

Markets count on a smooth landing

The central theme of the review period was the waxing and waning of financial markets' optimistic expectations over the policy outlook.¹ Until late December, financial conditions continued to ease, driven by investors anticipating looser policy in the near term. Since January, financial conditions firmed and tightened, as central bank communication pushed back against such expectations and data releases pointed at more stubborn inflation pressures. Sovereign bond yields declined on balance during the period, while valuations of risky assets generally rose. Supported by resilient risk sentiment, emerging market economies (EMEs) experienced bond inflows, and (except China) their stock markets extended gains.

Expectations of policy rate trajectories set the tone for global fixed income markets. Against a benign backdrop of declining inflation and surprisingly resilient economic activity, market participants' expectations initially drifted away from central bankers' projections, so they started pricing in early rate cuts. But then central bank officials repeatedly intervened to dispel excessive optimism, reaffirming that the fight to bring inflation back to target could not be declared won yet. Their efforts to herd market expectations back in line with their projections succeeded and narrowed the daylight between markets' and central banks' expectations. These reassessments left an imprint in elevated bond volatility, which even surpassed that of equities. Government bond yields in major economies broadly reflected these developments: they first continued to decline in December, and then they edged up again after central bank communications pushed back in January and a less benign inflation release in the United States came out in February.

The overall optimistic mood also had a bearing on risky assets. Global stock indices rallied and credit spreads narrowed. While still relatively tight, global financial conditions eased, reflecting expectations of a soft landing. That said, bond issuance and bank credit supply terms painted a less rosy picture. Issuance remained rather subdued, as firms seemed less willing to tap the market at higher rates while banks' lending standards were still tight. The foreign exchange market sent mixed signals: the dollar initially depreciated but then appreciated markedly from January onwards, in response to signs of later-than-expected rate cuts. This pattern reflects exchange rate movements being associated mostly with revisions to the monetary policy outlook rather than being driven by risk sentiment.

EMEs broadly followed the developments in AEs. Bond yields fell, driven by the outlook for policy easing, and equity markets rose across the board. In China, however, equity markets plunged in response to persistent woes about the real estate sector, despite several support measures. EME bond funds saw sustained inflows in Asia and Latin America, in contrast to equity funds, which differed across jurisdictions. EME currencies depreciated across the board, with those in Latin America depreciating more than those in Asia, on the back of a larger compression in yield spreads vis-à-vis the United States.

¹ The review period covers 25 November 2023 to 26 February 2024.

Key takeaways

- Bond markets moved with the waxing and waning of expectations of early policy rate cuts as central bankers intervened to dispel excessive optimism.
- Risky assets rallied, with still tight financial conditions easing substantially from their late-October peak.
- EMEs broadly followed the developments in AEs as yields fell and equity markets rallied; in China, by contrast, the stock market slumped.

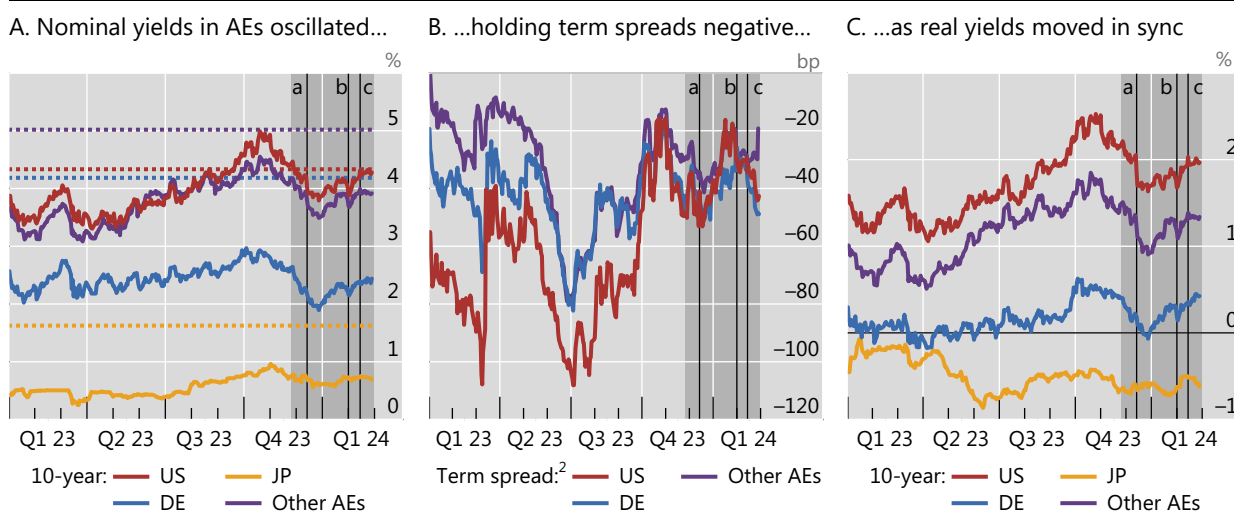
Global bond markets stay attuned to monetary policy

A “tug of war” between markets and central banks characterised developments over the review period. In early December, market pricing indicated greater investor conviction in earlier and deeper rate cuts, largely in response to macroeconomic data releases. Yet, from early January onwards, central bank communication increasingly pushed back to dispel excessive market optimism.

Government bond yields declined, on balance, even though they underwent substantial gyrations. In December, long-term government bond yields in major AEs continued their descent from the late-October peaks. In January, yields firmed and then increased, in part supported by central bank communication pushing back

US yields set the tone for global bond markets¹

Graph 1



The shaded area indicates 25 November 2023–26 February 2024 (period under review). The dotted horizontal lines indicate January 2007–June 2008 average.

^a FOMC press conference (13 December 2023). ^b FOMC press conference (31 January 2024). ^c US CPI release (13 February 2024).

¹ Other AEs based on simple average of AU, CA and GB. ² 10-year minus 2-year.

Sources: Bloomberg; Datastream; BIS.

expectations of early rate cuts (Graph 1.A).² Evolving expectations over the timing and extent of policy rate cuts also drove changes in the overall shape of the yield curve: term spreads fluctuated, but overall the curve remained negatively sloped in most AEs (Graph 1.B).

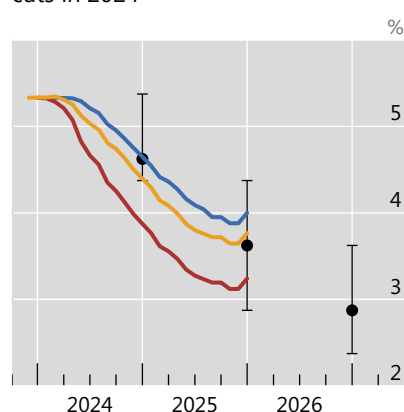
As long-term inflation expectations remained roughly stable, changes in inflation-adjusted (real) yields matched most of the movement in nominal yields (Graph 1.C). Japan was an exception: real yields remained mostly flat, and the bulk of the movement in nominal yields reflected changing long-run inflation expectations.

Central bank communication conveyed a sense of patience and caution, but financial market participants eyed a much easier stance ahead. Market participants revised their policy expectations repeatedly, navigating between macroeconomic releases and central bank communication. Eventually though their views converged towards central bankers' projections. Market-based measures of expected US policy rates for end-2024 declined substantially in December, moving well out of line with the Federal Open Market Committee (FOMC) members' projections (Graph 2.A, red line), but reverted by February. Similarly, while professional forecasters' prospects on US inflation were aligned with FOMC projections, they also reflected more dovish expectations on the policy rate trajectory (Graph 2.B). That said, the disagreement

Yields remain volatile amid changing expectations of monetary policy

Graph 2

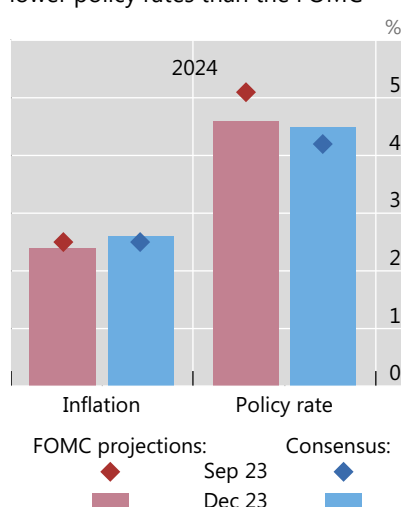
A. Investors anticipated steep rate cuts in 2024



December Fed dot plot forecast:
● Median — 10th–90th percentiles

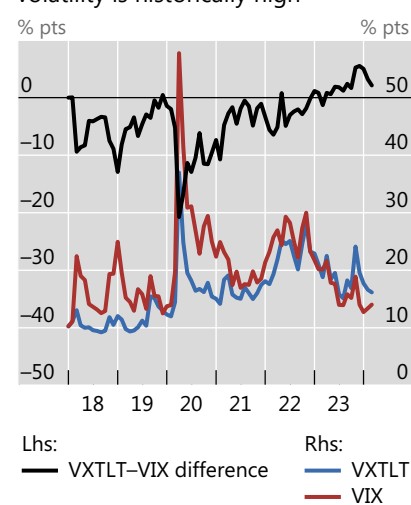
Implied policy rates on:
— 28 Nov 23 — 26 Feb 24
— 28 Dec 23

B. Professional forecasters expected lower policy rates than the FOMC



FOMC projections: Sep 23 Dec 23
Consensus: Sep 23 Dec 23

C. Gap between bond and equity volatility is historically high¹



Lhs: — VXLT-VIX difference
Rhs: — VXLT — VIX

¹ See technical annex for details.

Sources: Federal Reserve Bank of St Louis; Bloomberg; Consensus Economics; BIS.

² The minutes of the December FOMC meeting, released on 3 January, while acknowledging the risks of high policy rates, reaffirmed the need to see more progress on inflation before cutting rates. This was then reinforced in a speech by Governor Waller on 17 January and in Chair Powell's press conference following the 31 January FOMC meeting. ECB President Lagarde was also cautious and stressed in the press conference following the 25 January ECB governing council meeting that rate cuts were yet not discussed.

among different forecasters on the future course of monetary policy rose substantially, both in the United States and the euro area (Box A).

Reassessments of policy rate paths and the associated portfolio shifts kept bond yield volatility elevated. Gauges of government bond volatility declined somewhat from the peak in October last year, but they remained high and, more unusually, well above those for equities (Graph 2.C). Historically, such a pattern tends to occur around turning points in the policy cycle. For instance, the lift-off of policy rates at end-2015 also coincided with higher volatility in bonds than equities. That said, the recent gap has been larger and longer-lived. Part of the gap may reflect a stronger compression of equity volatility due to dealers selling volatility via yield-enhancing structured products (Box B).

Box A

The return of monetary policy uncertainty

Matteo Aquilina, Marco Lombardi and Sonya Zhu^①

Uncertainty about policy rates is a key factor that influences financial markets. Market participants therefore keep their eyes firmly on central banks' deliberations. Broadly speaking, policy rate uncertainty fuels the volatility of all financial assets – not only bonds – and hence has significant implications for asset prices and economic decisions. Uncertainty and, more generally, the distribution of policy expectations, may also impact the transmission of monetary policy.^②

The yields on short-term government paper closely track policy rates. This is why policy rate uncertainty, which is not directly observable, can be proxied by looking at the disagreement (ie dispersion) among individual forecasters about three-month yields.^③ Based on forecasts by respondents to the Consensus Economics survey, this box documents how such disagreement has evolved over time. By further examining forecasters' disagreement at different horizons (three or 12 months ahead), it also highlights a recent upward trend and dissects its drivers.

Disagreement over interest rates evolved in line with the monetary policy cycle. In major advanced economies, disagreement was exceptionally low following the Great Financial Crisis (GFC), echoing the low policy rate uncertainty at that time (Graph A1.A, dark coloured line). Before 2013, several central banks deliberately sought to compress policy uncertainty by signalling that rates would be kept extraordinarily low for extended periods – the so-called forward guidance. Afterwards, disagreement briefly resurfaced in the United States during the tightening phase preceding the pandemic as well as at its outbreak. But it then abated swiftly when central banks underscored their commitment to keep policy rates low to support lockdown-stricken economies.

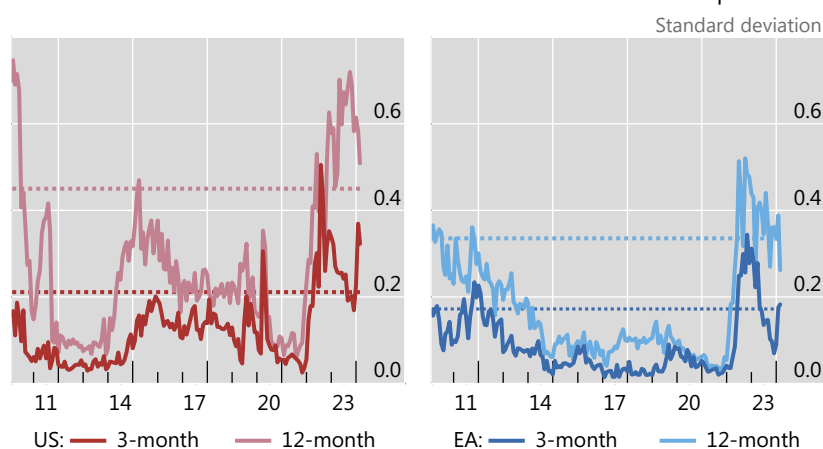
Disagreement over short-term bond yields at the 12-month-ahead horizon (Graph A1.A, light coloured lines) started to grow in 2021, as inflation surged and the economic outlook became more uncertain. Yet this disagreement remained high and failed to subside^④ even when inflation and macroeconomic uncertainty receded last year. This has fuelled exceptionally high volatility in bond markets, even exceeding that of equities, as described in the main text.

Since mid-2022, the dynamics of disagreement over future interest rates at different forecast horizons diverged substantially. At first, disagreement over the level of interest rates that would prevail in three months dwindled as tightening progressed and forecasters anticipated rates nearing their peaks; disagreement 12 months ahead kept rising instead. However, these dynamics have reversed since late-2023. As the debate focused on the timing of the first cut, disagreement at the three-month horizon surged but that at the 12-month horizon declined in the United States and remained stable in Europe. This highlighted that forecasters had different views over when the easing cycle would start.

Disagreement about short-term interest rates is high

Graph A1

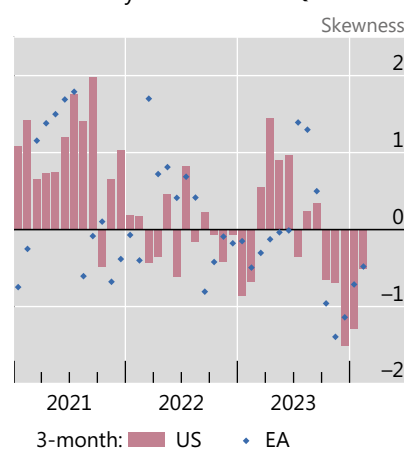
A. Forecasts over the future level of interest rates became more dispersed...



Dotted horizontal lines indicate 2005–09 averages.

Sources: Consensus Economics; authors' calculations.

B. ...and asymmetric since Q4 2023



Looking at the asymmetry of individual forecasts reveals that interest rate uncertainty is unevenly balanced. In 2021, before the tightening cycle even started, a greater proportion of forecasters were more hawkish than the average. Such positive skewness characterised the distribution of forecasts for most of the last three years (Graph A1.B). It reflected that survey participants anticipated a large upside risk to interest rates; that is, central banks might have tightened more aggressively than expected in the short run. Skewness became negative in the last few months: forecasters were anticipating a higher likelihood of deep rate cuts in the next quarter.

Looking beyond the three- and 12-month horizons, there is also wide disagreement on terminal rates – the level of policy rates that will eventually prevail once inflation is again at the desired level.^⑤ This is what in macroeconomic jargon is called r^* (see G Benigno, B Hoffman, G Nuño and D. Sandri, “Quo vadis, r^* ? The natural rate of interest after the pandemic,” in this issue for a comprehensive discussion).

① The views expressed are those of the authors and do not necessarily reflect the views of the BIS. ② See, for example, M De Pooter, G Favara, M Modugno and J Wu, “Monetary policy uncertainty and monetary policy surprises”, *Journal of International Money and Finance*, vol 112, April 2021, 102323. ③ As the projections of the Consensus survey participants do not cover the policy rate, we proxy it by looking at the three-month rate projections. ④ On the contrary, the standard deviation of the one-year inflation forecast of the same Consensus Economics survey increased substantially in 2022, but it then declined and remained low. ⑤ Note that this will be reflected only partly in disagreement at the 12-month horizon, unless one believes inflation would have already reverted to target within the next year.

What could explain the recent drop in VIX?

Karamfil Todorov and Grigory Vilkov^①

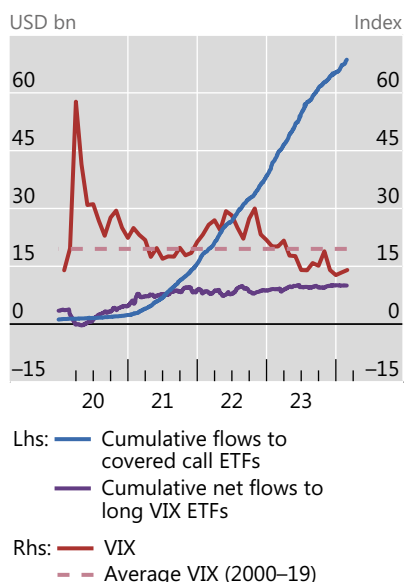
The compression of equity market volatility (VIX) throughout most of 2023 seems puzzling. Despite the prevailing uncertainty stemming from interest rate paths (Box A) and geopolitical tensions, the VIX remained below its long-term average of around 20 for most of 2023 (Graph B1.A, red line). Some observers relate the drop in VIX to the recent rise of trading in short-term options on the S&P 500 index that expire on the day of trading (zero-days-to-expiry or ODTE). The rise of these short-term options, so the argument goes, has drawn trading activity away from the one-month-to-expiry (1MTE) options that underlie VIX. This drop in activity, in turn, has decreased demand for one-month options, thereby depressing VIX.^② In this box, we show that the increased trading in ODTEs in the past few years did not, on net, lure activity away from one-month options and thus is unlikely to be the main explanation behind the drop in VIX. We then propose an alternative explanation: option dealers effectively dampen volatility when they hedge structured products, which have become more popular recently.

Trading volume in ODTEs has risen in recent years because these options are relatively cheap and provide a lottery-like payoff with extremely high, if very unlikely, returns, which appeals to certain investors.^③ These ODTE options on the S&P 500 index (SPX) accounted for more than 50% of the SPX options' trading volume in August 2023, up from just 5% in 2016.^④ Low premiums on ODTEs allow investors to build in very high leverage, hence the lottery-like payoff profile. In fact, leverage ratios of ODTEs are several orders of magnitude higher than those of one-month options and can reach levels above 400 (Graph B1.B, left-hand scale). Investing in ODTE options loses money on average, with annualised returns of -32,000%, but on rare occasions generates extremely high returns of up to 79,000% (Graph B1.B, right-hand scale). These returns are much more volatile than the returns on one-month options, which have an average return of -550% annualised and a maximum of 2,500%.

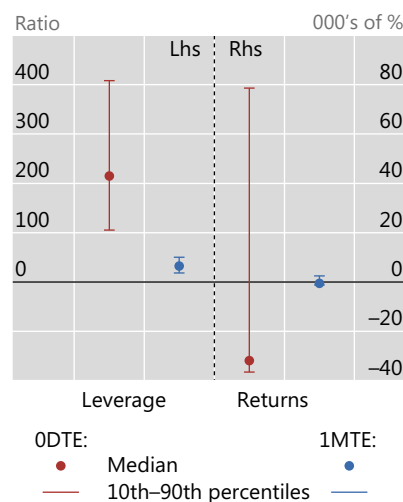
VIX dropped as popularity of structured products surged

Graph B1

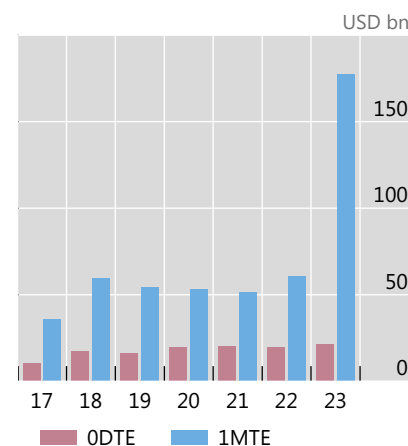
A. ETFs and VIX¹



B. Leverage and returns of ODTEs²



C. 1MTE are used more to obtain market exposure³



ODTE = zero-days-to-expiration options; 1MTE = one-month-to-expiration options.

¹ Covered call exchange-traded funds (ETFs) implement a strategy that buys the index and sells a call option on the index every month. The flows are based on the following ETFs: QYLD, BUFR, XYLD, KNG, RYLD, PJUL, JEPI, QYLG, JEPQ, FEPI, KLIP and DIVO. VIX ETFs trade VIX futures. Net flows to long VIX ETFs are computed as flows into long VIX ETFs minus flows into short VIX ETFs, weighted by their corresponding leverage. The flows are based on the following ETFs: SVIX, SVXY, SVOL, VXX, VIXY, UVXY and UVIX. ² Leverage and returns are computed across moneyness levels for calls and puts. ³ Computed as open interest times option's absolute delta.

Sources: Bloomberg; CBOE; BIS.

While the trading in ODTEs soared in the past few years, this surge is unlikely to explain the drop in VIX for two reasons. First, even though both instruments have grown in past years, one-month options are still used disproportionately more than ODTEs to get actual exposure to the market index itself (Graph B1.C, blue bars vs red bars).^⑤ Second, ODTE trading activity does not directly affect the pricing of one-month options and thus the VIX. This is because the latter is based on one-month maturity, whereas ODTEs expire on the day of trading.

The sale of VIX futures by short VIX exchange-traded funds (ETFs), which was presumably one of the factors behind the drop in VIX in 2017–18, is also unlikely to explain the recent decrease in VIX. These ETFs could put downward pressure on VIX as they sell futures on the volatility index. Such a mechanism was potentially at play in the years before the “Volmageddon” of February 2018, when VIX spiked more than 100% on a single day.^⑥ Recent years though have seen a net positive demand for VIX futures by VIX ETFs (Graph B1.A, purple line). This is inconsistent with pressure from VIX futures sales by ETFs as being a key driver of the drop in VIX.

An alternative and presumably more likely reason behind the compression of volatility is the surge in issuance of yield-enhancing structured products. These types of structured products provide a yield enhancement by offering higher returns to investors thanks to the sale of options. A classic example of a yield-enhancing structured product is a so-called “covered call”: a purchase of the S&P 500 index and a simultaneous sale of a one-month call option on the index. The product gives an exposure to the index and generates a yield enhancement with the sale of the call option (the premium income), but it gives up part of the upside if the index rises above a threshold, say 5% over the next month. In other words, an investor in this covered call effectively takes the view that the market will not rise more than 5% over the next month and monetises this view by selling the call option. A covered call is just a simple illustration of a yield-enhancing structured product, but there are many more-complicated types.^⑦ These structured products are frequently offered to retail investors by banks, which are often dealers.

The rise of yield-enhancing structured products may dampen volatility due to the mechanics of how dealers hedge option exposures. When dealers sell such structured products, they effectively buy an option from their clients. To hedge the option exposure, dealers trade in the underlying asset (the equity index) as a function of its price.^⑧ Specifically, they need to buy when the index goes down and sell when it goes up – a practice known as “dynamic hedging”.^⑨ By doing so, dealers act in a contrarian way, effectively dampening the price movements of the underlying asset. As volatility declines, so does the cost of ensuring against it, as reflected in option prices. Such market dynamics could explain why the VIX can be depressed even in an environment of heightened uncertainty. Suggestive of this mechanism at play, the meteoric rise of yield-enhancing structured products linked to the S&P 500 over the last two years has gone hand in hand with the drop of VIX over the same period (Graph B1.A, blue line).

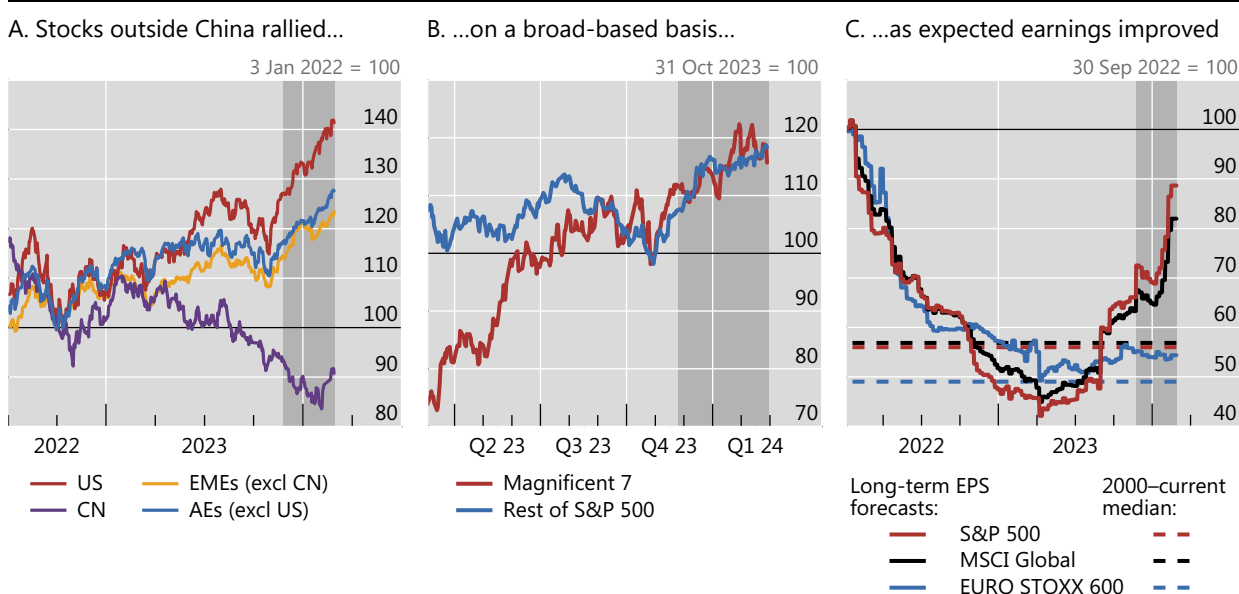
① The views expressed are those of the authors and do not necessarily reflect the views of the BIS. ② R. Wigglesworth, “The ‘broken’ Vix”, *Financial Times*, 30 January 2023, ft.com. ③ G. Vilkov, “ODTE trading rules”, December 2023, available at SSRN: <https://ssrn.com/abstract=4641356>. ④ M. Xu, “Volatility Insights: Much Ado About ODTEs - Evaluating the Market Impact of SPX ODTE Options”, CBOE, 8 September 2023, cboe.com. ⑤ As each option is equivalent to certain number of market shares (delta), the absolute exposure of all one-month options to the market is obtained by multiplying the total amount of option contracts traded with their absolute market share equivalent (absolute delta). ⑥ K. Todorov, “When passive funds affect prices: evidence from volatility and commodity ETFs”, *Review of Finance*, forthcoming. ⑦ Other examples include equity-linked notes or barrier options. Structured products might also involve selling a put option, or a simultaneous purchase and sale of calls and puts. However, as long as the product is yield-enhancing and generates higher coupons than the risk-free rate, which is achieved by the sale of options, the mechanism is similar to a covered call: the client is net short an option and thus sells volatility. ⑧ The dealer can also offload the resulting exposure by matching it against opposing exposure due to transactions in other instruments or other clients; alternatively, the dealer can sell the option on the market, which would also decrease VIX because it depresses option prices. ⑨ H S Shin, *Risk and Liquidity*, Oxford University Press, 2019.

Risky assets pull ahead amid a buoyant mood

Equity markets posted substantial gains in the review period, as market participants anticipated rate cuts and earnings surprises on the upside supported risk sentiment. The rally was common to most AEs and EMEs, with the notable exception of China (Graph 3.A). This time around, it encompassed most stocks (Graph 3.B), rather than overwhelmingly the “magnificent 7” big tech companies, whose valuations nonetheless reached ever loftier levels. In addition to lower discount rates, positive earnings surprises buoyed prices (Graph 3.C). Japanese stocks, which underperformed in December, subsequently rallied, reaching all-time highs.

Global equity markets are buoyed by declining interest rates and strong earnings¹

Graph 3

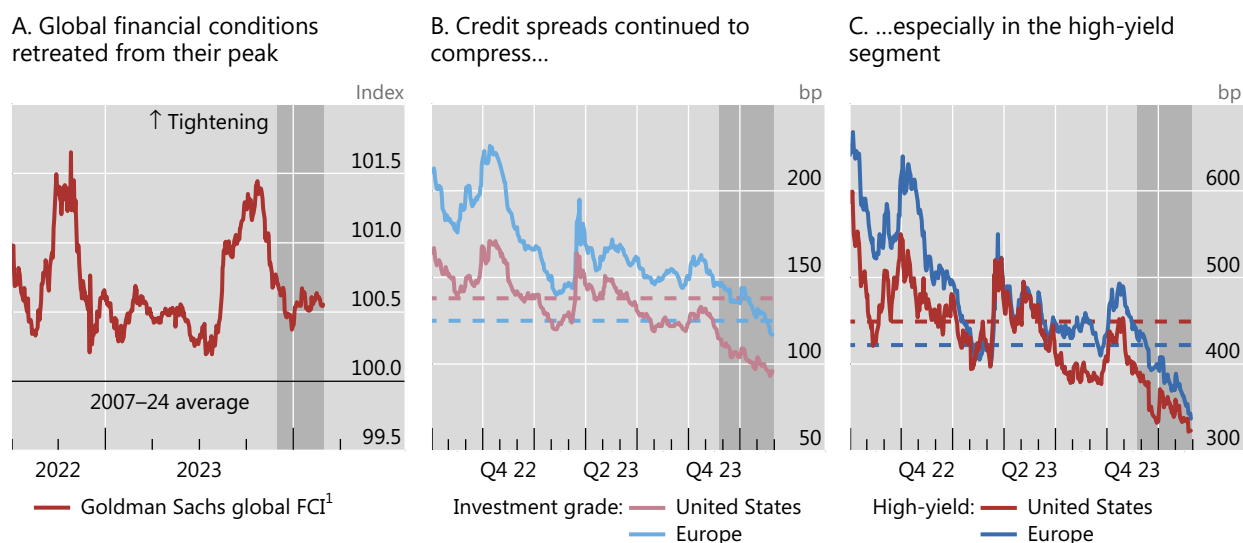


The shaded area indicates 25 November 2023–26 February 2024 (period under review).

¹ See technical annex for details.

Sources: IMF; Bloomberg; Datastream; Refinitiv; BIS.

The dynamics of financial conditions reflected the waxing and waning of market participants' expectations of early rate cuts. While remaining, on balance, tight relative to historical averages, global financial conditions eased substantially from their late-October peak (Graph 4.A). Corporate bond yields fell considerably until the end of December and then recovered somewhat as participants continuously re-evaluated how central bank actions would evolve. Credit spreads, by contrast, mostly followed the declining trajectory embarked on in mid-2022. They declined both in the investment grade and high-yield segments of the market and are now substantially below historical norms in the United States and Europe (Graphs 4.B and 4.C).



The shaded area indicates 25 November 2023–26 February 2024 (period under review). The horizontal dotted lines indicate 2005–current medians.

¹ See technical annex for details.

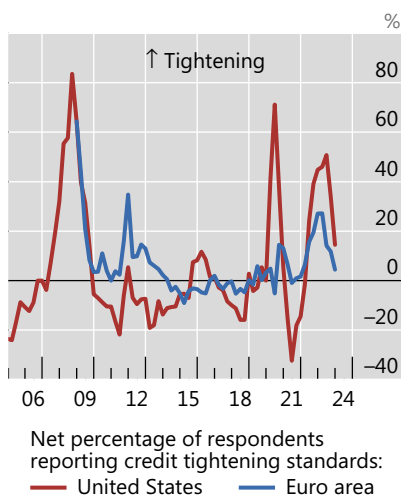
Sources: Goldman Sachs Global Investment Research; ICE BoAML indices; BIS.

The buoyant pricing in equity and credit markets stood in contrast with banks' cautious approach to lending, subdued bond issuance and rising corporate defaults.³ Survey responses showed that – on net – banks were still tightening standards, albeit less than in the previous quarter (Graph 5.A). Furthermore, while bond issuance rose slightly, it remained substantially below pre-pandemic levels. This probably reflected firms' overall limited refinancing needs, given the bulge in issuance in 2020 and 2021. Another factor could be timing decisions, as firms waited for rates to decline further. That said, the continued increase in defaults suggests that at least some firms may have been experiencing funding difficulties (Graph 5.B).

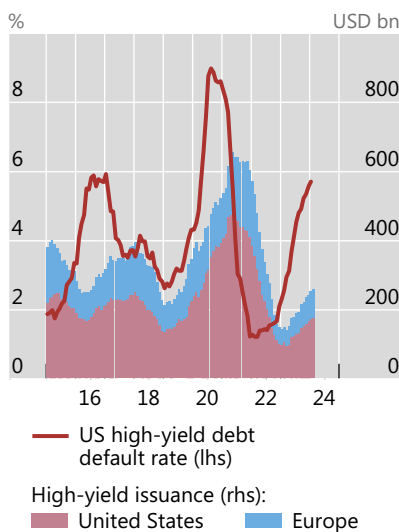
Different factors drove changes in the foreign exchange market over the review period. Until late December, the US dollar depreciated while risk assets rallied, in line with the dollar functioning as a key barometer of risk-taking. However, from January onwards, the dollar appreciated markedly, even as equity and credit markets continued to rally. This pattern is at odds with typical risk-on phases of the period following the Great Financial Crisis (GFC), but it aligns with a more traditional channel of exchange rates reacting to interest rate differentials. Indeed, the behaviour of the dollar was closely linked with changing expectations of future policy rates. When markets' views on the prospects of early rate cuts waned and expectations realigned with central banks' projections, the dollar strengthened materially (Graph 5.C).

³ The resolution of this tension between central banks, financial markets and lending volumes may produce some turbulence, especially in markets with pockets of leverage; see Box C for a discussion of risks among prime brokers.

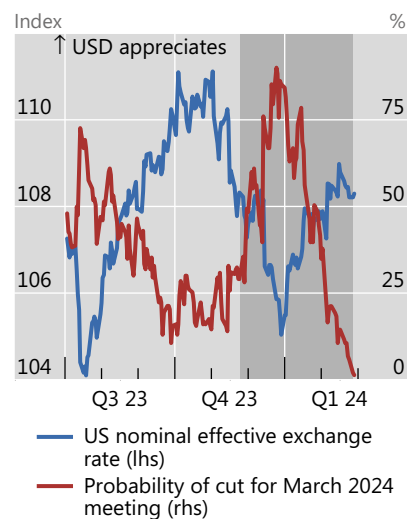
A. Lending standards stayed tight...



B. ...amid subdued corporate issuance, increasing defaults...¹



C. ...and a strengthening US dollar



¹ See technical annex for details.

Sources: Board of Governors of the Federal Reserve System; Bloomberg; Datastream; Dealogic; Moody's; BIS.

The prime broker–hedge fund nexus: recent evolution and implications for bank risks

Douglas Araujo, Benjamin Cohen and Kevin Tracol^①

Prime brokerage is a set of services offered to hedge funds and other non-bank financial institutions by broker-dealers, most of which are part of large banking groups. It centres around the provision of leverage via both derivatives and securities financing transactions, such as margin loans, and of the necessary infrastructure related to market access, custody, clearing and related support. Past research has studied how liquidity and funding shocks at prime brokers (PBs) can spill over to hedge funds,^② but contagion can run in both directions. This box uses several relatively underexplored data sets to look at how hedge funds might contribute to the risks of their PB counterparties.

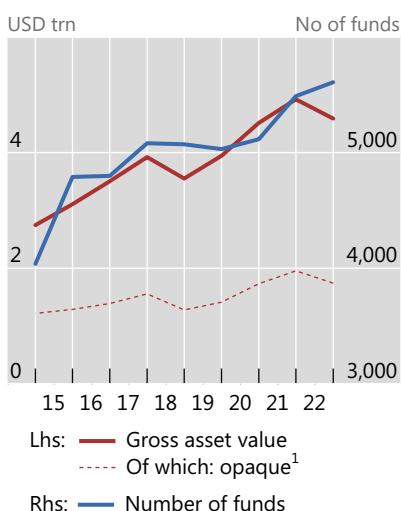
As of end-2022, US-registered hedge funds held over \$4.5 trillion of gross assets (Graph C1.A). This sum refers to those funds not associated with any bank, broker-dealer or insurance company. Their gross assets are small relative to the global assets of non-bank financial institutions, estimated at between \$63 trillion and \$218 trillion.^③ But hedge funds attract particular attention because of their ability to ramp up leverage, which can create financial stability risks.

Hedge funds rely mostly on a few PBs, who tend to be global systemically important banks, with the largest ones each serving more than 1,000 funds (Graph C1.B). Larger hedge funds tend to have relationships with PB offices located in various jurisdictions (Graph C1.C), helping them to broaden their trading reach across markets.

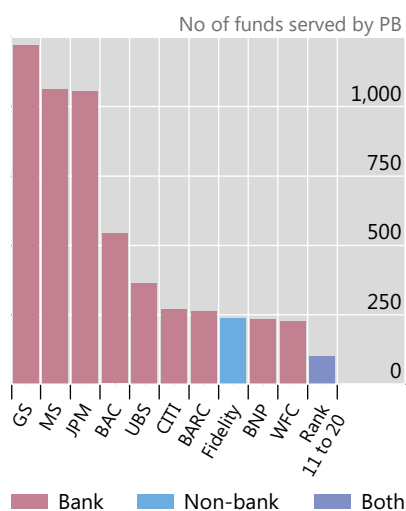
Hedge funds are directly connected to large banks and non-banks across borders

Graph C1

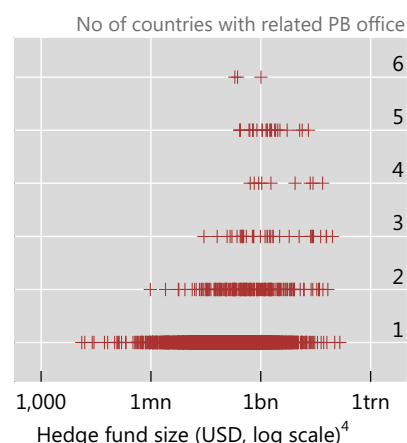
A. Independent hedge funds are significant players...



B. ...that rely mostly on a few large banks for prime brokerage...²



C. ...in multiple financial markets³



¹ Assets not independently valued. ² Ranked by number of funds serviced by prime broker in 2022. Count of prime broker linkages ranked 11 to 20 represent the average number of funds serviced by each prime broker (PB) in the sample as of end-2022. ³ 2022 data. Each plus sign represents a hedge fund. ⁴ Hedge fund's gross asset value.

Sources: US Securities and Exchange Commission (SEC) Form ADV; authors' calculations.

Prime brokerage is designed to be a low-risk activity, but wrong-way risk (WWR), the opaqueness of funds' positions and poor risk management can create vulnerabilities for PBs. WWR refers to the risk that a PB's credit exposure to a hedge fund counterparty increases at the same time as the likelihood of the counterparty's default. Opaqueness is present when the PB does not have the necessary visibility into the funds' positions, eg because they are booked in different entities, the assets are complex or the assets do not have readily verifiable market values. The resulting risk exposures often become apparent only when the fund is facing severe difficulties.

These factors played out, for example, in the Archegos Capital Management episode. The fund had large and concentrated positions in a small number of shares. When these stocks suddenly plummeted, the fund's financial strength suffered a blow, while PBs' exposure to the fund surged, exacerbated by leverage – a case of WWR. Illustrating

opaqueness, Archegos' PBs were not fully aware of the size of the fund's positions with other banks, thereby underestimating its overall leverage and impact on the markets in which it was active. Compounding these risks, Credit Suisse, the PB most affected by Archegos' failure, had not set sufficiently conservative terms for the leverage it had provided. This resulted in both an excessive credit exposure for the bank and excessive leverage of the fund.^④

The hedge fund sector as a whole also demonstrates signs of procyclical leverage, WWR and opaqueness. PBs tend to provide more margin loans to hedge funds when markets are buoyant: secured borrowing by hedge funds correlates closely with stock market valuations (Graph C2.A), just as leverage in dealer balance sheets is procyclical.^⑤ Hedge fund credit quality as perceived by dealers (Graph C2.B, blue line) deteriorates during weak market conditions (red line), when the value of assets the banks hold as collateral vis-à-vis the funds falls. This positive correlation between default probability and *net* credit exposure constitutes WWR. As for opaqueness, the assets of a quarter of hedge funds are not fully independently valued,^⑥ comprising 38% of hedge fund assets (Graph C1.A), making it more difficult for PBs to trust the fund's stated asset values, especially in adverse market conditions.

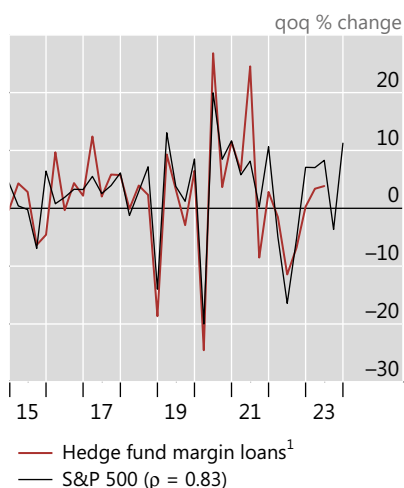
PBs accommodate hedge fund requests for better conditions on margin loans during calmer market periods, only to tighten these conditions during stress episodes (Graph C2.C). The Archegos episode is an extreme example: well in advance of the fund's troubles, those in Credit Suisse who wanted to maintain a relationship with Archegos reportedly resisted efforts by risk management to demand more margin. Evidence suggests that such efforts to accommodate customers occur in the market in aggregate, reinforcing procyclicality. When hedge funds seek looser trade conditions with their PBs, such as better pricing or lower margin requirements (Graph C2.C, black line), fewer dealers report margin loan tightening (Graph C2.C, red line). Dealers tighten such terms when markets turn volatile (quarters with darker shading).

These vulnerabilities call for sound risk management by PBs, overseen by risk-based, proactive supervision. Further, the global nature of prime brokerage illustrates the value of international supervisory collaboration.

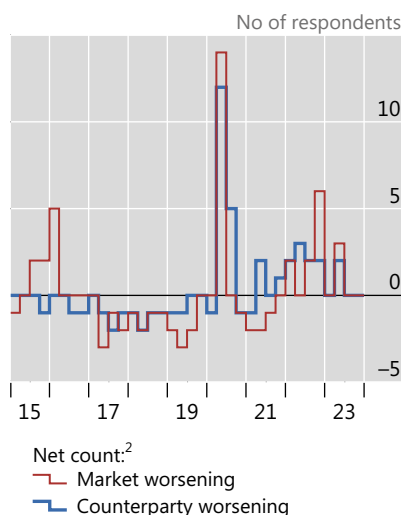
Vulnerabilities from hedge funds also play out in aggregate

Graph C2

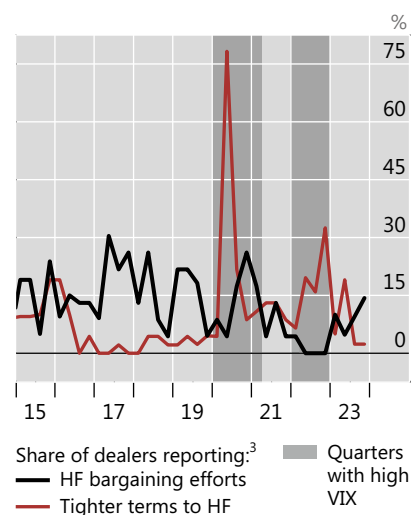
A. Leveraged trades that co-move with the market...



B. ...lead to wrong-way risk...



C. ...while dealers avoid tightening trade conditions in calmer periods



¹ Hedge funds' total secured borrowing via prime brokerages (margin accounts). ² Net count of dealers reporting reason for tightening vs easing price or non-price terms to hedge funds over the past quarter due to either market or counterparty worsening. ³ Net per cent of dealers reporting reason for tightening vs easing price or non-price terms to hedge funds over the past quarter.

Sources: Federal Reserve Bank of St Louis, FRED; US Securities and Exchange Commission (SEC) Form ADV; authors' calculations.

① The views expressed are those of the authors and do not necessarily reflect the views of the BIS. ② M S Kruttli, P J Monin and S W Watugala, "The life of the counterparty: shock propagation in hedge fund-prime broker credit networks", *Journal of Financial Economics*, vol 146, no 3, December 2022, pp 965–88. ③ Financial Stability Board, *Global monitoring report on non-bank financial intermediation: 2023*, 18 December 2023. ④ Paul, Weiss, Rifkind, Wharton & Garrison LLP, *Credit Suisse Group Special Committee of the Board of Directors report on Archegos Capital Management*, 29 July 2021. ⑤ S Aramonte, A Schrimpf and H S Shin, "Non-bank financial intermediaries and financial stability", *BIS Working Papers*, no 972, October 2021. ⑥ Data from US Securities and Exchange Commission Form ADV.

EMEs, with the exception of China, followed AEs

With the exception of China, developments in EME fixed income markets were broadly in line with those in AEs. Disinflation also remained well on track in EMEs (Graph 6.A), and most central banks were expected to either continue or begin cutting policy rates (Graph 6.B). As a result, nominal government bond yields fell in the early part of the review period. In contrast to AEs, however, and somewhat surprisingly given the appreciation of the dollar, they did not increase substantially afterwards (Graph 6.C).

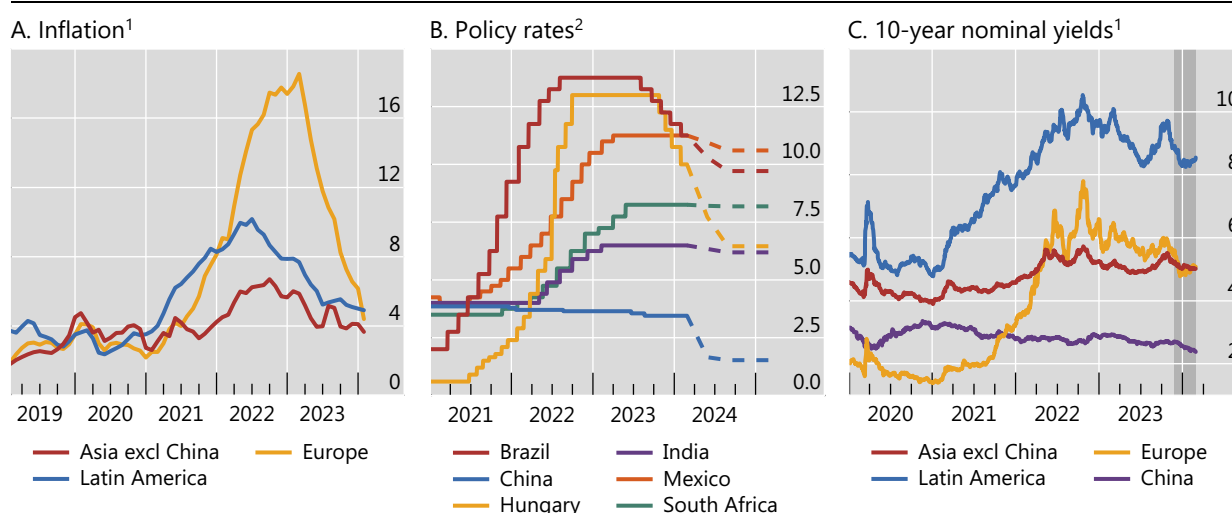
In line with the general risk-on sentiment, equity markets in most EMEs rose, even though they broadly underperformed those in AEs. Latin American markets increased slightly more than Asian ones (Graph 7.A). Despite the recent rally, EME stock prices still entailed a heavy valuation discount, rendering their valuations more attractive on a forward-looking basis compared with those of AEs (Graph 7.B).

In contrast to those of most other EMEs, Chinese stocks continued to slump. And this took place despite signs that the Chinese economy was stabilising, as official data showed it had met the government's 5% growth target. Market participants shrugged off the support offered by the central bank and fiscal authorities in December. Instead, they seemingly focused on inflation indicators and the persistent problems in the real estate sector. Property sales and new home starts contracted, and property prices continued to decline. In addition, inflation gauges pointed to prices declining at their fastest pace since the GFC. Reflecting this negative sentiment, Chinese equities extended losses: at one point the CSI 300 Index was 45% below its previous peak. In parallel, the Hang Seng Index fell in January, even reaching July 1997 levels. The tide seemed to turn in February, when Chinese authorities unveiled a number of measures to ease financial conditions and stimulate credit.

EME yields went down

In per cent

Graph 6



The shaded area indicates 25 November 2023–26 February 2024 (period under review).

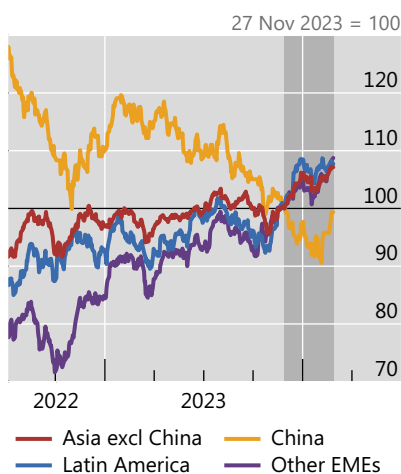
¹ See technical annex for details. ² Dashed lines represent futures-implied market expectations of policy rates.

Sources: Bloomberg; Datastream; BIS.

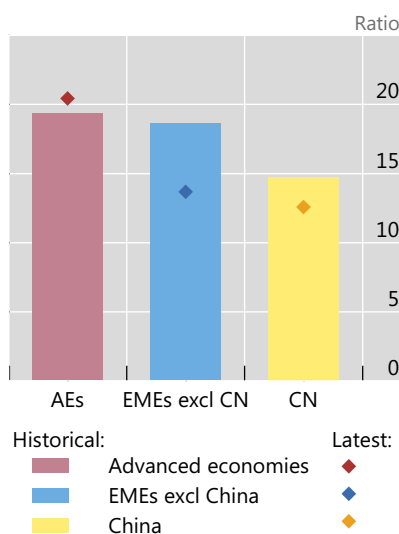
EME equities went up with the exception of China¹

Graph 7

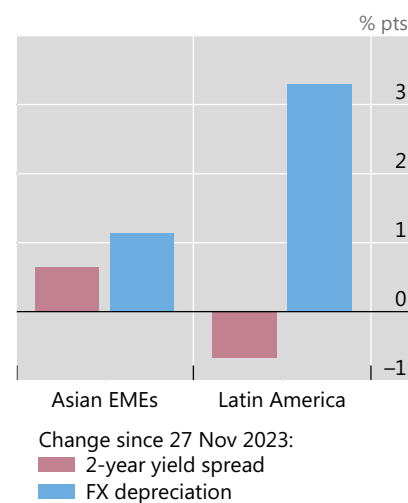
A. Equity markets



B. Price-to-earnings ratios



C. Change in 2-year yield spread and FX depreciation vis-à-vis USD



The shaded area indicates 25 November 2023–26 February 2024 (period under review).

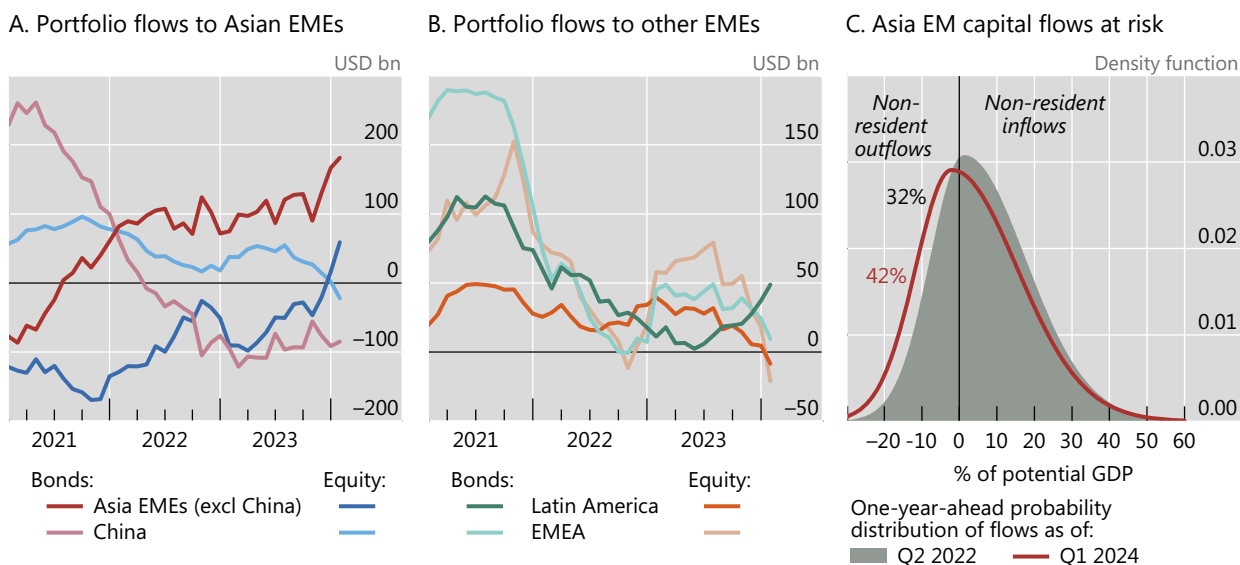
¹ See technical annex for details.

Sources: Bloomberg; Datastream; BIS.

EME currencies depreciated mildly, with foreign exchange (FX) markets hinting at some localised pressure. Asian currencies depreciated less than Latin American ones on the back of improving interest rate differentials vis-à-vis the US dollar (Graph 7.C). While EME spot markets remained orderly, FX derivative segments for the Chinese renminbi showed signs of tension. Against the backdrop of sustained capital outflows, the cross-currency basis for the Chinese renminbi remained substantially large, indicating an elevated premium for Chinese borrowers to obtain dollar funding. This contrasted with the dynamics of the basis for major currencies, which continued to narrow despite the appreciation of the US dollar.

Prospects for yield differentials and equity valuations influenced capital flows to EMEs. Bond flows picked up in Latin America and Asia, given the mostly positive interest rate differentials with the United States (Graphs 8.A and 8.B). Equity flows diverged across jurisdictions: Latin American and EMEs in Europe, the Middle East and Africa saw pronounced outflows (Graph 8.B), whereas Asian EMEs experienced inflows (Graph 8.A). China was a notable exception, as equity funds saw sustained outflows.

There are indications that the risk of moderate-to-large EME capital outflows has increased, which could bring vulnerabilities to the fore. Specifically, compared with mid-2022, the estimated probability distribution of non-resident capital flows one year ahead shifted to the left, indicating a higher probability of outflows (Graph 8.C).



EMEA = Europe, Middle East and Africa.

¹ See technical annex for details.

Sources: Aguilar et al (2024); IIF; BIS.

Technical annex

Graph 2.C: VIX = CBOE Volatility Index. The VIX Index is a financial benchmark designed to be an up-to-the-minute market estimate of the expected volatility of the S&P 500R Index. It is calculated by using the midpoint of real-time S&P 500 Index (SPX) option bid/ask quotes. VXTLT = CBOE 20+ Year Treasury Bond ETF Volatility Index.

Graph 3.A: US = S&P 500; CN = CSI 300 Index. Country group aggregates based on gross domestic product (GDP)-weighted averages.

Graph 3.B: Magnificent 7 = Apple, Alphabet, Amazon, Meta, Microsoft, Nvidia and Tesla.

Graph 3.C: EPS = earnings per share.

Graph 4.A: Goldman Sachs Financial Conditions Index (FCI): a weighted average of country-specific risk-free interest rates (both long and short term), 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 5.B: US high-yield default rate based on Moody's 12-month rolling US speculative grade default rates. High-yield issuance based on a 12-month rolling sum.

Graph 6.A: Purchasing power parity (PPP)-weighted averages. Asia excl China = IN, ID, KR, MY, PH, SG and TH. Latin America = BR, CL, CO, MX and PE. Europe = BG, CZ, HU, PL and RO.

Graph 6.C: Asia excl China = IN, ID, MY and TH. Latin America = CL, CO, MX, PE and BR. Europe = CZ, HU, PL, SK and RO.

Graph 7.A: Asia excl China = HK, IN, ID, KR, MY, PH, SG and TH. Latin America = BR, CL, CO, MX and PE. Other EMEs = CZ, HU, PL and ZA.

Graph 7.B: Historical = average GDP-weighted price-to-earnings ratios from 2 January 2010 until 26 February 2024. Latest = 26 February 2024. Advanced economies = US, JP, EA, AU, CA, NZ, CH and GB. EMEs excl China = HK, ID, KR, MY, PH, SG, TH, BR, CL, CO, MX, PE, CZ, HU, PL and ZA.

Graph 7.C: Asian EMEs = CN, ID, IN, KR, MY, TH and SG. Latin America = BR, CL, CO, MX and PE. Yield spread is the average spread of the two-year yield over the two-year US Treasury yield.

Graphs 8.A and 8.-B: Cumulative net non-resident purchases of equity and debt flows for the past 12 months, serving as proxy for portfolio flows as measured in the balance of payments.

Graph 8.C: Average figures for Emerging Asia considering ID, IN, KR, MY, PH and TH. Probability distribution of non-resident flows based on model estimation of A Aguilar, R Guerra and F Zampolli, "Assessing capital flows' risk to emerging market economies: the role of domestic factors", *BIS Working Papers*, forthcoming.