

Markets swayed by inflation and growth prospects

Changes in the anticipated monetary stance and in the economic outlook continued to shape financial markets in the review period.¹ The interplay of shifting inflation dynamics and deteriorating growth gave rise to two phases. In the first, from mid-September to mid-October, inflation readings came in stronger than anticipated, pushing up expectations of policy rates in the near future. In the second, through November, lower than expected inflation and weakening economic activity led markets to reassess downward the extent of policy tightening ultimately needed to contain inflation. These developments kept asset price volatility elevated in the context of poor liquidity conditions across market segments, contributing to swings in global financial conditions.

Markets tracked the synchronised rise in expected policy rates through mid-October. As a result of the inflation surprise in September, investors' expectations of policy rates started rising rapidly in core markets. This pushed yields upwards amid low liquidity, supporting the US dollar and weighing on risky assets.

In late October and especially in November, market dynamics reflected investors' perception of a decline in terminal rates. As the US yield curve inverted further, the US dollar fell vis-à-vis most currencies from multi-decade highs, alleviating pressures in funding markets. Equities recouped losses, thanks in part to easing energy concerns in Europe, while poor earnings weighed on the technology sector. Corporate bond spreads compressed slightly but remained wide in Europe. Issuance continued to be limited in the investment grade (IG) segment and was minimal for high-yield (HY) bonds.

Commodity prices eased in most markets, despite clouds on the horizon. The decline was especially sharp for natural gas in Europe, but crude oil also fell markedly. However, lingering supply disruptions showed up in the markups for refined products, and long-term energy concerns persisted.

Assets in emerging market economies (EMEs) largely tracked those in AEs. Sovereign yields rose at a quick clip early in the review period and then trended down as the dollar weakened and financial conditions eased. China was an exception in October, as persistent stresses in the real estate sector and weakness in consumer demand weighed heavily on equities, including those of trading partners, and drove outflows from bonds, especially those issued offshore. Policy actions supported Chinese assets in November.

¹ The period under review extends from 13 September 2022 to 25 November 2022.

Key takeaways

- Investors stayed focused on central banks' inflation fight and on growth risks. After rising amid poor liquidity, core yields pulled back and the US dollar weakened from historical highs as inflation slowed.
- Equities experienced bouts of elevated volatility and proved particularly sensitive to the monetary policy outlook. Corporate bond spreads remained wide in Europe, and issuance contracted overall.
- EMEs generally appeared resilient, although weakness in China spilled over to trading partners. The real estate sector weighed on China's growth outlook but was supported by policy.

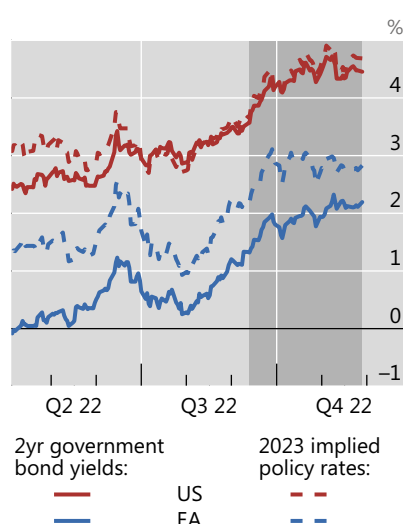
The monetary policy outlook shaped core bond markets

Shifting market expectations for the monetary policy outlook set the tone for yield curves over the review period. In September, expected policy rates for 2023 rose across all major advanced economies (AEs) after surprisingly high inflation readings. Subsequently, the evolution of these rates diverged somewhat, but they largely stabilised in November after US inflation surprised on the downside (Graph 1.A). In parallel, short-term sovereign yields rose steadily and then plateaued in the United States and Germany. As long-term sovereign yields dropped, yield curve slopes inverted further in the United States and turned negative in Germany and other AEs (Graph 1.B). Together with nominal yields, US forward interest rates rose on net but fell in November, as market participants reassessed downward the terminal policy rate (Graph 1.C).

Short-term yields climbed in anticipation of tighter monetary policy¹

Graph 1

A. Market-implied policy rates rose



B. Yield curves inverted to historical lows



C. Perceived terminal rate pulled back after an extended increase

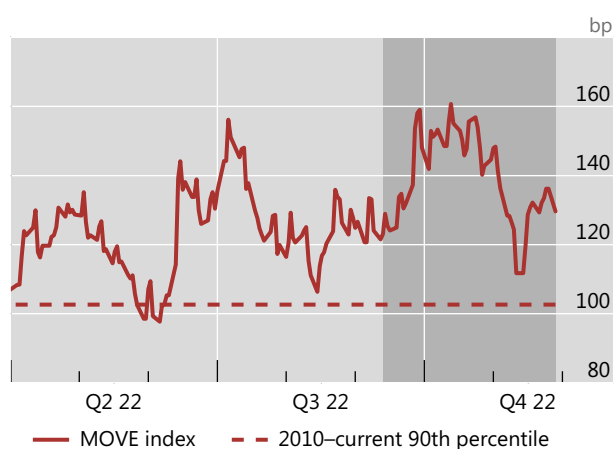


The shaded areas indicate 13 September–25 November 2022 (period under review).

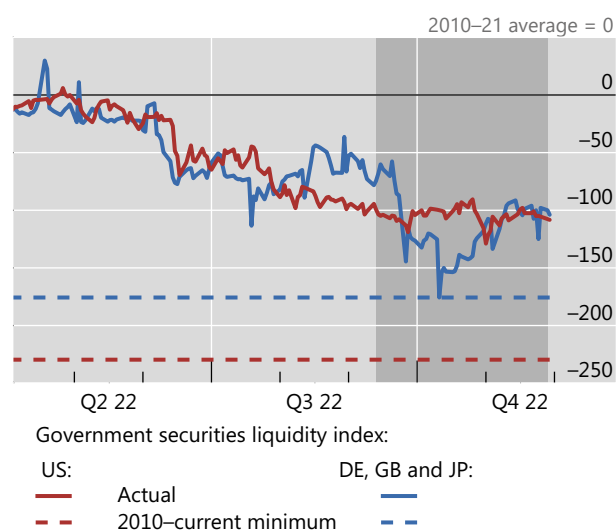
¹ See technical annex for details.

Sources: Board of Governors of the Federal Reserve System; Bloomberg; BIS.

A. Implied volatility for Treasury yields was elevated



B. In many core bond markets, liquidity worsened



The shaded areas indicate 13 September–25 November 2022 (period under review).

¹ See technical annex for details.

Sources: Bloomberg; Datastream; BIS.

The interest rate outlook was uncertain, and bond market liquidity deteriorated in most AEs. Despite some swings, option-implied volatility for US rates remained very elevated throughout the review period (Graph 2.A). As rates climbed rapidly and volatility increased, bond markets turned progressively less liquid. For instance, a common liquidity measure based on bond prices² worsened markedly and reached its lowest level since the Great Financial Crisis (GFC) for a group of AEs (Graph 2.B). In the United States, liquidity conditions had started deteriorating during the summer and were stable over the review period, remaining noticeably worse than during the March 2020 episode of Treasury market dysfunction. Across AEs, these conditions improved somewhat after mid-October as market expectations of rate volatility fell. That said, liquidity appeared fragile in some market segments, such as those supporting US mortgage credit (Box A).

The market for long-dated UK government bonds came under severe stress in late September. The initial increase in yields followed the Bank of England's monetary policy decision and the announcement of a fiscal plan that included tax cuts and energy subsidies. Subsequently, yields rose further on the back of rapid sales by leveraged investment vehicles that pension funds employ (Box B; Graph 3.A). Illiquidity compounded these self-reinforcing dynamics. Eventually, following targeted and temporary central bank bond purchases aimed at restoring market functioning, yields retraced most of their increase.

² Based on deviations of bond prices from a smooth theoretical yield curve.

Liquidity risk in MBS markets

Sirio Aramonte and Phurichai Rungcharoenkitkul^①

There are emerging signs of fragility in the markets for agency mortgage-backed securities (MBS). As MBS trading volumes declined in 2022, their yield spreads over US Treasuries became unusually volatile compared with those over the past 35 years (Graph A1.A). By examining transaction patterns across key intermediaries in the \$10 trillion MBS market, this box discusses the risk of liquidity disruptions.^②

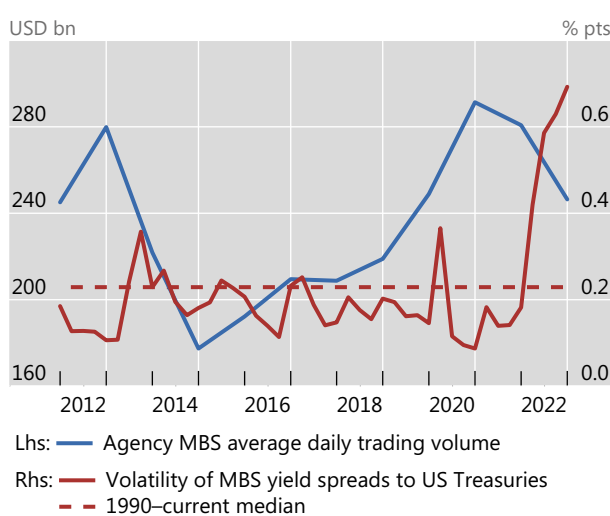
MBS demand from banks and the central bank proved an important stabilising force in two major stress episodes prior to 2022. During the Great Financial Crisis (GFC) and early in the Covid-19 pandemic, banks purchased large volumes of MBS, amounting to about 30% of transactions in each instance. The Federal Reserve was also an active buyer to support market functioning, absorbing roughly 10% in both cases (Graph A1.B).^③ In contrast, other MBS investors were less reliable sources of demand. In particular, small investors and leveraged funds purchased significant amounts during the GFC but little in the midst of the Covid-19 crisis.

A shift in the composition of MBS buyers in 2022 could be a sign that the market has become more prone to bouts of volatility. Small investors and leveraged funds have become the main buyers, and they have been traditionally less forthcoming than banks in providing liquidity in times of stress. At the same time, monetary policy priorities may make it challenging for the Federal Reserve to backstop the MBS market, should the need arise. In this environment, surges in selling pressure could be particularly disruptive.

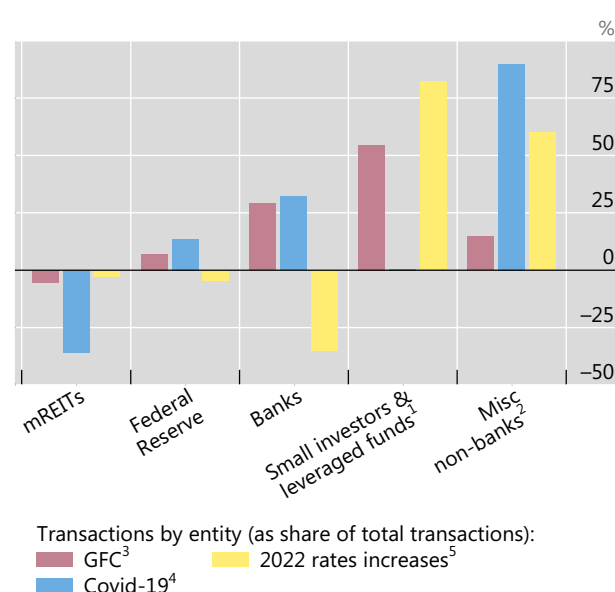
Liquidity worsened and the investor base changed in 2022

Graph A1

A. MBS liquidity deteriorated



B. Banks and the Fed stepped back



¹ This corresponds to the “households” flow of funds category. ² Includes other intermediaries in Table F.211 of the Z.1 statistical release (eg insurers, mutual funds, pension funds). ³ Q3 and Q4 2008. ⁴ Q1 2020. ⁵ Q2 2022.

Sources: Board of Governors of the Federal Reserve System; Bloomberg; FINRA; SIFMA; authors' calculations.

Among key market participants, closed-end funds known as mortgage real estate investment trusts (mREITs) are relatively prone to selling rapidly in times of stress. Large amounts of debt – often in the form of short-term repos – allow mREITs to pay out double-digit yields, even if they mostly invest in low-risk securities. High leverage and maturity mismatches imply that mREITs can be an important source of fire sales, even though they hold a small share of MBS outstanding (between 1.5% and 5% over the past 10 years).^{③,④} In fact, early in the Covid-19 pandemic, mREITs were behind a substantial fraction of overall MBS sales. In this instance, purchases by banks and the Federal Reserve provided the backstop, just as they did during the GFC.

With a history of high liquidity demand in times of stress, mREITs remain a potential source of market dysfunction, especially if banks and the central bank continue to pull back.

Liquidity disruptions in the MBS market could have material systemic implications. First of all, MBS play a crucial role in facilitating credit to the US real estate sector. In addition, since MBS are near substitutes for US Treasuries, liquidity strains could reverberate more broadly in financial markets. The role of leverage and maturity mismatches in shaping fire sale risk in MBS markets, together with potential wide-ranging ramifications, is a reminder of the policy challenges in containing risk in non-bank financial intermediation.^⑤

① The views expressed are those of the authors and do not necessarily reflect the views of the BIS. ② A Fuster, D Lucca, J Vickery, "Mortgage-backed securities", Federal Bank of New York *Staff Reports*, no 1001, 2022. ③ S Pellerin, D Price, S Sabol and J Walter, "Assessing the risks of mortgage REITs", Federal Reserve Bank of Richmond *Economic Brief*, no 13-11, 2013. ④ K Pence, "Liquidity in the mortgage market: How does the COVID-19 crisis compare with the global financial crisis?", *Real Estate Economics*, vol 50, no 6, 2022. ⑤ A Carstens, "Non-bank financial sector: systemic regulation needed", *BIS Quarterly Review*, December 2021, pp 1–6.

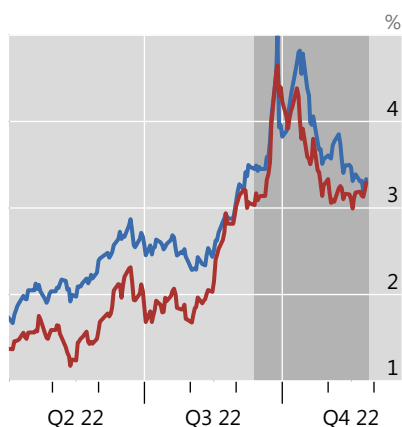
In Japan, investors continued to wager that the yield curve control policy would eventually be relaxed. This policy caps the yield on 10-year Japanese government bonds at 25 basis points. However, corresponding rates in derivatives markets, which the Bank of Japan does not target directly, rose rapidly to exceed cash yields by a wide margin (Graph 3.B). In parallel, the yen depreciated, prompting foreign exchange (FX) interventions.

Similar to the evolution of long-term core bond yields, sovereign bond spreads in the euro area widened through October but compressed thereafter. The narrowing was especially pronounced for Greek and Italian bonds. That said, the spreads on these bonds remained much wider than for other euro area members and, in the case of Italy, were markedly higher than early in the year (Graph 3.C).

Euro area sovereign spreads compressed amid dislocations in other AEs

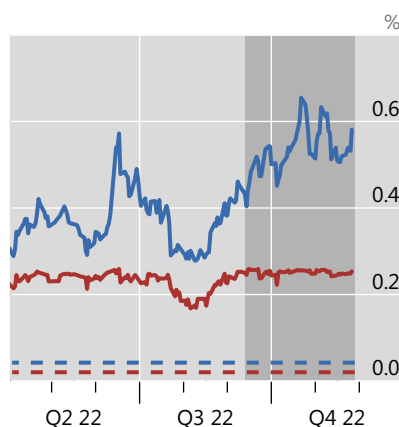
Graph 3

A. UK yields spiked during the gilt turmoil in late September



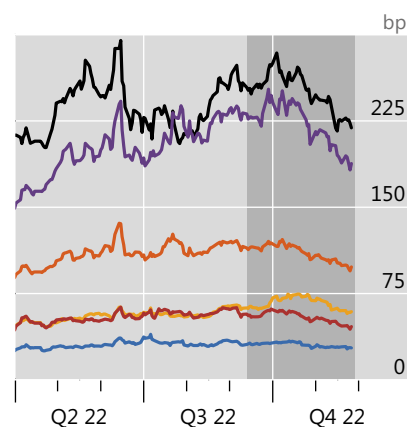
GB government bond:
— Two-year yield
— 30-year yield

B. Investors showed doubts about Japan's yield curve control



10yr JGB yield: — Actual — Sep 2016–2021 average
10yr JPY OIS rate: —

C. Euro area sovereign spreads stayed elevated in some countries



Spread over 10-year bund:
— AT — FR — IT
— ES — GR — NL

The shaded areas indicate 13 September–25 November 2022 (period under review).

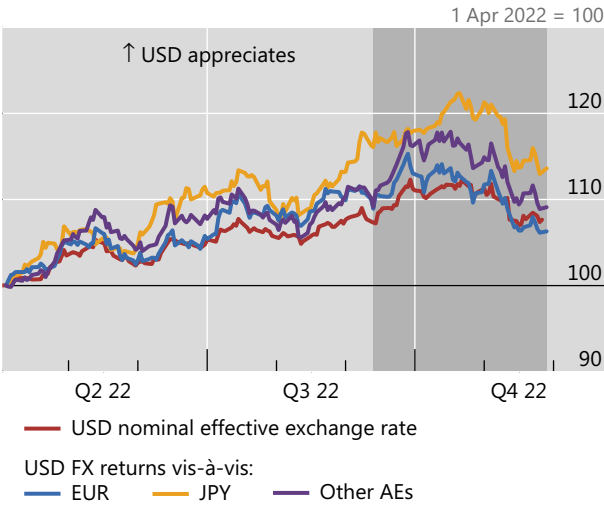
Sources: Bloomberg; BIS.

After extended gains that led to multi-decade highs, the US dollar paused and then weakened. The dollar’s nominal effective exchange rate fell by about 2% following the lower than expected CPI release in November, as market participants reassessed the outlook for interest rate differentials (Graph 4.A). In particular, the US dollar weakened against the euro and the yen over the review period as a whole. Against the backdrop of relatively poor liquidity in major FX markets, option-implied FX volatility climbed further to reach post-Covid-19 highs in most cases. More broadly, signs of significant strains in dollar funding markets emerged as year-end approached but then eased when the dollar weakened (Graph 4.B).

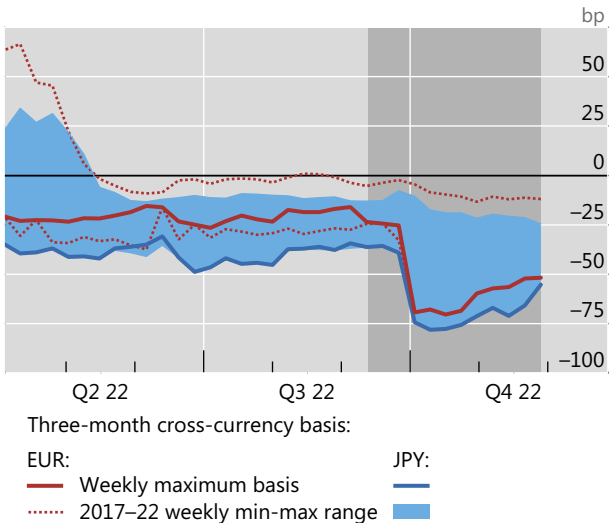
The US dollar pulled back¹

Graph 4

A. The US dollar depreciated from October



B. Dollar funding pressures built ahead of year-end



The shaded areas indicate 13 September–25 November 2022 (period under review).

¹ See technical annex for details.

Sources: Bloomberg; BIS.

Leverage and liquidity backstops: cues from pension funds and gilt market disruptions

Sirio Aramonte and Phurichai Rungcharoenkitkul^①

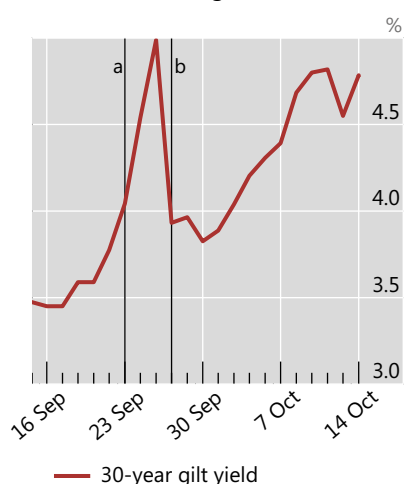
The market for UK sovereign bonds (gilts) experienced significant turmoil in late September. A sharp rise in yields, set off by the then announced change in the UK fiscal stance, was amplified by forced selling due to rapid deleveraging by investment vehicles used by pension funds. This box reviews the dynamics that led to the disruptions and highlights factors that could set off similar episodes in other markets and jurisdictions.

Liquidity in the gilt market started to worsen on 22 September 2022, when the Bank of England announced a 50 basis point rate hike, and deteriorated rapidly the following day (Graph B1.A). A surge in yields was precipitated by plans for an expansionary fiscal programme featuring tax cuts and energy subsidies. In addition, the gilt market witnessed unusually large trading volumes, a sharp widening of bid-ask spreads and a significant depreciation of sterling. Markets returned to normal only when the Bank of England committed to purchase large amounts of long-dated gilts on 28 September. To encourage timely deleveraging, the commitment was for a limited period.

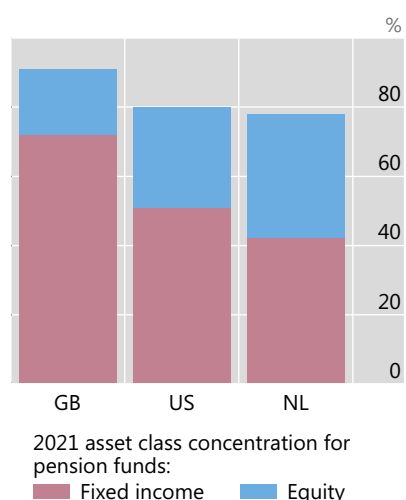
Pension funds and risks of market disruptions

Graph B1

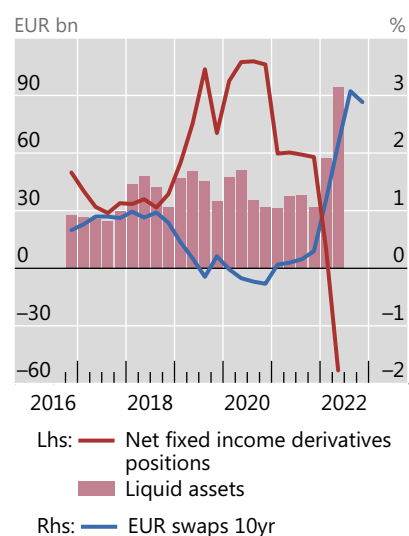
A. Gilt yields spiked as pension funds hurried to deleverage



B. UK pension funds hold relatively more fixed income securities



C. Dutch pension funds quickly raised cash to cushion losses in Q2 2022



^a “Mini” Budget announced. ^b Gilt purchases by the Bank of England.

Sources: Netherlands Bank; EIOPA; Pension Protection Fund; Bloomberg; Milliman; authors’ calculations.

Liability-driven investment (LDI) funds played an important role in the late September events. These legally separate investment vehicles help defined benefit pension funds hedge long-lived liabilities towards future retirees. A hedging strategy could in principle simply entail purchasing long-term sovereign bonds, similar to asset-liability duration matching by insurance companies.^② But, over the years, a shortage of such physical bonds led UK LDIs to obtain the desired asset side duration via leverage, which increases the sensitivity of asset returns to long-term interest rates. LDIs had levered up by funding bond holdings with repurchase agreements (repos) or, to a smaller extent, by partial collateralisation of interest rate swaps.

As gilt yields rose rapidly in September, LDI funds came under severe pressure, in contrast to pension funds themselves. The yields’ rise generated losses for LDIs’ leveraged positions and triggered calls for additional collateral. To meet these calls, LDIs needed cash infusions, which pension funds failed to provide promptly enough. The infusions were particularly slow to come for “pooled LDIs”, which manage assets on behalf of

multiple pension funds. In this case, individual pension funds had less incentive to step in, as the benefits would have been shared by all participants but the costs borne privately. As their solvency positions worsened, LDI funds had to deleverage by selling gilts, putting further upward pressure on yields and setting off a full-fledged spiral.^③ These yield moves might have also been amplified by other intermediaries attempting to maintain matched duration across assets and liabilities. From a system-wide perspective, the cause of market dysfunction was predominantly a liquidity problem. Pension funds' overall net worth actually improved with the higher interest rates: given incomplete hedging, the decline in the present value of marked-to-market liabilities more than offset the corresponding asset losses.

In principle, the mechanism that led to the UK turmoil could be at work in other jurisdictions. Key determinants of potential disruptions are: (i) leverage, which raises the risk of forced sales to prevent a default; (ii) lack of portfolio diversification, which forces funds to sell similar assets; (iii) small market size for the assets being sold, which raises the price impact of forced sales; and (iv) reliance on pooled LDI funds, which are slow to raise liquidity.

On the basis of these criteria, other large defined benefit pension systems, notably in the Netherlands and the United States, appear less vulnerable to the risk of fire sales than those in the United Kingdom. To begin with, US pension funds reportedly seldom use leverage, in part because the shorter duration of their liabilities limits their need to hedge with long-duration investments.^④ Likewise, Dutch pension funds rely less on leverage than their UK counterparts, as they only hedge less than 60% of their interest rate risks on average.^⑤ They also often use over-the-counter derivatives for hedging, with flexibility to post margins with certain securities rather than cash. As for diversification, portfolios of US and Dutch pension funds are less concentrated in fixed income instruments than those in the United Kingdom (Graph B1.B).^⑥ In addition, compared with the United Kingdom, the sovereign bond holdings of US and Dutch pension funds represent a smaller share of the total outstanding amounts of US Treasury and euro area sovereign debt, respectively. Lastly, US and Dutch pension funds rely less on pooled LDI funds and can readily use own fund-wide cash and liquid assets when the value of leveraged positions fluctuates. Indeed, as interest rates rose sharply in the second quarter of 2022, Dutch pension funds were able to quickly raise liquidity to cushion against the falling value of interest rate derivatives positions (Graph B1.C).

The stress episode in the gilt market holds broad lessons for non-bank financial intermediaries (NBFIs).^⑦ Financial stability risks from high leverage and inadequate market liquidity are not confined to the pension fund sector. Indeed, long periods of low interest rates have incentivised a reach for yield and leverage build-up by financial institutions across the spectrum, including more innovative forms of securitisation, such as those of private equity funds. With rapid increases in interest rates and receding liquidity in core markets, simultaneous deleveraging can generate liquidity demand pressure, which could lead to market dysfunction. In addition, strategies that involve duration matching could create similar pressures, eg when a sharp rise in interest rates shortens liability duration, and prompts asset sales in a falling market. When these risks materialise and the attendant economic costs are substantial, there will be pressure on central banks to provide backstops – as market-makers of last resort. While justified, this can contrast with the monetary policy stance and encourage risk-taking in the longer run.^⑧ Such dilemmas highlight the urgency of implementing systemically oriented regulation that addresses structural vulnerabilities in the NBFIs sector.^⑨

① The views expressed are those of the authors and do not necessarily reflect the views of the BIS. ② D Domanski, H S Shin and V Sushko, "The hunt for duration: not waving but drowning", *IMF Economic Review*, March 2017. ③ Bank of England, "Letter to the Chair of the Treasury Committee, House of Commons", 5 October 2022. ④ R Ratkowski, "Four structural differences to know about the UK and US LDI markets", *NISA Perspectives*, 20 October 2022. ⑤ Netherlands Bank, individual pension fund statistics. ⑥ JPMorgan, "Flows & liquidity", 20 October 2022. ⑦ S Aramonte, A Schimpf and H S Shin, "Non-bank financial intermediaries and financial stability", *BIS Working Papers*, no 972. ⑧ Markets Committee, "Market dysfunction and central bank tools", May 2022. ⑨ A Carstens, "Non-bank financial sector: systemic regulation needed", *BIS Quarterly Review*, December 2021, pp 1–6.

Risky assets fluctuated as uncertainty rose

Equity prices were attuned to the monetary policy outlook and saw pronounced swings. In October and especially in November, stocks were bolstered by investors' downward reassessment of ultimate policy tightening, even as expectations of near-term policy rates changed little and corporate earnings proved weak (Graphs 5.A and 5.B). The closing of short positions probably contributed to spikes in stock prices in early October and mid-November. Chinese equities were under pressure for most of the review period due to economic weakness but rose in November on expectations of less stringent pandemic management.

Corporate bond markets showed some signs of strain. Yield spreads over sovereign bonds widened in September and October, ending the review period at and above historical norms in the United States and Europe, respectively, after a tightening in November (Graph 6.A). Average spreads in Q4 2022 appeared broadly in line with the economic backdrop (Graphs 6.B). In the background, perceived default risk picked up and was somewhat elevated for IG firms (Graph 6.C). In this context, issuance dried up in the HY segment, until a tentative reprise in November, and declined sharply for IG firms, approaching its lowest levels since the GFC (Graph 7.A).

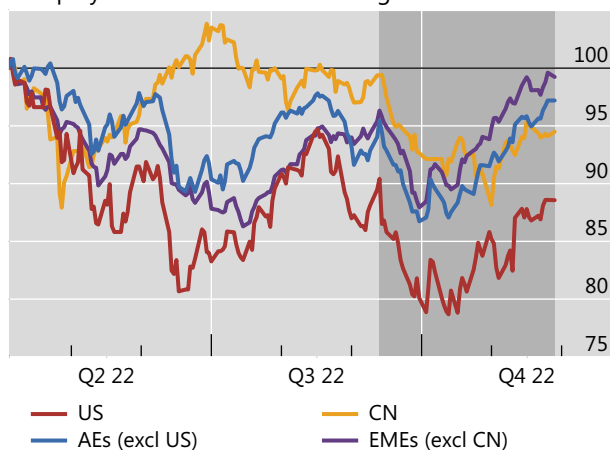
Leveraged loans, which tend to be more sensitive to rising interest rates due to their floating coupons, were also under some pressure. Notably, syndicate underwriters engaged in large sales. While significant discounts attracted purchases by collateralised loan obligations (CLOs), the demand from traditional buyers for these securitisations – notably for their senior tranches – remained limited.

Equity prices fluctuated with the policy outlook, while profitability deteriorated¹

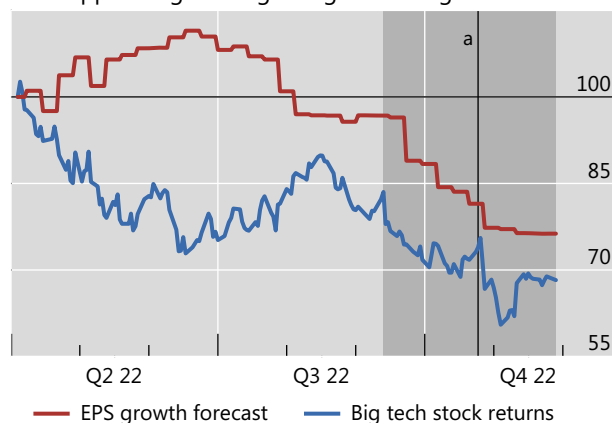
1 April 2022 = 100

Graph 5

A. Equity markets seesawed once again



B. Disappointing earnings weighed on big tech stocks

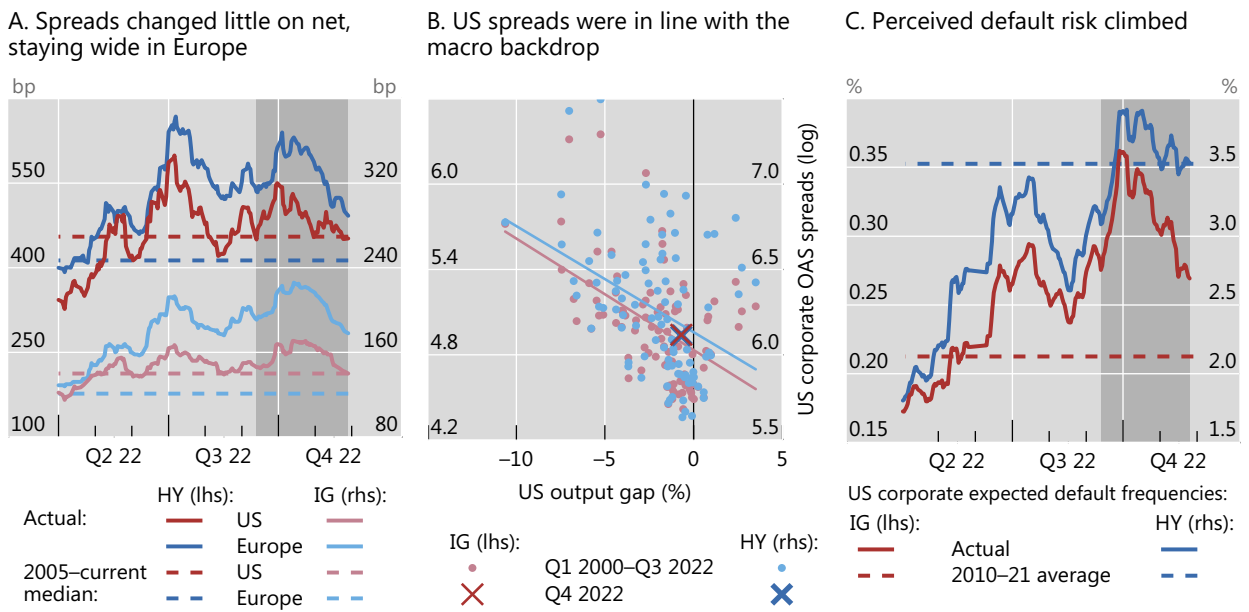


The shaded areas indicate 13 September–25 November 2022 (period under review).

^a Start of the week in which big tech firms reported Q3 earnings.

¹ See technical annex for details.

Sources: Bloomberg; Datastream; BIS.

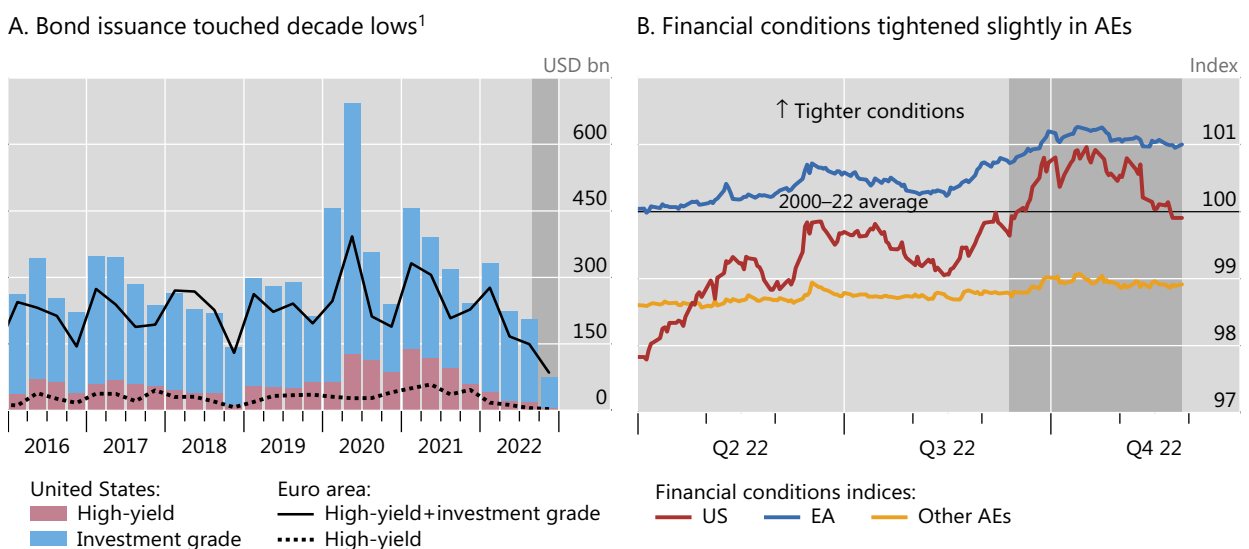


The shaded areas indicate 13 September–25 November 2022 (period under review).

Sources: ICE BofAML; Moody’s; national data; BIS.

Financial conditions tightened somewhat in AEs. The initial change was particularly marked in the United States, mostly driven by rising long-term rates and declining equities (Graph 7.B). In October, US financial conditions became more restrictive than the long-term average for the first time since April 2020. However, they eased as risky assets gained ground in November, ending the period under review at a similar level as at the start. Other AEs also saw a tightening, but it was more contained than in the United States because of a more limited increase in long-term rates.

Bond issuance fell sharply, financial conditions tightened on net¹

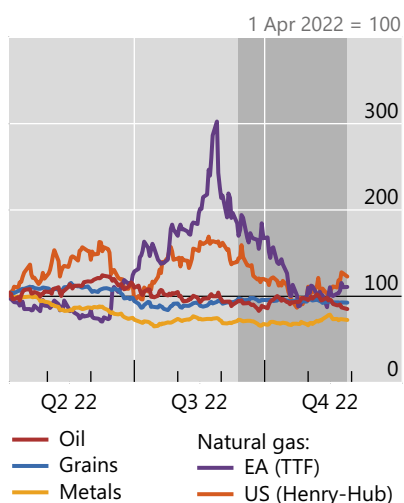


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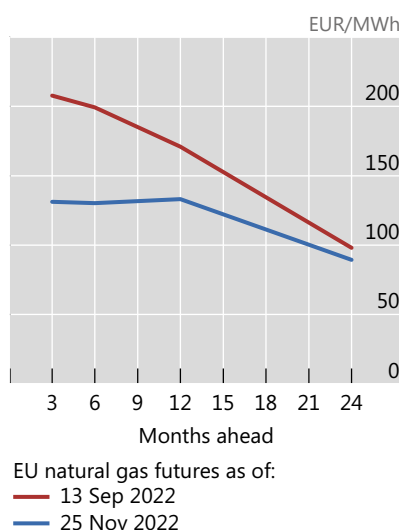
¹ See technical annex for details.

Sources: Bloomberg; Dealogic; BIS.

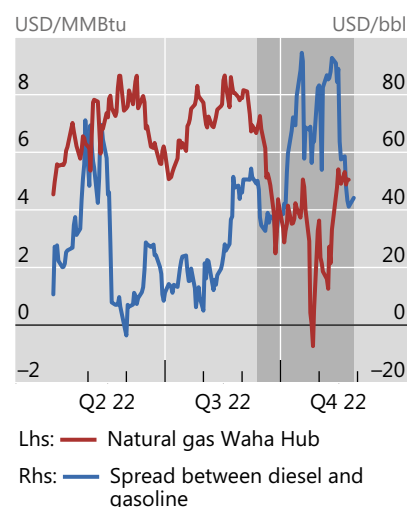
A. Natural gas prices fell rapidly, especially in Europe



B. Prices fell for short-dated futures, hardly budged for long-dated ones



C. Supply and storage constraints affected some energy markets



The shaded areas indicate 13 September–25 November 2022 (period under review).

Sources: Bloomberg; Datastream; BIS.

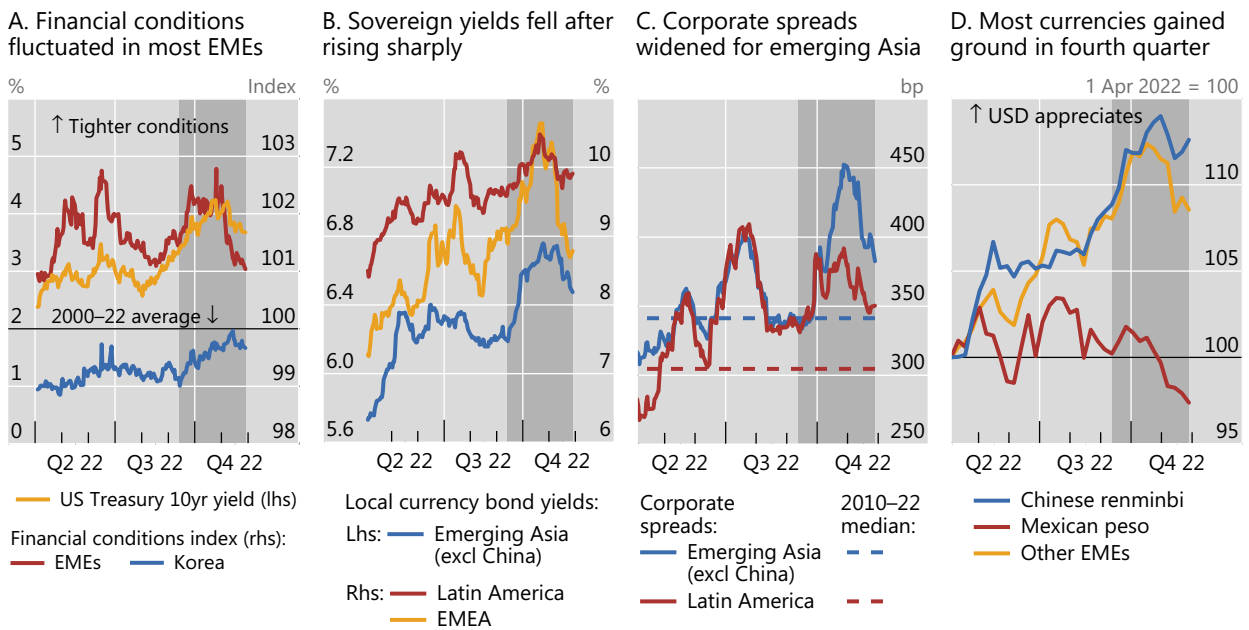
In commodity markets, futures prices signalled lingering concerns about long-term natural gas supply in Europe. Spot natural gas prices fell sharply, especially in Europe (Graph 8.A). The drop was partly due to unusually warm weather and ample storage before winter. However, investors fretted about long-term imbalances, leaving futures prices two years ahead unchanged over the review period, even as prices three months ahead fell sharply (Graph 8.B). Some energy markets still experienced supply issues. For instance, technical constraints that curbed shipments from a US pricing hub for natural gas resulted in briefly negative prices there (Graph 8.C, red line). In addition, limited refining capacity kept diesel prices relatively high compared with other fuels, even as oil prices fell (Graph 8.C, blue line).

EMEs were relatively resilient, but not without fragilities

Dynamics in AEs influenced financial conditions in EMEs. In line with AE risky assets and long-term core bond yields, conditions tightened significantly early in the review period before easing sharply in November (Graph 9.A).

EMEs' local currency sovereign yields largely tracked those in AEs. In September, they rose especially quickly in Asia (excluding China) and in EMEA,³ but the increase was notable in Latin America as well (Graph 9.B). The subsequent reversal was smaller in Asia. Local currency spreads over US Treasuries held up, suggesting that the bulk of yield adjustments owed to higher Treasury yields.

³ Europe, the Middle East and Africa.



The shaded areas indicate 13 September–25 November 2022 (period under review).

¹ See technical annex for details.

Sources: Bloomberg; JPMorgan Chase; BIS.

Corporate bond spreads picked up in some EMEs, especially in emerging Asia excluding China (Graph 9.C). At the end of the review period, they remained somewhat wider than historical standards. Notably, in Korea short-term corporate funding costs increased rapidly as credit quality concerns emerged. Corporate spreads widened significantly, as companies struggled to refinance maturing debts. Authorities acted as buyers of last resort to restore orderly market functioning. That said, financial conditions kept tightening in Korea due to rising short-term rates (Graph 9.A).

Most EME currencies continued to depreciate against the US dollar through October, before strengthening in November (Graph 9.D). The key determinants of exchange rates continued to be cross-country differences in inflation and monetary policy outlooks as well as exposure to external and terms-of-trade shocks.

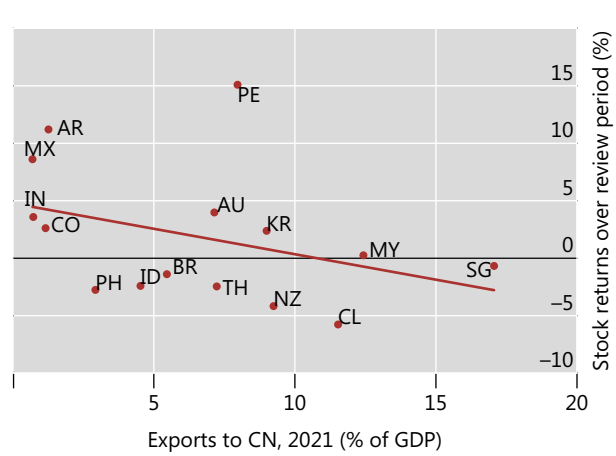
In China, the growth outlook was clouded through October by weakness in the real estate sector and by persistent Covid restrictions. The perception that real estate developers would need to further restrict activity to meet balance sheet prudential ratios cast a shadow on the near-term outlook. As a result, the sector’s stocks contributed to the decline of a broad equity index up to end-October (Graph 10.A). Covid-related restrictions put pressure on consumption, adding to headwinds from real estate. Overall, slowing activity in China weighed on the equity returns of its trading partners, particularly those most reliant on Chinese exports (Graph 10.B).

New policies aimed at easing credit flows offered some respite to risky assets in early November. Chinese equities rose sharply, led by the real estate sector. In parallel, the renminbi appreciated against the US dollar, while the credit default swap spread on Chinese sovereign bonds fell after doubling midway through the review period (Graph 11.A). While outflows from Chinese bonds quickened somewhat, they remained below early 2022 levels (Graph 11.B)

A. Concerns were visible in real estate equities



B. Trade links with China weighed on EMEs

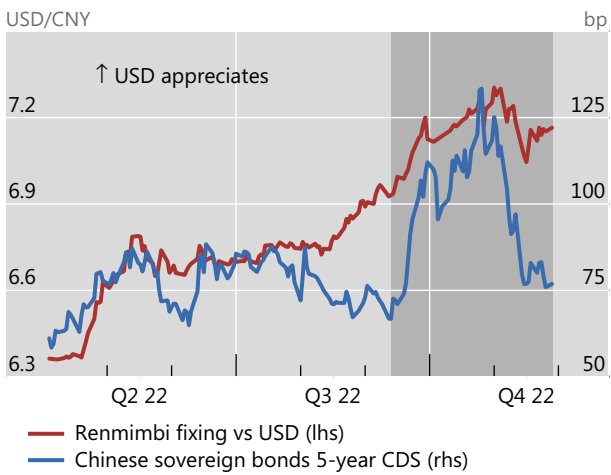


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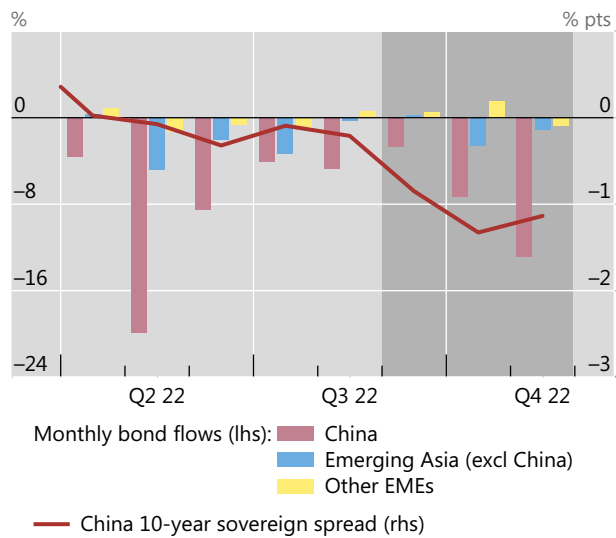
Sources: UN Comtrade; Bloomberg; Datastream; BIS.

Policy actions in China provided some support to investor confidence¹

A. Renminbi depreciation and sovereign risk reversed



B. Outflows from Chinese bonds picked up



The shaded areas indicate 13 September–25 November 2022 (period under review).

¹ See technical annex for details.

Sources: Bloomberg; EPFR; BIS.

Technical annex

HY = high-yield; IG = investment grade; JGB = Japanese government bond; OIS = overnight indexed swap; YCC = yield curve control policy.

Graph 1.A: For US, federal funds rates implied by futures maturing in December 2023. For EA, rates implied by ESTR futures maturing in December 2023.

Graph 1.B: "Other AEs" is based on data for AU, CA, DK, GB, JP, NZ and SE.

Graph 1.C: US instantaneous forward rate two years hence, adjusted for risk premium. Based on the model of D Kim and J Wright, "An arbitrage-free three-factor term structure model and the recent behavior of long-term yields and distant-horizon forward rates", *FEDS Working Papers*, no 2005-33, 2005.

Graph 2.B: Bloomberg government securities liquidity indices, defined as the average yield error for government securities with more than one year of remaining maturity. The indices are displayed on an inverted scale.

Graph 4.A: "Other AEs" is based on US dollar exchange rates for AUD, CAD, CHF, GBP, NZD, NOK and SEK.

Graph 5.B: Expected earnings per share growth between end-2021 and estimated end-2023. As to big tech returns, this is calculated as the simple average of Apple, Microsoft, Amazon, Alphabet and Meta cumulative stock returns.

Graph 7.A: For Q4 2022, issuance data up to 25 November 2022, extrapolated to full quarter.

Graph 7.B: Goldman Sachs Financial Conditions Index (FCI): a weighted average of country-specific risk-free interest rates, exchange rates, equity valuations and credit spreads, with weights that correspond to the estimated impact of each variable on GDP. A value of 100 indicates average conditions. A higher (lower) value indicates tighter (looser) conditions.

Graph 9.A: See entry for Graph 7.B.

Graph 9.B: Simple averages of JPMorgan Chase GBI Global sub-indices, traded yields.

Graph 9.C: Simple averages of JPMorgan Chase CEMBI sub-indices, stripped spreads.

Graph 9.D: "Other EMEs" is based on US dollar exchange rates for BRL, CLP, COP, CZK, HKD, IDR, ILS, INR, KRW, MYR, PHP, PLN, RUB, SAR, SGD, SOL, THB, TRL, TWD and ZAR.

Graph 11.B: Monthly bond flows: flows to local currency bond funds, scaled by previous month's assets. The 10-year rate differential is the monthly average of the difference between the 10-year local currency sovereign bond yield and the 10-year US Treasury yield.