquidity to the private sector, to ensure both the continued operation of foreign exchange markets and the continued availability of external financing, including trade finance. Central banks also intervened to counteract tighter financial conditions in domestic funding and credit markets.

Foreign currency liquidity and external financing

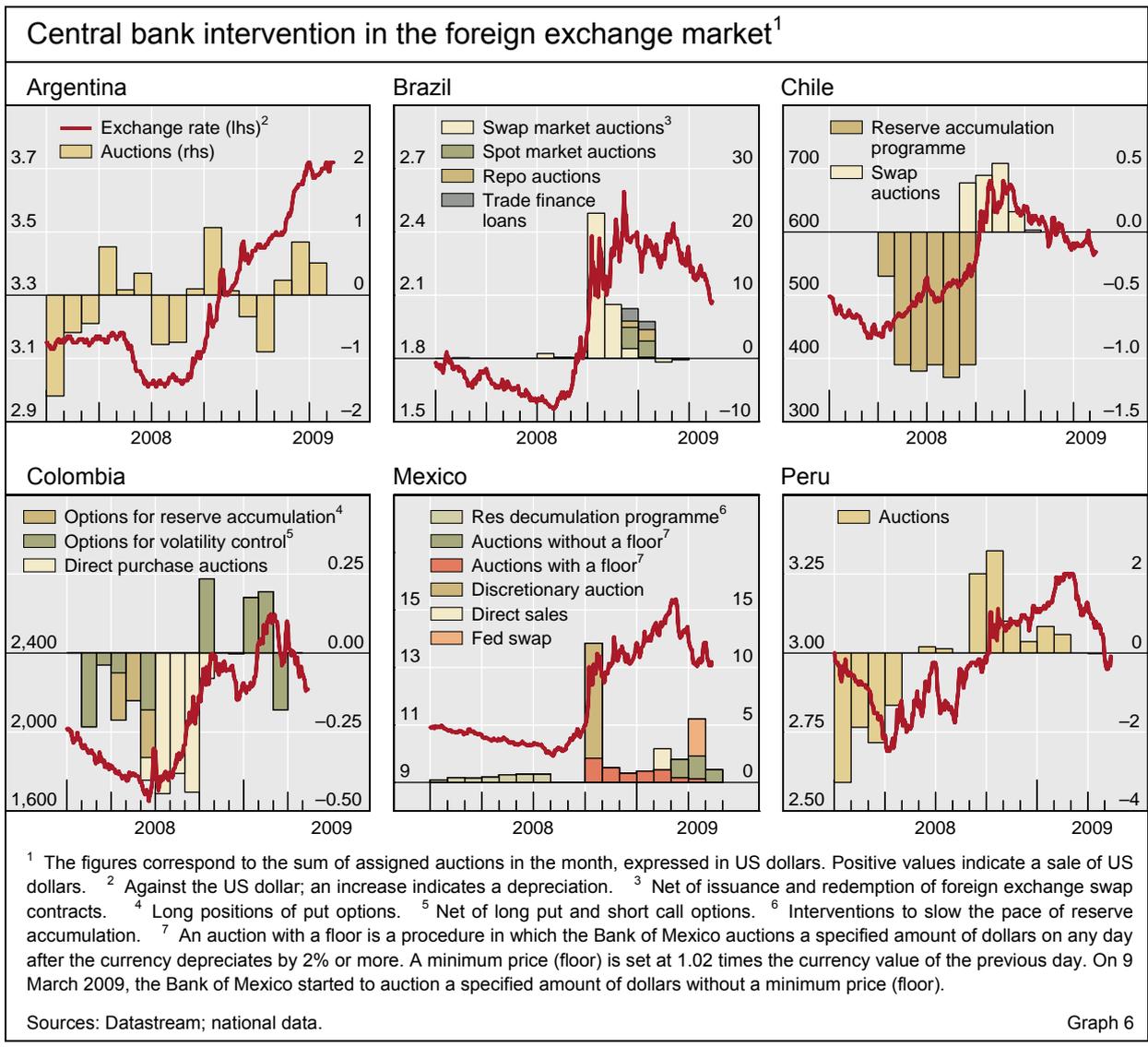
... using a variety of
 instruments

Most central banks in the region supplied foreign currency liquidity through intervention or operations in the foreign exchange market, including foreign exchange spot, repo and swap transactions. In some cases, reserve requirements on foreign currency deposits were lowered.¹⁰ The Central Bank of Brazil set up facilities to provide trade finance and also to help companies roll over their foreign debt.¹¹

Foreign exchange market intervention has been an important way of providing foreign currency liquidity, although it has generally been scaled back in 2009 as foreign exchange markets stabilised (Graph 6). There was some variation in intervention tactics. For example, some countries focused on operations in the spot market, while Brazil and Chile implemented a large number of operations in the swap market. One explanation for the latter is that foreign exchange swap markets are active in Brazil and Chile. Another

¹⁰ For example, the Central Reserve Bank of Peru lowered the marginal reserve requirement on foreign currency from 49% in October to 30% in December 2008. In December, the legal reserve requirement on foreign currency was lowered from 9.0% to 7.5% and in March 2009 from 6.5% to 6.0%.

¹¹ Foreign currency trade finance in the region has also been supported by international organisations. For example, between July 2008 and March 2009 the International Finance Corporation increased trade finance guarantees in Latin America and the Caribbean by 86% over a year earlier, to \$520 million.



explanation is that in contrast to spot transactions, swaps do not deplete foreign reserves as they involve the reversal of the foreign currency sale by the central bank at some future date.

Some of the foreign exchange market intervention was non-discretionary, to underscore that central banks were not targeting an exchange rate level, which past experience has shown can trigger speculative attacks. For example, in October 2008, Mexico adopted a rule according to which the central bank would auction \$400 million (lowered in March 2009 to \$300 million) on any day after the exchange rate depreciated by 2% or more. A minimum price or floor was set at 1.02 times the average currency value of the previous day. Colombia also followed a rule in which 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 2009.¹² More recently, the Central Bank of Mexico implemented two important

Dampening FX volatility rather than targeting a level

¹² The Colombian central bank sold \$235 million in October 2008 and \$369 million in the first two months of 2009.

changes to its intervention procedures. The first was to conduct daily auctions with no price floor (in recent weeks these have accounted for a large part of the daily auctions), and the second was direct sales in its foreign exchange market operations.

Foreign reserves exceed adequacy thresholds ...

Though intervention in foreign exchange markets was in some cases associated with depletions of foreign exchange reserves – as much as 15% compared to mid-2008 levels in Peru and 7% in Brazil – conventional indicators suggest that reserve holdings are still ample (Table 1). Foreign reserves in Latin American economies on balance increased in 2008, and were much larger than in 1996, prior to the Asian crisis. Indicators of foreign reserve adequacy are generally well above conventional thresholds of 100% (ie one year's cover) relative to short-term external debt or 25–50% (three to six months' foreign exchange cover) relative to imports.

At the same time, foreign reserve adequacy depends in part on other characteristics of the economy not captured by conventional indicators. For example, despite comparatively low reserves and falling export revenues, Chile's foreign reserves have been remarkably stable. One explanation is that both the government (through its sovereign wealth fund) and households (through pension funds) have very large holdings of foreign assets, which has contributed to reassuring markets. Reserves have also been stable in Colombia; in this case, government regulations limiting domestic US dollar

Foreign reserve adequacy ¹													
Outstanding year-end reserves position													
	In billions of US dollars				As a percentage of:								
					GDP	Short-term external debt ²				Imports			
	96	07	08	09	08	96	07	08	09	96	07	08	09
Argentina	18	44	44	44	14	60	200	279	274	75	99	77	84
Brazil	58	179	193	186	12	111	292	342	329	109	149	111	115
Chile	16	17	23	24	14	201	86	113	114	89	38	40	47
Colombia	9	20	23	23	9	142	201	390	352	69	61	58	57
Mexico	19	86	94	84	9	60	256	241	218	21	31	30	29
Peru	11	27	30	30	24	166	284	248	243	135	137	106	111
Venezuela	11	24	33	19	10	273	347	972	569	125	57	72	42
<i>Memo:</i>													
<i>Latin America</i> ³	142	397	440	410	13	145	238	369	300	89	82	71	69
<i>Asia</i> ⁴	246	2,327	2,685	2,712	40	284	624	889	908	60	120	106	120
<i>Southeast Asia</i> ⁵	91	270	283	289	27	119	431	500	498	39	64	54	60
<i>Central Europe</i> ⁶	40	124	133	138	17	383	177	169	175	49	31	29	33
<i>Other</i> ⁷	29	569	513	465	15	59	260	279	254	19	96	70	70
<i>Total EME's</i> ⁸	548	3,688	4,054	4,015	22	188	343	452	429	58	80	68	72

¹ For the outstanding year-end position, regional aggregates are the sum of the economies listed; for percentages, simple averages. For 2009, latest available data. ² Consolidated cross-border claims to all BIS reporting banks on countries outside the reporting area with a maturity up to one year plus international debt securities outstanding with a maturity of up to one year. ³ Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. ⁴ China, Chinese Taipei, India and Korea. ⁵ Indonesia, Malaysia, the Philippines and Thailand. ⁶ The Czech Republic, Hungary and Poland. ⁷ Russia, South Africa and Turkey. ⁸ Sum of the regions listed.

Sources: IMF; Thomson Reuters; national data.

Table 1

interbank loans and foreign exchange counterparty risk appear to have played a role. More generally, it has been argued that the commitment of international reserves in response to the crisis has been lower in Latin America than in some other EMEs (eg Korea and Russia). This could reflect lower perceived exposures to external refinancing risk or to currency mismatches in Latin America.¹³

External resources have provided significant additional support to Latin American EMEs during the current crisis. In October 2008 large reciprocal currency arrangements were established by the central banks of Brazil and Mexico with the US Federal Reserve, totalling \$30 billion each (these arrangements will expire on 30 October 2009).¹⁴ More recently, G20 initiatives have increased resources for international financial institutions. In particular, at its 2 April 2009 summit the G20 called for a tripling of IMF resources to \$750 billion, a new SDR allocation (which would increase the availability of foreign reserves) of \$250 billion, \$100 billion of additional lending by multilateral development banks and the allocation of \$250 billion for trade financing. In the meantime, as part of its efforts to enhance the scope and effectiveness of its crisis-related operations, the IMF has created the FCL aimed at countries with sound fundamentals. Two Latin American economies, Colombia and Mexico, have obtained access to the FCL. The financing is for one year, and amounts to \$47 billion for Mexico and \$10.5 billion for Colombia.

... with EMEs now also supported by external resources

Stabilising domestic markets

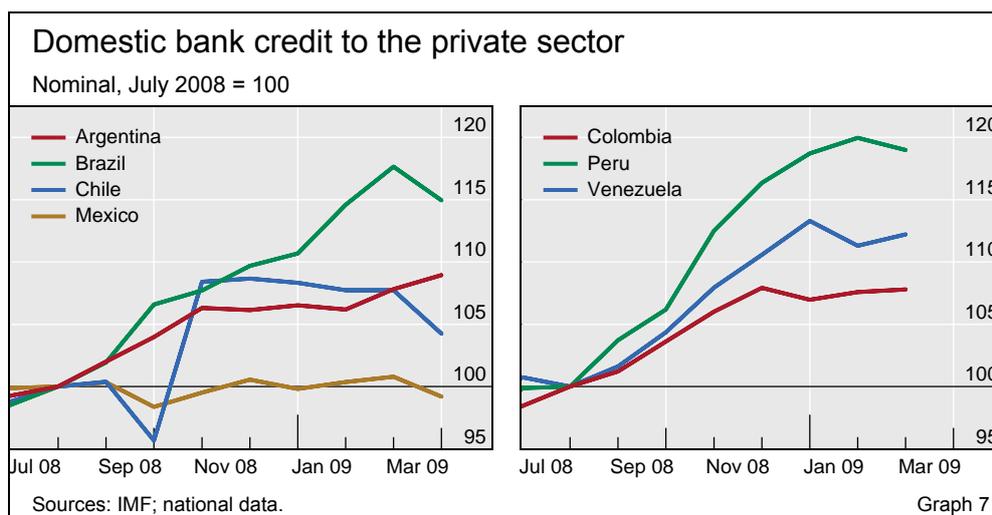
As discussed above, the crisis was also associated with tighter financial conditions in domestic markets, and authorities responded with a variety of policy measures. There was no immediate systematic effort to offset tighter financing conditions by lowering policy rates. Central banks delayed lowering rates until late 2008 or early 2009, after much of the initial market turbulence following the Lehman bankruptcy had subsided. This reflected continuing concerns about inflationary pressures and the potential impact of any additional exchange rate depreciation that might accompany lower rates. Since late 2008, however, rates have fallen sharply in Brazil, Chile and Colombia as the focus shifted to the impact of slowing growth. In contrast, in Mexico and Peru policy rates have declined much more gradually.

Interest rates lowered with a lag ...

Central banks also modified their operating procedures. Apart from implementing open market operations to dampen volatility in short-term interest rates, some central banks also increased the range of assets accepted as collateral to improve access to short-term funding (eg Argentina, Brazil, Mexico and Peru).

¹³ See Aizenman (2009).

¹⁴ The provision of Federal Reserve swap lines for Brazil and Mexico is unprecedented. Whether this signals a new approach to interacting with emerging market central banks or is a temporary response to the global crisis remains uncertain. The drawdown of these resources has been relatively recent and comparatively limited. On 21 April 2009 the Bank of Mexico auctioned \$4 billion out of this swap line to support the rollover of maturing debt in the Mexican corporate sector. However, only \$3.2 billion was placed.



... and reserve requirements reduced

Many central banks also relied heavily on lower domestic currency reserve requirements: in Peru, for example, marginal reserve requirements were lowered from 25% in September 2008 to 7.5% in December 2008 and to 6% by March 2009. Brazil's reserve requirements were also lowered significantly from much higher levels, and in Colombia reserve requirements were lowered and marginal reserve requirements removed.

Steps were also taken to maintain the flow of credit to offset the possible impairment of the transmission mechanism of monetary policy. For example, to improve funding conditions in the commercial paper market, the Mexican government extended guarantees to issuance by some corporations. In October 2008, state-owned development banks in Mexico offered partial guarantees to facilitate the rollover of short-term domestic debt. Measures were also taken to support the operation of banks. For example, in Brazil, state-owned financial institutions were authorised to buy shares in banks facing difficulties. Government institutions were also authorised to purchase the assets of local banks (particularly small and mid-sized banks).

Policies apparently effective

The effectiveness of measures to support domestic interbank and credit markets may be assessed in two ways. One is the extent to which interbank rates at longer maturities have stabilised. As noted above, spreads of rates at longer maturities to overnight rates have fallen from their peaks, suggesting a certain degree of normalisation. Another is the growth in domestic credit to the private sector. Here there appear to be wide variations in performance across countries. Credit has broadly remained on a rising trend in Brazil, Peru and Venezuela but has flattened in Argentina and Colombia (Graph 7). In contrast, in Chile and Mexico credit dropped in September 2008 but recovered thereafter, with particularly sharp swings in Chile. Nevertheless, while a collapse in bank credit of the kind observed in previous crises has so far been avoided, the risk remains high that credit will fall sharply due to the ongoing economic downturn.

Conclusions

The world economy is experiencing a severe economic and financial crisis. Despite initial signs of decoupling, Latin America was strongly affected after the Lehman Brothers bankruptcy, as were other EME regions. Nevertheless, compared to previous crises, the disruption to the functioning of domestic financial markets has so far been less severe. The unprecedented (non-reserve) foreign asset accumulation by residents in some countries and the progress made in developing domestic debt markets (particularly in government securities) appear to have played important roles. Furthermore, policy responses across the region were significant, and in many cases pre-emptive. Nevertheless, new vulnerabilities became apparent, such as the corporate foreign currency exposures from derivatives transactions that led to bankruptcies of leading firms, and which contributed to foreign exchange or domestic market instability in Brazil and Mexico.

The recent experience with the crisis offers a number of policy lessons. First, there is a need to ensure that risks assumed in financial markets are well understood by market participants and policymakers. This could help prevent bankruptcies of large and otherwise economically viable firms and disruptions to local funding markets of the kind observed in the region during the current crisis.

Second, while local currency bond markets could play a “spare tyre” role and effectively substitute for foreign currency financing, in Latin America more work is needed to deepen these markets and to develop a liquid and diversified investor and issuer base. Financing problems in the corporate sector also indicate that the development of corporate bond markets remains a priority.

Third, public sector efforts to reduce external vulnerability over the past decade have enhanced the ability to respond to crises. In particular, the recent crisis illustrates the importance of having large foreign currency resources available to cope with external shocks. Central banks have drawn on international reserves to stabilise foreign exchange markets and to support the flow of foreign currency financing. Greater credibility has also given them some scope to inject domestic liquidity and lower interest rates countercyclically. However, the crisis has revealed that a stronger public sector could not completely offset private sector vulnerabilities.

Finally, recent initiatives have significantly increased the amount of external foreign currency resources available to EMEs and broken new ground in how such resources are provided (eg through the Federal Reserve’s reciprocal currency arrangements or the IMF’s FCL). An important question is whether these arrangements will be seen as sufficiently large and durable as to provide an alternative to costly self-insurance via reserve accumulation in EMEs.

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