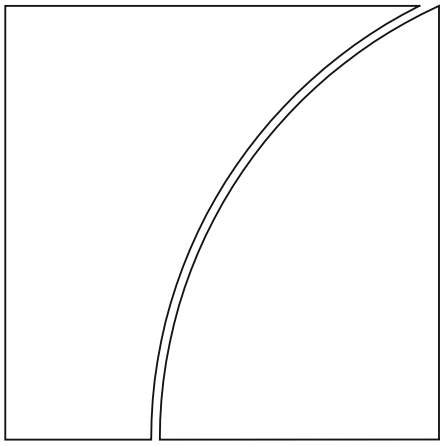

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Capital flows, exchange rates and financial conditions in EMEs in an evolving international monetary system

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Foreword

Emerging market economies (EMEs) have navigated a rapidly evolving global financial landscape shaped by structural changes in capital flow and exchange rate dynamics as well as global financial conditions. Since the Great Financial Crisis, EMEs have witnessed a shift in the composition of capital flows, with the increasing importance of residents' outflows and local currency financing and the growing role of non-bank financial institutions in both gross portfolio capital inflows and outflows. These trends, coupled with the increasing intraregional financial integration among EMEs, underscore the need for resilient and adaptive policy frameworks for EMEs. The 2026 EME Deputy Governors Meeting held in Basel on 12–13 March 2026 provided a platform for central banks to discuss these developments and their implications. The discussions highlighted how EMEs have leveraged diverse policy toolkits, including financial condition indices, foreign exchange interventions and macroprudential measures, to maintain external stability and foster sustainable growth in an increasingly uncertain global environment.

The papers in this volume reflect the key themes discussed at the meeting, exploring the intersection of global and domestic factors shaping EMEs' financial conditions. They examine the evolving dynamics of capital flows and exchange rates, the role of local and foreign investors and the transmission of global financial shocks to EMEs. The volume also sheds light on the innovative approaches adopted by central banks to manage exchange rate pressures, address procyclical investor behaviours and enhance market infrastructure. By sharing the insights and experiences in these contributions, we aim to deepen the understanding of how EMEs can address the challenges of an increasingly interconnected and complex international monetary system in the future.

Frank Smets	Alexander Tombini	Ilhyock Shim
Acting Head of Monetary and Economic Department	Chief Representative for the Americas	Head of Economics for the Americas

Contents

BIS background paper

Contributed papers

Capital flows, exchange rates and financial conditions in EMEs in an evolving international monetary system

Paolo Cavallino, Torsten Ehlers, Fredy Gamboa, Rafael Guerra, Berenice Martinez and Ilhyock Shim[1]

Introduction

The global financial system has experienced significant structural changes since the Great Financial Crisis (GFC). These changes include a shift in capital flows from bank loans to bonds and an increasing role for non-bank financial institutions (NBFIs). In addition, three key developments are particularly notable in emerging market economies (EMEs): (i) the growth of gross international investment positions and the emergence of EMEs as (net) creditors to the rest of the world; (ii) a shift towards greater reliance on local currency financing over foreign currency financing; and (iii) the expansion of intraregional EME portfolio investments.

This note documents these changes and key developments and analyses their implications for the dynamics of capital flows, exchange rates and financial conditions in EMEs. Some of these changes have probably contributed to the resilience of EMEs in recent years. Over the past decade, EMEs have weathered major shocks such as the outbreak of the Covid-19 pandemic in early 2020, globally synchronised monetary policy tightening in 2022 and heightened trade uncertainty in 2025.

At the same time, financial conditions remain highly synchronous across EMEs. This suggests that global factors, in particular changes in the value of the US dollar, remain important. Financial conditions indices used by many EME central banks and the BIS show that almost all EMEs benefited from accommodative global and domestic financial conditions in 2025, despite high levels of economic and trade uncertainty. This was primarily because of a weak US dollar and cuts in EME policy rates. The latitude to cut rates without experiencing capital outflows and a weakening currency is indicative of the strengthened policy frameworks in many EMEs. Indeed, the sensitivity of portfolio capital flows to and from EMEs as well as of EME local currency bond yields to a unit change in the US dollar's strength has declined over the past several years. This stands in contrast to the 2020 and 2022 episodes during which global financial conditions tightened and EMEs experienced capital outflows.

An effective policy mix tailored to country circumstances remains important to maintain external stability and to manage risks from non-resident inflows and resident outflows. Some structural changes, especially the increased symmetry in the magnitude of capital inflows and outflows, have reduced frictions and would allow exchange rates to play a greater role as a shock absorber in many EMEs. The substantial differences in the underlying composition and drivers of capital inflows

[1] The views expressed in this paper are those of the authors and not necessarily those of the BIS. We thank Kevin Cheng, Gaston Gelos, Benoit Mojon, Hyun Song Shin, Frank Smets, Christian Upper, Alexandre Tombini and Tao Zhang for comments, and Ulf Lewrick for providing analytical inputs.

and outflows, however, imply that they can react differently to the same shocks. To remain strong, EME policy frameworks need to adapt to these structural changes.

The remainder of this note is structured as follows. The first section documents the key structural changes in the global financial system from the perspective of EMEs. The second section conducts an empirical analysis of the dynamics of capital flows and exchange rates and studies which factors drive financial conditions. The last section discusses their implications for EME central banks' policy mix.

Key structural changes in the global financial system

This section documents the dynamics of capital flows in EMEs over the past two decades, highlighting three structural changes and evolving investor composition.

Capital flows

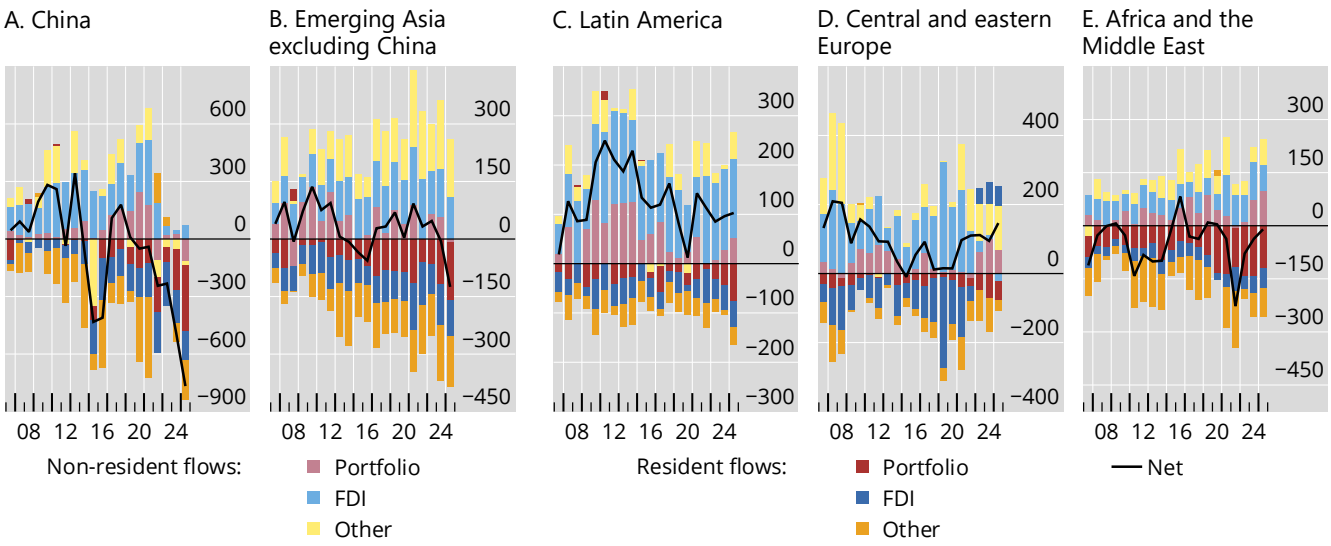
The composition and direction of capital flows to and from EMEs have exhibited significant changes over the past decades.

First, both gross capital inflows and gross capital outflows have grown substantially in all EME regions, with some emerging as net creditors to the rest of the world (Graph 1). Since the GFC, the external assets of emerging Asia and, to a lesser extent, those of Africa and the Middle East have increased at a faster pace than their external liabilities, turning these regions into net exporters of capital (black solid

Capital flows by EME regions[1]

In billions of US dollars, annual data

Graph 1



[1] For 2025, figures correspond to the sum of flows for the last four available quarters up to Q3 2025. For more details, see Graph A.1.

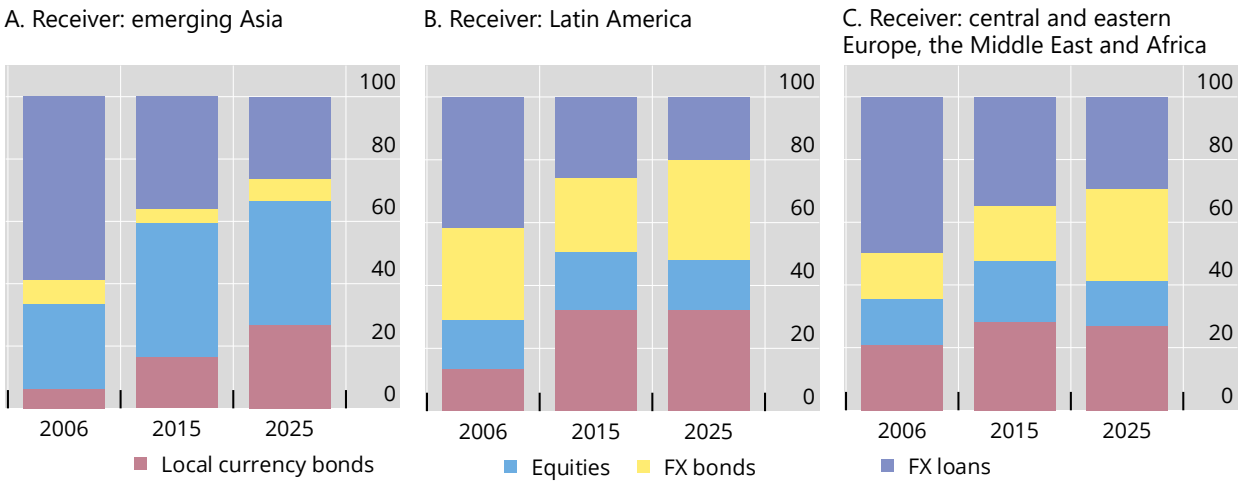
Sources: IMF; BIS.

line), with China playing a particularly prominent role (McGuire et al (2021)). This growth has been primarily driven by the rise in portfolio outflows. In contrast, Latin America and central and eastern Europe have continued to be net capital importers. However, while foreign direct investment (FDI) continues to dominate capital inflows in Latin America, central and eastern Europe has experienced a shift in recent years, with portfolio and other flows replacing FDI as the primary source of capital inflows.

Second, bond and equity flows have gained greater importance than banking flows, both for inflows and outflows (Graphs A.2 and A.4). The share of foreign exchange (FX) loans in EMEs' total outstanding amount of external financing has declined from approximately 50% before the GFC to less than 30% across all regions (Graph 2). At the same time, the share of bonds and equities has grown substantially, with local currency bonds now accounting for nearly a third of all external financing. Similarly, the share of equities in external assets held by EME residents has grown faster than that of loans and bonds across all regions, albeit starting from a very low base (Graphs 3 and A.3). Among EMEs' lending to banks abroad, banks located in an EME (Graph 3, yellow bars) made more loans and deposits to banks located outside the EME than non-bank entities located in the EME did (orange bars).[2]

Changing composition of external financing by EMEs[1]

In per cent; the amount outstanding of foreign liabilities — Graph 2



[1] External financing comprises foreign currency (FX) credit to EMEs via FX loans and bonds, and foreign investment in EME local currency assets via equities and local currency bonds. Data for each year correspond to Q1.

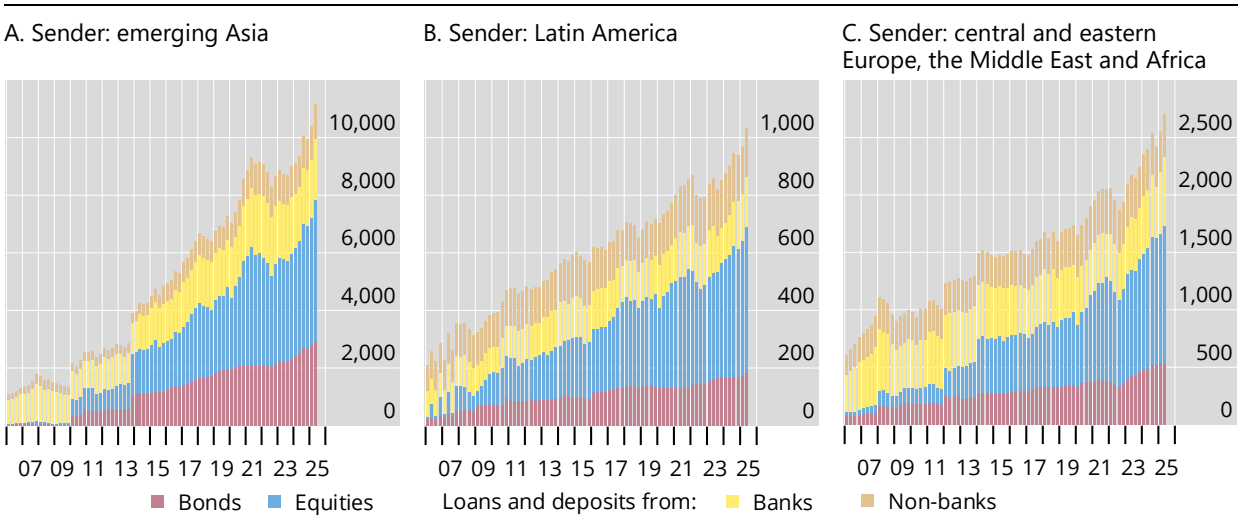
Sources: IMF; BIS global liquidity indicators; BIS locational banking statistics; BIS.

[2] In 2025, 87% of the outstanding amount of emerging Asia's loans to and deposits in foreign banks was from China, Hong Kong SAR and Singapore, and mainly to banks located in China, France, Germany, Hong Kong SAR, Singapore, the United Kingdom and the United States. Similarly, 54% of the outstanding amount of Latin America's loans to and deposits in foreign banks were from Mexico, and mainly to banks located in Canada, Switzerland, the UK and the US. Finally, 42% of the outstanding amount of central and eastern Europe's, the Middle East's and Africa's loans to and deposits in foreign banks were from the United Arab Emirates, and mainly to banks located in the United Kingdom and the United States.

Third, EMEs have become increasingly significant investors in other EME bonds, particularly within the same region. While advanced economies (AEs) in Europe and North America remain the largest investors in EME bonds across all regions (Graph 4), the share of portfolio bond investments held by EMEs within the same region has grown substantially (Ehlers et al (2025)). As of 2024, intraregional investors had a strong presence in emerging Asia's bond markets. A similar trend is observed in portfolio bond outflows from EMEs. Although US bonds, followed by those issued by AEs in Europe and offshore financial centres ("other AEs"), remain the primary investment destinations for EME residents, the share of EME bonds in their portfolios has risen significantly across all EME regions, with notable intraregional holdings (Graph 5). Similar patterns are evident in equity investments both to and from EMEs, where intraregional investors are playing an increasingly prominent role (Graphs A.5 and A.6).[3]

Portfolio capital and banking investments abroad by residents in EMEs[1]

In billions of US dollars; the amount outstanding of foreign assets — Graph 3



[1] Portfolio bond and equity outflows from residents in the region; loans and deposits correspond to the outstanding amount of the liabilities of banks located in reporting countries excluding an EME to all banks (yellow bars) and non-banks (orange bars) in the EME in each region.

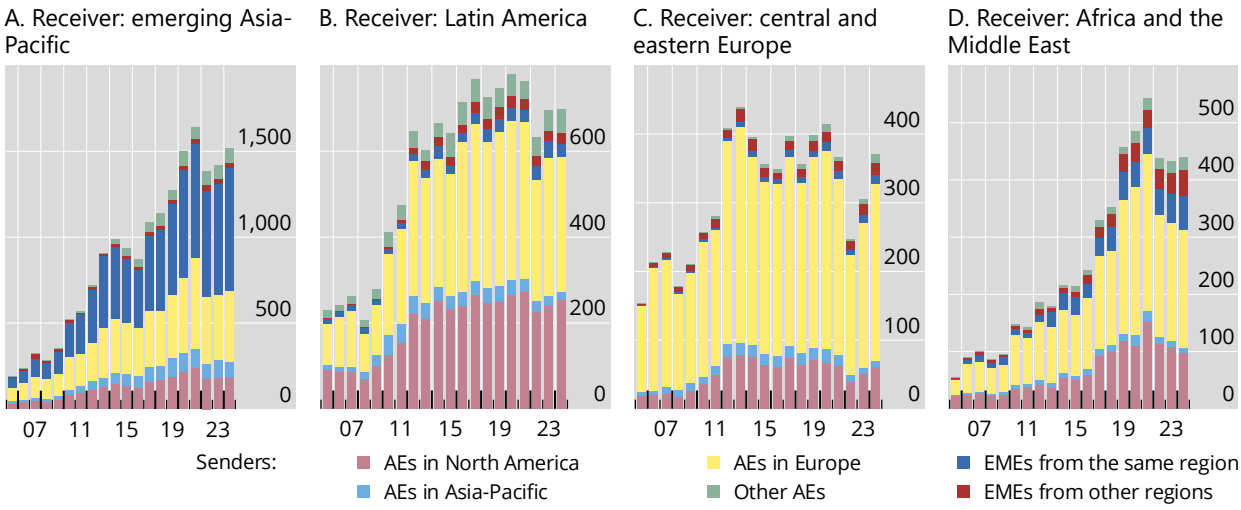
Sources: IMF; BIS locational banking statistics; BIS.

[3] Regarding intraregional bond and equity investments in emerging Asia, it is important to consider the strong link between China and Hong Kong SAR via the Stock and Bond Connects and other routes.

Portfolio bond investment in EME regions by non-resident investors[1]

In billions of US dollars; the amount outstanding of holdings

Graph 4



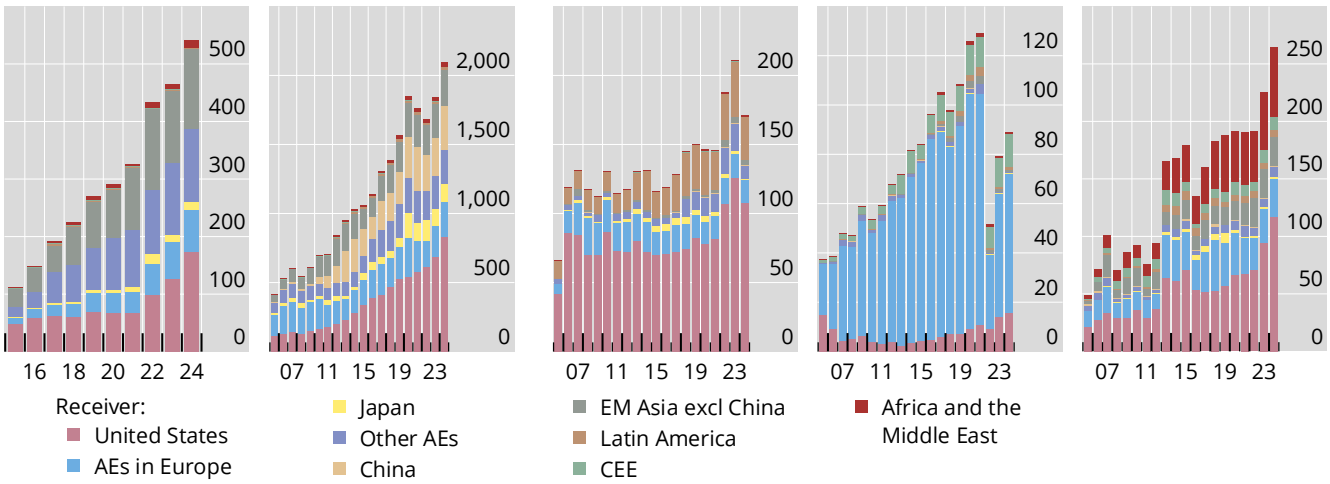
[1] SA started reporting to the IMF's Portfolio Investment Positions by Counterpart Economy (PIP) survey in 2013, and CN and PE in 2015; data for RU up to 2021. For details of countries in each region, see Graph A.5.

Sources: IMF; BIS.

Portfolio bond investment in foreign countries by residents in EME regions[1]

In billions of US dollars; the amount outstanding of holdings

Graph 5



[1] SA started reporting to the IMF's Portfolio Investment Positions by Counterpart Economy (PIP) survey in 2013, and CN and PE in 2015; data for RU up to 2021. For details of countries in each region, see Graph A.6.

Sources: IMF; BIS.

Investor composition of EME foreign assets and liabilities

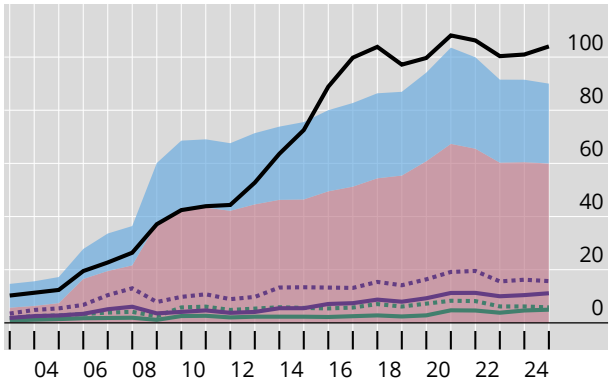
The surge in gross capital inflows and outflows in EMEs has been accompanied by an increasingly significant role played by both foreign and domestic NBFIs.[4]

Domestic NBFIs are becoming increasingly important in EMEs, although their foreign asset holdings remain relatively small in many cases. By end-2024, the total assets of NBFIs in EMEs excluding China amounted to around 90% of GDP (Graph 6.A). In comparison, total foreign assets held by EME residents accounted for just 11% of GDP, while foreign assets held specifically by domestic NBFIs were only 5% of GDP. However, there is significant variation across EMEs. In some, foreign asset holdings of domestic NBFIs are substantial, reaching 54% of GDP in South Africa, 37% in Chile and 21% in Korea (Graph 6.B). The low share of foreign assets held by NBFIs in other EMEs is broadly consistent with that in major AEs due to strong "home bias" or "home

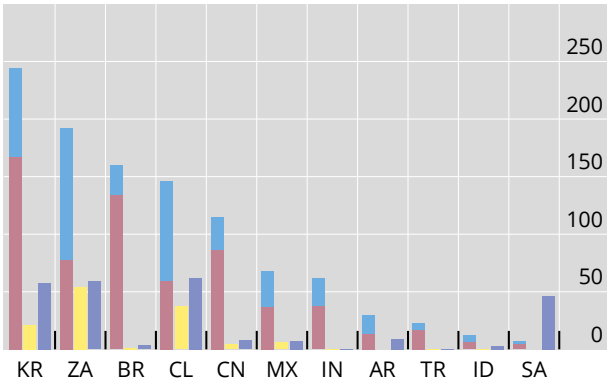
Domestic NBFIs are increasingly important in EMEs, while their foreign asset holdings remain limited in most cases[1]

As a percentage of GDP — Graph 6

A. Total assets of domestic NBFIs in EMEs over time



B. Total assets of NBFIs across selected EMEs in 2024[3]



[1] Data for total assets of domestic NBFIs and total foreign assets comprise the following countries: AR, BR, CL, CN, IN, ID, MX, SA, ZA, KR and TR. HK and SG are not included, as they are financial centers. [2] Investment funds and other NBFIs include money market funds, hedge funds, mutual funds, ETFs and some other NBFIs such as central counterparties, broker-dealers, finance companies, trust companies and structured finance vehicles. [3] Data for foreign NBFI assets in AR and SA not available for that year.

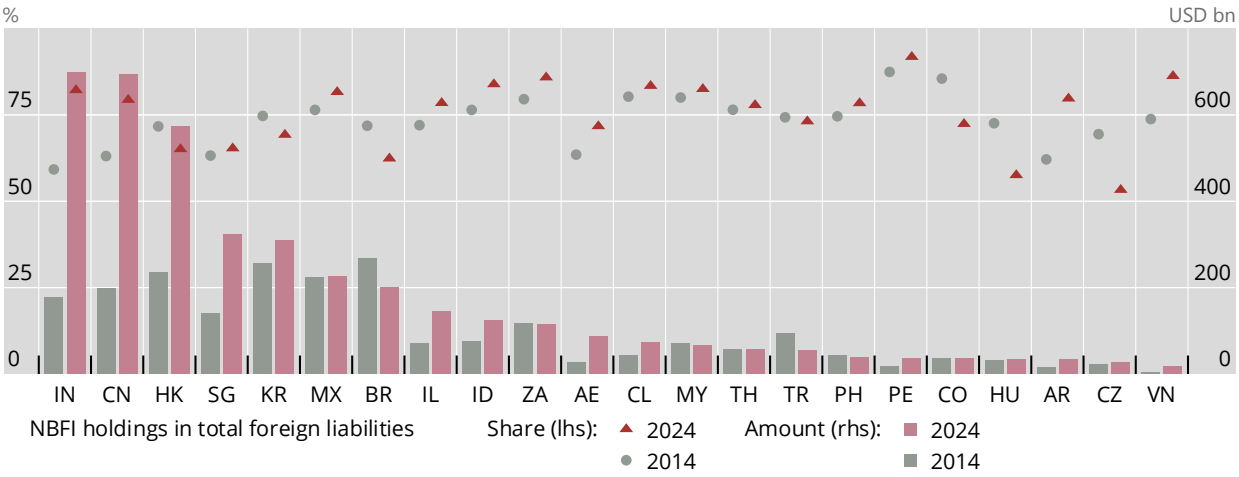
Sources: FSB (2025); IMF; BIS.

[4] NBFIs include investment funds (mostly mutual funds and exchange-traded funds (ETFs)) and long-term institutional investors (such as insurance companies and pension funds). Official investors such as sovereign wealth funds are excluded.

currency bias" in asset holdings (Hau and Rey (2008); Burger et al (2018); Maggiori et al (2020)) and to regulatory restrictions.[5]

While data on foreign asset holdings by different types of NBFIs remain limited for EMEs, countries where NBFIs hold a larger share of foreign assets often have a more developed insurance and pension fund sector. Demographic factors may play a relevant role, as an ageing society boosts both the size of NBFIs and the demand for foreign assets to diversify the relatively higher savings. Understanding which type of NBFIs hold these foreign assets is crucial for assessing international shock transmission (Banerjee et al (2025)). Investment funds, for example, tend to be procyclical, amplifying market movements (eg Ryan (2024); Timmer (2018)). In contrast, insurance companies and pension funds are typically countercyclical investors, providing a buffer against market volatility. Their foreign asset holdings could further strengthen this countercyclical behaviour. Since they often aim to match long-term liabilities in local currency, an FX shock, such as a depreciation of the local currency, would prompt them to sell foreign assets (usually denominated in US dollars[6]), assuming currency risk is not hedged ex ante. This dynamic, in turn, can help dampen the depreciation of the local currency. This is in line with a broader literature on the positive effects of a larger domestic investor base on the resilience of EMEs against external shocks.

Foreign NBFIs' investment in EME assets has increased in importance for most EMEs[1] Graph 7



[1] The amount of holdings by NBFIs of EME assets is estimated based on creditor countries positions. As not all creditor countries provide data on holdings of foreign assets by NBFIs, both the amount and share of NBFIs present a lower bound of the true number. The amount and share for China and other economies in emerging Asia is likely to be substantially underestimated, due to lack of data from Hong Kong SAR.

Sources: IMF; BIS.

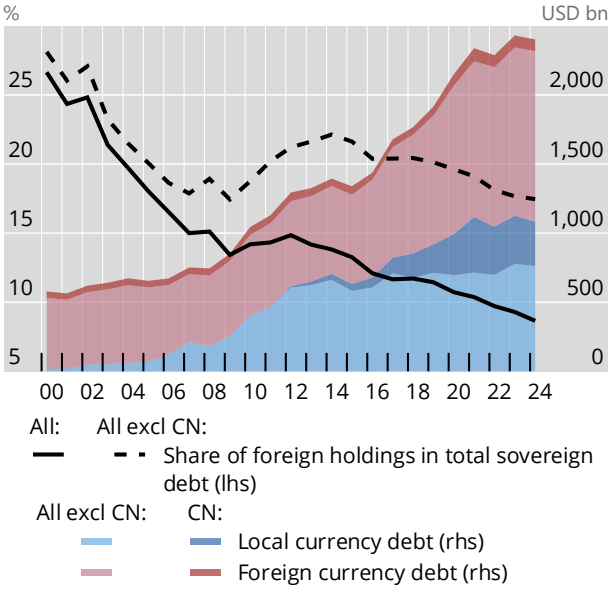
[5] The share of domestic asset holdings in AEs tends to be slightly smaller at about 85% for the United States and closer to 50% for euro area countries, which exhibit a large share of cross-border asset holdings within the common currency area.

[6] Foreign equity is naturally denominated in foreign currency. In some cases, foreign bonds have been issued in EME currencies such as the Chinese yuan (Panda bonds), Hong Kong dollar or Singapore dollar. These bonds are usually marketed to local investors in those countries. In overall volumes, they have remained very small compared with total investments in foreign assets in those countries.

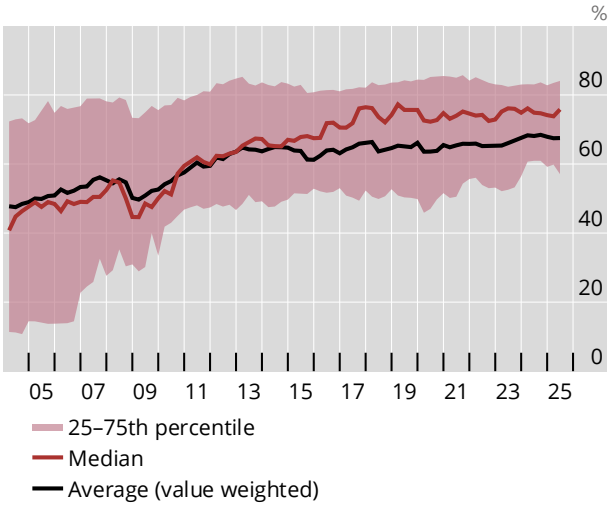
In addition to domestic NBFIs, foreign NBFIs have also grown in importance as investors in EME assets. While the data for these holdings are not complete for all EMEs, the available data do illustrate the significant role of foreign NBFIs for EME assets and their potential to drive capital flows. Overall, the share of NBFI holdings in total foreign holdings of EME financial assets (equities and bonds) is very high across most countries (Graph 7). In some countries (eg China, India), NBFI holdings have increased markedly in the last 10 years.

NBFIs have become key holders of EME sovereign debt[1] Graph 8

A. Foreign holdings of EME sovereign debt



B. Non-banks' share in foreign holdings of EME sovereign debt



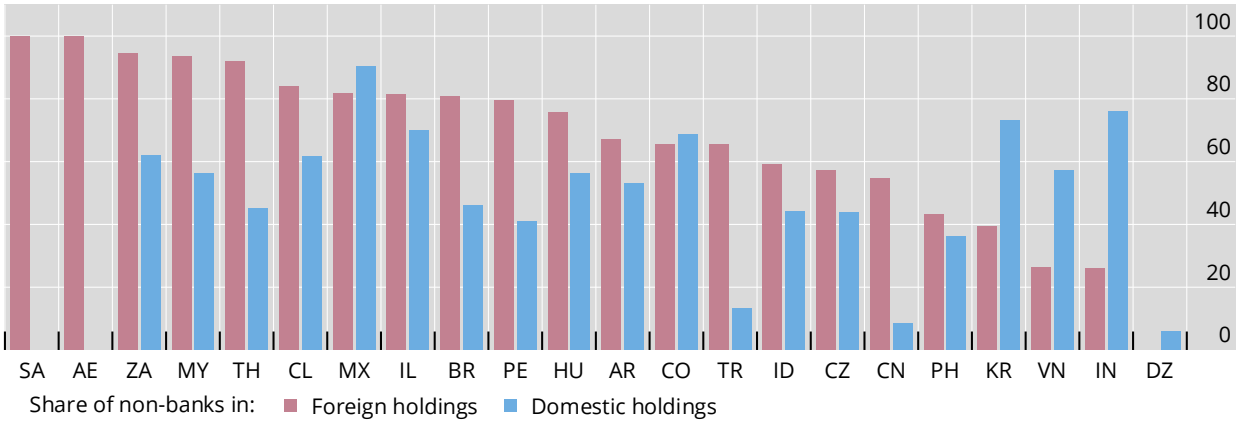
[1] Includes all jurisdictions participating in the BIS EM DGM meeting except HK and SG.

Sources: Arslanalp and Tsuda (2014); BIS.

Foreign NBFIs are the largest foreign investors in EME sovereign bonds. Over the past 20 years, foreign holdings of EME sovereign debt have grown rapidly, primarily driven by local currency bonds (Graph 8.A). Despite the rapid increase in the absolute amount of EME sovereign bond holdings by foreign NBFIs, the overall share of holdings by foreign investors (NBFIs and other) has decreased substantially because of the much faster expansion of EME local currency bond markets. Among foreign investors, NBFIs account for the largest share (Graph 8.B). However, in countries like China and India, the share of NBFIs in foreign holdings is lower than other EMEs, as foreign central banks play a more prominent role (Graph 9).

NBFIs hold high shares of the sovereign bonds of most EMEs[1]

Share of non-banks in foreign and domestic sovereign bond holdings, mid-2025, in per cent Graph 9



[1] Data on sovereign debt holdings by domestic NBFIs are not available for AE and SA. The NBFI share in foreign holdings for DZ is zero. Data for AE, DZ, IL and SA as of end-2024 and for VN as of end-2023.

Sources: Arslanalp and Tsuda (2014); BIS.

Among foreign NBFIs, investment funds are the predominant holders of EME assets, as insurance companies and pension funds are often constrained by home country regulations that limit their exposure to riskier assets. The presence of these NBFIs can heighten the volatility of EME capital inflows, since investment funds tend to trade EME assets in a procyclical manner. This volatility is further amplified by the fact that a significant share of EME assets held by foreign NBFIs are denominated in local currency. Foreign investment funds typically measure their returns in foreign currency (most often the US dollar), and exchange rate fluctuations amplify their gains and losses. These funds generally do not fully hedge their EME currency exposures, exposing them to "original sin redux" since they aim to benefit from potential currency appreciations. This dynamic leads to procyclical buying and selling of EME bonds (Hofmann et al (2025)). For example, a depreciation of the local currency relative to the US dollar prompts investment funds to sell EME assets, exacerbating capital outflows and further depreciating the local currency. Bond funds are particularly vulnerable in this scenario, because their assets are generally less liquid than those of equity funds. This can make bond funds more susceptible to global shocks, as global investors are quick to pull out (Brandão-Marques et al (2022)). An additional amplifying factor arises from the issuance of long-duration EME local currency bonds (Bertaut et al (2025)). When EME currencies appreciate, yields fall, prompting global investors to buy EME bonds. However, when the cycle reverses, investors holding longer-duration EME bonds face a "double loss" as exchange rates depreciate and yields rise, causing bond prices to fall. Bruno et al (2022) find a similar procyclical pattern for EME equity funds.

Box A

Cryptoasset and stablecoin flows

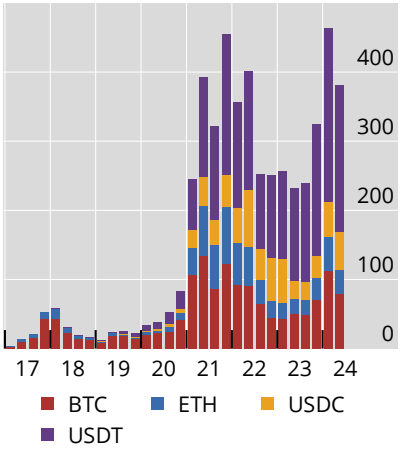
Cross-border cryptoasset (henceforth, crypto) flows to EMEs have seen remarkable growth over the past decade, now accounting for more than half of total global cross-border crypto flows. These flows surged from less than $4 billion in Q1 2017 to over $460 billion in Q1 2024 (Graph A1.A). Initially dominated by native cryptoassets – Bitcoin (BTC) and Ether (ETH) – transaction volumes shifted significantly towards asset-backed stablecoins from 2021 onwards, with Tether (USDT) and USD Coin (USDC) representing approximately 70% of flows by Q2 2024.

Geographically, emerging Asia has consistently led in cross-border transaction volumes, accounting for more than 50% of EME flows in both native cryptocurrencies and stablecoins throughout the period (Graphs A1.B and A1.C). Since 2019, cross-border activity in BTC, ETH and USDC has shifted from China to other major EMEs, particularly India and Indonesia, driven by tighter crypto regulations and bans imposed by the Chinese authorities. As of Q2 2024, Türkiye has emerged as the second largest sender and receiver of USDT. Together with Russia, these two countries account for 12% of USDT cross-border volumes.

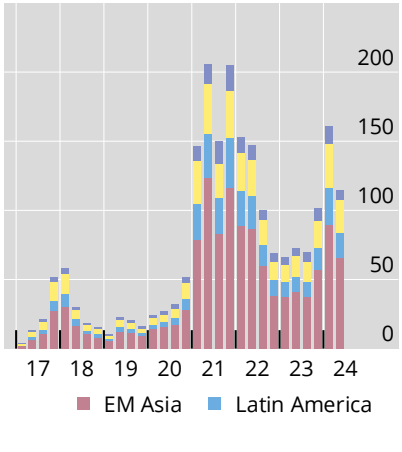
Crypto flows to EMEs[1]

In billions of US dollars — Graph A1

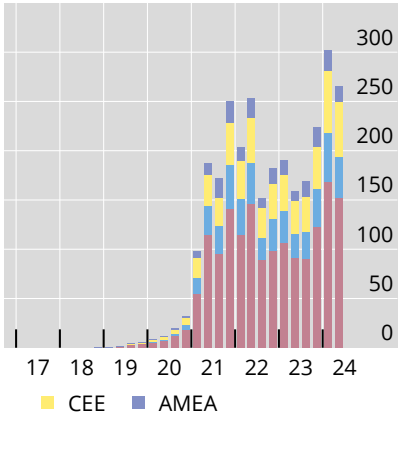
A. Cross-border crypto flows to EMEs



B. BTC and ETH flows to EMEs



C. USDC and USDT flows to EMEs



[1] Quarterly aggregates of cross-border transactions for four crypto assets from Q1 2017 to Q2 2024, where an EME is the recipient.

Source: Auer et al (2025).

Crypto can serve multiple purposes, which in turn affect the drivers of cross-border crypto flows. Unlike traditional finance and trade flows, geographical and proximity factors play a diminished role in crypto flows (Tables A.4 and A.5). This is consistent with the advantages of distributed ledger technologies in overcoming informational asymmetries and reducing transaction costs.

As financial assets, crypto flows are sensitive to global financial and monetary conditions. In particular, tighter global funding conditions, measured by the US dollar index or the credit spread on high-yield debt, reduce cross-border Bitcoin flows to EMEs (Table A.4). In addition, stablecoin flows are closely tied to US monetary policy due to their peg to the US dollar (Table A.5). For instance, a 25 basis point rise in the federal funds rate is associated with an increase in cross-border USDC and USDT flows to EMEs of approximately 14% and 15%, respectively. In contrast, high expected financial market volatility, as captured by the VIX, shows a strong positive relationship with both Bitcoin and stablecoin flows, reflecting their use for speculative motives (Tables A.4 and A.5).

As a medium of exchange, cryptoassets are shaped by conditions in the sending and receiving countries, particularly the stability of local fiat currencies. High inflation in both countries – serving as a proxy for the opportunity cost of using fiat currency – is linked to increased crypto transaction volumes (Table A.6). Similarly, periods of heightened volatility in the bilateral exchange rate between the sending and receiving countries are associated with a rise in stablecoin flows.

The use of crypto as a cross-border medium of exchange is particularly significant in the context of remittances. High remittance costs through traditional financial intermediaries are one factor for increased cross-border stablecoin flows and low-value Bitcoin transactions from AEs to EMEs (Table A.7). Specifically, a 1 percentage point rise in the cost of sending remittances – measured as a percentage of the transaction value – is associated with an increase in stablecoin flows of 1.3–1.6%, and a rise in low-value Bitcoin transactions of 9–10%.

Crypto has the potential to facilitate cheaper and faster cross-border payments while fostering financial inclusion, which could deliver significant benefits and support economic growth. However, they also pose notable risks that may threaten macroeconomic stability and policy effectiveness in EMEs. Three key risks stand out:

Exchange rate volatility. Crypto could significantly reshape capital flow dynamics and amplify exchange rate volatility by reducing frictions in cross-border payments. Transactions between EME currencies and USD stablecoins inherently involve FX transactions. Instability in stablecoin prices could, in turn, increase exchange rate volatility. A note prepared by the Hong Kong Monetary Authority highlights that increased stablecoin transactions vis-à-vis EME currencies are associated with higher exchange rate volatility. Larger and more volatile FX transaction flows driven by stablecoin activity could undermine the effectiveness of foreign exchange interventions, making it increasingly challenging for policymakers to stabilise unwarranted currency fluctuations.

Currency substitution. FX-denominated stablecoins could accelerate currency substitution, posing a threat to monetary sovereignty in EMEs. Although current holdings of FX stablecoins in EMEs remain small compared with overall FX deposits, and the share of FX deposits in total deposits has not increased since the adoption of stablecoins (Adrian et al (2025)), the potential risks are significant. Stablecoins could enable much faster and larger shifts out of local currencies if trust in an EME's domestic currency were to erode. Such currency substitution could weaken the influence of local currency conditions on households' and firms' saving and investment decisions, thereby undermining the effectiveness of monetary policy.

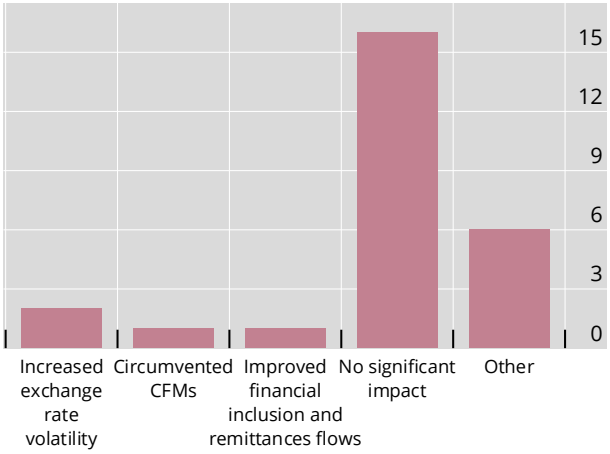
Circumvention of CFMs. Crypto could provide a means to circumvent capital flow management measures (CFMs). These measures typically rely on established financial intermediaries, but crypto allows capital flows to take place outside these traditional channels. Indeed, some evidence indicates that crypto is being used as a marketplace for capital flight (Graf von Luckner et al (2024); Auer et al (2025)). The decentralised, borderless and often pseudonymous nature of cryptocurrencies complicates the imposition and enforcement of CFMs, posing significant challenges for policymakers.

Due to their small volumes, crypto flows have had no significant macroeconomic impact on EMEs, and most central banks assess the risk posed by crypto as minimal (Graph A2). Only seven central banks consider the risks by crypto to be

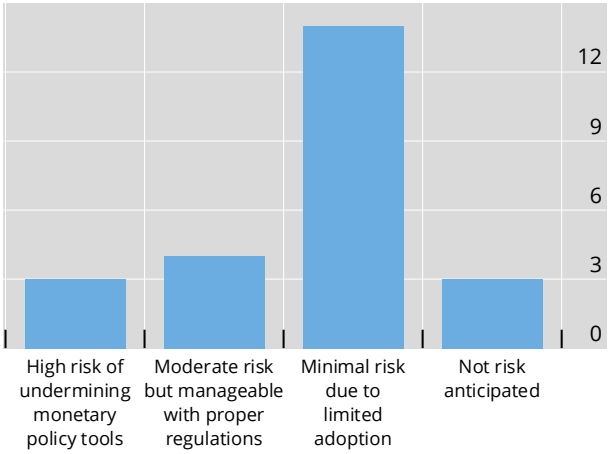
Impact of cryptoassets

Number of respondents — Graph A2

A. Impact of cross-border cryptoasset flows in the economy



B. Potential impact of US dollar-denominated stablecoins and other cryptoassets in monetary policy effectiveness



CFMs = capital flow management measures.

Source: 2026 EME Deputy Governors' meeting survey.

significant, with currency substitution identified as the primary threat. In contrast, other central banks assess these risks as minimal, citing weak incentives for holding FX-backed stablecoins in their economies, often due to the presence of a stable currency and a well developed digital payment system. Recent estimates suggest that stablecoin adoption in EMEs is unlikely to exceed 20% of M2 by 2030, a share that would not significantly affect banks' role in financial intermediation or the effectiveness of monetary policy. ①

Even if stablecoins do not become widespread enough to threaten currency substitution, their increased use would present challenges. Integration with domestic payment systems would be necessary. Structural shortcomings limit stablecoins' ability to function as money. Unlike banks, stablecoin issuers cannot elastically expand their supply in response to economic activity, and they fail to uphold the "singleness" of money, which could create vulnerabilities during market stress. The use of public blockchains introduces financial integrity and security risks, as stablecoins can bypass regulated entities through unhosted wallets.

To address these issues, central banks may want to focus on three areas. First, ensuring robust safeguards to prevent spillovers from stablecoins into the domestic financial system by regulating payment service providers and monitoring stablecoin exposures in regulated entities. Second, preventing the use of stablecoins for illicit activities by enforcing anti-money laundering and combating the financing of terrorism standards, such as the Financial Action Task Force's Travel Rule and the US GENIUS Act. Finally, aligning stablecoin services more closely with traditional financial systems, which may reduce their competitive advantages.

① See S&P Global (2026).

Global financial conditions and the dynamics of capital flows and exchange rates

This section examines how global financial conditions influence capital flows and financial conditions in EMEs, drawing on survey responses and empirical analyses. It also explores how EMEs utilise financial condition indices (FCIs).

Response of EME capital flows and bond yields to global factors

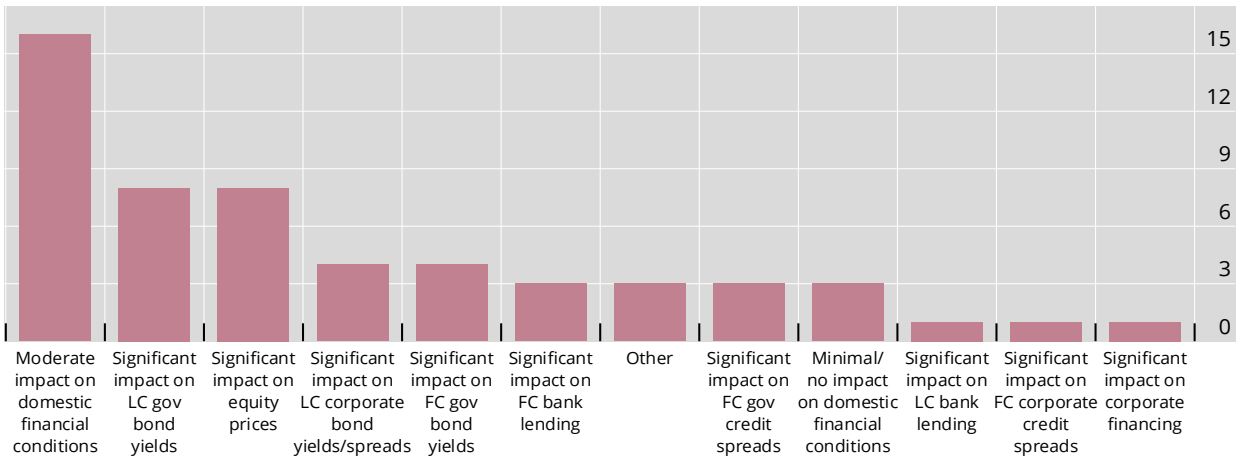
Global financial conditions play a pivotal role in shaping capital flow dynamics and exchange rate movements, particularly in EMEs. Understanding how the sensitivity of EME capital flows to global factors – such as US monetary policy and US dollar exchange rate fluctuations – has evolved over time is essential for assessing the implications for domestic financial conditions and stability.

In this context, central banks reported significant variation in the effects of capital flows and US dollar exchange rate movements on domestic financial conditions across EMEs. While two thirds (16) of EME central banks noted a moderate impact on domestic financial conditions, one third (eight) observed significant effects on local currency government bond yields and equity prices, and several mentioned significant impacts on FX bond yields and credit spreads. These responses illustrate the sensitivity of domestic asset prices to global financial conditions (Graph 10).

Impact of capital flows and US dollar on domestic financial conditions

Number of respondents

Graph 10



FC = foreign currency; LC = local currency; gov = government.

Source: 2026 EME Deputy Governors' meeting survey.

Countries with high external debt exposure highlighted that US dollar appreciation tightened financial conditions by increasing the cost of FX debt and amplifying exchange rate volatility. For instance, Brazil and Mexico mentioned that exchange rate depreciation significantly influenced sovereign bond yields and equity prices. Conversely, Asian EMEs such as Korea and Malaysia observed relatively moderate impacts owing to deeper financial markets and diversified investor base. In addition, Indonesia and South Africa noted that exchange rate volatility exacerbated the procyclical behaviour of NBFIs, further tightening financial conditions in stress periods. These findings support that while EMEs have become more resilient, price-sensitive investors and global financial shocks remain key sources of vulnerability.

Central banks report that a depreciation of the US dollar typically loosens financial conditions in EMEs, although the magnitude and transmission channels vary significantly (Table A.2). Malaysia and Mexico indicated that a weaker US dollar reduced sovereign credit spreads. These effects are attributed to capital inflows into local currency bond markets, which lower borrowing costs. A weaker US dollar was also associated with notable increases in equity prices, consistent with the findings of Bruno et al (2022). For example, the Philippines and Vietnam observed that improved risk sentiment and higher capital inflows into equity markets boosted valuations. Meanwhile, Chile and Peru highlighted that US dollar depreciation linked to improved global risk sentiment tends to loosen financial conditions, whereas depreciation driven by US monetary easing has a muted impact.

Survey participants generally agreed that US monetary policy and Treasury yields significantly influence EME financial conditions, primarily through capital flow and exchange rate channels (Table A.3). Interest rate spillovers were particularly evident in Colombia and Indonesia, where increases in US Treasury yields were associated with rises in local currency government bond yields. South Africa and Türkiye noted that higher US rates lead to capital outflows, local currency depreciation and tighter domestic liquidity conditions. In contrast, Korea and Malaysia reported that proactive

monetary policy, including interest rate hikes and FX intervention, were effective in mitigating the adverse effects of rising US rates.

The sensitivity of EME capital flows to changes in global financial conditions, particularly US interest rates and US dollar strength, varies significantly across countries, reflecting differences in market structures, external positions and policy tools. In Colombia, foreign investors' participation in the domestic sovereign bond market has played a key role in shaping financial conditions.[7] In Peru, financial conditions are influenced primarily by interest rate differentials and deviations from covered interest parity. In contrast, Singapore demonstrates the dominance of global "push" factors over domestic "pull" factors in driving capital flows.

Consistent with country experiences, an empirical analysis for 18 EMEs extending Gelos et al (2024) for 2006–26 shows that gross capital inflows increase when global financial conditions loosen or the US dollar weakens (Graph A.8). This sensitivity has also changed over time and has been relatively low since the end of the pandemic. In particular, the sensitivity to the broad US dollar index either stayed flat or declined steadily in 2025 (Graph 11). In addition, the sensitivity of bond fund flows to the broad US dollar index and the VIX (Graphs A.7.A and A.7.B) is greater than that of gross bond inflows to EMEs (Graphs 11.A and 11.B, respectively). These results imply that price-sensitive and redemption-prone investors such as mutual funds and ETFs tend to react more strongly to global factors which capture global investors' risk appetite.

An empirical analysis on bond and equity outflows from EMEs shows that when the VIX or MOVE index falls, equity or bond outflows, respectively, from EMEs tend to increase, and that EME equity outflows also increase when the US-EME equity return differential increases (Graph A.9). The sensitivity of bond and equity outflows to the bilateral exchange rate, VIX index, MOVE index, US-EME 10-year bond yield differential and US-EME equity return differential has generally declined or stayed around zero since 2022 (Graph 12). In particular, the US-EME equity return differential has been a significant driver of EME equity outflows since 2022 (Graph 12.F).

Given the major trends documented in the first section, we can look at the cross-country relationship between the sensitivity of various types of capital flows to the foreign and global factors considered in Graphs 11 and 12 and the structural characteristics of EMEs. In particular, we consider the local currency share in total external financing and the NBFI share in foreign investment in EMEs vis-à-vis non-resident portfolio inflows and net portfolio inflows and the depth of FX spot or derivatives markets vis-à-vis resident portfolio outflows.

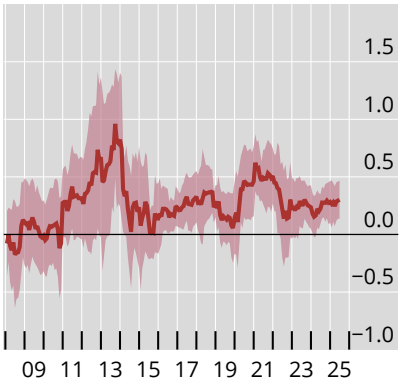
[7] During periods of elevated foreign participation (2014–22), Colombia's financial conditions became more sensitive to global shocks. However, since 2023 the sensitivity has declined due to reduced foreign participation. The central bank's inflation targeting regime has helped to mitigate risks.

Time-varying impact of global and foreign factors on EME portfolio inflows[1]

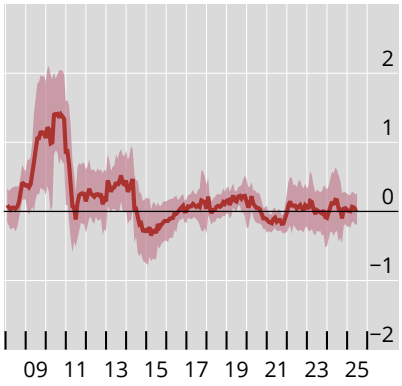
Coefficient on the 1% or 1 percentage point change in each factor, monthly data — Graph 11

Local currency bonds

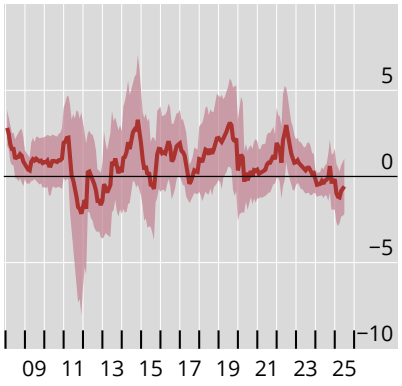
A. Nominal broad US dollar index[2]



B. VIX (inverted)[3]

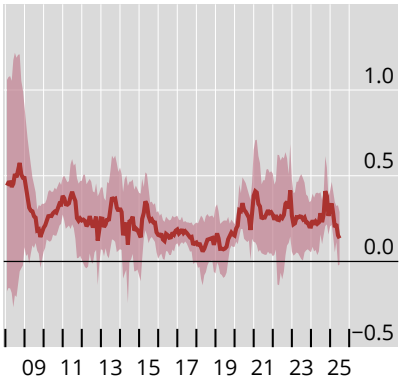


C. Policy rate differential[4]

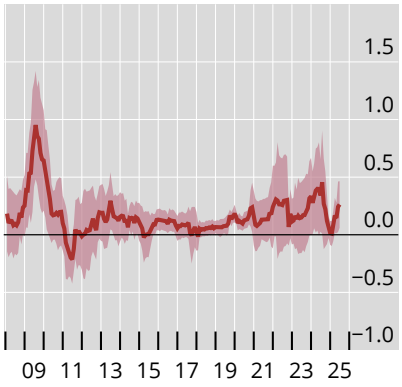


Equities

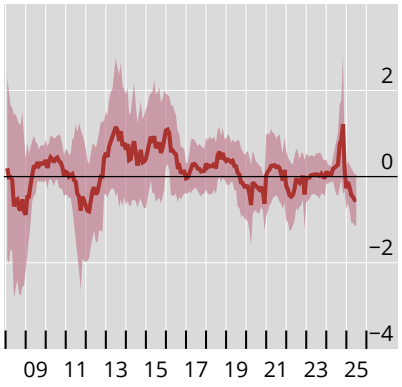
D. Nominal broad US dollar index[2]



E. VIX (inverted)[3]



F. Policy rate differential[4]



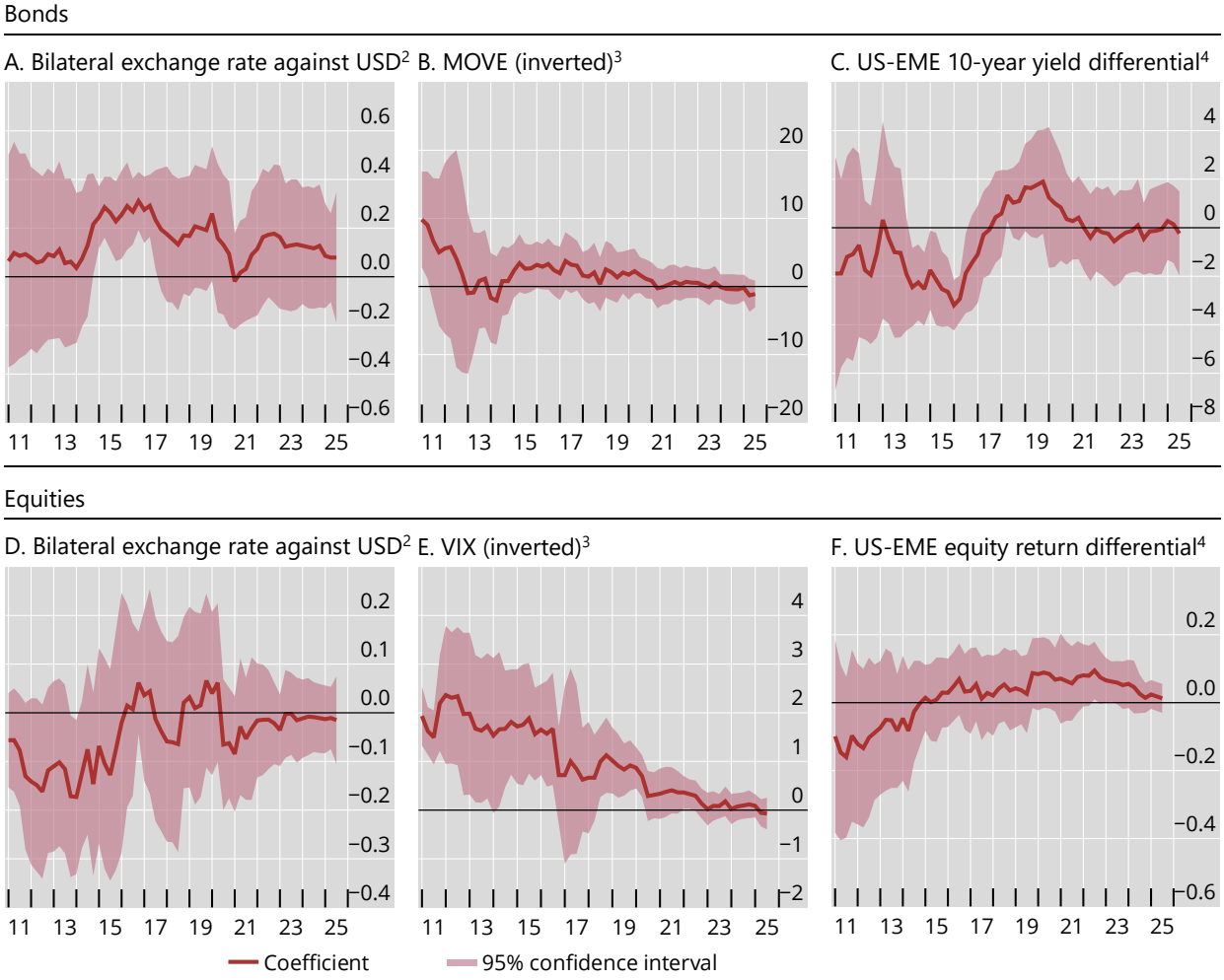
Coefficient — 95% confidence interval

[1] The red line shows the change in the ratio of capital flows to total foreign holdings in percentage points in response to a 1% depreciation of the nominal broad US dollar index; a one-unit decrease in the VIX; or a 1 percentage point increase in the policy rate differential between an EME and the US. The regressions use two-year moving windows with monthly data. The contemporaneous value of the first two variables and the one-period lagged value of the change in the policy rate differential are included jointly in regressions, together with the one-period lagged dependent variable and controls (US CPI, EME CPI, US industrial production (IP), EME IP and Brent oil price; for equities, EME and US equity market returns are also included). The shaded area shows the 95% confidence interval. [2] A positive coefficient means that a depreciation of the nominal broad US dollar index increases capital flows. [3] A positive coefficient means that a decrease in the VIX increases capital flows. [4] A positive coefficient means that an increase in the policy rate differential increases capital flows.

Sources: Federal Reserve Bank of St Louis; Institute of International Finance; IMF; Bloomberg; LSEG Datastream; national data; BIS.

Changing impact of global and foreign factors on portfolio outflows from EMEs[1]

Coefficient on the 1% or 1 percentage point change in each factor, quarterly data — Graph 12



[1] The red line shows the change in the ratio of capital flows to total foreign holdings in percentage points in response to a 1% appreciation of an EME's local currency against the US dollar; a one-unit decrease in the MOVE index or the VIX index, or a 1 percentage point increase in the US-EME 10-year yield differential or the US-EME equity return differential. The MOVE (Merrill Lynch Option Volatility Estimate) index is calculated from implied volatilities of 1-month US Treasury options. The regressions use five-year moving windows with quarterly data. The contemporaneous value of the MOVE and VIX indices and the one-period lagged value of the change in the bilateral exchange rate and the yield/return differentials are included jointly in regressions, together with the one-period lagged dependent variable and controls (US CPI, EME CPI, US real GDP, EME real GDP and the US-EME policy rate differential). The shaded area shows the 95% confidence interval. Fifteen EMEs are considered in the regressions. [2] A positive coefficient means that an appreciation of an EME's local currency against the US dollar increases capital outflows. [3] A positive coefficient means that a decrease in the MOVE/VIX index increases capital outflows. [4] A positive coefficient means that an increase in the US-EME 10-year bond yield differential / US-EME equity return differential increases capital outflows.

Sources: IMF; Bloomberg; LSEG Datastream; national data; BIS.

First, we find a positive relationship between the local currency share of an EME and the sensitivity of bond inflows to the policy rate differential between the EME and the United States for individual EMEs (Graph A.10.A). One explanation could be that a higher local currency share in external financing by an EME signals stronger economic fundamentals. This, in turn, may attract more yield-seeking, long-term investors such as insurance companies and pension funds to the EME. Similarly, a negative relationship between the NBFI share of foreign investment and the

sensitivity of equity inflows to the VIX may be because when a higher NBFI share is associated with more long-term investors in an EME's equity market, their investments are likely to be less sensitive to US equity market volatility (Graph A.10.B).

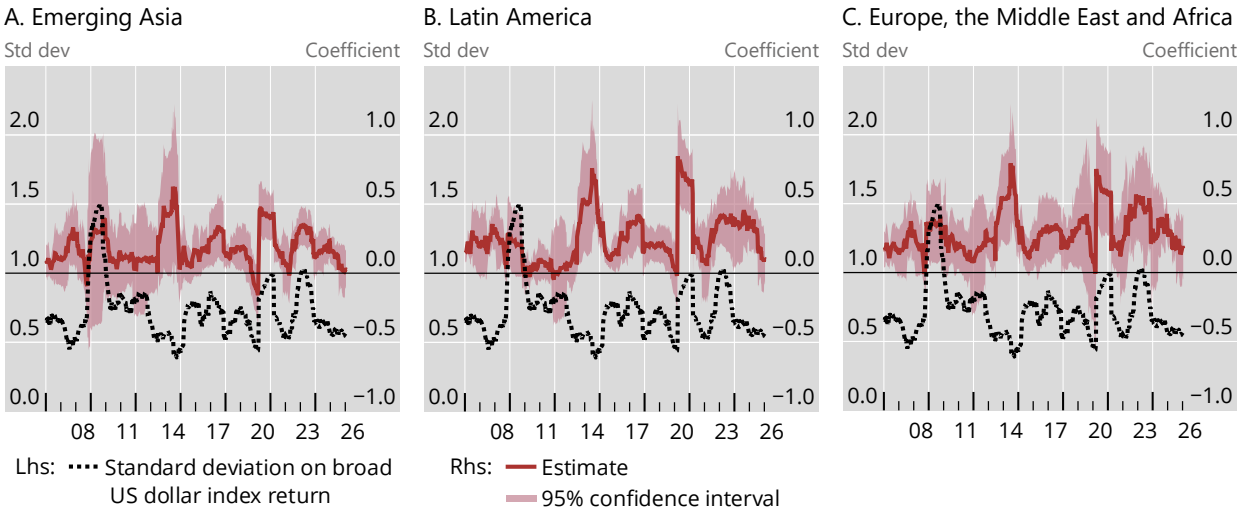
Regarding outflows, we find a negative relationship between net portfolio capital inflows to an EME and the sensitivity of bond outflows to the 10-year bond yield differential between the United States and the EME (Graph A.10.C). This is because capital-exporting countries (ie negative net capital inflows) are likely to react more strongly to higher bond yields in the United States than capital-importing countries. Finally, Graph A.10.D shows a negative relationship between FX derivatives market depth and the sensitivity of equity outflows to the VIX. This can be attributed to local investors being able to manage currency risks more effectively when they invest in US equities and hedge their currency exposures in response to US equity volatility.

Finally, we consider if EME local financial conditions have become more sensitive to global financial conditions and/or if the size of global financial shocks has become larger over the past two decades. To do so, we first look at the variation over time in the relationship between the dollar's general strength and EME local currency bond returns. The sensitivity of EME portfolio returns to a 1% increase in the broad US dollar index is larger during periods of financial stress, as shown in the downward spikes in returns (ie sharp increases in bond yields) during the GFC, the 2013 "taper tantrum", the China stock market stress in 2015, the start of the pandemic in 2020 and the globally synchronised monetary tightening in 2022 (Graph 13).[8] In contrast, the sensitivity was relatively low or close to zero during tranquil times. In particular, the sensitivity has declined from 2024 to early 2026 in all EME regions. In addition, we find that the size of fluctuations in the US dollar index measured by its standard deviation (black dotted line) has also fluctuated between tranquil and stress periods.

A joint consideration of the standard deviation and the sensitivity implies that the non-linearity in the response of an EME's domestic financial conditions measured by the EME's local currency bond yields during global stress periods is driven by both the shock size and the sensitivity. Also, the standard deviation of the US dollar index in 2020 and 2022 was of the similar magnitude, but the sensitivity of EME LC bond returns/yields was lower in 2022 than in 2020. Finally, since early 2025 the standard deviation of the broad US dollar index has barely declined but the sensitivity has declined to a historically low level in each EME region.

[8] The broad US dollar index includes EMEs. When many EMEs face difficulties because of domestic drivers, their currencies will depreciate and their risk premia rise. This can raise endogeneity concerns.

Sensitivity of EME local currency bond return on the broad US dollar index return[1] Graph 13



[1] The sensitivity is calculated using a moving window of one year in a weekly panel regression of the JPMorgan GBI-EM Broad local currency bond country return on the broad US dollar index return. One coefficient is estimated per week. The sample includes 16 EMEs and covers the period from January 2006 to 14 January 2026.

Sources: JPMorgan Chase; BIS.

Financial conditions indices in EMEs

The previous section established the general relationship between global investors' risk-taking, financial conditions in EMEs and the strength of the dollar. This section considers EME financial conditions indices (FCIs) and the role of dollar exchange rates.

Central banks use various variables and assign weights to them to construct FCIs. The survey responses highlight diverse practices among central banks in constructing and using FCIs to monitor and guide monetary policy. Many central banks, including those in Brazil, South Africa and Thailand, incorporate a range of variables such as bond yields, exchange rates, credit spreads and equity prices into their FCIs. Principal component analysis (PCA) and vector autoregression are commonly employed to calculate weights and assess the impact of financial conditions on GDP growth.

FCIs are widely used as supplementary tools for monetary policy decision-making. For instance, Brazil's FCI is used to assess the tightness of financial conditions relative to historical standards, while Malaysia's FCI captures the impact of global and domestic factors on capital flows and asset prices. Some respondents, such as the Philippines and Indonesia, noted challenges in integrating new data sources, such as crypto flows, into their FCIs. Others, including Vietnam, reported that their central banks do not yet produce FCIs but are exploring their development. These findings highlight the role of macro-financial stability frameworks, particularly the need for robust analytical tools like FCIs to monitor vulnerabilities and guide policy responses.

Central banks emphasise that the increasing reliance on local currency financing and domestic financial market development have enhanced EME resilience to external shocks. However, NBFIs' procyclical behaviour and the dominance of US dollar funding remain significant risks. The use of FCIs and other macro-financial stability

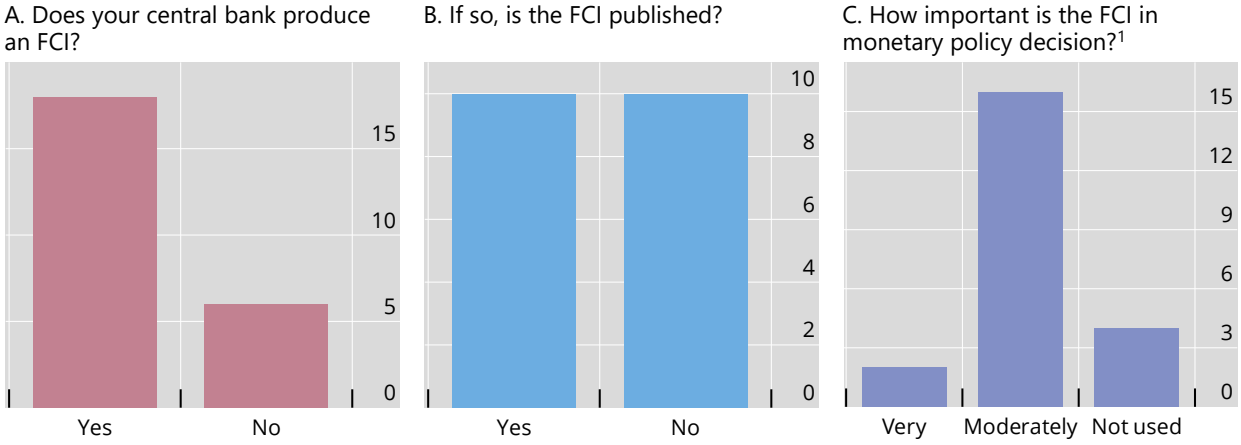
tools is critical in mitigating vulnerabilities and ensuring effective monetary policy transmission. Central banks refine these tools to address emerging risks such as geopolitical tensions. Finally, the ongoing evolution of global financial conditions, including changes in US monetary policy and the role of the US dollar, necessitates proactive and flexible policy responses of EMEs to maintain macro-financial stability.

Among the 23 EME central banks which responded to the survey, 17 said that they used an FCI (Graph 14.A). Of the 17 central banks, 10 publish their FCIs, six explicitly mentioned that they followed the GDP growth target method, and 11 said they employ some statistical methods (eg PCA). For example, the Philippines explicitly mentioned using both methods. Türkiye reported that it was transitioning from a GDP growth impact method to a PCA method for constructing an FCI.

Given that EME central banks use widely different methods to construct FCIs, we calculate the FCIs for 20 EMEs, for which data are available, using the AGST FCI described in Box B. Graph B3 in the box shows that AGST EME FCIs exhibit different behaviours from the widely used Goldman Sachs EME FCIs, especially in 2020. Also, financial conditions at end-2025 measured by the Goldman Sachs FCI are looser than those by the AGST FCI. The difference largely stems from the way exchange rate appreciation and the weakness of the US dollar are accounted for in the two FCIs.

Financial condition indices (FCIs) in EME central banks

Number of respondents — Graph 14



[1] "Very" = very important in guiding policy decisions; "moderately" = moderate importance as a supplementary tool; "minimal" (not shown, as the value equals zero) = minimal importance due to limited data coverage.

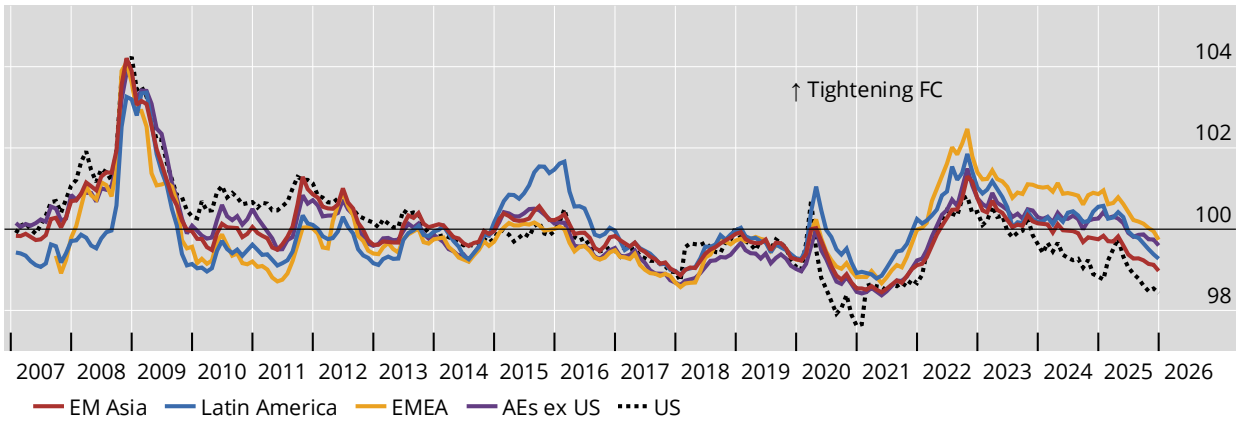
Source: 2026 EME Deputy Governors' meeting survey.

Across all AEs and EMEs, financial conditions generally moved together as a group over the past two decades (Graph 15). This is in line with the presence of the global financial cycle (see eg Miranda-Agrippino and Rey (2022) and the papers mentioned therein). In particular, financial conditions tightened the most during the GFC in both AEs and EMEs. The second tightest financial conditions were observed in all EME regions in 2022 during the unprecedented global rate hikes. Among the three EME regions, Europe, the Middle East and Africa (EMEA) experienced stronger tightening in financial conditions in 2022 than the other AE and EME regions, while in

2015 when the commodity supercycle ended, Latin America witnessed the strongest tightening of financial conditions among all AE and EME regions. Finally, during the peak of the 2010–11 eurozone debt crisis, financial conditions in AEs tightened more than those in EMEs.[9]

Financial conditions indices by regions[1]

Standardised units — Graph 15



[1] The FCI for each economy except the United States is calculated from risk-free rates (the overnight policy rate, the two-year and 10-year local currency government bond yields), risk premia (the JPMorgan CEMBI country spread for EMEs and the JPMorgan GABI country spread for AEs, the five-year sovereign CDS spread), and foreign/global factors (the bilateral exchange rate against the US dollar, the nominal broad US dollar index, US 10-year Treasury yield, the Merrill Option Volatility Estimate (MOVE) index). The FCI for the United States is calculated from risk-free rates, risk premia and the MOVE index. When calculating the impact of each FCI component on one-year ahead GDP growth, we control for each country's nominal effective exchange rate to consider the trade channel. The FCI values for each region are the simple average of country-specific FCIs. AEs excluding the United States are Australia, Canada, France, Germany, Japan, Switzerland and the United Kingdom. Source: BIS.

Türkiye's sensitivity to global financial conditions captured by the FCI is pronounced through its impact on GDP via firm-level investment. Panel regressions linking firm-level expectations and capacity utilisation to global financial tightening reveal that tighter global financial conditions depress firm-level expectations and capacity utilisation, particularly for leveraged and export-intensive firms.[10]

Graph 16 shows the cumulative impact of different components of FCIs since January 2025. Foreign and global factors have played a dominant role in easing FCIs in all EME regions since January 2025.[11] Graph A.15 shows that this was also true for seven major AEs excluding the United States. In order to see if the dominant role of foreign and global factors in loosening financial conditions in almost all EMEs in 2025

[9] Financial conditions eased in 2025 and Q1 2026 in almost all AEs and EMEs (Graphs A.11 and A.12).

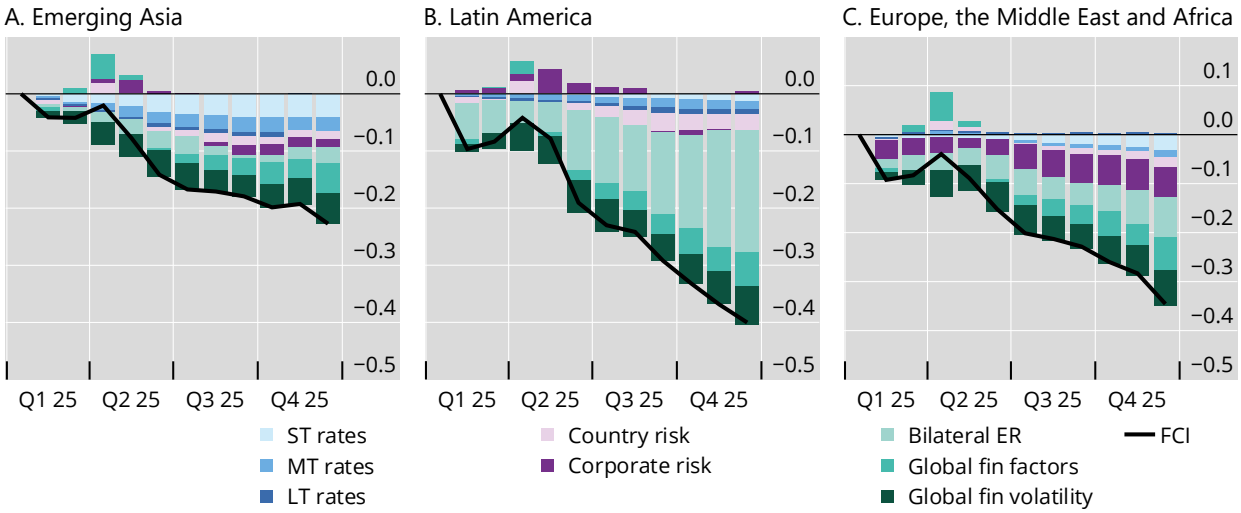
[10] This is consistent with Bruno and Shin (2023), who highlight that dollar appreciation tightens global credit conditions, increases borrowing costs and reduces investment. Turkish firms with larger FX debt are significantly affected by these dynamics, as exchange rate fluctuations amplify financial vulnerabilities. Kalemli-Özcan et al (2021) further support this and show that a depreciation of local currency increases the debt burden of firms with FX liabilities, leading to deleveraging pressures and reduced investment. This manifests in heightened corporate sector vulnerabilities, where increased borrowing costs and reduced global demand exacerbate the decline in GDP growth.

[11] When we look at the breakdown country by country, in Indonesia, India, Malaysia, Poland and Thailand external and global factors did not play a dominant role in loosening FCIs in 2025, but domestic factors played a bigger role in loosening financial conditions (Graph A.13).

was an exception, we compare the contribution of different FCI components with the one-year-ahead GDP growth in 2024. Graph A.14 shows that in 2024, FCI tightened in roughly half of the 20 EMEs, while it loosened in the other half. It also shows that foreign and global factors did not play a dominant role in many EMEs in 2024.

Decomposition of FCIs since January 2025[1]

Index, January 2025 = 0 — Graph 16



ER = exchange rate; LT = long-term; MT = medium-term; ST = short-term.

[1] Global financial factors include the nominal broad US dollar index and long-term US Treasury yields, while global financial volatility is measured by the Merrill Option Volatility Estimate (MOVE) Index. Regions aggregated using a simple average.

Source: BIS.

Finally, given the growing importance of capital outflows from EMEs, it would be important to also consider the potential impact of large capital outflows by residents on their overall financial conditions, for example via exchange rates.

Box B

Measuring FCIs for EMEs

Financial conditions influence macroeconomic outcomes. A financial conditions index (FCI) aggregates financial variables into a single metric to reflect the cost and availability of financing for households, firms and governments. While FCIs are valuable for monitoring financial markets and assessing monetary policy transmission, their construction varies across institutions, leading to differing diagnoses. This box presents the methodology of AGST FCI1 and its differences with that of widely used FCIs.

To estimate the impact of financial variables on GDP growth, we use local projections as below:

$$Y_{t+h} = \alpha_0 + \sum_{j=1}^{4} \gamma_j^h y_{t-j} + \beta^h financial\ component_t + \delta^h NEER_t + \varepsilon_{t+h} \quad (1)$$

where Y is the cumulative response of the GDP growth rate between quarter t–1 and quarter $t+h$ with h = 0, 1, 2 and 3, y the lagged dependent variable from t–1 to t–4, the *financial component* the financial variable being tested for its relationship with GDP growth and *NEER* the nominal effective exchange rate, which is used to control for the trade channel of exchange rates on GDP growth. This methodology is implemented for 20 EMEs: BR, CL, CN, CO, CZ, HK, HU, ID, IN, KR, MX, MY, PE, PH, PL, SG, TH, TR, VN and ZA. The trade and financial channels of exchange rates work similarly, albeit weaker, for AEs excluding the United States, so we use the same methodology for calculating FCIs of AEs excluding the United States in Graph 15.

We use the following three blocks of financial variables to capture the financing channel of the transmission:

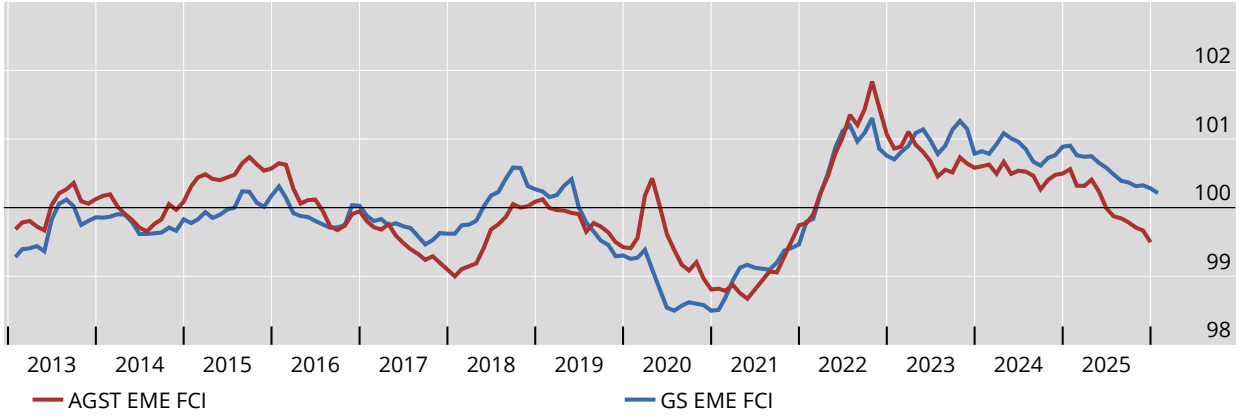
1) Domestic factors: risk-free interest rates
- Short-term rate: the overnight monetary policy rate
- Medium- and long-term rates: two-year and 10-year local currency government bond yields, respectively

2) Domestic factors: risk premium
- Credit market: JPMorgan CEMBI Broad index spread used as a proxy for corporate default risk
- Five-year sovereign CDS spread as a proxy of sovereign default risk

3) Foreign and global factors
- Exchange rate: bilateral exchange rate against the US dollar
- Global financial factors: nominal broad US dollar index and US long-term Treasury yield
- Global financial market volatility: MOVE index

FCIs can diverge for EMEs across methodologies[1]

January 2018 = 100 — Graph B1



A higher value of an FCI means tightening financial conditions.

Sources: Goldman Sachs; BIS.

Important caveats arise when we compare the AGST methodology with others, emphasising the need to understand component selection and weighting. Goldman Sachs (GS) FCIs for EMEs prioritise domestic risk-free rates and assume that an exchange rate depreciation against the US dollar eases financial conditions by giving greater weights on the trade channel (NEER) than on the financial channel (debt-weighted exchange rate).2 While suitable for some AEs, these assumptions may not be suitable for EMEs.3 A comparison shows stark differences: AGST FCIs indicate tightening during exchange rate depreciation and heightened volatility in 2020, whereas GS FCIs suggest loosening (Graph B1). Such divergence could have significant policy implications, potentially confusing the private sector. Finally, Lombardi et al (2025) propose a two-factor approach, offering insights into the macroeconomic implications of safe interest rates and domestic financial risks, but this is not directly comparable with that of GS or AGST FCI.

The role of and implications for EME central banks' policy mix

This section reviews the policy responses of EME central banks to recent global financial shocks and stress episodes. It further explores how the structural changes outlined in this note might influence the effective use of various policy instruments and their coordination.

Recent experiences

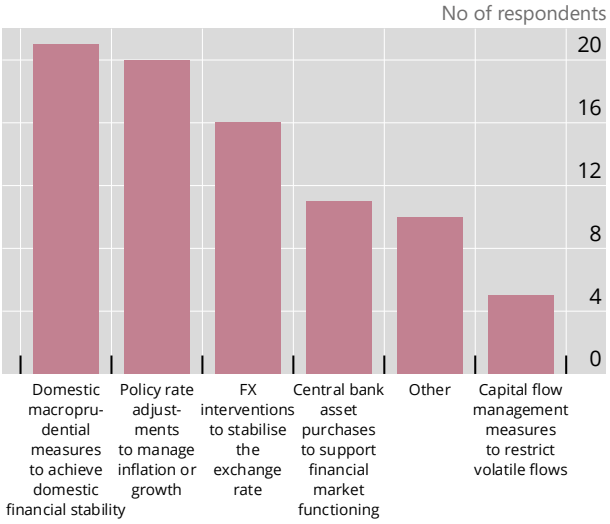
Over the past five years, EMEs have shown remarkable resilience in navigating three major global shocks: the start of the Covid-19 pandemic in early 2020, the globally synchronised monetary policy tightening in 2022 and the trade and geopolitical uncertainty shocks in 2025. The 2020 and 2022 episodes were characterised by tighter global financial conditions and capital outflows from EMEs, which posed significant challenges but did not cause a financial crisis. The backdrop in 2025, however, was different. EMEs benefited from loose global financial conditions driven by a weak US dollar, which provided a favourable backdrop for managing the uncertainty around trade and geopolitical developments.

In response to the Covid-19 shock and the tightening of international financial conditions in 2022, EME central banks adopted flexible and varied policy mixes tailored to their specific circumstances (BIS (2022a, 2025); Borio et al (2022)). Policy rate adjustments, macroprudential measures and FX intervention (FXI) emerged as the most commonly utilised tools both across countries – with nearly two thirds of respondents reporting the use of all three tools – and across stress episodes (Graph 17.A).

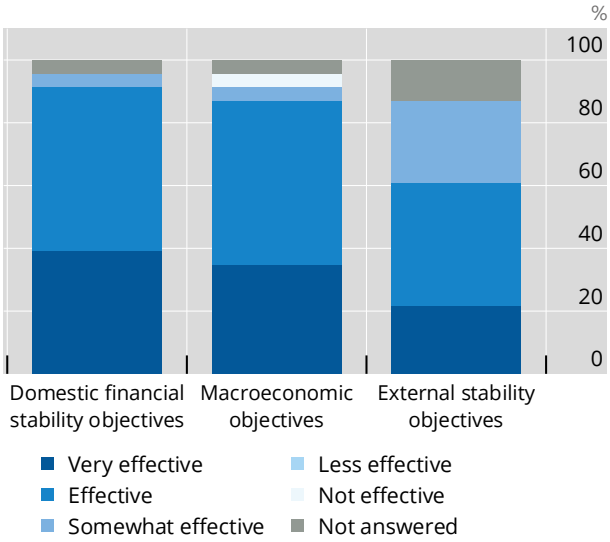
Policies used in market stress periods and their effectiveness

Graph 17

A. Policies deployed during recent market stress periods[1]



B. How effective have policy measures been in achieving specific objectives?



[1] Answer to "What policy mix has your country deployed during recent market stress periods (eg the pandemic, global rate hikes, geopolitical tensions)?".

Source: 2026 EME Deputy Governors' meeting survey.

Central banks generally assess that their policies have been effective in achieving macro-financial stability objectives, although they have been somewhat less effective in addressing external stability challenges (Graph 17.B). Over 90% of respondents report that the measures implemented during recent market stress periods have been effective or very effective in stabilising inflation and supporting economic growth. Similarly, nearly 90% of central banks found these policies effective in achieving domestic financial stability objectives, such as maintaining credit provision and ensuring market functioning. However, for external stability objectives, only 60% of respondents rated their measures as effective or very effective, highlighting ongoing challenges in managing external pressures like currency volatility and capital outflows.

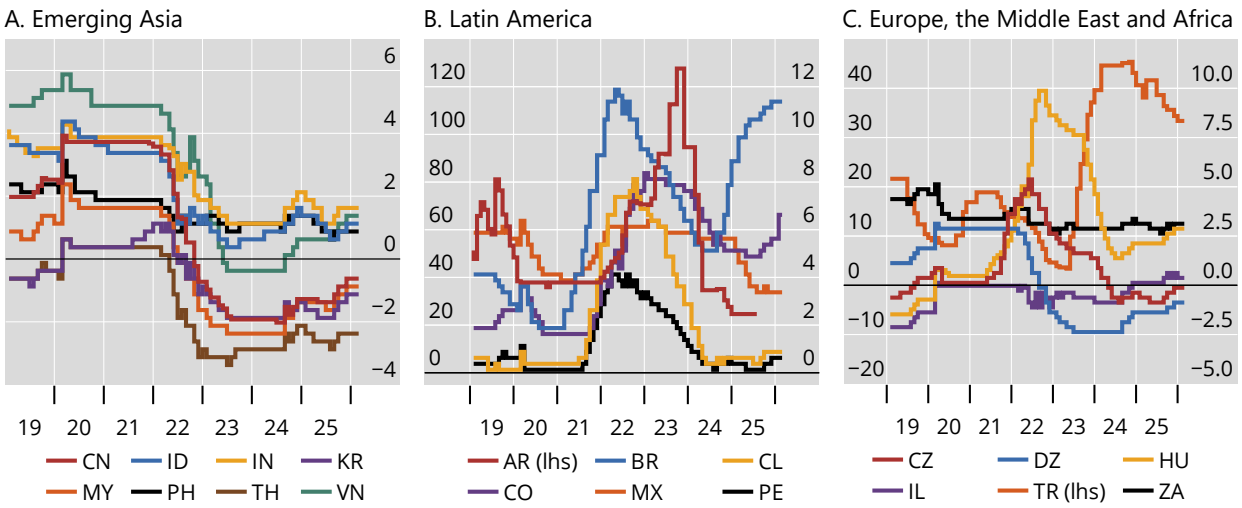
Policy rate adjustments have been the primary line of defence for EMEs, although their use has varied across stress episodes. In early 2020, almost all EME central banks cut rates to support their domestic economy despite sharp currency depreciations and significant capital outflows (Graph 18). This was facilitated by well anchored inflation expectations, swift monetary easing in AEs and the provision or reinstatement of Fed swap lines to major central banks, which quickly stabilised global markets. Conversely, in 2022, amid synchronised monetary tightening in AEs and a strengthening US dollar, EME central banks raised policy rates to stabilise inflation and support their currencies, albeit at different speeds across regions. Asian EMEs tightened modestly due to weaker inflationary pressures and lower sensitivity of domestic financial conditions to the dollar, while Latin American central banks acted earlier and tightened more aggressively, raising long-term yields and stabilising their currencies. Finally, in 2025, as disinflation progressed, most major EME central banks cut rates gradually or held rates steady, supported by appreciating currencies and favourable financial conditions. If the US dollar were to appreciate sharply in 2026,

EME central banks might face constraints on deploying monetary policy focusing on domestic macroeconomic developments.

Policy rate differential between EMEs and the United States[1]

In percentage points

Graph 18



[1] Differential between end-month figures.

Sources: Macrobond; national data; BIS.

Central banks have often complemented interest rate policy with FXI to stabilise exchange rates and ensure orderly market functioning. The choice of policy mix depends on various factors, including country-specific characteristics of financial markets and policy space. For example, EMEs with a history of higher inflation and greater sensitivity of local currency bond returns to fluctuations in the US dollar (see previous section) tended to rely more on policy rate adjustments to combat inflation. This dynamic was evident in 2022–23, as Latin American economies raised policy rates by relatively more and relied more on exchange rate flexibility, while Asian EMEs did not raise policy rates as much but leaned more on FXI (Graph 19). One exception was Peru, which effectively used FXI to reduce the impact of external shocks. EMEs in the other regions increased policy rates aggressively and also actively engaged in FXI.

EME central banks have also used macroprudential measures to maintain financial and external stability during stress episodes. For instance, the Hong Kong Monetary Authority (HKMA) reduced the Countercyclical Capital Buffer in March 2020 and eased macroprudential measures for property mortgage loans in July 2023. Similarly, at the onset of the pandemic some EMEs relaxed FX-related prudential regulations. In March 2020, the Korean authorities raised forex futures trading limits for banks, temporarily lifted the macroprudential levy on financial institutions' non-deposit FX liabilities and lowered FX liquidity coverage ratio (LCR) from 80% to 70%.

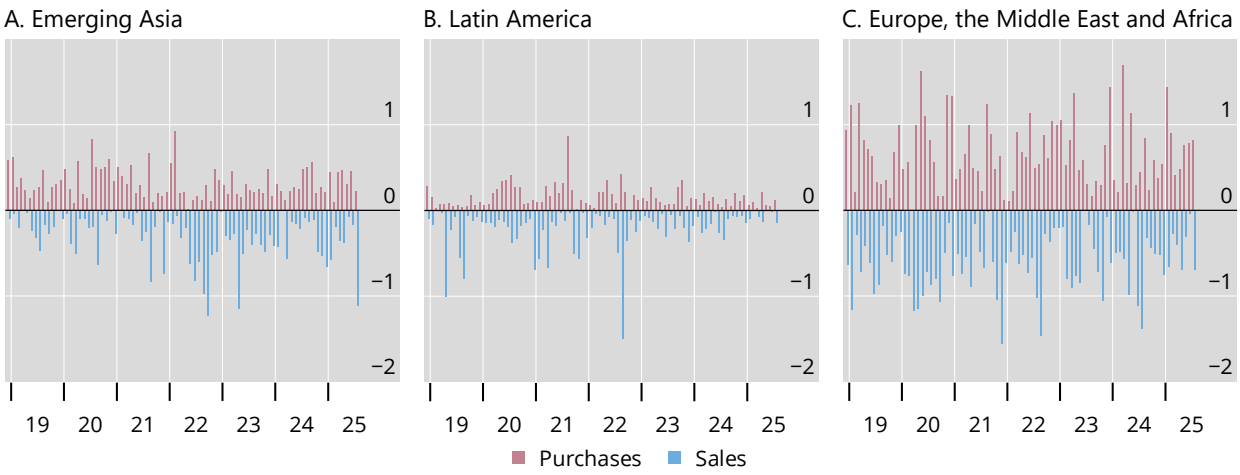
Local currency asset purchases were employed by some central banks exclusively during the pandemic, with usage varying by region. In emerging Asia, central and eastern Europe and Africa, central banks actively purchased government bonds to support pandemic-related measures and promote economic recovery. In contrast, EME central banks in Latin America were more cautious about public debt purchase programmes, largely avoiding direct purchases and instead conducting twist-type

operations, where they bought long-term securities while selling short-term ones to absorb duration risks and curtail long-term rates.[12]

Foreign exchange interventions[1]

As a percentage of GDP

Graph 19



Emerging Asia = CN, HK, ID, IN, KR, MY, PH, SG, TH and VN; Latin America = AR, BR, CL, CO, MX and PE; Europe, the Middle East and Africa = AE, CZ, DZ, HU, IL, PL, SA, TR and ZA.

[1] Median of countries in the region of proxied foreign exchange intervention as a percentage of three-year moving average GDP.

Source: Adler et al (2025).

Capital flow management measures (CFMs) targeting non-residents' capital inflows have been applied sporadically by EMEs, whereas CFMs related to residents' capital outflows were used frequently in recent years – often to promote repatriation of foreign investments. In 2025, the Central Bank of Malaysia increased FX policy flexibility to encourage resident corporates to repatriate foreign currency investment income, aiming to maintain continued two-way flows in the domestic FX market. Similarly, in December 2025 Korea introduced tax exemptions to encourage retail investors to sell foreign equities and reinvest those funds in the domestic equity market, thereby alleviating downward pressure on the local currency. In contrast, the Thai authorities simplified outbound investment procedures, allowing residents easier access to foreign securities to mitigate upward pressure on the Thai baht.

Implications of the structural changes for EMEs' policy frameworks

What might be the impact of the structural changes documented in this note on the appropriate policy mix going forward?

More symmetrical international investment positions of EMEs may contribute to greater macroeconomic stability under certain circumstances. However, gross capital inflows to EMEs by non-residents and gross capital outflows from EMEs by residents do not necessarily cancel each other out – and can even amplify each other. For example, when the US dollar suddenly becomes strong, foreign investors in an EME

[12] See Cantú et al (2021).

may sell the EME's local currency assets and repatriate the proceeds to their home country. At the same time, domestic investors in the EME may want to purchase more US dollar-denominated assets. When both types of outflows go through the EME's relatively illiquid and shallow FX markets at the same time, the EME may suffer from negative spirals between currency depreciation, capital outflows and local asset price declines. This means that a robust macro-financial stability framework grounded in a macroprudential perspective remains essential.

In addition, the composition of international assets and liabilities, as well as the characteristics of their investor bases, can vary significantly and may exhibit asymmetric responses to shocks. Moreover, a more symmetrical international investment position can involve more complex asset and liability structures, requiring sophisticated risk management tools. To address these complexities, authorities would need to strengthen regulatory frameworks, improve transparency and enhance the monitoring of cross-border financial activities.

As the growing role of domestic NBFIs and retail investors investing abroad may heighten the volatility of dollar demand, EME financial authorities may need to take steps to strengthen the resilience of these investors in the face of disruptions in dollar funding markets. These include: (i) enhancing the monitoring of systemic risks posed by NBFIs; (ii) improving oversight of FX funding liquidity risks stemming from asset managers and institutional investors; (iii) calibrating regulations on FX hedging to incentivise longer-term hedging; and (iv) assessing the need for facilities to provide FX liquidity to NBFIs during severe market stress. For example, the disruptions in Korea during March 2020 highlight how the dollar funding liquidity needs of institutional investors and asset managers can intensify the broader scramble for dollar funding during financial turmoil. These non-bank investors have traditionally been subject to less stringent FX liquidity regulations and risk management requirements than banks, which pose challenges to financial authorities in monitoring and addressing their funding needs.

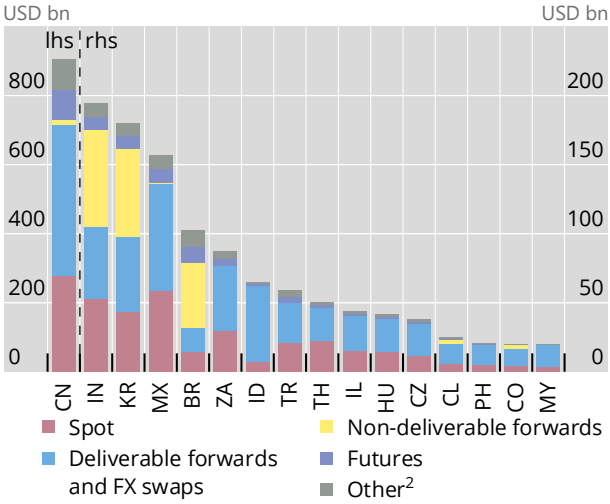
A key aspect for EMEs' resilience amid the fast growth of EME international assets and liabilities is the depth of FX spot and derivatives markets (BIS (2022b)). The latest BIS Triennial Survey of FX and OTC derivatives markets shows that FX markets in EME currencies have grown in size and reached a new high of 29% of global trading (Wooldridge (2025)). For some EME currencies, the average daily turnover in FX spot and derivatives markets reached levels which, on the surface, suggest that markets can handle a significant volume of trades (Graph 20.A).

Relative to the stock of EMEs' foreign assets, however, FX market depth is still low. In some instances, such as Malaysia, Chile and Korea, the value of foreign assets held by residents is more than 20 times the normal daily turnover in FX spot markets of their currencies (Graph 20.B). The depth of FX markets may therefore not be sufficient to handle the sale of a relatively small share of foreign assets. In countries where foreign asset holdings are 20 times the turnover in FX markets, a sale of just 5% of foreign assets in a given day would exceed the normal daily trading volume of the FX spot market. FX hedging markets for EME currencies appear somewhat deeper, but the size of foreign assets is still a large multiple of the daily turnover in FX derivatives markets for many EMEs.

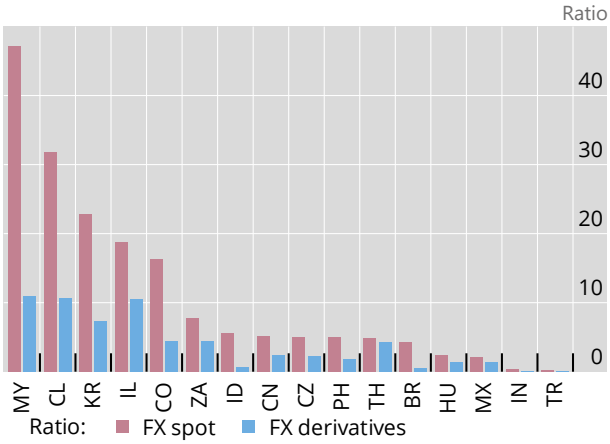
Foreign exchange market depth remains low

Graph 20

A. Average daily FX market turnover as of April 2025[1]



B. Ratio of foreign assets over average daily FX market turnover as of end-2024[1, 3]



[1] FX market turnover covers both over-the-counter (OTC) and exchange-traded (XTD) markets. [2] "Other" includes OTC and XTD options, cross-currency swaps and other exotic OTC derivatives. [3] The ratios are calculated as total international assets of a given jurisdiction at end-2024 divided by the average daily FX turnover (spot or derivatives) in April 2025, the date of the latest BIS Triennial Survey.

Sources: IMF; BIS exchange-traded derivatives statistics; BIS Triennial Survey; BIS.

Finally, as EME financial markets become increasingly interconnected across regional currencies, policymakers should closely monitor regional developments, since stress in one regional currency's markets can trigger contagion effects on those of other regional currencies. For example, in April 2025, when life insurance companies in Chinese Taipei rushed to cover their uncovered dollar exposures in the non-deliverable forwards market (Setser (2025); Shin et al (2025)), the Korean won also appreciated, as investors used the won as a proxy to hedge their Taiwanese dollar exposures (Wigglesworth (2025)). This suggests that FX hedge ratios and investors' currency exposure management require careful monitoring. Similarly, in some EMEs (eg Brazil), local NBFIs hold significant derivatives positions with other EMEs' assets, which means that shocks originating from major EMEs could spill over to others.

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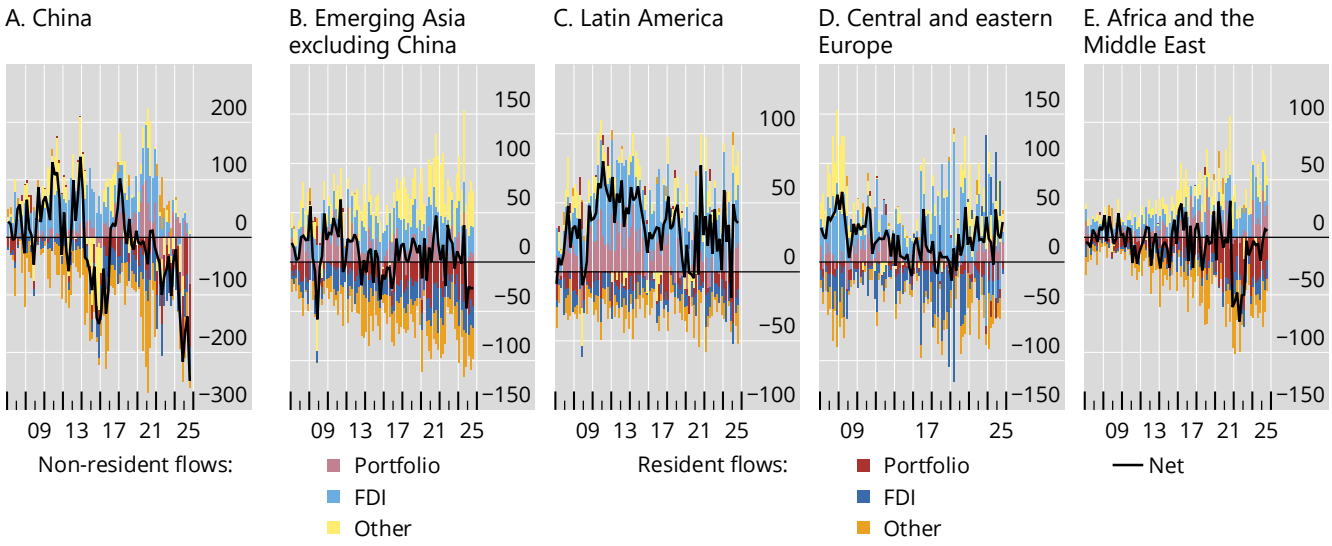
Capital flows by EME regions (quarterly data)[1]

In billions of US dollars (up to Q3 2025) Graph A.1



EMEs in Asia-Pacific excluding China = ID, IN, KR, MY, PH, TH and VN; Latin America = AR, BR, CL, CO, MX and PE; Central and eastern Europe = AL, BA, BG, BY, CY, CZ, EE, HR, HU, LT, LV, MD, MK, MT, PL, RO, SI, SK, TR and UA. Africa and the Middle East = AO, BI, BW, CD, CM, CV, DJ, DZ, EG, ER, ET, GA, GH, GM, GN, IL, IQ, JO, KW, LR, LS, MA, MG, MR, MZ, NA, NG, QA, RW, SA, SC, SD, ST, SZ, TN, TZ, UG, YE, ZA, ZM and ZW.

[1] Data for MY and VN up to Q4 2024.

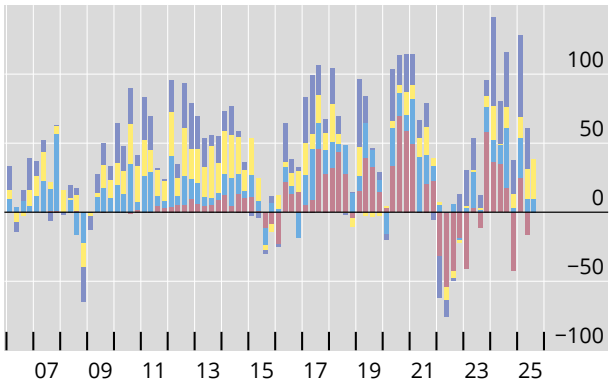
Sources: IMF; BIS.

Portfolio capital and banking inflows from non-residents to EMEs

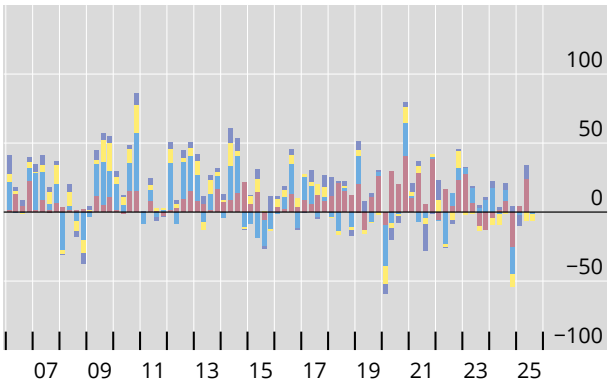
In billions of US dollars

Graph A.2

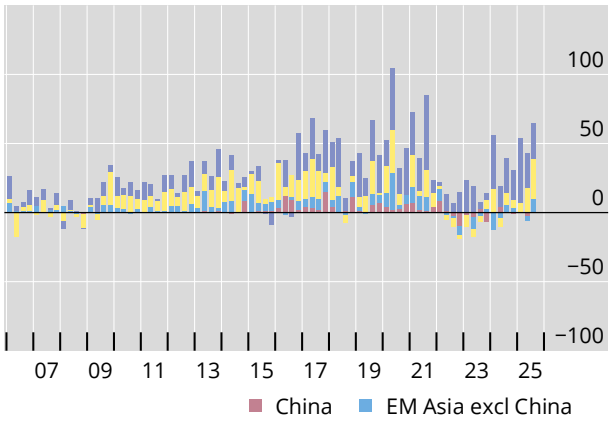
A. Local currency-denominated bonds



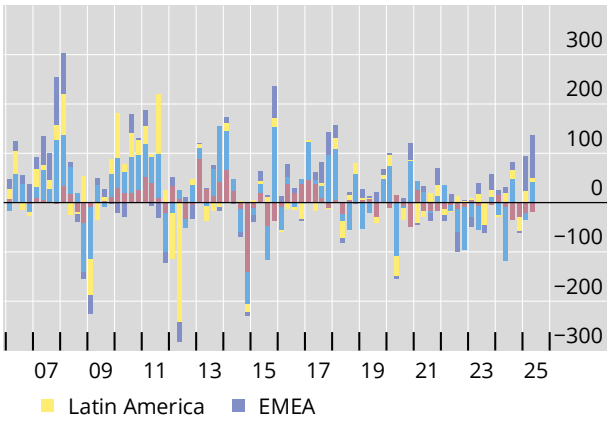
B. Equities



C. Foreign currency-denominated bonds[1]



D. Foreign-currency denominated loans



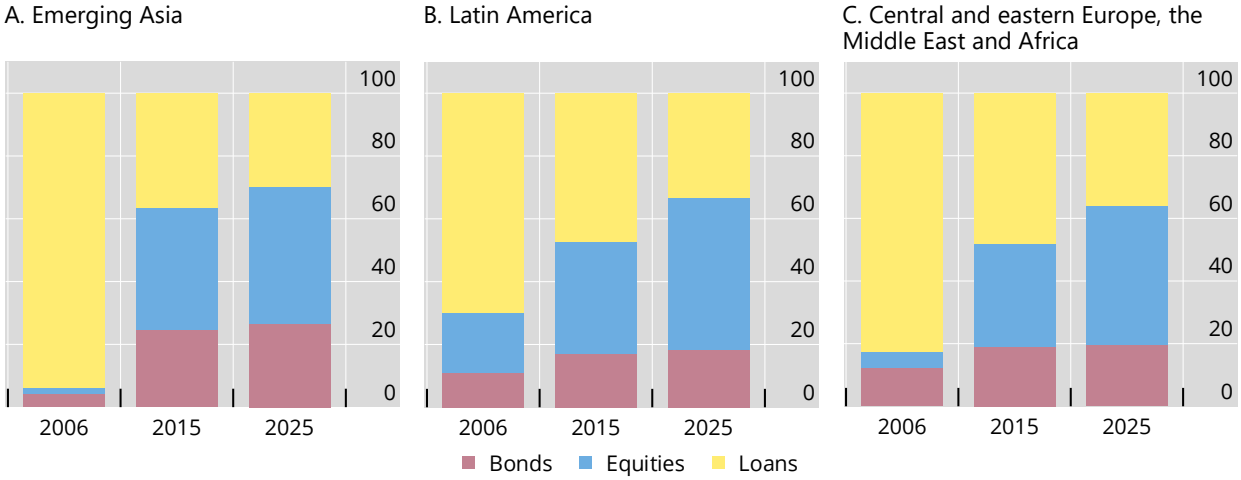
[1] Quarterly changes in foreign currency (US dollar, yen and euro) credit, converted into the dollar across major economies in each region. China is included from Q1 2010.

Sources: IMF; BIS global liquidity indicators; BIS locational banking statistics; BIS.

Changing composition of portfolio capital and banking investments abroad by EME residents[1]

In per cent; the amount outstanding of foreign assets

Graph A.3



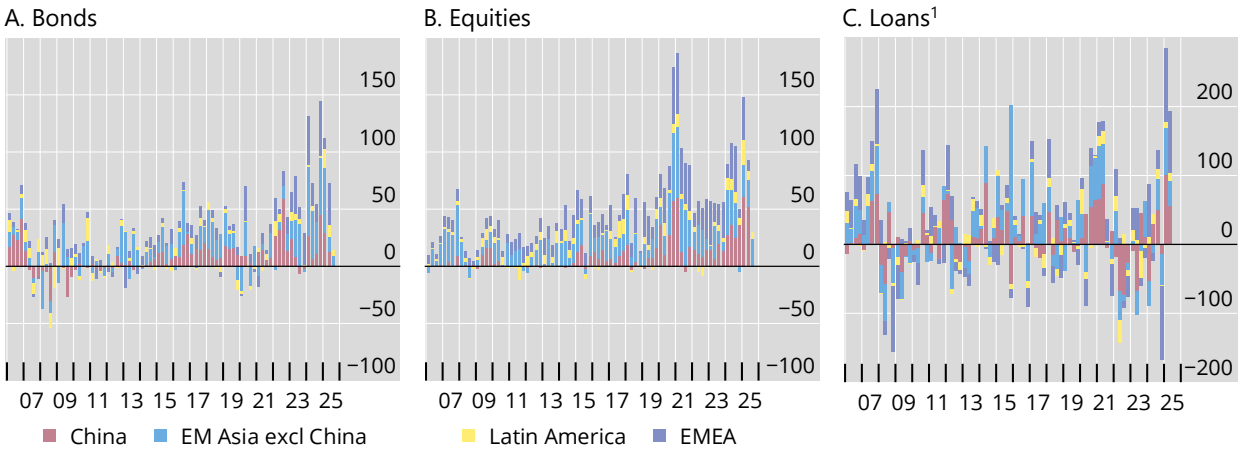
[1] Portfolio bond and equity outflows from residents in the region; loans and deposits correspond to the outstanding amount of the liabilities of banks located in reporting countries excluding an EME to all banks and non-banks in the EME in each region.

Sources: IMF; BIS locational banking statistics; BIS.

Portfolio capital and banking outflows from EME residents to other countries

In billions of US dollars

Graph A.4



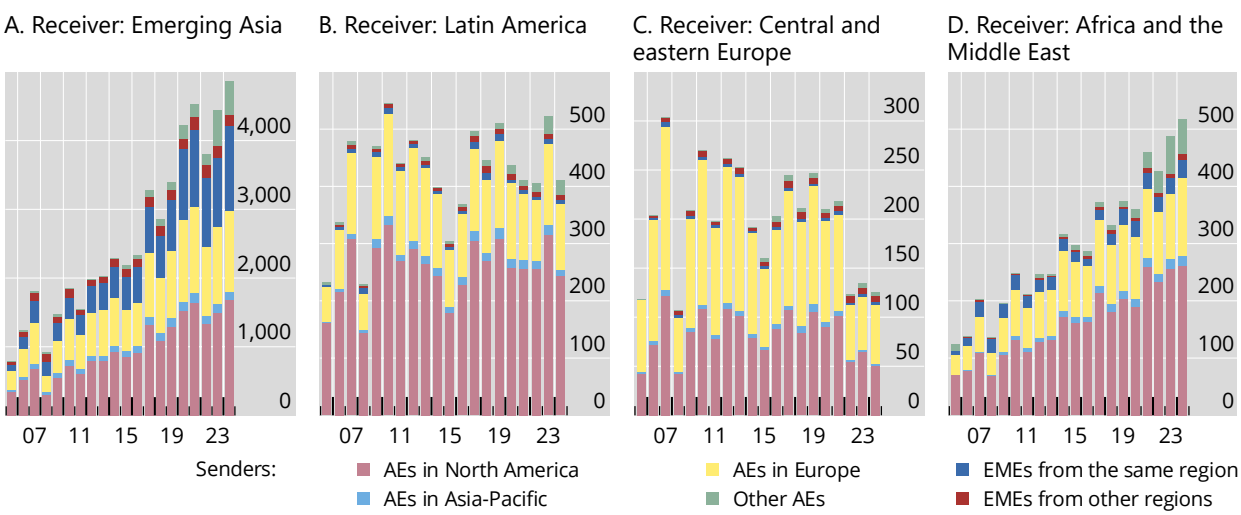
[1] loans and deposits correspond to the change in the outstanding amount of the liabilities of banks located in reporting countries excluding an EME to all banks and non-banks in the EME in each region.

Sources: IMF; BIS locational banking statistics.

Portfolio equity investment in EME regions by non-resident investors[1]

In billions of US dollars

Graph A.5



AEs in Asia-Pacific = AU, JP and NZ; AEs in North America = CA and US; AEs in Europe = AD, EU, FO, GI, GL, GG, IS, IM, JE, LI, NO, SM, CH, GB and VA; Other AEs = AI, AW, BM, BQ, KY, CW, FK, PF, TF, MS, AN, NC, SX, SH, TC, PU, VG, and WF; EMEs in Asia-Pacific = BD, CN, HK, ID, IN, KR, KZ, MN, MO, MY, PH, PK, SG, TH and VU; Latin America = AR, BB, BO, BR, BS, CL, CO, CR, HN, MX, PA, PE, SV, UY and VE; central and eastern Europe = AL, BG, BY, CZ, HU, MK, PL, RO, RU, TR, UA and XK; Africa and the Middle East = BH, EG, IL, KW, LB, LR, MU, NA, PS, SA and ZA.

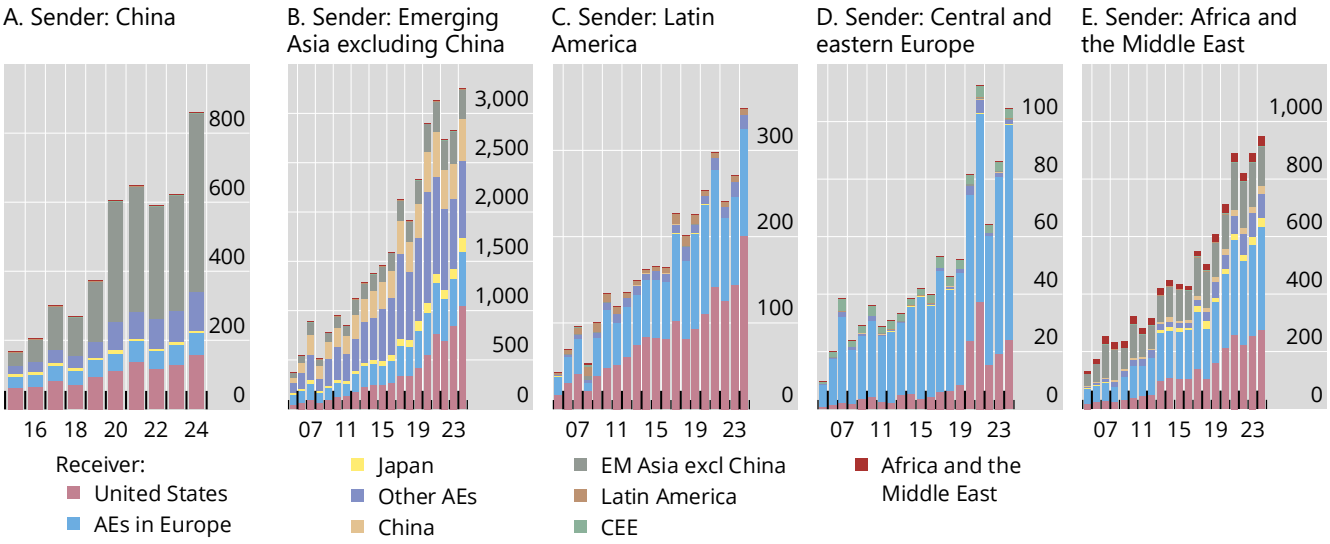
[1] SA started reporting to IMF *PIP* in 2013; while CN and PE in 2015; data RU up to 2021.

Sources: IMF; BIS.

Portfolio equity investment in foreign countries by residents in EME regions[1]

In billions of US dollars

Graph A.6



AEs in Europe: AD, EU, FO, GI, GL, GG, IS, IM, JE, LI, NO, SM, CH, GB and VA; Other AEs = AI, AW, BM, BQ, KY, CW, FK, PF, TF, MS, AN, NC, SX, SH, TC, PU, VG, and WF; EMEs in Asia-Pacific excluding China = BD, HK, ID, IN, KR, KZ, MN, MO, MY, PH, PK, SG, TH and VU; Latin America = AR, BB, BO, BR, BS, CL, CO, CR, HN, MX, PA, PE, SV, UY and VE; Central and eastern Europe = AL, BG, BY, CZ, HU, MK, PL, RO, RU, TR, UA and XK. Africa and the Middle East = BH, EG, IL, KW, LB, LR, MU, NA, PS, SA and ZA.

[1] SA started reporting to IMF *PIP* in 2013; while CN and PE in 2015; data on RU up to 2021.

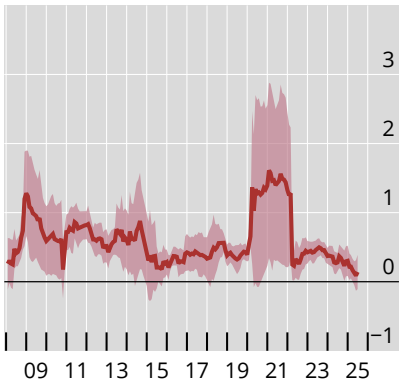
Sources: IMF; BIS.

Changing impact of global and foreign factors on portfolio fund inflows to EMEs[1]

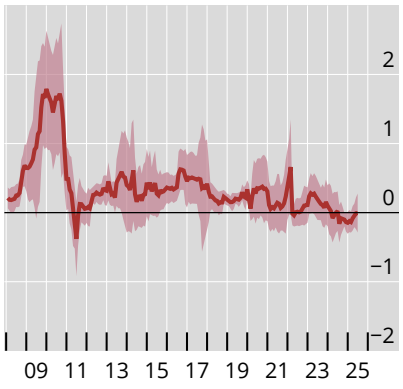
Coefficient on the one percentage change in each factor — Graph A.7

EPFR monthly bond fund flows

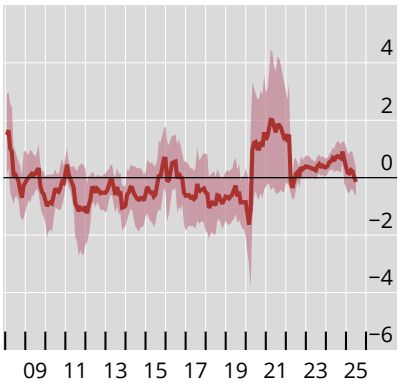
A. Nominal broad US dollar index[2]



B. VIX (inverted)[3]

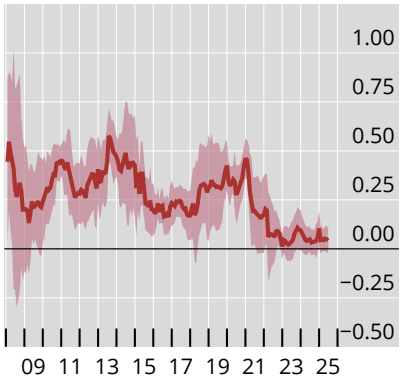


C. Policy rate differential[4]

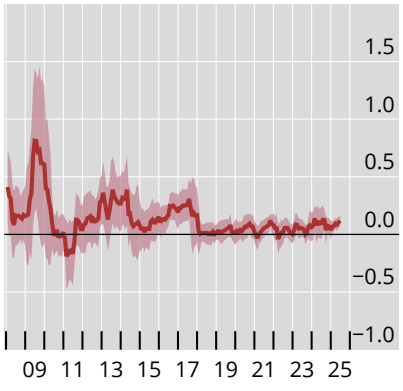


EPFR monthly equity fund flows

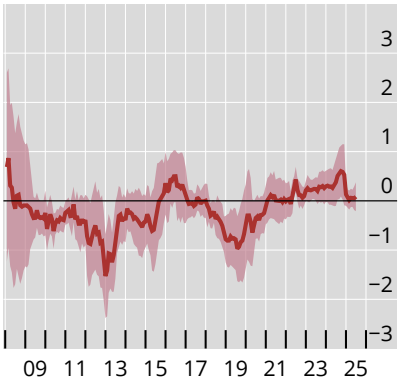
D. Nominal broad US dollar index[2]



E. VIX (inverted)[3]



F. Policy rate differential[4]



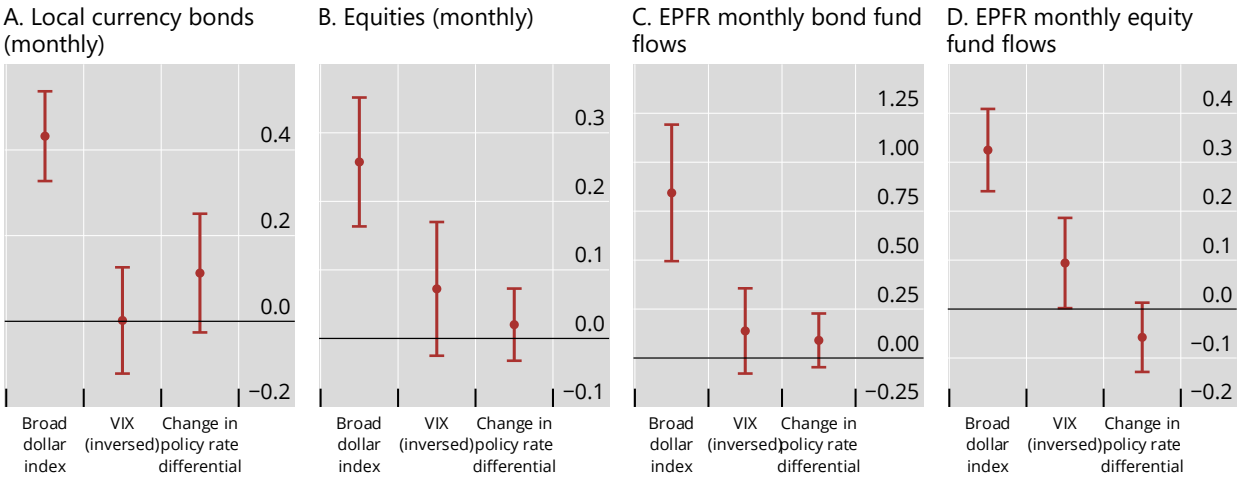
Coefficient — 95% confidence interval

[1] The red line shows the change in the ratio of fund flows to total fund holdings in response to a 1% depreciation of the nominal broad US dollar index; a one-unit decrease in the VIX; or a 1 percentage point in the policy rate differential. The regressions use two-year moving windows with monthly data. The contemporaneous value of these two variables and the one-period lagged value of the change in the policy rate differential are included jointly in regressions, together with the one-period lagged dependent variable and one-period lagged controls (US CPI, EME CPI, US industrial production (IP), EME IP, Brent oil price; for equities, EME and US equity market returns are also included). The shaded area shows the 95% confidence interval. [2] A positive coefficient means that a 1% depreciation of the nominal broad US dollar index increases fund flows. [3] A positive coefficient means that a one-unit decrease in the VIX index increases fund flows. [4] A positive coefficient means that a 1 percentage point increase in the policy rate differential increases fund flows.

Sources: Federal Reserve Bank of St Louis; Bloomberg; LSEG Datastream; national data; BIS.

Standardised impact of global factors and policy rate differentials on capital inflows[1]

Coefficient on the standardised explanatory variables — Graph A.8

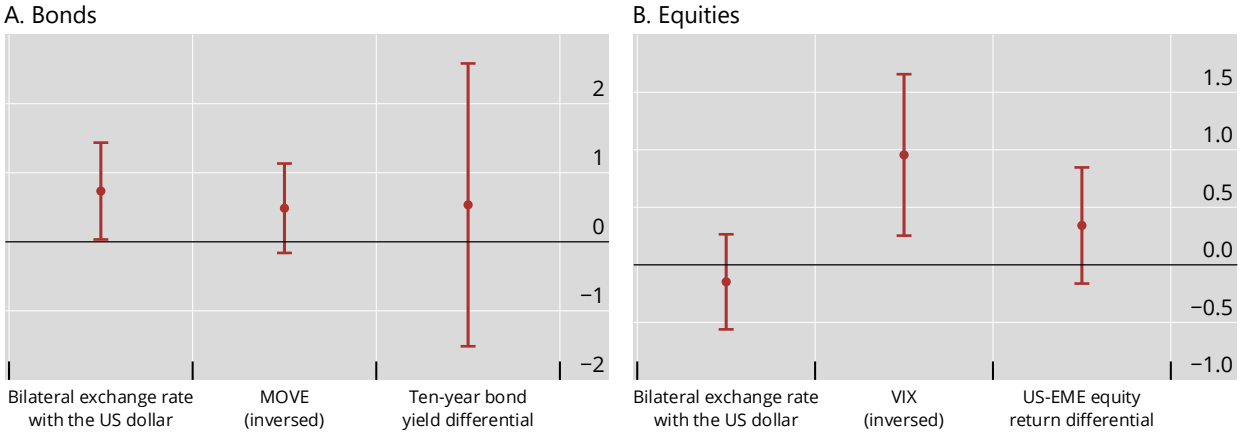


[1] Each dot shows the change in the ratio of capital flows to total foreign holdings in percentage points in response to a one standard deviation depreciation of the nominal broad US dollar index, a one standard deviation decrease in the VIX or a one standard deviation increase in the change in the policy rate differential. The contemporaneous value of the first two variables and the one-period lagged value of the third variable are included jointly in monthly regressions of portfolio flows, together with one-period lagged dependent variable and controls (US CPI, EME CPI, US industrial production (IP), EME IP, Brent oil price; for equities, EME and US equity market returns are also included). 95% confidence interval is shown around the point estimate.

Sources: Federal Reserve Bank of St Louis; Institute of International Finance; IMF; Bloomberg; LSEG Datastream; Global EPFR; BIS.

Standardised impact of global and foreign factors on capital outflows[1]

Coefficient on the standardised explanatory variables — Graph A.9



[1] Each dot shows the change in the ratio of capital flows to total foreign holdings in percentage points in response to a one standard deviation appreciation of an EME local currency against the US dollar, a one standard deviation decrease in the MOVE index or the VIX index, or a one standard deviation increase in the level of ten-year bond yield differential between the US and an EME, or the change in the US-EME equity return differential. The one-period lagged value of the first and the third variables and the contemporaneous value of the second variable are included jointly in quarterly regressions of portfolio outflows, together with the one-period lagged dependent variable and lagged controls (US CPI, EME CPI, US real GDP, EME real GDP and the US-EME policy rate differential). 95% confidence interval is shown around the point estimate. 15 EMEs are considered in the regressions.

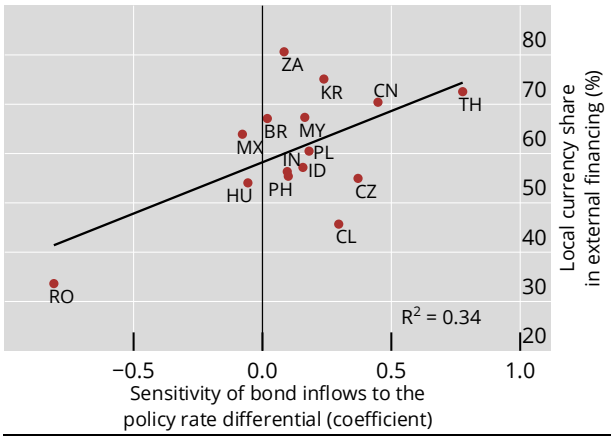
Sources: IMF; Bloomberg; LSEG Datastream; national data; BIS.

Cross-sectional relationship between structural factors and an EME's capital flow sensitivity to foreign/global factors[1]

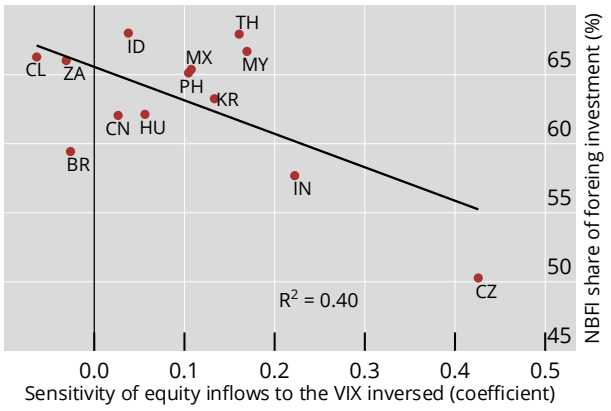
Graph A.10

Inflows

A. Bond

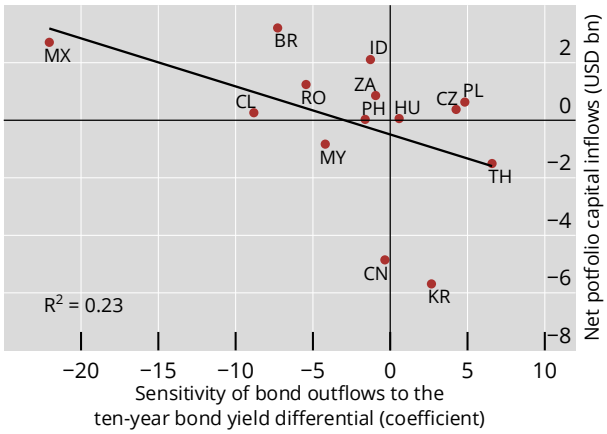


B. Equity

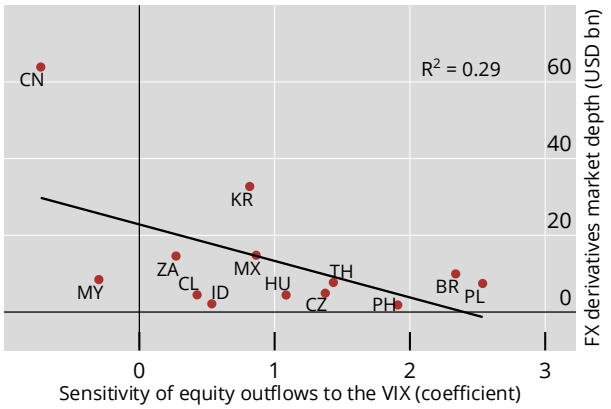


Outflows

C. Bond



D. Equity



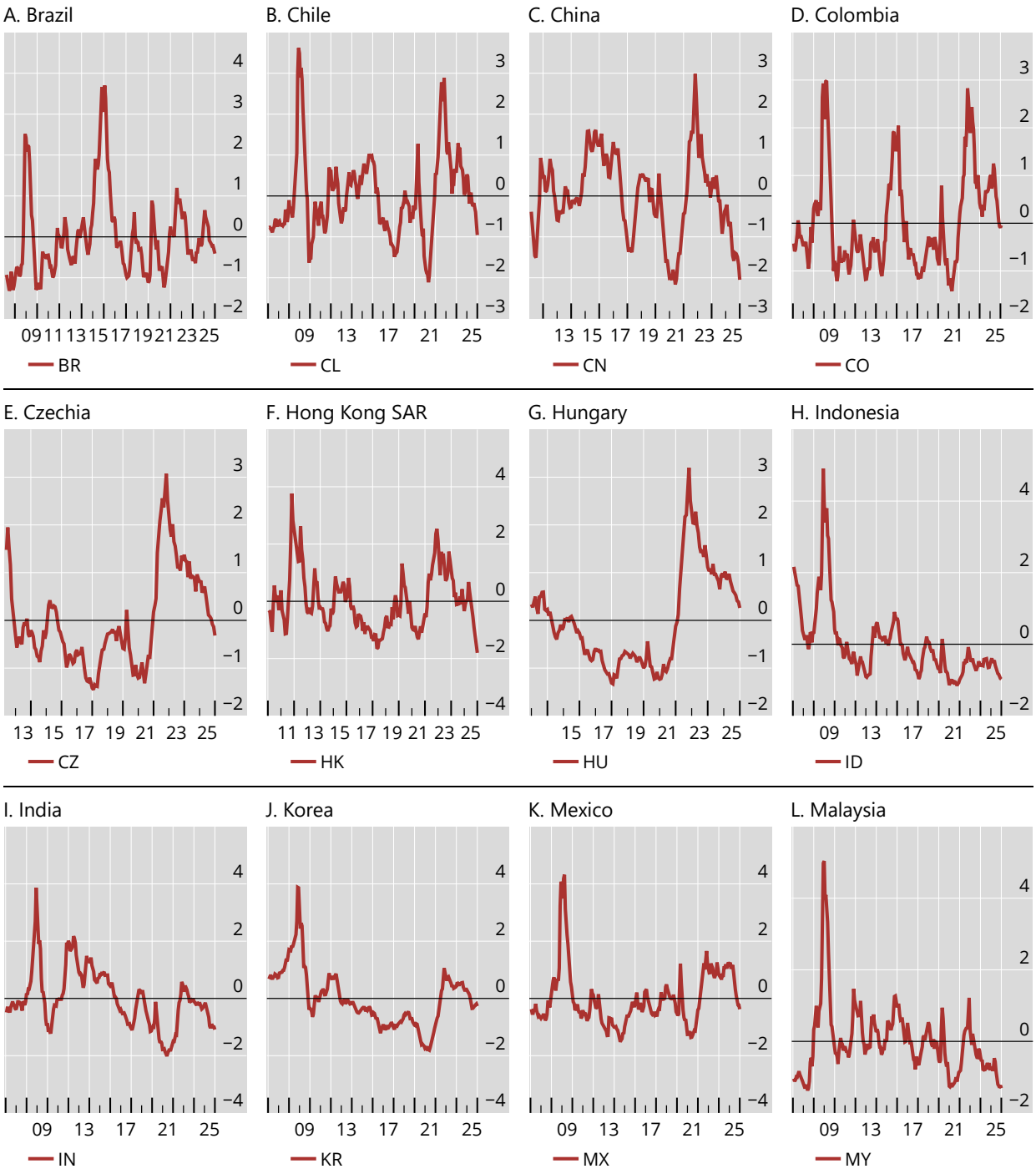
[1] On the horizontal axis, the values for sensitivity correspond to the coefficients estimated as described in Graph A.8 for inflows and in Graph A.9 for outflows, respectively, for each EME. The values on the vertical axis correspond to the average of each variable for each EME over the last 20 years upon data availability.

Sources: Federal Reserve Bank of St Louis; IIF; IMF; Bloomberg; EPFR; LSEG Datastream; national data; BIS Triennial Survey; BIS.

Financial conditions indices in individual EMEs[1]

Standardised units

Graph A.11



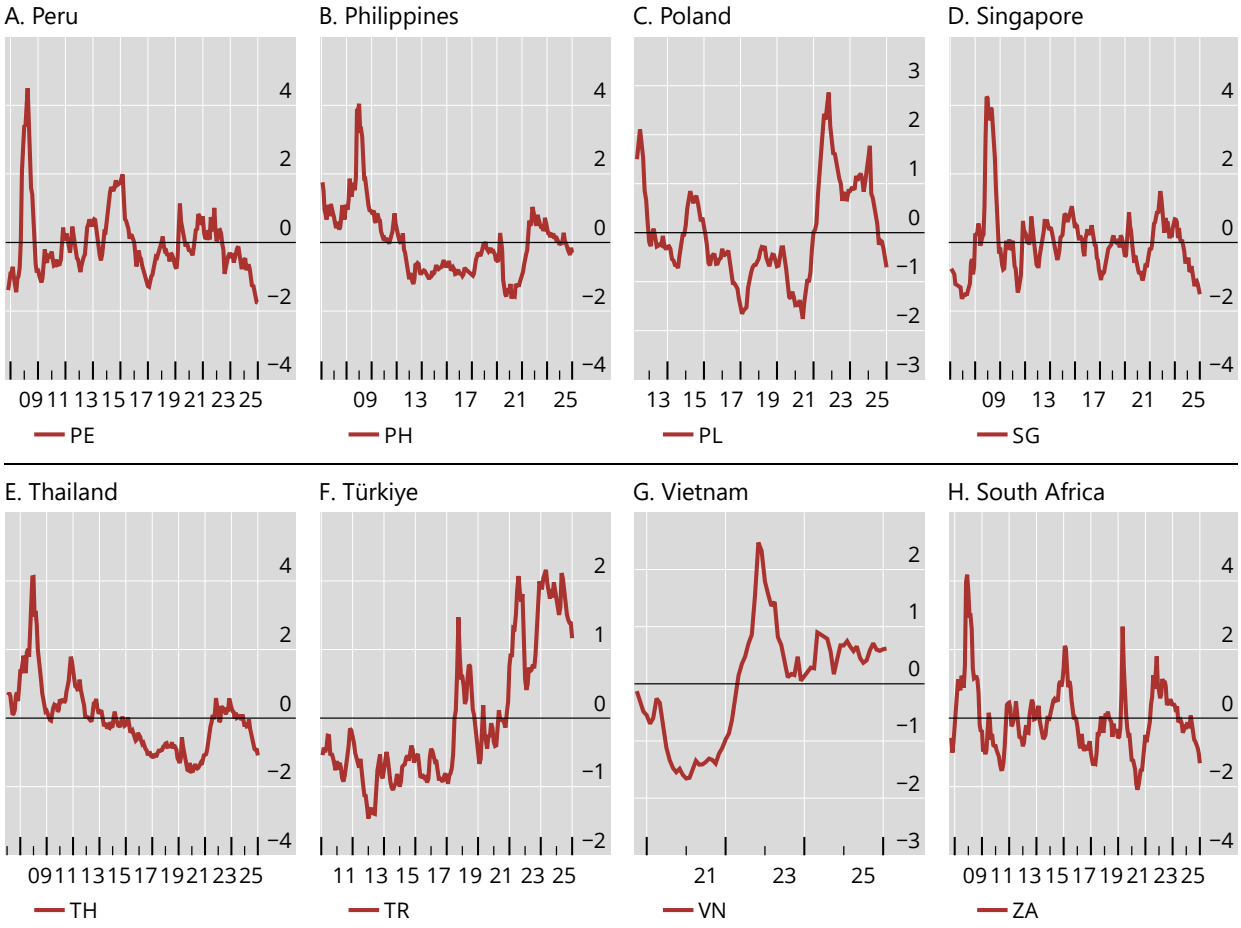
[1] FCIs are normalised with positive values indicating tighter financial conditions relative to history. For more details, see the footnote to Graph 15.

Source: BIS.

Financial conditions indices in individual EMEs (continued)[1]

Standardised units

Graph A.11



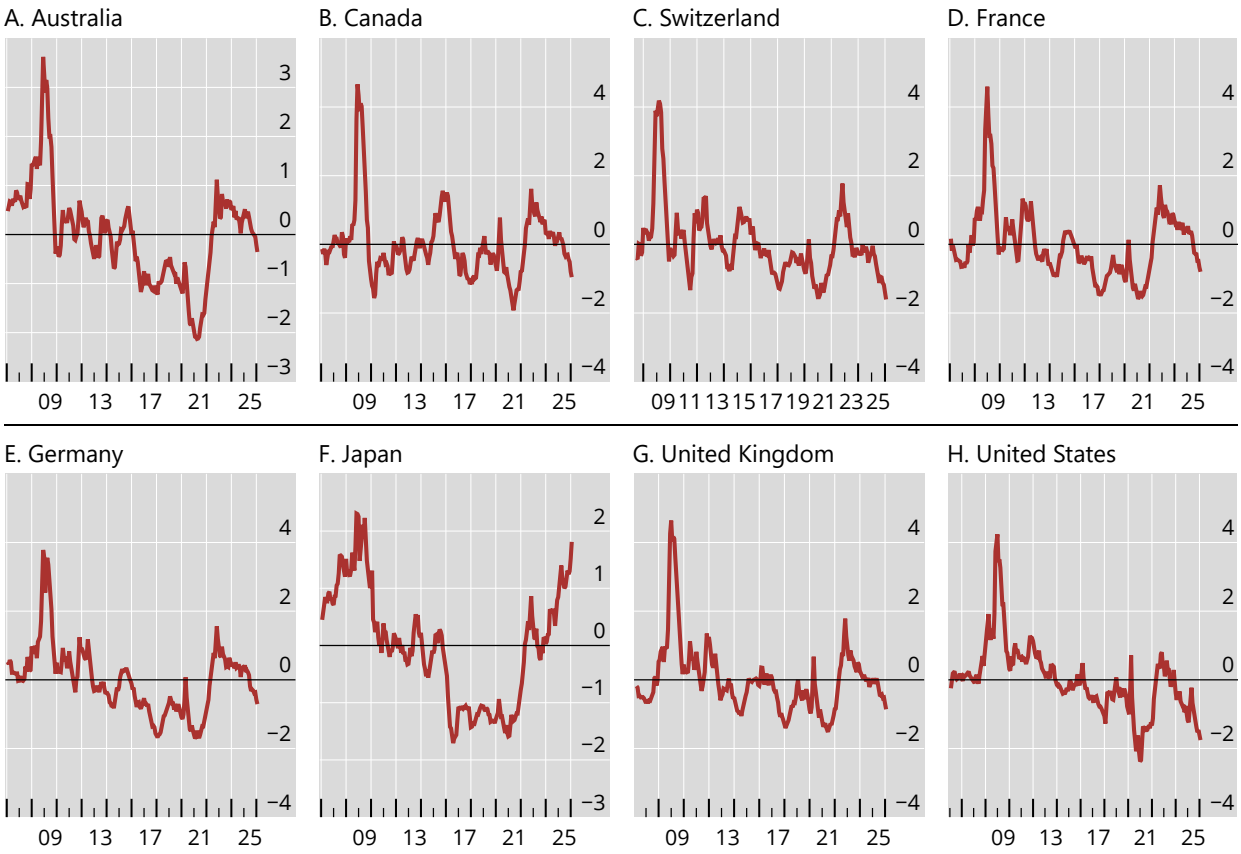
[1] FCIs are normalised with positive values indicating tighter financial conditions relative to history. For more details, see the footnote to Graph 15.

Source: BIS.

Financial conditions indices in individual AEs[1]

Standardised units

Graph A.12



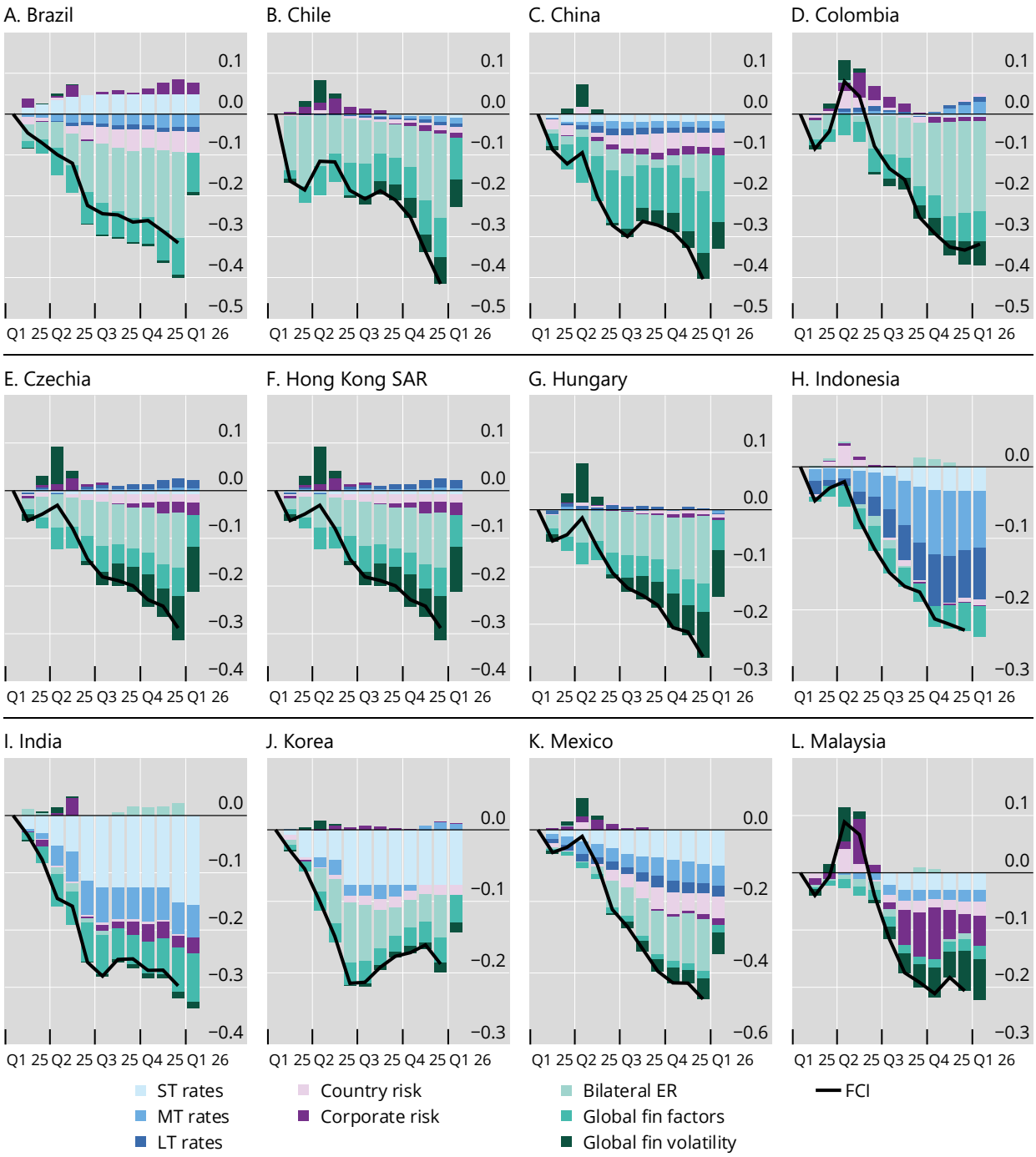
[1] FCIs are normalised with positive values indicating tighter financial conditions relative to history. For more details, see the footnote to Graph 15.

Source: BIS.

Decomposition of FCIs in individual EMEs since January 2025[1]

Standardised units

Graph A.13



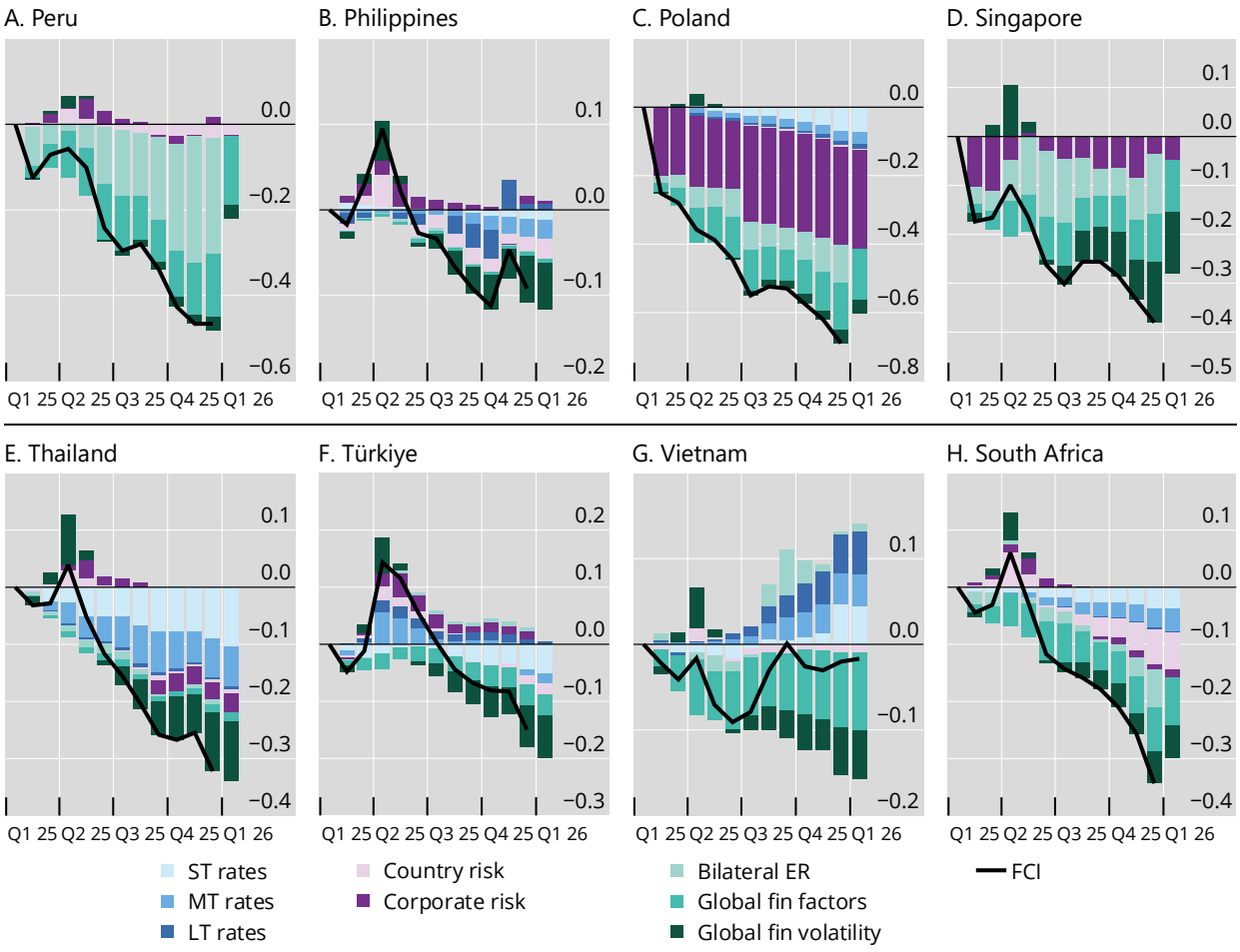
ER = exchange rate; LT = long-term; MT = medium-term; ST = short-term.

[1] Global financial factors include the nominal broad US dollar index and long-term US Treasury yields, while global financial volatility is measured by the Merrill Option Volatility Estimate (MOVE) Index.

Source: BIS.

Decomposition of FCIs in individual EMEs since January 2025 (continued)[1]

Standardised units — Graph A.13



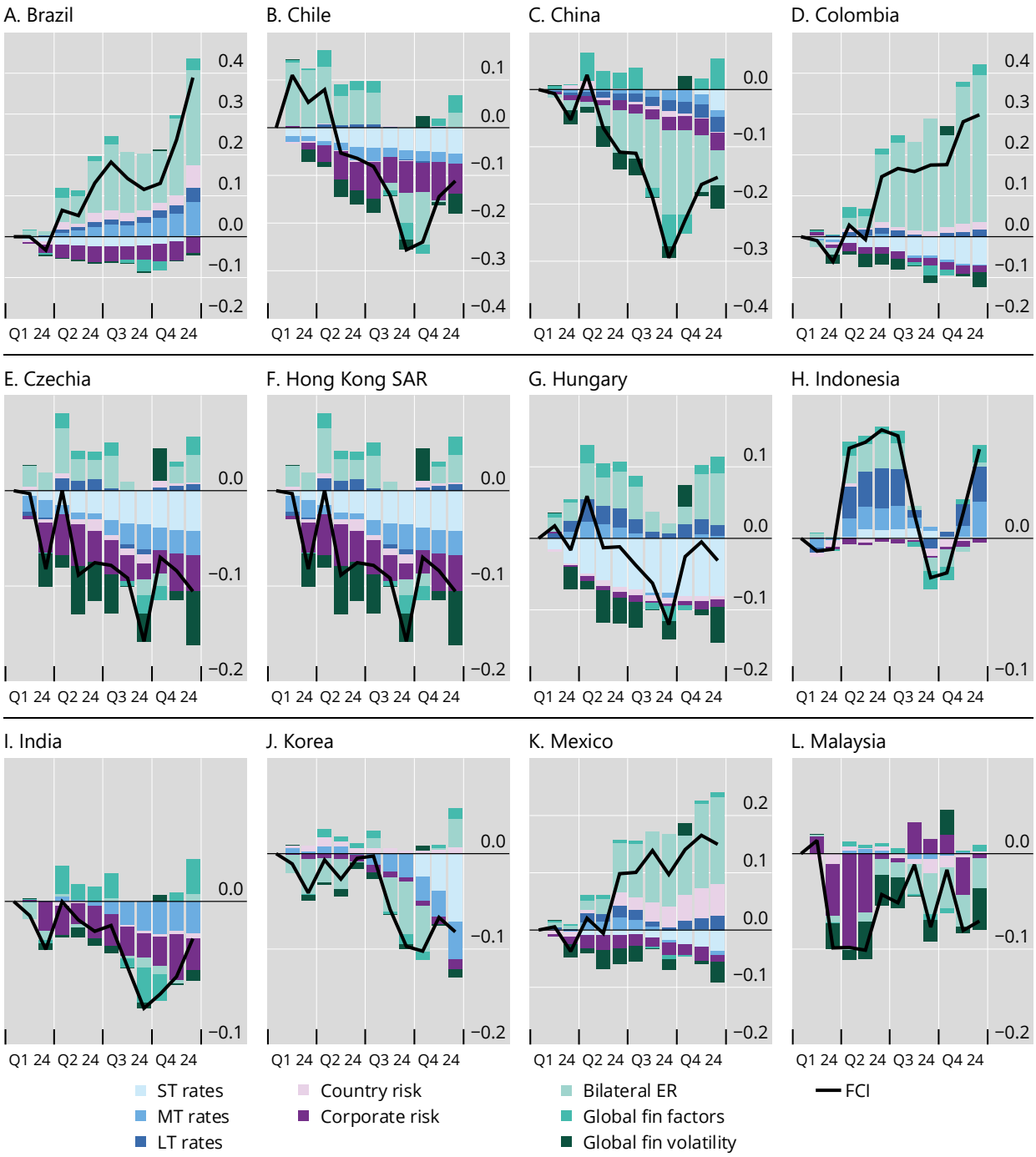
ER = exchange rate; LT = long-term; MT = medium-term; ST = short-term.

[1] Global financial factors include the nominal broad US dollar index and long-term US Treasury yields, while global financial volatility is measured by the Merrill Option Volatility Estimate (MOVE) Index.

Source: BIS.

Decomposition of FCIs in individual EMEs since January 2024[1]

Index, January 2024 = 0 Graph A.14



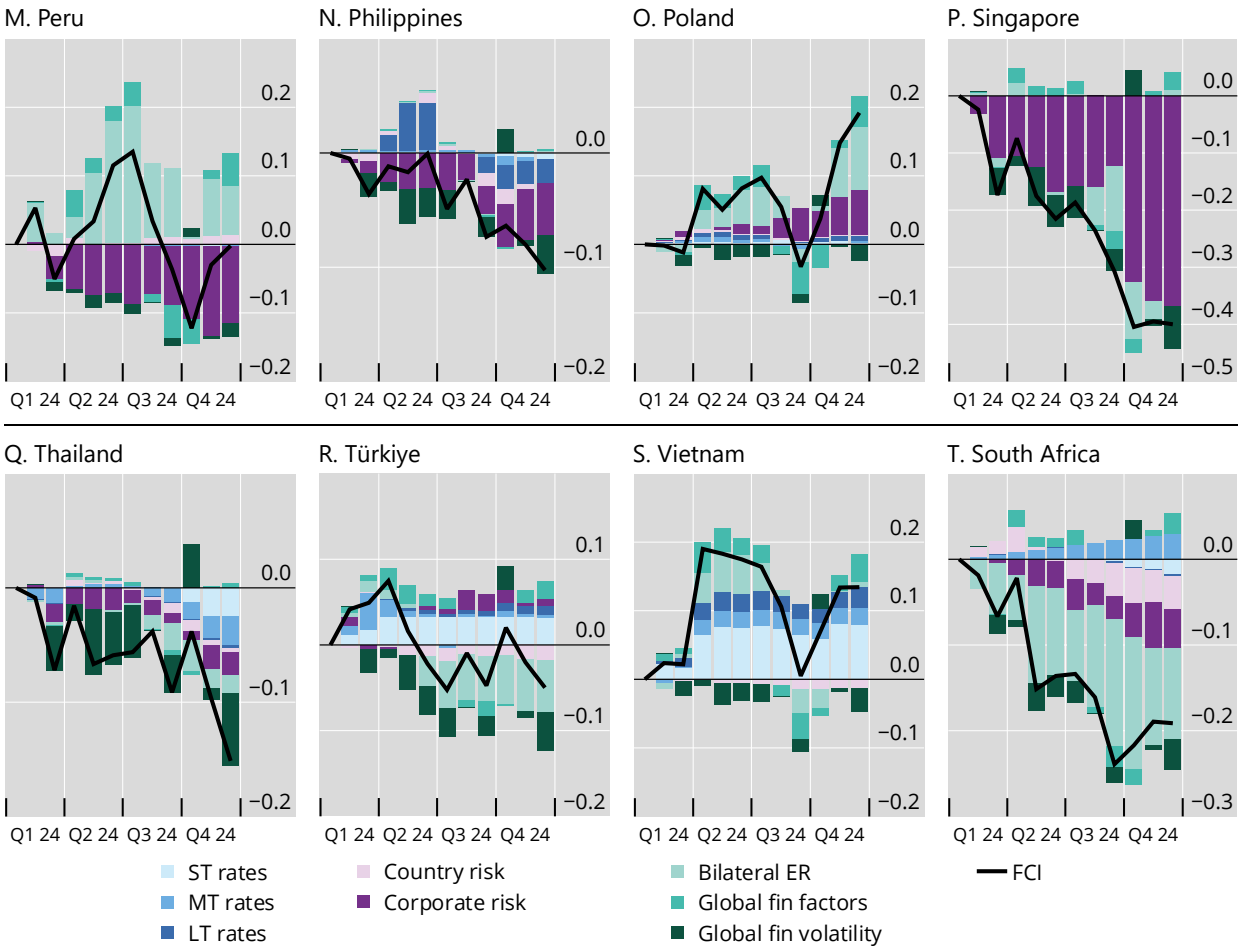
ER = exchange rate; LT = long-term; MT = medium-term; ST = short-term.

[1] Global financial factors include the nominal broad US dollar index and long-term US Treasury yields, while global financial volatility is measured by the Merrill Option Volatility Estimate (MOVE) Index.

Source: BIS.

Decomposition of FCIs in individual EMEs since January 2024 (continued)[1]

Index, January 2024 = 0 Graph A.14



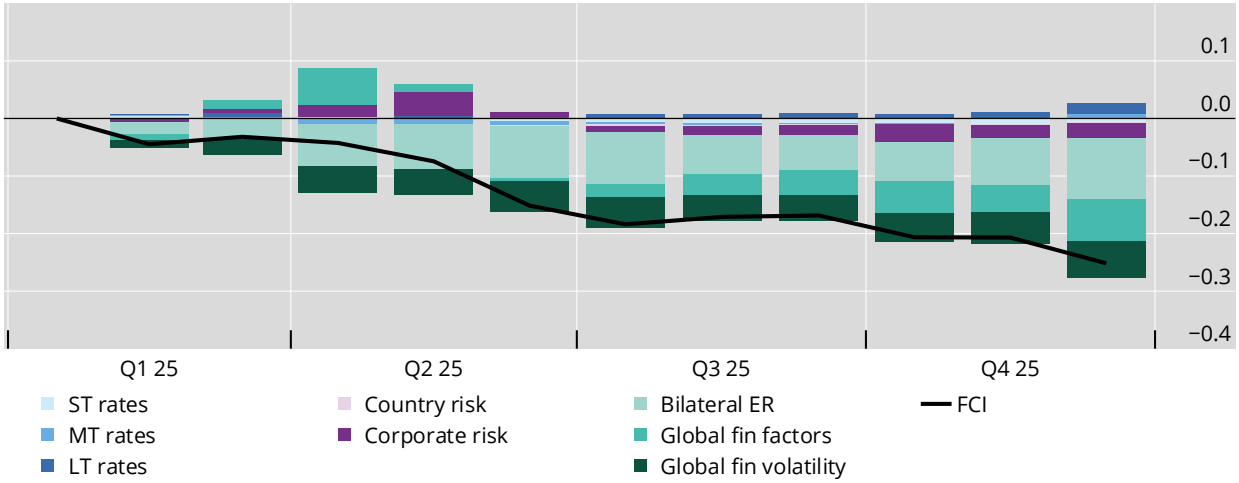
ER = exchange rate; LT = long-term; MT = medium-term; ST = short-term.

[1] Global financial factors include the nominal broad US dollar index and long-term US Treasury yields, while global financial volatility is measured by the Merrill Option Volatility Estimate (MOVE) Index.

Source: BIS.

Average decomposition of FCIs since January 2025 in 7 advanced economies

Index, January 2025 = 0 Graph A.15



ER = exchange rate; LT = long-term; MT = medium-term; ST = short-term.

[1] Global financial factors include the nominal broad US dollar index and long-term US Treasury yields, while global financial volatility is measured by the Merrill Option Volatility Estimate (MOVE) Index. Seven AEs consist of Australia, Canada, France, Germany, Japan, Switzerland and the United Kingdom. The above decomposition is calculated from the simple average of country-by-country decomposition across the seven AEs.

Source: BIS.

Financial conditions index methodology in EME central banks

Table A.1

	What variables are included?	How are weights on these variables calculated?	What are the current weights?	What is the main approach /method to construct FCI?
AE	1. Asset prices (real estate, equities). 2. Oil prices. 3. Lending rates. 4. Changes in private credit.	Estimated to maximize the FCI's predictive power for future bank default rates over a two-year horizon.		Weighted average of a broad set of transformed macro-financial indicators. Each underlying variable is standardized by mapping its values onto the unit interval through percentile transformation.
AR		In most cases, averages.		Depends on the index.
BR	26 domestic and external variables in 7 groups: 1. Domestic interest rates. 2. Foreign interest rates. 3. Risk. 4. Currencies. 5. Oil prices. 6. Commodities. 7. capital markets.	Calculated from regressions capturing the ability of the principal components (PCA) of each group to bring information on the future variation of the economic activity index.	1. Domestic interest rates = 0.34. 2. Foreign interest rates = 0.33. 3. Risk = 0.18, 4. Currencies = 0.20. 5. Oil prices = 0.23. 6. Commodities = –0.13. 7. Capital markets = –0.15.	Build an indicator that incorporates daily information on general financial market conditions, having as a reference for its construction the ability to generate information on future economic activity
CL	1. Exchange rates. 2. Bond yield 3. Stock prices, local and American.			Measure FC's impact on GDP and the tightness of current FC by historical standards.
CO	1. Short term corporate loan rates vs TES. 2. Corporate loan rates vs TES. 3. Consumer loan rates vs TES. 4. Confidence indicators: commercial, consumer, and industrial . 5. Expectations: growth, inflation, and spreads from the EOF survey. 6. Market volatility: conditional volatility of the equity market and TES. 7. Standard deviation of inflation expectations from the central bank's survey.	Each variable is standardized and, depending on its nature, multiplied by -1 so that a positive movement reflects an improvement in financial conditions. The final index is calculated as the simple average of all standardized variables.	Weight of 0.1428 for each variable	Index can be used as a proxy for understanding how financial conditions may influence real economic activity.
DZ	1. Interest rates, 2. Credit spreads. 3. Credit growth. 4. Exchange rates. 5. Government 5-year bond yield.			Informing monetary policy, monitoring financial stability and forecasting economic growth.
HK	1. Stock index volatility 2. Three-month interbank rate spread to central bank bills and notes yield 3. QoQ change in 3-month interbank rate. 4. QoQ % change in REER. 5. QoQ % change in stock price. 6. QoQ % change in property price index 7. QoQ % change in domestic currency credit.	Calculated based on VAR model.	Coefficients: 1. Stock index = –0.0013. 2. 3-m interbank rate spread to CB bill/note yields = –1.36. 3. 3-m interbank rate = –0.79. 4. REER = –0.16. 5. Stock price = 0.12. 6. Property price index = 0.22. 7. Dom currency credit = 0.14.	Estimated impact of financial variables on GDP growth
HU	Endogenous variables: 1. 3-m interbank rate. 2. NEER. 3. Real GDP. 4. Corp loan volume 5. Consumer loan volume 6. The bank interest margin on corporate loans. 7. The bank interest margin on consumer loans. Exogenous variables: 1. 3-m EURIBOR. 2. MNB's import-based foreign demand indicator.	Based on impulse response functions from a VAR model, we quantified the impact of the individual components of the index. The variables were weighted in the index according to the strength of these effects.		
ID	The Financial System Stability Index (FSSI) is composed of three main components: 1. The Resilience Index consists of: credit risks; liquidity risks; capital risks; market exposure risks 2. The Intermediary Index is weighted by the lending shares of banks and other financial corporations (OFCs), incorporating banks' lending growth and loan-to-deposit ratios alongside OFC financing growth. 3. Efficiency Index weighted by intermediary shares evaluates bank/OFC performance through net interest margin & operating cost–income ratios.	The Financial System Stability Index (FSSI) is composed of three main components: the Resilience Index (70%), the Intermediary Index (20%), and the Efficiency Index (10%). The indicators are weighted using Principal Component Analysis (PCA) and professional judgement.		To serve as a tool to gauge financial stability, regularly reported in Board of Governor Meetings and published in the Financial Stability Review. To act as one of the key indicators for determining the macroprudential policy stance To function as one of the main indicators within the Crisis Management Protocol.

Financial conditions index methodology in EME central banks

Table A.1

	What variables are included?	How are weights on these variables calculated?	What are the current weights?	What is the main approach /method to construct FCI?
KR	1. Short-term interest rate. 2. Real effective exchange rate. 3. Stock prices. 4. Term spread. 5. Risk premium. 6. Housing prices.	Weights are calculated with the relative impact on GDP gap		Assess overall tightening or easing based on its impact on GDP, and also compared historically with past periods
MX	1. The FCI-A considers 18 variables from the foreign exchange market, foreign financial conditions, the stock market, country risk, the debt market and macroeconomic variables. 2. The FCI-B has 9 financial variables: short- and long-term interest rate, sovereign spread, corporate spread, stock index, exchange rate, USD, VIX, and a US FCI.	FCI-A is calculated using the methodology proposed by Koop & Korobilis (2014). Variable weights and model parameters are dynamic and are calculated using a TVP-FAVAR with a dual Kalman filter. FCI-B uses PCA.		As an indicator of financial vulnerabilities, it tracks the source of vulnerabilities. Used as indicator of the impact of monetary stance on financial variables, eventually affecting economic activity. Interpreted as proxy to monetary stance.
MY	Twelve variables categorised into 3 major areas: 1. Banking system (credit spreads, money growth) 2. FX markets (exchange rate levels and volatility; and changes in official foreign reserves) 3. Capital markets (term premia; risk premia in bond yields; equity market size, level volatility).	Weights result from principal component analysis.	Weights are typically higher for FX and capital markets respectively.	Tool to measure whether overall financial conditions are tightening or loosening relative to a base period.
PE	For the FCI in domestic currency: 1. 3-m prime lending rate. 2. 10-y yield of Soberanos Bond. 3. Spread between the domestic currency interbank rate and the federal funds rate. 4. Spread between 10-y yield of Soberanos Bond and 10-y yield of US Treasury bonds. 5. Spread between 3-m prime lending rate and 3-m central bank securities interest rate. 6. Spread between 10-y yield of Soberanos Bond and 3-m central bank securities interest rate. For the FCI in foreign currency: 1. Interbank rate in Foreign Currency. 2. 3-m prime lending rate. 3. 10-y yield of Global Bond. 4. Spread between the 3-m prime lending rate and the interbank interest rate. 5. Spread between 10-y yield of Global Bond and 10-y yield of US Treasury bonds.			
PH		GaR framework: weights for are determined using linear discriminant analysis (LDA). PCIFS: all indicators used to measure financial stress in each sub-market are assigned equal weights in forming the composite index.		GaR framework assesses current macro-financial conditions using financial market indicators to anticipate future economic growth. PCIFS provides a measure-ment of current stress in financial markets.
SA		Financial conditions are assessed through a Financial Stability Heatmap.		Assessing tightness/looseness of financial conditions relative to historical trends.
SG	1. Interest rates. 2. Asset prices. 3. Credit and money supply. 4. Global market indicators of risk sentiments. 5. Growth expectation. 6. S&P 500 equity index. 7. VIX implied volatility index. 8. BCOM index for global commodity prices	Calculated via a Principal Component Regression.		Measure the impact of a broad range of financial variables on Singapore's output gap.
TH	FCI is the weighted average of 4 sub-indices: 1. Funding cost: interbank rate, new loan rate, average MLR and MRR of 6 commercial banks, corporate spread for A up and BBB rating group, 2-year and 10-year government bond yields level and volatilities. 2. Private credit: business and household loans, corporate bond excluding financial institution. 3. Equity prices: SET index, MAI index, SET volatility. 4. Foreign exchange: gap of Thai baht and NEER to their long-term trend; and Thai baht volatility.	Weights for each sub-indices derived from its respective impact on real GDP over next 4 quarters by using Bayesian VAR with sign restrictions. To construct a sub-index, all variables in sub-index normalized to z-score and weighting by its contribution to first principal component from factor model	The sub-indices weights are: 1. Funding cost = 33%. 2. Private credit = 22%. 3. Equity prices = 19%. 4. Foreign exchange = 26%.	Assess the tightness or looseness of current financial conditions relative to historical period, while explicitly linking these conditions to real economic activity.

Financial conditions index methodology in EME central banks

Table A.1

	What variables are included?	How are weights on these variables calculated?	What are the current weights?	What is the main approach /method to construct FCI?
TR		Currently, we are reassessing and revising the variables and weights, reconciling their approach, methodology and construct indexes with some new methodology.		Past indexes aimed to measure impact of financial conditions on GDP growth. We aim to measure tightness of financial conditions by historical standards as well.
ZA	1. Ten-year government bond yield. 2. Sovereign CDS spread; term spread. 3. Rand-Dollar exchange rate volatility. 4. Equity (Alsi) volatility 5. Equity (Alsi) prices, m-o-m growth rate. 6. Real household price index, m-o-m growth rate. 7. Credit to households, m-o-m growth rate. 8. Credit to corporates, m-o-m growth rate.	The variables are equally weighted.		1. Measure the tightness of current financial conditions by historical standards. 2. Measure the impact of financial conditions on GDP growth.

Sources: 2026 EME Deputy Governors meeting survey; BIS.

Estimated impact of a depreciation of the US dollar on domestic financial conditions Table A.2

	What is the estimated impact of a 1% depreciation of the US dollar on domestic financial conditions?	
AE	No nominal impact due to a fixed exchange rate regime.	
BR	A 1% depreciation of the US dollar generates:	A 0.23% decrease in the FCI (less restrictive financial conditions).
CL	The source of exchange rate depreciation is crucial in understanding its impact.	
	If the depreciation is driven by a less restrictive monetary policy in the United States, it tends to have a positive effect on Chilean financial markets—leading to:	- 0.5% increase in the stock index. - 3 bp decline in the 10-year sovereign bond yield.
	If the depreciation of the dollar stems from a reduction in global risk, it leads to:	- 0.1% increase in the stock index. - 1.3 bp decline in the 10-year sovereign bond yield.
CO	A 1% appreciation of the US dollar generates:	- 0.000004 bp increase in the three-years TES yield - 0.000006 bp increase in the six-years TES yield - No significant effect on the one-month and one-year yields.
CZ	Most likely, direct consequences of a mild US dollar depreciation would be insignificant.	
DZ	Very moderate impact on domestic financial conditions	
HK	Under the Linked Exchange Rate System (LERS), the HKD stays within the Convertibility Zone of HKD7.75-7.85 per USD. For this reason, the impact of a depreciation of the USD on domestic financial condition is non-linear, as it depends on whether the exchange rate movement is large enough to trigger the strong-side Convertibility Undertaking (CU) at HKD7.75 per USD. - When the strong-side CU is triggered, the HKMA will sell HKD to banks for USD and the Aggregate Balance (a component of the Monetary Base) will then expand to push down HKD interest rates. - When the strong-side CU is not triggered, the impact would be less pronounced when the USD depreciates. Moreover, when the USD depreciates against a broad basket of currencies, the HKD NEER will closely mirror this depreciation against the basket, and the depreciation will have the usual effects on the domestic economy and financial conditions.	
IN	The impact of rupee depreciation works through trade and finance channels. Since, the trade channel works with a lag and is found to be weaker, finance channel is usually predominant in the short run. Rupee depreciation leads to an increase in debt servicing cost, thus leading to tighter financial conditions.	
MX	Based on FCI-A, a 1% depreciation of the US dollar is associated with:	- .0.2379% decrease in corporate credit spread. - 3.2435% increase in equity prices. - 0.0077% decrease in sovereign CDS spread. - No significant effect on FCI or government bond yields.
	Based on FCI-B, an appreciation of the US dollar tightens domestic financial conditions by:	- Increasing EMBI spread. - Increasing long-term yield. - Decreasing stock exchange returns.
MY	A depreciation of the US dollar and an appreciation of the ringgit results in a loosening of domestic financial conditions, as measured by the Financial Conditions Index.	
	During the 2006-2007 episode of USD weakness, where the DXY declined by 15.9%	- The MYR appreciated by 14.3%, alongside a broad-based easing in financial conditions. - Bond yields declined by 9.6 bp reflecting increasing demand for domestic bonds. - Credit spreads narrowed by 0.5 bp.
	In recent periods of USD weakness, particularly in 2025. Year-to date (Up to 25 November 2025), the dollar (DXY) has weakened by -7.7%.	- MYR has appreciated by 8.2%, contributing to an easing in domestic financial conditions. - Bond yields declined by 39 bp amid higher demand for domestic bonds. - Credit spreads narrowed by 17.6 bp.
PE	A 1% depreciation of the US dollar generates:	- 0.7 bp in the bank lending rate in PEN one-year ahead - No significant effect on bank lending rate in USD.
PH	A depreciation of the US dollar, or an appreciation of the domestic currency, is expected to help ease financial conditions in the country.	
SA	If the depreciation of the U.S dollar is driven by changes in policy rates, domestic financial conditions should loosen.	
SG	Domestic interest rates are heavily influenced by US rates, though often with a discount, in the sense that domestic rates remain lower than US rates, most likely reflecting market expectations of appreciation in the domestic currency. This "discount" can average slightly around 110 bps (when the low interest rate years post-GFC are excluded) or around 80bps for the full sample from 2000-25.	
TH	In addition to trade channel, U.S. dollar depreciates leads to tighter financial conditions for Thailand mainly through financial channel. This is because Thailand is a net exporting country with (1) mostly unhedged USD-invoiced export revenues and (2) mostly domestic borrowing. Therefore, financial channel does not countervail, but instead adversely amplifies trade channel. The impact through other channels such as funding cost, private credit, and equity prices appears relatively limited, as these factors are mainly driven by domestic conditions.	
TR	An appreciation of local currency against hard currency due to exogenous shocks are expected to decrease credit spreads and increase demand for local financial assets, while the expected effects could vary depending on global and domestic financial conditions. Moreover, financial conditions are highly associated with expectations on the outlook of the financial markets.	
VN	When the US dollar depreciates by around 1%, domestic financial conditions tend to ease slightly in the short term.	- Government bond yield may decline due to increased capital inflows into the domestic market. - Credit spreads often narrow as risk sentiment improves. - The stock market also tends to rise, reflecting renewed attractiveness of VND-denominated assets.

Sources: 2026 EME Deputy Governors meeting survey; BIS.

Estimated impact of changes in the US federal fund rate and US long-term Treasury yield on domestic financial conditions

Table A.3

	What is the estimated impact of a 1% depreciation of the US dollar on domestic financial conditions?	
AE	A 100 bp policy rate hike links to:	- Time deposit growth of about 20 bp.
BR	A 1% increase in the US ten-year treasury yield is associated with:	- Positive but inelastic rise in the ten-year local-currency government bond yield.
CL	A 10 bp increase in the ten-year US treasury yield leads to:	- 0.2% decline in the stock market. - 1 bp increase in the 10-year sovereign bond yield. - 0.1% depreciation of the CLP.
CN	The China-U.S. interest rate spread serves as a primary transmission mechanism influencing the RMB exchange rate against the USD. A decline in the U.S. federal funds rate and long-term Treasury yields tends to narrow the inversion of the China-U.S. interest rate spread, thereby alleviating depreciation pressure on the RMB against the U.S. dollar. As a large open economy, China's monetary policies have always given prominence to the country's own development. In recent years, with the optimization of economic structure and the enhanced competitiveness of manufacturing industry, China's current-account surplus has remained within the range of a reasonable equilibrium, providing solid support for the stability of the RMB exchange rate. Since 2020, despite the Fed's aggressive quantitative easing and tightening monetary policy, the RMB exchange rate has exhibited relatively low volatility compared to global peers, cross-border capital flows remained broadly stable, the international balance of payments maintained a basic equilibrium, and the economy was relatively resilient to external shocks.	
CO	Ruiz and Christensen (2023) analyse the term structure of interest rates in Colombia and finds that local currency public debt bonds (TES) respond to international financial variables primarily through changes in the inflation risk premium. A VAR model including the first principal component of global risk indicators (VIX, MOVE, DXY, and the CDS spread of emerging economies), which is refer to as RI shows the following effects on the TES (Colombia's local currency public debt bonds). The results indicate that tighter external financial conditions translate into tighter domestic financial conditions, as measured by the IDOAM, particularly:	- A 1 ppt in the 10-year US treasury yield increase by 14 bp the 5-year Colombia inflation risk premium. - A 10 point increase in the MOVE index increases Colombia's inflation risk premium by 5 bp. - Before 2014 and during 2014–2022, a one unit increase in the RI increases approximately 30 bp in the ten-year TES yield. - After 2022, the effect remains statistically significant but is shorter-lived and comparatively smaller, at around 20 bp.
CZ	Direct impact is negligible. Indirectly through pressures on ECB and CNB interest rates and "hot money" flows. Any such changes have first to reach European bond markets. If they do, Czech bond rates usually adjust to their German benchmarks, unless there are autonomous shocks that specifically affect the EUR/CZK segment of the forex. Occasionally, "hot money" flows to/from the Czech market can be temporarily affected by unexpected Fed measures, but the magnitude is limited.	
DZ	Very moderate impact on domestic financial conditions	
HK	Under the Linked Exchange Rate System, Hong Kong dollar interbank rates generally track their US dollar counterparts, and the yields of the long-term HKD HKSAR government bonds generally follow the movements of US long-term Treasury yields.	
ID	A 1 ppt increase in the US 10-year treasury yield is associated with:	- Positive but inelastic rise in the 10-year local-currency government bond yield
IN	Higher India-US yield differential is associated with tighter financial conditions. This is because an increase in yield differential reflects relatively higher domestic interest rate, which compensates for the expected rupee depreciation and country risk premium under the interest rate parity condition.	
MX	Based on FCI-A, a 1% decline in the three-month US T-bill rate is associated with: Based on FCI-A, a 1% decline in US ten-year T-bond rate is associated with: Based on FCI-B, an increase in the US long term yield leads to:	- 0.3671% decline in the FCI. - 0.0051% decline in the ten-year sovereign peso yield. - 5.1517% increase in equity prices. - 0.0177% decline in the ten-year sovereign US dollar yield. - 0.0026% decrease in the ten-year sovereign peso yield. - 0.0032% decrease in the ten-year sovereign US dollar yield. - No significant effect on the FCI-A. - Increase in the Mexican long-term yield. - Decrease in the EMBI. - No significant response of the exchange rate.
MY	Changes in the US Federal Reserve policy rate affect interest rate differentials and impact Malaysia's financial conditions primarily through portfolio flows and exchange rate movements. During the Fed tightening cycle in 2022-2023, the federal funds rate was raised by 525 bps and UST yields increased by 169 bps.	- MYR depreciated by 8.1%. - Domestic bond yield increase by 125 bp.
PE	Following Aguirre et al. (2022), we estimate that the pass-through effect of a 1 percent increase in the 3-month SOFR results, after one year, in:	- A 4.7 bp increase in the domestic bank lending rate in soles.
PH	According to (Bagsic, 2024) a 1 ppt increase (decrease) in the US fed fund rate results in:	- A decrease (increase) in relative foreign borrowing of non-financial corporates by 4.5 ppts.
SA	Given the Saudi Riyal's peg to the U.S. dollar, policy rates are aligned with the U.S. federal reserve. which result in a direct impact on domestic financial conditions.	
SG	Domestic interest rates are heavily influenced by US rates, though often with a discount, in the sense that domestic rates remain lower than US rates, most likely reflecting market expectations of appreciation in the domestic currency. This "discount" can average slightly around 110 bps (when the low-interest rate years post-GFC are excluded) or around 80bps for the full sample from 2000-25.	

TH	Changes in the U.S. interest rates usually impact Thai financial conditions through exchange rate channel, while bond yield and credit spreads play a limited role due to low level of non-resident participation in bond market. To illustrate, when the federal funds rate rises, the U.S. dollar typically appreciates, which may lead to depreciation of the Thai baht and a loosening of domestic financial conditions. However, this effect may be temporary due to the fluctuating nature of exchange rates.
TR	An increase in US FED funds rate or long-term Treasury yields is likely to direct capital flows from an emerging market to the rest of the world. Thus, this could result in tightening in the domestic financial conditions.

Sources: 2026 EME Deputy Governors meeting survey; BIS.

Gravity, global and crypto risk factors as drivers of Bitcoin flows[1]

Table A.4

	IBS claims	Exports	Bitcoin flows		
	(1)	(2)	(3)	(4)	(5)
Gravity					
Distance	-0.774***	-0.749***	-0.075***	-0.075***	-0.075***
	(0.069)	(0.037)	(0.016)	(0.016)	(0.016)
Common border	0.921***	0.693***	0.007	0.007	0.007
	(0.192)	(0.098)	(0.035)	(0.035)	(0.035)
Common language	0.213	0.086	0.095***	0.095***	0.095***
	(0.151)	(0.088)	(0.021)	(0.021)	(0.021)
Global factors (t-1)					
VIX			1.571***	2.027***	2.180***
			(0.019)	(0.032)	(0.030)
High-yield spread				-3.749***	-3.354***
				(0.043)	(0.041)
Dollar index			-9.817***		
			(0.178)		
Federal fund rate				-0.007*	0.000
				(0.004)	(0.004)
US growth				-0.037***	0.010***
				(0.002)	(0.002)
Crypto risk factors (t-1)					
BTC-USD volatility			0.743***	1.014***	
			(0.043)	(0.040)	
Crypto market					7.070***
					(0.076)
Crypto size					-2.074***
					(0.090)
Crypto momentum					-5.714***
					(0.231)
N	81,716	468,828	529,746	529,746	529,746
Pseudo R^2	0.860	0.919	0.878	0.930	0.938
FE: sender×t & receiver×t	Yes	Yes			
FE: sender & receiver			Yes	Yes	Yes

[1] *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the quarterly US dollar amount of bilateral (1) cross border interbank (IB) claims; (2) merchandise exports; and (3–5) bilateral cross-border Bitcoin (BTC) flows. To ensure comparability across the different specifications, the regressions are estimated based on using observations from Q1 2017 up to Q2 2023, consistent with the last available quarter of observation for the crypto risk factors (i.e. Q1 2023) at the time of writing. Robust standard errors, clustered by country pairs, in parentheses.

Source: Auer et al (2025).

Drivers of cross-border flows in ETH, USDC and USDT[1]

Table A.5

	ETH	ETH	USDC	USDC	USDT	USDT
	(1)	(2)	(3)	(4)	(5)	(6)
Gravity	-0.028***	-0.028***	0.003	0.003	-0.016***	-0.016***
Distance	(0.008)	(0.008)	(0.004)	(0.004)	(0.003)	(0.003)
	0.006	0.006	0.019	0.019	0.017	0.017
Common border	(0.020)	(0.020)	(0.015)	(0.015)	(0.013)	(0.013)
	0.080***	0.080***	0.032***	0.032***	0.005	0.005
Common language	(0.018)	(0.018)	(0.010)	(0.010)	(0.010)	(0.010)
	-0.028***	-0.028***	0.003	0.003	-0.016***	-0.016***
Global factors (t-1)						
VIX	1.953***	3.286***	1.371***	6.721***	1.499***	6.907***
	(0.020)	(0.039)	(0.032)	(0.092)	(0.021)	(0.043)
Dollar index	-13.156***		-1.294*		-1.868***	
	(0.183)		(0.702)		(0.266)	
High-yield spread		-4.774***		-7.848***		-8.432***
		(0.054)		(0.156)		(0.065)
Federal fund rate		0.069***		0.507***		0.566***
		(0.005)		(0.012)		(0.003)
US growth		0.062***		0.036***		0.062***
		(0.002)		(0.003)		(0.003)
Crypto risk factors (t-1)						
BTC-USD volatility	-0.496***		-2.710***		-2.394***	
	(0.056)		(0.122)		(0.050)	
Crypto market		6.956***		-6.215***		0.397***
		(0.080)		(0.502)		(0.108)
Crypto size		-3.009***		-6.740***		-6.771***
		(0.074)		(0.156)		(0.111)
Crypto momentum		-3.467***		10.546***		1.776***
		(0.240)		(0.678)		(0.242)
US dollar index		6.956***		-6.215***		0.397***
		(0.080)		(0.502)		(0.108)
N	521,234	521,234	384,669	384,669	434,253	434,253
Pseudo R^2	0.820	0.938	0.806	0.909	0.763	0.912
FE: sender×t & receiver×t	Yes	Yes	Yes	Yes	Yes	Yes

[1] *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the quarterly US dollar equivalent of bilateral cross-border flows in (1-2) ETH (Ether); (3-4) USDC (USD Coin); and (5–6) USDT (Tether) respectively. To ensure comparability across the different specifications, the regressions are estimated based on using observations from Q1 2017 up to Q2 2023, consistent with the last available quarter of observation for the crypto risk factors (i.e. Q1 2023) at the time of writing. Robust standard errors, clustered by country pairs, in parentheses.

Source: Auer et al (2025).

How are crypto flows related to country-specific factors?[1]

Table A.6

	BTC	ETH	USDC	USDT	USDC	USDT
	(1)	(2)	(3)	(4)	(5)	(6)
Sender (t-1)						
High inflation	0.066***	0.183***	0.492***	0.147***	0.624***	0.156***
	(0.017)	(0.016)	(0.053)	(0.017)	(0.077)	(0.021)
High GDP growth	0.082***	0.062***	-0.021	0.046***	-0.016	0.033
	(0.012)	(0.013)	(0.016)	(0.015)	(0.018)	(0.021)
High Bitcoin awareness	0.093***					
	(0.016)					
High Ethereum awareness		0.291***	0.408***	0.351***		
		(0.020)	(0.037)	(0.024)		
High stablecoin awareness					0.144***	0.151***
					(0.027)	(0.022)
Receiver (t-1)						
High inflation	0.090***	0.144***	0.277***	0.225***	0.318***	0.275***
	(0.019)	(0.017)	(0.029)	(0.021)	(0.036)	(0.024)
High GDP growth	0.034***	0.031**	0.064***	0.015	0.068**	0.023
	(0.012)	(0.013)	(0.021)	(0.015)	(0.028)	(0.020)
High Bitcoin awareness	0.245***					
	(0.015)					
High Ethereum awareness		0.242***	0.378***	0.297***		
		(0.023)	(0.051)	(0.028)		
High stablecoin awareness					0.224***	0.188***
					(0.051)	(0.021)
High bilateral FX volatility	0.005	-0.003	0.004	0.038**	0.009	0.105***
	(0.014)	(0.016)	(0.043)	(0.018)	(0.060)	(0.024)
N	159,937	155,361	116,939	136,684	18,452	21,708
Pseudo R^2	0.895	0.897	0.893	0.867	0.845	0.784
Gravity controls	Yes	Yes	Yes	Yes	Yes	Yes
Global factors	Yes	Yes	Yes	Yes	Yes	Yes
FE: sender & receiver	Yes	Yes	Yes	Yes	Yes	Yes

[1] *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the quarterly US dollar equivalent of bilateral cross-flows in the crypto asset reported in the top row. All regression includes controls for gravity (distance, common language and common border), lagged global factors (VIX, high-yield spreads, US policy rate change and US growth). High inflation and high GDP growth are binary variables equal to one (zero otherwise) for values in the top quartile of the sample distribution. High awareness is a binary variable equal to one (zero otherwise) if the number of Google searches for "Bitcoin" (column1), for "Ethereum" (columns 2 to 4), and for "Stablecoin" (columns 5 and 6), respectively, are in the top quartile of the country's own time series of searches. Robust standard errors, clustered by country pairs, in parentheses.

Source: Auer et al (2025).

Crypto as an emerging substitute for remittances?[1]

Table A.7

	Remittances	BTC	ETH	USDC	USDT	BTC<$500	BTC<$200
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Remittance cost (t-1)	-0.111***	-0.001	0.006	0.013***	0.016***	0.088**	0.101***
	(0.041)	(0.004)	(0.004)	(0.004)	(0.006)	(0.034)	(0.033)
Distance	-0.690***	-0.067***	-0.027***	0.006	-0.015	-0.310***	-0.346***
	(0.114)	(0.019)	(0.007)	(0.009)	(0.015)	(0.109)	(0.107)
Common border	0.782**	-0.069**	-0.011	-0.110***	-0.006	-1.623***	-1.496***
	(0.343)	(0.033)	(0.026)	(0.038)	(0.021)	(0.135)	(0.143)
Common language	0.674***	0.122***	0.038***	0.032***	-0.001	0.461***	0.537***
	(0.133)	(0.022)	(0.012)	(0.011)	(0.009)	(0.133)	(0.133)
N	2,029	8,766	8,766	6,705	7,755	5,232	5,232
Pseudo R^2	0.869	0.996	0.998	0.999	0.999	0.985	0.985
FE: sender×t & receiver×t	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frequency	Annual	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly

[1] *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the quarterly US dollar amount of bilateral remittances in column (1) and cross border crypto flows in columns (2) to (7). Remittance costs are measured based on the log of the (lagged) mean of the total percentage of the transaction value charged for payments. Robust standard errors, clustered by country pairs, in parentheses.

Source: Auer et al (2025).

Capital flows to emerging markets: insights from Argentina[1]

Central Bank of Argentina

Introduction

This note examines recent dynamics of capital flows to Latin America and Argentina, considering global structural changes and country-specific factors. We showcase the main features of capital flows to Latin America over the last two decades, noting how countries strengthened policy frameworks in the same period. We then point to how Argentina differed from Latin America due to idiosyncratic factors. Finally, we highlight how current reforms in Argentina have a twofold significance.: (i) they are the first step to realising the potential for domestic financial market development, achieving sustainable integration into global financial markets; and (ii) by fostering a sound monetary and fiscal policy framework, they will contribute to building buffers and thus becoming the "first line of defence" against external financial volatility.

1. EMEs and Latin America's capital flows in context

In the last two decades, emerging market economies (EMEs) experienced two major waves of capital inflows: 2010–14 and 2016–21 (Graph 1), driven by accommodative global monetary conditions and structural changes in the international monetary system (CGFS (2021)). During the first of these, the exit from the Great Financial Crisis (GFC) of 2008 was accompanied by expansionary monetary policies in advanced economies. This translated into a boom in the flow of capital seeking performance to emerging markets. The process was marked not only by exchange rate appreciation but also by reserve accumulation – a policy which EMEs had embarked on by the time of the commodity price surge in the early 2000s.

The first phase lasted until the so called "Taper Tantrum" around 2013. The initial impact was indiscriminate; emerging equity markets fell and suffered a sharp depreciation of their currencies. After the implementation of the announcement, however, differentiation could be perceived. Countries with strong macroeconomic fundamentals (low inflation, balanced accounts, high reserves) fared better (Eichengreen and Gupta (2015)). By 2014, despite persistent volatility, the gradual normalisation of emerging market debt markets was leading to another wave of capital flows, mainly to countries which had more significant buffers and monetary

[1] Economic Research, Central Bank of Argentina. Note prepared for presentation at the meeting of BIS Emerging Market Deputy Governors on "Capital flows, exchange rates and financial conditions in EMEs in an evolving international monetary system", held on 12–13 March 2026 in Basel. Information is current as of November 2025 unless otherwise indicated.

policy credibility, and which had avoided fiscal and external misalignments (Chari et al (2021)).

Between 2016 and 2021, the global cycle was more volatile, marked by episodes of risk aversion due to the "global growth scare" (2015–16), trade tensions and geopolitical shocks. Covid-19 represented a major external shock, with supply disruptions and massive capital outflows. Global monetary policy remained expansionary until 2021, with some tightening episodes (Federal Reserve hikes). This period is characterised by the deepening of economic policies developed in the aftermath of the Taper Tantrum that affected emerging markets. These policies generated the necessary "antibodies" to trigger an early reaction from the monetary authorities after the pandemic. This was reflected in the increase in the reference interest rates set by Latin American central banks in response to rising international prices after Covid-19 (see, for instance, Basco et al (2023)).

EMEs' policy frameworks strengthened in three areas: monetary, macroprudential and fiscal. Monetary policy gained credibility, with better-anchored inflation expectations, lower exchange rate pass-through and more autonomous responses than in the past. Several EMEs raised interest rates before advanced economies after the pandemic, prioritising inflation control over exchange rate stability and using timely unconditional tools without destabilising capital flows. Macroprudential measures included stricter FX loan regulations, reduced "original sin", increased local currency debt and greater domestic investor participation. Fiscal policy advanced with stronger rules and more countercyclical responses during global recessions, though Covid-19 eroded fiscal space and raised global public debt. The pandemic was a major risk-off shock, causing capital outflows and initial depreciation, followed by rapid recovery. Robust reserves and access to IMF precautionary lines (FCL, SLL) mitigated risk. Output losses were far smaller than in the pre-GFC era (IMF (2025a)). Inflation remained contained in countries with strong fundamentals, while others required aggressive tightening. Lower reliance on FX intervention amid anchored expectations was a common feature.

In summary, in 2010–14 resilience was supported by favourable external conditions and early reforms, while in 2016–21 resilience was more structural, driven by monetary credibility, macroprudential regulation and fiscal rules – though Covid-19 exposed vulnerabilities in weaker frameworks (IMF (2025a)).[2]

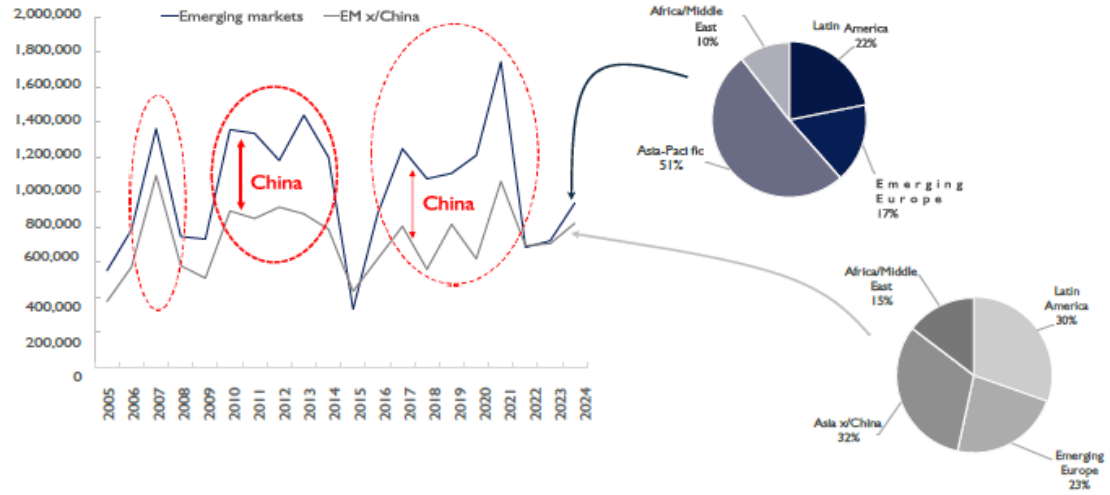
In this context, Asia – and China in particular – received more than 50% of total non-resident capital flows during both periods (Graph 1), while Latin America received about 20%, led by Mexico and Brazil in the first wave. But Argentina's participation was limited. It was largely absent in the first wave, as capital controls were introduced in 2007 and tightened in 2011, and only briefly included in the second period. During the 2016–18 capital account liberalisation phase in Argentina, inflows were concentrated in short-term portfolio investments rather than foreign direct investment (Graph 2). Following the 2018–19 balance of payments crisis, capital controls were reintroduced until 2025. These dynamics are explored in the following section.

[2] However, recent data from the EM BOP Capital Flows Monitor indicate slowing inflows, declining FDI, rising resident outflows and growing reliance on volatile portfolio flows, suggesting resilience is uneven and temporary (IMF (2025b))

Non-resident capital flows to emerging markets and participation[1] by region

In millions of US dollars

Graph 1



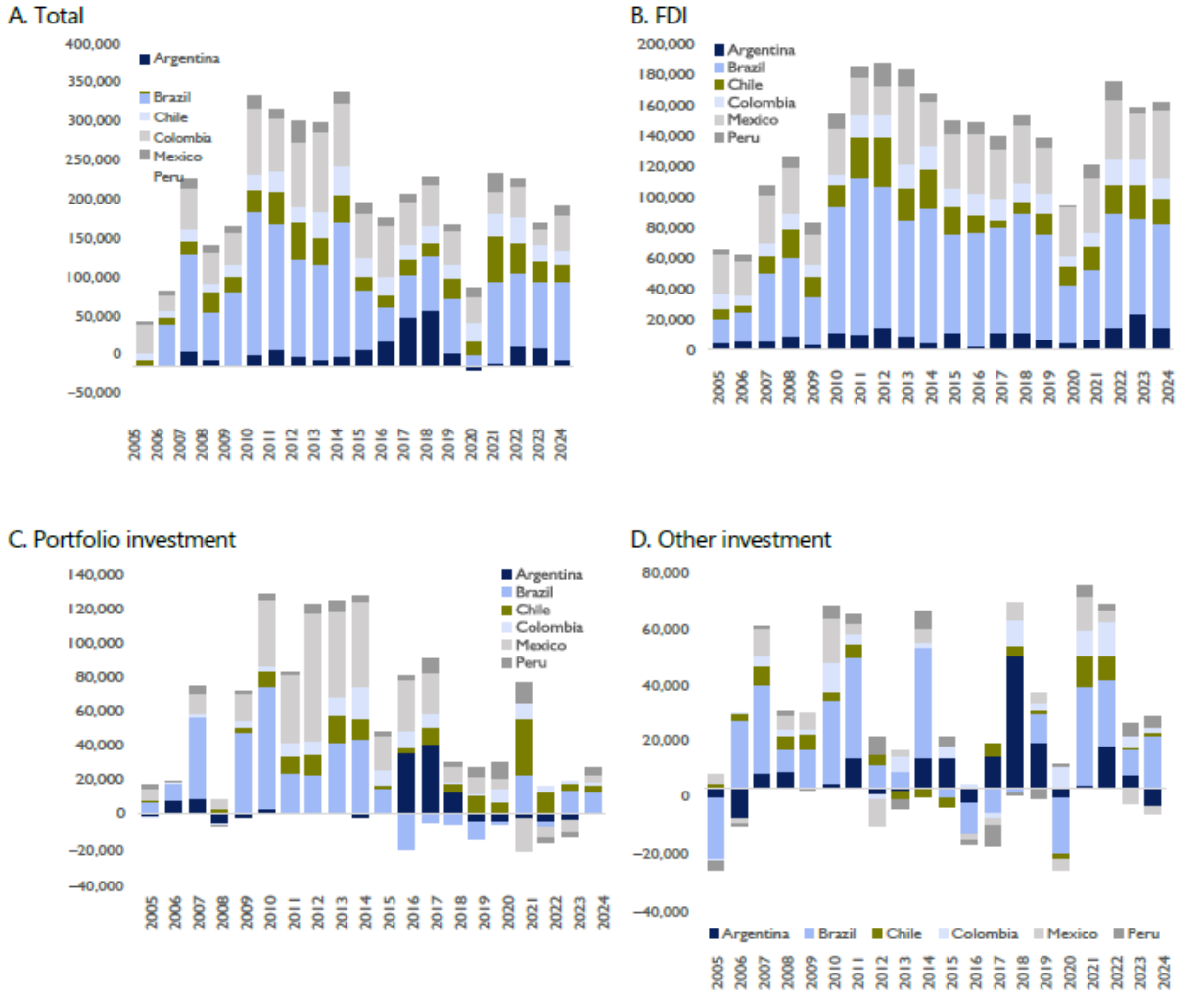
[1] Average over the last 20 years.

Source: Central Bank of Argentina based on data from IMF and IIF.

Non-resident capital flows to Latin America[1]

In millions of US dollars

Graph 2



[1] Selected countries.

Source: Central Bank of Argentina based on data from IMF and IIF.

2. The dynamics of capital flows to Latin America and idiosyncratic factors from Argentina

In recent years, non-resident capital flows to Argentina (measured as a percentage of total exports[3]) have typically been below the region's lows (Graph 3). Foreign direct investment (FDI) has always been closer to regional lows than the regional average. Non-resident portfolio flows in Argentina have generally been below the regional minima, even showing net outflows when – in the worst cases of the region – they are at least neutral. This has largely been the consequence of a financially closed economy, as the debt default in 2002 left the country with virtually no access to international debt markets for several years and capital controls were substantially tightened from 2010–11 onwards.

The exception was the 2016–18 capital account liberalisation phase, when there was a surge in portfolio inflows. This was linked to "carry trade" strategies by foreign investors, profiting from the interest rate differential on central bank issued bills; these paid the monetary policy rate, which was aggressively hiked in order to reduce inflation (as part of the inflation targeting regime then in place). The 2018 crisis, followed by an IMF-led programme (which shows in the "Other investment" item of Graph 3), ultimately led to the reinstating of tight capital controls from 2019–20 onwards.

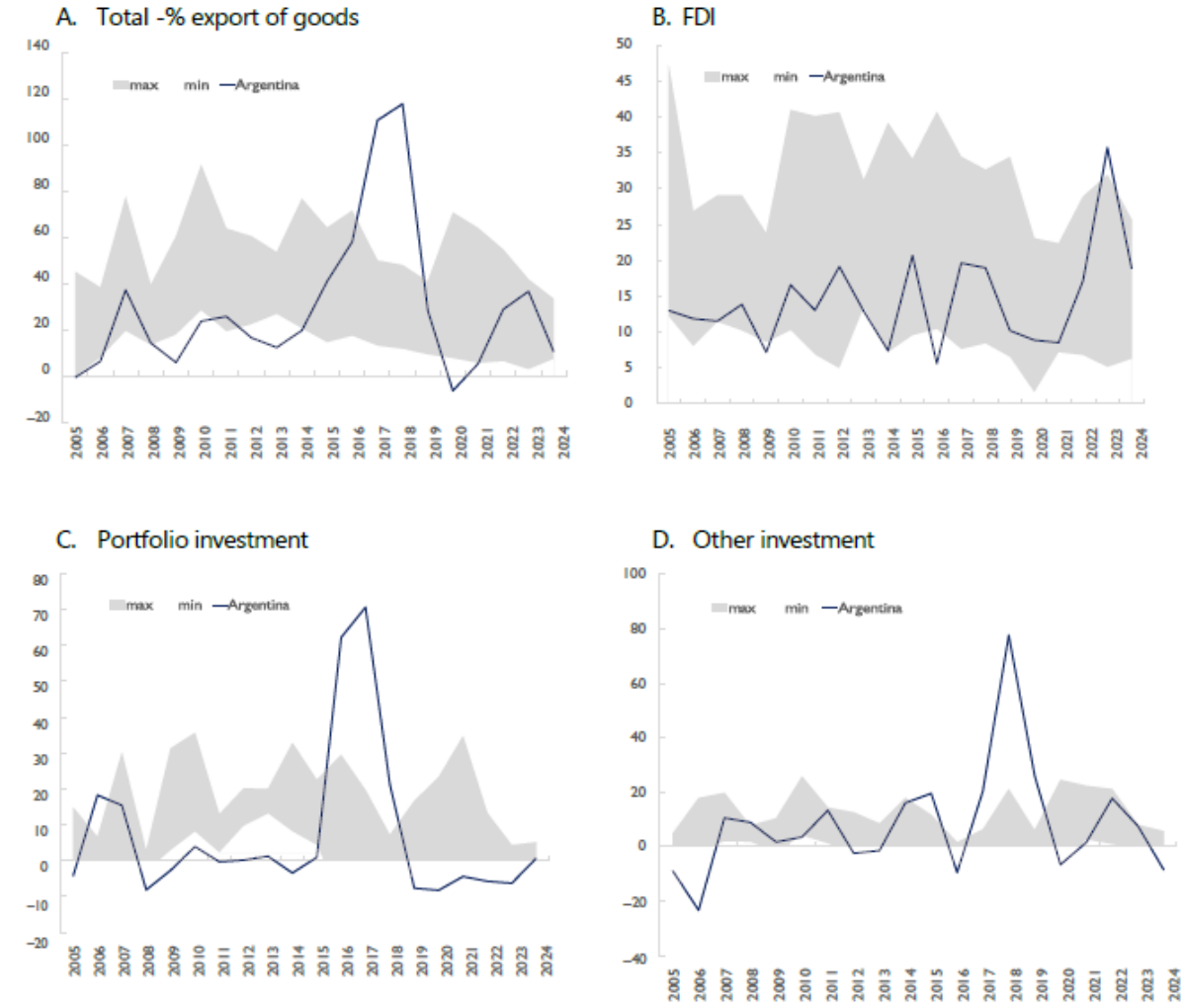
In contrast, capital account dynamics in Argentina have largely been driven by portfolio decisions of the domestic private sector. This shows in the accumulation of external assets by residents: demand for foreign currency (largely US dollars) comes because of decades of macroeconomic instability; in response to inflation, households and businesses seek to protect their wealth by substituting local currency with foreign currency or tangible assets outside the financial system. "Capital outflows" are indeed portfolio dollarisation by the Argentine private sector, as shown by the "Other investment" item of capital flows from residents (Graph 4). Argentina fluctuates below the regional average; and in 2018–19, with a balance of payments crisis, portfolio dollarisation became even more pronounced. No long-term investment, but FX hedging is sought by local investors.

[3] This note chooses to measure capital flows in terms of exports rather than gross domestic product (GDP). Unlike GDP, exports represent a country's actual capacity to generate the foreign exchange required to withstand a reversal of such flows, particularly when external debt is held by non-residents. This ratio therefore reflects the economy's ability to meet its obligations in foreign currency and is of paramount relevance for the balance of payments, as it more accurately captures the sensitivity of EMEs to external shocks. It is no coincidence that this measure is among the most widely used indicators of vulnerability in early-warning systems for sudden stops in external financing, alongside the reserve ratio (Sidaoui (2000); Pattillo et al (2002); IMF and World Bank (2003); Reinhart and Rogoff (2009)).

Non-resident capital flows to Latin America[1]

In millions of US dollars

Graph 3



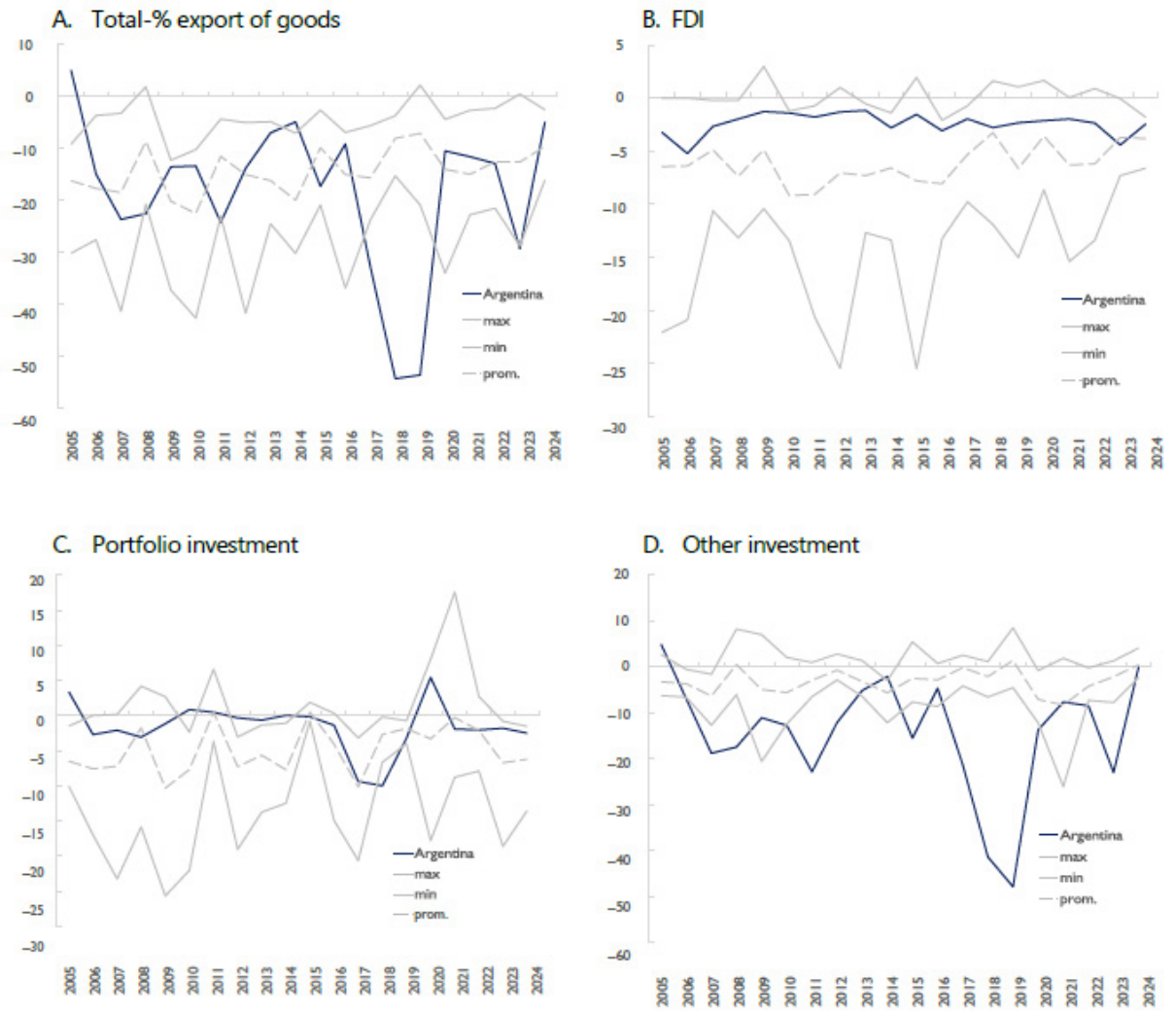
[1] Minimum and maximum values of the Latam countries selection (Brazil, Chile, Colombia, Mexico, Peru).

Source: Central Bank of Argentina based on data from IMF and IIF.

Considering flows to and from countries, net capital flows to Latin America were positive, while Argentina hovered near zero except in 2016–17. Non-resident flows to Argentina, as a share of exports, remained below regional minima due to capital controls. Resident outflows in Argentina reflect a preference for liquidity and dollar hedging rather than long-term foreign investments. Portfolio flows from non-residents were negligible outside 2016–17 (Graph 5).

Resident capital flows from Latin America[1]

Change in assets (as a percentage of goods exports) Graph 4

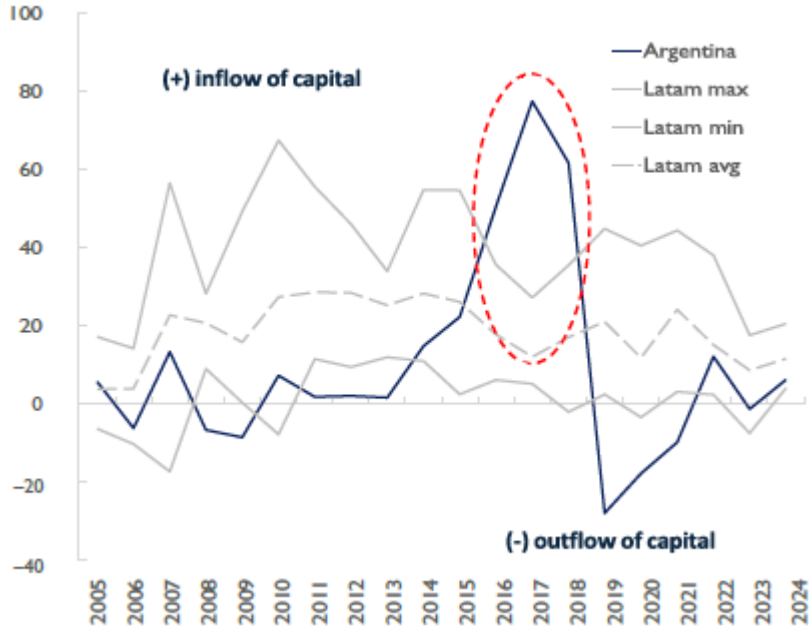


[1] Minimum and maximum values of the Latam countries selection (Brazil, Chile, Colombia, Mexico, Peru).

Source: Central Bank of Argentina based on data from IMF and IIF.

Net capital flows to Argentina versus Latin America[1]

Percentage export of goods — Graph 5

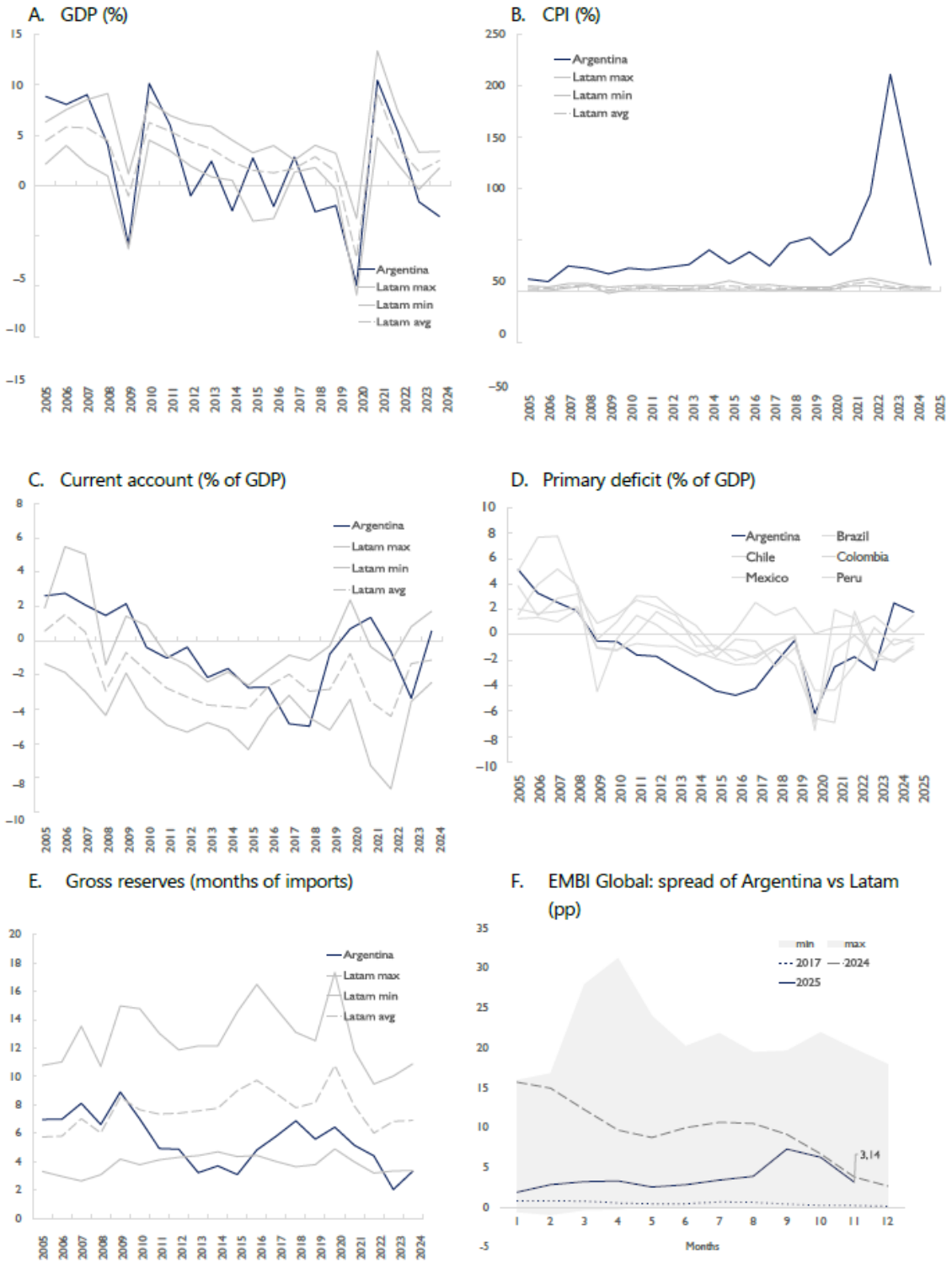


[1] Minimum and maximum values of the Latam countries selection (Brazil, Chile, Colombia, Mexico, Peru).

Source: Central Bank of Argentina based on data from IMF and IIF.

Capital flow dynamics in Argentina are in keeping with macroeconomic performance. Since 2007, Argentina has exhibited low growth and high volatility relative to the region. Inflation diverged sharply post-2007, while the current account shifted from surplus to deficit. International reserves have consistently lagged behind regional norms since 2010. The primary fiscal deficit widened after 2007, improving only in 2024 (Werning (2024)); this is partially reflected in EMBI spreads (Graph 6).

Macroeconomic indicators of Argentina versus Latin America Graph 6



Source: Central Bank of Argentina based on data from IMF, JP Morgan and IIFS..

We use an econometric exercise to underscore the relationship between domestic macroeconomic factors and capital flows. We estimate a VAR model with local and foreign macroeconomic drivers of capital flows from 2000 to 2025: US GDP, yields on 10-year US Treasury bonds, USD broad dollar index, Argentina's country risk (EMBI+), local GDP and trade-weighted exchange rate, and the financial account of the balance of payments (a measure of net flows). Impulse response functions show the most significant impacts from domestic economic activity and country risk, and variance decomposition reveals that the biggest weight of net flows variability is carried largely by domestic GDP and country risk, as well as flows themselves (an indication that other variables not included in the analysis may be driving results; this is consistent with, for instance, the weight of capital controls).

The situation we have described in this section may be summarised by the MSCI Global Market Accessibility Review, which highlights persistent frictions in emerging markets – ownership limits, lack of offshore FX markets, complex registration and limited derivatives – raising investment costs and amplifying risk during global volatility (MSCI (2023)). Argentina stands out as an extreme case until 2023: minimal participation in regional flows, concentrated in short-term portfolio investments, compounded by chronic inflation, macro instability and alternating cycles of capital controls and liberalisation (Table 1).

MSCI Global Market Accessibility Review (June 2023) Table 1

	Argentina	Brazil	Chile	Colombia	Mexico	Peru
Openness to foreign ownership						
Investor qualification requirement	++	++	++	++	++	++
Foreign ownership limit (FOL) level	++	+	++	++	-	++
Foreign room level	++	++	++	++	++	++
Equal rights to foreign investors	+	-	+	+	-	+
Ease of capital inflows/outflows						
Capital flow restriction level	-	-	+	+	++	++
Foreign exchange market liberalisation level	-	-	+	-	++	++
Market entry						
Investor registration and account setup	+	-	-	-	+	+
Market organisation						
Market regulations	+	+	+	+	++	+
Information flow	+	+	+	+	+	+
Market infrastructure						
Clearing and settlement	-	-	++	+	++	-
Custody	++	++	++	++	++	++
Registry/depository	++	++	++	++	++	++
Trading	+	++	++	++	++	+
Transferability	+	+	-	-	++	+
Stock lending	-	++	-	+	++	-
Short-selling	-	++	-	+	+	-
Availability of investment instruments	-	-	++	++	++	++
Stability of institutional framework	-	+	++	-	+	+

++: no issues; +: no major issues, improvements possible; -: improvements needed.

Source: Central Bank of Argentina based on MSCI (2023).

3. Argentina: regime change and prospects for financial integration

By late 2023, the economy was vulnerable, with no access to international financial markets, on the brink of a new default and undergoing a three-digit annual accelerating rate of inflation. In the subsequent stabilisation plan, monetary policy acted together with fiscal and exchange rate policy to eliminate excess money (Werning (2024)):

- An unprecedented fiscal adjustment was carried out, going from an overall deficit of 2.7% of GDP in 2023 to a surplus of 2% in 2024. This effectively eliminated the monetisation of the deficit.
- A new FX policy regime was implemented, with an initial depreciation that was necessary to correct the FX misalignment, and a subsequent monthly crawling peg that was replaced by a floating regime within bands in April 2025.
- A U-turn in monetary policy was taken, aimed at eliminating endogenous excess money supply and defusing the "snowball" effect created by interest payments on the central bank's interest-bearing liabilities.
- Additional measures were taken to clean up the central bank's balance sheet. All interest-bearing liabilities were transferred to the Treasury in order to establish a banking liquidity regulation mechanism that could absorb excess liquidity without incurring sterilisation costs, first using LEFIs (fiscal liquidity bills) and then, when these were left aside, using treasury bills to manage medium-term liquidity while encouraging the financial system to increase usage of the interbank lending market for intramonth liquidity management.
- By mid-April 2025, a new phase of the stabilisation plan was launched to consolidate the disinflation process; this included strengthening the central bank's balance sheet (supported by a new Extended Fund Facility (EFF) agreement totalling USD 20 billion); implementing a more flexible exchange rate regime and lifting several FX restrictions; and adopting a monetary framework based on monetary aggregates, with a tightening bias in the initial phase.
- Moreover, structural reforms were adopted aimed at deregulating the economy and opening up trade.

Money demand recovered from its lows of early 2024, mainly driven by time deposits. This dynamic in bank funding enabled a "crowding in" process whereby credit to the private sector doubled throughout 2025. .

As a result, both inflation and inflation expectations have decreased sharply. After annual inflation reached almost 290% in April 2024, it dropped to 31% in October 2025, with the market expecting 20.8% over the next 12 months.

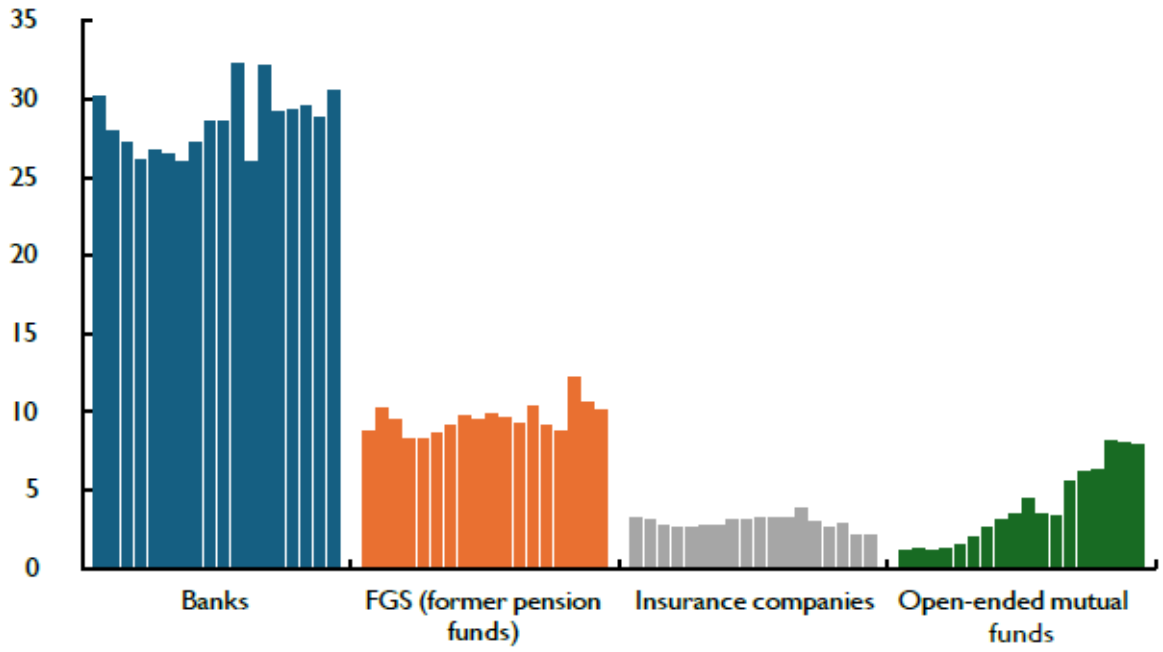
Putting in place a solid macroeconomic framework is a key first step to successful financial integration into world markets: sound fiscal and monetary policies are the "first line of defence" against international volatility and they are necessary conditions for unlocking access to international markets and regaining credit. The current administration views fiscal balance and a clean central bank balance sheet as non-negotiable anchors of stability.

Evidence from recent Latin American history demonstrates that countries maintaining such consistency can eventually graduate to monetary frameworks aligned with international best practices. For instance, a sound macroeconomic framework allows the exchange rate to transition from being a source of nominal instability to serving as a countercyclical tool and a shock absorber. Normalising the macro-fiscal stance is the prerequisite for Argentina to regain this policy flexibility.

Argentina's capital financial system and markets present significant potential for development given their current low penetration relative to GDP. Banks' assets amount to just 30% of GDP, and this is not because financing is delivered through other sources. The size of non-bank financial intermediaries (NBFIs) is also very low in international comparison, even compared with countries with a similar degree of development (Graph 7). The central bank views the expansion of NBFIs as a complement to the traditional banking sector, not a substitute. The regulatory stance is one of neutrality: the regulator holds no preference for one intermediation channel over the other, aiming instead for a balanced ecosystem where both sectors contribute to deepening overall market liquidity and efficiency.

Private sector financing

As a percentage of GDP (December 2008 – June 2025) Graph 7



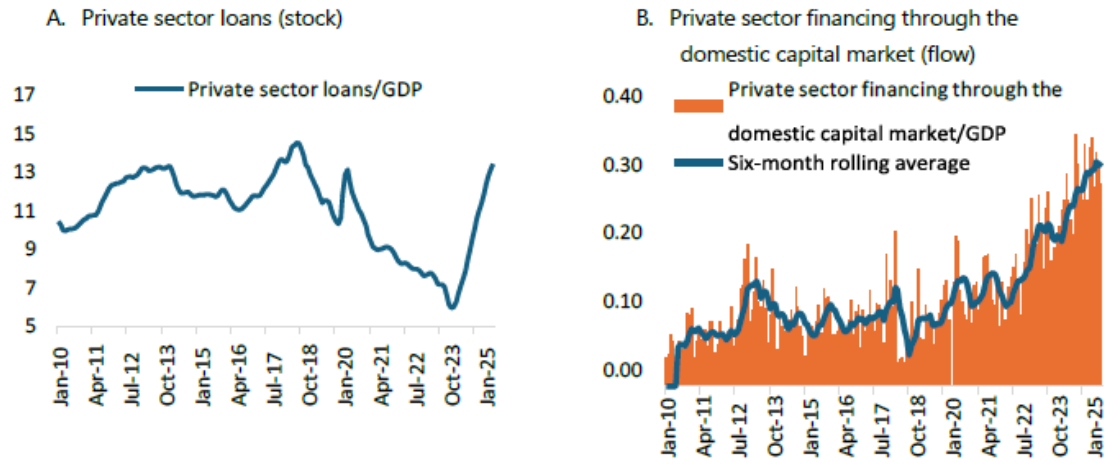
Source: Central Bank of Argentina.

A pivotal factor for the forward-looking outlook is consolidating the stabilisation policy. We are witnessing a structural shift from "crowding out" to "crowding in". Reducing public sector financing needs has triggered a sharp recovery in real credit to the private sector and a resurgence of corporate debt issuance. As the public sector withdraws from the demand side of loanable funds, liquidity is naturally redirecting towards financing. Private sector loans as a percentage of GDP increased to 13.5% in September 2025, from only 6% in March 2024. Also, private sector financing through

the domestic capital markets has increased by more than 50% since the beginning of 2024 (Graph 8).

Private sector financing

As a percentage of GDP — Graph 8

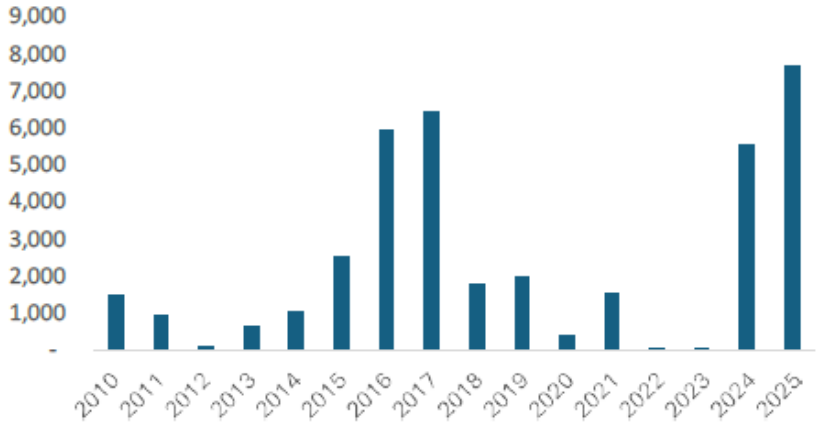


Source: Central Bank of Argentina.

In addition to the increase in financing through the local capital market, the implementation of a solid macroeconomic framework also allowed Argentina's corporates to obtain financing in international capital markets. As shown in Graph 9, corporate bonds issued abroad have ballooned in the last two years, reaching a maximum not seen for 15 years in the first 10 months of 2025.

Financing through international corporate bonds

In millions of US dollars — Graph 9



The 2025 figures cover the period January–October.

Source: Central Bank of Argentina.

There is high potential for capital market growth and FDI acceleration. The implementation of the Incentive Regime for Large Investments (RIGI) provides the necessary long-term predictability to unlock capital-intensive projects. This institutional framework creates a fertile environment for shifting the composition of flows from short-term to long-term real economy investment.

The RIGI programme establishes a framework of legal certainty by guaranteeing regulatory stability in tax, customs and foreign exchange matters for a 30-year period. Fiscal incentives include a reduced corporate income tax (CIT) rate of 25%. In terms of foreign trade, the regime provides an exemption from import duties on new capital goods and spare parts and eliminates export duties after three years (or two for strategic projects). Crucially, the FX framework grants unrestricted access to foreign currency for the payment of dividends and interest, while establishing a gradual exemption from the requirement to repatriate and settle export proceeds in the local exchange market, ensuring free disposal of funds from local or external financing.

Official announcements and filings under the RIGI framework have already identified an investment pipeline exceeding USD 50 billion, with over USD 35 billion in projects currently in advanced stages of execution or evaluation.

4. Concluding remarks

In recent years, despite favourable global conditions, Argentina has attracted only limited and short-term inflows, reflecting structural weaknesses and policy uncertainty. Persistent capital controls, macroeconomic volatility and severe market friction have constrained integration and amplified financial risk. While Argentina was affected by structural changes in the global financial system, evidence suggests that idiosyncratic local factors have been the dominant drivers of capital flow direction and magnitude in recent years. Domestic policy volatility has historically outweighed global push factors. Consequently, the normalisation of domestic policy is expected to have a disproportionately positive impact on capital account dynamics.

A retrospective analysis highlights a stark divergence between Argentina and its Latin American peers. In the region, capital inflows have typically funded current account deficits. In contrast, Argentina has historically funded these deficits through reserve depletion and restrictions that generated parallel exchange rate gaps. The evidence indicates that periods of tightening controls followed by erratic liberalisation have served as catalysts for volatility. The current strategy aims to align Argentina with the regional norm.

Recent stabilisation efforts – focused on fiscal consolidation and monetary discipline – offer a critical opportunity to rebuild confidence. Success will depend on gradual but sustainable implementation, institutional strengthening and credible policy anchors. Regional experience shows that resilience requires robust frameworks and multiple anchors to mitigate external shocks. For Argentina, restoring credibility and deepening markets are essential steps towards sustainable financial integration.

Current external conditions appear more supportive of emerging markets. The change in macroeconomic policy since late 2023 opens up significant potential for improvement. This shift aims to permanently anchor expectations and restore

intertemporal solvency. This will allow for market deepening and infrastructure improvement, generating greater availability and diversity of instruments and players. It fosters long-term investment (eg via FDI and the RIGI programme) by reducing uncertainty and regulatory burdens. Finally, a process of opening and reform can be successful based on recent Latin American experience (solid policy frameworks). Argentina is now implementing these standards to ensure that financial integration promotes sustainable growth rather than instability.

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The rise of non-bank financial institutions: Central Bank of Brazil

Central Bank of Brazil

Introduction

The rise of non-bank financial intermediaries (NBFIs) has significantly transformed global financial systems, reshaping how these systems provide credit, distribute risks and manage financial stability and liquidity. It has also affected the transmission of monetary policy to the real economy.

Understanding NBFI risks and transmission channels is fundamental. In Brazil, the transformation has been particularly pronounced, with the country now hosting the second-largest NBFI sector among emerging markets, trailing only China.

Following are the most important developments within the NBFI sector in Brazil:

- Expansion of asset management: Investment funds have grown rapidly, with their total net worth rising from 38% of GDP in 2006 to nearly 80% in 2024. These funds now surpass the asset size of the banking sector, becoming central to Brazil's financial landscape.
- Alternative financing channels: Receivables investment funds (FIDCs) have emerged as vital sources of corporate financing, offering alternatives to traditional bank credit. Although funds cannot directly provide credit, they act as buyers of corporate bonds, bearing significant credit risk and supporting the real economy.
- Diversification of investment options: Investment funds have become alternatives to bank deposits, offering households and corporates diversified portfolios. They have also democratised access to international markets through vehicles that invest abroad and exchange-traded funds (ETFs) tracking global indices.
- Pension fund reform: The pension sector has broadened its reach through open-ended products, shifting from defined benefit plans to defined and variable contribution models. This transition has reduced systemic risk and increased accessibility.
- Fintech and payment innovation: Regulatory initiatives like Pix and Open Finance, part of the Agenda BC# initiative,[1] have enabled fintechs and

[1] In 2019, Agenda BC# added new dimensions to the Central Bank of Brazil's (BCB's) strategic work agenda, focused on tackling structural issues of the national financial system (SFN) through fostering technological innovation. As well as aiming to reduce the cost of credit, enhance banking regulation and improve the efficiency and competitiveness of the SFN, Agenda BC# started to focus on three new dimensions: inclusion, competitiveness and transparency. The project "financial education" –

payment institutions to revolutionise retail finance. These innovations have enhanced competition, financial inclusion and digitalisation.

- Investment platforms and market access: Digital investment platforms have expanded access to financial products, especially for retail investors. They have improved distribution, transparency and liquidity in capital markets, contributing to the democratisation of investment.

NBFIs and monetary policy channels

The NBFI segment in Brazil is primarily represented by the investment fund industry, mainly low-leveraged fixed income funds whose portfolios are predominantly composed of Brazilian Treasury bonds or repo operations backed by these bonds.

The segment has experienced strong and sustained expansion over the years.

- Total net worth of investment funds in Brazil grew from 38% of GDP in 2006 to nearly 80% of GDP in 2024.
- The highest growth in value was registered in fixed income and multimarket funds, but pension funds, private equity and FIDCs also experienced substantial expansion.

The business models and behaviour of NBFIs, particularly investment and pension funds, have had a dampening effect on the transmission of monetary policy:

- Short-duration asset holdings: A significant portion of assets held by fixed income investment funds and pension funds – around 60% – are low-duration securities (maturities of approximately two years or less). This short-term orientation reduces sensitivity to changes in long-term interest rates, thereby weakening the transmission of monetary policy through the wealth channel.
- Mark-to-market accounting: Investment funds are subject to mark-to-market accounting, which encourages managers to hold shorter-duration assets to minimise volatility in fund performance. This behaviour further limits the impact of monetary policy on asset prices and investor wealth.
- Brazil's federal public debt (DPF): DPF reached a record BRL 8.64 trillion in February 2026, with an annual increase of more than 18% in 2025. The debt profile is predominantly composed of floating rate bonds (48.1%), followed by price-indexed bonds (26.1%) and fixed rate bonds (22.1%), with an average maturity of around four years and an average cost of close to 12% per year. The issuance of mainly short-term and floating rate bonds contributes to the prevalence of low-duration assets in NBFI portfolios. Floating rate instruments are less responsive to monetary policy changes, further dampening transmission.

which the BCB was already involved in – was revised and kept as a fourth pillar, the education dimension. In 2020, a new and fifth strategic focus was also included in Agenda BC#: the sustainability dimension. More information about Agenda BC# can be found at: www.bcb.gov.br/en/about/bcbhashtag.

As a result, these NBFIs reduce the procyclicality of financial markets and limit the wealth effects typically associated with monetary policy adjustments, making policy less effective in influencing long-term rates and economic activity.

Global spillovers

Globally, the growth of the NBFI segment has sparked discussions regarding its potential to amplify cross-border financial spillovers.

Regarding global financial spillovers, while Brazil's NBFI sector has limited direct exposure to international markets (only about USD 37 billion out of USD 2.8 trillion in managed assets), it remains vulnerable to global financial spillovers through indirect channels:

- Domestic asset price sensitivity: External shocks – such as changes in US interest rates or global risk sentiment – can affect domestic asset prices, triggering margin calls and liquidity pressures, especially among leveraged multimarket and equity funds.
- Derivatives market exposure: Investment funds use derivatives primarily through Brazil's central counterparty, which can amplify volatility during global stress events. Insurance and pension funds, however, have minimal derivatives exposure.
- Contagion via hedge fund strategies: Global hedge fund unwinding – such as after the "Liberation Day" episode – can transmit volatility to Brazil's financial markets, affecting exchange rates and domestic interest rates through interconnected asset holdings and liquidity-sensitive segments.

Some NBFIs dampen monetary policy transmission, such as fixed income investment funds and pension funds with short-duration portfolios. On the other hand, multimarket and equity funds, especially those with leveraged positions and derivatives exposures, may amplify global spillovers.

Despite these vulnerabilities, the high liquidity levels in Brazilian investment funds help absorb redemption pressures during stress periods, mitigating systemic risks to some extent. The NBFI sector does not directly internalise global financial fluctuations.

- Although NBFIs have broadened access to international markets through vehicles that invest abroad, their exposure to foreign assets remains limited – around USD 37 billion – and is concentrated in multimarket and equity funds.

Significant investment fund outflows from emerging market economies (EMEs) resulting from global shocks or increased risk aversion may impact exchange rates and domestic interest rates.[2]

[2] We can group investors allocating resources in EMEs into three categories: dedicated investors, crossover investors and other institutional investors. Dedicated EME funds usually follow some index,

In December 2024, there was an expressive portfolio outflow from Brazil (totalling USD 29.2 billion), driven by domestic fiscal uncertainty and narrowing interest rate differentials. Nearly half of that total corresponded to outflows from investment funds, mainly crossover investors.

- This motivated a series of interventions by the BCB in the spot FX market, to prevent market dysfunctionalities.
- Despite the significance of this episode – which marked an all-time high in monthly outflows from investment funds – the financial outflow did not lead to major impacts.

Low duration of assets

When it comes to the impact of investment fund growth on monetary policy transmission channels, it is useful to highlight some additional features of Brazil's investment fund industry. The sector is heavily invested in bonds issued by the Brazilian government.

- Around 60% of investment fund portfolios in Brazil are allocated to sovereign bonds or sovereign backed repos.[3]

The profile of Brazil's public debt, in turn, is highly concentrated in short-duration bonds.

- Currently, as part of the Treasury's strategy to minimise the cost of federal government debt:
    - Approximately 20% of the debt is composed of inflation-linked or fixed rate bonds with maturities of up to two years.[4]
    - Around 50% of the debt consists of floating rate bonds, which are less sensitive to interest rate fluctuations.[5]
    - Summing up, around 70% of the federal government's debt has very low price sensitivity to interest rate changes.

This decreases the procyclicality of investment funds in Brazil – reducing the transmission of monetary policy to long-term rates – and the wealth effects, reinforcing the idea that transmission channels of monetary policy may not function in Brazil with the same fluidity observed in other economies.

such as the Government Bond Index – Emerging Markets (GBI-EM) calculated by JPMorgan Chase, and set the share of each country on their portfolios according to the weight of each country in the index. Crossover investors, on the other hand, have more flexibility, decide to invest in EMEs when the opportunity arises and generally do not follow any index. Other institutional investors, such as hedge funds, tend to react faster, reallocating portfolios swiftly in response to changes in perceptions.

[3] Source: BCB.

[4] See Tesouro Nacional, *Relatório Mensal da Dívida*, September 2025. Only about 15% of the federal government debt composed of inflation-linked or fixed rate bonds has a maturity longer than five years.

[5] See Tesouro Nacional, *Relatório Mensal da Dívida*, September 2025.

Corporate financing

In the context of NBFIs, it is important to highlight some links between financial stability and the transmission channels of monetary policy.

Investment funds in Brazil have also played an increasingly important role in corporate financing.

- Although Brazilian regulation prevents investment funds from providing credit, private credit funds operate as buyers of securities – especially corporate bonds – mainly in the secondary market, and end up as risk bearers of a relevant share of the credit provided to the real economy.

These private credit funds may have longer-duration assets, liquidity mismatches in their balance sheets and portfolios with illiquid assets.

The largest private credit funds are linked to banking conglomerates.

- To avoid reputational risks, financial institutions may need to provide non-contractual liquidity support to the managed funds if needed (step-in risk).
- However, private credit funds not managed by financial institutions do not have such liquidity support.

Disruptions in these specific segments of the investment funds industry can trigger market dysfunctions and liquidity imbalances, pose systemic risks to financial stability, particularly during periods of market stress, and affect monetary policy transmission channels.

- These shocks may be amplified by mechanisms like the first-mover advantage[6] and elevate risk premia, effectively tightening financial conditions and making monetary policy more contractionary in practice.

Implications for central banks

The expansion of NBFIs and the diversification of credit channels in Brazil have profound implications for the design and effectiveness of central bank policy tools and operational frameworks.

Reassessing monetary policy transmission

- Shift from traditional channels: The growing role of NBFIs in Brazil – such as investment funds, FIDCs, CRIs, CRAs and pension funds – has shifted part of financial intermediation away from the banking system and the Selic rate.

[6] It is argued that regulators should require that investment funds, to honour redemptions, must sell assets according to the proportion of them in their portfolio (horizontal slicing). In moments of stress, this determination would prevent funds from disposing of their liquid assets first (vertical slicing) to cover the first redemptions and leaving the less liquid assets to cover subsequent redemptions, reducing the incentives for runs.

These new structures may respond differently to monetary policy decisions, depending on asset composition, investor behaviour and risk perceptions.

- Alternative credit provision: Capital markets have become a major source of credit, especially for large corporations. Private credit funds and tax-incentivised debentures are increasingly important, while mid-sized firms and fintechs rely on FIDCs for securitising receivables. These instruments may not react uniformly to interest rate changes, weakening the traditional transmission mechanism.
- Investor heterogeneity: The response of households and institutional investors to monetary policy varies based on their investment horizons, risk profiles and portfolio strategies. This heterogeneity complicates the central bank's ability to predict and manage the effects of policy changes.

Implications for policy design

- Enhanced analytical capacity: Central banks must invest in granular data collection and develop specialised analytical tools to understand how monetary policy propagates through these alternative channels. Without this, the effectiveness of the Selic rate as a policy instrument may be diluted.
- Liquidity and stability management: As NBFIs become more central to credit provision, safeguarding financial stability becomes critical. Central banks must adapt their frameworks to monitor systemic risks arising from interconnectedness and market stress, including the potential for contagion from global financial shocks.
- Cross-border coordination: Given the global nature of financial markets and the role of NBFIs in amplifying spillovers in a globally connected financial system, central banks must enhance international regulatory cooperation to manage risks and ensure consistent outcomes and policy effectiveness to safeguard financial stability.

Note on the role of non-residents in the Chilean foreign exchange market[1]

Alberto Naudon[2] and Rodrigo Barria[3]

1. Introduction

Foreign exchange markets in emerging market economies are increasingly shaped by global investors operating through derivatives markets. In many cases, non-resident investors obtain currency exposure primarily through non-deliverable forwards (NDFs) rather than through direct participation in local funding markets. While these instruments allow investors to take positions without accessing domestic money markets, they do not eliminate currency risk. Instead, that risk must ultimately be absorbed and managed by financial intermediaries that take the opposite side of these trades.

This paper studies how that mechanism operates in the Chilean foreign exchange (FX) market. Chile provides a particularly useful setting for examining these issues. The Chilean peso (CLP) is traded in a deep and highly integrated FX market in which derivatives account for the majority of turnover and non-resident investors play a central role in NDF trading. At the same time, the institutional structure of the domestic financial system places local banks at the centre of FX intermediation. These banks act as dealers that connect offshore derivatives trading with onshore price formation.

The central idea of this note is that, in this institutional environment, the price impact of non-resident flows depends critically on the balance sheet capacity of local intermediaries. When non-resident investors take positions in the peso through NDF contracts, local banks typically absorb the opposite side of those trades. Managing the resulting exposures often requires hedging in the spot market and accessing short-term dollar funding. As a result, shifts in non-resident demand can affect both the spot exchange rate and the cross-currency basis, and the magnitude of those effects depends on the availability of intermediary balance sheet capacity.

Using daily data for the Chilean FX market between 2010 and 2024, this note documents three main empirical findings. First, unexpected changes in non-resident demand for peso exposure have a significant and immediate effect on the exchange rate. Second, the same shocks also affect the cross-currency basis, indicating that their transmission operates not only through cash market demand but also through the balance sheets of financial intermediaries that warehouse and hedge these positions. Third, the price impact of non-resident flows is state-dependent: both the exchange rate and the basis respond more strongly when dealer balance sheet

[1] We appreciate the support of Max Gondonneau, Rodrigo Lozano and María Teresa Reszczynski in preparing this document. All errors are solely our responsibility. The opinions expressed here do not necessarily reflect those of the Central Bank of Chile's Board.

[2] Deputy Governor, Central Bank of Chile.

[3] Central Bank of Chile.

capacity is tighter. When short-term dollar funding needs are smaller, the exchange rate exhibits a stronger response, whereas the basis reacts more weakly.

These results contribute to a growing literature that links exchange rate dynamics to financial intermediation and limits to arbitrage. A large theoretical literature emphasises the role of constrained intermediaries in currency pricing (Gabaix and Maggiori (2015), He and Krishnamurthy (2013, 2018)), while a related empirical literature documents how dealer balance sheet constraints affect deviations from covered interest parity (Du et al (2018), Avdjiev et al (2019), Schrimpf and Sushko (2019)). This note complements that literature by highlighting the role of local dealers in the transmission of non-resident FX demand in an emerging market setting.

More broadly, the Chilean experience illustrates how the structure of FX market intermediation can shape the transmission of global portfolio flows to exchange rates. In markets where derivatives dominate trading and foreign investors rely heavily on offshore instruments, exchange rate dynamics depend not only on macroeconomic fundamentals but also on the balance sheet capacity of the intermediaries that connect offshore trading with onshore price formation.

The rest of the note proceeds as follows. Section 2 describes the structure of the Chilean FX market and its main participants. Section 3 explains how non-resident demand is transmitted into spot and basis through NDF intermediation. Section 4 develops a simple model, while Section 5 describes the data. Section 6 explains the empirical strategy, and section 7 presents the results. Section 8 discusses policy implications, and section 9 concludes.

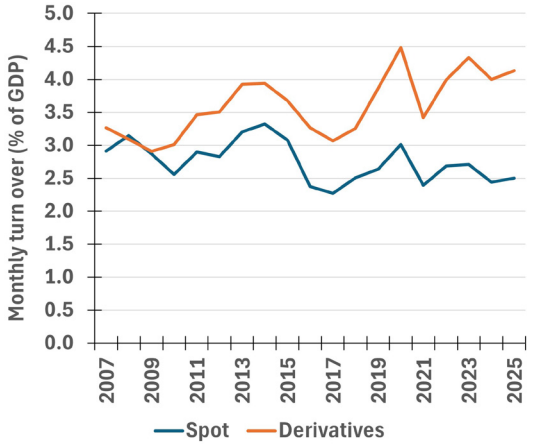
2. The Chilean FX market and its participants

The Chilean FX market is unusually large relative to the size of the domestic economy. Measured against GDP, turnover in both spot and derivatives is high by emerging market standards, reflecting a combination of financial openness, institutional depth and the availability of developed hedging instruments. According to IMF data, the Chilean FX market is highly liquid and efficient, supported by well developed hedging instruments.[4] The onshore FX market represents about 6.5 times GDP, a figure that has remained relatively stable over the past 15 years. Compared with other countries in the region and with emerging market economies, it is a large market.[5] The market is organised around two broad segments: spot and derivatives. While the spot market remains important, derivatives account for the majority of turnover and play a central role in the transmission of portfolio and hedging flows.

[4] See IMF (2025).

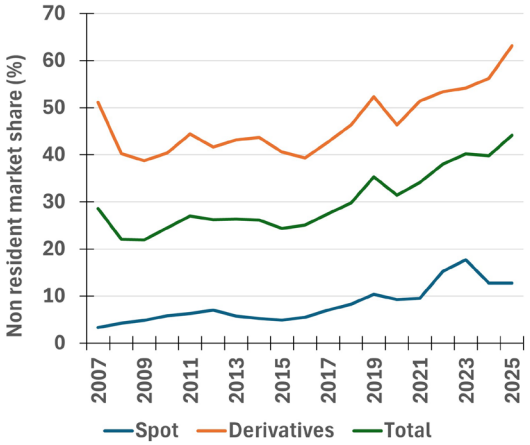
[5] According to the most recent BIS Triennial Survey, turnover in Chile's spot and FX derivatives markets was approximately 8.5 times GDP, while the average for emerging market economies was four times GDP and for Latin America, 3.3 times GDP. In advanced economies, this figure exceeds 15 times GDP. Globally, the peso plays a small role. According to the same survey, the US dollar remains the most widely used currency worldwide. The Chilean peso ranks 28th, below the Mexican peso (14th) and the Brazilian real (18th).

Graph 1: Monthly transaction volume (% of GDP)



Source: Central Bank of Chile

Graph 2: Non-resident share of annual transactions (%)



Source: Central Bank of Chile

In 2025, the onshore spot segment accounted for about 43% of transactions, with derivatives making up the remainder. As shown in Graph 1, after averaging close to three times GDP between 2010 and 2016, spot transactions have fluctuated around 2.5 times GDP since 2017. The derivatives market, by contrast, increased from 3.5 to around four times GDP. In US dollars, both segments have expanded over recent decades. While average monthly turnover was approximately USD 100 billion in 2010 (USD 46 billion spot and USD 54 billion derivatives), by 2025 these figures had almost doubled to USD 190 billion (USD 70 billion spot and USD 120 billion derivatives).

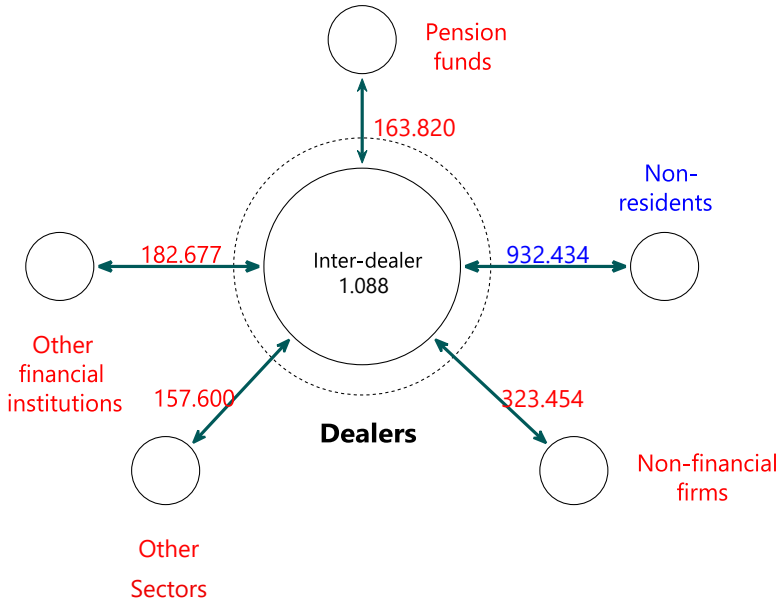
The relatively large share of derivatives compared with spot and the specific composition of derivative instruments are unusual in global comparison.[6] In general, FX trading is concentrated in spot and swaps, with no major differences between emerging market and advanced economies. In Chile, by contrast, non-deliverable forwards (NDFs) are by far the dominant derivative, both onshore and offshore. This probably reflects the legacy of past FX controls. For years, Chile maintained restrictions on the use of its currency in cross-border transactions, which were lifted some years ago. This may have contributed to the development of offshore peso markets in non-deliverable form. Unlike what is observed for other currencies, nearly all peso forwards traded by dealers resident in North America are non-deliverable, a feature similar to that of countries that still maintain restrictions on the use of their currency, such as Argentina, Brazil, South Korea and India. In line with this, for the currencies of those countries, most of the FX instrument volume traded in North America is in forwards – contracts that can be structured as non-deliverable – whereas other currencies tend to be traded via deliverable instruments, such as spot transactions and swaps.

As shown in Graph 3, a useful way to organise the market is around three sets of participants. The first of these consists of domestic non-bank financial institutions and

[6] According to the BIS Triennial Survey cited above, derivatives turnover in Chile is 5.2 times GDP, well above the figures of 2.6 and two times GDP in emerging market economies and Latin America, respectively.

non-financial corporations. The second consists of non-residents. The third consists of banks, which effectively play the role of dealers in the Chilean market.

FX instrument turnover by sector (in USD billions of US dollars Graph 3



Note: Data up to November 2025.

Source: Central Bank of Chile

This tripartite structure is important because it separates the sources of currency demand from the institutions that intermediate that demand and translate it into price movements.

Within the first group, domestic non-bank financial institutions are dominated by pension fund administrators (AFPs). AFPs have historically played a central role in the development of Chile's FX derivatives market. Their growing foreign asset holdings created a sustained need to hedge currency risk, while their institutional and regulatory constraints made the forward market the natural instrument through which to do so. As a result, AFPs became a structural source of FX hedging demand, typically taking short dollar positions in derivatives to protect the CLP value of their foreign currency assets. This persistent hedging demand contributed to the depth and liquidity of the Chilean forward market and remains one of the defining features of the local FX ecosystem.

The second group, non-residents, has become increasingly important over time. In Chile, this participation is concentrated in derivatives markets and, in particular, in NDF contracts. Non-resident investors use these instruments as a substitute for direct spot transactions and local currency positions, allowing them to take exposure to the peso without relying on local deposits, domestic settlement infrastructure or direct access to onshore balance sheet instruments. Since the further integration of the Chilean NDF market into global markets, non-resident activity has grown substantially and now accounts for a large fraction of total turnover. Their positions reflect a mix of directional views, global portfolio rebalancing, commodity-related trades and carry-related strategies. The important point for this note is that these positions are

often implemented in instruments that are contractually offshore but economically relevant for onshore price formation.

The third group consists of banks, which are the key dealers in the Chilean FX market. The interbank spot market is organised as an over-the-counter electronic platform to which only authorised local dealers have direct access. End users cannot access this market directly. This institutional feature matters because it places local banks at the centre of the intermediation process. When domestic institutional investors or non-residents generate net currency demand, it is local banks that must warehouse the resulting inventory, manage the associated risk and decide how to hedge it across spot, forward and synthetic markets.

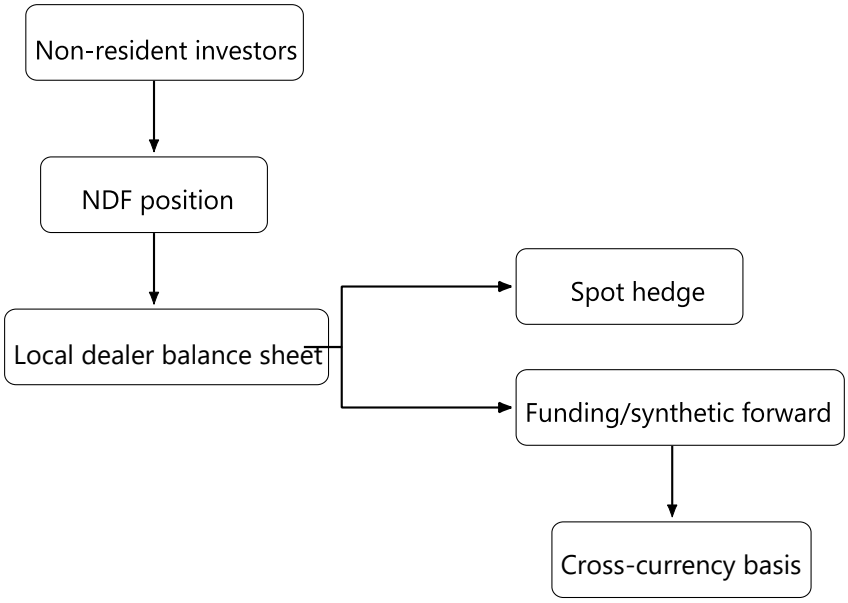
These features imply that the Chilean FX market should not be understood as a frictionless arena in which prices simply reflect macroeconomic fundamentals or uncovered interest parity. Instead, it is a market in which price formation depends on who is trading, through which instrument, and through which intermediary. Structural hedging demand from AFPs, cyclical and often NDF-based demand from non-residents, and the balance sheet capacity of local banks jointly shape how exchange rate pressure is absorbed and transmitted into both spot and derivatives prices.

3. From non-resident demand to spot and basis

This section develops the economic intuition that motivates the model and the empirical analysis. The key institutional feature of the Chilean FX market is the segmentation of market participants across instruments. Non-resident investors typically obtain exposure to the Chilean peso through non-deliverable forward (NDF) contracts traded offshore, while domestic institutions operate mainly in the onshore spot and deliverable markets. These segments are connected by local banks, which act as dealers and intermediaries between foreign investors and domestic market participants.

Graph 4 summarises the transmission mechanism emphasised in this note. When non-resident investors take positions in the peso through NDF contracts, local banks typically take the opposite side of the trade. Dealers must then manage the resulting currency exposure. In practice this often requires hedging operations in the spot market and access to short-term dollar funding. Because these operations use dealer balance sheet and dollar liquidity, their cost depends on the financial condition of the intermediary sector. When balance sheet capacity is limited, shifts in non-resident demand can affect both the spot exchange rate and the cross-currency basis.

Intermediation of non-resident NDF positions Graph 4



In a frictionless environment, arbitrage between spot, forward and funding markets would prevent order flow in one segment from generating persistent price effects in others. In practice, however, the intermediation of NDF positions requires dealer balance sheet capacity and access to short-term dollar liquidity. When that capacity becomes scarce, intermediaries require compensation to absorb additional positions. In this sense, the cross-currency basis can be interpreted as a price-based measure of the cost of FX intermediation and the scarcity of intermediary balance sheet capacity.

3.1 Carry trade and non-resident demand

Carry trade is one example of non-resident demand for currency exposure, but it should not be interpreted as the only or even the dominant motivation for taking foreign positions in the Chilean peso. Non-resident investors may take positions in response to a wide range of factors, including directional views on the dollar, commodity-related developments, global portfolio rebalancing or relative conditions across emerging markets.

Moreover, the role of the Chilean peso in carry strategies has not been constant over time. In some periods the peso has acted as a relatively high-yielding investment currency, attracting long positions from global investors. In other periods, particularly when domestic interest rates have been relatively low, the peso has instead served as a funding currency in global strategies. In those episodes, non-resident positions tend to involve short peso exposure, generating pressure in the opposite direction in FX markets.

From the perspective of this note, the key point is not the direction of these positions but the way they are implemented. Whether non-resident investors take long or short peso positions, these exposures typically enter the market through NDF

contracts and must ultimately be intermediated by local dealers. As a result, both types of flows generate inventory and hedging needs on dealer balance sheets.

In practice, dealer desks operate under tight limits on net FX exposure and typically close their currency positions at high frequency. As a result, the relevant risk for intermediaries is not a persistent directional exposure, but rather the temporary inventory and balance-sheet usage required to intermediate client flows.

3.2 Structural hedging demand in Chile

The Chilean case is distinctive not only because non-resident investors rely heavily on NDF contracts, but also because the derivatives market has a large structural counterparty: domestic pension funds. AFPs hold substantial portfolios of foreign assets and systematically hedge a portion of their currency exposure. This creates persistent demand for FX derivatives that is not driven by short-run speculation but by institutional portfolio management.

Local banks stand between these two sides of the market. They intermediate the structural hedging demand generated by domestic institutions and the more cyclical demand for peso exposure coming from abroad. As a result, exchange rate dynamics in Chile reflect not only macroeconomic fundamentals but also the way these heterogeneous flows interact on dealer balance sheets.

3.3 Why local dealers matter

Much of the recent international literature emphasises the role of global dealers and global financial conditions in shaping exchange rates and deviations from covered interest parity. While these forces are clearly relevant for a small open economy such as Chile, the marginal intermediaries connecting non-resident demand to onshore price formation are domestic banks.

This distinction matters for both theory and measurement. The relevant state variables may include not only global risk appetite, but also local balance sheet conditions and short-term dollar liquidity needs. Local data therefore provide a unique opportunity to study how the price impact of flows varies with the state of intermediary balance sheets.

The next section formalises this mechanism in a simple partial equilibrium model in which non-resident demand affects both the spot exchange rate and the cross-currency basis through dealer balance sheet constraints.

The mechanism described above can operate under different configurations of flows. These include portfolio reallocations executed in spot markets with NDF hedging, carry trades implemented through forward positions, and arbitrage strategies along the forward curve. While these cases differ in their microstructure, they share a common feature: they require balance-sheet intermediation by financial institutions.

4. A partial equilibrium model of intermediary constraints, spot FX and the cross-currency basis

This section develops a deliberately parsimonious partial equilibrium model that links: (i) non-resident demand pressure in FX markets; (ii) intermediary balance sheet conditions; and (iii) equilibrium pricing in the spot exchange rate and the cross-currency basis.

The objective is not to provide a complete model of exchange rate determination. Rather, the aim is to isolate a mechanism that is especially relevant for the Chilean market: non-resident flows affect prices because they must be absorbed, warehoused and hedged by intermediaries with limited risk-bearing capacity and finite short-run dollar liquidity.

The model is designed for empirical implementation. It highlights state-dependent transmission mechanisms and yields transparent sign predictions for the reduced-form specifications estimated below. Many objects that would be endogenous in a richer general equilibrium environment are taken as given. In particular, interest rates, the distribution of non-resident hedging demand and the law of motion of intermediary wealth are treated as exogenous. This is appropriate for our purposes: the goal is to isolate how predetermined intermediary conditions shape the price impact of flow shocks and the behaviour of the basis.

4.1 Environment and notation

Time is discrete. At each date t, the home currency is CLP and the foreign currency is USD. Let S_t denote the spot exchange rate, expressed as CLP per USD, and let $s_t \equiv \log S_t$. A positive change

$$\Delta s_{t+1} \equiv s_{t+1} - s_t$$

corresponds to a depreciation of the peso.

Let i_t and i_t^* denote one-period continuously compounded risk-free interest rates in CLP and USD, respectively. Let F_t denote the one-period forward rate and $f_t \equiv \log F_t$.

Currency excess return. Define the one-period excess return, in logs, from holding a USD position financed in CLP as

$$rx_{t+1} \equiv \Delta s_{t+1} + i_t^* - i_t \,. \tag{1}$$

Under frictionless uncovered interest parity (UIP), one would have $E_t[rx_{t+1}] = 0$. In the present setting, intermediaries require compensation to absorb currency risk, so expected excess returns can be non-zero and state-dependent.

Cross-currency basis. Define the one-period covered interest parity (CIP) basis as

$$b_t \equiv f_t - s_t + i_t^* - i_t. \tag{2}$$

Under frictionless CIP arbitrage, $b_t = 0$. In the present setting, however, CIP arbitrage uses an intermediary balance sheet, and the basis reflects the shadow cost of deploying that balance sheet. Thus, deviations from covered interest parity can be interpreted as reflecting the shadow cost of intermediary balance-sheet capacity.

4.2 State variables: intermediary wealth and near-term dollar funding needs

Intermediary conditions are summarised by two predetermined state variables observed at time t.

First, let $N_t > 0$ denote intermediary net worth, which captures the scale of the intermediary sector's balance sheet capacity. A higher N_t corresponds to a looser balance sheet state.

Second, let $NEF_t > 0$ denote *net expected dollar outflows*, a summary measure of expected net USD outflows over a short horizon – for example, the next 30 days – relative to the banking system's USD asset base. A lower value of NEF_t implies smaller anticipated dollar outflows and, therefore, less need to intermediate in dollars. Higher expected net dollar outflows (NEF) increase intermediaries' demand for dollar positions, making them more willing to absorb dollar inflows from non-residents. In this sense, NEF operates through incentives and balance-sheet composition, rather than as a purely mechanical relaxation of constraints. In this sense, higher NEF should be interpreted as reflecting a greater willingness or capacity of intermediaries to absorb FX flows, rather than a tightening of balance-sheet constraints.

For the purposes of the model, (N_t, NEF_t) may vary stochastically over time but are taken as given by the intermediary at the time decisions are made. This assumption matches the empirical design, in which state dependence is captured by interactions between flow shocks and contemporaneously observed or lagged balance sheet indicators.

4.3 Intermediary problem

A representative intermediary chooses two positions at date t:

- x_t, a net USD inventory position that loads on the risky currency payoff rx_{t+1} in (1), interpreted as the temporary exposure associated with intermediating client flows rather than a persistent directional position;
- q_t, denotes the intermediary's position in forward contracts, which should be interpreted broadly as reflecting intermediation in forward markets. This includes both client-driven transactions and, potentially, arbitrage activities, although the model abstracts from distinguishing between these motives.

One-period objective. Let end-of-period trading profits be

$$\Pi_{t+1} = x_t\, rx_{t+1} + q_t\, b_t. \tag{3}$$

The intermediary chooses (x_t, q_t) to maximise a mean-variance criterion:

$$\max_{x_t, q_t} \quad E_t[\Pi_{t+1}] - \frac{\gamma_t}{2} V_t(\Pi_{t+1}), \tag{4}$$

where $\gamma_t > 0$ is the effective coefficient of risk aversion. To capture the idea that better-capitalised intermediaries can warehouse more risk, one may allow $\gamma_t = \Gamma(N_t)$ with $\Gamma'(N_t) < 0$.

Balance sheet constraint. Intermediation uses scarce balance sheet. Let $\kappa_x > 0$ denote the balance sheet intensity of the risky USD position and $\kappa_q > 0$ the balance sheet intensity of the forward intermediation position. Assume the intermediary faces the constraint

$$\kappa_x |x_t| + \kappa_q |q_t| \leq \bar{B}(N_t) + \eta \, NEF_t, \tag{5}$$

with $\eta > 0$.

The function $\bar{B}(N_t)$ captures the dependence of balance sheet capacity on intermediary net worth. Higher net worth relaxes the constraint.

The term NEF_t captures anticipated short-term dollar funding needs. When expected dollar outflows are higher, banks have a stronger incentive to accumulate dollar positions. In this situation intermediaries are more willing to absorb dollar inflows from non-resident investors, which effectively increases the amount of balance sheet capacity available for FX intermediation.

Because the constraint depends on absolute positions, the optimisation problem is piecewise and the exact solution depends on the signs of (x_t, q_t). Different combinations of positions therefore correspond to different local regimes.

For expositional purposes, we focus on a configuration that is particularly relevant for the Chilean market: a situation in which intermediaries absorb non-resident demand for dollar exposure and provide forward intermediation. In this case, the constraint binds locally in the positive quadrant and the solution can be characterised using standard first-order conditions.

4.4 Optimality conditions and pricing implications

For simplicity, assume that the basis position is close to riskless over the relevant horizon, so that the conditional variance of profits is dominated by the risky currency position:

$$V_t(\Pi_{t+1}) \approx x_t^2 \, \sigma_t^2. \tag{6}$$

Let $\lambda_t \geq 0$ denote the Lagrange multiplier on the balance sheet constraint (5). The first-order conditions imply

$$E_t[rx_{t+1}] = \gamma_t \, x_t \, \sigma_t^2 + \lambda_t \, \kappa_x \,, \tag{7}$$

$$b_t = \lambda_t \, \kappa_q. \tag{8}$$

The Lagrange multiplier, λ_t, represents the shadow cost of intermediary balance sheet. It depends on the financial condition of the intermediary sector. In particular, higher intermediary net worth – proxied empirically by intermediary capitalisation (*TIT*) – relaxes balance sheet constraints and therefore lowers λ_t. Similarly, higher anticipated dollar funding needs (NEF_t) increase intermediaries' willingness to accumulate dollar positions, effectively expanding the balance sheet available for FX intermediation. Both forces reduce the shadow value of balance sheet and therefore lower λ_t.

Equation (7) is a state-dependent UIP condition. Expected currency excess returns compensate the intermediary for: (i) bearing currency risk; and (ii) deploying scarce balance sheet.

Equation (8) links the cross-currency basis to intermediary constraints: even if CIP arbitrage is nearly riskless, it uses scarce balance sheet, and the equilibrium basis reflects the shadow cost of that resource.

Substituting the definition of excess returns in (1) into (7) yields

$$E_t[\Delta s_{t+1}] = (i_t - i_t^*) + \gamma_t \, x_t \, \sigma_t^2 + \lambda_t \, \kappa_x. \tag{9}$$

Expected exchange rate movements therefore reflect three components: the interest rate differential, a currency risk premium associated with bearing exchange rate risk and an intermediation premium associated with the deployment of scarce dealer balance sheet. The basis should not be interpreted as the realized profit of intermediaries. Instead, it reflects the equilibrium price required to compensate the use of balance sheet in forward market intermediation, capturing the shadow cost of constrained intermediary capital. This interpretation is consistent with the fact that, in practice, the profitability of intermediaries depends on mark-to-market dynamics, funding conditions, and internal balance-sheet costs, rather than solely on the level of the basis.

4.5 Market clearing and non-resident flow shocks

Let H_t denote exogenous net non-resident demand pressure that must be intermediated. A natural market-clearing condition is

$$x_t = H_t \,, \tag{10}$$

with the convention that $H_t > 0$ corresponds to net demand for USD exposure that the intermediary must absorb. Substituting (10) into (7) yields

$$E_t[rx_{t+1}] = \gamma_t \, H_t \, \sigma_t^2 + \lambda_t \, \kappa_x \,. \tag{11}$$

Thus, expected currency excess returns and expected depreciation depend on both current flow pressure and intermediary balance sheet conditions.

At the same time, equation (8) implies

$$b_t = \kappa_q \lambda_t \,. \tag{12}$$

The basis therefore provides a price-based measure of the shadow cost of intermediary balance sheet.

4.6 Empirical implications

The model yields several empirical predictions that guide the analysis in the next section.

First, unexpected non-resident demand pressure should move the spot exchange rate on impact.

Second, the price impact of flows should be state-dependent. A given flow shock should produce larger exchange rate movements when intermediary net worth is lower or when anticipated near-term dollar funding needs are lower.

Third, the same forces should affect the cross-currency basis. When balance sheet capacity is scarce, intermediaries require higher compensation to provide forward intermediation, widening the basis.

5. Data

The empirical analysis uses daily data for the Chilean FX market covering the period 2010–24. The focus is on three sets of variables: measures of non-resident flow pressure, outcomes in spot and derivatives markets and indicators of intermediary balance sheet conditions. A detailed description of the underlying data sources and construction procedures is available upon request.

5.1 Non-resident order flow

The key flow variable is a measure of non-resident FX derivatives order imbalance, denoted OIB_t^{NR}. It is constructed from gross purchases and sales of Chilean pesos by non-resident investors in the local FX derivatives market. Formally,

$$OIB_t^{NR} = \frac{C_t^{NR} - V_t^{NR}}{C_t^{NR} + V_t^{NR}}, \tag{13}$$

where C_t^{NR} and V_t^{NR} denote, respectively, gross purchases and gross sales of Chilean pesos by non-residents. By construction, positive values correspond to net peso demand by non-residents, while negative values correspond to net dollar demand.

This normalisation scales net flows by total turnover, which helps control for changes in market liquidity over time and allows the variable to be interpreted as a measure of relative demand pressure in the FX market.

Because the empirical analysis focuses on the price impact of unexpected flow pressure, the reduced-form specifications use the unpredictable component of order imbalance. This component is obtained from a simple forecasting equation that removes predictable variation in flows using lags and calendar effects:

$$OIB_t^{NR} = \alpha + \rho_1 OIB_{t-1}^{NR} + \rho_2 OIB_{t-2}^{NR} + \Gamma' D_t + \epsilon_t, \tag{14}$$

where D_t denotes a set of calendar controls and ϵ_t captures the unexpected component of non-resident order flow. In the empirical exercises below, ϵ_t is interpreted as the flow shock that intermediaries must absorb in the short run.

5.2 FX price variables

The main spot market outcome is the daily log return of USD/CLP. Consistent with the notation in section 4, the variable is defined so that a positive value corresponds to a depreciation of the peso.

To capture conditions in derivatives markets, the analysis also uses the USD/CLP cross-currency basis measured at the three-month tenor. As discussed in the model, the basis can be interpreted as a price-based measure of the shadow cost of

intermediary balance sheet: when dealers face tighter balance sheet constraints or higher short-term dollar funding needs, the basis tends to widen.

5.3 Intermediary balance sheet conditions

The empirical analysis uses two variables intended to capture the financial conditions of FX intermediaries.

The first is intermediary net worth, which proxies for the overall balance sheet capacity of the banking system. Higher intermediary capital corresponds to a looser balance sheet environment in which dealers can absorb larger positions.

The second variable captures anticipated short-run dollar funding needs. We construct a measure of *net expected foreign currency outflows*, denoted NEF_t, defined as

$$NEF_t = \frac{Expected\ foreign\ currency\ outflows_{t,+30} - Expected\ foreign\ currency\ inflows_{t,+30}}{Banking\ system\ equity_t}. \quad (15)$$

This measure summarises the expected net demand for foreign currency over the next 30 days relative to the equity of the banking system. Higher values of NEF_t indicate larger anticipated dollar outflows. In this situation, banks have a greater incentive to accumulate dollar positions, which makes them more willing to absorb dollar inflows from non-residents. As a result, the price impact of non-resident demand shocks may be smaller when NEF_t is high.

5.4 Control variables

The control set includes copper returns, changes in the broad US dollar index, and global risk, proxied by the VIX. These variables capture the main global forces that typically drive commodity-linked currencies and emerging market exchange rates.

In addition, the control set includes global financial indicators, such as US and global economic policy uncertainty measures, the MOVE index and time fixed effects. Together, these variables are intended to absorb common macro-financial shocks that could jointly affect exchange rates, commodity prices and international portfolio flows.

5.5 Sample and subsamples

The baseline sample runs from 2010 to 2024. In addition to full-sample estimates, several exercises are reported separately for two subsamples.

The first subsample covers the *pre-withdrawal period* from 2010 to 2019, before the pension fund withdrawal episode that began in 2020. The second subsample covers the *post-withdrawal period* from 2020 to 2024.

This distinction is economically relevant because the pension withdrawals substantially reduced the size of the AFP sector and therefore the scale of structural FX hedging demand generated by domestic pension funds. As a result, the structure of FX intermediation and the interaction between resident and non-resident flows may differ across the two periods.

Unless otherwise noted, standard errors are Newey-West to account for serial correlation in daily data and in the residuals of the local projection specifications used in the empirical analysis.

6. Empirical strategy

This section describes the empirical strategy used to estimate the price effects of non-resident flow shocks and to test the state dependence predictions of the model. The analysis proceeds in three steps. First, we isolate the unexpected component of non-resident order flow. Second, we estimate local projections to trace the dynamic responses of FX prices to this shock. Third, I test whether those responses depend on intermediary balance sheet conditions.

6.1 Constructing the unexpected order-flow shock

The first step is to isolate the unexpected component of non-resident order flow. We estimate a forecasting equation for the non-resident order imbalance measure $OIBNR_t$ that includes two lags of the variable together with day-of-week effects and end-of-month and end-of-quarter indicators:

$$OIB_t^{NR} = \alpha + \rho_1 OIB_{t-1}^{NR} + \rho_2 OIB_{t-2}^{NR} + \Gamma' D_t + \epsilon_t \ . \tag{16}$$

The residual from this regression is interpreted as the daily innovation in non-resident order flow and is denoted $Shock_t^{OIB}$. The purpose of this filtering step is to remove predictable persistence and calendar effects before linking flows to asset price movements.

This construction provides a natural empirical counterpart to the flow shock H_t in the model developed in section 4. In that framework, H_t represents unexpected demand pressure that intermediaries must absorb through their balance sheets. The innovation $Shock_t^{OIB}$ therefore captures the empirical analogue of that shock in the data.

An alternative identification strategy would be to use instrumental variables to isolate exogenous shifts in non-resident demand. While conceptually appealing, this approach faces practical challenges in the present context. In particular, it is difficult to find instruments that are both strongly correlated with daily non-resident flows and plausibly exogenous to contemporaneous exchange rate movements. For this reason, the empirical strategy relies on the unexpected component of order flow obtained from the forecasting equation above. Developing strong external instruments for flow shocks remains an important avenue for future research.

It is also important to emphasise that the analysis focuses specifically on innovations in *non-resident* demand for currency exposure. Other sources of flow pressure may also affect FX markets. For example, domestic institutional investors such as pension funds generate substantial structural hedging demand in derivatives markets. The focus of this note, however, is on the interaction between non-resident demand shocks and intermediary balance sheet conditions. Extending the framework to study shocks originating from other types of market participants would be a natural extension for future work.

6.2 Baseline local projections

To trace the dynamic effects of the shock, we estimate horizon-by-horizon local projections. Let Y_{t+h} denote a generic FX market outcome observed at horizon h. In the empirical analysis, Y_{t+h} corresponds either to the return of the USD/CLP exchange rate or to the cross-currency basis level.

The baseline specification takes the form

$$Y_{t+h} = \alpha_h + \beta_h \, Shock_t^{OIB} + \Gamma' X_t + u_{t+h} \,, \tag{17}$$

where X_t denotes a vector of control variables that includes copper returns, changes in the broad US dollar index and measures of global financial risk such as the VIX and EPU indices.

The coefficients β_h trace the dynamic response of the FX outcome to an unexpected non-resident flow shock. Estimating the equation separately for each horizon h allows the impulse response profile to vary flexibly across horizons without imposing a particular dynamic structure.

Local projections are particularly convenient in this setting because they allow a transparent comparison of how different FX prices – such as the spot exchange rate and the cross-currency basis – respond over time to the same underlying flow shock.

6.3 State dependence

A central prediction of the model is that the price impact of flow shocks depends on the state of intermediary balance sheets. To test this prediction, the baseline specification is augmented with interaction terms between the flow shock and a proxy for intermediary tightness.

Let Z_t denote a generic measure of intermediary balance sheet conditions. In the empirical analysis, two variables are considered: expected short-term dollar funding needs (NEF_t) and intermediary capital ratios.

The empirical specification becomes

$$Y_{t+h} = \alpha_h + \beta_h \, Shock_t^{OIB} + \delta_h \, Z_t + \theta_h \left(Shock_t^{OIB} \times Z_t \right) + \Gamma' X_t + u_{t+h}. \tag{18}$$

The coefficient θ_h captures how the price impact of order flow varies with intermediary conditions. A statistically significant interaction implies that the sensitivity of FX prices to flow shocks depends on the availability of intermediary balance sheet capacity, consistent with the mechanism described in the model.

6.4 Identification and interpretation

The empirical strategy interprets innovations in non-resident order flow as shocks to demand for currency exposure that intermediaries must absorb in the short run. This interpretation follows the microstructure literature, where order flow is often treated as the proximate driver of short-run exchange rate movements.

At the same time, the identification strategy is reduced-form. Exchange rate movements and order flow may respond jointly to common information shocks, such as changes in global risk conditions or macroeconomic news. Moreover, portfolio

rebalancing by foreign investors may itself be partly driven by expectations about future exchange rate movements.

To mitigate these concerns, the empirical specifications control for a range of global financial variables and isolate the unpredictable component of order flow by removing predictable persistence and calendar effects. Nevertheless, the results should be interpreted as documenting systematic empirical relationships between non-resident demand pressure, intermediary conditions and FX prices, rather than as a fully structural identification of causal flow shocks.

From the perspective of the mechanism emphasised in this note, the key empirical question is whether innovations in flow pressure are associated with systematic movements in FX prices and whether those responses vary with intermediary balance sheet conditions. The transmission mechanism operates even in the absence of persistent FX risk-taking by intermediaries. What matters is the temporary balance-sheet capacity required to absorb flow imbalances, which generates price pressure in both spot and forward markets. The empirical evidence presented below provides strong reduced-form support for that mechanism.

7. Empirical evidence

This section presents the empirical evidence on how non-resident flows affect the Chilean FX market and how those effects depend on intermediary balance sheet conditions. The empirical exercises follow directly from the mechanism developed in the model. In that framework, unexpected shifts in non-resident demand for currency exposure must be absorbed by intermediaries whose capacity to warehouse and hedge those positions is limited. As a result, such shocks should affect not only the spot exchange rate but also the cross-currency basis, and their impact should depend on the balance sheet conditions of dealers.

The analysis proceeds in four steps. First, we construct the unexpected component of non-resident order flow. Second, we estimate the dynamic responses of the spot exchange rate and the cross-currency basis to that shock. Third, we examine whether those responses vary systematically with intermediary balance sheet conditions. Finally, we explore whether the transmission of non-resident flows changed after the pension fund withdrawal episode that began in 2020, which significantly reduced the size of the domestic pension system and therefore the scale of structural FX hedging demand in Chile.

The objective of this section is not to estimate a fully structural system. Rather, it is to establish a set of reduced-form empirical facts consistent with a market in which the price impact of flows depends on the balance sheet capacity of intermediaries.

7.1 The unexpected component of non-resident flow

The first step is to isolate the unexpected component of non-resident order flow. Table 1 reports the forecasting regression used to construct the order-flow shock. Non-resident order imbalance is clearly persistent at the daily frequency, which justifies filtering the raw series before using it in the asset pricing exercises.

The residual from this regression is interpreted as the daily innovation in non-resident order flow. This variable is the empirical counterpart of the flow shock H_t in the model and is the object used throughout the remainder of the analysis.

The distinction between raw order imbalance and the filtered shock matters for interpretation. What enters the empirical specifications is not a gradual reallocation trend or a predictable calendar pattern, but an innovation in non-resident demand pressure that must be absorbed by intermediaries on that day.

OLS regression results – OIB shock

Table 1

	Intercept	OIB$_{t-1}$	OIB$_{t-2}$	R^2 Adj.	N
Coef.	0.006	0.215***	0.146***	0.094	4,215
(S.E.)	(0.006)	(0.016)	(0.016)		

OLS regression of the OIBNR shock on its own two lags and day-of-week dummies (Monday through Thursday), end-of-month (*eom*), and end-of-quarter (*eoq*) indicators (coefficients omitted for brevity). The residual from this regression is used as the OIBNR shock in the local projection analysis. Standard errors in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01.

7.2 Baseline responses of spot and basis

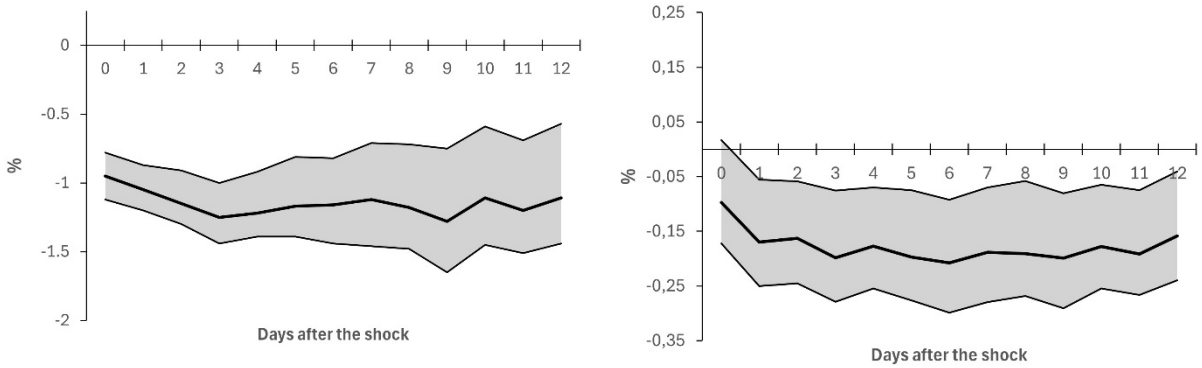
The next step is to examine how FX prices respond to an unexpected non-resident flow shock. Graph 5 reports the dynamic responses of the USD/CLP exchange rate and the cross-currency basis estimated using local projections.

Graph 5.A shows the response of the exchange rate. A positive shock to FX derivatives net peso demand by non-residents is associated with an immediate appreciation of the peso, with the largest adjustment occurring on impact. Subsequent coefficients are materially smaller, and the cumulative response stabilises relatively quickly. This pattern is consistent with the idea that the shock operates primarily through contemporaneous market-clearing pressure rather than through gradual revisions in macroeconomic fundamentals.

Graph 5.B shows that the same order-flow shock also affects the cross-currency basis. This result is central for interpreting the mechanism. If order flow mattered only as a cash market demand shock, one might expect it to move the spot exchange rate without necessarily affecting forward pricing. Instead, the basis responds systematically as well, indicating that the shock is associated with an intermediation demand that is priced in derivatives markets.

Baseline responses of FX prices to a non-resident flow shock Graph 5

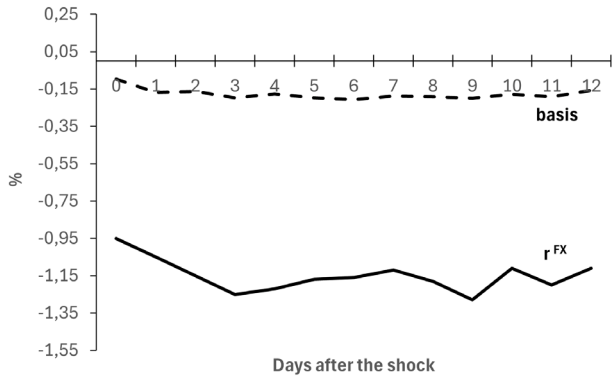
A. Exchange rate response B. Basis response



This graph plots the cumulative responses of the USD/CLP exchange rate (panel A) and the USD/CLP cross-currency basis (panel B) to a one-unit innovation in non-resident FX derivatives order flow, estimated using local projections at horizons $h = 0, \ldots, 12$. The flow shock is constructed as in Table 1. The dependent variable is the three-month USD/CLP cross-currency basis, measured in percentage points. Controls include copper returns, DXY returns, the VIX, US and global economic policy uncertainty, and year and quarter fixed effects. Shaded bands report bootstrap confidence intervals.

Graph 6 shows the dynamics of the two prices. While the spot exchange rate adjusts sharply on impact, the basis response accumulates over the first days before reaching a statistically significant effect. The timing suggests that the spot market clears most of the imbalance immediately, while in parallel the basis starts reflecting the balance sheet cost of warehousing and hedging that imbalance.

Exchange -rate response versus basis response Graph 6



This graph compares the cumulative local projection responses of USD/CLP returns and the USD/CLP cross-currency basis with the same non-resident order-flow shock. Each series is estimated using the baseline specification described in the text. The comparison highlights differences in the dynamic adjustment of spot and derivatives prices following an innovation in non-resident flow pressure.

7.3 State dependence

The model predicts that the price impact of non-resident flows should depend on the balance sheet capacity of intermediaries. This subsection tests that prediction using two proxies for intermediary tightness.

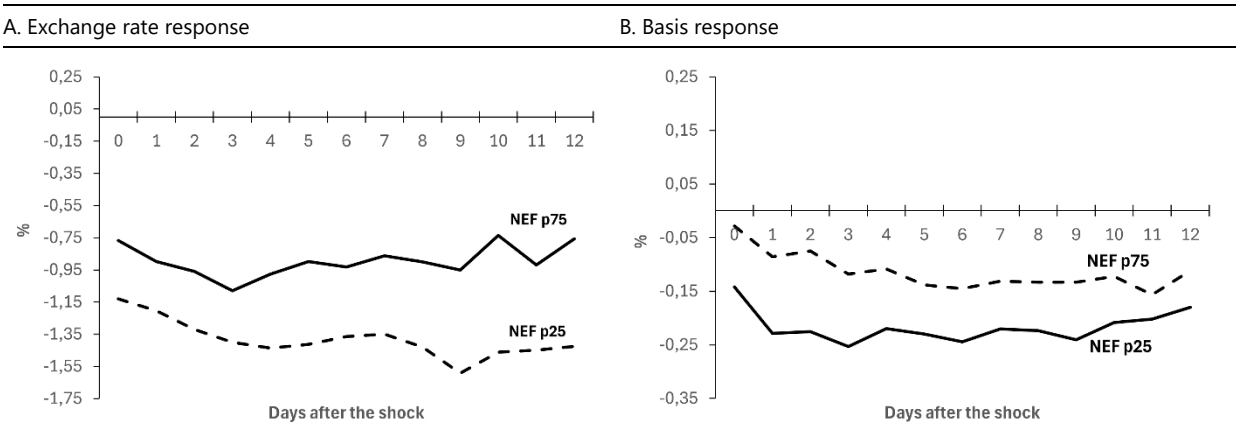
7.3.1 Net expected dollar outflows

Graph 7 examines state dependence using the measure of expected net dollar outflows over the next 30 days (NEF). The responses are computed from local projections that interact the order-flow shock with the level of NEF.

When expected dollar outflows are high, the exchange rate responds less in absolute terms to a given flow shock. The intuition is straightforward: when intermediaries anticipate larger dollar needs, they are more willing to absorb the dollar exposure generated by additional non-resident flow pressure. As a result, the spot exchange rate needs to adjust less to clear the market.

Regarding the basis, its response is stronger in absolute value when NEF is high and weaker when NEF is low. This pattern is consistent with the view that the basis reflects the marginal shadow cost of intermediary balance sheet capacity. The marginal cost rises with *NEF*, as banks are forced to hoard increasingly large and not necessarily efficient foreign-currency inventories to absorb the anticipated foreign-currency outflows.

State dependence: expected dollar outflows — Graph 7



This graph plots the implied cumulative response of USD/CLP returns to a one-unit non-resident order-flow shock at different values of NEF, the measure of expected net dollar outflows over the next 30 days. High and low states correspond to the 75th and 25th percentiles of the NEF distribution. The responses are obtained from local projections that interact the order-flow shock with NEF. Controls include the baseline macro-financial variables and fixed effects described in the text.

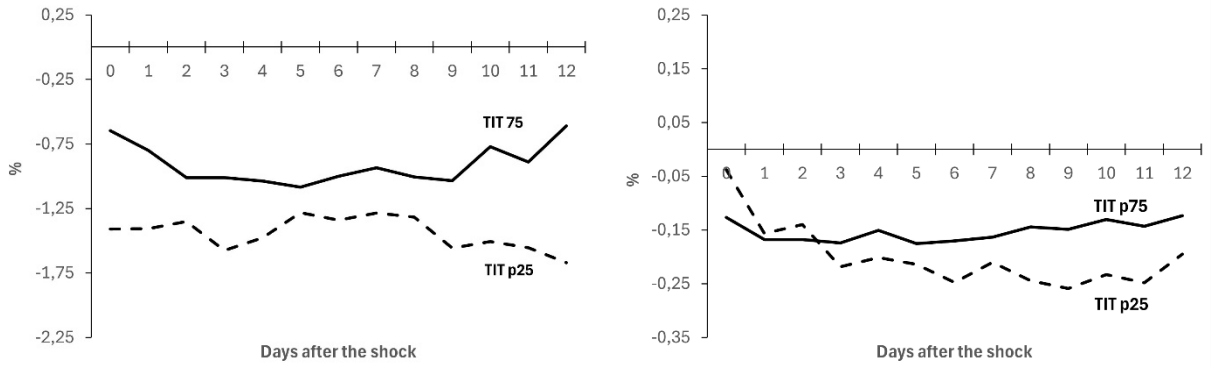
7.3.2 Intermediary capital

Graph 8 presents the analogous exercise using the ratio of intermediary equity to assets (TIT) as a proxy for dealer capitalisation.

The results are broadly consistent with the previous exercise. The spot exchange rate tends to respond more strongly when intermediary capital is lower, indicating tighter balance sheet conditions. The cross-currency basis also reacts more strongly in those periods, again suggesting that balance sheet scarcity increases the cost of FX intermediation.

State dependence: intermediary capital Graph 8

A. Exchange rate response B. Basis response



This graph plots the implied cumulative response of USD/CLP returns to a one-unit non-resident order-flow shock at different values of TIT, measured as intermediary equity relative to assets. Low and high states correspond to the 25th and 75th percentiles of the TIT distribution. The responses are obtained from local projections that interact the order-flow shock with TIT. Lower TIT corresponds to tighter intermediary balance sheet conditions.

Taken together, the results in this section indicate that the price impact of non-resident flows is not constant over time. Instead, it varies systematically with the capacity of intermediaries to absorb, warehouse and hedge those positions.

The evidence reported in the Appendix 2, which is available upon request, shows that the state-dependent results vary across subsamples, particularly after 2020. This pattern suggests noticeable changes to the transmission mechanism during the post-2020 period.

8. Interpreting the evidence and policy implications

The empirical results in section 7 establish three central facts about the Chilean FX market. First, unexpected changes in non-resident demand for peso exposure have a clear and immediate effect on the spot exchange rate. Second, the same shocks affect the cross-currency basis, indicating that the transmission mechanism operates not only through cash market demand but also through the balance sheet costs faced by intermediaries. Third, the price impact of flows varies systematically with indicators of intermediary balance sheet conditions.

This section interprets these findings from an economic and policy perspective. The discussion proceeds in three steps. First, the estimates are used to quantify the magnitude of the flow channel in economically meaningful units. Second, the role of intermediary balance sheet conditions is examined more closely. Finally, the section discusses several implications for the interpretation of exchange rate movements and for the design of policy frameworks in small open economies.

8.1 Quantifying the flow channel

The estimated responses imply economically meaningful price effects. The standard deviation of the non-resident order imbalance measure in the data is approximately

0.18. Using the baseline estimates reported in section 7, an immediate beta of 0.95% implies that a one standard deviation innovation in non-resident demand leads to an average contemporaneous appreciation of the peso of roughly 0.17% over the 2010–24 period. Appendix 2.2, available upon request shows that prior to 2020, the immediate impact beta was somewhat smaller, at approximately 0.68%, implying an average spot appreciation of about 0.1% in the pre-2020 period.

Although these magnitudes may appear modest in isolation, they are economically meaningful when benchmarked against the typical scale of daily spot exchange rate fluctuations, which have a standard deviation of around 0.7% over the sample period. At an exchange rate of roughly CLP 800 per US dollar, a 0.1% movement corresponds to approximately one peso. Put differently, a typical unexpected shift in non-resident positioning generates an exchange rate movement that accounts for a non-trivial share of normal daily volatility.

The results for the later period are even more striking. In the subsample covering the years after the pension withdrawals began in 2020 (see Appendix 2.2, available upon request), the estimated immediate impact coefficient rises substantially to roughly 2.60%. Applying the same previous logic, this implies that a one standard deviation flow shock moves the exchange rate by roughly 0.47%, or about four pesos, on impact. This difference highlights that the sensitivity of the exchange rate to capital flow shocks is not a fixed parameter of the economy but rather depends on the institutional structure of the FX market and the set of agents participating in it.

The evidence for the cross-currency basis points to a similar mechanism. Unexpected non-resident flows systematically move the basis, implying that these shocks generate hedging and funding pressures that must be absorbed by intermediaries. In other words, non-resident demand shocks affect not only the price of currency risk but also the price of balance sheet intermediation in FX markets.

8.2 Balance sheet conditions and exchange rate sensitivity

A central implication of the model is that the price impact of flows should depend on the balance sheet capacity of intermediaries. The empirical results provide strong support for this prediction.

The variables used to capture intermediary conditions in the empirical analysis – expected dollar outflows (NEF) and intermediary capital (TIT) – are standardised measures. Moving from the 25th to the 75th percentile of these variables therefore corresponds to a change of roughly 1.4 standard deviations.

The interaction estimates imply that such shifts in balance sheet conditions materially alter the sensitivity of the exchange rate to flow shocks. When expected dollar outflows are high – that is, when banks face larger anticipated short-term dollar needs – the exchange rate response to a given non-resident flow shock is significantly smaller. A similar pattern emerges when intermediary capital is higher.

These findings are consistent with a view of FX markets in which dealers temporarily absorb shifts in demand but face limits in their capacity to warehouse risk. When balance sheet capacity is abundant, the market can accommodate a given flow shock with relatively modest price adjustments. When balance sheet capacity is scarce, the same shock requires a larger exchange rate movement in order to induce other market participants to absorb the resulting positions.

Importantly, these results also help explain the joint behaviour of spot exchange rates and the cross-currency basis. When dealer balance sheets are tight, the shadow cost of intermediation rises. This cost is reflected in both a larger spot price adjustment and a widening of the basis.

8.3 Policy implications

The mechanism highlighted in this paper has several implications for how exchange rate movements should be interpreted in small open economies.

First, the results suggest that short-run exchange rate fluctuations can reflect not only changes in macroeconomic fundamentals but also shifts in the balance sheet capacity of financial intermediaries. In particular, periods in which global investors reduce exposure to a currency may coincide with periods in which domestic intermediaries face tighter balance sheet constraints or smaller short-term dollar funding needs. When these forces occur simultaneously, exchange rate movements may appear unusually large relative to the underlying macroeconomic news.

Second, the findings highlight the importance of monitoring indicators of intermediary balance sheet conditions in FX markets. Variables such as expected dollar funding needs or dealer capital buffers may provide useful information about periods in which exchange rates are likely to become more sensitive to capital flow shocks.

Third, the pension withdrawal episode suggests that the presence of large domestic institutional hedgers can influence the way international capital flows affect exchange rates. In Chile, pension funds historically generated substantial structural demand for FX derivatives in order to hedge their foreign-asset portfolios. The reduction in the size of the pension system after 2020 probably altered the balance between resident hedging flows and non-resident portfolio flows, contributing to the higher exchange rate sensitivity observed in the later part of the sample. Beyond this, other factors that may also have contributed to this shift include the Covid-19 pandemic, global inflation shocks and the monetary policy responses of major central banks.

Finally, the mechanism described in this paper is relevant for the broader discussion of FX intervention. The results suggest that exchange rate movements may become particularly sensitive to capital flow shocks precisely when intermediary balance sheets are constrained. In such situations, relatively modest shifts in investor positioning can generate large price adjustments.

At the same time, this observation should not be interpreted as implying that FX intervention should be frequent. In practice, FX interventions are typically justified only when market functioning is impaired or when exchange rate movements appear disconnected from underlying fundamentals. Moreover, frequent intervention can create expectations of exchange rate insurance, potentially weakening private incentives to manage currency risk and slowing the development of hedging markets.

For these reasons, the mechanism documented in this paper should primarily be viewed as a framework for understanding when exchange rate movements may become unusually sensitive to capital flow shocks. Whether policy intervention is warranted in such situations depends on a broader set of considerations, including market functioning, financial stability risks and the potential long-run effects of intervention on market development.

Conclusions

This note studies the role of non-resident investors in the Chilean foreign exchange market and the mechanism through which their positions affect exchange rate dynamics. The analysis highlights the importance of financial intermediation in markets where foreign investors obtain currency exposure primarily through derivatives and where local banks act as the marginal dealers connecting offshore trading with onshore price formation.

The empirical evidence shows that unexpected shifts in non-resident demand have a clear and immediate impact on the exchange rate and also affect the cross-currency basis. Moreover, the price impact of these flows depends systematically on intermediary balance sheet conditions. Exchange rate movements are larger when dealer balance sheet capacity is tighter or when short-term dollar funding needs are low, consistent with a framework in which intermediaries face constraints in their ability to warehouse currency risk.

These findings suggest several directions for future research. First, further work could explore the microstructure of FX intermediation using more granular data on dealer positions and hedging strategies. Second, developing stronger identification strategies for exogenous flow shocks would help sharpen causal interpretation. Finally, a promising avenue for future research is to study how structural changes in the domestic financial system – such as the pension fund withdrawal episode – alter the interaction between resident hedging demand, non-resident flows and exchange rate dynamics.

More broadly, understanding how financial intermediation shapes the transmission of global capital flows remains an important challenge for macroeconomics and international finance, particularly in small open economies with deep derivatives markets.

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Characteristics and changes in the driving factors of China's cross-border capital flows and monetary policy responses

People's Bank of China

Currently, the global economic and financial framework is undergoing profound adjustments. Monetary policy divergence is intensifying, geopolitical rivalries are heating up, and supply chain restructuring is accelerating. These factors have led to significant shifts in the scale, structural characteristics and underlying drivers of cross-border capital flows. As the world's second largest economy and a leading representative of major emerging markets, China's cross-border capital flows not only reflect the inherent demands of deepening financial system transformation but also confront external shocks from an increasingly complex global environment. The evolving dynamics and corresponding policy responses are crucial not only for China's macroeconomic stability but also hold important reference value for global financial governance. This article focuses on three core aspects: the new trends in China's cross-border capital flows, structural shifts in driving factors and the practice of monetary policy responses.

1. The latest trends and characteristics in China's cross-border capital flows

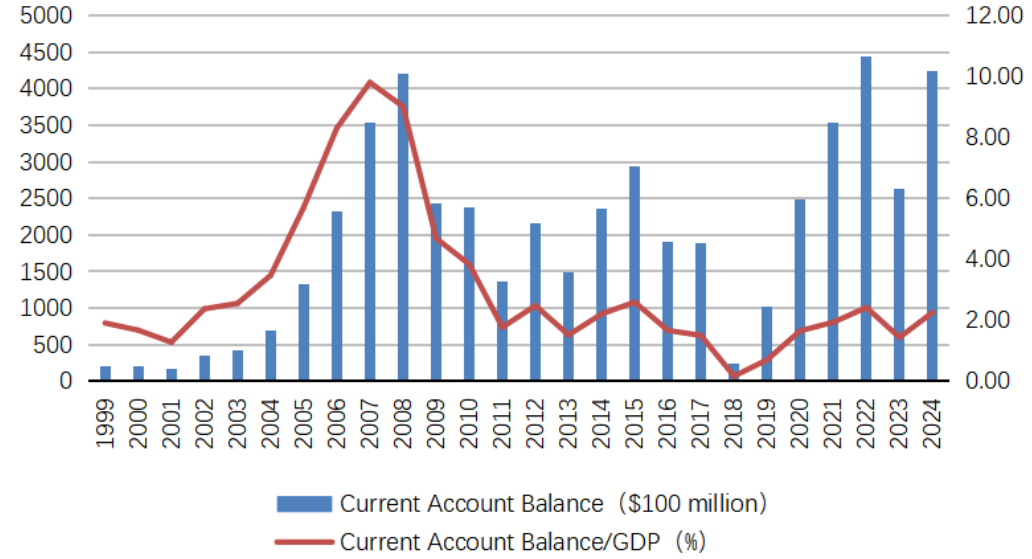
In recent years, alongside the continuous deepening of two-way opening-up in China's financial market, cross-border capital flows have generally demonstrated the typical characteristics of "two-way fluctuations and overall balance". Overall risks remain controllable and aligned with macroeconomic fundamentals.

1.1 Overall balance of payments pattern: the current account surplus is within a reasonable equilibrium range, forming an autonomous balance with the capital and financial account deficit

First, dynamics and characteristics of the current account. China's current account is generally within a reasonable and balanced level. The scale of the surplus has gone through stages of rapid growth (2001–08), steady decline (2009–18) and fluctuating adjustment (since 2019). According to statistics released by the State Administration of Foreign Exchange (SAFE), the scale of China's current account surplus in 2024 reached USD 423.9 billion, accounting for 2.2% of GDP, which falls within the internationally recognised reasonable range.[1]

[1] See State Administration of Foreign Exchange Balance of Payments Analysis Group, *2024 China Balance of Payments Report*, March 2025.

China's current account dynamics Graph 1



Source: SAFE.

Second, dynamics and characteristics of the capital and financial account. Between 1999 and 2014, China consistently maintained a pattern of "dual surpluses" in both the non-reserve financial account and the current account, with reserve accumulation gradually increasing. From 2015 to 2016, due to factors such as Federal Reserve interest rate cuts, China experienced a significant deficit under the capital account, resulting in a decline in the reserve scale. Since 2017, with the expansion of the two-way opening-up of the financial market, China's outbound investment and foreign investment from abroad have steadily increased. The non-reserve financial account has shifted to a deficit-dominated situation, forming an autonomous balance with the current account surplus, while the reserve scale remains stable. From the international balance of payments perspective, when a country experiences a surplus in current transactions, it implies that the domestic excess savings will be invested abroad through the capital and financial account, resulting in net capital outflows, that is, a deficit in capital and financial transactions. In recent years, China's current account surplus has expanded. Correspondingly, domestic entities have increased their outbound investments, which has driven the widening of the capital and financial account deficit and the continuous accumulation of external assets. In the first half of 2025, China's current account surplus was USD 294.1 billion, with a non-reserve financial account deficit of USD 318.2 billion,[2] maintaining a basic balance of international payments. The reasons are as follows:

1. Under the influence of various factors such as global supply chain adjustments, geopolitical conflicts and China's ongoing manufacturing transformation and upgrading, equity-based foreign direct investment in China has maintained a net inflow but at a slower pace. Tthe willingness of domestic enterprises to invest

[2] See State Administration of Foreign Exchange Balance of Payments Analysis Group, *China's Balance of Payments Report for the First Half of* 2025, September 2025.

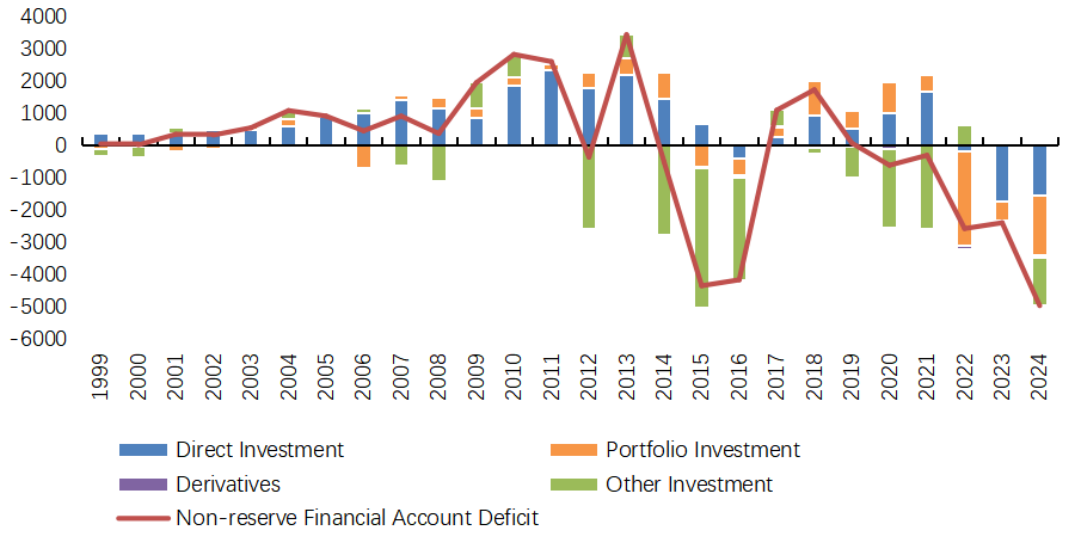
abroad has strengthened, leading to a steady increase in outbound equity-based direct investment.

2. Securities investment primarily follows market fluctuations. Foreign investment in China's securities market has maintained a net inflow. In the first half of 2025, foreign investment in domestic stocks shifted from a net outflow in the second half of 2024 to a net inflow, while investment in domestic CNY bonds remained stable. Domestic entities' outbound investment expanded rapidly, with 60% year-on-year growth in the first half of 2025, mainly driven by the rise in the Hong Kong SAR stock market, which boosted the investment enthusiasm of domestic entities.

3. When the interest rate level in the United States is significantly higher than that in China, debt between affiliated enterprises and other investments included in foreign direct investment generally show a net outflow. In the first half of 2025, the cumulative net outflow reached USD 163.4 billion.

China's financial account dynamics

Graph 2



Source: SAFE.

1.2 Market-based exchange rate reform: letting the market play a decisive role in CNY exchange rate formation and keeping the CNY exchange rate basically stable at a reasonable and balanced level

For many years, market-based exchange rate reform has been steadily advanced in China. In 1994, China established a single, managed floating exchange rate regime based on market demand and supply. In 2005, it established a managed floating exchange rate regime based on market demand and supply with reference to a basket of currencies. In recent years, China has been constantly improving the managed floating exchange rate regime based on market demand and supply with reference

to a basket of currencies, letting the market play a decisive role in CNY exchange rate formation. The exchange rate formation mechanism has become increasingly market-based, the flexibility of the exchange rate has been significantly enhanced, and two-way floating has become normal. The exchange rate has remained basically stable at a reasonable and balanced level. Since 2020, the USD index has risen about 1.9%, while the CFETS[3] CNY index (which measures the CNY exchange rate against a basket of currencies) has climbed 7.2%. Overall, the CNY exchange rate has remained stable.

The resilience of China's foreign exchange market has strengthened with stable market expectations. In recent years, this market has made significant strides in terms of improvement. From 2015 to 2024, the trading volume of the interbank foreign exchange market increased by 131%, from USD 17.8 trillion to USD 41.1 trillion. There are more than 40 tradable currencies in China's foreign exchange market, with primary trade types, like spot, forward, swap, option, etc, effectively satisfying all kinds of market participants' needs for trading and risk hedging. The market participants have become more mature and their behaviours more rational, while the resilience of the market has grown significantly. In 2025, the trading volume of China's foreign exchange market reached USD 42.6 trillion and the ratio of corporate foreign exchange hedging rose to 30%, both record highs.

1.3 Structure of capital flows and behaviour of entities: transitioning from single to multiple, continuous deepening of the two-way opening pattern

As foreign investors' participation in China's capital markets continues to deepen, diversified channels such as securities investment and debt financing are playing an increasingly prominent role in cross-border capital flows. As of end-2024, the market value of foreign investors' holdings in China's domestic stock and bond markets amounted to USD 1,025.2 billion, with their stock holdings accounting for about 4% of the total A-share market capitalisation and their bond holdings representing 2.4%[4] of the total domestic bond custody volume. By the end of June 2025, inbound securities investment accounted for 30% of China's external liabilities, which is an increase of 1.8 percentage points[5] from the end of 2024. Meanwhile, China has accelerated its economic structural adjustment and the transformation and upgrading of its manufacturing sector, and the channels for outbound investment have gradually expanded with enterprises' "going global" investment continuously increasing. First, outbound direct investment has grown steadily. In 2024, the scale of China's outbound direct investment was USD 172.2 billion, a historical high. By the end of 2024, the outbound direct investment stock was USD 3.1 trillion, leading globally.[6] Second, securities investment has become an important channel for

[3] China Foreign Exchange Trade System.

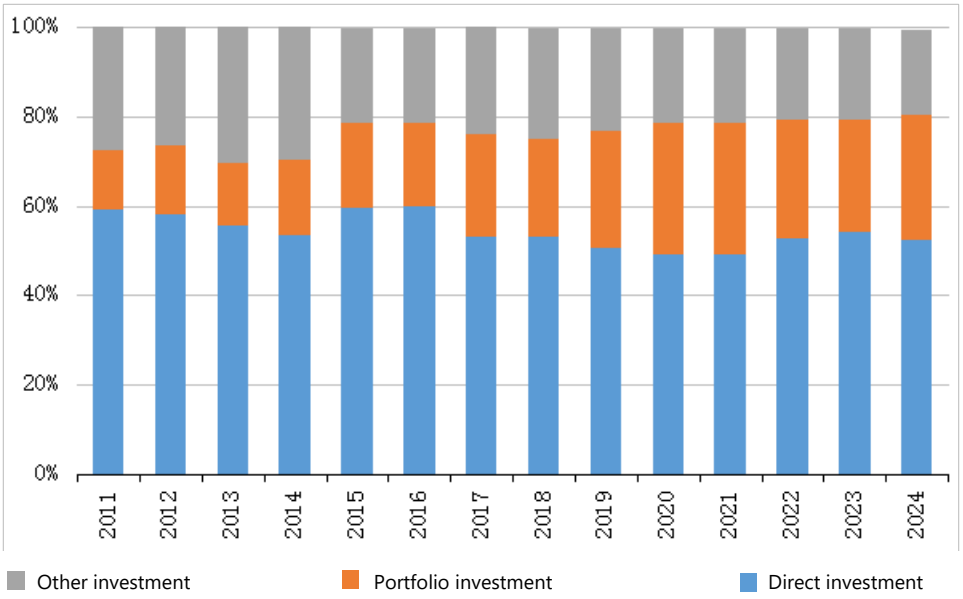
[4] See State Administration of Foreign Exchange Balance of Payments Analysis Group, *2024 China Balance of Payments Report*, March 2025.

[5] See State Administration of Foreign Exchange Balance of Payments Analysis Group, *China's Balance of Payments Report for the First Half of 2025*, September 2025.

[6] See State Administration of Foreign Exchange Balance of Payments Analysis Group, *2024 China Balance of Payments Report*, March 2025.

outbound investment. By the end of 2024, China's outstanding overseas securities investment had reached USD 1.4 trillion, accounting for 14% of total external assets and showing a gradually increasing trend. Overall, a new pattern of two-way and balanced capital flows is gradually taking shape.

Structural changes in China's external liabilities Graph 3



Source: SAFE.

2. Driving factors and transmission mechanisms of cross-border capital flows

The new characteristics of cross-border capital flows in China stem from structural shifts in financial deepening, the diversity of market participant behaviour and the reshaping of globalisation. These factors not only change the scale, structure and volatility of cross-border capital flows, but also profoundly impact the independence and effectiveness of China's monetary policy through multiple transmission channels.

2.1 Deepening reform of the domestic financial system: the expansion of financial channels reshapes monetary policy transmission

In recent years, China has expanded and diversified the financing channels for firms in different ways, which has contributed to the continuous increase in the proportion of direct financing, the optimisation of the structure of capital supply and the development of the modern financial system. As of 15 April 2025, the total size of China's bond market had reached CNY 183 trillion (USD 25 trillion), ranking second

globally.[7] Mechanism innovations represented by the Stock Connect and Bond Connect programmes have continuously deepened the financial market connectivity between the domestic and overseas financial markets. From January to September 2025, the average daily turnover of Northbound Shanghai-Shenzhen Stock Connect reached CNY 206.4 billion (USD 29.02 billion),[8] while from January to October 2025, the average daily trading volume of Northbound Bond Connect amounted to CNY 40.8 billion (USD 5.75 billion).[9] As China's cross-border capital flows become more sensitive to global financial environment changes, the volume, structure and frequency of these flows become more complex. The monetary policy transmission mechanism, which used to rely on bank credit channels, has also been extended to encompass asset price channels in markets such as bonds and stocks. As the intensification of the internal linkage between capital market volatility and cross-border capital flows continues, monetary authorities must place more emphasis on transmission efficiency and policy timing when employing price-based tools such as interest rates, balancing the dual objectives of price stability and financial stability.

2.2 Diversified investor: differentiated behaviour amplifies volatility and difficulty of monetary policy regulation

Globally, the dominant force in capital flows is shifting from commercial banks to non-bank financial institutions (NBFIs), which include asset management companies, investment funds and insurance companies and are more vulnerable to market sentiment. This shift poses new risks and challenges to emerging market economies like China. Compared with traditional banks, NBFIs exhibit stronger procyclicality in their behaviour patterns under internal risk controls and customer redemption pressures. This tendency may amplify external liquidity shocks and transmit them to the domestic market, thereby aggravating the volatility and unpredictability of capital flows.[10] As Chinese assets are incorporated into mainstream indices such as the MSCI, the share of passive indexing investments in cross-border capital flows has risen significantly, which weakens the long-term appeal of economic fundamentals to cross-border capital.[11] Moreover, influenced by information asymmetry and mutual dependence on global macroeconomic signals, foreign investors tend to respond homogeneously to individual risk events, which further exacerbates capital flow volatility.[12] The challenges faced by monetary policy are that the effectiveness of traditional policy signalling may be disrupted by highly heterogeneous market

7 See https://news.cctv.com/2025/04/19/ARTIyDKXsBkgOByosFaFN11q250419.shtml.

8 See http://www.chinanews.com.cn/cj/2025/10-22/10502803.shtml.

9 See https://www.chinabondconnect.com/en/index.html.

10 See E Eren and P Wooldridge, "The role of non-bank financial institutions in cross-border spillovers", *BIS Papers*, no 129, December 2022, www.bis.org/publ/bppdf/bispap129.pdf.

11 See A Moro and A Schiavone, "The role of non-bank financial institutions in the intermediation of capital flows to emerging markets", *Bank of Italy Working Papers*, no 1367, April 2022, www.researchgate.net/publication/360924123_The_Role_of_Non-bank_Financial_Institutions_in_the_Intermediation_of_Capital_Flows_to_Emerging_Markets#read.

12 See Y Lei, "The impact of herd behaviour on the Chinese stock market", *Advances in Social Science, Education and Humanities Research*, vol 638, https://www.researchgate.net/publication/358585679_The_Impact_of_Herd_Behavior_on_the_Chinese_Stock_Market.

participants, while the frequent inflow and outflow of short-term capital may affect the effectiveness of domestic interest rate regulation and other policies to some extent.

2.3 Reshaping globalisation: tightening external constraints promotes upgraded policy synergy

The Federal Reserve's decisions and the corresponding shifts in US dollar exchange rate expectations play a significant role in shaping international capital flows, spilling over into emerging markets through interest rate parity, liquidity conditions and global risk appetite. According to BIS research, a one standard deviation depreciation of the US dollar against other advanced economy currencies tends to increase local currency bond and equity inflows to emerging market economies by 0.29 and 0.16 percentage points, respectively. Meanwhile, frequent geopolitical conflicts have significantly amplified the volatility of capital flows in emerging markets, constituting a long-term structural constraint on cross-border capital movements.

Global trends such as "friendshoring", "nearshoring" and "de-risking" are catalysing a restructuring of global supply chains that now spans not only the trade sector but also the financial domain, thereby reshaping the global capital allocation. Within this context, China's cross-border capital flows are simultaneously influenced by two sets of forces: the short-term dollar cycle and medium- to long-term structural factors. The interaction of these forces heightens the challenges in China's monetary policy implementation. As a result, policymakers need to pursue a dynamic balance of domestic monetary autonomy, exchange rate stability and orderly capital flows.

3. China's monetary policy responses and framework optimisations

The evolving dynamics and new characteristics of cross-border capital flows have put forward higher requirements for the independence, transmission efficiency and tool selection of China's monetary policy. China has accordingly instituted a series of effective policy practices and framework optimisations.

3.1 Safeguarding monetary policy independence

From 2022 to 2023, China's monetary policies gave prominence to the country's own development. Instead of tightening monetary conditions in response to the Federal Reserve's rate hikes, China's adjustments were made flexibly in accordance with domestic macroeconomic operations and situational changes. The one-year and over five-year loan prime rates (LPRs) cumulatively decreased by 35 basis points and 45 basis points, respectively.[13]

[13] Source: CFETS.

China's economic fundamentals maintained a stable and positive trend, with core indicators such as GDP growth and industrial added value performing steadily, while cross-border capital flows also remained generally stable.

3.2 CNY exchange rate remains basically stable, with increasingly enhanced flexibility

In recent years, China has steadily pushed market-oriented exchange rate reforms, adhering to the decisive role of the market in CNY exchange rate formation. The degree of marketisation of the exchange rate has been continuously improved, and its flexibility has been significantly enhanced, maintaining basic stability at a reasonable and balanced level. Since 2020, the CFETS CNY index (which measures the CNY exchange rate against a basket of currencies) has generally operated around 100, remaining stable among major international currencies. The annualised volatility of the CNY exchange rate has stayed at around 3–4%, basically the same as other major international currencies. It has effectively served as an automatic stabiliser for the macroeconomy and balance of payments, successfully withstanding multiple major shocks, including Sino-US trade frictions, the outbreak and global spread of the Covid-19 pandemic, world economic recession, global inflation and monetary policy tightening in developed economies.

3.3 Improving the "macroprudential and micro-supervision" policy regulation framework

To effectively guard against systemic financial risks that may be triggered by large inflows and outflows of cross-border capital, China has continuously improved its policy regulation framework centred on macroprudential management and supported by microprudential supervision. Macroprudential policy aims to smooth cyclical shocks caused by capital flows through multi-layered tool combinations. Micro-supervision focuses on compliant management of cross-border capital flows, strengthening institutional risk prevention and market behaviour supervision, to jointly ensure the stable operation of financial markets in complex environments.

This framework demonstrates three prominent advantages in practice. **First**, the multi-layered macroprudential tool combination exhibits strong flexibility and adaptability. When responding to different types of external shocks, it exhibits a high level of targeted regulatory capability. **Second**, the coordination between macroprudential policy and micro-supervision mechanisms enables a balance between systemic risk prevention and the stable operation of individual financial institutions. Such measures not only effectively control overall cross-border financing risks at the macro level, but also incentivise financial institutions to enhance their internal risk management capacities at the micro level, strengthening their resilience in responding to cross-border fluctuations.

3.4 Strengthening the coordination of domestic and foreign currency policies and guidance on market expectations

Faced with the increasingly complex and diverse landscape of cross-border capital flows, the People's Bank of China (PBOC) has taken a series of measures. **First,** it has enhanced policy coordination and information-sharing with authorities including the SAFE and the National Development and Reform Commission (NDRC) to strengthen integrated domestic-foreign currency management and effectively prevent regulatory arbitrage. **Second**, it has revised integrated domestic-foreign currency management policies for bank credit asset transfers and overseas lending, making cross-border capital management more efficient and convenient for financial institutions.[14] **Third**, the PBOC has continuously refined policies on multinational corporate capital pools while accelerating the advancement of integrated domestic and foreign currency capital pools for multinational corporations. Currently, over 1,000 multinational corporate groups in 10 pilot regions, including Shanghai and Beijing, have participated in the capital-pool operations, covering 19,000 member enterprises.[15] **Meanwhile**, through various channels such as regularly releasing the Monetary Policy Implementation Report, holding press conferences and conducting market communications, the PBOC has stabilised expectations for exchange rates. It has directed foreign exchange market participants such as foreign trade enterprises to enhance their ability to respond to exchange rate risks by increasing CNY settlement and strengthening the use of exchange rate risk hedging tools. During the "14th Five-Year Plan" period, the share of CNY in cross-border trade increased from 16% to nearly 30%, and the ratio of corporate foreign exchange hedging rose from 17% in 2020 to around 30%. These efforts have effectively curbed herd behaviour and the risk of exchange rate overshooting, significantly enhancing the transparency and market credibility of monetary policy.

In addressing cross-border capital flows and exchange rate volatility, China has progressively explored and established a viable pathway that balances financial openness, macroeconomic stability and resource allocation efficiency. By continuously deepening financial supply side structural reforms, innovating and enriching the macro-control toolkit, and enhancing policy synergy, China has not only strengthened its own economic resilience and monetary policy effectiveness, but also offered a valuable reference for other economies.

[14] See X Sheng, "Continuously promoting the facilitation of cross-border investment and financing to support the construction of a higher-level new system for an open economy", China Foreign Exchange, 2025.

[15] See Z HeXin, speech at the series of themed press conferences on the high-quality completion of the "14th Five-Year Plan", October 2025.

Global risk transmission to local financial conditions and the participation of foreign investors in emerging market economies' sovereign bond markets: the case of Colombia

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Abstract

Foreign investor participation in Colombia's domestic sovereign bond market surged after 2014, lowering yields and supporting local-currency debt issuance and local market liquidity. However, it also increased the market's sensitivity to global financial shocks. Empirical analysis suggests that during periods of high foreign participation in the local sovereign debt market (2014–22), global risk factors had a stronger impact on domestic financial conditions, while the recent decline in foreign participation since 2023 has somewhat reduced this sensitivity. The Central Bank of Colombia's flexible inflation targeting regime, supported by a fully flexible exchange rate regime and robust external buffers, has helped manage these risks, as demonstrated during the Covid-19 pandemic. The evolving composition of foreign investors remains a key channel for the transmission of global shocks to Colombia's financial conditions.

JEL classification: E44, E52, F30, F32, F34, F31, F38, G12, G15, G18

Keywords: sovereign bond markets, foreign investors, benchmark-driven investors, global risk transmission, financial conditions, original sin, inflation targeting, exchange rate flexibility, central banking, Colombia

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1. Introduction

Foreign participation in Colombia's sovereign bond market has become a channel for transmission of global risk to local financial conditions. Market-deepening reforms in the early 2010s enabled a sharp rise in foreign portfolio investment after Colombia's reweighting in the J.P. Morgan Government Bond–Emerging Market (GBI-EM) index in 2014. These inflows reduced sovereign yields, expanded the local-currency investor base, strengthened liquidity and lowered financing costs. However, higher foreign ownership also increased sensitivity to global financial conditions.

In this note, we first describe the main episodes of foreign investor entry and retrenchment. We then review some documented effects of increased foreign participation in the local bond market, both in Colombia and in other emerging economies, including the influence of this participation on the domestic transmission of changes in external financial conditions. This review further explores the evolving composition of foreign investors as a key channel for the transmission of global shocks. Next, we present a financial conditions index (IDOAM) calculated at Banco de la República and examine its relationship to domestic absorption. Finally, based on IDOAM, we discuss some econometric results that capture the changing sensitivity of local financial conditions to global factors, and we conclude with a description of the features of the monetary and foreign exchange (FX) policy framework in Colombia that are relevant for the management of shifts in external financial conditions.

2. The exposure of emerging market economies to global financial conditions and gross capital flows

The prominent role of foreign investors in Colombia's sovereign bond (TES) market followed a surge in inflows after Colombia's inclusion in the GBI-EM index in 2014. Significant foreign sell-offs have been observed since 2023 as a consequence of fiscal deterioration and the downgrade of Colombian public debt. In 2014, J.P. Morgan announced a sharp increase in Colombia's weight in the GBI-EM index (Graph A.1) – from roughly 4% to 8% over a four-month period (Romero et al (2021); Botero et al (2025)). This reweighting triggered foreign inflows of USD 8–9 billion, making 2014 the year with the largest public-bond portfolio inflows on record in the country.

Subsequent research exploits this episode as a quasi-natural experiment and shows that the arrival of foreign investors relaxed domestic funding constraints, reduced financial repression and fostered bank credit expansion (Williams (2018); López-Piñeros et al (2020)). These results are consistent with broader evidence that the growing importance of benchmark-driven investment in emerging market local-currency indices has mechanically increased the sensitivity of domestic markets to index changes and global risk conditions (Broner (2013); Arslanalp et al (2020)).

Regulatory reforms implemented between 2010 and 2013 enhanced the attractiveness of Colombian TES for global investors. According to Romero et al (2021), changes to the foreign investment regime, coupled with the adoption of a more favourable tax framework, reduced administrative barriers and lowered the effective tax burden for non-resident investors. These policy measures not only made

TES a more appealing portfolio asset but also facilitated Colombia's subsequent rise in the GBI-EM index in 2014 by simplifying foreign investor entry and trading in the local sovereign bond market.

Additionally, the 2011 launch of centrally cleared COP/USD non-deliverable forwards on the Chicago Mercantile Exchange could have played a supporting role in shaping aggregate inflows. This is because it reduced counterparty and operational risks in peso hedging and improved the efficiency and security of currency-risk management for local-currency bond positions. However, the bulk of foreign holdings in Colombian sovereign bonds are unhedged. As a result of these market-deepening measures, including the removal of requirements to invest through a locally registered investment vehicle operating separately from the global fund, foreign investors expanded their share of the TES market dramatically – from just 1% in 2010 to nearly 25% by 2015 (Graph A.2).

Since 2023, foreign investors have engaged in a gradual and orderly reducion of their holdings of Colombian sovereign bonds, with their market share declining to approximately 15% by October 2025 (Graph A.3). This withdrawal has occurred amid a difficult macroeconomic environment characterised by fiscal deterioration, the suspension of the fiscal rule, the loss of investment grade status for local-currency sovereign bonds and persistent global conditions of elevated interest rates and heightened uncertainty.

The growing presence of foreign investors fundamentally reshaped Colombia's sovereign bond market. Their entry provided a valuable new source of funding, but it also heightened sensitivity to global financial shocks. The expansion of foreign investor participation has played a pivotal role in helping Colombia address key aspects of the "original sin" (Eichengreen and Hausmann (1999)) – the historical reliance on foreign-currency borrowing – —by facilitating the issuance of longer-term, local-currency sovereign debt.

Research by Eichengreen et al (2023) underscores that, while original sin remains persistent across emerging economies, meaningful progress is possible when countries attract stable foreign demand for local-currency securities and foster deep, liquid domestic markets. Colombia's trajectory since the 2010s reflects these conditions: the establishment of a credible macroeconomic framework, improvements in market infrastructure and an enhanced capacity to issue longer-tenor debt in local currency to both domestic and foreign investors. While this progress is ongoing and not guaranteed, it demonstrates the constructive role foreign investors can play in strengthening local-currency sovereign debt markets.

In parallel, foreign investors broadened and diversified Colombia's investor base, increased market liquidity and supported the extension of the sovereign yield curve – mechanisms highlighted by Burger and Warnock (2004) and Peiris (2010) as essential for the deepening of local bond markets. Empirical evidence for Colombia corroborates these benefits: Ocampo et al (2025) show that a one–standard-deviation increase in foreigners' market share reduces TES yields by roughly 0.5% relative to their mean and lowers yield volatility by about 10%. These effects suggest that during the years of expanding foreign participation, external investors not only eased government financing costs but also contributed to more stable and resilient market dynamics.

Yet the rise in foreign participation has also created new vulnerabilities. A large body of work – including Obstfeld (2012), Ebeke and Kyobe (2015) and Miyajima and Shim (2014) – shows that when foreigners hold a meaningful share of local-currency sovereign debt, domestic financial conditions become more exposed to global risk factors, shifts in international liquidity and external monetary shocks.

This pattern is consistent with evidence for Colombia. As for the effects on the credit market, López-Piñeros et al (2020) show that there have been several episodes in which the reversal of external capital flows has affected the credit conditions in the local market. For instance, they found the following:

- The liquidity shock produced by the 2008 Great Financial Crisis reduced the access to credit for banks and, in consequence, limited the supply of credit to export firms.
- The rise in the demand of public debt securities by foreigners after the inclusion of the country in the GBI-EM index was associated with a subsequent positive credit dynamic in the country.

Beyond the overall effects of higher foreign participation, implications also depend on the composition of the investor base. This reinforces the need to understand which types of foreign investors are driving inflows and outflows, as this influences how global shocks are transmitted to Colombia's local market.

Empirical studies and evidence for Colombia indicate that portfolio flows are shaped by a combination of global financial conditions, such as US monetary policy and shifts in global risk appetite, and domestic factors, including local policy rates. Yet different investor groups react asymmetrically to these determinants: short-term, market-sensitive investors tend to respond sharply to external shocks, whereas long-horizon institutional investors adjust more gradually and in line with domestic fundamentals. Moreover, according to the literature, benchmark-driven investors – those tracking specific indices – often amplify external volatility through mechanical adjustments while unconstrained investors respond primarily to underlying economic fundamentals.

Empirical analyses by Banco de la República (2024) show that both global and domestic financial conditions influence Colombia's portfolio flows, but the impact differs depending on the type of investor. Global factors – like US monetary policy and global risk indicators – have a strong effect, often leading to capital outflows when conditions tighten. Domestic factors also play a role, but their influence is generally less pronounced.

Disaggregating portfolio flows by investor category, the work of Gamboa-Estrada and Sanchez (2024) reveals distinct behavioural patterns: investment (mutual) funds are notably more sensitive to global shocks, while international pension funds respond more strongly to domestic interest rates and macroeconomic fundamentals, reflecting their long-term investment horizons. These results are consistent with international evidence, such as that presented by Arslanalp and Tsuda (2015), Bruno and Shin (2015) and Koepke (2019).

Additional evidence from Colombia further underscores this distinction. Ocampo et al (2025) demonstrate that the increasing participation of mutual funds has heightened yield volatility at shorter maturities and resulted in more frequent, sharp reversals in market positions. These outcomes are consistent with international

studies showing that mutual funds tend to behave pro-cyclically – frequently selling assets during periods of global financial stress or when facing investor redemptions (Timmer (2018); Hui (2019); Fong et al (2022)).

Another strand of the literature emphasises investment strategy over investor type, distinguishing between benchmark-driven and unconstrained foreign investors. Benchmark-driven investors, who track indices like the GBI-EM, adjust portfolios mechanically in response to index changes and global conditions, thereby amplifying domestic market sensitivity to external shocks. In contrast, unconstrained investors rely on valuations and fundamentals, helping to partially offset external pressures during periods of stress (Arslanalp and Tsuda (2015); Miyajima and Shim (2014) Broner et al., (2013)).

Expanding on this perspective, Botero et al (2025) find that the composition of foreign investors influences not only TES yields but also domestic credit market dynamics. Banks with a greater exposure to unconstrained investors significantly expand lending during capital inflows, whereas those linked to benchmark-driven investors tend to exhibit a more muted response, showing that foreign investors can amplify the transmission of global shocks within Colombia – not just through asset prices, but also by constraining credit supply to firms.

3. Financial conditions and the participation of foreign investors

The Central Bank of Colombia uses a straightforward financial conditions index that aggregates key indicators, including interest rates, credit spreads, exchange rates and asset prices. This index effectively captures the overall stance of financial conditions and their sensitivity to shifts in global volatility and liquidity. Notably, it has shown a significant correlation with internal demand, making it a valuable leading indicator for the domestic economy.

The IDOAM index is a composite measure used to monitor financial conditions in Colombia (for the mathematical definition of the index, see Appendix B). It aggregates several standardised variables that capture different aspects of financial stress and investor sentiment, including the following:

- interest rate spreads between various loan portfolios (corporate and consumer, segmented by maturity) and government bond yields (TES)
- confidence indicators (commercial, consumer and industrial)
- expectations for growth, inflation and survey-based spreads between foreign-currency sovereign bonds and US Treasuries
- market volatility (equity market and TES)
- the standard deviation of inflation expectations from the Central Bank's survey.

Each variable is standardised and, where appropriate, multiplied by -1 so that a positive movement always signals a tightening in financial conditions.

The final index is the simple average of these components, ensuring consistency and interpretability over time. The IDOAM index shows a strong and stable correlation with the annual growth rate of domestic demand in Colombia, suggesting it is a valuable proxy for assessing how financial conditions may influence real economic activity (see Graphs A.4 and A.5).

The following evidence indicates that the sensitivity of Colombia's domestic financial conditions to global risk factors has evolved in tandem with shifts in foreign investor participation. Periods of elevated foreign ownership in sovereign bonds, particularly between 2014 and 2022, were marked by a stronger transmission of global financial stress to local markets. We estimated a vector autoregressive (VAR) model using monthly data from January 2011 to September 2025. The model incorporates key variables such as a composite global risk indicator (RI)[2], Brent oil prices, the overnight local interest rate and its expectations, foreign portfolio flows, exchange rate depreciation and the IDOAM index. We conducted the estimation separately for three periods reflecting shifts in foreign investor participation in Colombia's sovereign bond market: (i) limited participation (2011–13); (ii) high participation (2014–22); and (iii) declining participation (post-2022). For the specification of the model, see Appendix C.

The impulse-response analysis of the IDOAM index reveals an interesting evolution in Colombia's sensitivity to global financial stress across different phases of foreign investor participation (Graphs C.1 to C.3). Notably, during 2014–22 – when foreign investors emerged as the second-largest holders of TES – global shocks were rapidly and clearly transmitted to domestic financial conditions. Specifically, a one-unit increase in the global RI resulted in an average 0.15 rise in the IDOAM index over the subsequent 10 months (Graph C.2), underscoring how external volatility directly shaped local market dynamics. This significant sensitivity aligns with international evidence: as foreign ownership deepens, local markets become more reactive to global turbulence, amplifying the transmission of external shocks (Arslanalp et al (2020); Broner (2013)).

In sharp contrast, during the pre-2014 period – when foreign investors accounted for only a small share of TES holdings – the IDOAM index showed virtually no response to global risk shocks (see Graph C.1). This muted transmission points to the influence of a market dominated by domestic investors, who are generally less reactive to short-term external volatility. As highlighted by Burger and Warnock (2004) and Peiris (2010), domestic investors often serve as an anchor in local-currency sovereign debt markets, dampening the impact of global financial turbulence

In the post-2022 period, the transmission of global financial shocks to Colombia's domestic conditions became more moderate. The IDOAM index's response to global risk (RI) remained positive and statistically significant, but its magnitude declined to around 0.05 on average (see Graph C.3). This diminished sensitivity tracks the reduction in foreign investor participation since 2023: as their market share fell, so did their capacity to amplify global volatility within the local market. Nevertheless, the influence of external shocks persisted, highlighting that even with reduced foreign participation, global factors continued to shape Colombia's local financial conditions.

[2] This aggregate indicator is constructed as the first principal component of global risk indicators (VIX, MOVE, DXY, and the CDS spread of emerging economies)

To deepen the analysis, a second VAR specification replaced the IDOAM index with the 10-year TES yield, offering a direct lens on how global shocks affect long-term sovereign borrowing costs in domestic currency. The impulse-response functions (Graphs C.4 to C.6) reveal that episodes of heightened global financial stress consistently pushed up long-term yields across all periods. Before 2014, a one-unit increase in the global RI led to an increase of about 30 basis points in the 10-year TES yield with some lags (see Graph C.4). This response was slower but greater than the one observed in the period of elevated foreign participation in the TES market (2014–22) (Graph C.5). This result is consistent with the prediction of the model developed in Romero et al (2021), in which the size of the response of local yields to foreign interest rate shifts decreases with the applicable tax rate.[3] Recall that the rise in foreign participation was partly a reaction to the reduction and simplification of the tax burden on foreign portfolio investment.

After 2022, the estimated response remained fast but was greater than in the 2014–22 period (Graph C.6). This could reflect a still substantial presence of foreign investors in the TES market, but with more prominent credit risk considerations after the deterioration of the Colombian fiscal position.

Interestingly, the contemporaneous decline in the influence of external financial conditions on domestic financial conditions, illustrated above, may reflect not only the reduced participation of foreign investors – who are highly sensitive to external risk – but also the greater exposure of domestic investors to local public bonds, which increases the relative value of other local assets. As foreigners exit, domestic investors must absorb a larger share of a growing stock of public debt; if loans or other domestic assets are imperfect substitutes for public bonds, they become relatively scarcer and thus more attractive. In this setting, a tightening of foreign financial conditions raises local public-bond yields but has a more muted effect on the prices of other domestic assets and, more generally, on domestic financial conditions.

This mechanism is also described in Romero et al (2021). Overall, the evolution of the impulse-response functions across subsamples provides suggestive evidence that periods of higher foreign investor participation are associated with a stronger pass-through of external volatility into local markets. As foreign participation has waned, this sensitivity has moderated, though global financial factors are still a significant force shaping Colombia's financial landscape.

4. Monetary and FX policy in Colombia

The Central Bank of Colombia's policy framework is anchored in a flexible inflation targeting regime, with a fully flexible exchange rate serving as the primary line of defence. Within this framework, FX interventions are reserved for addressing specific

[3] If foreign investors are subject to a tax rate on the returns obtained on local bonds, then non-arbitrage conditions require that local yields compensate for the tax. The higher the tax rate, the greater the local yields. Consequently, an increase in the foreign interest rate (the opportunity cost of holding the domestic bond) would require an adjustment in the local yields that is positively related to the tax rate. The higher the tax rate, the greater the response of local yields to a shift in the foreign interest rate.

market frictions, mitigating disorderly market conditions or ensuring the proper functioning of financial markets, rather than targeting a particular exchange rate level.

By not committing to a specific exchange rate target, the central bank can focus on achieving its inflation and sustainable growth objectives. This enhances policy credibility, avoids procyclical interest rate hikes and protects international reserves by limiting FX interventions to exceptional circumstances. Foreign investors in the sovereign bond market understand this framework, recognising that the central bank intervenes infrequently. As a result, they must internalise exchange rate risk or interest rate risk. This feature ultimately deepens the market's capacity to absorb shocks and reinforce the scope and benefits of exchange rate flexibility.

The robustness of this framework was tested during the Covid-19 pandemic shocks. Facing external vulnerabilities – including a high current account deficit, increased public and external debt, and significant exposure to oil prices – the central bank allowed substantial exchange rate and long-term interest rate adjustments and relied on ample external liquidity buffers (international reserves and access to the IMF Flexible Credit Line). This response played a central role in mitigating the effects of global "flight to safety" episodes that triggered capital outflows and exchange rate pressures (see Cardozo et al (2023)).

During this period, the central bank implemented a comprehensive policy mix that included cutting the policy rate from 4.25% to a record low of 1.75% to stimulate demand and credit, as well as expanding repo operations, reducing reserve requirements and conducting outright purchases of government bonds (TES) and private debt instruments to provide liquidity and stabilise markets. It also used FX and FX liquidity intervention mechanisms such as non-deliverable forward sales and FX-swap auctions to further support market functioning. As mentioned, a key element of this strategy was allowing sizeable adjustments in both the long-term interest rate and the exchange rate before any central bank intervention. This approach reduced incentives for speculation against the bank and facilitated market-driven corrections once uncertainty receded.

Following the pandemic, the central bank resumed gradual reserve accumulation, further strengthening external buffers and enhancing resilience to global shocks. Colombia's experience confirms the effectiveness of its policy framework. Exchange rate flexibility serves as the primary shock absorber, complemented by targeted, temporary interventions to address market dysfunctions and preserve orderly conditions in both domestic and external markets.

5. Conclusion

In summary, the experience of Colombia's sovereign bond market illustrates both the opportunities and challenges brought by foreign investor participation. While the entry of global investors since 2014 deepened the market, lowered financing costs and enabled the issuance of longer-term, local-currency debt, it also raised the market's exposure to global financial shocks. The recent reduction in foreign holdings since 2023, amid a difficult macroeconomic environment and persistent global uncertainty, has somewhat decreased this sensitivity. The Central Bank of Colombia's flexible inflation targeting regime, supported by robust external buffers and timely

interventions, has proven effective in mitigating these risks and preserving financial stability. Looking ahead, continued vigilance regarding the composition and behaviour of foreign investors will be essential to assess the risks that shifts in the external environment pose to domestic financial conditions.

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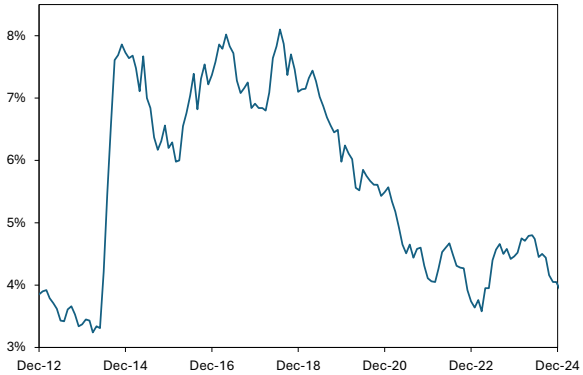
Appendix A. Graphs

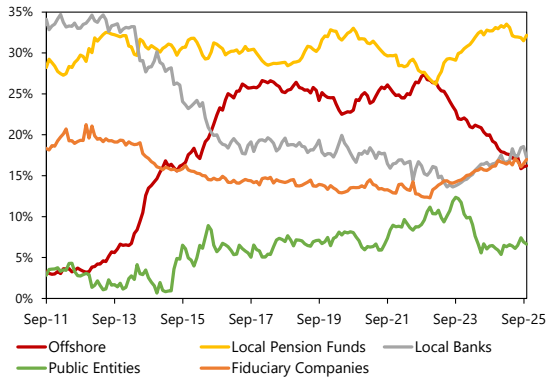
Colombia's share in the GBI-EM index

Graph A.1



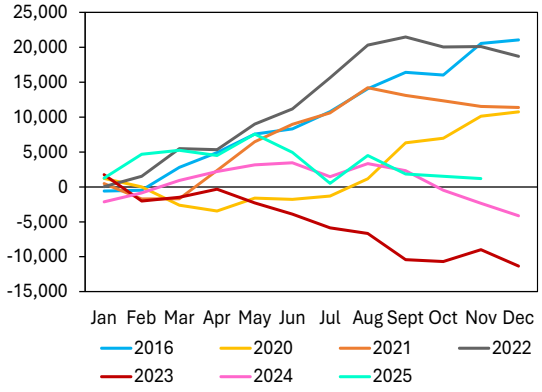
Source: J.P. Morgan

Graph A.2. Sovereign bond balance by investor group (% total)



Source: Central Bank of Colombia.

Graph A.3. Net flows by foreign investors in the sovereign bond market accumulated per year (COP billion)



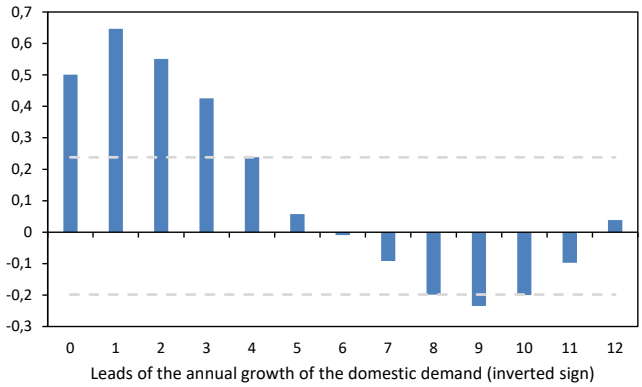
Note: The last 4 years are incorporated, and the flows from 2016 are added as it is a reference period for its significant volume of purchases.

Source: Central Bank of Colombia.

Graph A.4. IDOAM index

Source: Central Bank of Colombia; Fedesarrollo; and Colombian Stock Exchange.

Graph A.5. Correlation between the IDOAM index and the annual growth of the domestic demand (with inverted sign)



Note: The dotted grey areas represent the lower and upper bounds of the 95% confidence intervals.

Source: Authors' calculations based on data from the Central Bank of Colombia and DANE (National Administrative Department of Statistics).

Appendix B. IDOAM index specification

The IDOAM index is calculated as follows:

$$IDOAM_t = \frac{1}{I}\sum_{i=1}^{I}\frac{X_{it}-\mu_i}{\sigma_i},$$

where X_{it} is the observed value of variable i, including credit-market spreads – loan–TES spreads for preferred and consumer portfolios across four maturity buckets (<1 year, 1–3 years, 3–5 years, and >5 years) – together with three confidence indicators (business, consumer and industrial). It also incorporates expectations from the Financial Opinion Survey (EOF, by its Spanish acronym) on gross domestic product (GDP) growth, inflation and the spread between foreign-currency sovereign bonds and US Treasuries, along with measures of conditional volatility in the equity and TES markets, and the cross-sectional dispersion of inflation expectations from the Central Bank survey. TES refers to Colombia's local-currency sovereign bonds.

The parameters μ_i and σ_i are the historical mean and standard deviation of each variable i. Confidence indicators and GDP-growth expectations are multiplied by -1 so that a positive movement always signals a deterioration in financial conditions.

Appendix C. VAR model specification

Given the potential for an interdependent or simultaneous relationship between the IDOAM and OIS rates, we estimate a VAR(p) model using monthly data from January 2011 to September 2025. The specification is:

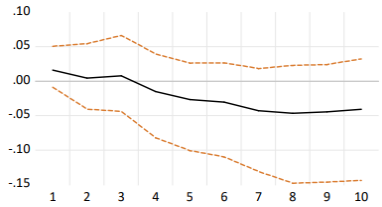
$$y_t = A_0 + \sum_{p=1}^{P} A_p\, y_{t-p} + \varepsilon_t \;\; \varepsilon_t \sim N\,(0,\, \Sigma_t),$$

where y_t is the vector of endogenous variables, including the first principal component of global risk indicators (VIX, MOVE, DXY and the CDS spread of emerging economies), which we refer to as RI; the Brent oil price; the overnight rate and its 1-year-ahead expectations; foreign portfolio flows; the 12-month depreciation of the exchange rate against the US dollar; and the IDOAM index. Σ_t is the variance–covariance matrix of the model.

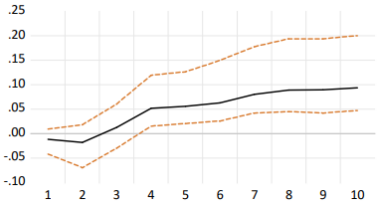
To account for structural changes associated with foreign investor participation in the sovereign bond market, the VAR is estimated over three subsamples: (i) before 2014; (ii) 2014–22; and (iii) after 2022, corresponding to the three phases of foreign investor dynamics in Colombia's local-currency government bond market (Graphs C.1 to C.3).

Graph C.1. Some impulse response functions for the IDOAM index – period of low foreign participation (2011–13)

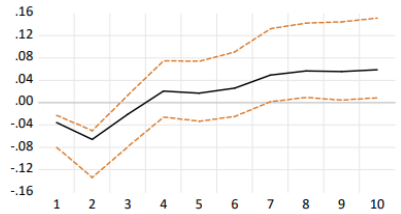
A. Response of IDOAM to RI



B. Response of IDOAM to overnight rate



B. Response of IDOAM to 1-year-ahead overnight rate expectations

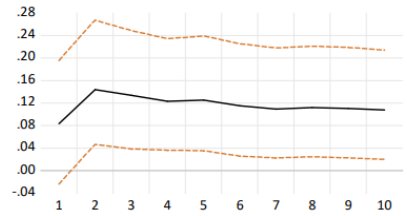


Note: The figures show the response of the IDOAM index to Cholesky one-standard-deviation innovations with 95% confidence intervals using Hall's percentile bootstrap with 999 replications, based on the VAR model.

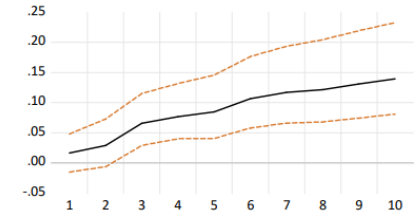
Source: Authors' calculations.

Graph C.2. Some impulse response functions for the IDOAM index – period of high foreign participation (2014–22)

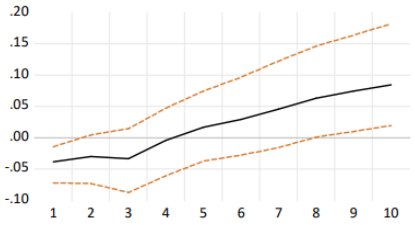
A. Response of IDOAM to RI



B. Response of IDOAM to overnight rate



C. Response of IDOAM to 1-year-ahead overnight rate expectations

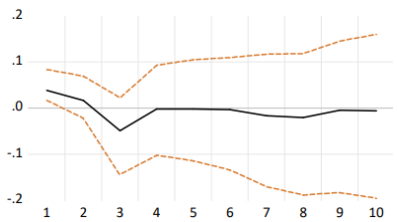


Note: The figures show the response of the IDOAM index to Cholesky one-standard-deviation innovations with 95% confidence intervals using Hall's percentile bootstrap with 999 replications, based on the VAR model.

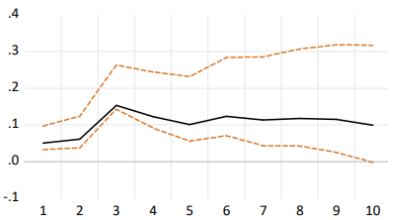
Source: Authors' calculations.

Graph C.3. Some impulse response functions for the IDOAM index – period of declining foreign participation (2023–25)

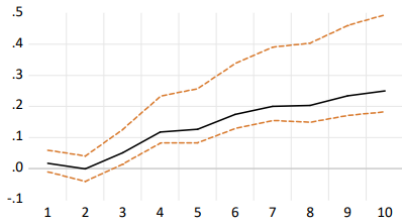
A. Response of IDOAM to RI



B. Response of IDOAM to overnight rate



C. Response of IDOAM to 1-year-ahead overnight rate expectations



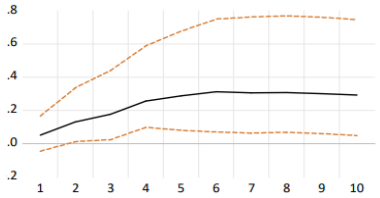
Note: The figures show the response of the IDOAM index to Cholesky one-standard-deviation innovations with 95% confidence intervals using Hall's percentile bootstrap with 999 replications, based on the VAR model.

Source: Authors' calculations.

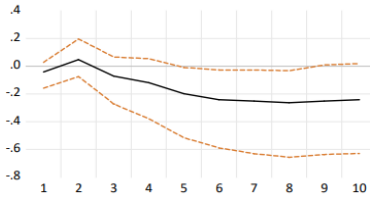
Additionally, we estimate the same VAR model replacing the IDOAM with the returns of 10-year sovereign bonds. Graphs C.4 to C.6 report the estimated response of 10-year sovereign bond yields to shocks in selected endogenous variables of the VAR.

Graph C.4. Some impulse response functions for 10-year bond yields – period of low foreign participation (2011–13)

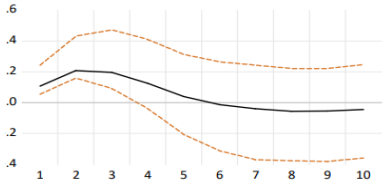
A. Response of 10-year bonds to RI



B. Response of 10-year bonds to overnight rate



C. Response of 10-year bonds to 1-year-ahead overnight rate expectations

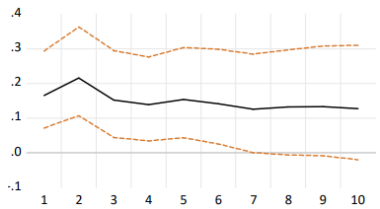


Note: The figures show the response of 10-year sovereign bond yields to Cholesky one-standard-deviation innovations with 95% confidence intervals using Hall's percentile bootstrap with 999 replications, based on the VAR model.

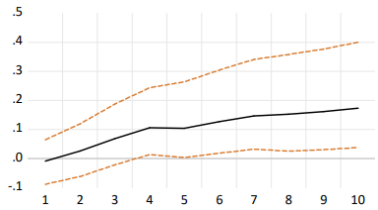
Source: Authors' calculations.

Graph C.5. Some impulse-response functions for 10-year bond yields – period of high foreign participation (2014–22)

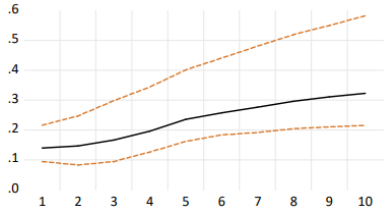
A. Response of 10-year bonds to RI



B. Response of 10-year bonds to overnight rate



C. Response of 10-year bonds to 1-year-ahead overnight rate expectations

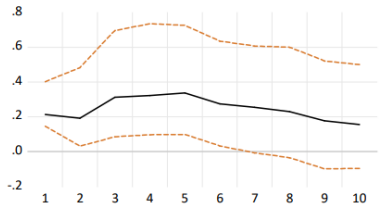


Note: The figures show the response of 10-year sovereign bond yields to Cholesky one-standard-deviation innovations with 95% confidence intervals using Hall's percentile bootstrap with 999 replications, based on the VAR model.

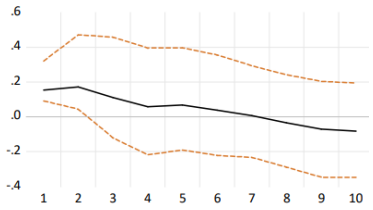
Source: Authors' calculations.

Graph C.6. Some impulse-response functions for 10-year bond yields – period of declining foreign participation (2023–25)

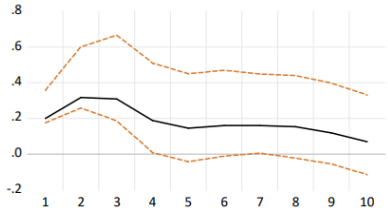
A. Response of 10-year bonds to RI



B. Response of 10-year bonds to overnight rate



C. Response of 10-year bonds to 1-year-ahead overnight rate expectations



Note: The figures show the response of 10-year sovereign bond yields to Cholesky one-standard-deviation innovations with 95% confidence intervals using Hall's percentile bootstrap with 999 replications, based on the VAR model.

Source: Authors' calculations.

Financial conditions in the Czech economy against the backdrop of turbulent global developments

Czech National Bank

Introduction

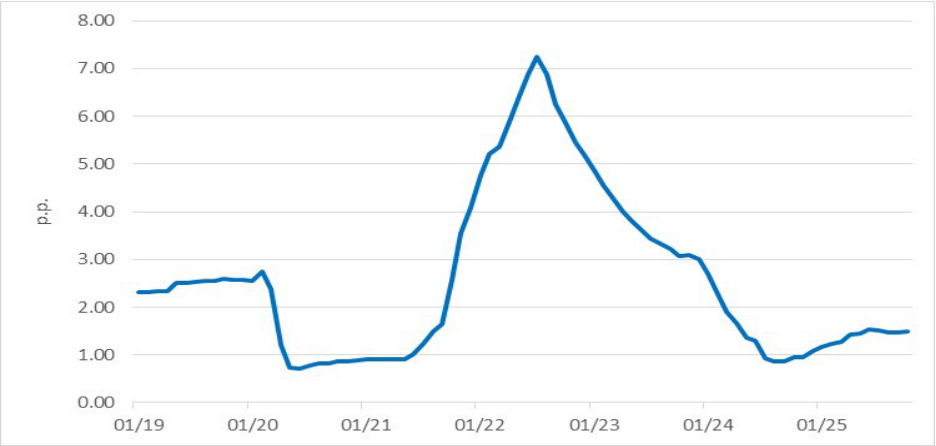
Since the early 1990s, Czechia's trajectory of economic development has been associated with deepening integration into European and global markets. Currently, strong trade, investment and policy interactions within the European Union mean that Czech capital flows are highly sensitive to shifts in regional economic conditions and market sentiment. Recent global and geopolitical shocks – including surging inflation in the wake of the Covid-19 pandemic, Russia's aggression against Ukraine, the energy crisis and the resulting external imbalances – have transformed the external environment and heightened regional uncertainty. Alongside volatile interest rate differentials resulting from frequent monetary policy changes worldwide, these factors have influenced capital flows, exchange rate dynamics and the Czech National Bank's (CNB's) policy responses. This note summarises the main external risks to the Czech financial sector and the policies implemented to mitigate them.

1. Volatile interest rate differentials, shifts in risk-taking behaviour and evolving dynamics of gross capital flows

In Czechia, capital flows have evolved in line with global risk-on/risk-off dynamics, reflecting changes in investor sentiment and market conditions. However, the scale and composition of international capital flows across sectors have also been influenced by two-way movements in interest rate differentials in recent years (see Graph 1 for the three-month maturity, for example).

Interest rate differential

3M PRIBOR – 3M EURIBOR, monthly averages — Graph 1



Source: CNB staff calculations.

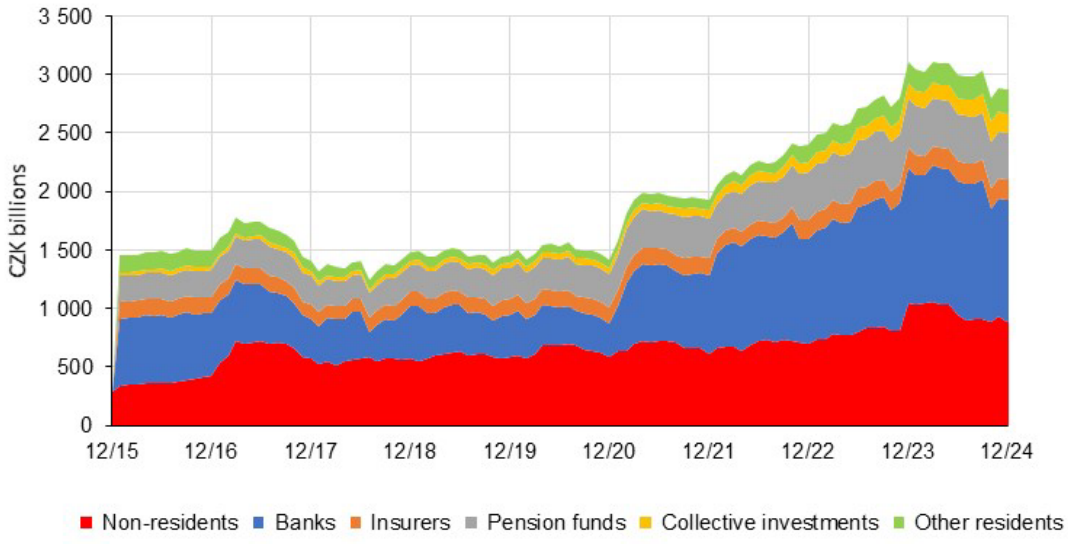
During the Covid-19 pandemic in the years 2020–22, government deficits were financed through an increase in government securities issuance and co-financed through EU programmes. Non-resident investors, the second-largest creditor group, actively traded Czech government bonds as interest rate differentials shifted, though they gradually reduced their participation in financing Czech government debt as more attractive opportunities emerged elsewhere.

In addition, the improvement in central government finances in 2024 was reflected in reduced borrowing requirements and lower koruna bond issuance. While the share of the domestic banking sector in government debt holdings temporarily declined, its dominant position was restored in subsequent years. Currently, non-residents are the second-largest group of creditors, accounting for 28% of the total debt at the end of 2024, before undergoing a slight downward correction in 2025 (see Graph 2). In other words, foreign demand for domestic government bonds remains a significant market factor.

Holdings of koruna-denominated Czech government securities

CZK billions

Graph 2



Sources: CNB; authors' calculations.

Interest rate differentials have also influenced non-resident koruna deposits in domestic banks (see Graph 3). A substantial amount of foreign short-term capital, accumulated during the 2013–17 exchange rate commitment period and, still exceeding three trillion CZK, remains in the system. These legacy positions make deposit flows highly sensitive to shifts in risk sentiment and relative yields. Non-resident koruna deposits increased significantly in the second half of 2021 as a result of the widening interest rate spread compared with the euro area. However, their growth moderated from late 2022 onwards because of the narrowing differential.

Non-resident koruna deposits in Czech banks

monthly data

Graph 3

Source: CNB staff calculations.

Similar dynamics were observed in the private sector. Relatively high domestic interest rates compared with those abroad prompted Czech enterprises to increase their reliance on foreign currency borrowing from both domestic and non-resident banks. The volume of such lending increased significantly, peaking at around CZK 250 billion in 2022, when the interest rate differential was at its widest.

High inflation and volatility in interest rates also affected equity investments by Czech households and enterprises. Since 2021, data have shown persistent resident outflows into foreign equity assets, as both domestic households and firms sought to diversify savings beyond the relatively shallow domestic capital market. The combination of high savings and limited local investment opportunities encouraged greater exposure to foreign equities, often through collective investment schemes. However, in 2022, the sharp increase in global interest rates temporarily reduced the attractiveness of foreign stock markets, prompting a shift towards fixed-income instruments both domestically and abroad. Afterwards, the structural trend of outward portfolio diversification continued, reflecting the growing financial sophistication and ongoing global integration of Czech investors. Non-resident holdings of Czech equity instruments remained broadly stable, underscoring the limited depth and liquidity of the domestic market, as well as its modest role in regional portfolio allocation.

Relative interest rate dynamics have also influenced the behaviour of multinational enterprises in the foreign direct investment (FDI) role. Intra-group debt generally represents an important channel of cross-border financing because of constant efforts to optimise liquidity management and minimise funding costs. Accordingly, the corresponding debt levels have reacted strongly to changes in

interest rate differentials as multinational enterprises adjusted their internal financing structures.

Since 2013, Czechia's international investment position has gradually improved from previously high debtor levels. The sharp improvement in 2020 was due largely to temporary factors, including the pandemic-related decline in commodity prices and favourable exchange rate and valuation effects.

From mid-2021 onwards, this trend reversed as these influences faded. The koruna's earlier depreciation unwound, deferred bank dividends were paid out, and the temporary alignment of domestic and foreign monetary policy conditions ended as the CNB began tightening ahead of its peers. The position continued to weaken through 2022 amid external imbalances, but it later stabilised, with the improving trend resuming thereafter. Czechia's net international investment position (IIP) stood at -7.2% of gross domestic product (GDP) at the end of 2024, its lowest level since 1999.

With the IIP still dominated by foreign direct investment, Czechia's external exposure remains largely tied to advanced economies. At the end of 2023, the FDI stock was almost 50% of GDP. The structure of FDI-related assets and liabilities has stayed broadly stable, with inward positions concentrated in traditional partner countries – primarily advanced European economies and the United States. In recent years, new FDI inflows have moderated, reflecting tight labour market conditions and relatively high wage levels compared with other central European economies competing for similar projects. Meanwhile, the growing financial strength and international expansion of Czech corporates have supported a gradual rise in outward FDI, directed mainly towards advanced European economies.

2. Financial sector risks

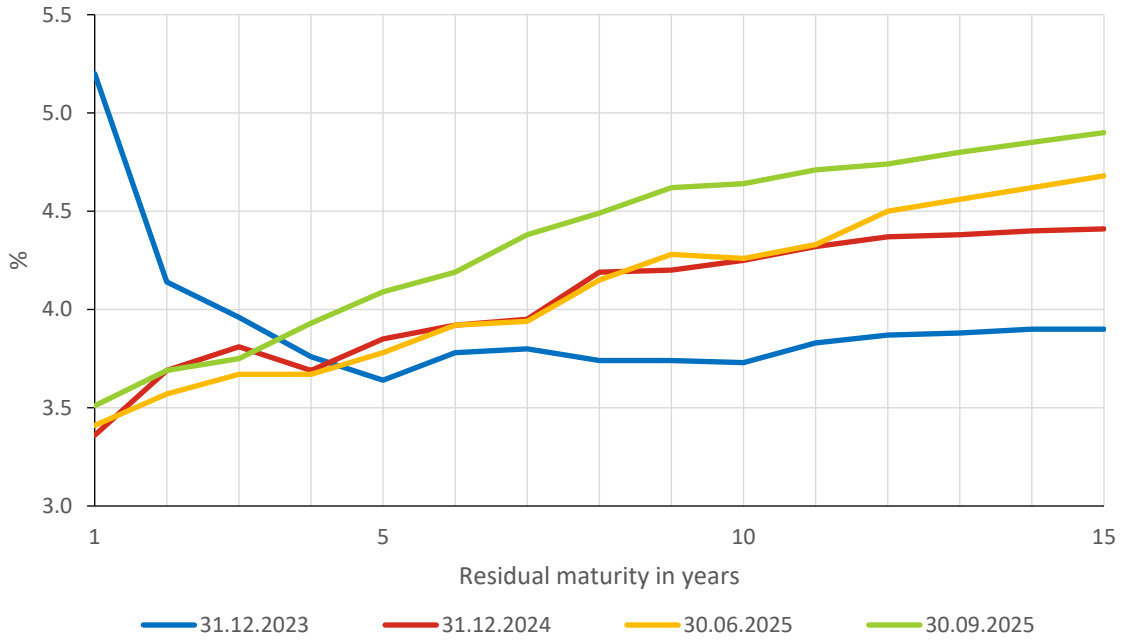
In general, the financial sector is exposed to a wide range of risks that can affect its stability and performance. Over the past five years, the Czech financial sector has proven robust and resilient in the face of huge external shocks. Currently, the sector's biggest external challenges are widely considered to stem from uncertainty in international trade and related policy shifts (see Caldara et al (2020)).

Since the start of the economic transformation of the 1990s, the vulnerability of domestic financial and non-financial entities to economic developments abroad has increased because of the considerable openness of the domestic economy. This is currently being exacerbated by the high geographical concentration of exports and imports, as well as product concentration, despite the efforts made to diversify and reorient foreign trade in recent years.

In terms of sovereign bond spreads, the country's risks are comparable to or lower than those of several industrial economies, including the United States. Following a period of inverse slope during the inflationary developments related to the pandemic and energy crisis, the shape of the Czech government yield curve has now normalised (see Graph 4).

Czech government bond yield curve

Graph 4

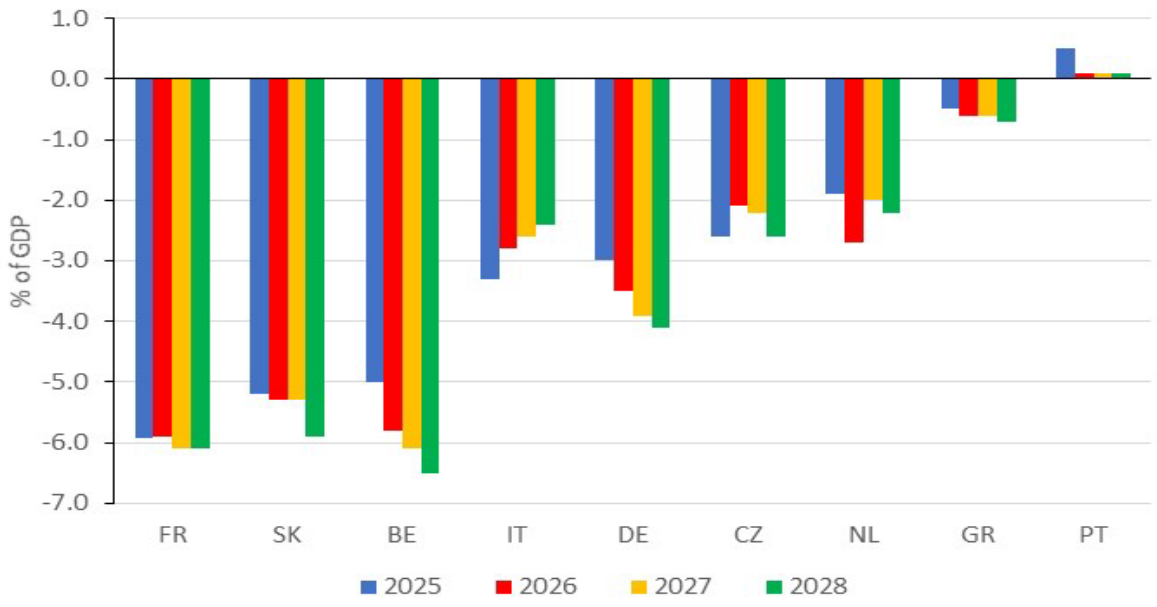


Sources: CNB, LSEG.

This reflects a moderate level of debt service on Czech sovereign liabilities by European standards. As of the end of 2024, debt service in Czechia, expressed as a percentage of GDP, stood at 1.26%. The cost of servicing public debt was therefore below the euro area average (1.85% of GDP) as well as below the levels recorded in Poland (2.15% of GDP) and Hungary (4.7% of GDP).

Also, the expected public budget deficits place the country at a level comparable to, for example, the Netherlands and in a slightly better position than Germany (after the constitutional revision of the debt brake in the latter; see Graph 5). In terms of total government debt, Czechia is among the less indebted countries in the EU. Last year, Czechia's government debt reached 43.3% of GDP, making it the eighth lowest in the EU.

Projected public budget balances in selected countries Graph 5



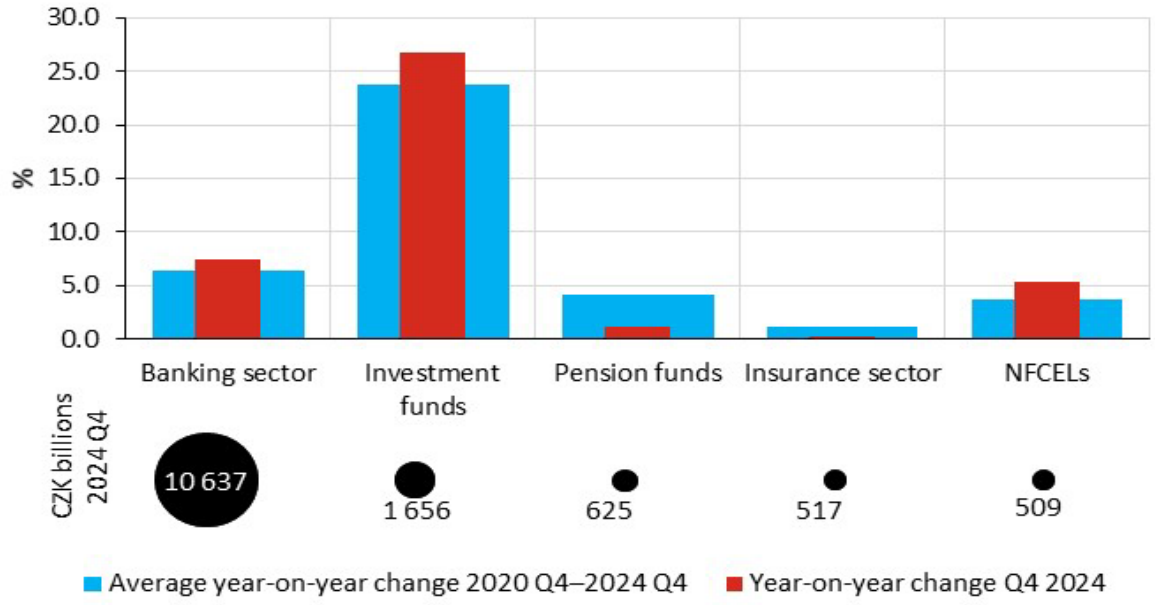
Source: IMF Fiscal Monitor, April 2025.

As part of its stress-testing procedure, the CNB regularly evaluates the Sovereign Risk Indicator of the banking sector, intended to capture the interconnectedness between public institutions and financial institutions in the country. According to the available data, this interconnectedness has grown since the start of the pandemic and has now reached systemically important levels, although this development has mainly concerned Czech public debt. Exposure to the general governments of other countries was found to be insignificant. Nevertheless, the share of non-residents in debt holdings, which has quite a large weight in the Sovereign Risk Indicator, was very close to breaching its critical limit in 2025, indicating a potential need for policy intervention in the adverse scenario of stress tests.

3. Non-bank financial institutions

All subsectors of the Czech financial sector recorded growth in 2024; investment funds expanded the fastest and the insurance sector the slowest (see Graph 6). The banking sector, which holds a key position, accounts for 76% of the financial system's overall assets.

Rates of growth of sub-sectors of the financial system Graph 6



NFCELs = non-bank financial corporations engaged in lending

Source: CNB, *Financial Stability Report*, Spring 2025.

The dynamic growth of investment funds is gradually increasing their contribution to systemic risk. Investment fund assets grew in 2024 as a result of both inflows of new funds and a positive return on assets. Collective investment bond funds and funds for qualified investors recorded the largest inflows. Therefore, the investment fund segment – and hence its systemic importance – is expected to continue growing over the next few quarters.

The risks to financial stability stemming from the activities of investment funds are generally associated with maturity mismatch between their assets and liabilities, high leverage and a large market footprint. However, the liquidity position of domestic investment funds has long been robust. Bond funds account for the largest share of liquid assets. The use of leverage by domestic funds likewise remains moderate, as confirmed by the CNB's quarterly assessment. In terms of concentration risk, funds hold a significant market share of Czech government bonds, accounting for around 6% of the total. Nevertheless, a stress test measuring the strength of transmission of market contagion through fire sales by investment funds did not identify any significant contribution to systemic risk.

A significant proportion of the funds' investments are allocated to publicly traded foreign assets, which are characterised by high liquidity and a small market footprint of Czech funds. Almost 50% of the investments – primarily in equities, investment funds including ETFs, and corporate bonds – are made abroad.

Much attention is traditionally given to risks stemming from institution interconnectedness within a small national financial services market. In this regard, the nature of the interconnectedness of financial institutions on the domestic market

remains stable. Domestic banks play a key role in this. They are important counterparties for other financial institutions, which need to keep part of their assets in liquid form on bank accounts and carry out cross-border transactions. Banks are also an important source of funding for some firms in their domestic financial groups. This is particularly evident for non-bank financial corporations engaged in lending, mostly leasing companies. Banks, which have foreign linkages through derivatives transactions (especially interest rate derivatives), also play a key role in non-balance sheet interconnectedness. The level of direct interconnectedness between sectors of the domestic financial system remains stable and does not indicate risks to financial stability. In the area of indirect interconnectedness, common exposures to the portfolio of Czech government bonds are the most important. A sell-off of these bonds could lead to a rise in stress in the market and to propagation of additional risks to the balance sheets of other financial institutions.

The interconnectedness of domestic banking groups remains stable, with the net creditor position of the largest domestic banks accounting for around 60% of total regulatory capital. On the asset side of banks' balance sheets, their own non-financial corporate entities have long been the largest debtors within bank groups. By contrast, liquidity received from building societies is the largest liability.

The debtor position of Czech banks vis-à-vis their foreign parent banks likewise remains stable and highly negative. The net debtor position of the five largest domestic banks vis-à-vis their foreign parent banks was 153% of their regulatory capital at the end of 2024. However, this situation is largely the result of the exchange rate commitment period of 2013–17, during which time the negative debtor position was offset by an increase in the banking sector's excess liquidity with the CNB.

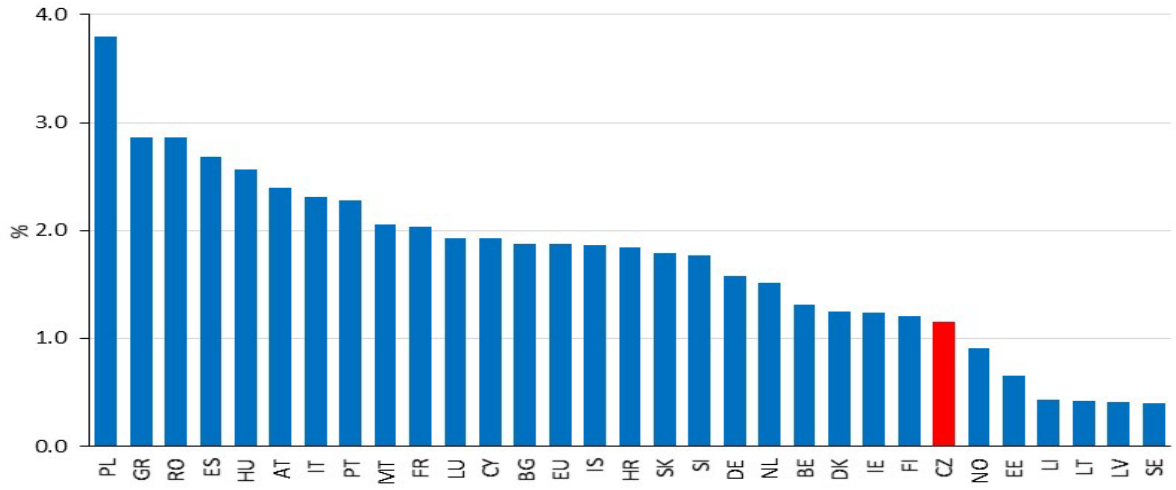
4. Mortgage markets and credit quality

Borrower-based mortgage limits were eased during the pandemic: the debt-to-income (DTI) ratio was abolished on 1 April 2020 and the debt service-to income (DSTI) ratio on 18 June 2020 (effective 1 July 2020), while an eased recommended loan-to value (LTV) ratio of 90% remained in place. The limits were reinstated as legally binding from 1 April 2022 (LTV 80%, 90% for borrowers under 36; DTI 8.5/9.5; DSTI 45%/50%). They were later relaxed again as conditions improved, with DSTI deactivated on 1 July 2023 and DTI deactivated on 1 January 2024, while the LTV cap remained binding.

In the past two years, despite the mortgage market recovery, debt and cyclical credit risk have remained low by European comparison (see Graph 7). Nevertheless, the estimate of the capital requirement for unexpected cyclical losses rose slightly.

Shares of non-performing client loans in selected EU countries

as of 31 December 2024 Graph 7



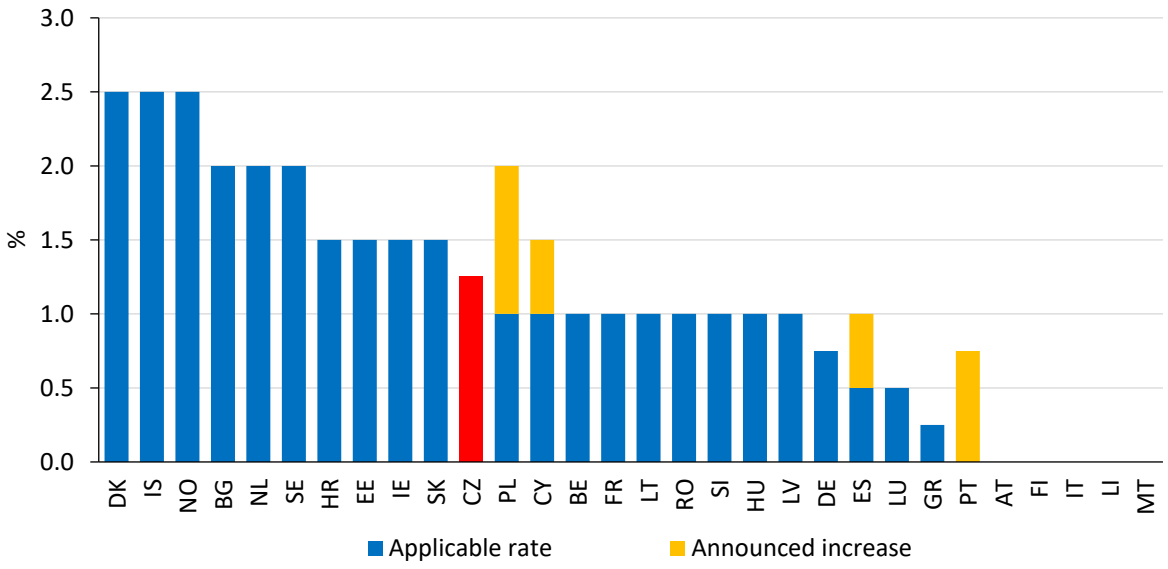
Source: CNB, *Financial Stability Report*, Spring 2025.

The countercyclical capital buffer (CCyB) rate in Czechia is in the middle of the European distribution. Most European countries maintain CCyB rates of 1.5% or lower (see Graph 8). None of them, except for Czechia, has lowered the rate in the past year. On the contrary, several have moved to set non-zero CCyB rates in a standard cyclical risk environment, mainly with a view to creating capital buffers in good times and increasing the room to respond to unexpected stress. A non-zero rate in a standard risk environment also allows countries to respond more moderately to faster growth in cyclical risks. Overall, the trend towards implementing a positive neutral (or standard) CCyB rate has continued across European Economic Area countries in recent quarters (see CNB (2023)).

On minimum reserve requirements, the CNB ended remuneration of minimum reserves on 5 October 2023 and later raised the reserve ratio from 2% to 4%, effective 2 January 2025. These steps were intended to lower the cost of monetary policy implementation, absorb excess liquidity and strengthen transmission and were in line with the contemporaneous move by the ECB to set the rate on minimum reserves to zero.

Countercyclical capital buffer rates in selected European countries

values as of 31 October 2025 Graph 8



Source: European Systemic Risk Board.

5. Tools for assessing financial conditions

The Financial Conditions Index (FCI), in the sense employed by recent literature on funding availability (including, but not limited to, EMEs, see Nguyen et al (2024)), is not among the analytical tools used by the CNB. Unlike broader FCIs, which may include a wide range of financial variables such as asset prices or credit spreads, the CNB actively uses the Real Monetary Conditions Index (RMCI) as a satellite indicator to support a simplified assessment of the monetary policy stance.

The RMCI focuses specifically on variables closely related to monetary policy, that is, it is composed of an interest rate component and an exchange rate component. The interest rate component reflects the deviation of the ex ante expected real interest rate (3M PRIBOR, corrected for inflation) from the equilibrium real interest rate. The exchange rate component captures the deviation of the real exchange rate (CZK/EUR) from the estimated real equilibrium exchange rate. This structure enables the RMCI to effectively capture the interest rate and exchange rate channels. The RMCI provides a useful analytical framework for evaluating whether monetary conditions are restrictive or expansionary.

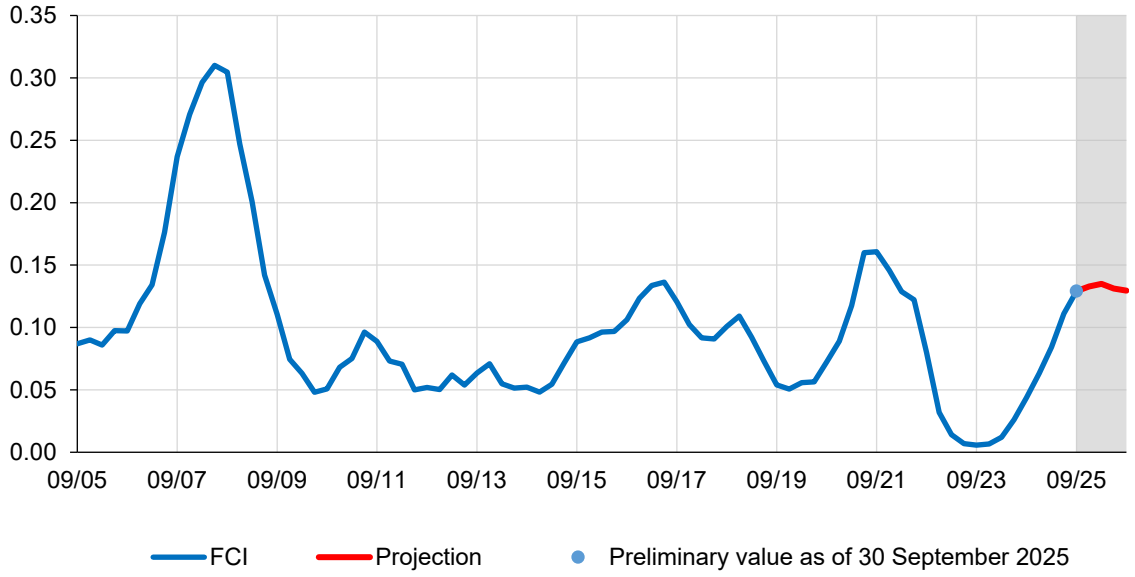
This targeted approach proves useful for both policy analysis and monetary policy communication. By distinguishing between the interest rate and exchange rate components, it allows policymakers to transparently communicate their views on how each channel affects the economy. Over time, the CNB has found that communicating

the monetary policy stance through the RMCI has proven to be both clear and effective in practice.

For the purposes of macroprudential policy, particularly when setting capital requirements and buffers (such as the CCyB), the CNB uses a measure similar to the aforementioned FCI, albeit more narrowly targeted. This measure is called the Financial Cycle Indicator. According to this metric, the Czech economy remained in the growth phase of the financial cycle throughout the first half of 2025 but now appears to have reached its peak (see Graph 9).

The Czech economy could enter an even stronger growth phase in the next few quarters, provided that borrowing by the household sector continues to grow and the recovery in the non-financial corporate sector continues. According to the CNB's projections, the upward trend in newly accepted cyclical risks will continue in line with developments in the credit and property markets, albeit at a slower pace.

Financial Cycle Indicator — Graph 9



Note: 0 minimum, 1 maximum; the projection is based on the CNB's spring forecast (MPR – Spring 2025).

Sources: CNB; CZSO.

6. Monetary policy and FX market implications

In response to the Covid-19 pandemic, the CNB cut the two-week repo rate in three steps to 0.25% between March and May 2020. From mid-2021, it raised rates to fight inflationary pressures, reaching 7.00% in June 2022. Rates were then kept high throughout 2023 to anchor expectations and reinforce disinflation. Once inflation was

under control, the CNB began reducing rates in December 2023, and it has continued on a cautious path of normalisation.

Foreign exchange interventions were launched on 12 May 202, to prevent the koruna from depreciating in a situation of high inflation. The CNB ceased intervention in October 2022, and the Bank Board formally ended the intervention regime on 3 August 2023. These operations were effective in stabilising the exchange rate and achieving macroeconomic stability during a period of economic stress.

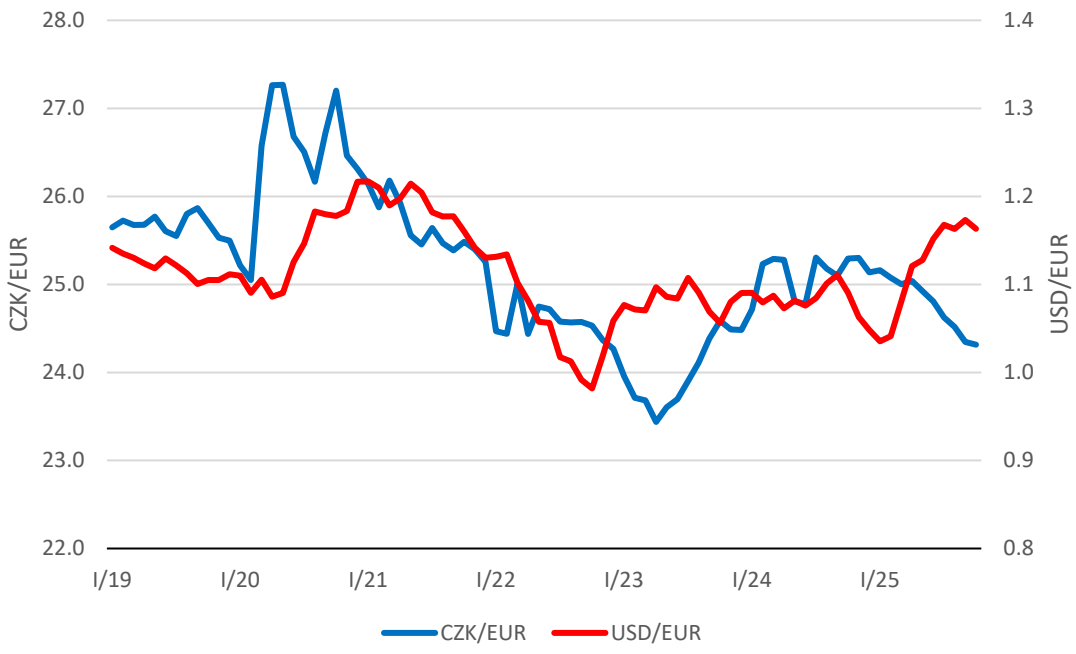
The exposure of the Czech koruna to US dollar movements is somewhat specific. It is distinctly different from those observed in markets for the currencies of small open economies outside Europe. The spot market for the USD/CZK currency pair is quite small, so developments in the mutual exchange rate are essentially dictated by the arbitrage with the EUR/CZK rate and the market for the EUR/USD pair – the largest in the world. Some researchers occasionally claim that periods of koruna strength (weakness) are in some way related to a strengthening (weakening) dollar. The data support this conjecture in some periods but not in others (see Graph 10). To explain the observed positive correlation episodes, we would need more information about the motives and decision-making processes of regional currency traders (which usually include the Polish zloty and the Hungarian forint in their portfolios alongside the Czech koruna). In any case, the potential influence of the US dollar on the value of the koruna has always been too modest to warrant a specific policy response.

Czechia's foreign debt also plays a role in financial stability in this context. At the end of last year, it amounted to USD 217.5 billion, or 65.4% of GDP.

CZK exchange rates

monthly averages

Graph 9



Source: CNB staff calculations.

7. Conclusion

Over the past few turbulent years, the CNB has implemented a combination of monetary, foreign exchange, macroprudential and operational measures. The aim was to maintain price stability – the CNB's primary statutory objective – and to safeguard financial stability. The adopted CNB's policy helped to anchor inflation dynamics and sustain the resilience of the financial system.

According to the available data, when appropriate polices are ready to be implemented, the foreign spillover channels most often discussed in the financial stability literature – contagion through interbank and bond markets, short-term capital, the balance sheets of systemically important institutions and sovereign debt – pose no immediate threat to the Czech financial sector. At least, they have not done so to date, even during the most critical periods of the past five years.

Given that the Czech capital markets are closely tied to those of the euro area, it is difficult to identify explicit channels through which USD-denominated assets could affect Czech financial conditions. While the CNB closely monitors markets for dollar-denominated assets because of their dominant global position, the firm anchoring of the Czech economy and financial sector in EU markets provides a buffer against shocks. Notwithstanding this buffer, the adequacy of the CNB's policies is constantly tested by global financial developments.

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Assessing the impact of stablecoins on exchange rate volatility for emerging market economies and policy implications

Hong Kong Monetary Authority

Abstract

Stablecoins have seen increasing adoption worldwide, including in emerging market economies (EMEs), where financial systems are often less developed and more vulnerable to external shocks. This note documents that, given the prevalence of US dollar-pegged stablecoins, stablecoin transactions vis-à-vis EME currencies are associated with higher exchange rate volatility. Furthermore, instability in stablecoin prices could induce exchange rate volatility in EME currencies that are more exposed to stablecoins. The note then examines how robust regulatory frameworks can help mitigate such instability. A robust regulatory framework not only promotes price stability of stablecoins, but it also helps dampen the exchange rate volatility associated with stablecoin transactions. Recognising the importance of such frameworks, Hong Kong, as an international finance centre, is among the first jurisdictions to introduce a stablecoin regulatory regime, adopting a prudent approach to uphold the credibility of stablecoins issued in Hong Kong.

1. Introduction

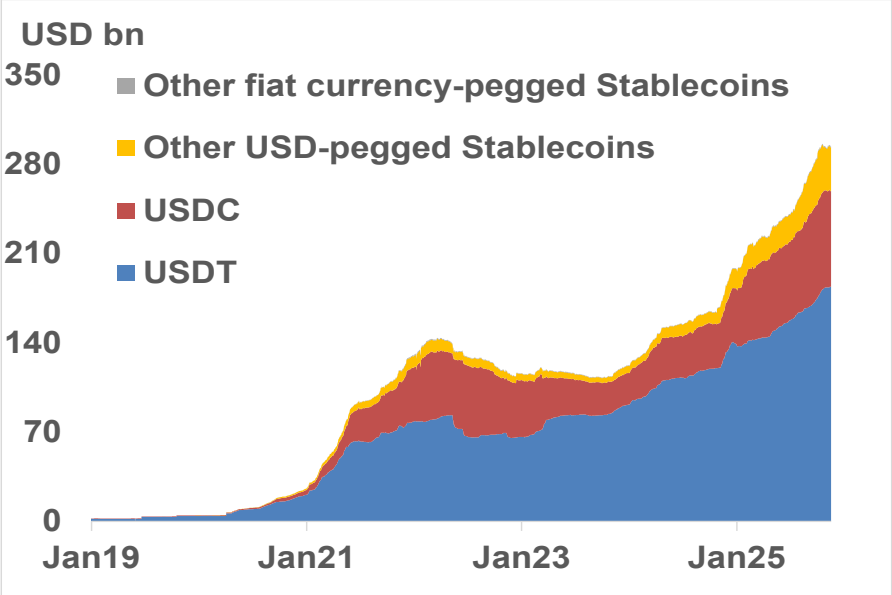
Stablecoins are cryptocurrencies designed to maintain a stable value.[1] They offer a new way to transfer money across borders for payments and investment, including cryptoassets. The market of stablecoins has grown rapidly in recent years (Graph 1). One important feature of this market is the prevalence of stablecoins pegged to the US dollar (referred to as "USD stablecoins" hereafter), which account for approximately 99% of stablecoin market capitalisation. This segment is dominated by USD Tether (USDT) and USD Coin (USDC), representing around 60% and 25%, respectively, of total stablecoin market capitalisation in November 2025.

Some cryptocurrency exchanges allow users to buy and sell stablecoins using fiat currencies other than USD. As buyers do not require prior conversion to USD, this market feature is particularly attractive to investors in emerging market economies (EMEs), given their less developed domestic financial markets and constraints on

[1] Throughout this note, "stablecoins" refers specifically to those whose values are pegged to a fiat currency ("fiat currency-pegged stablecoins"). According to CoinGecko (https://www.coingecko.com/en/categories/stablecoins), these account for over 97% of total market capitalisation of all stablecoins as of 19 November 2025, with the remainder consisting of stablecoins whose values are linked to other assets (such as cryptocurrencies or commodities).

accessing foreign assets. As a result, transaction flows between EME currencies and stablecoins have been substantial.

The market capitalisation of stablecoins Graph 1



"Stablecoins" in this chart refers to stablecoins that are pegged to a fiat currency ("fiat currency-pegged stablecoins"; see footnote 1 of this note)." USDC" refers to USD Coin, and "USDT" refers to USD Tether.

Source: CoinGecko.

The increase in flows from EMEs to USD stablecoins could have important implications for exchange rate volatility in EMEs, as such flows ultimately involve conversions between EME currencies and the USD in the foreign exchange (FX) market to complete the transactions. Consequently, increased FX activity in EME currencies arising from flows driven by stablecoins can lead to greater volatility in these currencies.

To broaden our understanding on this issue, the first part of this note provides an overview of stablecoin transactions vis-à-vis EME currencies and illustrates their potential linkages with the exchange rate volatility. We then present anecdotal evidence and empirical results, which suggest that EME currencies tend to be more volatile when flows of stablecoin transactions vis-à-vis these currencies increase. Furthermore, instability in stablecoin prices could induce greater exchange rate volatility in EME currencies that are more exposed to stablecoins. The increasing adoption of stablecoins in EMEs could result in a significant channel through which exchange rate volatility could be affected. This would warrant policy measures to reduce the price instability of stablecoins, which could also dampen the impact on exchange rate volatility.

To this end, the second part of this note reviews and discusses how robust regulatory frameworks can enhance the stability of stablecoins. Specifically, our findings suggest that capital buffer and cash holding requirements would be effective in limiting run risks of stablecoins amid market turbulence. We also find that the requirement for timely stablecoin redemption accelerates price convergence to the

peg. Taken together, these measures can help reduce the risks of stablecoin runs and de-pegging, thereby mitigating potential spillover effects, including those on the FX market.

This note is structured as follows. The next section provides an overview of stablecoin transactions vis-à-vis EME currencies and illustrates their potential linkages with exchange rate volatility. Section 3 discusses how ongoing regulatory implementation in stablecoins would help improve the stability of stablecoins. Section 4 concludes.

2. Stablecoin transaction flows vis-à-vis EME currencies and their linkages with exchange rate volatility

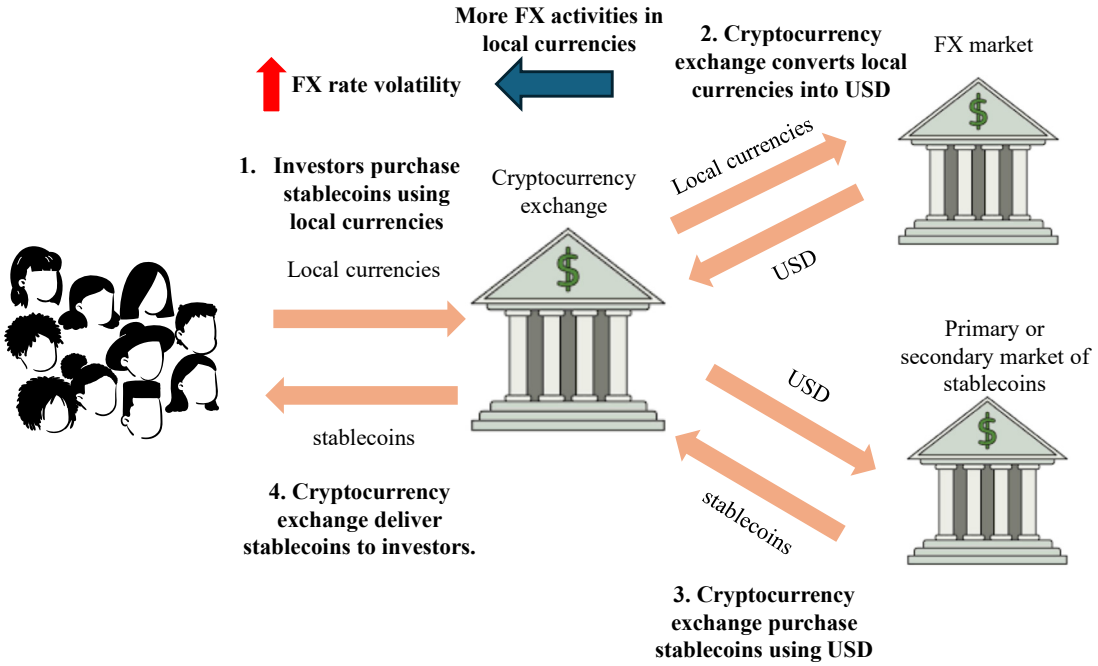
Graph 2 provides a schematic overview of how the purchase of USD stablecoins using non-USD fiat currencies can induce exchange rate volatility. By the same token, sales of USD stablecoins can also induce exchange rate volatility. Permitting direct purchases by EME currencies enables investors in EMEs to obtain USD stablecoins without the intermediate step of converting their funds into USD in the FX market. Operationally, FX conversion is facilitated by local cryptocurrency exchanges or market makers, which quote stablecoin prices in the local currency and accept settlement in that currency. To complete these transactions, cryptocurrency exchanges or market makers need to acquire the corresponding stablecoins for delivery to clients, necessitating the conversion of local-currency payments into USD.[2]

Under this arrangement, a greater volume of stablecoin transactions vis-à-vis EME currencies would lead to increased conversion activities in the FX market, potentially inducing volatility in these currencies. In addition to using local currencies directly for stablecoin transactions, EME residents may also acquire them using USD obtained by first converting their local currencies in the FX market. While such transactions can likewise affect exchange rate volatility, they are not captured in our study because of data limitations.

[2] Crypto exchanges / market-makers that accept EME currencies obtain the USDT required to complete transactions from either the primary market (where the USDT issuer accepts only USD for new issuances) or the secondary market (mostly likely the USDT/USD market, given the much deeper USDT market in USD). In both cases, the crypto exchanges / market-makers require the proceeds of EME currencies to be converted into the USD to purchase USDT to deliver to their clients.

Illustration of transactions between USD stablecoins and non-USD local currencies

Graph 2



The level of stablecoins activity in EME currencies could be influenced by a number of factors. For instance, Auer et al (2025) find that higher inflation and greater bilateral exchange rate volatility tend to increase the flow of cross-border stablecoins; they also find that cross-border remittance cost is an important driver for greater stablecoin usage in EMEs.[3]

Apart from the above, the stability of stablecoins may also influence stablecoin transaction flows vis-à-vis EME currencies. A distinguishing feature of stablecoins, compared with other cryptocurrencies, is their commitment to exchange for fiat currencies at a predetermined fixed price (the peg). While the market price of a stablecoin may deviate from its peg due to changes in market demand and supply, such deviations are generally corrected through an arbitrage mechanism, keeping them minimal.[4]

However, in some circumstances this mechanism may fail to operate effectively. Although stablecoin prices usually remain close to their peg, significant deviations can arise – for instance, during periods of instability in the broader cryptocurrency

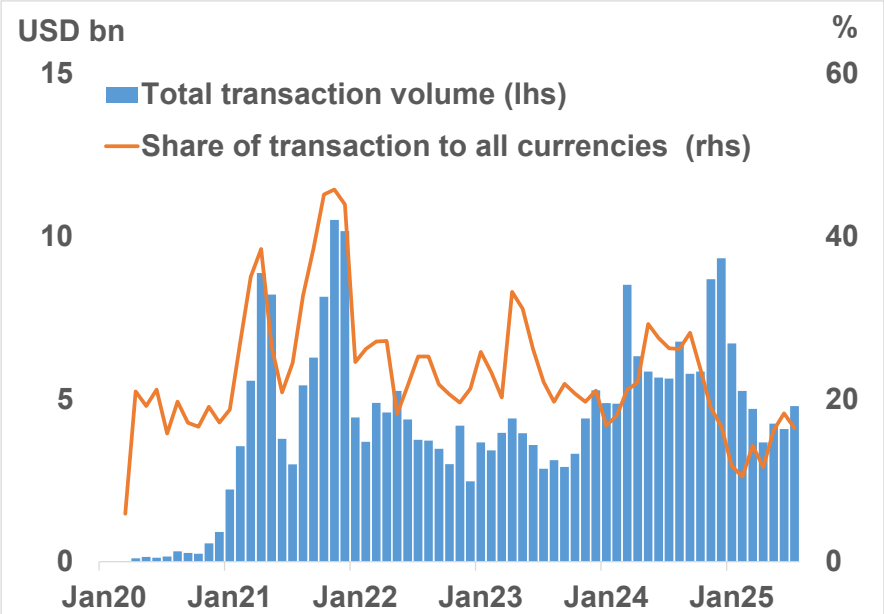
[3] R Auer, U Lewrick and J Paulick, "DeFiying gravity? An empirical analysis of cross-border Bitcoin, Ether and stablecoin flows", *BIS Working Papers*, no 1265, May 2025.

[4] When a stablecoin's market price is above its peg, arbitrageurs mint new coins from the issuer at the peg value and sell them on the market for a profit. This increases the market supply of stablecoins and pushes the price down towards the peg. When the market price is below the peg, arbitrageurs purchase coins on the market and redeem them at the peg. This reduces the market supply and helps lift the price back towards the peg.

market.[5] In such cases, stablecoin instability, reflected in a substantial price deviation from the peg, can spur greater activity in stablecoins, including transactions involving EME currencies. This, in turn, may contribute to volatility in EME currencies, as discussed above.

To provide an overview of stablecoin flows vis-à-vis EME currencies, Graph 3 presents monthly transaction volume data for USDT vis-à-vis 12 EME currencies,[6] sourced from CryptoCompare. This platform aggregates cryptocurrency transactions vis-à-vis different fiat currencies, as reported by different crypto exchanges.[7] Graph 3 shows that USDT transaction flows vis-à-vis the sampled EME currencies account for a notable share of around 20% of the total USDT transaction flows vis-à-vis all reported fiat currencies.

USDT transaction flows vis-à-vis 12 emerging market economy currencies — Graph 3



This chart depicts the total monthly USD Tether transaction flows vis-à-vis sampled emerging market economy currencies as reported by source, presented in total volume (USD billions) and share of all reported currencies. The currencies included are Argentine peso, Brazilian real, Colombian peso, Indonesian rupiah, Nigerian naira, Polish zloty, Romanian leu, Russian rouble, South African rand, Thai baht, Turkish lira and Ukrainian hryvnia.

Source: CryptoCompare.

[5] For example, during the US banking turmoil in March 2023, the price of USDC fell below USD 0.90, because a large amount of its cash reserves was held at Silicon Valley Bank. Similarly, the collapse of Terra (UST) in May 2022 triggered widespread sell-offs across the crypto market, and the price of USDT dropped to USD 0.95.

[6] The currencies were Argentine peso, Brazilian real, Colombian peso, Indonesian rupiah, Nigerian naira, Polish zloty, Romanian leu, Russian rouble, South African rand, Thai baht, Turkish lira and Ukrainian hryvnia.

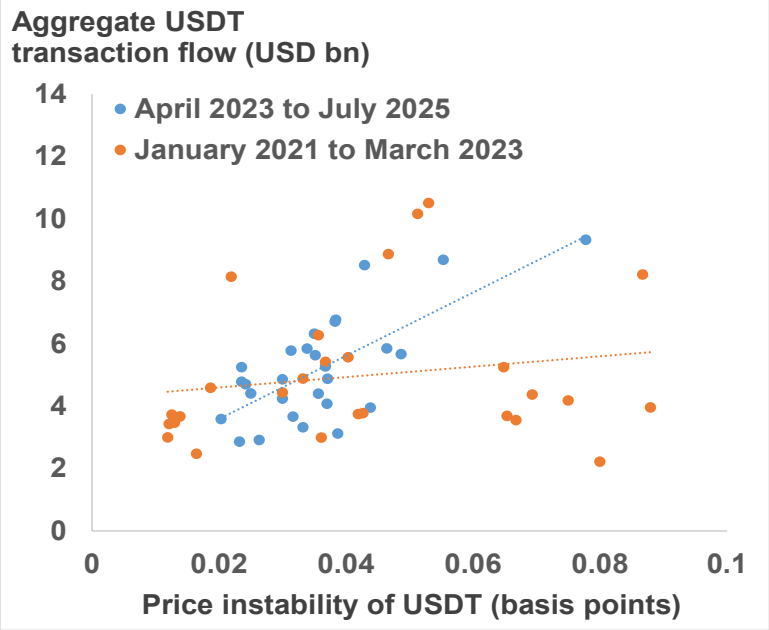
[7] CryptoCompare collects data from over 300 cryptocurrency exchanges worldwide (as of November 2025), compiling daily transaction volumes against different fiat currencies for various cryptocurrencies (including stablecoins).

Anecdotal evidence supports the argument that price instability of stablecoins would drive stronger flows of EME currencies, particularly in more recent periods. Graph 4 presents a scatter plot showing aggregate monthly USDT transaction flows vis-à-vis sampled EME currencies against the monthly average of the daily absolute deviation of USDT price from its peg value (ie price instability of USDT) since 2021. Observations before 2021 were discarded due to much smaller transaction flows (see Graph 3). To assess whether the relationship has evolved over time, we split the observation period further into two halves, as indicated in Graph 4.

Graph 4 shows that in the earlier periods, when USDT's price was more volatile, the relationship between price instability and aggregate transaction flows was positive but weak (orange dots, with a correlation coefficient of 0.18). In the latter period, the relationship strengthened markedly (blue dots, with a correlation coefficient of 0.7), evident at both lower and higher levels of price instability. While Graph 4 supports the existence of a positive relationship between price instability of stablecoins and their transaction flows vis-à-vis sampled EME currencies, it cannot provide insights into the causality, which will be examined later.

Scatter plot of the price instability of USDT and aggregate USDT transaction flows vis-à-vis sampled emerging market economy currencies

Graph 4



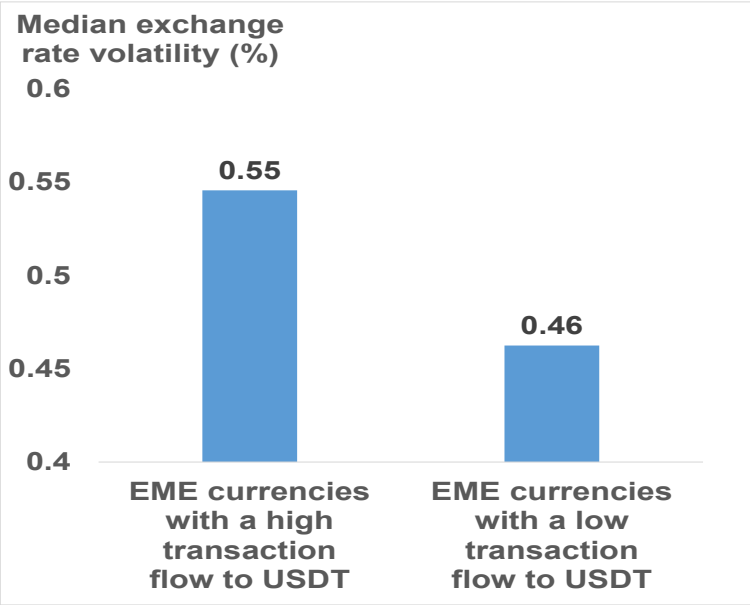
This graph plots aggregate monthly USDT transaction flows vis-à-vis sampled EME currencies (see Graph 3) against the price instability of USDT since 2021, split into two halves.

Sources: CoinGecko; CryptoCompare.

We further provide evidence that the level of stablecoin transactions vis-à-vis EME currencies may play a role in driving the respective exchange rate volatility. Graph 5 compares the median monthly exchange rate volatility (measured as the standard deviation of daily FX returns) for sampled EME currencies, grouped by their cumulative historical average transaction flows to USDT (from the start of the sample period up to $t-1$) when USDT significantly deviates from its peg value (ie 1 USD).

For a given month, USDT is considered to significantly deviate from its peg value when the average daily absolute deviation from the peg exceeds the sample median (which is about 0.04 basis points). During these periods, EME currencies with high historical average transaction flows to USDT (ie larger than the sample median) tend to show greater exchange rate volatility than those with lower flows.

Exchange rate volatility of emerging market economy currencies when USDT significantly deviates from its peg value (ie 1 USD) Graph 5



This chart depicts the median value of sampled emerging market economy (EME) currencies' monthly exchange rate volatility by their cumulative historical average transaction flows to USDT, when USDT significantly deviates from its peg value. EME currencies with a high (low) transaction flow to USDT are defined as those whose cumulative historical average USDT transaction flows are larger (smaller) than sample median. The currencies included in the sample are Argentine peso, Brazilian real, Colombian peso, Indonesian rupiah, Nigerian naira, Polish zloty, Romanian leu, Russian rouble, South African rand, Thai baht, Turkish lira and Ukrainian hryvnia.

Source: CryptoCompare; Bloomberg.

We further conduct panel regression analyses to test whether the observed patterns persist, after accounting for other drivers of exchange rate volatility and addressing potential endogeneity issues. The estimation is conducted using monthly observations from February 2021 to December 2024.[8]

$$FX\ vol_{i,t} = \beta_{USDT} USDT\_flow_{i,t-1}^{detrended} + \beta_{BTC} BTC\_flow_{i,t-1}^{detrended} + \sum_{k=1}^{m} \beta_k Control_{i,t} + FE_t + FE_{i,q} + \epsilon_{i,t} \quad (1)$$

Equation (1) presents our baseline panel regression model, which examines the relationship between exchange rate volatility and stablecoin transaction flows vis-à-vis the sampled EME currencies. The dependent variable, $FX\ vol_{i,t}$, measures monthly

[8] As shown in Graph 3, aggregate USDT transaction flows vis-à-vis sampled EME currencies were very small prior to 2021. In addition, we used Bai-Perron's (1998) structural break test to examine the time series of the deviation of USDT price from its peg and found a structural break between January and February 2021. To reduce the undue influence of these observations, our empirical analysis uses observations starting from February 2021. Details of Bai-Perron's (1998) structural break test can be referred to J Bai and P Perron, "Estimating and Testing Linear Models with Multiple Structural Changes", *Econometrica*, Vol 66, No 1 (January 1998), 47-78.

realised exchange rate volatility for currency i in month t. It is calculated as the standard deviation of daily FX rate returns during the month, capturing the degree of short-term fluctuations in the FX market.

The key explanatory variable is $USDT\_flow_{i,t-1}^{detrended}$, representing the lagged and de-trended USDT transaction flows vis-à-vis currency i, measured in billions of USD. This variable serves as a proxy for the level of stablecoin transaction activity and is our focus of interest. We lag the transaction flows by one month to mitigate potential endogeneity, as it could be argued that higher exchange rate volatility could itself induce more stablecoin transaction flows.[9] In addition, we de-trend the lagged flows by subtracting their 12-month trailing average from the observed flows. The primary aim of this de-trending is to avoid potential non-stationarity issues. The resulting measure captures short-term deviations in USDT flows for each currency relative to its longer-term trend, allowing us to assess how these fluctuations are associated with exchange rate volatility.

In addition to USDT flows, the baseline model also includes Bitcoin transaction flows vis-à-vis currency i ($BTC\_flow_{i,t-1}^{detrended}$) to control for broader cryptocurrency transactions vis-à-vis EME currencies, which may also influence FX activity. Like $USDT\_flow_{i,t-1}^{detrended}$, $BTC\_flow_{i,t-1}^{detrended}$ is lagged by one period and de-trended. Equation (1) also incorporates month-fixed effects (FE_t) to capture common time-varying influences (eg global financial and crypto market conditions); currency–quarter fixed effects ($FE_{i,q}$) for slow-moving currency-specific factors (eg macro-economic fundamental, financial market development); and a set of monthly currency-specific controls ($Control_{i,t}$) of exchange rate volatility that are not accounted for by the month-fixed and currency-quarter-fixed effects but may still affect exchange rate volatility.[10]

Column (1) of Table A.1 in Annex 1 presents the estimation results for Equation (1), showing that the estimated coefficient on $USDT\_flow_{i,t-1}^{detrended}$ is positive and statistically significant (0.13). This suggests that stablecoin transaction flows vis-à-vis EME currencies are one significant driver of the exchange rate volatility. To gauge the economic significance, we first separate the EME currencies into two groups: high- and low-flow groups. The former includes EME currencies whose average flow to USDT is larger than the median over the full sample, while the latter contains the remaining EME currencies. We then assume an increase in the USDT transaction flows by one standard deviation based on the historical distribution of each currency, and we further estimate the impact on the exchange rate volatility for each currency based on the estimation result in Column (1) of Table A.1. We found that for the high-flow group, the median impact on the exchange rate volatility is around 3.6% of their historical volatility, which is much larger than that of the low-flow group (ie 0.35% of the historical volatility).

We then examine whether stablecoin market conditions, specifically the price instability of USDT, could also induce exchange rate volatility. USDT price instability can trigger arbitrage, portfolio adjustments or hedging activity, leading to increased

[9] Auer et al (2025).

[10] These include inflation differential with the US, capital flows proxied by equity market fund flows, the currency's bid-ask spread, and FX market intervention by the authorities.

stablecoin flows and potentially greater exchange rate volatility. We conjecture that this impact is stronger for currencies with historically higher USDT activity.

$$FX\ vol_{i,t} = \beta_{USDT} USDT\_flow_{i,t-1}^{detrended} + \beta_{dev} USDT\_deviation_t + \beta_{devexp} USDT\_deviation_t * ExpCur_{i,t} + \beta_{exp} ExpCur_{i,t} + \beta_{BTC} BTC\_flow_{i,t-1}^{detrended} + \sum_{k=1}^{m} \beta_k Control_{i,t} + \sum_{z=1}^{n} \beta_z Month_t + FE_{i,q} + \epsilon_{i,t} \quad (2)$$

To test the above conjecture, we extend the baseline model to include $USDT\_deviation_t$, which measures the price instability of USDT, in Equation (2). This variable is defined as the monthly average of the daily absolute deviation of USDT's price from its peg.[11] We also include a dummy variable, $ExpCur_{i,t}$, to classify a group of EME currencies that are more exposed to USDT in a given month. $ExpCur_{i,t}$ is defined as one if in month *t*, a currency's cumulative historical average USDT transaction flows (from the start of the sample period up to $t-1$) exceed the median of all sampled currencies, and zero otherwise. We include an interaction term between $USDT\_deviation_t$ and $ExpCur_{i,t}$ to test the hypothesis that during periods of price instability of USDT, those EME currencies that are more exposed to USDT tend to have stronger impacts on their exchange rate volatility. We expect a positive β_{devexp}.

Column (2) of Table A.1 reports the estimation results of Equation (2). As expected, the estimated β_{devexp} is positive and statistically significant (3.55), supporting the hypothesis that during periods of price instability of USDT, EME currencies that are more exposed to USDT tend to have stronger sensitivity of exchange rate volatility to the price instability of USDT. This positive empirical relationship remains statistically significant when accounting for the total effect (ie. the sum of the estimated β_{devexp} and β_{dev}, 3.56). However, the estimation result for currencies that are less exposed to the USDT, which is reflected by the coefficient estimate of β_{dev}, is found to be statistically insignificant. Finally, the estimation results for both Equation 1 and 2 remain largely similar when lagged exchange rate volatility is included as an additional control variable, as reported in Columns (3) and (4) of Table A.1, respectively.

To summarise, results of our empirical analysis suggest that the volatility of EME currencies tends to be higher when flows of stablecoin transactions vis-à-vis these currencies increase. Furthermore, instability in stablecoin prices could induce exchange rate volatility in EME currencies that are more exposed to stablecoins. As stablecoin adoption continues to grow in EMEs, a significant channel could emerge through which exchange rate volatility could be affected. This calls for policy measures to reduce the price instability of stablecoins, which could help dampen the impact of the growth of stablecoin adoption on exchange rate volatility.

[11] One modification from Equation (1) is the treatment of factors that are common across currencies. More specifically, instead of applying month-fixed effects (FE_t), we include $Month_t$, which is a set of monthly common factors including log changes in the USD Index (control for USD condition); log changes in the VIX Index (control for global market volatility); and Bitcoin return volatility (control for cryptocurrency market volatility). This change is necessary because $USDT\_deviation_t$ is common across currencies and would be fully absorbed by month-fixed effects if they were retained.

3. How regulations on stablecoins can improve their stability

The de-pegging and runs on stablecoins have been demonstrated to amplify exchange rate volatility in EMEs, underscoring the importance of a comprehensive and robust regulatory regime to bolster financial resilience. In this regard, an increasing number of jurisdictions have enacted dedicated regulatory frameworks or specific provisions applicable to authorised virtual assets in recent years.[12] These regimes to varying degrees conform to the Financial Stability Board's (FSB's) international standards for stablecoin oversight,[13] requiring stablecoin issuers to (i) uphold sufficient capital buffers; (ii) adopt prudent reserve management practices (eg minimum cash holdings); and/or (iii) extend redemption rights from a restricted group of authorised counterparties[14] to all stablecoin holders, with redemption requests fulfilled promptly.

Drawing on a novel and granular dataset that primarily captures the capital buffers, reserve compositions and net flows of the world's major fiat-referenced stablecoins[15] from January 2021 to September 2025, our preliminary empirical results reveal how these provisions address distinct vulnerabilities.

First, we conduct a panel regression to examine whether a higher level of capital buffers or a larger share of cash as reserve assets disclosed by a stablecoin will mitigate the negative impact of adverse market shocks on its net flows:

$$\begin{aligned} Flow_{i,t+1} = {} & \beta_1 \times MOVE_t + \beta_2 \times MOVE_t \times Cash_{i,t} + \beta_3 \times Cash_{i,t} + \\ & \beta_4 \times MOVE_t \times CAR_{i,t} + \beta_5 \times CAR_{i,t} + \\ & \beta_6 \times MOVE_t \times UST_{i,t} + \beta_7 \times UST_{i,t} + \\ & \beta_8 \times MOVE_t \times Other_{i,t} + \beta_9 \times Other_{i,t} + \\ & Control_{i,t} + Coin_i + \varepsilon_{i,t}\,, \end{aligned} \qquad (3)$$

where $Flow_{i,t+1}$ denotes the net daily flow of stablecoin i on day $t+1$ as the share of its market capitalisation at the end of day t; $Cash_{i,t}$ denotes its share of reserve assets in cash or bank deposits in its latest public attestation report; $UST_{i,t}$ denotes the share in US Treasury (UST) spot holdings, UST-collateralised repos, and UST-focused money market funds; $Other_{i,t}$ denotes the share in other assets, such as non-UST sovereign bonds, corporate bonds, metals and cryptos; and $CAR_{i,t}$ denotes its capital position.[16] Meanwhile, $MOVE_t$ proxies for adverse market conditions using the Merrill Lynch Option Volatility Estimate (MOVE) Index on day t; the vector $Control_{i,t}$ denotes a set of both stablecoin-specific and market-wide controls; and $Coin_i$ denotes the stablecoin fixed effects.

[12] See Financial Stability Board, *Thematic review on FSB global regulatory framework for crypto-asset activities*: *Peer review report*, October 2025.

[13] See Financial Stability Board, *FSB global regulatory framework for crypto-asset activities: Umbrella public note to accompany final framework*, July 2023.

[14] See Y Ma, Y Zeng and A L Zhang, "Stablecoin runs and the centralization of arbitrage", *NBER Working Papers*, no 33882, May 2025.

[15] These include 17 stablecoins whose combined assets comprise about 99% of the market total.

[16] The capital position of a stablecoin is defined as the sum of any excess capital reported in the most recent public attestation report and the minimum regulatory capital required of the stablecoin issuer.

In this equation, the coefficients of interest are β_2 and β_4, which quantify the marginal impact of each percentage point change in disclosed cash ratios and capital ratios on net flows, respectively. If higher disclosed cash reserves and capital buffers mitigate outflows from stablecoins, we expect both β_2 and β_4 to be significantly positive.

Table A.2 in Annex 2 presents the results for Equation (3). Specifically, the estimated β_2 and β_4 are both positive and statistically significant, confirming that higher levels of cash holdings and capital buffers are effective in mitigating outflows from stablecoins in stressed periods.

Second, we conduct a panel regression to study whether the enhanced accessibility and promptness in redemption mechanisms in response to price discounts can accelerate price convergence to the peg:

$$Flow_{i,t+1} = \delta_1 \times PD_{i,t}^{+} + \delta_2 \times PD_{i,t}^{+} \times MMFL_{i,t} + \delta_3 \times PD_{i,t}^{-} + \delta_4 \times PD_{i,t}^{-} \times MMFL_{i,t} + Control_{i,t} + Coin_i + \varepsilon_{i,t}\,, \quad (4)$$

where $PD_{i,t}^{+}$ denotes the positive end-of-day price deviation of stablecoin i on day t, or is set to zero if the deviation is negative; $PD_{i,t}^{-}$ indicates the negative end-of-day price deviations of stablecoin i on day t, or is set to zero if the deviation is positive; and $MMFL_{i,t}$ is set at 1 if stablecoin i on day t is legally obliged to settle redemption requests from all stablecoin holders within a prescribed window, typically a few business days in our sample. Meanwhile, $Flow_{i,t+1}$, $Control_{i,t}$ and $Coin_i$ are defined as in Equation (3).

In this equation, the coefficient of interest is δ_4. A significantly positive δ_4 suggests that a more accessible and faster redemption mechanism can encourage stablecoin redemptions in response to price discounts, thereby accelerating price convergence to the peg from below. To isolate the causal effect of the redemption mechanism per se, we constructed two matched samples in which the treated and controlled stablecoins are comparable along all major observable dimensions except for the redemption mechanism.

Table A.3 in Annex 2 presents the results for Equation (4). Specifically, the estimated δ_4 are positive and statistically significant in both matched samples, confirming that the enhanced accessibility and promptness in redemption mechanisms encourage stablecoin redemptions in response to price discounts, thereby accelerating price convergence to the peg and strengthening peg stability. Taken together, these measures effectively mitigate run and de-pegging risks, thereby alleviating the potential for stablecoin-driven exchange rate volatility in EMEs.

As an international financial centre, Hong Kong stands among the first jurisdictions to introduce a stablecoin regulatory regime. The Hong Kong Monetary Authority (HKMA) has actively engaged in the FSB's initiatives to delineate international standards for stablecoin oversight. In harmony with such standards, Hong Kong's Stablecoins Ordinance, effective from 1 August 2025, imposes a suite of requirements. For instance, each licensed stablecoin issuer must maintain paid-up share capital of at least HK $25 million, or more as required by the HKMA. The stablecoin must be fully backed by assets of high quality and liquidity with minimal investment risks, such as cash and bank deposits. The issuer must also grant each stablecoin holder the right to redeem at par value. Unless otherwise approved, valid

redemption requests must be processed within one business day.[17] These stipulations provide robust protections against the aforementioned financial stability risks posed by stablecoins. To uphold the credibility of stablecoins in Hong Kong, the HKMA will adopt a prudent approach and apply a reasonably high bar in evaluating stablecoin licence applications.

4. Conclusion

Stablecoins – cryptocurrencies designed to maintain a stable value – are increasingly adopted worldwide, including in EMEs where financial systems are often less developed and more vulnerable to external shocks. With the prevalence of stablecoins linked to the USD, flows between EME currencies and stablecoins involve conversions between EME currencies and the USD in the FX market to complete the transaction. The increased FX activity could lead to greater volatility in these currencies.

Using data on transaction flows of USDT (the largest USD stablecoin) vis-à-vis 12 EME currencies, this study finds that larger flows are associated with higher exchange rate volatility. Furthermore, instability in stablecoin prices could induce exchange rate volatility in EME currencies that are more exposed to stablecoins. As stablecoin adoption continues to grow in EMEs, a significant channel could emerge through which exchange rate volatility could be affected. This warrants policy measures to reduce the price instability of stablecoins, which could also dampen the impact on exchange rate volatility.

In this regard, our preliminary empirical findings indicate that a holistic and well-calibrated stablecoin regime can effectively strengthen peg stability and mitigate run risks for stablecoins. By enhancing capital adequacy and reserve liquidity, this regime could alleviate the potential for stablecoin-driven exchange rate volatility in EMEs. Recognising the importance of such regimes, Hong Kong, as an international finance centre, stands among the first jurisdictions to introduce a stablecoin regulatory framework in alignment with the international standards delineated by the FSB. Going forward, the HKMA will adopt a prudent approach in its assessment of stablecoin licence applications, with a view to promoting the credibility of stablecoins issued in Hong Kong.

[17] For details, please refer to Hong Kong e-legislation, *Cap. 656 Stablecoins Ordinance*; and HKMA, *Stablecoins Ordinance: Guideline on Supervision of Licensed Stablecoin Issuers*, August 2025.

Annex 1

Table A.1: Estimated relationships between exchange rate volatility, USDT transaction flows and price instability of USDT

	$FX\ vol_{i,t}$			
	(1)	(2)	(3)	(4)
$USDT\_flows_{i,t-1}^{detrended}$ (β_{USDT})	**0.13*** **	**0.09*** **	**0.20*** **	**0.14*** **
$USDT\_deviation_t$ (β_{dev})		0.01		0.28
$USDT\_deviation_t * ExpCur_{i,t}$ (β_{devexp})		**3.55***		**3.21***
$ExpCur_{i,t}$ (β_{exp})		0.01		0.01
$FX\ vol_{i,t-1}$			**-0.17****	-0.17
$BTC\_flows_{i,t-1}^{detrended}$ (β_{BTC})	0.08	0.09	0.10	0.12
Monthly currency controls ($Control_{i,t}$)	Yes	Yes	Yes	Yes
Monthly controls ($Month_t$)	No	Yes	No	Yes
Month-fixed effects (FE_t)	Yes	No	Yes	No
Currency-quarter fixed effects ($FE_{i,q}$)	Yes	Yes	Yes	Yes
Number of observations	494	472	494	472
Number of currencies	12	12	12	12
$USDT\_deviation_t + USDT\_deviation_t * ExpCur_{i,t}$ ($\beta_{dev}+\beta_{devexp}$)		**3.56***		**3.49***

Columns (1) and (2) report the estimation results for Equations (1) and (2), respectively. In all columns, $FX\ vol_{i,t}$ is the exchange rate volatility of currency i in month t. $USDT\_flow_{i,t-1}^{detrended}$ and $BTC\_flows_{i,t-1}^{detrended}$ are the detrended USDT and bitcoin transaction flows vis-à-vis currency i respectively. In Column 2, $USDT\_deviation_t$ measures the price instability of USDT, while $ExpCur_{i,t}$ is a dummy variable indicating whether a currency is exposed to USDT in a given month t. Columns (3) and (4) report the estimation results for Equations (1) and (2), respectively, with lagged exchange rate volatility included as an additional control. ***, ** and * indicate that the estimated coefficient is statistically significant at the 1%, 5% and 10% levels, respectively.

Annex 2

Table A.2: Estimated impacts on net daily flows of stablecoins from higher cash holdings and capital buffers[i]

	(1) $Flow_{i,t+1}$
$MOVE_t(\beta_1)$	-0.21**
$MOVE_t \times Cash_{i,t}(\beta_2)$	0.003**
$MOVE_t \times CAR_{i,t}(\beta_4)$	0.05**
$Control_{i,t}$	Yes
$Coin_i$	Yes
Stablecoins	Full sample[ii]
Period	1 January 2021 – 30 September 2025
Observations	9,595

[i] ***, **, and * denote a 1%, 5% and 10% level of statistical significance, respectively.

[ii] The full sample includes USDT, USDC, FDUSD, PYUSD, RLUSD, USDG, USDL, USDP, GUSD, EURC, XUSD, XSGD, EUROe, ZUSD, EURØP, GYEN and BUSD.

Table A.3: Estimated impacts on net daily flows of stablecoins from enhanced redemption mechanism[i]

	(1) $Flow_{i,t+1}$	(1) $Flow_{i,t+1}$
$PD_{i,t}^{-} \times MMFL_{i,t}(\delta_4)$	1.96**	10.6**
$Control_{i,t}$	Yes	Yes
$Coin_i$	Yes	Yes
Stablecoins	USDP, USDL, USDG[ii]	PYUSD, USDC[iii]
Period	1 January 2021 – 30 September 2025	
Observations	1,215	1,448

[i] ***, ** and * denote a 1%, 5% and 10% level of statistical significance, respectively.

[ii] USDP, USDL and USDG are Paxos-issued and USD-referenced, and have similar market capitalisation and reserve mix, except that USDP and USDL are subject to an enhanced redemption mechanism while USDG is not.

[iii] The issuers of PYUSD and USDC are US-listed firms of similar size. They rank second and third among USD-referenced stablecoins in size with similar reserve mix, except that PYUSD is subject to an enhanced redemption mechanism while USDC is not.

The changing nature of real interest rates: Will positive values become the norm again?

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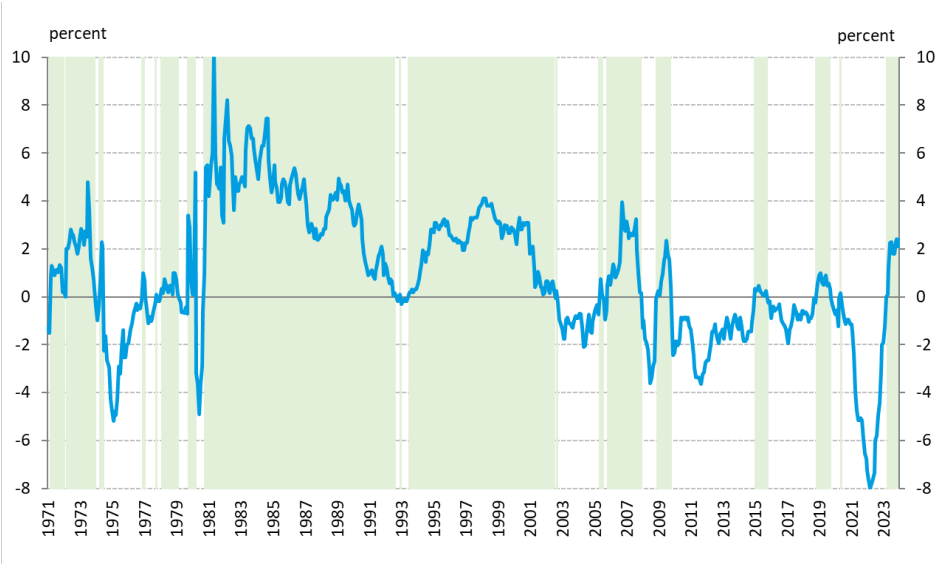
Motivation

Real interest rates have shown significant volatility globally over the past 50 years While positive real interest rates were typical in the 1980s and 1990s, the indicator has been negative since the 2000s (see Graph 1). The energy crisis triggered by the Russian-Ukrainian war and inflation rates rising into double digits have led to a decrease in real interest rates to previously rare lows. Rising interest rates due to the central banks' fight against inflation naturally has also affected real indicators. Thus, since mid-2023, real interest rates have risen back into positive territory across a wide range of countries. Looking ahead, an important question is whether this change can be considered a temporary or permanent development.

The backward-looking real interest rate in the United States — Graph 1



Note: We calculate the backward-looking real interest rate based on the central bank's base rate and the latest monthly inflation figures. Periods with positive real interest rates are marked with a green background.

Sources: Bloomberg; authors' calculations.

Financial market participants follow the development of real interest rates with special attention, using many different methods of calculation. Although the forward-looking real interest rate can be considered a relevant indicator from an investment and capital expenditure perspective, most analyses calculate the backward-looking real interest rate based on central banks' base rates and latest monthly inflation figures, which can be traced back to the fact that these are the most easily accessible

public data. The indicator appears regularly in investor analyses and recommendations; therefore, its development also deserves special attention from a central bank perspective. It is a variable that is also treated with special attention. The ECB, among others, emphasises that achieving an appropriate level of short-term (forward-looking) real interest rates is also necessary because monetary policy can be successful in managing high inflation only if this is achieved.

In our present analysis, we review the theoretical background of the calculation of real interest rates, examine the practice of key central banks and investment banks and review the development of real interest rates in developed and emerging countries calculated using different methods over the longer term. We also examine whether different patterns can be identified during periods characterised by positive and negative real interest rates. Finally, we investigate the relationship between risk indicators and real interest rates.

Literature review

In macroeconomics, the real interest rate – commonly defined as an inflation-adjusted nominal interest – is widely regarded as a fundamental price that coordinates intertemporal economic decisions and channels the effects of monetary policy (Fisher (1907); Keynes (1936)). Its level and trajectory also serve as key signals of underlying economic conditions, particularly monetary conditions – reflecting expectations about growth, inflation and associated risks. Policymakers, market participants and investors monitor these expectations closely when forming decisions.

Economic agents typically make decisions by weighing expected returns against the cost of capital, where the real interest rate plays an important role. In asset pricing and valuation models, the real interest rate serves as a key measure for assessing the attractiveness of certain investments. The relationship between real interest rates and asset prices is inverse: lower real rates, *ceteris paribus*, mean lower nominal discount rates, increasing the present value of future earnings, hence asset prices. This is also a key driver of investor behaviours: higher returns on any projects encourage firms to initiate investments, while higher real interest rates limit the pool of financially acceptable projects.

This idea leads directly to the importance of the real interest rate in monetary policy transmission mechanisms. Central banks adjust short-term nominal rates to influence a variety of real economic variables, including household consumption, business fixed investment and aggregate demand. The efficiency of monetary policy relies on the relationship between the actual real interest rate and the unobservable "natural rate of interest" that ultimately defines the degree of monetary stimulus or restraint as it is perceived by economic agents. In practice, the natural rate of interest is estimated through models that rely on assumptions about potential output, inflation expectations and structural factors. When the actual real rate exceeds the estimated neutral rate, monetary conditions are considered restrictive, signalling a drag on economic activity. Conversely, if the actual rate falls below the neutral level, policy is deemed accommodative, encouraging borrowing and investment. This distinction is central to modern monetary frameworks, as it guides decisions on

whether to tighten or loosen policy in response to evolving macroeconomic conditions (Laubach and Williams (2003); Holston et al (2017)).

The prevailing consensus is that long-term real interest rates have experienced a secular decline over the past four decades, driven primarily by structural factors rather than short-term monetary policy alone. Most studies attribute this trend to a combination of global forces: demographic changes (aging populations and higher life expectancy), slower productivity growth, increased demand for safe assets relative to supply and heightened risk aversion following financial crises. These factors have collectively reduced the equilibrium or "natural" real interest rate. While cyclical elements-such as fiscal policy, credit conditions and monetary stance can influence real rates in the short run, the persistently low levels observed during the 2010s were driven primarily by structural determinants. Recent research also emphasises the global nature of these trends, noting that real rates across advanced economies move together, reflecting integrated capital markets and common shocks. However, there is ongoing debate about whether recent developments – such as deglobalisation, larger fiscal deficits and potential productivity gains from technological innovation – could reverse this decline (Kiley (2019)).

Borio et al (2017) challenge the conventional view that long-term movements in real interest rates are driven primarily by real factors such as saving and investment preferences. Using historical data from 19 countries dating back to 1870, they found that these relationships are weak and inconsistent over extended periods. Instead, their evidence suggests that persistent shifts in real interest rates are closely associated with changes in monetary policy regimes and global financial conditions. In particular, interest rates in financially dominant economies exert significant influence across countries, pointing to the importance of monetary frameworks and external spillovers rather than common global saving-investment trends. This perspective implies that monetary policy plays a more central role in shaping real rates than traditionally assumed, raising questions about the reliability of natural rate concepts as a policy guide (Borio et al (2017); Borio et al (2022)).

A perspective for emerging markets is that the real interest rate includes all premia that go beyond inflation risk; thus, an elevated perception of riskiness or worsening external environment is consistent with higher real interest rates. Though the macroeconomic textbook understanding of real interest rate is more concerned with long-term and structural factors, market participants such as investment banks and funds indeed use real interest rates as a benchmark to compare markets and assess potential returns.

Regarding the calculation of the real interest rate, at least three methods may be used, and two of them are frequently applied in market analyses and research papers (see Graph 2).

The most common approach is to adjust the currently observed short-term interest rate by incorporating inflation expectations; this is a so-called **forward-looking** real interest rate. The prevailing one-year yield (which may come from the interbank market or government securities market) can be corrected using survey-based inflation expectations. The advantage of this method is that it captures how much higher the market yield is compared with the currently expected inflation. However, the drawback of analyst surveys lies in the limited pool of respondents or the potential influence of a few analysts with overly extreme views on inflation

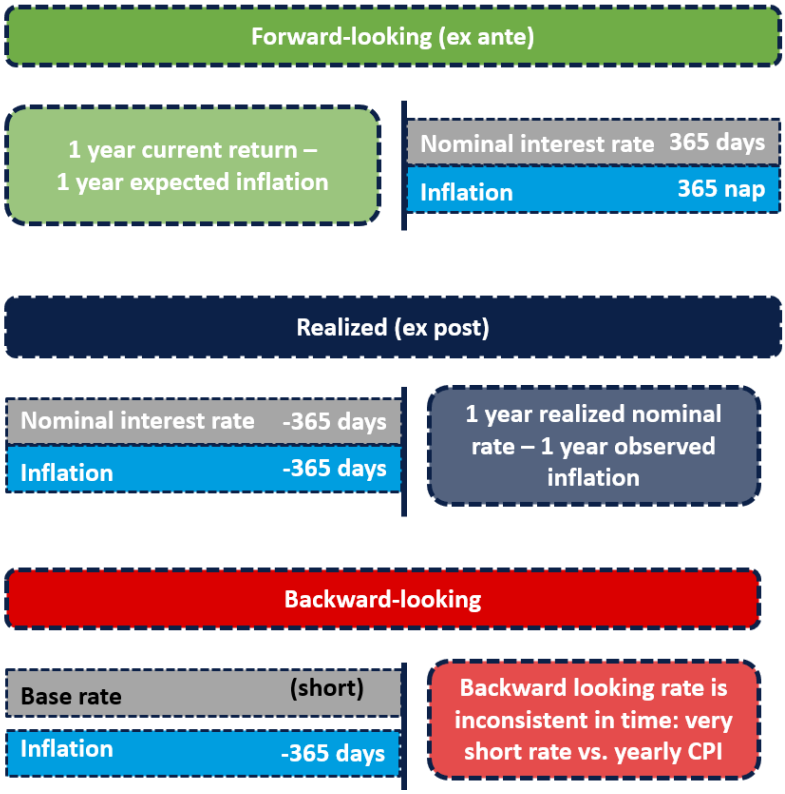
dynamics. Bernardini et al (2024) argue that in the case of the Eurozone, a fully market-based indicator provides a better approximation and eliminates most of the biases inherent in survey-based measures. According to their view, the difference between the overnight index swap rate and inflation swaps leads to a more accurate market estimate of real interest rates and is preferable to using inflation-linked swaps, which occasionally appear in analyses. In general, the forward-looking real interest rate is relevant for making funding and investment decisions. While the future inflation rate is based only on expectations, it is still the closest to the relevant financial conditions for evaluating projects.

The **backward-looking** approach to real interest rate calculation combines the currently observable short-term rate (either the policy rate or short-term money market rates) in annual term with the most recent reading of inflation. While this method lacks economics relevance, it is easy to calculate and the inputs are readily available. The interpretation relies broadly on the presumption that inflation figures will not change in the short run – or at least that this expectation does not really influence investors and firms in their decisions. Moreover, it is also an economically incorrect indicator, as it combines indicators for different periods. While inflation basically shows price changes in the past period, nominal interest rates contain information about the future.

Theoretically, economic agents could also calculate a **realised** real interest rate by observing market rates one year ago and adjusting it with the latest inflation figures. It may seem reasonable to assume that an economic agent bases its decisions on past experiences and therefore relies on the most straightforward real interest rate calculation: namely, the one reflecting the actually realised return. However, our review indicates that references to real interest rates in this form are exceedingly rare in analytical work.

The choice among the three types of real interest rate indicators often falls under the simplifying assumptions of models, while analysts typically assess the returns available across different investments based on the easily calculated, backward-looking real interest rate. In reality, this may convey a very different message. If a central bank's argument is built on the premise that it has sufficiently eased or tightened monetary conditions, such an assessment can be made only from its own perspective and based on its own calculations. Consequently, central banks that communicate a forward-looking real interest rate generally refer to the adjustment of the current yield level using market analysts' consensus expectations. However, on the investor side, a backward-looking or, in the worst case, realised real return may also be considered.

Calculation methods of real interest rates Graph 2



Analysis of the development of real interest rates

Backward-looking real interest rates

In presenting real interest rates, we examined 32 countries and the eurozone, which we categorised into seven country groups based on International Monetary Fund classification. When calculating backward-looking real interest rates, we subtracted the change in the given country's one-year inflation rate from the country's current central bank policy rate. The data always refers to the last month of the current year. Furthermore, within each country group, we weighted the countries based on their gross domestic product (GDP).[1]

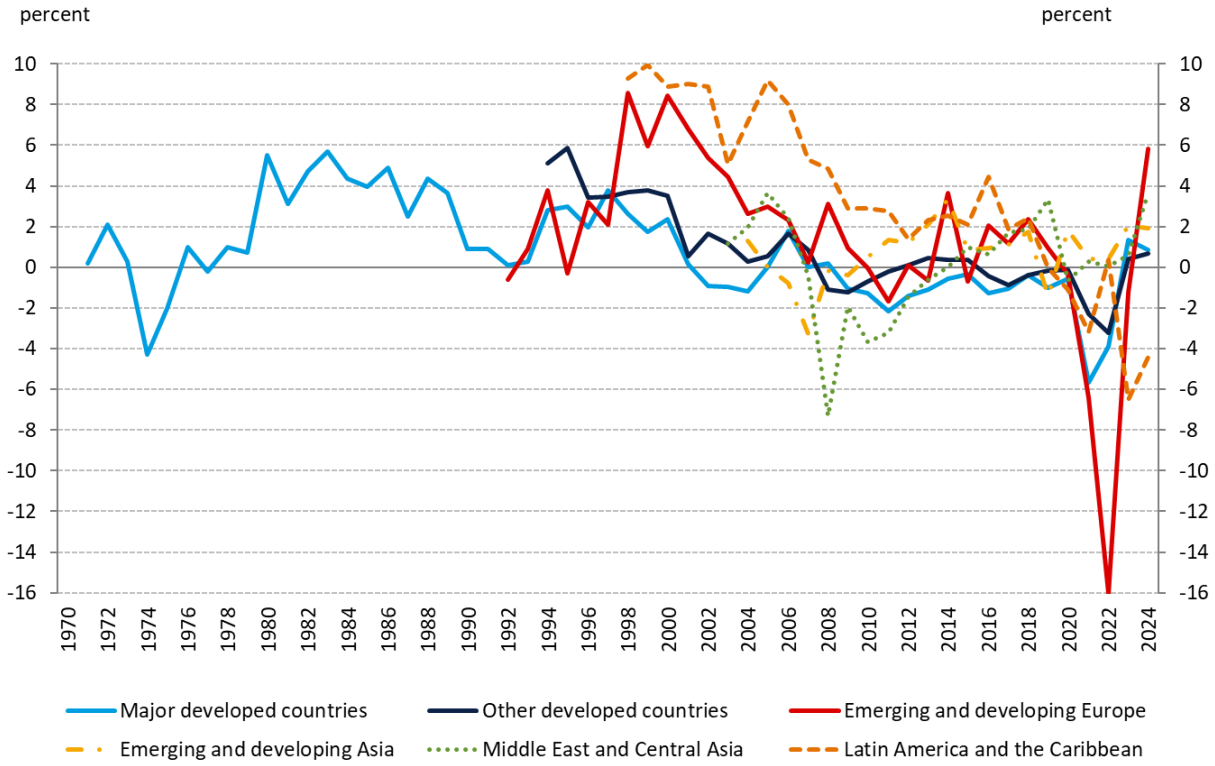
Several characteristics can be identified in backward-looking real interest rates (see Graph 3):

- In advanced economies, backward-looking real interest rates are less volatile than in emerging or developing countries.

[1] Within each country group, the weight of countries' real interest rates was determined based on their GDP measured in current US dollars, as available in the International Monetary Fund database. The weighting of real interest rates for a given year was calculated based on GDP data for the same year.

- Since the late 1990s, there has been a global downward trend in backward-looking real interest rates. The less developed the country, the more pronounced the decline, as backward-looking real interest rates in developed countries were generally no higher than 4–5%.
- Following the global economic crisis of 2008, backward-looking real interest rates in emerging and developing countries were typically close to zero until the 2020s, while in developed countries they were even lower. This means that negative backward-looking real interest rates were typical in developed economies for more than a decade.
- After 2020, in a globally surging inflationary environment, strongly negative backward-looking real interest rates characterised almost all countries without exception. This can be seen between 2020 and 2024. The largest declines are seen in developing and emerging countries, but the decline in the indicator was also higher than previously observed movements in developed countries.

Backward-looking real interest rate trends for selected country groups since 1970 Graph 3

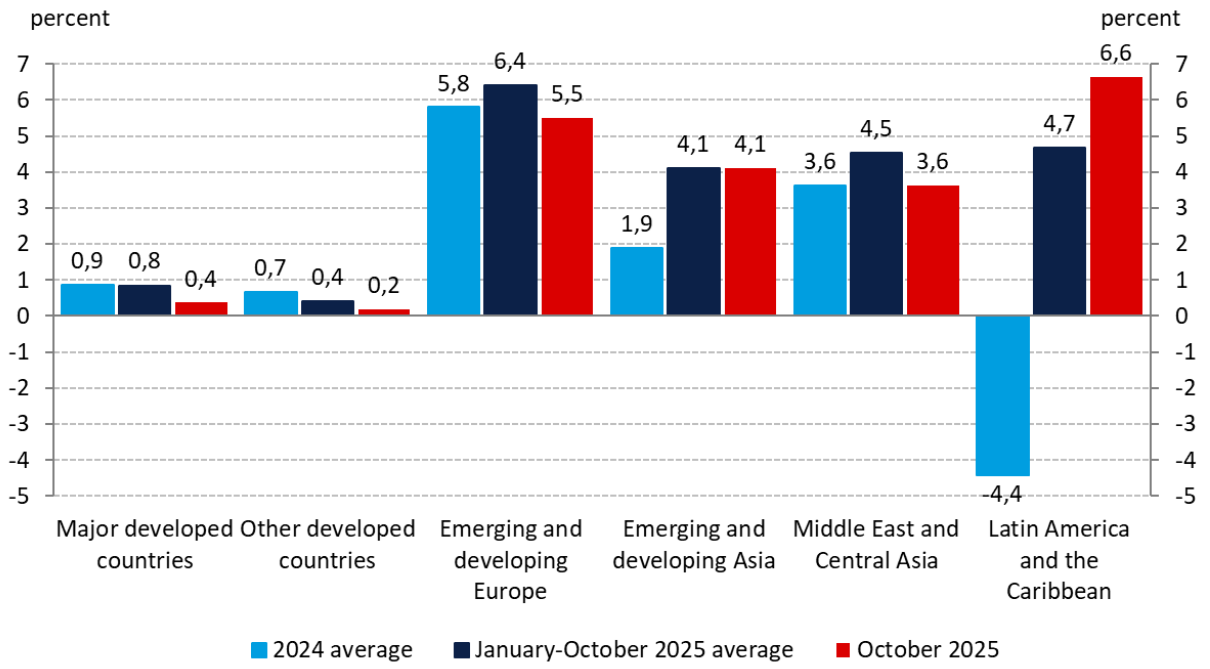


Sources: International Monetary Fund; Bloomberg.

Backward-looking real interest rates have changed only minimally in developed countries in recent times (see Graph 4), while in emerging and developing countries the rate of change has been around 1 to 2 percentage points (pp). The exception is the Latin American and the Caribbean region, where the large increase is due to the Argentine backward-looking real interest rate of the previous year, as the indicator exceeded the -200% level in some months of the previous year. However, in recent months this has turned into positive territory and is characterised by an upward trend.

The extent of the changes also supports our earlier assertion that real interest rates in developed countries are less volatile than those in emerging and developing countries.

Developments in backward-looking real interest rates over the past two years Graph 4



Data for 2025 were available until October at the time of the study.

Sources: International Monetary Fund; Bloomberg.

We also examined the periods characterised by positive and negative real interest rates along the main economic indicators in the United States (real GDP growth, inflation year-on-year, 10-year bond's yields and base rates) (Table 1). Based on these, economic growth was more than 1 pp faster in periods characterised by positive real interest rates, while inflation was 1 pp lower than in the case of negative real interest rates. Smaller differences can be identified in the case of 10-year yields and the base rate, but in both cases the higher values were in periods characterised by positive real interest rates. Based on these simple comparisons, the sign of real interest rates is better explained by higher inflation (1.2 pp differences) than by the difference in base rates (0.5 pp differences).

Table 1: Development of main economic indicators in periods characterised by positive and negative real interest rates and their difference in the United States

Period of positive real rates				Period of negative real rates				Differences			
GDP	Inflation	10-y bond yield	Base rate	GDP	Inflation	10-y bond yield	Base rate	GDP	Inflation	10-y bond yield	Base rate
3.4	**3.8**	**5.4**	**5.0**	**2.4**	**5.0**	**5.1**	**4.5**	**1.0**	**-1.2**	**0.3**	**0.5**

The values are the averages of the examined periods' indicators, in percentage. The differences are in percentage points. The periods were determined as indicated in Graph 1.
Sources: Bloomberg; authors' calculations.

Forward-looking real interest rates

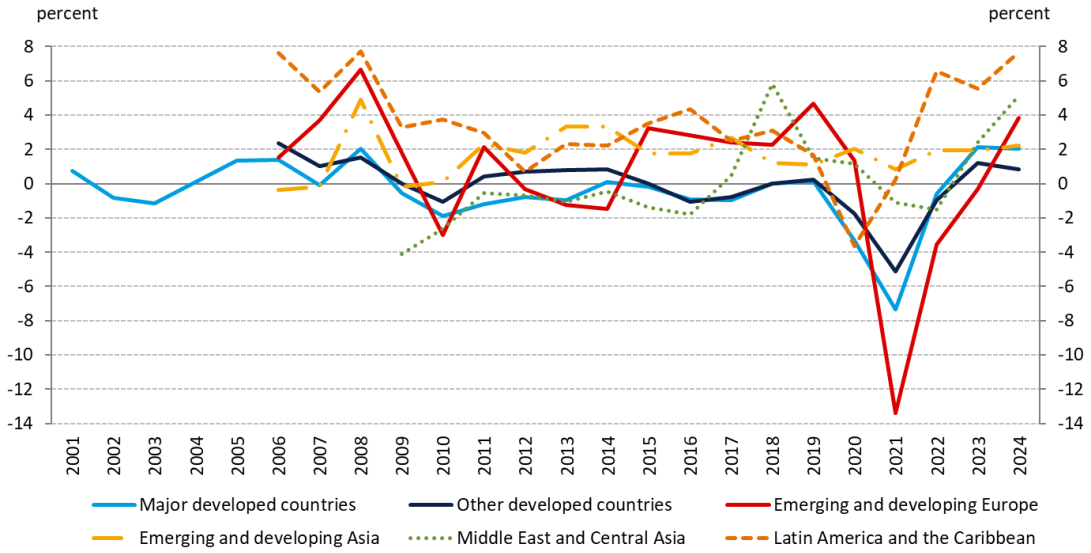
In connection with the analysis of forward-looking (ex ante) real interest rates, the data were calculated based on the country groups examined in the previous section. We calculated forward-looking real interest rates as follows: we subtracted Bloomberg survey's inflation expectations for the coming year from the interbank yields of individual countries for 12 months. This resulted in forward-looking real interest rates for the following year. Country weights were determined by GDP data.

Graph 5 clearly shows that real interest rates remained typically low in developed countries, at 1–3%, until the 2010s. It can be observed that real interest rates in developed countries are lower than in emerging and developing countries, and their volatility is also lower.

The 2010s saw a trend reversal in real interest rates following the 2008 global economic crisis. Because of the deflationary risks, interest rates were extremely low, close to zero (and in some cases below zero) in developed countries, resulting in forward-looking real interest rates falling into negative territory.

As a result of the global inflation shock following 2020, the average forward-looking real interest rate in the observed group of countries fell back into negative territory. In most countries, this was the lowest level of the millennium. Central banks responded to high inflation with massive interest rate hikes, so that by 2023, forward-looking real interest rates had turned positive and have typically remained above zero since then.

Forward-looking real interest rate trends for selected country groups since 2001 Graph 5



Sources: International Monetary Fund; Bloomberg.

The question for the future is whether we will see a trend reversal similar to that of 2010, or whether the period of near-zero and then negative real interest rates will continue in the coming years.

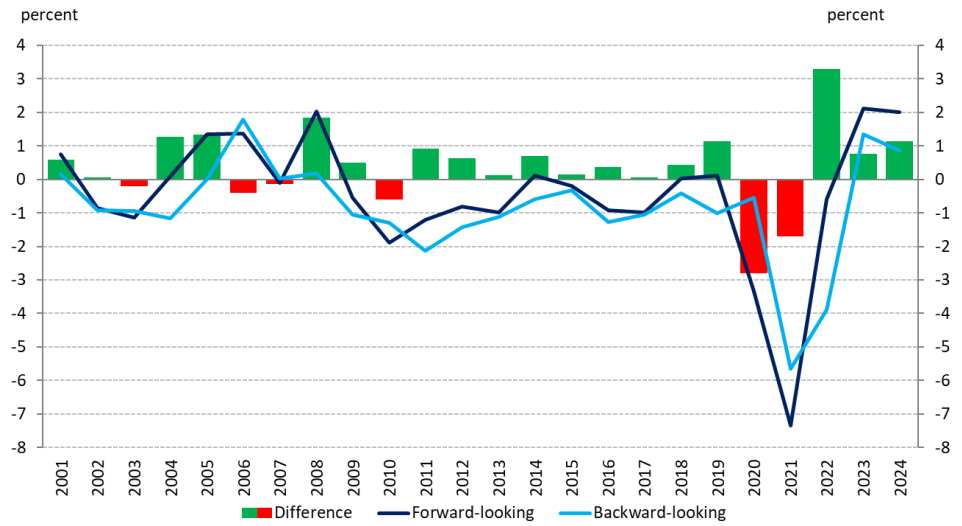
Based on the previous graphs, it can be observed that backward-looking real interest rates are typically more volatile than forward-looking real interest rates. We compared the average real interest rates of a group of countries comprising the most developed economies using both methods (Graph 6). We can draw several conclusions from this:

- In a fundamentally stable economic and market environment, the difference between forward-looking and backward-looking real interest rates is less than 1 pp.
- In most cases, forward-looking real interest rates are higher than backward-looking ones, which may be due – as we have already established – to the time intervals considered in the calculations, which are inconsistent in the case of backward-looking rates.
- The greatest differences between the two methods occur in crisis situations, such as the economic crisis of 2008 and the inflation crisis at the beginning of 2020s. During these periods, it becomes even more important to include economically correct forward-looking real interest rates in the analyses.

The main difference in backward-looking and forward-looking real interest rates lies in the period of inflation, so it is worth examining the difference between actual and expected inflation (Graph 7). In line with real interest rates, we can say that the difference between the two indicators is less spectacular in developed countries, since the rate of price increases in economically developed countries is more balanced, allowing analysts to provide more accurate forecasts. The other parallel is that in times of crisis the differences between expected inflation and actual data increase.

Comparison of forward- and backward-looking real interest rates in major developed countries

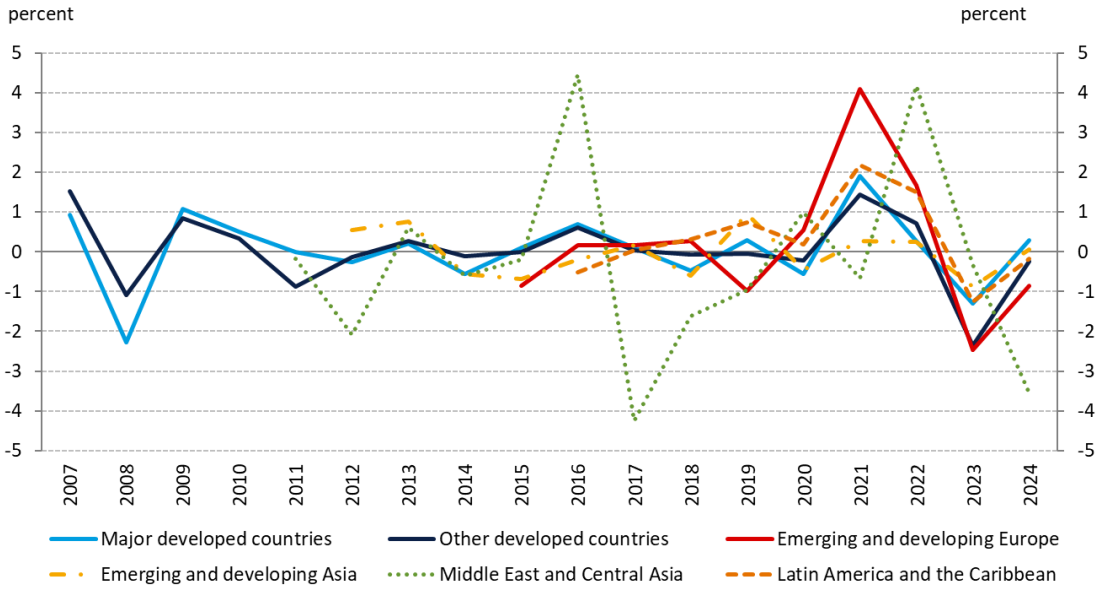
Graph 6



Sources: International Monetary Fund; Bloomberg.

Differences between actual inflation and expected inflation

Graph 7



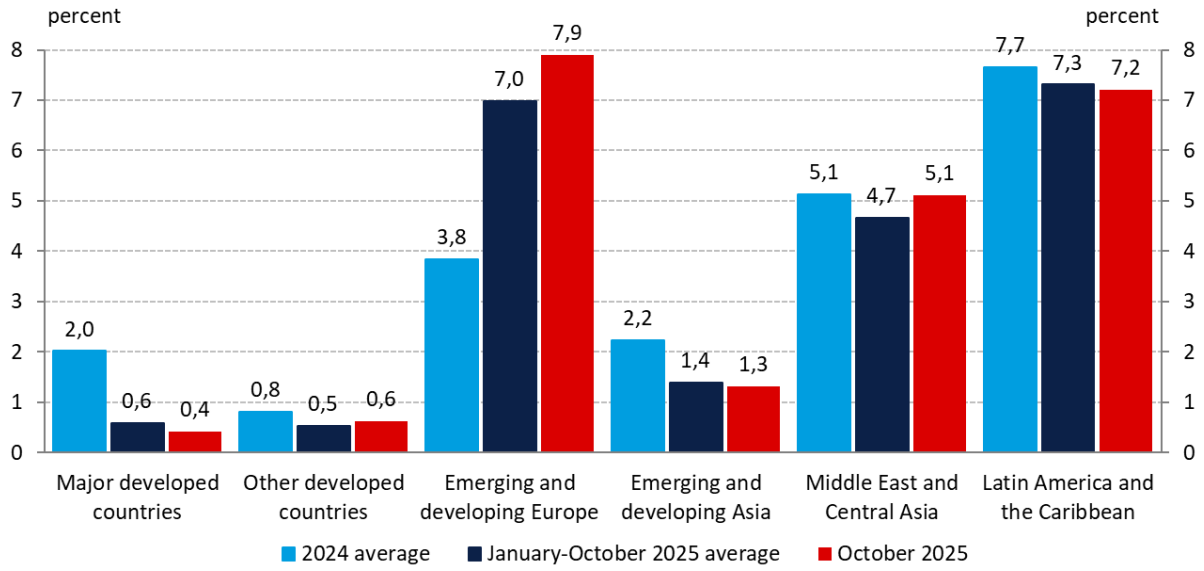
Sources: International Monetary Fund; Bloomberg.

In the case of forward-looking real interest rates, it is also clear that the change is typically smaller in advanced economies (Graph 8). The larger increase in the emerging and developing European group of countries is because the Turkish forward-looking real interest rate was negative in the first half of last year and then

averaged 4.5% in the second half, while its value has been above 10% for a significant part of this year.

It is important to note that forward-looking real interest rates are typically higher than backward-looking real interest rates. This can be explained by the fact that backward-looking real interest rates include higher inflation from previous periods, while forward-looking real interest rates calculate with inflation expectations, which are already at lower levels than the actual data of recent years.

Developments in forward-looking real interest rates over the past two years — Graph 8



Data for 2025 was available until October at the time of the study.

Sources: International Monetary Fund; Bloomberg.

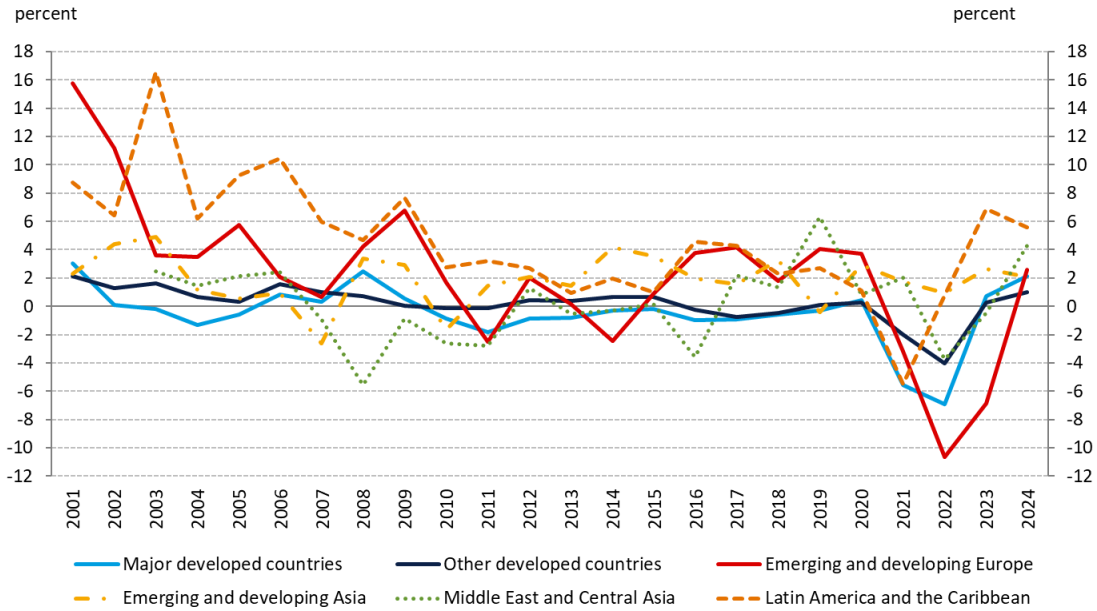
Realised real interest rates

We also obtain results similar to the previous two methods when examining the realised real interest rate method (Graph 9). Among other things, real interest rates are more stable in developed countries and we see larger shifts in the indicator during periods of crisis.

The trend after 2010 is also reflected in realised real interest rates. After 2010, realised real interest rates were negative in the main developed countries; and then in the middle of the decade, the other developed countries also turned into the negative range.

After the inflation shock following 2020, a positive realised real interest rate could be detected in the countries examined almost without exception in 2024.

Realised real interest rate trends for selected country groups since 2001 Graph 9



Sources: International Monetary Fund; Bloomberg.

Real interest rate indicators across different institutions

The real interest rate is a central variable for interpreting monetary conditions, assessing the stance of policy and evaluating macro-financial vulnerabilities. While the conceptual definition is straightforward, institutional practice varies widely.

A comprehensive review of central bank communication and market research shows a systematic difference: central banks rely primarily on forward-looking (ex ante) real rates, whereas investment banks use a mix of ex ante and ex post measures, with ex post definitions dominating. The institutions typically use the policy rate and the current or expected headline inflation rate to calculate the real interest rate. This section summarises these institutional patterns and explains the economic logic behind them.

Table 2: Institutional use of real interest rate measures: ex post versus ex ante approaches

	Central banks	Investment banks	Nominal rate used	Inflation measure used
Backward-looking real rate	18%	60%	Policy rate / Short-term market rate	Headline inflation
Forward-looking real rate	82%	40%	Policy rate / Short-term market rate	1 year expected inflation

The figures indicate the share of each institution using ex post versus ex ante real interest rate measures. The last two columns report the most frequently used nominal rate and inflation indicator for the respective institution.
Sources: Central bank and investment bank analyses; authors' calculations.

Central banks

Central banks predominantly define the real policy rate as a forward-looking indicator: the nominal policy rate minus expected inflation over the horizon relevant for monetary transmission. This expectation may be based on internal staff projections, surveys of analysts or households, or market-implied inflation compensation. While the precise inputs differ, the conceptual motivation is shared across institutions. Central banks adopt an ex ante definition because the real interest rate that influences economic decisions is inherently forward-looking. Agents determine their saving and investment based on expected inflation and the real interest rate, not realised inflation from the past.

Most central banks also highlight that ex post real rates can be misleading, particularly when inflation dynamics are changing rapidly. After a period of high inflation, headline CPI may remain elevated even as expected inflation declines. In such situations, the ex post real rate may appear deeply negative, suggesting loose monetary conditions, even though the ex ante real rate may already be positive and restrictive due to falling expectations. Conversely, when expectations are more pessimistic than current headline inflation, ex post measures can overstate monetary tightness. Although forward-looking real rates form the core of policy assessment, central banks typically monitor additional real-rate concepts (eg simple ex post real rates or sector-specific real rates such as real loan and deposit rates) for descriptive or communication purposes.

In emerging markets, the emphasis on ex ante real rates is similar, although practical considerations differ. Inflation tends to be more volatile, expectations less anchored and market-based measures less reliable. At the same time, ex post real deposit or lending rates frequently appear in communication because they are more tangible for households and firms. Still, the internal policy evaluation overwhelmingly relies on forward-looking real rates.

Investment banks

Investment banks operate under different informational constraints and analytical needs. Their research must be updated frequently, often covers dozens of economies and is consumed by audiences seeking quick, comparable indicators. As a result, investment banks tend to employ a flexible mixture of real-rate concepts.

A structured review of market research shows that approximately 60% of investment bank analyses use ex post real rates, while around 40% use ex ante measures relying on expected inflation. In a non-negligible share of reports, analysts present both metrics side by side, especially in contexts where inflation expectations are shifting. The predominance of ex post real rates reflects operational convenience: they are easy to compute, rely only on publicly available data and provide a uniform benchmark for cross-country comparison. They also offer an intuitive narrative – whether policy rates lie above or below current inflation – that is attractive for client communication.

Markets also display greater heterogeneity in the inputs used to construct real-rate indicators. On the nominal interest rate side, analysts typically use the policy rate or short-term money-market rates (eg 1- to 3-month interbank rates) depending on country coverage and data availability. On the inflation side, the variation is substantial: many analyses use headline year-on-year CPI; others rely on year-on-year core inflation, especially when headline inflation is volatile; and some use annualised month-on-month core inflation, particularly in emerging market coverage, where short-term dynamics matter for trading strategy.

Despite the differences, investment bank usage of ex post real rates is often justified by pragmatic considerations. In normal times, when inflation is stable and expectations are well anchored, the gap between ex ante and ex post real rates is relatively small. Under such conditions, using realised inflation produces a real-rate measure that closely approximates the forward-looking indicator. Only during periods of inflation shocks or credibility shifts does the backward-looking measure diverge meaningfully from the ex ante one; these are precisely the moments when investment bank analyses that incorporate forward-looking real-rate measures can provide a more accurate picture.

Overall, central banks overwhelmingly rely on ex ante real interest rates because they reflect the forward-looking nature of monetary policy and the expectations of economic agents. Investment banks employ a mixed approach, with ex post measures dominating around 60% of analyses due to their simplicity and comparability but ex ante measures still representing a substantial share. Understanding these differing practices, and the conditions under which the two real-rate concepts diverge, is essential for correctly interpreting real interest rate indicators across institutions and for avoiding misjudgements of global monetary conditions.

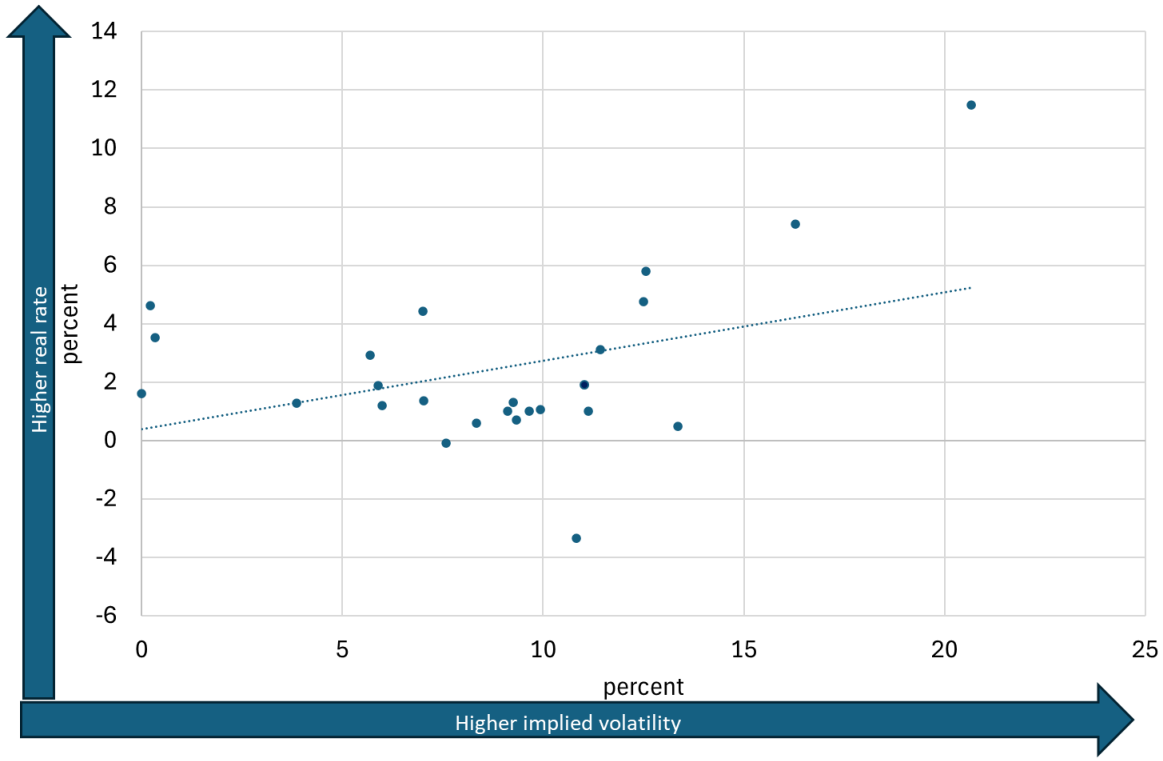
Real rates and risk perception

In theory, nominal interest rates compensate investors for the time value of money, expected inflation and various risk premia embedded in an investment. Adjusting for inflation to obtain the real interest rate provides a clearer measure of the inflation-

adjusted return and facilitates comparisons across markets with differing inflation dynamics.

Emerging markets, however, are typically associated with higher risk profiles, including foreign exchange risk and policy-related uncertainty. Empirical observations suggest that periods of elevated real interest rates have often coincided with higher implied volatility in several emerging market currencies. Real interest rates are commonly used as proxies for expected returns, while option-implied volatility serves as a market-based measure of foreign exchange risk, enabling investors to evaluate relative opportunities across different markets before making allocation decisions. According to our research, a 1 pp higher exchange rate volatility was associated with a 0.25 pp higher forward-looking real interest rate at the end of 2024.

Forward-looking real interest rates and implied volatilities in selected countries Graph 10



Option-implied foreign exchange volatility and forward-looking real rates, on 31 December 2024.

Sources: Bloomberg; authors' calculations.

Conclusion

This study examined the importance of real interest rates as one of the most relevant indicators for monetary policy and market analysis, while highlighting the methodological differences between forward-looking and backward-looking measures. Central banks rely primarily on forward-looking real rates because they

reflect expectations that drive economic decisions, whereas investment banks often use ex post measures for simplicity and comparability. Our findings show that real interest rates globally have returned to positive territory. The question is whether this is a temporary change or the beginning of a more permanent period.

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Indonesia: implications of global financial structural shifts

Bank Indonesia

Executive summary

Since the Great Financial Crisis, the global financial system has undergone structural transformation. Financial intermediation has increasingly shifted away from traditional bank-based models towards more market-based forms of finance, accompanied by the rapid expansion of non-bank financial intermediaries (NBFIs) (BIS (2025)), although these vary from one country to another.

These developments in general have altered the composition, volatility and transmission of global capital flows, increasing the sensitivity of many emerging market economies (EMEs) to global financial conditions, shifts in investor risk appetite and valuation effects. More recently, the growing digitalisation of finance, including the rise of cryptoassets and stablecoins, has introduced additional potential channels for cross-border capital movements and raised new questions regarding exchange rate dynamics, capital flow management and monetary policy effectiveness.

This short note assesses how these global financial structural shifts have affected Indonesia as an EME. The note provides the implications of the global financial structural shift for Indonesia's international investment position, gross capital flows, investor composition, exchange rate dynamics, domestic financial conditions, and conduct of monetary and macroprudential policy. While Indonesia's exposure to global financial conditions has moderately increased, the macro-financial transmission of NBFIs and cryptoassets remains limited at this stage. Indonesia's external position continues to be driven primarily by conventional capital flows, particularly foreign direct investment and portfolio investment, as well as valuation effects on traditional financial instruments. Domestic financial conditions have remained resilient through recent global stress episodes, supported by solid macroeconomic fundamentals and a comprehensive, well-coordinated policy mix.

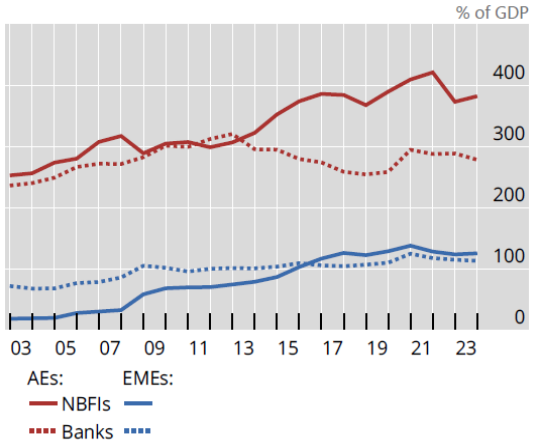
1. Global financial structural shifts: background and context

Since the Great Financial Crisis, the structure of the global financial system has changed markedly. Bank-based intermediation has gradually given way to more market-based financing, reflected in the rapid expansion of NBFIs. In advanced economies, NBFI assets have grown to exceed those of the banking sector and now average around 400% of gross domestic product (GDP) (see Graph 1). This expansion has been driven by post-crisis regulatory reforms, prolonged periods of low interest rates and investors' search for yield, all of which have reshaped the allocation of global capital. In EMEs, NBFIs remain smaller in relative terms, but their assets have also grown steadily, in some cases overtaking banks in size (BIS (2025)).

This shift towards market-based intermediation has been accompanied by important changes in the structure of debt financing. While bank lending remains an important source of financing for households and firms, bond market financing has expanded more rapidly, particularly since 2020 (see Graph 2). Governments have become the largest borrowers in global debt markets. As a result, sovereign bond markets have assumed greater importance in the transmission of global financial conditions, particularly through valuation effects, benchmark-driven investor behaviour and exchange rate dynamics (Chan et al (2025)).

Financial assets on NBFIs have overtaken banks

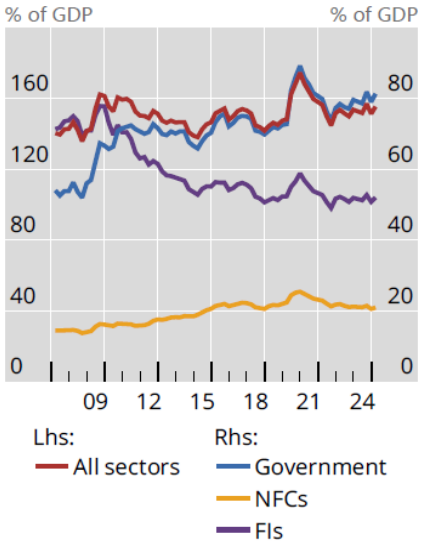
(median across 7 AEs and 12 EMEs) Graph 1



Source: BIS GEM, 2025.

Bonds as a share of global GDP

(share of the global total) Graph 2

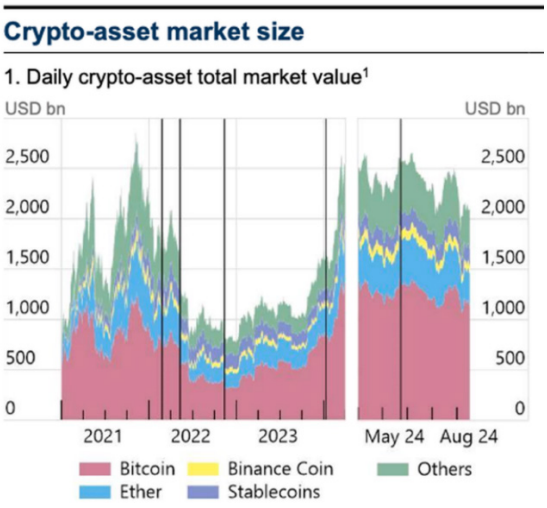


Source: BIS, Quarterly Review, September 2025.

Alongside these structural shifts in market-based finance, crypto assetcryptoassets have emerged as a new asset, although their systemic impact remains limited. According to the FSB-IMF crypto assetcryptoasset policy roadmap of the Financial Stability Board and the International Monetary Fund (FSB-IMF (2024)), financial stability risks from crypto markets are still contained. As of 30 August 2024, the estimated market value of the crypto market was $2.2 trillion, largely driven largely by the price increases of Bbitcoin and Eether, which represent almost 80% of the crypto-asset total market value.

However, the total crypto assetcryptoassets remain a small portion (less than 1%) of global financial system assets (see Graph 3). Regarding the stablecoins, the market value is gradually increasing from 2023, but their use for payment and settlement in the real economy is still very limited (FSB-IMF (2024)).(FSB, IMF, 2024). According to a survey by the BIS, the use of stablecoins for payments outside the crypto ecosystem, however, is still extremely limited, regardless of the payment purpose , (see Graph 4). Mmore than half of central banks indicated that the use of stablecoins within their jurisdictions is still trivial or negligible (Di Iorio et al (2024)). (Di Iorio, Kosse, & Ilaria, 2024).

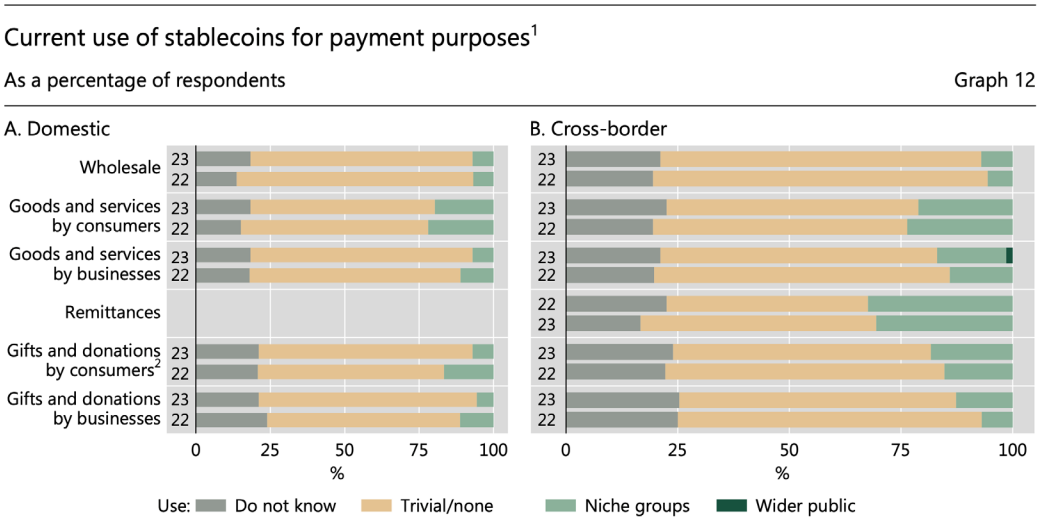
Daily cryptoasset total market value — Graph 3



[1] The vertical lines indicate 23 February 2022, the day before the start of the Russia-Ukraine war; 9 May 2022, the day TerraUSD started to significantly decouple from its peg; 11 November 2022, the day FTX filed for bankruptcy; 10 January 2024, the day the SEC approved 11 spot bitcoin ETPs; and 23 May 2024, the day the SEC approved eight spot Ethereum ETPs.

Source: FSB-IMF, *G20 Crypto-Asset Policy Implementation Roadmap*, 2024.

Current use of stablecoins for payment purposes[i] Graph 4



Wider public = used by different groups of consumers/businesses but still for a small share of their total payments made for a particular payment purpose; niche groups = used mainly by a particular group of consumers/businesses and for a small share of their total payments made for a particular payment purpose; trivial/none = hardly used by anyone, and those who do, use it only for a tiny fraction of their total payments made for a particular payment purpose.

[i] Apart from potentially being used in decentralised finance. The sample includes only central banks that have replied to the survey since 2022.

Source: BIS central bank surveys on central bank digital currency and crypto, 2022–23.

For EMEs, these global structural shifts, including the expansion of NBFIs and changes in bank lending patterns, have raised concerns regarding increased exposure to global risk sentiment and the procyclicality of capital flows. At the same time, the digitalisation of finance, including the emergence of cryptoassets and stablecoins, has introduced new, albeit still evolving, channels for cross-border financial flows that may interact with traditional capital flow dynamics.

2. Indonesia's exposure to global financial structural shifts

Global financial structural shifts have resulted in a moderate increase in exposure to global financial conditions for Indonesia, rather than a significant or disruptive change. This reflects Indonesia's relatively diversified capital flow structure, the continued dominance of conventional investment channels and the presence of a large and stable domestic investor base. While Indonesia remains integrated into global financial markets and is affected by global financial cycles, the transmission of structural changes in the global financial system has so far remained contained.

A key factor underpinning this assessment is the role of NBFIs in Indonesia's financial system. NBFIs have continued to transform domestic financial intermediation by broadening sources of financing beyond the banking sector. Their primary contribution has been to enhance access to finance for households and micro, small and medium-sized enterprises (MSMEs), particularly in segments not

fully served by banks. This has occurred through financing companies, venture capital firms, microfinance institutions, digital lending platforms and pawn-broking services.

Despite this expansion, NBFIs remain a relatively small part of Indonesia's financial system, accounting for around 21% of total financial sector assets. Moreover, the growth of NBFI intermediation moderated in 2025, with financing expanding by 3.71% year-on-year in the first half of the year, driven mainly by financing companies. Risk indicators suggest that credit risk remains contained across the sector, with non-performing financing ratios remaining low (the risk profile of financing companies remains controlled with gross non-performing financing (NPF) = 2.52 %, net NPF = 0.88 % (July 2025)). Importantly, interconnectedness between NBFIs and the banking sector remains limited, with asset and liability exposures of around 3%. This limited interconnectedness significantly reduces the risk of spillovers from NBFIs to the broader financial system, even during periods of heightened global financial stress.

3. International investment position and gross capital flows

Indonesia's external position continues to be shaped primarily by foreign direct investment and portfolio investment (Graphs 5 and 6). Direct investment liabilities recorded surpluses, driven by foreign equity inflows into sectors such as manufacturing, wholesale and retail trade, and mining and quarrying. These flows reflect continued investor confidence in Indonesia's medium-term growth prospects and domestic economic fundamentals. Portfolio investment flows also contributed to changes in the international investment position.

At the end of the third quarter of 2025, Indonesia's international investment position recorded a net liability of USD 262.9 billion, equivalent to 18.3% of GDP, increasing from USD 244.5 billion or 17.2% of GDP in the previous quarter. The latest developments were driven mainly by a larger increase in foreign financial liabilities, resulting from ongoing foreign capital inflows into direct investment and higher valuations of domestic financial instruments.

On the liability side, foreign financial liabilities rose to USD 803.9 billion and continued to be dominated by direct investment and portfolio investment (Graph 7). Direct investment amounted to USD 336.9 billion, driven primarily by equity capital in line with foreign capital investment in several sectors, including the manufacturing industry, wholesale and retail trade, and the mining and quarrying sector, thus reflecting maintained investor confidence in the promising economic outlook and conducive investment climate. Portfolio investment liabilities reached USD 278.2 billion, driven primarily by an increase in the position of equity capital. On the asset side, foreign financial assets increased to USD 541.1 billion, supported by higher prices of gold, global equities and assets prices in several placement countries.

International investment positions

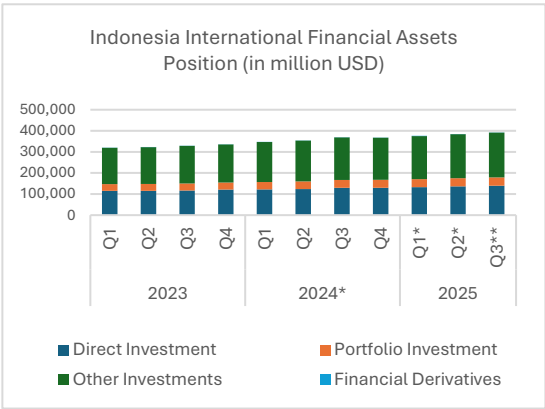
(in USD millions) Graph 5

*) preliminary figures; **) very preliminary figures

Source: Bank Indonesia, *Indonesia international investment position Q3 2025*.

Indonesia international financial asset position

(in USD millions) Graph 6

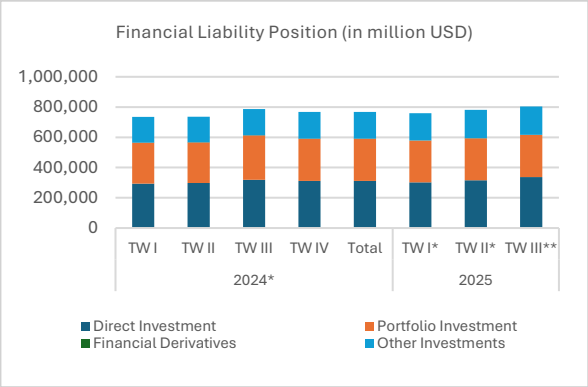


*) preliminary figures; **) very preliminary figures

Source: Bank Indonesia, *Indonesia international investment position Q3 2025*.

Indonesia international liability positions

(in USD millions) Graph 7



Source: Bank Indonesia, *Indonesia International Investment Position Report Q3 2025*.

4. Government bond and equity market structure

Indonesia's government bond market has expanded significantly in recent years and plays a central role in the transmission of global and domestic financial conditions. As of 31 October 2025, the outstanding amount of tradable rupiah-denominated government securities amounted to IDR 5,313.1 trillion for conventional bonds and IDR 1,153.7 trillion for sharia-compliant securities. Domestic investors held most of these securities as of 31 October 2025 (DJPPR (2025)). Non-resident holdings of rupiah-denominated government securities amounted to IDR 878.1 trillion, including holdings by foreign governments and central banks.

This ownership structure highlights the dominant role of domestic investors in Indonesia's sovereign bond market and provides an important buffer against sudden capital flow reversals. The large and diversified domestic investor base helps reduce the sensitivity of government bond yields to global risk sentiment and benchmark-driven portfolio reallocations.

Historical ownership data for rupiah-denominated Indonesian government securities (SBN) confirm this pattern, with domestic investors consistently accounting for most holdings. Foreign investor participation declined during 2019–22, reflecting a combination of global risk-off sentiment during the Covid-19 pandemic, aggressive monetary tightening in advanced economies and portfolio reallocations to save haven assets. This was followed by a modest recovery since 2022.

A similar pattern is observed in Indonesia's equity market. As of 31 October 2025, total listed equity value amounted to IDR 8,722.2 trillion (see Table 1). Domestic investors accounted for 56.16% of market capitalisation, while foreign investors held 43.84%. Although foreign participation remains significant, the majority domestic ownership contributes to market resilience during periods of global financial volatility and mitigates the risk of abrupt capital outflows.

Domestic equity ownership by local and foreign investors* Table 1

Category	Local	Foreign	Total
Share (%)	56.16%	43.84%	100%
Value (in trillion rupiah)	4,898.28	3,823.72	8,722.15

*As of 31 October 2025

Source: KSEI Capital Market Statistics.

5. Exchange rate dynamics and domestic financial conditions

Throughout 2025, heightened global uncertainty driven by global growth concerns, geopolitical and trade fragmentation, and uncertainty over the future path of monetary policy in major advanced economies led to capital outflows from many EMEs, including Indonesia. Non-resident investors recorded net sales in equities, government securities and Bank Indonesia Rupiah Securities (net sales of IDR 32.17 trillion in the equity market, IDR 6.52 trillion in the SBN market, and IDR 143.83 trillion in Bank Indonesia Rupiah Securities (SRBI), based on settlement data as of 20 November 2025 (Bank Indonesia (2025b)). Despite these outflows, Indonesia's domestic financial markets remained stable, supported by ample liquidity conditions and an accommodative policy stance, underpinned by Bank Indonesia's monetary policy and coordination with fiscal authority.

During this period, domestic money market and government bond yields declined markedly amid ample liquidity conditions. Money market interest rates declined, as reflected in the decline of SRBI yields for 6–12-month tenors by 256–261 bp (as of 14 November 2025). Government bond yields also fell, with 2-year SBN yields declining by 224 bp and 10-year SBN yields decreasing by 83 bp over the course of 2025 (as of 20 November 2025).

These reflect strong liquidity provision by Bank Indonesia and effective coordination with fiscal authorities. This outcome indicates that while capital flows and exchange rate movements influence domestic financial conditions, their impact remains moderate and is largely mitigated by domestic policy frameworks and macroeconomic fundamentals. Indonesia's experience suggests that capital flows have not exhibited excessive procyclicality in their transmission to domestic financial conditions.

More recent developments further indicate that domestic financial conditions have remained stable despite a build-up of pressures stemming from heightened global financial market uncertainty. This resilience can be attributed to a combination of solid macroeconomic fundamentals and consistent policy implementation. Bank Indonesia has remained firmly committed to maintaining rupiah stability through a well-calibrated and consistent policy mix, supported by close coordination with the Government and other relevant authorities. In parallel, Indonesia's solid economic performance – characterised by low inflation, a sound

balance of payments position with a low current account deficit, positive growth prospects and attractive yields – has continued to support investor confidence and sustained capital inflows, particularly into government bonds, thereby reinforcing exchange rate stability. In addition, the implementation of the new regulation on export proceeds from natural resources (DHE SDA), as stipulated in Government Regulation No. 8/2025, has encouraged greater conversion of US dollar export earnings into rupiah. This has increased foreign exchange supply in the domestic market, further supporting exchange rate stability and strengthening overall macroeconomic resilience.

6. Cryptoassets and cross-border digital flows

Indonesia's cryptoasset market has expanded rapidly in terms of participation, with the number of cryptoasset consumers reaching 18.08 million as of August 2025 (see Table 2). This growth has been driven predominantly by domestic individual investors, which account for most users, while foreign participation remains very limited. Data on ownership structure indicate that Indonesian citizens represent almost all individual crypto users, whereas foreign individual investors number fewer than 40,000. Participation by entities, both domestic and international, remains marginal relative to individual users. Overall, these patterns suggest that the expansion of cryptoasset participation in Indonesia has been broad-based domestically but has not been accompanied by significant foreign involvement.

Cryptoasset ownership by local and foreign investors — Table 2

Number of cryptoasset consumers based on ownership								
No	Number of cryptoasset consumers		Period					
			Feb 2025	Mar 2025	Apr 2025	May 2025	Jun 2025	Jul 2025	Aug 2025
1	Individual	Indonesian citizen	13,278,892	13,675,106	14,118,651	15,034,052	15,812,156	16,463,689	18,042,004
		Foreign citizen	29,728	36,610	36,850	37,200	37,477	37,765	38,476
2	Entity	Domestic	367	398	418	440	469	509	559
		International	214	220	229	242	256	265	270
Total			**13,309,201**	**13,712,334**	**14,156,148**	**15,071,934**	**15,850,358**	**16,502,228**	**18,081,309**

Source: OJK, Statistics on Digital Financial Assets and Cryptoassets, 2025.

Despite the rapid increase in the number of users, household exposure to cryptoassets remains modest. Crypto holdings account for only about 0.84% of total household financial assets and approximately 1.81% of household third-party funds. This indicates that cryptoassets continue to represent a relatively small component of household balance sheets and do not constitute a major channel of financial intermediation within the Indonesian financial system. Moreover, most crypto transactions in Indonesia are conducted through domestic trading platforms, which implies that traceable cross-border crypto flows remain limited.

Cryptoasset transaction values in Indonesia during 2025 exhibited notable volatility rather than a sustained upward trend (see Table 3). Transaction values declined from IDR 41.3 trillion in January to around IDR32 trillion in February and

March, before recovering moderately in April. A more pronounced increase was observed in May, when transaction values rose to nearly IDR 49.6 trillion, reflecting a temporary surge in market activity. This momentum weakened again in June, followed by a sharp rebound in July, which recorded the highest transaction value during the period at IDR 52.5 trillion. In August, transaction values moderated to IDR 45.2 trillion. These fluctuations suggest that crypto market activity in Indonesia remains highly sensitive to market sentiment and price dynamics rather than reflecting a steady expansion of systemic financial use.

Cryptoassets transaction value in Indonesia — Table 3

Cryptoasset transaction value (in IDR trillions)	Period							
	Jan 2025	Feb 2025	Mar 2025	Apr 2025	May 2025	Jun 2025	Jul 2025	Aug 2025
	41.30	32.72	32.45	35.61	49.60	32.31	52.46	45.21

Source: OJK, Statistics on Digital Financial Assets and Cryptoassets, 2025.

The use of cryptoassets in Indonesia is subject to a strict and clearly defined regulatory framework that limits their scope and systemic relevance. Under the prevailing legal regime, cryptoassets are classified as digital commodities rather than as means of payment or instruments within the formal financial system. This framework is anchored in Law Number 7 of 2011 on Currency, which establishes the rupiah as the sole legal tender in the territory of the Republic of Indonesia. Consequently, the use of cryptoassets as a means of payment is prohibited. As a result, crypto-related activities in Indonesia are largely confined to investment and trading purposes, significantly constraining their transmission to the payment system and the broader financial system.

Consistent with this regulatory treatment, the macro-financial impact of cryptoassets in Indonesia has so far remained limited. Bank Indonesia's international investment position data do not indicate any identifiable impact of crypto activity on either foreign financial assets or foreign financial liabilities. Moreover, Indonesia reports no significant macro-financial impact from cross-border crypto or stablecoin flows, as there has been no observable effect on capital flows, exchange rate dynamics or monetary policy transmission. Stablecoins are not recognised as legal tender, and the rupiah remains the sole legal means of payment. Cryptoassets are regulated as financial assets under the supervision of the Financial Services Authority (OJK), which has helped contain risks related to currency substitution, circumvention of capital flow management measures and broader financial instability. Despite the rapid expansion of the domestic crypto user base and intermittent increases in transaction values, cryptoassets currently play only a marginal role in Indonesia's external position and overall macro-financial dynamics.

7. Monetary policy, financial conditions and the policy mix

Changes in US monetary policy and global financial conditions affect Indonesia primarily through shifts in global risk appetite and portfolio rebalancing, which influence capital flows and the relative attractiveness of emerging market assets. Movements in the federal funds rate and US Treasury yields are therefore closely monitored by Bank Indonesia, as increases in US yields tend to prompt portfolio adjustments, higher risk premia and upward pressure on domestic government bond yields.

Empirical analysis conducted by Bank Indonesia indicates that increases in US long-term Treasury yields are associated with positive but inelastic increases in Indonesia's long-term local-currency government bond yields. Specifically, a 1 percentage point rise in the US 10-year Treasury yield is linked to an increase in the domestic 10-year government bond yield with a pass-through coefficient of less than one. This finding underscores the influence of global financial conditions on domestic financial markets while also highlighting the important role of domestic macroeconomic fundamentals and policy frameworks in moderating the transmission of external spillovers.

Indonesia has deployed a comprehensive and well-sequenced policy mix during recent periods of heightened stress, including the Covid-19 pandemic, the global monetary tightening cycle beginning in early 2022 and episodes of elevated geopolitical tension. This policy mix has combined adjustments to the policy rate, prudent purchases of government securities, foreign exchange market intervention and accommodative macroprudential measures. According to Indonesia's self-assessment, these measures have been effective to very effective in maintaining macroeconomic stability, safeguarding financial system resilience and supporting exchange rate stability.

Regarding monetary policy, during the Covid-19 pandemic, Bank Indonesia responded decisively to the sharp contraction in economic activity and heightened financial market stress. Between early 2020 and February 2021, Bank Indonesia gradually reduced the 7-Day Reverse Repo Rate by a cumulative 150 bp, consistent with subdued inflationary pressures and the need to support economic recovery. At the same time, Bank Indonesia implemented large-scale quantitative easing measures by injecting substantial liquidity into the banking system, amounting to approximately IDR 726.6 trillion in 2020, with further expansion in early 2021. Liquidity provision was conducted through a range of instruments, including purchases of government securities in both the primary (under Perppu No 1/2020 only during the Covid-19 pandemic) and secondary markets.

During the global rate hike cycle from early 2022 to mid-2023, Bank Indonesia adopted a pro-stability monetary stance. The policy rate was gradually increased from its post-pandemic low to contain inflationary pressures and preserve the attractiveness of rupiah-denominated assets. Exchange rate stabilisation was reinforced through a "triple intervention" strategy, encompassing spot foreign exchange intervention, Domestic Non-Deliverable Forwards (DNDF) and purchases of government bonds in the secondary market. At the same time, macroprudential and payment system policies remained accommodative to support credit growth and economic recovery, ensuring that the overall policy mix balanced inflation and exchange rate stability with the need to sustain domestic growth momentum.

In response to escalating geopolitical tensions and capital outflow pressures that led to rupiah depreciation in April 2024, Bank Indonesia adopted pre-emptive and forward-looking measures. The policy rate was increased by 25 basis points (bp) to 6.25% to strengthen exchange rate stability and ensure inflation remained within the 2.5±1% target range for 2024–25. This action was complemented by strengthened foreign exchange market stabilisation through spot intervention, DNDF operations and secondary-market government bond purchases. In parallel, Bank Indonesia optimised the use of SRBI, SVBI and SUVBI instruments to attract portfolio inflows, while maintaining an accommodative macroprudential stance to support banking intermediation and domestic economic recovery.

Following the April 2024 policy adjustment, Bank Indonesia maintained a tight and data-dependent monetary policy stance: keeping the policy rate at 6.25% for an extended period through most of 2024 to maintain exchange rate stability, anchoring inflation expectations within the target range and preserving portfolio inflows amid elevated global financial uncertainty. As external pressures gradually eased, global financial conditions became less restrictive, and domestic inflation showed a sustained moderation, Bank Indonesia began a cautious and calibrated easing cycle, lowering the policy rate to 4.75% towards the end of 2025.

Monetary easing was complemented by a broad set of macroprudential policies aimed at sustaining credit flows and mitigating financial stability risks. Bank Indonesia implemented a series of liquidity-enhancing measures during 2020. In addition to reductions in reserve requirements, Bank Indonesia temporarily removed additional reserve requirement penalties for banks that failed to meet the Macroprudential Intermediation Ratio (RIM) target range of 84–94%, effectively reducing both upper and lower disincentive parameters to zero. This measure provided additional liquidity to the banking sector amounting to approximately IDR 15.8 trillion. Further liquidity support was provided through a 50-bp reserve requirement incentive for banks extending credit to MSMEs and export-import activities, as well as for banks expanding credit to priority sectors under the Task Force Chief for National Economic Recovery (PEN) programme. Liquidity support was also extended to banks restructuring MSME and ultra-micro loans, helping to maintain credit flows at lower cost and support economic recovery.

To preserve banking sector resilience while supporting intermediation, Bank Indonesia maintained the countercyclical capital buffer (CCyB) at 0% throughout 2020. At the same time, the Macroprudential Liquidity Buffer (Penyangga Likuiditas Makroprudensial-PLM/PLM Syariah) was strengthened in line with monetary expansion through reserve requirement reductions effective 1 May 2020. The PLM ratio was increased from 4% to 6% of rupiah third-party funds for conventional banks and to 4.5% for Islamic banks, with compliance required through holdings of government securities purchased in the primary market. In parallel, Bank Indonesia lowered minimum down-payment requirements for environmentally friendly vehicle loans and financing to 0%, effective 1 October 2020, to further support domestic demand.

In 2021, Bank Indonesia continued its accommodative macroprudential stance while gradually normalising selected instruments in line with improving economic conditions. Loan-to-value (LTV) and financing-to-value (FTV) ratios for property loans and down-payment requirements for motor vehicle loans were relaxed to 0% from 1 March 2021, in close coordination with the Government and the OJK,

which had introduced complementary measures to stimulate the property and automotive sectors. Bank Indonesia also began publishing assessments of banks' base lending rate transparency in February 2021 to strengthen the transmission of monetary and macroprudential easing. As economic conditions improved, the RIM was gradually reactivated, with the lower bound raised to 75% in May 2021, 80% in September 2021 and 84% in January 2022. Export bills were incorporated into the RIM calculation, while accommodative liquidity conditions were maintained through a CCyB of 0% and a PLM ratio of 6%, with PLM instruments fully eligible for repo transactions with Bank Indonesia.

During this period, Bank Indonesia also refined its MSME Credit Ratio framework into the Macroprudential Inclusive Financing Ratio (RPIM). The refinement aimed to broaden financial inclusion by expanding the financing target beyond MSMEs to include MSME corporations and low-income individuals. Greater flexibility was provided to banks by widening eligible financing modalities, including direct and supply-chain-based financing; financing through financial institutions and service agencies such as rural banks (BPR/BPRS), fintech platforms, Permodalan Nasional Madani (PNM) and Sarana Multigriya Finansial (SMF); and financing through the purchase of securities linked to inclusive financing, including Inclusive SBN, Inclusive Medium Term Notes and Inclusive Asset Backed Securities (*Efek Beragun Aset (EBA) Inklusif*).

Beyond cyclical responses, macroprudential policy during 2024–25 was designed to maintain financial system stability and ensure balanced and high-quality intermediation in the domestic economy. In 2024, Bank Indonesia maintained a pro-growth macroprudential stance, with the Macroprudential Liquidity Incentive (KLM) emerging as the central instrument. The KLM incentive was progressively expanded from 1.0% of third-party funds at its introduction to 2.8% in April 2023 and 4.0% in October 2023, while sectoral coverage was broadened to include 46 priority subsectors. In 2024, the priority list was further expanded to include mineral down-streaming, agriculture, livestock, plantations, fisheries, construction, housing (including affordable housing), tourism, the creative economy, MSMEs/KUR and ultra-micro financing, positioning KLM as a more targeted and powerful tool than general reserve requirement easing.

Other macroprudential instruments remained accommodative, including a flexible PLM ratio, 100% LTV/FTV ratios for property loans, a 0% down-payment requirement for vehicle loans, a RIM range of 84–94%, a CCyB of 0%, the RPIM framework and strengthened transparency of banks' base lending rates. The period also saw the introduction of the Foreign Funding Ratio (RPLN), with a 30% ceiling and a dynamic countercyclical parameter of 5%, to strengthen banks' foreign funding management through a risk-based and countercyclical approach.

Entering 2025, Bank Indonesia maintained an accommodative macroprudential stance focused on expanding banks' lending capacity, particularly to priority and labour-intensive sectors aligned with the Government's Asta Cita agenda. Effective 1 April 2025, the KLM incentive was further strengthened beyond the previous 4% threshold and sharpened towards sectors with high multiplier and employment effects, notably agriculture and housing. In parallel, the RPLN framework was eased by raising the ceiling from 30% to 35% and increasing the countercyclical parameter from 0% to +5%, providing banks with greater flexibility to access foreign funding while maintaining prudential safeguards.

Further enhancements to KLM were announced in December 2025 through a forward-looking and performance-based mechanism. The refined framework introduced incentives linked both to banks' lending commitments to priority sectors and to the speed of adjustment of lending rates to Bank Indonesia's policy rate. Under this framework, lending channel incentives of up to 5% of third-party funds and interest-rate channel incentives of up to 0.5% of third-party funds could be granted, bringing the total potential incentive to 5.5%. Incentive allocation also incorporated adjustment factors based on the realisation of credit growth relative to prior commitments.

To further strengthen domestic liquidity management, Bank Indonesia reduced the PLM ratio effective 1 June 2025 and lowered the repo flexibility threshold, providing banks with greater room to mobilise liquidity for lending. Other macroprudential instruments remained accommodative, including the RIM range of 84–94%, a CCyB of 0%, extended 100% LTV/FTV ratios and 0% down-payment requirements through end-2025, and continued implementation of the RPIM framework. Bank Indonesia implemented close coordination with the Financial System Stability Committee (KSSK) to maintain financial system stability and revive lending to priority sectors, thereby supporting economic growth, exports and financial inclusion.

Bank Indonesia monitors domestic financial conditions through the Financial System Stability Index (FSSI), which serves as a comprehensive indicator of financial system soundness. The FSSI is used primarily for macroprudential surveillance, crisis management and financial stability assessments. While the index informs policy discussions and supports decision-making, it is not used directly as an operational tool for monetary policy.

The FSSI is composed of three main components: the Resilience Index, the Intermediation Index and the Efficiency Index, with respective weights of 70%, 20% and 10%. The Resilience Index captures vulnerabilities in the financial system across multiple risk dimensions. Credit risk is assessed using indicators such as the Domestic Systemically Important Bank (D-SIB) score, banks' non-performing loan (NPL) ratios and NPF ratios of other financial corporations (OFCs). Liquidity risk is measured through the D-SIB score, banks' total asset-to-securities gaps and OFCs' current liabilities-to-current assets ratios. Capital risk indicators include the D-SIB score, banks' capital adequacy ratios and OFCs' capital-to-asset ratios. Market exposure risk is captured using the D-SIB score, monthly average foreign exchange returns, net open positions, indicators from the inter-dealer market association and banks' holdings of sovereign bonds, including trading and available-for-sale securities. Market risk is assessed using global and domestic volatility indicators, including the VIX, the 10-year government bond yield, average monthly USD/IDR exchange rate volatility and Jakarta Composite Index volatility. The D-SIB score reflects the domestic systemic importance of individual banks across these risk categories.

The Intermediation Index is weighted by the respective lending shares of banks and OFCs and captures developments in financial intermediation through indicators such as banks' lending growth, loan-to-deposit ratios and OFCs' financing growth. Meanwhile, the Efficiency Index, also weighted by intermediary shares, evaluates the performance of banks and OFCs using indicators such as net interest margins and operating cost-to-income ratios.

The selection and weighting of indicators within the FSSI are determined using a combination of principal component analysis and professional judgment. Methodologically, the FSSI serves three primary purposes. First, it functions as a tool to gauge overall financial stability and is regularly reported to the Board of Governors and published in the *Financial Stability Review*. Second, it acts as one of the key indicators informing the macroprudential policy stance. Third, it serves as a core indicator within the Crisis Management Protocol, supporting timely and coordinated policy responses during periods of financial stress.

The FSSI functions as Bank Indonesia's primary indicator for assessing overall financial system conditions and serves as a macroprudential tool rather than a monetary policy instrument. In Indonesia, this framework is formally referred to as the *Indeks Stabilitas Sistem Keuangan* and is published on a biennial basis in Bank Indonesia's *Financial Stability Review*. Given its macroprudential orientation, the index is not used as an operational input for monetary policy decisions. Instead, it plays an important role in informing macroprudential policy formulation, financial stability surveillance and crisis preparedness. Importantly, Bank Indonesia publishes only the finalised aggregate index, while the detailed methodology and underlying component indicators are not disclosed publicly. This approach reflects the index's role as an internal policy-support tool designed to guide supervisory assessment and policy coordination, rather than as a market-facing monetary policy signal.

Overall, the evolution of Bank Indonesia's policy mix during 2024–25 reflects a consistent strategy centred on strengthening the KLM as the primary lever, supported by flexible liquidity buffers and adaptive foreign funding regulations. This approach has aimed to safeguard financial stability while sustaining credit expansion, supporting inclusive growth and enhancing the resilience of the Indonesian economy amid persistent global uncertainty.

8. Overall assessment

Indonesia's experience demonstrates that while global financial structural shifts have increased the complexity of the international financial environment, their transmission to EMEs is not uniform. In Indonesia's case, the impact of NBFIs and cryptoassets on capital flows, exchange rate dynamics and monetary policy effectiveness remains limited. The external position continues to be driven primarily by conventional capital flows and valuation effects, supported by strong domestic fundamentals and a diversified investor base.

Going forward, Indonesia remains vigilant to evolving global financial developments and supports internationally coordinated regulatory approaches to ensure that future structural changes, particularly in digital finance, do not undermine macro-financial stability.

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Exposure to foreign equity futures: a case for macroprudential regulation

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Abstract

An increasing exposure of Israeli savings to S&P 500 futures contracts has reached a macroeconomic scale and created a potential stability risk in local capital and foreign exchange (FX) markets. The risk materialised during March 2020, following the Covid-19 outbreak. The S&P 500 index dropped sharply, triggering large margin calls and a spike in demand for dollar liquidity. This episode created considerable volatility in local financial and FX markets and required Bank of Israel (BOI) intervention. Further increases in the exposure to S&P 500 futures led the BOI to promote macroprudential regulation on minimum dollar liquidity, which would be levied on institutional investors and mutual funds alike and provide a buffer against adverse global shocks.

JEL classification: G28, G01, E44.

Introduction: the savings ecosystem

Israeli savings are managed either by households directly or by institutional investors (IIs) that include pension funds, education/study[2] funds, provident funds and insurance programmes that include a savings mechanism, and mutual funds. IIs manage roughly half of households' financial wealth, and the market is dominated by several large fund managers. The total assets under management (AUM) managed by IIs is over USD 1 trillion, over 150% of GDP compared with about 100% 15 years ago (Graph 1). Their relative size turns IIs into key players in the local financial and foreign exchange (FX) markets.

The magnitude of this portfolio is to a large extent the result of the fundamental structure of the system. The economy is characterised by high domestic savings supported by demographics and a tax code that gives tax exemptions for savings through IIs.[3]

The result is a constant flow of *defined contributions, mostly mandatory,* to these funds, while outflows are mainly governed by eligibility criteria, as most of the funds are illiquid. As a result, the growth in IIs' total AUM in the last two decades has

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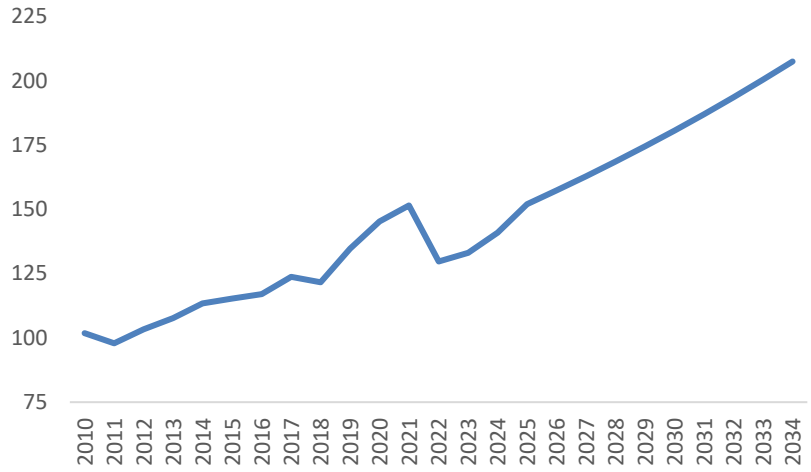
[2] Ostensibly set up to encourage on-the-job education but in practice are medium-term savings.

[3] For example, these funds are exempted from capital gains tax. This inflow to the funds, however, is capped. Education funds are somewhat different in that they become liquid after seven years.

exceeded the rate of growth of the economy, and this phenomenon is expected to continue in the foreseeable future.[4]

Institutional investors' assets under management, actual and forecast

As a percentage of GDP Graph 1



Source: Bank of Israel.

The investment behaviour of IIs is a complex combination of the size of the domestic market, which limits their investment options, foreign exposure policies and active choices made by households. IIs have "default" tranches that take into account the natural investment horizon and goal of each fund. Pension funds take into account the age of the account holder and the official retirement age and derive a default plan with decreasing risk over time, in line with the so-called Chilean model; provident and education funds are locked for 15 and 7 years from inception, and this also defines a natural investment horizon for the fund managers. However, savers can choose different tranches within their II, move between IIs quite easily, and even take over and "overrule" the fund's defaults and change the level of risk by changing the asset allocation directly, while preserving all the tax benefits associated with investment through IIs.

As IIs manage long-term savings, the risk/return profile of their portfolio is relatively high. An increasing share of their portfolio is allocated to equity investments, and as of October 2025, the total exposure to equities was about 40%, while in 2010 it was about 20%. Since the local equity market is relatively small, the equity allocation has become increasingly directed towards foreign equity markets. Today, two thirds of equities in II portfolios are foreign equities. This investment behaviour is the result of diversification strategies, better (until recently) performance of US equities, the limited size of the local stock market relative to IIs' portfolio[5] and (as mentioned above) the result of active management by households. In recent years,

[4] The forecast in Graph 1 is based on asset growth of 8.7% per year, which is the average for the last 15 years, and on nominal GDP growth of 5%.

[5] The stock market size relative to the economy is limited also due to the tendency of many leading local companies to list their shares in the United States.

a growing number of households have chosen to actively allocate higher amounts to investment in US equities, specifically to the S&P 500 index.

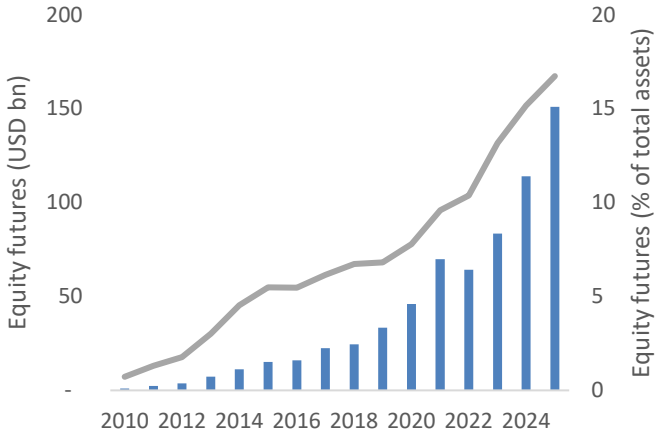
In addition to saving through IIs, households extensively use mutual funds in order to manage their "liquid" savings. Here, too, investment in the S&P 500 index has become a popular investment strategy, specifically since 2023, when local geopolitical risks intensified, leading to underperformance of domestic markets and new shekel (ILS) depreciation that motivated households to diversify away from local assets and the local stock market.

The increase in futures contracts and the Covid-19 crisis

The result of these trends[6] is an increasing exposure of savings to US equities and specifically to the S&P 500 index. This, however, is only part of the story; the reason why higher allocation to US equities has created local financial risk is that about half of the exposure to the S&P 500 index is implemented via futures. The exposure of savings to futures contracts is around 16% of total assets managed by IIs (Graph 2).

Equity investment through futures has several well-known advantages over direct holding of equities: capital efficiency – futures free up capital for optimal cash management and other investment; liquidity – the contracts are very liquid, and this reduces the transaction costs and simplifies the operational aspects of liquidity management; flexibility – the contracts are traded continuously; and taxation – futures are treated as long-term investment regardless of the holding period. These advantages are substantial for large, active fund managers.

Equity futures held by institutional investors — Graph 2



Source: Bank of Israel.

[6] In recent years, households have actively moved to unhedged foreign investment, which has resulted in a strong increase in IIs' AUM FX exposure.

As investment in a futures contract is made on a notional basis, the exposure to the S&P 500 index requires only an *initial margin*, which equals roughly 5% of the notional exposure. This frees up about 95% of the capital for other investments. A common practice of IIs and mutual funds is to invest most of this free capital in short-term Israeli bonds. This also matches the preference of many investors to sell the currency exposure (ie, to keep their S&P 500 investment hedged into local currency).

This practice – investing most of the notional value of S&P 500 exposure in ILS bonds – creates a substantial currency mismatch in the event of equity price declines.[7] In this case, margin calls require the investors in futures to come up with the losses in dollars and to replenish the initial margin. As the collateral is held in Israeli assets, converting them to USD requires a fire sale of ILS bonds and an immediate conversion of the cash proceeds to USD. Thus, a sharp increase in the demand for dollar liquidity applies pressure on both the local bond market and the FX market. The dynamics are amplified by the fact that Israel is a peripheral market with limited dollar access during financial crises.[8]

Normal declines in the stock market do not require very large operations, and the markets absorb those easily as both the bond and FX markets are relatively deep. But in crisis times, when equities fall sharply and consecutively, the required adjustments are of a scale that might jeopardise local markets' stability and lead to market dysfunction. This is not a speculative assertion: it is exactly what happened in March 2020, when the markets priced in the full gravity of Covid-19, and the S&P 500 index dropped by 33% peak to trough in less than a month.

At the time, the total futures contracts held by IIs was USD 30 billion, and the decline in equities triggered margin calls amounting to about USD 10 billion. A shortage of immediate dollar liquidity led IIs to sell shekel-denominated bonds, leading to a sharp increase in yields. In the FX market, the demand for dollars overwhelmed the dollar swap market (FX SWAP) at the same time when FX SWAP supply from foreign banks dried up, as the dollar shortage was global. These shocks led the implied short-term FX swap rate to drop and liquidity to dry up in that market (Graph 3). In the spot market, the high demand for dollars led to a depreciation of over 10%.

These events required BOI intervention in the bond and FX SWAP markets. The BOI purchased government bonds to stabilise yields and also rolled out an FX swaps programme of up to USD 15 billion in order to stabilise the swap market. It is important to emphasise that the large stock of futures contracts was not the only source of fragility in the system. Other feedback loops that magnified the initial shock had led to the underperformance of the financial markets relative to other countries. But it was a key factor.

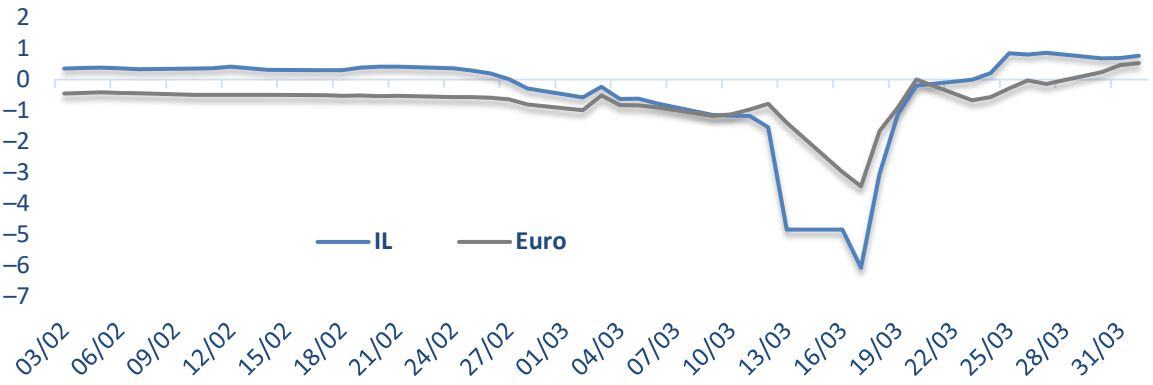
[7] Also, the unhedged futures do not provide dollar liquidity since IIs' strategy is to lend the dollars in the FX swap market and reap the FX basis, which is historically negative in Israel (ILS-implied rate > ILS money market rate).

[8] See S Avdjiev et al, "Dollar funding costs during the Covid-19 crisis through the lens of the FX swap market", *BIS Bulletin*, no 1, April 2020 and A Barajas et al, "Strains in offshore US dollar funding during the Covid-19 crisis: some observations", *IMF Global financial Stability Notes*, no 2020/01, July 2020.

ILS and EUR one-week implied rate around the Covid-19 crisis in 2020

In per cent

Graph 3



Source: Bloomberg.

The case for regulation

This episode, which points to the negative externalities of large-scale currency-exposed investment in futures contracts, provides a clear case for market regulation. Financial players do not internalise the potential negative spillovers of their actions on the markets. Moreover, the weakness that was revealed in 2020 has amplified since: the stock of futures contracts has continued to build up, and nowadays the total amount held by IIs and mutual funds has reached USD 200 billion. An event on the scale of the equity declines experienced in the Covid-19 crisis would cause margin calls in the order of USD 60 billion today, an amount that is difficult to absorb even in the deepest FX markets. In addition, one might suspect that the moral hazard dilemma that stems from financial players' expectation that, in the event of a dollar liquidity squeeze, the BOI would step in and use its FX reserves to alleviate the pressure, has even intensified given the BOI's previous interventions and the current level of FX reserves. In this respect, the BOI's USD 30 billion sales programme following the outbreak of the 7 October 2023 war, although not directly related to the subject at hand, might have exacerbated the moral hazard as market players received an additional example for both the BOI's resolve and its ability to step in to stabilise the FX market in crises.

As a result of the financial stability risk of equity futures exposure described above, the BOI and the financial stability committee, along with the relevant regulators, the Capital Markets Authority (CMA) and the Israel Securities Authority (ISA), promoted macroprudential regulation that would mitigate the risks. The regulation intends to preserve the advantages of futures investment but at the same time limit the risks associated with the FX mismatch it generates. The CMA and ISA

recently issued a guidance note on the subject.[9] According to the regulators' guidance, IIs and mutual fund managers should hold liquid dollar assets to the amount of at least 10% of the notional exposure to FX derivatives on equity indices, where liquid assets include cash, US government bonds, FX overnight deposits and dollar-denominated money market funds. In addition, IIs and mutual fund managers should set rules and procedures for assessing liquidity risks on an annual basis at least, and investment committees should actively supervise and monitor the dollar liquidity risks associated with futures contracts, including under stress scenarios. This guidance note is expected to become legally binding soon. The new regulation, coupled with supervision on its implementation, should provide an effective initial buffer in case of adverse global shocks that would moderate the impact of global crises on domestic capital and FX markets and provide precious time for shielding the economy against additional market pressure.

[9] The CMA issued the guidance note for public comments on 15 October 2025.

The expanding role of non-bank financial institutions in transmitting global financial conditions – the case of Korea

Bank of Korea[1]

1. Introduction

Over the past decade, Korea's external balance sheet has undergone a profound structural transformation. Korea became a net external creditor in 2014 and has steadily accumulated foreign assets since then. Non-bank financial institutions (NBFIs) have played a central role in this trend, as their cross-border investment has contributed substantially to the rapid increase in Korea's foreign asset holdings. With this structural shift, the traditional transmission channel of external shocks observed during the net debtor period has notably attenuated.[2, 3]

Despite this transition, domestic financial conditions in Korea remain highly sensitive to global financial conditions. When global risk sentiment deteriorates, domestic financial conditions also become tighter. The global risk-off episodes – marked by an elevated VIX index – are followed by notable tightening in domestic financial conditions, as reflected in indicators of covered interest parity deviations (CIPDs)[4] and in domestic credit spreads. While CIPDs capture market stress in synthetic dollar funding conditions, credit spreads reflect a tightening in the local currency funding conditions in domestic financial markets.

Graph 1 shows the linkage between global and domestic financial conditions. As Graph 1.A shows, during the risk-off episodes (marked as the shaded areas), the

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[2] External shocks have traditionally tightened domestic financial conditions through the balance sheets of debtor countries. When global financial conditions tighten, currency depreciation increases the local currency burden of foreign currency debt, raising credit risks and tightening domestic financial conditions, as observed in Korea during the Asian financial crisis (Krugman (1999); Céspedes et al (2004); Arellano (2008)). More recently, even countries that borrow mainly in local currency have experienced similar stress because currency depreciation reduces foreign investors' local currency returns and induces sell-offs of local currency bonds (Carstens and Shin (2019); Hofmann et al (2020)). In addition, a large literature emphasises that global shocks are also transmitted through global bank balance sheets by changing a bank's risk-taking capacity and cross-border lending (Bruno and Shin (2014, 2015); Adrian and Shin (2010, 2014)).

[3] As of end-2024, a large share of Korea's external liabilities was denominated in Korean won (61.6%), followed by US dollars (29.2%) and other foreign currencies (9.2%). In contrast, most external assets are denominated in foreign currencies, with 61.9% in US dollars and 36.9% in other currencies.

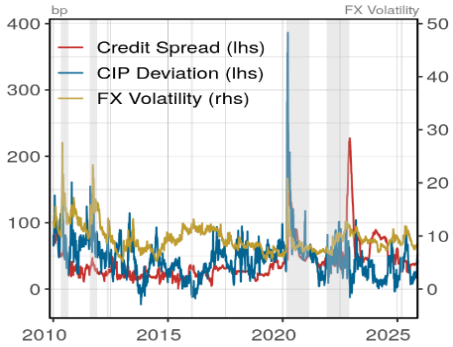
[4] CIPDs represent dollar funding costs, measured as the difference between the interest rate implied by foreign exchange (FX) derivatives (ie synthetic dollar funding) and the interest rate paid directly in the US dollar cash market. Specifically, CIPDs correspond to the gap between the Korea–US interest rate differential and the forward premium.

foreign exchange (FX) market becomes more volatile and, more importantly, domestic funding costs rise in both synthetic dollar markets and local currency credit markets. Graph 1.B reinforces this observation by examining the sensitivities of domestic financial conditions to global risk sentiment. Credit spreads, CIPDs and FX volatility all exhibit positive correlations with the VIX. Moreover, these sensitivities intensify markedly during risk-off episodes, underscoring the heightened transmission of external shocks in periods of deteriorated global sentiment.[5]

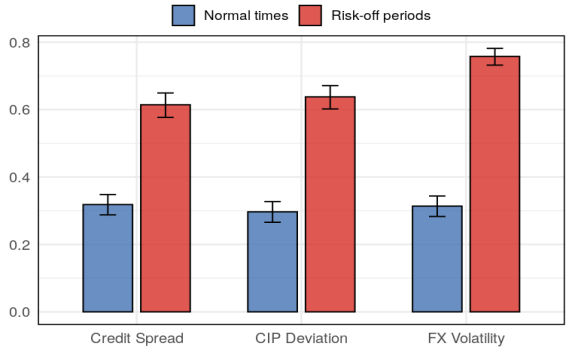
Based on these observations, the sections that follow examine how external shocks are transmitted to Korea's domestic financial markets, with particular emphasis on the role of domestic NBFIs. We analyse in greater detail their expanding role in cross-border investment and explore the mechanisms through which external shocks propagate into domestic financial conditions, with NBFIs positioned at the centre of this transmission channel. Finally, we present a case study of the 2022 market turmoil episode – a moment when these mechanisms are clearly activated – and review the Bank of Korea's policy response.

Linkage between global and domestic financial conditions — Graph 1

A. Credit spread, CIP deviation, FX volatility in global risk-off periods



B. Sensitivity to global financial conditions



Graph 1.A shows the daily series of credit spread (three-month commercial paper – three-month monetary stabilisation bonds), CIP deviation (three-month) and FX volatility (three-month). The credit spread and CIP deviation data are scaled by basis points (left-hand scale), while FX volatility (three-month USD-KRW implied volatility) is shown on the right-hand scale. Shaded regions represent major global risk-off episodes (defined as monthly log of VIX falls within the top 25% of its distribution). Graph 1.B shows each variable's correlation with the VIX, with the blue bars showing unconditional correlations and the red bars showing correlations during risk-off periods. The error bands denote the 95% confidence intervals. The sample covers 4 January 2010 to 20 November 2025.

Sources: Bank of Korea; Bloomberg; authors' calculations.

2. The rising role of domestic NBFIs

The role of domestic NBFIs in Korea's external financial landscape has expanded markedly over the past decade. Once secondary players in cross-border investment,

[5] This is one of the typical patterns observed in economies with relatively shallow financial markets. Using a panel of 17 countries, Kim and Kim (2025b) show that exchange rates and credit spreads react more strongly to global risk when financial market depth is low.

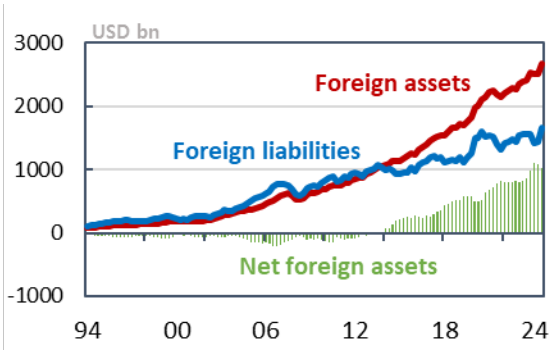
NBFIs have now become central drivers of Korea's rising net foreign asset (NFA) position and, by extension, key participants in the FX derivatives market.

Korea's shift towards a net external creditor position occurred in Q3 2014. This transition was driven primarily by the steady accumulation of foreign assets by domestic residents, while foreign liabilities remained relatively stagnant. Graph 2.A shows this pattern, showing a sustained rise in foreign assets that has outpaced the growth in foreign liabilities. As of Q2 2025, Korea's NFAs stood at USD 1.03 trillion, equivalent to about 55% of GDP.

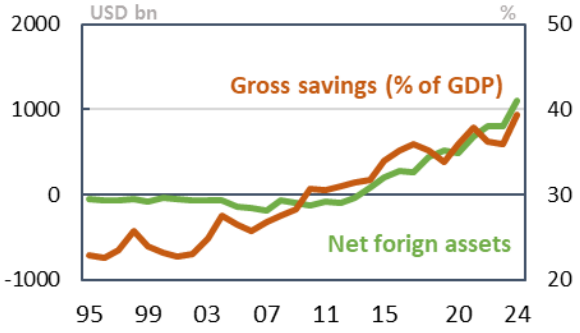
The rapid increase in the NFA position is closely linked to an upward trend in domestic savings. Graph 2.B shows that gross savings – measured as gross income net of consumption in the economy – have risen at a pace broadly similar to that of NFAs. This suggests that Korea's persistent current account surpluses have been directed more towards overseas investment, thereby contributing to the expansion of its external wealth.[6, 7]

Korea's sustained growth of net foreign assets — Graph 2

A. Korea's foreign assets and liabilities



B. Gross savings and NFAs



Graph 2.A shows foreign assets, foreign liabilities and net foreign assets on an end-of-quarter basis from Q4 1994 to Q2 2025. Graph 2.B shows gross savings (as a percentage of GDP) on an annual basis, while NFAs are shown on an end-of-year basis from 1995 to 2024.

Sources: Bank of Korea; Bloomberg.

Composition shift – from public to private sector

This steady accumulation of net foreign assets has been accompanied by a notable shift in their composition – from reserve accumulation to direct and portfolio investments as shown in Graph 3.A. In the aftermath of the 1997 Asian financial crisis and throughout the early 2000s, increases in foreign assets were dominated by

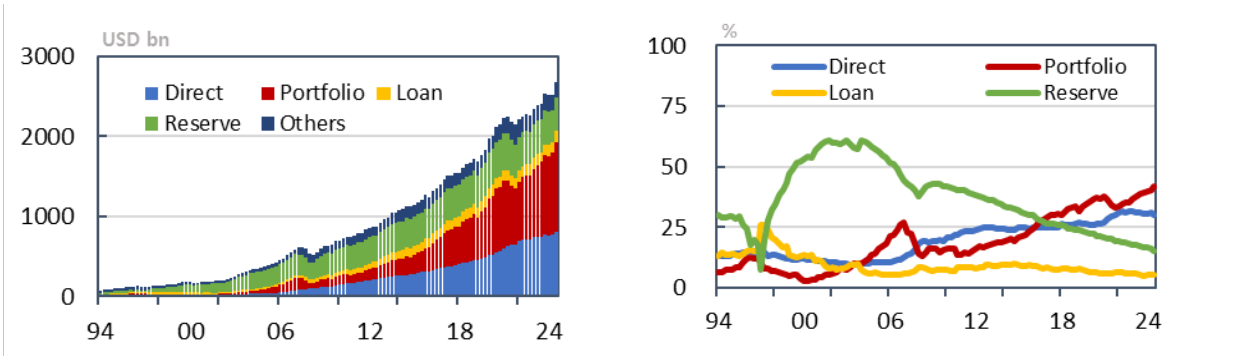
[6] In earlier years, much of the rise in national savings was offset by domestic investment, limiting its impact on the NFA position. After 2015, however, the combination of overseas investment promotion policies and declining domestic capital returns – reflecting demographic ageing and slowing productivity growth – has resulted in an increasing portion of excess savings being invested overseas (Higgins (1998); Lane and Milesi-Ferretti (2001); Bárány et al (2023)).

[7] This pattern is commonly seen in countries characterised by demographic ageing or by limited domestic investment opportunities.

reserve accumulation. Beginning in the mid-2010s, however, the composition of foreign assets shifted markedly towards direct and portfolio investments. Graph 3.B shows this shift clearly, with the share of reserve assets declining and the shares of direct and portfolio investments rising steadily over time. As of the end of Q2 2025, portfolio and direct investments account for approximately 42% and 30% of total foreign assets, respectively, whereas reserve assets represent only about 15%.

The shift in the composition of foreign asset accumulation Graph 3

A. By investment type (by amount) B. By investment type (by share)



Graph 3.A shows the outstanding stock of investment by investment type, while Graph 3.B shows the shares of each investment type. The data series are provided on a quarterly end-of-period basis from Q4 1994 to Q2 2025.

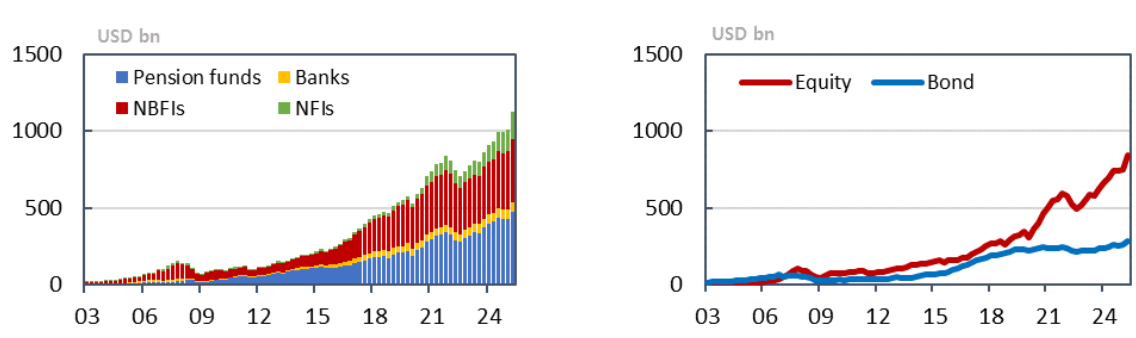
Source: Bank of Korea.

The shift driven by NBFIs is tilted towards equity

The shift towards the private sector has been driven primarily by NBFIs. Within the private sector, NBFIs – together with pension funds – account for the largest share of the increase in portfolio investment. Graph 4.A shows that the expansion in foreign portfolio assets since the mid-2010s has been driven mainly by NBFIs, while banks have played a comparatively limited role, reflecting tighter regulatory constraints. The NBFI-driven accumulation of foreign assets has been concentrated in equities rather than in debt securities. As shown in Graph 4.B, equity investment has risen sharply, particularly in recent years, whereas bond investments have grown only modestly.

Portfolio investment by investor group and asset classification Graph 4

A. By investor group B. By asset classification



Graph 4.A shows the outstanding stock of portfolio investment by investor group, while Graph 4.B shows the shares of each asset class. All data series are provided on a quarterly end-of-period basis from Q4 1994 to Q2 2025.

Source: Bank of Korea.

NBFIs' participation in FX derivatives market has grown

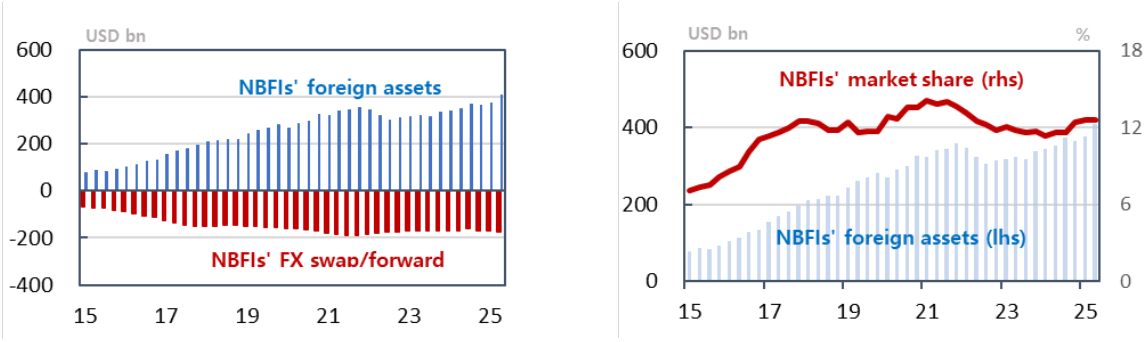
As NBFIs have become more active in cross-border investment, their participation in the FX derivatives market has risen accordingly. With limited ability to raise dollar funding directly, and given strong demand for FX hedging, NBFIs increasingly rely on off-balance sheet FX derivatives, including swaps and forwards.[8] Graph 5.A shows that the increase in NBFIs' portfolio investment has been accompanied by a corresponding rise in their demand for FX derivatives measured by short positions with a far leg. Graph 5.B further shows that NBFIs' share in the FX derivatives market has doubled over the past decade.

As domestic banks act as intermediaries in NBFIs' FX derivative transactions, the increased use of FX derivatives by NBFIs has created a tight linkage between the two sectors. During risk-off periods, when dollar funding through FX derivatives becomes scarce, NBFIs may increase their demand for hedging, thereby heightening funding stress in the FX derivatives market. In turn, domestic banks may also be under pressure. This bank–NBFI nexus serves as a key transmission channel through which external shocks spill over into the domestic financial market, a mechanism we illustrate in more detail in the next section.

[8] One key reason why Korean NBFIs rely so heavily on FX swaps and forwards is the regulatory environment. Korea imposes stricter requirements on FX hedging ratios for institutional investors than most other East Asian jurisdictions, which makes Korean institutions structurally more dependent on derivative hedging. As a result, Korean insurance companies typically hedge close to 100% of their foreign asset exposures, whereas their counterparts in Chinese Taipei, for example, hedge around 50%, and Japanese insurers generally hedge only 50–70% (McGuire et al (2021)).

NBFI portfolio investment positions and FX forward positions Graph 5

A. Position B. Market share



Graph 5.A shows the outstanding stock of NBFI foreign assets (blue) and NBFI demand for FX derivatives (measured by short forward positions), while Graph 5.B shows the outstanding stock of NBFI foreign assets (blue) and NBFI market share in the FX derivatives market (red). NBFI foreign assets correspond to the international investment position of other financial corporations, and forward positions represent the combined positions of insurance companies and asset management companies, as these two sectors represent the majority of foreign asset holdings within the non-bank financial sector. All data series are provided on a quarterly end-of-period basis from Q1 2015 to Q2 2025.

Source: Bank of Korea.

3. Transmission channels from global to domestic financial conditions in the rising role of NBFIs

As NBFIs account for an increasingly large share of Korea's cross-border investments, their expanding footprint has important implications for how external shocks spill over into domestic financial conditions. Some transmission channels resemble those that operated when banks were the dominant cross-border investors, while others are specific to NBFIs and have become more important today as their overseas exposures have grown.

Maturity mismatch problem, "old risk in new clothes"

NBFIs typically rely on liabilities denominated in Korean won (KRW). Thus, to invest in foreign assets, they rely on FX derivatives to obtain the necessary dollar funding. In doing so, they often face a maturity mismatch, as the maturity of their FX derivatives is considerably shorter than that of their dollar assets. This creates rollover risk because NBFIs must frequently renew short-term FX contracts to maintain long-term foreign asset positions. The underlying vulnerability resembles an old pattern – when banks were the dominant cross-border investors – now appearing in a new institutional setting. Hence, "old risk in new clothes".

The maturity structure of NBFI positions shows a pronounced imbalance. While 99.1% of NBFI bond investments have a remaining maturity of at least one year, their FX derivative contracts are heavily skewed towards maturities of less than one year, with only 32.6% extending beyond one year (Graph 6). This mismatch exposes NBFIs

to significant rollover risk that comes from the short-term nature of their FX funding relative to their longer-term dollar assets.

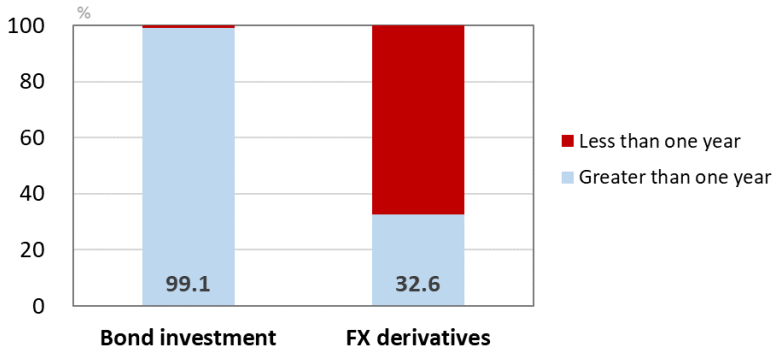
NBFI asymmetric dollar funding demand

NBFI demand for dollar funding through FX derivatives tends to rise when global financial conditions deteriorate, particularly during risk-off episodes marked by elevated VIX levels. Regression results illustrate this asymmetry. When the growth rate of NBFIs' foreign securities investment is regressed on the growth rate of their FX forward positions, the estimated coefficient is markedly higher during high-VIX periods (1.7) than during low-VIX periods (0.7), as shown in Graph 7. This indicates that NBFIs expand their dollar funding demand more relative to the scale of their portfolio investments when global risk sentiment worsens. Such behaviour appears partly driven by their tendency to strengthen hedging ex post as exchange rate volatility increases during episodes of global financial tightening.

These dynamics have important implications for the transmission of global financial conditions to domestic financial markets. Periods of heightened global risk aversion are typically accompanied by a contraction in dollar funding supplied by foreign bank branches, leading to tighter dollar liquidity conditions. In this environment, NBFIs' increased hedging-related dollar funding demand can further amplify stress in the dollar funding market.[9]

Maturity mismatch between NBFI on- and off-balance sheet positions

Graph 6

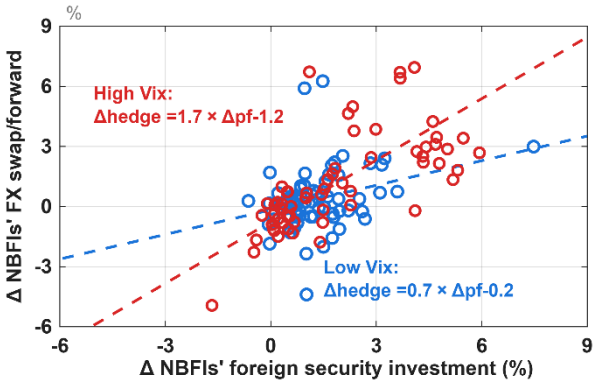


This graph compares the maturity structure of NBFI bond investments and FX derivatives. Each bar presents the share of each position with a remaining maturity of less than one year and of greater than one year, expressed as a proportion of the total amount within each category. The values represent five-year averages over 2020–24 using year-end data.

Sources: Bank of Korea; authors' calculations.

[9] This amplification mechanism is consistent with IMF (2025), which highlights that rising hedging demand by non-US NBFIs during global risk-off episodes can widen CIP deviations and intensify dollar liquidity pressures. Furthermore, it is closely related to the dynamic hedging behaviour of investors, which varies with global financial conditions, as documented by Sizova et al (2025), Shin et al (2025), Kim and Kim (2025a) and Liao and Zhang (2025).

NBFI asymmetric demand for dollar funding Graph 7



Δpf denotes the log difference of NBFI foreign security investments, measured as cumulative portfolio investments by NBFIs (based on balance of payments data), and Δhedge denotes the log difference of net US dollar short forward positions held by NBFIs (insurance companies and asset managers). The regression coefficient indicates that a 1% increase in NBFI portfolio investments is associated with a 1% increase in their FX forward positions. A larger coefficient implies that hedging demand rises more strongly relative to the scale of portfolio investment.

Sources: Bank of Korea; authors' calculations.

Off-balance sheet linkages between banks and NBFIs

Off-balance sheet FX derivative linkages between NBFIs and domestic banks create an additional transmission channel through which global risk shocks can amplify stress in domestic financial conditions, a channel that has grown in importance as NBFI overseas exposure has expanded. Although domestic banks generally face limited currency mismatch risk because they manage foreign currency assets and liabilities in a broadly matched manner, their role as intermediaries, borrowing dollars from foreign bank branches and supplying them to NBFIs, creates vulnerabilities when the exchange rate depreciates sharply.

These vulnerabilities materialise through two distinct channels. One channel affects bank capital positions, and the other weakens their liquidity buffers.

When the exchange rate depreciates, the KRW value of a bank's foreign currency assets and FX derivative exposure increases mechanically. In addition, depreciation raises the counterparty credit risk on long forward positions, as counterparties' burden to deliver dollars at maturity increases. The combination of valuation-driven increases in FX exposure and heightened counterparty credit risk expands a bank's risk-weighted assets (RWA), thereby putting downward pressure on their capital ratios.

Furthermore, depreciation also weakens banks' liquidity buffers through margin call and funding channels. As the KRW depreciates, domestic bank short-dollar forward positions with foreign bank branches incur valuation losses, triggering additional variation margin payments. As margin requirements increase, banks typically meet these obligations by selling or repo-ing KRW-denominated securities that had previously been counted as high-quality liquid assets, which leads to a decline in their Liquidity Coverage Ratio.

The deterioration in both capital and liquidity positions constrains banks' ability to maintain credit supply on their balance sheets and to intermediate FX derivative transactions off their balance sheets. As banks scale back lending, funding pressure shifts directly onto borrowers, who face tighter financing conditions, while reduced hedging capacity strains NBFIs that depend on banks for their FX risk management. These pressures spill back onto banks themselves, further tightening the constraints on their balance sheets. This interaction creates a negative feedback loop that magnifies the initial impact of exchange rate depreciation on domestic financial conditions.

4. Lessons from the market turmoil in 2022 and policy responses

We illustrate how the mechanism described above operated in transmitting external shocks to domestic financial conditions by examining the episode that took place in the second half of 2022, when global financial markets tightened and risk-off sentiment intensified as major central banks, including the US Federal Reserve, raised policy rates. We also review the policy measures that the Bank of Korea (BOK) implemented to mitigate the impact of shocks arising through this channel.

During the global risk-off period in Q3 2022, the KRW depreciated sharply by 21.1% against the US dollar on a year-on-year basis. This rapid depreciation affected domestic banks through two key channels – capital ratios and liquidity ratios – which played an important role in transmitting external shocks to domestic financial conditions.

Capital ratio

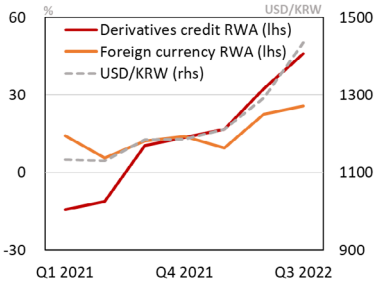
Exchange rate depreciation puts downward pressure on a bank's capital ratio. As the exchange rate depreciates, the KRW value of a bank's foreign currency exposure increases, which in turn raises the FX RWA (both on and off the balance sheet). Depreciation also raises credit RWA from FX derivatives because the depreciation heightens credit risk at the counterparty failing to meet their obligations. To restore capital, banks would reduce risky assets from both on and off their balance sheets, making it harder for customers to meet their financial needs.

Graph 8 shows that aggregated domestic bank foreign currency RWA and credit RWA increased sharply alongside the KRW depreciation in Q3 2022.[10] As the expansion in RWA outpaced capital buffers, banks' overall capital ratio decreased by 1.4 percentage points relative to the previous year, as depicted in Graph 9. To adjust to these pressures, banks reduced their overall supply of dollar funding to NBFIs and,

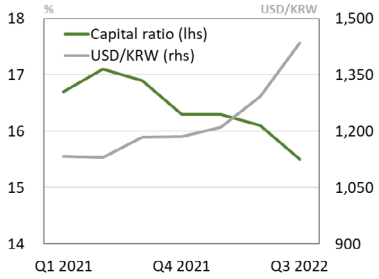
[10] Foreign currency RWA are calculated by including both on-balance sheet loans denominated in foreign currencies and off-balance sheet FX derivative exposures. Credit risk weighted assets for over-the-counter (OTC) derivatives capture the counterparty credit risk arising from OTC derivative transactions. Due to data limitations, it is not possible to isolate the portion related specifically to FX derivatives. Therefore, we use total OTC derivative credit risk weighted assets, which includes exposure from equity, interest rate and other derivative transactions.

more importantly, shortened the maturity of those funding channels. Graph 10 shows that the total amount of dollar funding supplied to NBFIs through FX derivatives declined by about 10% in Q4 2022 compared to the previous year. In addition, the share of FX derivatives with remaining maturities of less than one month increased during this period. These patterns illustrate two dimensions of bank responses: an adjustment along the extensive margin (a reduction in total supply) and an adjustment along the intensive margin (a shift towards shorter maturities). Both adjustments act to heighten NBFI dollar funding risks by shortening rollover horizons and reducing the availability of stable dollar funding instruments in the FX derivatives market.

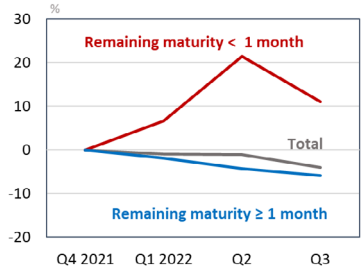
Graph 8. Domestic bank RWA growth rate and exchange rates



Graph 9. Domestic bank capital ratios and exchange rates



Graph 10. Domestic bank maturity structure of dollar funding supply to NBFIs



Graph 8 shows the (year-over-year) growth rates of domestic bank foreign currency RWA and credit RWA for OTC derivatives alongside the USD/KRW exchange rate. Foreign currency RWA includes (on-balance sheet) foreign currency loans and (off-balance sheet) FX derivative exposures, while OTC derivative credit RWA reflects counterparty credit risk from OTC derivative transactions, including FX derivatives. RWA growth rates are shown on the left-hand scale (%), and the USD/KRW exchange rate is shown on the right-hand scale. Graph 9 shows domestic bank aggregate end-of-period total capital ratios (%, left-hand scale) with the USD/KRW exchange rate (right-hand scale). Graph 10 shows the log of total forward USD long positions (grey) and the logs of forward USD long positions with remaining maturities below and above one month (red and blue), expressed relative to their values in Q4 2021 to represent cumulative log changes.

Sources: Bank of Korea, *Financial Stability Report*, December 2022; authors' calculations.

Liquidity ratio

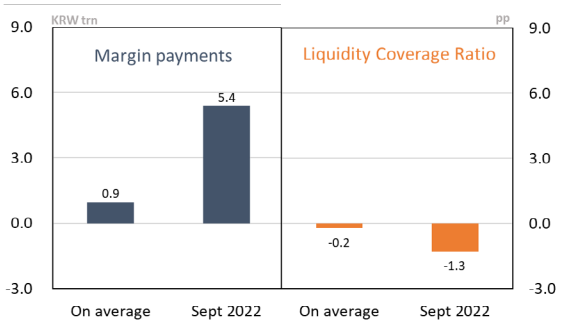
Sharp KRW depreciation can tighten liquidity conditions for domestic banks by triggering sizable variation margin calls on their FX forward dollar short positions. These positions are typically held vis-à-vis domestic affiliates of foreign banks, which act as intermediaries channeling dollar funding between domestic banks and global banks. Since many domestic bank customers, including NBFIs, are not required to post margin, domestic banks tend to bear most of margin call burden, potentially putting pressure on their liquidity buffers. As a result, the depreciation-induced increase in margin requirements dampens banks' liquidity ratios, with the magnitude of the impact varying across banks depending on their FX swap exposures. To restore their liquidity buffers, banks respond by issuing KRW-denominated bonds, particularly because margin payments are funded by liquidating KRW-denominated short-term government securities. This additional issuance of bonds, in turn, contributes to upward pressure on domestic market interest rates.

Graph 11 shows the eight major domestic banks' margin payments and liquidity ratios in September 2022 relative to their average levels from January to August 2022. It shows that banks paid a total of KRW 5.4 trillion in margin calls, a substantial increase compared with the average of only KRW 0.9 trillion. The graph also indicates that these banks' liquidity coverage ratios declined by an average of 1.3percentage points highlighting the liquidity strain generated by the sharp rise in margin requirements.

Graph 12 shows that banks with larger FX forward dollar short positions in 2021 issued significantly more bonds during Q3 2022.[11] This pattern suggests that banks which were more exposed to variation margin calls responded to heightened liquidity pressure by issuing KRW-denominated bonds more aggressively than their less exposed peers. Such behaviour provides evidence that margin call constraints created meaningful liquidity stress, prompting banks to issue bonds to rebuild their liquidity buffers during the market turbulence in Q3 2022.

Additional margin payments for OTC derivatives and changes in the liquidity ratios of domestic banks

Graph 11



The left-hand panel shows the additional margin payments for FX derivatives made by the eight major domestic banks in each period. The right-hand panel shows the average changes in the Liquidity Coverage Ratio of the same eight banks over the corresponding period. "On average" refers to the monthly average values of each variable from January to August 2022.

Source: Bank of Korea, *Financial Stability Report*, December 2022.

[11] We examine whether banks with larger one-month USD short-forward positions vis-à-vis foreign bank branches increased their issuance of bank bonds more significantly during periods when variation margin burdens rose using a difference-in-differences specification,

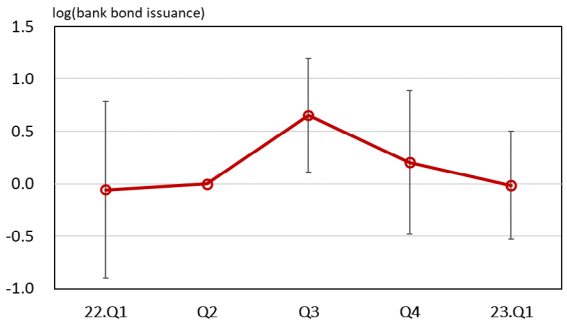
$$\log(\text{bank bond issuance})_{i,t} = \sum_{k \neq 2022Q2} \beta^k I(t=k) I_i^{\text{High}} + \underbrace{\tau_t}_{\text{time FE}} + \underbrace{\alpha_i}_{\text{bank FE}} + \varepsilon_{i,t},$$

where $log(bank\ bond\ issuance)_{i,t}$ denotes the log of bank i's bond issuance in period t, I_i^{High} is a dummy indicating whether bank i had a high USD short-forward position in 2021, and $I(t = k)$ is an indicator equal to 1 when $t = k$.

The regression exploits quarterly panel data up to Q4 2022, comparing changes in bond issuance between banks with high versus low forward dollar short positions, where exposure groups are defined based on their 2021 average positions. Within this framework, each coefficient β^k captures the changes in the difference in bond issuance between the two groups during period k, relative to Q2 2022. A statistically significant β^k therefore indicates that, during the corresponding period, banks with larger forward dollar short exposures increased their bond issuance more (or less) than banks with smaller exposures. By leveraging this identification strategy, we assess whether banks that faced greater margin call pressure expanded their bond issuance more aggressively than their less exposed counterparts, thereby providing evidence for the way in which margin call constraints translate into bank funding behaviour during episodes of market stress.

Bond issuance differences: large versus small US dollar forward short positions vis-à-vis foreign bank branches

Graph 12



This graph plots the coefficients from the difference-in-difference regression, capturing the additional increase in bond issuance by domestic banks with large forward USD short positions in 2021, relative to domestic banks with small forward USD short positions. The error bars indicate the 95% confidence intervals, and when the intervals include zero, the difference in bond issuance between the two groups is not statistically distinguishable from that in Q2 2022, the reference period.

Sources: Bank of Korea; Infomax; authors' calculations.

Policy responses

While such endogenous adjustment by banks helped restore the strength of their balance sheets, there were still potential risks at the customer end. The shift towards shorter maturities in FX derivatives heightened rollover risks at NBFIs. The newly issued bank bonds crowded out lower-rated corporate bonds, making it more difficult for firms to secure necessary funding.

To contain the build-up of these additional risks, the BOK promptly deployed several policy measures, including FX intervention and lending facilities. The primary objective of the FX intervention was to stabilise the heightened exchange rate volatility. The authorities conducted net sales of USD 17.5 billion during Q3 2022, the largest quarterly amount since intervention data became publicly available. This smoothing operation helped temper market participants' elevated expectations of further KRW weakening, thereby slowing the pace of currency depreciation. In parallel, the BOK implemented lending facilities to support local banks that faced liquidity pressure. Given the circumstances, the BOK also temporarily expanded the range of assets eligible as collateral. This broadened eligibility allowed banks to alleviate the regulatory burden associated with liquidity requirements and helped them to meet additional margin calls without excessively depleting their high-quality liquid assets.

5. Conclusion

Korea's transition to a net external creditor position has weakened the traditional transmission channel of external shocks that operated during its net debtor period. Nevertheless, as this study has shown, the domestic financial system remains exposed to global financial stress through several channels, including NBFI maturity mismatches, asymmetric dollar funding demand, and off-balance sheet linkages with the banking sector. These mechanisms highlight that, despite an improved external balance sheet, Korea's domestic financial conditions continue to be sensitive to global financial developments.

Against this backdrop, the Bank of Korea continues to pursue price stability as its primary policy objective through inflation targeting, while also employing a range of policy tools as part of the Integrated Policy Framework (IPF) to safeguard financial stability and to mitigate excessive volatility in foreign exchange markets.

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Capital flows, exchange rates and financial conditions in an evolving international monetary system – Malaysia's perspective

Central Bank of Malaysia

Introduction: Where Malaysia sits in an evolving system

The global monetary and financial landscape has, in recent decades, been characterised by large swings in global liquidity, shifts in international risk appetite and an expanding role for market-based finance. These dynamics affect how capital flows move in and out of emerging market economies, shaping both their size and how external shocks impact domestic financial conditions.

Malaysia has also been subject to these capital flow dynamics. Our openness has supported the development of deep and liquid local currency markets, drawing a wider range of foreign investors. This is complemented by the strong presence of domestic institutional investors (DIIs), whose expanding balance sheets and longer investment horizons have added depth to the market while serving as an important anchor of stability during periods of volatility.

Greater integration with global markets has also required our policy framework to adapt to an environment in which financial conditions can turn quickly and, at times, unevenly. The way investors allocate capital, shaped increasingly by benchmark-driven behaviour and the rising influence of non-bank financial institutions (NBFIs), has altered the way global developments interact with domestic conditions. These shifts have reinforced the importance of a framework that retains domestic monetary policy autonomy, maintains prudent policy buffers and underscores the importance of a flexible set of instruments to preserve domestic stability in the face of external shocks. Amid all this, the exchange rate remains a key absorber of external developments.

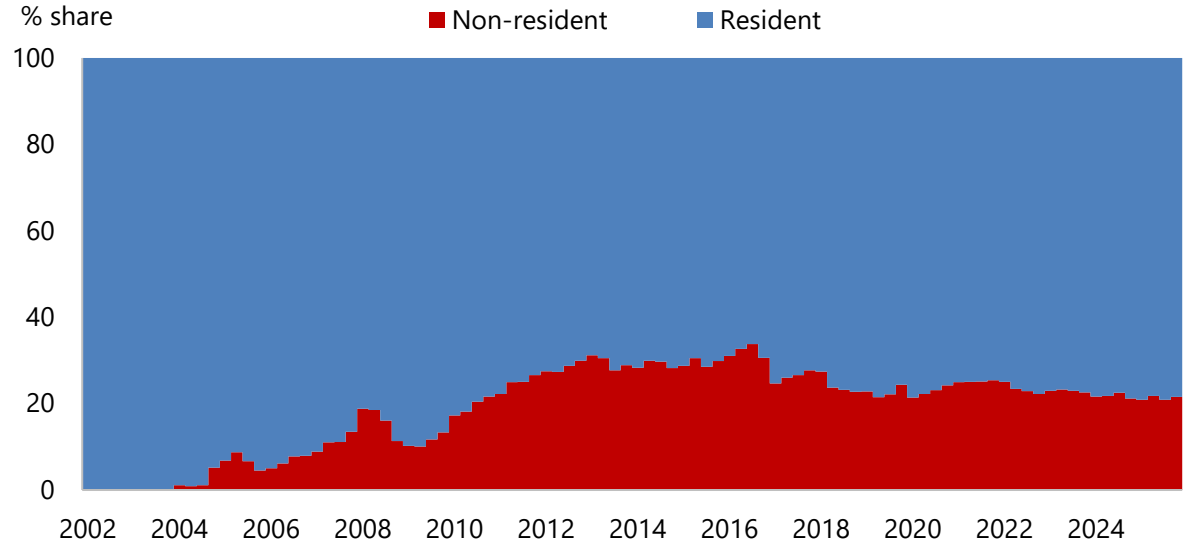
This note explains Malaysia's perspective in four parts. The first section describes the rising prominence of foreign and domestic NBFIs and examines how these shifts in market participation have shaped the resilience of our financial system. The second part considers the interaction between exchange rate dynamics, capital flows and domestic financial conditions, drawing on recent episodes to illustrate how global shocks transmit through Malaysian financial markets. The subsequent section discusses Malaysia's policy approach, centred on domestic objectives and delivered through a flexible, multi-instrument framework underpinned by strong buffers and clear communication. The final section looks ahead to emerging sources of risk in an environment marked by geoeconomic fragmentation, persistent global volatility and new market fragilities and outlines the policy priorities needed to sustain resilience going forward.

Part I: Structural shifts in investor participation and domestic resilience

Malaysia's financial markets have continued to grow following the Great Financial Crisis (GFC). The development of deeper domestic markets has attracted a broader set of foreign investors, while DIIs have expanded in scale and significance. These shifts have gradually reshaped the structure of intermediation and the ways the market adjusts across financial cycles.

A **first feature** of this evolution is the rise and subsequent easing of foreign participation in Malaysia's domestic financial markets. Foreign NBFI involvement increased markedly in the years post-GFC, reflecting a broader portfolio reallocation into emerging markets following quantitative easing and a period of favourable interest rate differentials. As the government bond market[1] expanded, non-resident holdings rose to almost one third of outstanding securities by 2016, before gradually settling into a more stable range in recent years (Graph 1). Although the non-resident share has declined from its peak, it now hovers around one fifth of outstanding securities – still elevated relative to many regional peers. This pattern suggests that Malaysia has maintained a substantial degree of foreign participation, while earlier inflows have stabilised into a more durable participation profile.

Resident and non-resident holdings of government bonds — Graph 1



Source: Central Bank of Malaysia.

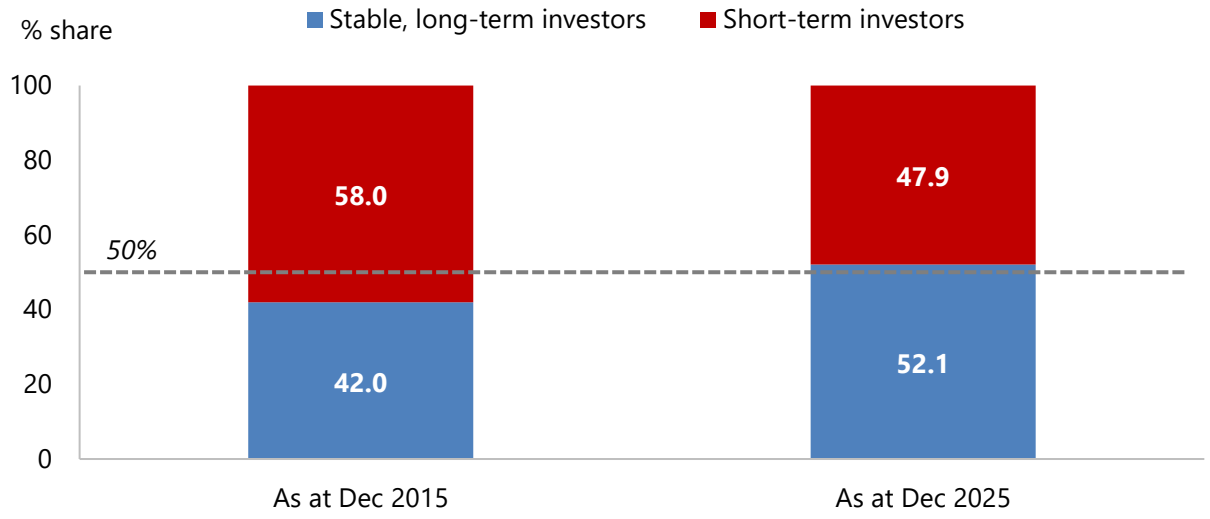
[1] Malaysian government bonds include Malaysian Treasury Bills (MTB), Malaysian Government Securities (MGS) and Malaysian Government Investment Issues (MGII).

A **second feature** is the shift in the nature and composition of foreign participation. In the post-GFC years, Malaysia attracted sizeable inflows from short-term, benchmark-driven investors. These flows expanded rapidly in response to accommodative global liquidity conditions, but were also quick to reverse during bouts of risk aversion or changes in interest rate expectations, resulting in periodic outflows.

Over time, however, positions held by longer-horizon investors, such as central banks, pension funds and insurance companies, have increased. The growing presence of these long-term institutional investors reflects greater confidence in the Malaysian market, supported by a track record of domestic macroeconomic resilience, a credible policy framework and ongoing efforts to strengthen market depth and liquidity. As a result, today's foreign participation constitutes a more balanced mix of long-term institutional investors and short-term benchmark-driven funds (Graph 2).

This rebalancing matters greatly for resilience. Longer-horizon investors help anchor market depth, provide more stable funding along the sovereign yield curve and reduce the likelihood of one-sided positioning during periods of uncertainty.

Distribution of non-resident holdings in government bonds — Graph 2

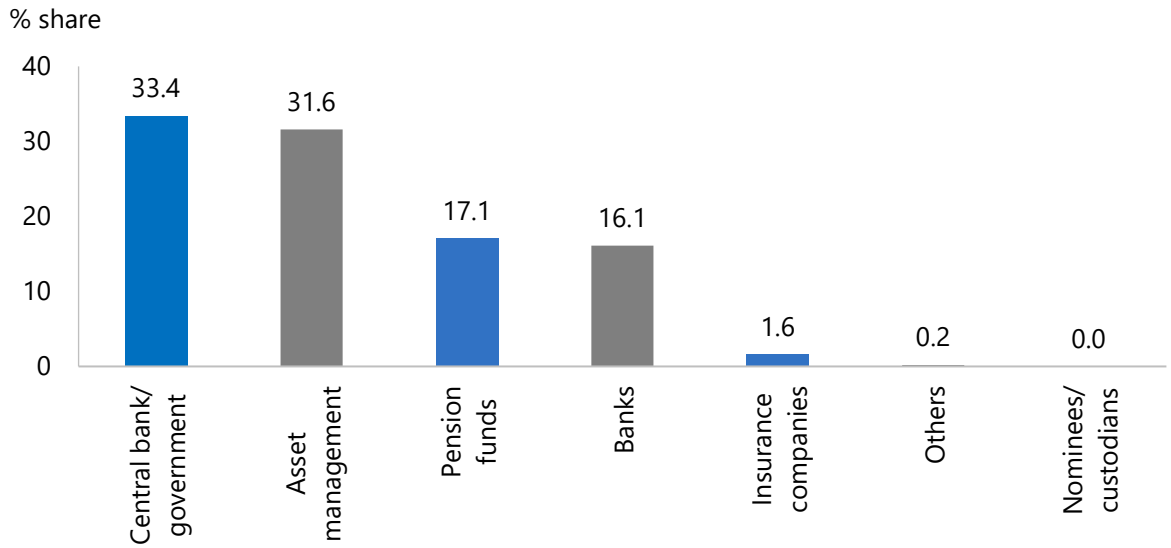


Source: Central Bank of Malaysia.

Even so, short-term investors continue to account for a significant share of foreign holdings, especially among benchmark-tracked asset managers (Graph 3). While these funds remain one of the largest foreign holders of Malaysian government bonds, their share has nonetheless edged down over the past decade, from roughly two fifths to about one third of total non-resident holdings more recently. Their behaviour, by design, is more procyclical and sensitive to shifts in global risk sentiment and yield differentials. Their adjustments, therefore, can amplify market

volatility during risk-off events, particularly through the exchange rate and domestic yields.

Distribution of non-resident holdings in government bonds as at December 2025 Graph 3



Blue bars refer to the share of stable, long-term investors.

Source: Central Bank of Malaysia.

These structural shifts have shaped the policy and market development priorities adopted in recent years. Episodes of volatility have underscored the importance of deeper and more liquid secondary markets, prompting measures such as the promotion of a securities-driven interbank repo market and the use of bond switching operations[2] to replace less liquid MGS with benchmark securities. These initiatives have improved market liquidity and enhanced secondary market trading. At the same time, sustained investor outreach and the broadening of product offerings, including the expansion of the Islamic sukuk market, have supported a richer investor ecosystem. Malaysia has also widened access to the onshore market by enabling multilateral development banks (MDBs) and development financial institutions (DFIs) to issue ringgit-denominated bonds for domestic use, further anchoring longer-horizon participation. These initiatives have been complemented by Malaysia's inclusion in major global indices,[3] which has raised its international profile and

[2] Bond switching operations (i.e. MGS switch auctions) refer to debt management operations involving the replacement of previously issued, less liquid MGS, with current benchmark issues of either the three-, five- or 10-year sector. Increasing issuance of these benchmark MGS and reducing the outstanding amount of off-the-run MGS enhances trading in the secondary market, thereby improving the overall liquidity in the Malaysian bond market.

[3] Malaysian bonds are included in various global bond indices such as the Bloomberg Global Aggregate Index, FTSE Russell WGBI, JPM GBI-EM and Markit iBoxx ALBI, due to the country's

encouraged participation from a broader range of foreign investors. Collectively, these efforts have strengthened market functioning and enhanced the capacity of domestic markets to absorb external shocks.

A **third feature** is the growing significance and influence of DIIs. Over time, pension funds, insurers and government-linked investment companies (GLICs) have steadily increased their holdings across domestic asset classes. The growing presence of domestic NBFIs across key asset classes has naturally enabled them to play an important stabilising role across periods of external volatility. During risk-off episodes such as the 2022–23 US tightening cycle and the phase of delayed US monetary easing in 2024, these institutions increased their holdings of government bonds and equities as foreign investors pared back their exposure (Graph 4).[4] The purchases by domestic NBFIs during periods of stress reflected their long-term investment mandates and the more attractive asset valuations at those points in time. Such countercyclical responses have helped to cushion volatility and support market functioning at times when external pressures might otherwise have been more disruptive.

The growing prominence of domestic NBFIs reflects not just their size, but also the breadth of their presence across government bonds, listed bank equities and banking system deposits. These exposures underscore the dense interlinkages between NBFIs, banks and capital markets. Recognising this interconnectedness, the central bank (BNM) applies regular stress tests to evaluate the resilience of systemic NBFIs. The results suggest that they maintain adequate liquidity buffers and have the capacity to provide capital support to investee banks if needed. Regulatory oversight and prudential safeguards further help contain the risk of contagion across the system.

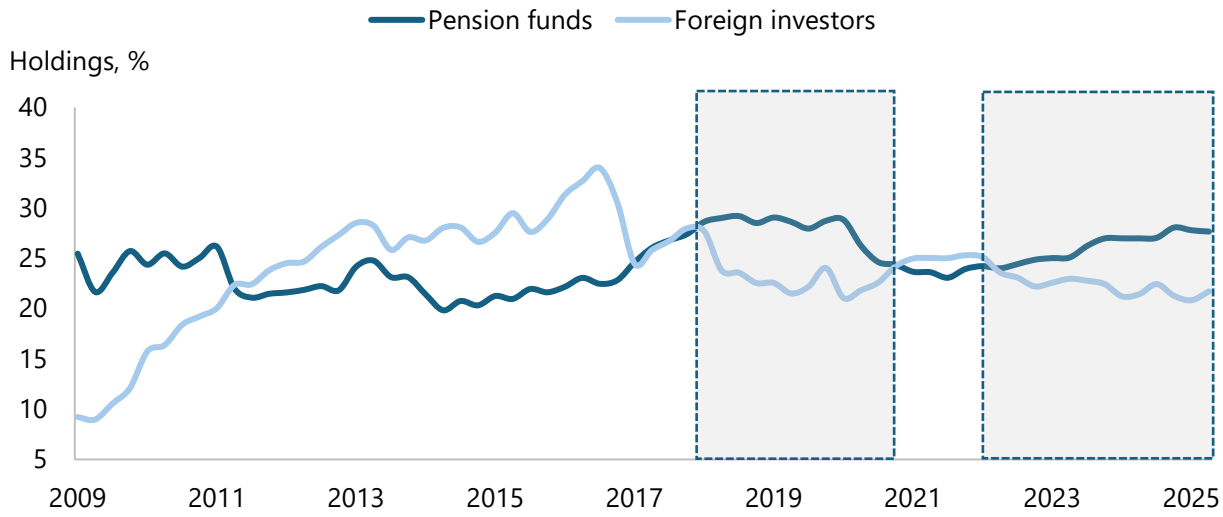
Beyond their domestic role, these NBFIs have also broadened their international portfolios as part of their portfolio optimisation strategies and in their search for higher returns. A growing share of their assets is now allocated to US dollar-denominated markets, particularly US equities. Although this global diversification brings portfolio benefits, it also raises the need for careful management of currency exposures. In practice, GLICs and other large institutions operate within BNM's hedging requirements for foreign exposures, which help mitigate currency mismatches and limit the risks of external shocks amplifying domestic volatility. These safeguards ensure that global diversification enhances long-term portfolio resilience without creating unwarranted procyclical spillbacks into domestic market conditions.

investment grade credit rating, progressive and inclusive financial market policies, developed infrastructure and ample secondary market liquidity.

[4] Domestic NBFIs, particularly pension funds' holdings of Malaysian government bonds, have consistently demonstrated a countercyclical pattern relative to non-resident holdings, as reflected by the long-term (2009–25) negative correlation of –0.34. Recently, the correlation between government bond holdings of NBFIs and foreign investors has strengthened to –0.81 in the post-pandemic environment, underscoring its role as an automatic stabiliser in the domestic bond market. This inverse relationship was particularly pronounced during episodes of non-resident outflows, notably between 2017 and 2019, when the correlation reached –0.84.

Percentage holdings of Malaysian government bonds

Graph 4



Shaded areas represent the periods of capital outflows. Domestic NBFIs (e.g. pension funds) acted countercyclically, increasing their government bond holdings and helping to stabilise market conditions.

Source: Central Bank of Malaysia.

Taken together, the broader foreign investor base and a stronger domestic NBFI presence have enhanced Malaysia's overall market resilience compared with the immediate post-GFC period. This provides a firmer footing to navigate changes in global sentiment over time, even as ongoing vigilance remains important in light of evolving risks.

Part II: Exchange rate dynamics, capital flows and domestic financial conditions

Given this underlying configuration of foreign and domestic investors, and Malaysia's position as a small, open economy, domestic financial conditions remain closely linked to developments in global markets. The exchange rate and portfolio flows are often the first channels through which external shifts register domestically, shaping domestic asset prices, funding costs and credit conditions more indirectly. Changes in global risk appetite, interest rate expectations and the broader dollar cycle tend to affect the ringgit (MYR) and the direction of flows into local currency assets.[5] Surges in inflows are typically associated with appreciation, while sudden reversals during periods of risk-off trigger depreciation.

[5] See Singh (2014). This paper discusses Malaysia's experience and policy responses with respect to spillovers of global monetary conditions.

The ringgit's flexibility allows much of this adjustment to occur through the exchange rate rather than through abrupt changes in domestic interest rates or liquidity. Even so, concentrated inflows or outflows can influence financial conditions in the near term, particularly when global shocks coincide with heightened investor uncertainty.

Recent episodes illustrate these dynamics clearly. At the onset of the Covid-19 shock,[6] a sharp deterioration in global risk sentiment led to sizeable non-resident bond outflows of USD 3.8 billion and a 5% depreciation of the ringgit, with domestic yields rising and credit spreads widening, tightening overall financial conditions. As global liquidity conditions stabilised, flows gradually returned and market pricing retraced, easing the financial conditions. A similar pattern was observed during the 2022–23 US monetary tightening cycle. Together with a stronger dollar, rising US yields following 525 basis points (bp) of policy rate increase placed renewed pressure on regional currencies, including the ringgit, despite Malaysia's own 125 bp policy rate adjustment. During this period, financial conditions similarly tightened, mainly through the foreign exchange (FX) and capital markets. In both instances, movements in the exchange rate and term premia accounted for much of the movement in domestic financial conditions. These episodes highlight the extent to which global monetary conditions can affect domestic markets, irrespective of underlying domestic fundamentals.

Beyond the immediate effects on the exchange rate and market pricing, the dynamics of capital flows can also shape broader domestic financial conditions, particularly when inflows or outflows are sustained. Strong and persistent inflows have, at times, been accompanied by easier funding conditions, firmer asset valuations and a more supportive environment for credit expansion. This was especially evident in the post-GFC period, during which Malaysia experienced a sustained period of easy liquidity conditions and strong credit expansion alongside cumulative net portfolio inflows into the economy following quantitative easing abroad (Table 1).[7] These inflows reinforced risk-taking and compressed risk premia,

Capital flows, financial market performance and macro indicators during major global events

Table 1

Event periods	Post-GFC (end-2008–12)	Aggressive Federal Reserve hikes (2022–23)	Delayed easing of Federal Reserve's MP (end-2024)
Cumulative non-resident flows into domestic bond market (USD bn)	4.2	–4.1	–0.6
Ringgit's performance against US dollar (%)	+12.4	–9.3	–7.8
10-year MGS yield (bp)	–108.0	14.0	11.0
Credit growth (%)	11.5	5.4	4.9

Sources: Central Bank of Malaysia; CEIC; EPFR Global.

[6] Refers to April–December 2020.

[7] During this period, domestic credit grew at an average annual rate of around 11.5% between end-2008 and 2012, coinciding with cumulative net portfolio inflows into the domestic financial market.

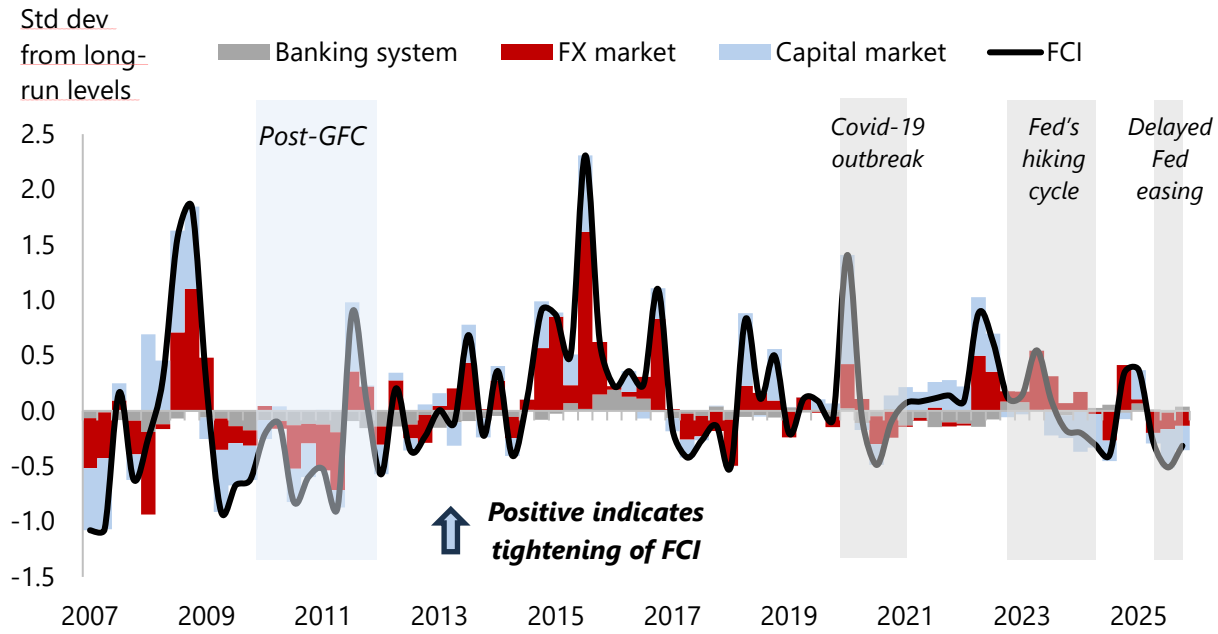
supporting asset valuations and easing funding conditions.[8] When flows reverse, especially in relation to a weaker currency or a shift towards greater global risk aversion, funding conditions can tighten even if domestic fundamentals remain sound. While these effects differ across episodes, they illustrate how the ebb and flow of global capital can influence domestic financial conditions over time, through its effects on sentiment, asset valuation and the pricing of risks.

Shifts in global sentiment, particularly those accompanied by US dollar strength, can amplify these dynamics. Risk-off episodes, typically characterised by depreciation pressures and rising bond yields, tend to tighten financial conditions and dampen investor confidence. The impact can be more persistent when depreciation pressures are prolonged, leading to a longer period of tighter conditions and muted sentiment.

In this context, BNM's Financial Conditions Index (FCI) provides a summary measure of how movements in asset prices, yields and other market indicators affect overall financial conditions (Graph 5). The FCI typically loosens when the domestic exchange rate appreciates, amid capital inflows, lower bond yields and narrower spreads, and vice versa. During the onset of Covid-19, the FCI tightened to around a 1.4 standard deviation (std dev) from long-run levels, driven mainly by the capital and

Malaysia's Financial Conditions Index

Graph 5



The shaded bands help interpret the index, where blue denotes periods of easing and grey, periods of tightening. The FX component reflects ringgit movements and volatility. An appreciation typically coincides with easing, while depreciation typically coincides with tightening. The capital market component covers both bonds and equities; easing is usually accompanied by declining bond yields and firmer equity prices, while tightening is associated with higher yields and softer equities. The banking component captures funding and credit conditions, including interest rates for retail and business borrowers.

Source: Central Bank of Malaysia.

[8] See Central Bank of Malaysia (2014).

FX market components. The FCI subsequently moderated as stress in the FX and capital markets subsided. Likewise, during the 2022–23 Federal Reserve tightening cycle, the FCI tightened to around a 0.9 std dev from long-run levels due to FX and capital market tightening before easing as pressures moderated in early 2024. In Malaysia's case, however, the impact on the real economy depends on its underlying drivers. While earlier estimations indicated that the FCI for Malaysia tended to lead real GDP growth by two to four quarters,[9] changes in the FCI do not necessarily translate into co-movement with economic activity. When tightness is contained within the domestic financial markets, such as the foreign exchange and capital markets, spillovers to real activity have historically been more contained. When such tightness coincides with signs of pressure in the banking system, however, the real economic transmission tends to be stronger. The FCI is therefore interpreted alongside a wider set of indicators and used to contextualise evolving financial conditions, rather than as a mechanical guide for policy.

One factor supporting Malaysia's resilience in absorbing shifts in global conditions is the structure of domestic intermediation. Malaysia's bank-based financial system provides an important buffer. While tighter conditions may have some bearing on banks, especially during periods of tighter liquidity following capital outflows, the impact is mitigated by banks' predominantly domestic funding base and their strong liquidity and capital buffers. Banks' relationship-based lending and credit assessments also respond more to underlying borrower fundamentals than to short-term movements in capital flows or market sentiment. Exchange rate flexibility reinforces this by allowing the ringgit to adjust to external pressures without forcing abrupt changes in domestic interest rates or liquidity. Together with macroprudential safeguards and strong supervisory oversight, these features have helped limit the extent to which global shocks spill over into broader strains within the domestic economy.

Such resilience in market functioning, however, does not fully insulate domestic sentiment from external developments. The ringgit's movements against the US dollar often attract significant public attention. A sharp or prolonged depreciation may be interpreted as a broader signal of economic weakness. When such perceptions take hold, households and firms may turn more cautious, raising the risk of a larger-than-intended pullback in consumption or investment. Such shifts in sentiment may differ from market-based adjustments, yet remain relevant in assessing the broader influence of external shocks on domestic financial conditions.

The direct inflationary impact of exchange rate movements, however, has historically been contained. Malaysia's exchange rate pass-through (ERPT)[10] to core inflation is relatively low, supported by well-anchored inflation expectations and the structure of domestic price formation. As a result, even when the ringgit experiences episodes of volatility during global risk-off periods, the immediate effects on inflation have tended to be moderate.

[9] See Central Bank of Malaysia (2017).

[10] A 5% change in the MYR/USD exchange rate is associated with approximately a 0.1 percentage point change in core inflation in the next quarter (short run) and 0.2 percentage points over a year (long run). For further information on the extent to which the ERPT channel affects domestic consumer prices in Malaysia, please refer to Central Bank of Malaysia (2022), box article titled "Revisiting exchange rate pass-through to inflation in Malaysia".

This broader context forms the operating environment within which domestic policy navigates external shocks while maintaining its focus on Malaysia's underlying economic objectives.

Part III: Malaysia's policy approach

Malaysia's policy approach therefore reflects this balance, managing external influences while preserving the conditions necessary for domestic stability. The framework draws on a wide set of instruments to support orderly market functioning and anchor confidence through periods of global volatility. Within this broader architecture, monetary policy remains focused on domestic inflation and growth objectives, while other tools help manage the shorter-term effects of external shocks. These policy tools are further complemented by ongoing structural and market development efforts that strengthen market depth and resilience over the longer term. This pragmatic approach is operationalised through several core principles that inform how policy is calibrated and deployed.

Principle 1: Build buffers and fortify foundations during good times

The core pillar of Malaysia's approach is to build buffers and strengthen foundations during periods of benign conditions. This creates room for policy to respond flexibly, rather than defensively, when global conditions turn. Doing so involves strengthening several layers of resilience: accumulating adequate foreign exchange reserves during periods of sustained inflows; maintaining robust capital and liquidity positions across banks and NBFIs; and using macroprudential tools to contain the build-up of vulnerabilities across households, corporates and financial intermediaries. A key element of this effort is surveillance of structural vulnerabilities such as net open positions (NOPs), liquidity mismatches and pockets of hidden leverage, particularly within segments of the NBFIs. These imbalances can amplify market stress, even when headline indicators appear sound. Early identification and mitigation, through prudential requirements, supervisory engagement and strengthened liquidity risk management, help prevent such fragilities from intensifying external shocks.

This philosophy of building resilience ahead of time has served Malaysia well. In the period prior to Covid-19, for instance, BNM had accumulated reserve buffers and strengthened balance sheets across banks and other financial institutions.[11] This groundwork provided room for BNM to take decisive steps to preserve orderly market functioning when the Covid-19 shock unfolded, while still being able to deliver the monetary and liquidity easing that domestic conditions warranted, including sizeable policy rate cuts and a reduction in the statutory reserve requirement (SRR).

[11] The banking system remained strong and well positioned to support financial intermediation in the face of the Covid-19 shock. As at end-December 2019, banks were well capitalised, with a total capital ratio of 18.6% and excess capital buffers of MYR 122 billion (as of February 2020). Funding and liquidity positions were also sound, with a Liquidity Coverage Ratio (LCR) of 149%. Refer to Central Bank of Malaysia (2020) for further information.

Importantly, banks continued to intermediate credit without major disruption, reflecting their strong capital and liquidity positions entering the crisis. The experience underscores the value of reinforcing buffers during more stable periods, ensuring that the policy framework has sufficient space to respond swiftly and flexibly when needed.

Principle 2: Targeted tools for targeted risks

Policy tools are most effective when they are aligned with the source of the risk. While some challenges warrant a broad, system-wide response, other risks are better addressed with more targeted instruments. Matching the tool to the nature of the risk ensures that policy actions are proportionate, effective and minimally disruptive to the wider economy. In managing episodes of exchange rate volatility, for instance, the central bank conducts foreign exchange interventions judiciously, focusing on smoothing excessive movements rather than resisting market-driven trends. In this context, BNM does not seek to defend any specific exchange rate level, nor does it intervene to resist fundamental capital flow movements. Additionally, measures under the foreign exchange policy help reinforce prudent behaviour by limiting excessive risk-taking and ensuring that corporates and financial institutions maintain sound currency risk management practices. Alongside these measures, direct engagements with key market participants, including corporates and DIIs, also play an important role. Initiatives such as the Qualified Resident Investor (QRI) framework,[12] which encourages resident corporates to repatriate earnings in exchange for flexibilities for investment abroad in the future, support the timely conversion and repatriation of foreign currency funds, helping to ease frictions when market conditions are tight and strengthening two-way liquidity in the onshore FX market.[13] These tools provide a means of addressing imbalances close to their source, allowing monetary policy to remain focused on domestic inflation and growth while other instruments manage market-specific pressures.

A recent episode illustrates this approach. When global risk sentiment deteriorated in early 2024 following the delayed monetary easing by the Federal Reserve, the ringgit faced renewed depreciation pressures. During this period, while the ringgit was affected, the underlying outlook for domestic growth and inflation did not materially shift. Thus, adjusting the domestic policy rate to offset the higher US rates was neither warranted nor would it have been effective or proportionate. Instead, the central bank focused on targeted measures, including closer engagement with corporates to encourage the timely conversion of export proceeds and improve onshore FX liquidity. These steps contributed to restoring more orderly market

[12] The QRI programme is a foreign exchange policy flexibility for resident corporates which are looking to repatriate and convert foreign currency funds from overseas investments and may have interest in undertaking new or further direct investment abroad (DIA) in the future.

[13] While BNM's FX interventions help manage excessive volatility, BNM supplemented FXI with initiatives to encourage healthy two-way flows in the onshore FX market through the full implementation of the QRI programme. The programme has yielded encouraging results as it has attracted more than USD 2 billion in inflows from participants since its launch in 2024.

conditions, with onshore FX trading remaining active and daily turnover rising to about USD 18 billion[14] from around USD 15.5 billion[15] prior to the measures.

Principle 3: Active communication to anchor expectations and build confidence

Clear and consistent communication is an integral part of Malaysia's policy approach. In periods of sharp exchange rate movements, timely messaging helps prevent negative sentiment from becoming self-reinforcing among both domestic and foreign market participants. This is particularly relevant in Malaysia, where the public often views the ringgit's performance as a barometer for overall economic conditions, and exchange rate depreciation can quickly be interpreted as signalling broader weakness.

For this reason, communication is calibrated to reach multiple audiences, including investors, analysts, businesses, the media and the wider public. During 2022–23, when aggressive US monetary tightening weakened regional currencies including the ringgit, concerns emerged among both market participants and the general public. BNM clarified that the depreciation primarily reflected global factors tied to US policy rather than domestic fragilities.[16] This communication, coupled with the measured calibration of the domestic policy stance, supported credibility and helped ease misinterpretation at a time of heightened uncertainty.

Communication also plays a practical role in setting expectations around the broader policy framework. Reinforcing that monetary policy remains focused on domestic objectives, while other tools address short-term market pressures, helps clarify policy intent. Restating BNM's commitment to orderly market conditions and its readiness to smooth excessive volatility when warranted likewise provides reassurance during periods of stress. Together, these efforts help support confidence and maintain clarity around BNM's policy approach.

Principle 4: Reinforce long-term resilience through structural measures

Beyond tools used to manage near-term pressures, BNM places equal emphasis on strengthening the longer-term foundations of Malaysia's financial markets, financial system and economy. Market development efforts such as the Principal Dealer (PD)

[14] Refers to the period from the start of coordinated efforts until end-2024.

[15] Refers to the period prior to the engagement, ie 30 December 2022 to 23 February 2024.

[16] The ringgit's weakness during 2022–23 was mainly attributed to the widening interest rate differentials between the United States and Malaysia, amid aggressive Federal Reserve monetary tightening. The rapid adjustment in US interest rates shifted global portfolio allocations towards US dollar assets, contributing to outflows from emerging markets and exerting depreciation pressure on the ringgit. These movements reflected external monetary conditions and global risk sentiment, rather than changes in Malaysia's underlying fundamentals.

system, the Dynamic Hedging Programme[17] for non-residents and the promotion of a securities-driven interbank repo market aim to deepen liquidity, broaden the investor base and strengthen market functioning. The PD system supports liquidity provision and market-making along the sovereign curve. The Dynamic Hedging Programme enhances FX risk management and participation in local currency assets. Meanwhile, a more active repo market improves collateral mobility and broadens funding options, strengthening market functioning especially during periods of stress.

Complementing these market initiatives, BNM continues to pursue broader measures that reinforce financial system resilience. This includes ongoing work to enhance prudential oversight and risk management practices across banks and NBFIs. These efforts help maintain a stable and well-functioning financial system that can support economic activity through varying conditions.

At the national level, these initiatives are complemented by a broader national reform agenda aimed at supporting Malaysia's long-term economic resilience. Since 2023, the government has undertaken renewed efforts to strengthen fiscal sustainability and enhance productivity. Fiscal reforms, including the phased rationalisation of subsidies for electricity, water, diesel and petrol, have been implemented carefully to balance growth, inclusion and price stability. Structural initiatives such as the New Industrial Master Plan 2030 and the National Energy Transition Roadmap seek to upgrade Malaysia's industrial capabilities, deepen value chains and position local industries for emerging opportunities in strategic sectors. Collectively, these efforts strengthen Malaysia's long-term fundamentals and enhance the country's attractiveness to investors.

Structural reform is not new to Malaysia. Decades of steady progress have helped build the foundations that support resilience today. BNM continues to work closely with the government, in its role as economic adviser, to support and advocate for these reforms. More importantly, these broader economic reforms help provide enduring confidence in the ringgit, attract a wider base of stable investors and position Malaysia's financial system to better withstand external shocks.

Part IV: Emerging challenges and policy priorities moving forward

Looking ahead, the global environment is likely to remain shaped by forces that could generate more frequent and complex spillovers for emerging markets. Two developments, in particular, have broad and lasting implications: policy-driven geoeconomic fragmentation and rapid advances in artificial intelligence (AI).

Geoeconomic fragmentation is structurally shifting the global economy from the earlier era of deep integration towards one of de-integration and rising

[17] The Dynamic Hedging Programme is part of BNM's initiative to provide market access for institutional investors to actively manage the FX exposures of their invested assets. This programme, which was first introduced in December 2016, provides the flexibility to actively manage FX risk exposure via forward hedging activities with onshore banks or an Appointed Overseas Office without the need to show documentation.

protectionism. The steady build-up of tariffs, export controls and investment restrictions reflects a broader policy-driven shift in which trade, technology and national security concerns increasingly overlap. Governments are reassessing supply chain dependencies and reshoring or "friendshoring" strategic sectors. Geopolitical tensions, shifting trade patterns and uncertainty over US monetary policy further heighten the risk of abrupt changes in global risk appetite, with spillovers to emerging markets regardless of domestic fundamentals.

In parallel, rapid advances in AI are reshaping production, investment and market behaviour. AI is emerging as a new form of capital – scalable, rapidly deployable and capable of transforming supply chains. These shifts have contributed to strong investment momentum and, in some market segments, elevated valuations, particularly in AI-related technology sectors. While innovation brings opportunities, high valuations and concentrated exposures also heighten sensitivity to changes in market sentiment. A sharp correction in AI-linked assets, or broader US equity valuations decoupling from fundamentals, could trigger a wider repricing of risk and spill over into emerging markets through wider term premia, weaker sentiment and renewed FX pressures. Given the potential for AI to amplify market adjustments, such spillovers can be transmitted more frequently and with greater speed, compressing the window for markets and policy to adjust in an orderly way.

These dynamics interact with the structure of global financial intermediation. The growing role of NBFIs internationally, including the use of leverage, liquidity transformation and complex funding structures in some segments, has at times amplified market adjustments during periods of stress. While Malaysia's domestic NBFIs remain well regulated, the global dimension of these risks highlights the need for continued surveillance of cross-border exposures and the channels through which liquidity tensions abroad may affect local conditions. Benchmark-driven allocations can also accelerate the pace of flow adjustments, making domestic markets more sensitive to shifts in global sentiment.

Emerging digital assets may also introduce new risks. The expansion of US dollar-backed stablecoins and other crypto instruments raises the possibility that during stress episodes, some cross-border movements could bypass traditional intermediaries, reducing visibility and complicating the effectiveness of conventional tools. Although such activity remains limited in Malaysia, the trend points to the need for enhanced surveillance, improved data collection and tighter cross-border coordination to identify and manage evolving risks.

Malaysia's ability to navigate these emerging risks will depend on the country's capacity to adapt and the robustness of its foundations. Policy priorities in this environment are clear. The framework must remain adaptable, with sufficient operational flexibility across instruments to respond swiftly and proportionately when external shocks occur. Preserving policy buffers, broadening the domestic investor base and keeping the macroprudential toolkit up to date remain important elements of resilience. Clear and consistent communication continues to play a key role, helping to anchor expectations and reinforce policy credibility at times when external signals are volatile.

As AI adoption accelerates, greater attention will need to be given to valuation concentrations, financing structures and third-party dependencies, including data governance and operational risks. Meanwhile, proactive risk monitoring should

remain attuned to NBFI exposures, leverage and liquidity mismatches, as well as to valuation risks that could propagate through global repricing episodes. Oversight of stablecoin and crypto-related activity adds another dimension, helping reduce blind spots in liquidity management and limiting the risk that such flows complicate conventional policy tools.

Continued market development will complement these efforts. Wider access to hedging instruments and greater transparency in FX liquidity can help smooth market adjustments during periods of stress. Stronger local currency market infrastructure and a more diversified, longer-horizon investor base across both conventional and Islamic finance further support orderly market functioning. At the same time, investments in data-driven supervision and regtech or suptech capabilities enhance the timeliness and coverage of macro-financial surveillance and strengthen early warning capacity.

Conclusion

Overall, Malaysia's experience highlights the reality that global conditions will continue to shape domestic financial markets in ways that require ongoing vigilance. While these external influences cannot be fully avoided, flexible policy frameworks and sound buffers, underpinned by steady structural progress and clearer visibility over evolving risks, can help ensure adjustments remain orderly. These elements support a policy environment that stays oriented towards domestic priorities, even as the external landscape becomes more complex.

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NBFIs' footprint on EMEs' financial markets

Bank of Mexico

This note explores three themes relating to the growth of non-bank financial institutions (NBFIs) and some of their potential consequences for emerging market economies (EMEs). First, we describe the key features of global NBFIs, which result in some having fickle portfolio investment positions in EMEs. We also provide an explanation on the role of *local* NBFIs as part of the investor base. Second, we examine interconnectedness, à la Diebold and Yilmaz (2015), among financial conditions indices of five Latin American economies.[1] We examine how it impacts bond flows and, conversely, the extent to which bond flows affect their co-movements. Third, we review some of the short- and long-term policy responses that EME authorities have pursued, partly due to NBFIs' growing footprint. For the long-term responses, we focus on the case of Mexico.

Global NBFIs

NBFIs render services similar to those of banks, but do not accept deposits in the traditional sense.[2] Some prominent examples of NBFIs are insurance companies, pension funds, broker-dealers, investment funds and hedge funds. Unlike banks, they are normally funded through capital markets rather than from deposits, which makes them, in general, more sensitive to financial conditions. Nonetheless, it is worth noting the heterogeneity among NBFIs as they differ from each other in important ways.[3]

The Great Financial Crisis (GFC) was a watershed in many respects; most notably, in terms of regulations affecting global banks. One of the main consequences of this is that a significant portion of capital flows ceased to be intermediated by banks and instead became intermediated by NBFIs. As part of this process, NBFIs have grown substantially in size and influence. In fact, they now account for nearly half of global financial assets (Graph 1). Although they bring many benefits such as increased

[1] According to the FSB (2022, 2025), interconnectedness is a broad concept that can take many forms. For instance, it can be financial, depending on the source of the linkage between institutions. There are two main categories: (i) direct, bilateral transactions between institutions, including funding, counterparty transactions, deposits and investments, among others; and (ii) indirect, portfolio linkages via similarities in investment strategies or in asset holdings. The latter operates primarily through price contagion. In this note, we use the measure proposed in Diebold and Yilmaz (2015); thus, this note refers to their specific notion. It is worth noting that the interconnectedness index á la Diebold and Yilmaz is intimately related to the notion of co-movement; we use the two terms interchangeably.

[2] These include credit, payment, asset management, financial advisory and custody services, among others.

[3] Their heterogeneity can be beneficial for financial stability if risk-sharing across their balance sheets takes place (Aquilina et al (2025)).

market efficiency, their nature can have consequences in terms of the volatility of capital flows and the interconnectedness of financial conditions.

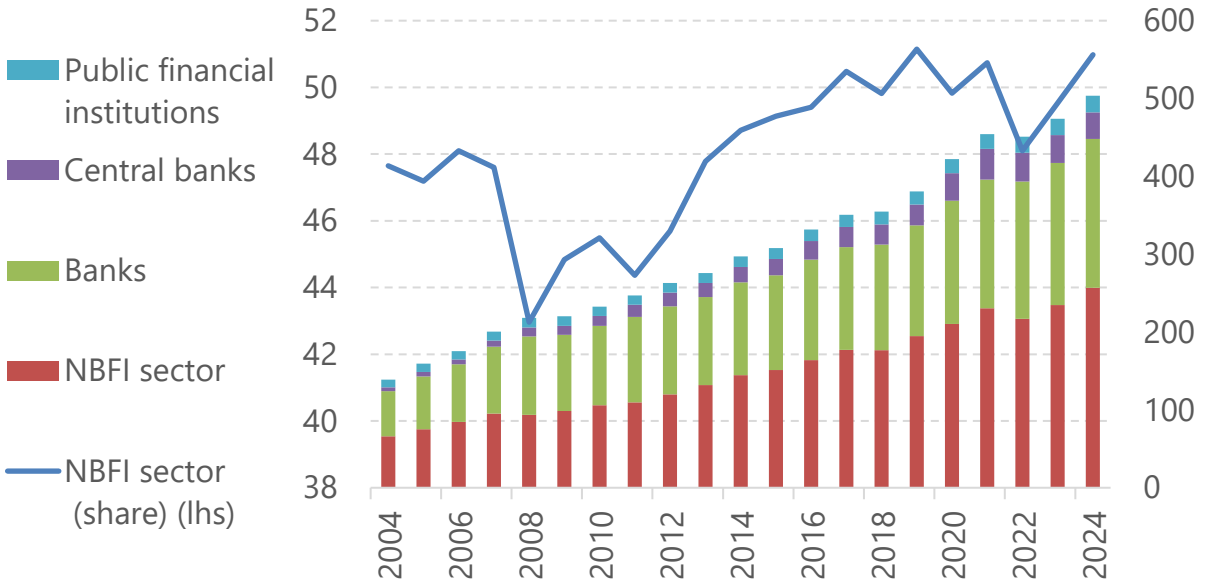
Having briefly outlined the growth and financial importance of NBFIs, our focus turns to global investment funds.[4] In effect, these funds could affect local financial conditions through their investment decisions. To understand the different mechanisms that explain this impact, it is useful to review a few models.

The association between capital owners and fund managers can be viewed as a principal-agent relationship.[5] There are several devices with which these agency frictions could be lessened. In this context, one such device is ranking fund managers within a given fund category, making them averse to ranking last. In the aggregate, this might lead to greater co-movement, herd-like behaviour and capital flow volatility.

NBFI as a share of total global financial assets increased in 2024

In percent and trillions of US dollars

Graph 1



Source: FSB.

To set the stage, suppose there is a set of portfolio managers competing against each other. As these managers care about their relative ranking, strategic interactions occur (Morris and Shin (2014)). Moreover, when fund managers have significant positions in relatively shallow financial markets, such as those in EMEs, their interactions become even more relevant, as asset prices can be sensitive to changes

[4] Investment funds can be further classified into mutual funds, exchange-traded funds, money market funds, hedge funds, private equity funds, venture capital funds, private debt funds, real estate funds, commodity funds, funds-of-funds, structured credit funds and crypto asset funds, among others.

[5] The term fund manager is being used in a general sense here. It could also refer to a portfolio manager in an NBFI different from a fund.

in their positions. In short, managers are subject to pecuniary externalities (Aramonte et al (2021)).

In this context, there are several potential mechanisms through which such dynamics could be exacerbated. As a case in point, suppose that each fund manager individually knows its type, conscientious or slacker, but no one else can observe it, including capital owners. Everyone observes each manager's performance and changes in asset positions. Thus, slackers have an incentive to follow others' portfolio allocation decisions in order to hide their type.[6]

In addition, some NBFIs, notably investment funds, can face important redemption pressures. There have been some financial stress episodes in which some fund managers have amplified stress as they tend to sell assets beyond what their redemptions warrant (ie so-called discretionary sales). This links retail and institutional outflows to market pressure on EMEs' bonds (Shek et al (2018)).

During such episodes, institutional funds may decide to rebalance their portfolios, which could impact financial conditions in EMEs, with a significant effect on those with low credit quality. Some NBFIs tend to be concentrated; for instance, the top investment funds have a significant portion of the total assets under management (AUM). Thus, funds could be affected by general investment decisions or similar valuation models.

One might consider other mechanisms that could lead to greater co-movements among global NBFIs' investment decisions, potentially implying greater volatility in capital flows.[7] While these mechanisms are challenging to identify, they could be present in many financial markets. We now turn to the issue of the leverage taken by NBFIs, which could exacerbate these dynamics.

Leverage and NBFIs

Leverage can take many forms. This is one of the reasons it can be challenging to assess, especially at an aggregate level. In fact, comparing leverage across a group of financial institutions is only reasonable if such institutions share similar investment strategies and regulatory constraints.

In one of its simplest forms, many NBFIs borrow cash using repurchase agreements (repos) and a safe asset as collateral (commonly, US Treasury bonds). NBFIs can also borrow securities to short-sell them. In both cases, NBFIs would increase their leverage. For its part, (synthetic) leverage can be implemented through derivatives, in this case with no need to borrow cash. Positions in futures and options

[6] Similarly, one could also think of manager types in terms of being informed or uninformed. In another case, suppose that managers receive a noisy signal sequentially. Each signal is informative with respect to EMEs' asset prospects. All managers see what other managers decide in terms of investing in EMEs after receiving their signal. An issue with their dynamics is that small deviations in terms of their signals can lead to different outcomes (Bikhchandani et al (2024)). Similarly, one could envision a set of investors that are overly optimistic about EMEs' assets. In its complement, investors are realistic but aware of other investors being optimistic (De Long et al (1990)).

[7] Other well-known mechanisms include flight to safety, deleveraging, unwinding of positions for liquidity preservation and making margin calls, among others.

are common cases of this type of leverage. Indeed, these enable NBFIs to gain exposure to financial assets without requiring initial capital. This form of leverage is very popular among investment funds.

NBFIs can also have off-balance sheet leverage. Examples include securitisation vehicles and private equity through leveraged buyouts. There is implied leverage through risk exposure; for example, liability-driven investment funds and insurance companies may have duration mismatches.

Not only does leverage lead to more risk, it is also more challenging to measure, which is a potential concern for financial authorities. In addition, some NBFIs often reuse collateral received in a repo or securities lending transaction (ie re-hypothecation). Authorities need to understand the extent to which NBFIs are reutilising their collateral.

All in all, returns under leverage tend to be higher than those from unleveraged positions. However, leveraged returns cut both ways, as substantial losses are a possibility. In short, leverage can amplify the speed and magnitude of financial contagion.[8]

As an exercise to illustrate the role of leverage in EMEs' bond flows, we consider a VAR model with three variables: EMEs' bond flows, the (change in the) VIX, and the (change in) US dollar credit to EMEs.[9] Based on McCauley et al (2015), we interpret the US dollar credit to non-bank borrowers as a *proxy* of global dollar leverage, reflecting both bank balance sheet expansion and NBFIs' bond market intermediation. All the variables are expressed in terms of their z-scores, so their units are in standard deviations.

Consider the generalised impulse response functions (GIRFs) of shocks to the VIX and credit, and the respective responses of EME bond flows (Graph 2). While a shock to the VIX leads to bond outflows and a shock to credit leads to bond inflows, a noteworthy result is that the latter seem to have greater magnitudes and persistence.

Thus, changes in leverage appear to be as relevant as changes in uncertainty. While leverage can enhance market efficiency and support liquidity, there is a possibility of market instability if market participants are unable to absorb the unwinding of positions and asset sales in an orderly manner.

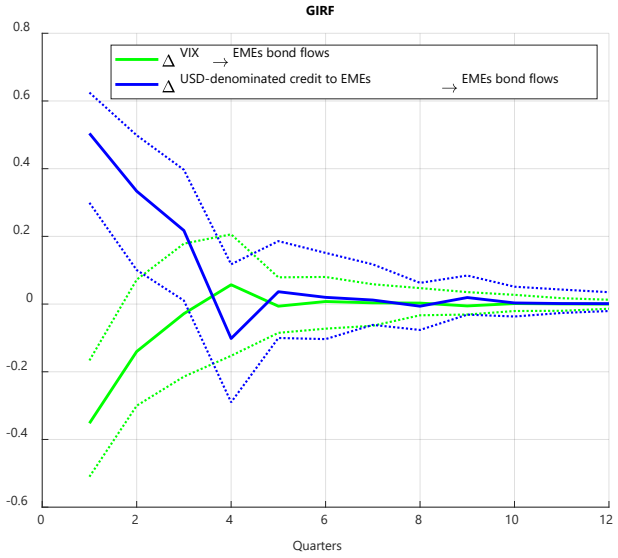
[8] On a related matter, unwinding positions and keeping track of them can be challenging too.

[9] The estimation sample is Q1 2005–Q1 2025. While the initial date of the sample is limited by the bond and equity flow data from the Institute of International Finance (IIF), the quarterly frequency is determined by the US dollar credit data frequency. The identification is based on generalised impulse response functions (Pesaran and Shin (1998)).

Changes in US dollar-denominated credit to EMEs and EME bond flows

In standard deviations

Graph 2



An increase in credit to EMEs, as a proxy of leverage, leads to bond inflows. An increase in the VIX leads to bond outflows. Notably, this proxy leads to greater magnitudes and persistence. Based on McCauley et al (2015), we interpret US dollar credit to non-bank borrowers as a proxy of global dollar leverage, reflecting both bank balance sheet expansion and NBFIs' bond market intermediation. In line with their findings, we use US dollar credit to EMEs as a proxy for externally financed leverage in market-based intermediation into emerging markets. A similar result holds when considering the sum of bond and equity flows. Intervals are set at the 95% confidence level.

Sources: Bloomberg; IIF; BIS.

Local NBFIs

Having considered key aspects of global NBFIs, we now turn to analyse key aspects of local NBFIs. Some of these entities are placed to take the positions being left by global NBFIs in the event of tightened financial conditions. The extent to which changes in global investors' positions in local assets affect their prices largely depends on the ability and willingness of local investors to take those positions.

In this respect, local NBFIs can play a key role. Their investment mandates largely determine their behaviour. A feature that captures part of this is their risk aversion. All else being equal, more risk-averse and more patient investors (eg pension funds) are willing to pay a lower price for a given financial asset.[10] An upshot to this point is that global and domestic investors with similar degrees of risk aversion and patience contribute towards smoother price dynamics when trading financial assets with one

[10] Concretely, the price, $P_{i,t}$, an investor, i, with a constant relative risk aversion coefficient (CRRA) of γ_i, is willing to pay for a financial asset decreases as their risk aversion increases. Technically, $P_{i,t} = \mathbb{E}_t(P_{t+1})R_{t,f}^{-1} - \gamma_i\,\beta_i\,\mathbb{C}\mathbb{o}\mathbb{v}_t(\Delta\, c_{t+1}, P_{t+1})$ where a positive covariance is expected. We have that $R_{i,t}^{-1}$ is the risk-free rate and c_t is the (log) of consumption. For simplicity, we have assumed the existence of a stochastic discount factor based on a utility function with a CCRA equal to γ, and have taken a linear approximation. That said, the result holds under more general conditions.

another. If the local investor base is not well diversified, there is likely to be a smaller number of local investors similar to the global ones.

A closely related consideration is the conformation of local NBFIs. On the one hand, institutional investors such as pension funds and insurance companies tend to be more patient and have longer-term investment horizons. On the other hand, local retail investors such as hedge funds are less patient and tend to focus more on short-term investments.

Having a large and diversified investor base brings about benefits. Macroeconomic shocks affect NBFIs in different ways depending on the nature of both the shocks and NBFIs themselves. For instance, an insurance company would probably shrug off a short-lived shock, whereas an investment fund would probably respond to it. As previously mentioned, this heterogeneity could benefit financial stability if there is risk-sharing across their balance sheets. In addition, a large investor base is also beneficial for its sheer capacity to withstand large shocks.

Similarly, different NBFIs have different liquidity needs. Thus, a diversified investor base could lead to more resilient liquidity conditions.[11] That said, it is important to understand the nature of liquidity provision and the demand that different types of NBFIs can provide, as well as how these can change during periods of financial stress. During such episodes, financial conditions can quickly erode intermediation capacity and amplify price movements.

Although one could take some comfort from the fact that the banking sector remains dominant in many economies, there is evidence that financial stress in NBFIs could transmit to banks through counterparty, liquidity and valuation channels (BCBS (2025)). Moreover, some global banks have turned into conglomerates, adopting some NBFIs' activities (Cetorelli and Prazad (2025)).

Co-movements in financial conditions indices of Latin America

The literature has paid much attention to understanding how US financial conditions can affect capital flows to EMEs (eg Rey (2015)), how some global NBFIs can be subject to herd-like dynamics (eg Radatz and Schmukler (2012)) and how local financial conditions can affect capital inflows to a given EME (eg Bruno and Shin (2012)). However, relatively less attention has been paid to understanding interconnectedness in local financial conditions indices (FCIs).[12]

Thus, a natural exercise is to explore the extent to which FCIs in the region present co-movements and their nature. To this end, we use estimates of the FCIs of five Latin American economies: Brazil, Chile, Colombia, Mexico and Peru (Graph 3). In the case of the United States, we use Goldman Sachs' US FCI. Next, we use the

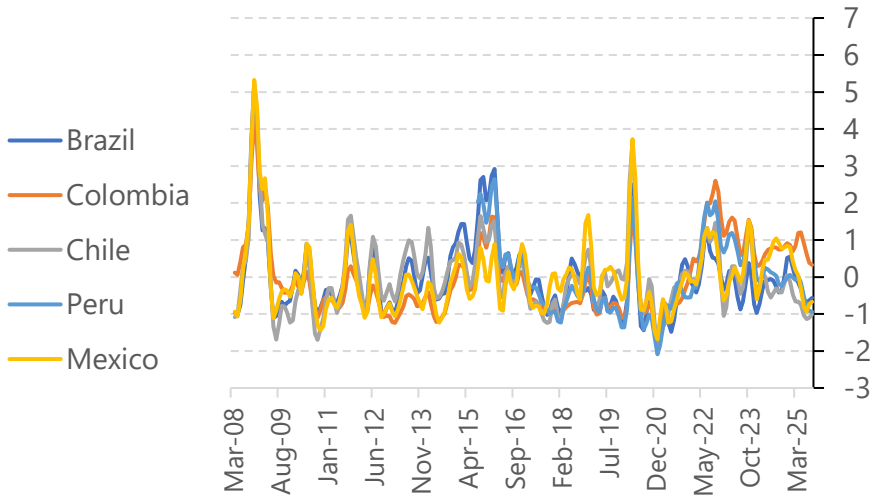
[11] This is not always the case, as, for example, events in the US Treasury markets have attested over the past year.

[12] The literature has explored connectedness across EMEs' specific financial markets, for example Assaf et al (2025).

FCIs for Brazil, Colombia, Chile, Mexico and Peru

In standard deviations

Graph 3



These FCIs are estimated based on principal component analysis (PCA) with the same set of financial variables for each of these economies. The financial variables used are: 10-year yield, three-month yield, corporate spread, stock exchange returns, FX implicit volatility (one-year horizon), sovereign spread (EMBI Spread), DXY, VIX and the US FCI (Goldman Sachs).

Source: Own estimations, with data from Bloomberg.

Diebold-Yilmaz (DY) index (Diebold and Yilmaz (2015)) to measure the FCIs' interconnectedness. This index is a way to measure how much FCIs (or other variables) influence one another at a given moment in time. If most movements reflect external shocks, the level of connectedness is high. If an FCI moves mainly due to local shocks, connectedness is low.[13] In sum, the index provides a single number reflecting how tightly financial markets are linked.[14]

Consider Graph 4. During the 2018–19 period, the financial interconnectedness between Latin America and the United States remained relatively high for the sample period. Regional differentiation increased marginally, largely through domestic policies, but the common factor remained dominant. The onset of Covid-19 in 2020 led to a significant increase in cross-market connectedness between the United States and Latin American economies under review. At the time, the DY index exhibited a marked increase. Thereafter, the global monetary easing spread to Latin America. The period was characterised by synchronised shocks, as macroeconomic and, until then

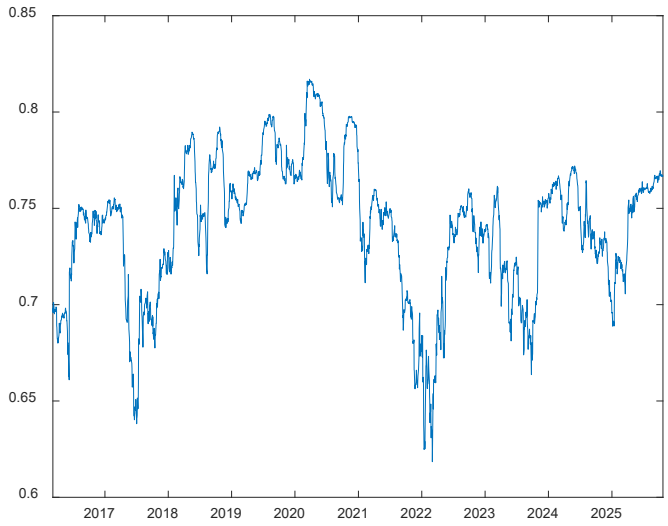
[13] There are no a priori levels with which one could determine whether the level of a DY index is high or low. It is a relative index, so one can consider a point of reference with respect to a known event, and then compare it with the levels on other dates.

[14] More formally, the DY connectedness index is a framework that quantifies how shocks in one variable spill over to others. It is based on a forecast error variance decomposition of a VAR model. For each variable, the method computes how much of its future uncertainty is explained by shocks originating in other economies versus its own economy. By aggregating these contributions across economies, the DY index provides a unique measure of connectedness, expressed as a percentage. It is worth underscoring that the DY index is agnostic about the sign of their interconnection.

The Diebold–Yilmaz (DY) connectedness index based on FCIs

Index; 1 indicates total connectedness and 0 indicates no connnectedness

Graph 4



This index is based on FCIs of Brazil, Chile, Colombia, Mexico, Peru and the United States. A higher value means markets are tightly linked and shocks propagate widely, while a lower value indicates segmentation or weaker spillovers. The VAR on which the DY index is estimated uses a 220-day rolling window. The DY considers the average of the forecasts for one- to 20-day horizons. Estimation sample: May 2015–Oct 2025.

Source: Authors' estimations with data from Bloomberg.

unfamiliar, epidemiological cycles took hold. In this period, financial conditions in the region were linked to US conditions.

In contrast, 2022 marked a notable decline in co-movements between US and Latin American financial conditions. The United States remained a global driver, but its transmission apparently weakened, and several Latin American markets (eg Brazil, Mexico and Chile) began to behave more idiosyncratically. From 2023 onwards, spillovers between the United States and Latin America intensified but did not return to the previous relatively high contagion regime of 2018–19. Finally, since 2024, spillovers have risen during periods of US data surprises and geopolitical shocks.

Next, as a key empirical exercise, we explore a VAR with the DY index based on the FCIs, Latam Bond Flows (ie the average of Brazil, Chile, Colombia, Mexico and Peru) and (the change in) the VIX.[15] We use bond flows from EPFR Global to obtain a weekly frequency. We consider shocks to the DY index and, separately, to the VIX, and consider the bond flows' response to each. In addition, we explore shocks to bond flows and the DY index response (Graph 5).

First, an increase in global uncertainty, as measured by the VIX, leads to bond outflows (green line). Second, a shock to interconnectedness leads to bond outflows (red line). Third, a shock to bond inflows leads to less interconnectedness (blue line). Equivalently, a shock to bond *outflows* leads to *greater* interconnectedness. While the

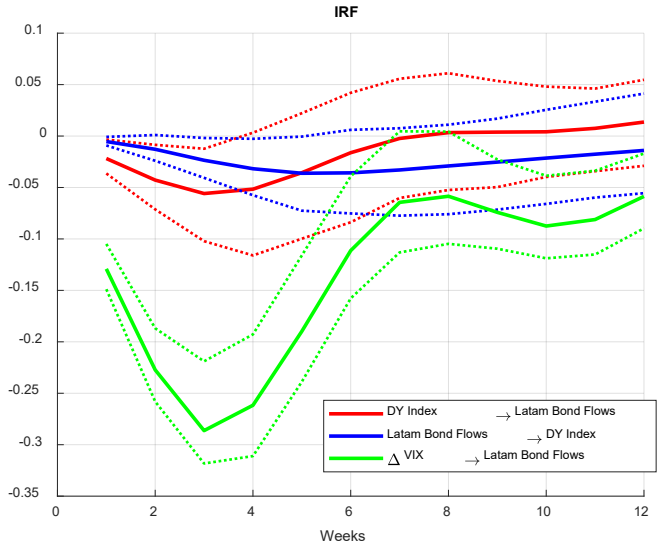
[15] The estimation period is March 2017–October 2025. The data have a weekly frequency. The identification is based on generalised impulse response functions (Pesaran and Shin (1998)).

latter effect seems to be relatively weaker, it points to the possibility of a potential feedback loop given sufficiently strong shocks.

Generalised impulse response function based on a VAR with three variables, the change in the VIX, the DY index and the average of bond flows of Brazil, Chile, Colombia, Mexico and Peru

In standard deviations

Graph 5



Bond inflows lead to a decrease in the DY index (blue). A shock to the DY index leads to bond outflows (red). Under sizeable shocks, this last effect could give place to an adverse feedback loop, which could prove fragile. For reference, positive (changes in) the VIX lead to bond outflows (green). In this case, we use EPFR Global to obtain a weekly frequency. Intervals are set at the 90% confidence level.

Source: Own estimations with data from Bloomberg and EPFR Global.

Another key issue is the extent to which global factors versus interconnectedness determine local financial conditions. A deterioration of global financial conditions would typically adversely affect local financial conditions. However, the extent to which interconnectedness adversely affects local financial conditions depends on several factors. In fact, interconnectedness could either be favourable or not depending on several circumstances. To explore this point, we regress each FCI on the z-scores of the VIX and the Latin American and US DY index:[16]

$$FCI_{i,t+1} = \beta_{i,0} + \beta_{i,1} VIX_t + \beta_{i,2} DY_t + u_{i,t+1}.$$

Our main interest is comparing $\beta_{i,1}$ with $\beta_{i,2}$. Not surprisingly, and partly by construction, the VIX plays an important role in determining the local FCIs being considered. In fact, in general, it is more relevant than the DY index itself. However, the role of the DY index varies depending on the economy and the period in question.

Since 2022, we find that in all five cases, an increase of the DY index adversely affects the individual local financial conditions. In fact, the mean of the coefficients

[16] For this regression, we use the sample January 2022–November 2025.

associated with the VIX index is approximately 0.25, whereas the mean of the coefficients associated with the DY index is around 0.07, about a third of the former. All the individual coefficients are individually statistically significant. This indicates that under global financial stress, interconnectedness in financial conditions could add to the already adverse referred global conditions.

This reveals the potential of regional interconnectedness to exacerbate local financial conditions. In comparison with estimations based on longer samples, the coefficients associated with the DY index in some cases have been found to be either not statistically significant or negative but small. This provides suggestive evidence that the importance of interconnectedness has increased in determining financial conditions in the region.

Policy responses

It is worth noting that some dynamics of global NBFIs, which could be considered externalities, originate beyond EMEs.[17] As the cost of the externality is not borne by institutions in the country of origin, a policy response in the economy of origin is highly unlikely. In fact, not even data-sharing between authorities is a common practice. While it would be desirable to have some policy coordination among jurisdictions, it is up to the local authorities in the affected economy to deal with the challenges that these dynamics could entail, including cross-border ones.

As a general rule, local NBFIs do not have access to central banks' facilities. That said, banks and NBFIs tend to maintain tight financial relationships through different channels. On the one hand, banks finance NBFIs based on repos, credit lines, collateral and market-making services, among others. On the other hand, NBFIs influence banks' liquidity needs, balance sheet usage and trading activity through their portfolio flows, hedging demands and redemption dynamics.

If banks have sufficient balance sheet capacity, NBFIs benefit from cheaper funding and deeper market liquidity. That said, when large NBFIs, for example, rebalance portfolios or face redemptions, they can drain liquidity from banks, increase dealers' inventory risks or raise collateral demands. This establishes a bidirectional relation, in which bank conditions influence NBFI behaviour, and NBFI behaviour affects bank intermediation capacity and local market liquidity. Thus, while NBFIs do not have direct access to the facilities, they can obtain liquidity through banks, which in turn obtain it from those facilities.

A natural theme to explore is what policymakers have done about NBFIs' footprint. This can be divided into short- and long-term policies. Regarding the short-term policy responses, we ponder liquidity enhancement measures and permanent backstop facilities.

Regarding the former, consider the following example, which is one of many. NBFIs' activity can sometimes lead to stress in certain nodes of the local bond markets. This could lead monetary authorities to implement measures such as debt

[17] Recall the review on some of the mechanisms and factors and the reference to pecuniary externalities in the first section of the note.

swaps (ie exchanges of long-term for short-term securities) in order to procure uniform liquidity across the yield curve, alleviating possible pockets of illiquidity. Permanent *backstop* liquidity facilities entail benefits, but have relevant trade-offs. They are commonly rules-based and, thus, set off only under financial stress periods. Eligible financial institutions would be familiar with such facilities and the conditions under which they would be activated. In effect, they allow for a swifter deployment. That said, there is the possibility that having such information could lead to moral hazard.

It is useful to distinguish two aspects of moral hazard in this setting. First, it could be present when a facility is being used actively. Financial institutions take their decisions during periods of financial stress knowing that they can access such a facility.[18] Second, if financial institutions are aware of the existence of a permanent backstop liquidity facility during their day-to-day normal business decisions, this could lead to the accumulation of risk in normal times. In effect, financial institutions could decide to take greater risks than they would under the absence of facilities. In sum, authorities need to be cognisant of the potential consequences of the moral hazard induced by a permanent backstop liquidity facility, in the short and long-term, and individually and collectively.

Authorities also need to watch for the possibility of stigma, as this would work against timely access to a facility. Under periods of financial stress, information asymmetry is exacerbated. Thus, financial institutions might be hesitant to deal with their peers, as they do not know whether a potential counterparty is really financially sound. If they learn that a potential counterparty has accessed a facility, they might interpret this as signalling financial hardship.

Institutions may be reluctant to utilise a permanent backstop liquidity facility due to concerns of being perceived as fragile. In the event of a liquidity shock, such hesitation may be the difference between a timely and decisive response from the financial institution, and a response that arrives too late. From the authorities' perspective, the former would help contain a shock, whereas a belated response by an institution could prove costly.[19]

[18] This, however, is not necessarily always the case, as shown in the United States during the 2023 banking turmoil in which banks did not take on additional risk funded through the US Bank Term Funding Program facility (Glancy et al (2025)).

[19] There have been two main potential responses to mitigate the presence of stigma attached to using a facility. One has been to preapprove access to a facility based on a prior financial assessment. Its overarching objective is to let stakeholders know that if the financial institution does access the facility, it is because of a short-lived financial mishap, unrelated to any fundamental issues. A second possible response is for authorities to force a set of financial institutions to access the facility. The objective here is to prevent market participants from stigmatising some facility users if a sufficiently large group uses it.

Long-term policies: the Mexican case of financial market development

A key long-term policy response to global NBFIs' dynamics is local financial market development. For financial markets to develop, there needs to be a joint effort between authorities and the private sector. Development typically requires joint improvement of several aspects and components.[20]

In this context, Mexico's financial market development over the past few decades has been built on a well-defined strategy. In the aftermath of the 1994–95 crisis, authorities adopted a flexible exchange rate regime and an inflation targeting regime, while they also focused on strengthening the banking sector and fostering the growth of the FX, money, debt and derivatives markets. Moreover, Mexico was able to implement many elements of the Basel III standards early, including the definition and composition of regulatory capital. This was partly because some of these elements were already in place. These factors have contributed to Mexico having a resilient financial sector (Bank of Mexico (2020)).[21]

From the market perspective, Mexico has built one of the most developed local currency government bond markets in Latin America, with outstanding domestic public debt securities and an established yield curve, which also supports financial asset pricing (Bank of Mexico (2014, 2023)), underpinned by a gradual shift towards domestic, longer-maturity, local currency public debt (FSB (2022)).

Over the past decade, Mexico has experienced a shift in the composition of government debt holders. Global NBFIs have reduced their participation substantially. This has been due to a combination of factors, including the global monetary tightening and shifts in benchmark index weights and in the risk appetite towards EME assets. Their share of Mexican government securities has fallen from historically high levels in the early 2010s to lower levels in more recent years. This reduction has been absorbed domestically. Pension funds, insurance companies, banks and local investment funds have steadily increased their allocations to government securities. Structural factors are key to understanding this process: first, local pension funds have continued to grow, leading to increased demand for long-duration instruments. Second, local banks have increased their holdings partly as a result of liquidity regulation (eg the Liquidity Coverage Ratio), stronger deposit growth and a preference for liquid assets. Third, funds have expanded (AMIB (2025)) in line with rising household financial participation (CNBV and INEGI (2024)).

In sum, the combined effect is that the exit of foreign NBFIs has not led to a structural demand gap. That being said, the remaining non-resident participants in local markets are primarily investors who commonly use the World Government Bond Index (WGBI) as a benchmark. Constant outflows from the non-resident sector mean that local investors currently own 88% of peso-denominated government debt, which make the financial sector more susceptible to idiosyncratic shocks.

[20] Please refer to the appendix for further long-term policies in this context.

[21] For example, shown by the orderly functioning of markets and strong bank balance sheets during the 2020 Covid-19 turmoil (FSB (2022)).

In addition, the reduced presence of non-residents has not been beneficial to trading conditions. In other words, strengthening the local investor base is a positive factor, though it increases the economy's exposure to idiosyncratic shocks.

Final remarks

The growing influence of NBFIs, particularly investment funds, has made capital flows more volatile, which can impact local financial conditions adversely. This note emphasises that regional financial interconnectedness could worsen local financial conditions during periods of financial stress.

In this context, policymakers must have a good understanding of the microstructure in the financial markets, particularly in relation to the NBFIs holding assets from their respective economies. It is particularly important that policymakers understand the incentives and regulatory restrictions that influence NBFIs, and how these might evolve over time.[22]

Authorities should have a flexible policy toolkit to respond to financial market incidents if and when strictly warranted. Such a toolkit typically entails facilities to provide liquidity and foster favourable behaviour in the financial markets. Financial market development is a desirable policy response, but one that takes time and effort to implement. This should lead to a diversified and large investor base, including local investors, with more capacity to absorb significant changes in global investors' positions in local financial assets.

All in all, the absence of a significant financial stress episode more recently in local markets is a positive signal of growing resilience, but should not create complacency or be taken for granted. It might as well be the case that there are underlying risks of adverse financial episodes being accumulated. We take the results of our empirical exercises on the interconnectedness of regional financial conditions as suggestive of the potential presence of such risks. Thus, policymakers need to be prepared for the possibility of these events in the future.

[22] For instance, the concept of "original sin" has evolved, for some economies, into what is now referred as "original sin redux". In Mexico, the low participation of non-residents in local debt markets significantly reduces the latter.

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Appendix: Long-term policies: the Mexican case of financial market development

This appendix covers some aspects of the Mexican case of financial market development which are important but not directly related to NBFIs.

The 2014 financial reform strengthened banking competition through measures such as portability of bank accounts and mortgages, and mandatory publication of interest rates. Since then, economic policies have placed particular emphasis on fostering competition, promoting inclusion and enhancing capital market access.

In 2018, Mexico enacted the Law to Regulate Financial Technology Institutions ("Fintech Law"), which regulates fintech providers and virtual-asset services based on principles of financial inclusion, innovation, competition, consumer protection, financial stability and anti-money laundering/countering the financing of terrorism (Bank of Mexico (2018)).

In this context, the 2022 IMF Financial Sector Assessment Program (FSAP) corroborated these findings, concluding that Mexico had had a robust financial system for many years, with banks maintaining high capital and liquidity buffers (IMF (2022)). That being said, the FSAP also underscores that credit to the private sector remains low relative to its economic fundamentals. It goes without saying that it remains low relative to its peers. This points to the need for further work in terms of research as well as policy.

The authorities have also promoted sustainable finance. By 2023, Mexico had accumulated green, social, sustainability and sustainability-linked bonds (Climate Bonds Initiative (2024)). These developments have also supported orderly trading in local currency government bond markets during recent episodes of global financial stress.

Recently, the Securities Market Law and new secondary regulations adopted in 2024–25 were amended. These changes have led to the creation of the figure of "simplified issuers". This figure should allow moresmall and medium-sized enterprises to register securities through a simplified procedure and place them with institutional and qualified investors (Martin et al (2024)).

The cited FSAP notes that capital markets remain relatively modest in size relative to those in other EMEs, are heavily focused on sovereign bonds and only have a comparatively small stock market capitalisation (IMF (2022)). In addition, financial inclusion indicators remain low and call for a constant effort to expand access (Maravalle and González Pandiella (2022)).

Capital flows, financial conditions and exchange rate dynamics: Implications for monetary policy in Peru[1]

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Abstract

Capital flows play a central role in shaping domestic financial conditions in emerging market economies (EMEs), often creating additional trade-offs for monetary policy. When global financial conditions ease, external liquidity can feed into domestic credit markets, compress risk premia and boost local asset prices, generating demand pressures on inflation and the output gap. These effects are amplified in partially dollarised economies such as Peru, where balance-sheet mismatches strengthen the financial accelerator. As a result, a standard policy response – raising the policy rate in the face of overheating – may paradoxically attract additional capital inflows, complicating domestic stabilisation.

This note documents how Peru has mitigated these spillovers through an active policy mix that combines foreign exchange (FX) intervention, cyclical reserve accumulation and the systematic use of foreign currency reserve requirements within an inflation targeting regime. Drawing on Peru's experience during the Covid-19 pandemic and the 2021–22 tightening cycle, the note shows how this combination of non-conventional instruments and the policy rate has helped preserve monetary policy autonomy, smooth financial conditions and limit FX volatility amid highly volatile capital flows.

[1] The authors would like to thank Rafael Herrada, Miriam Luna, Rafael Nivin, Fernando Perez and Rafael Velarde for their valuable comments and suggestions on earlier versions of this paper. The views expressed in this note are those of the authors and do not necessarily reflect those of the Bank for International Settlements or the Central Reserve Bank of Peru. Any remaining errors are our own.

1. Introduction

Capital flows and US dollar exchange rate fluctuations are central determinants of domestic financial conditions in emerging market economies (EMEs). A large and expanding empirical literature – most notably associated with the work of Hélène Rey – shows that the stance of US monetary policy has strong spillover effects on global financial conditions, affecting interest rates, credit spreads, asset prices and risk-taking behaviour across countries. In this environment, the traditional monetary policy trilemma (the "impossible trinity") becomes more binding: even under a flexible exchange rate regime, EMEs face powerful external financial shocks that constrain monetary policy choices.

These constraints are magnified in partially dollarised economies, where exchange rate movements have larger balance-sheet effects and global financial conditions pass through more forcefully to credit, investment and domestic interest rates. Recent evidence (Castillo et al (2024)) shows that spillovers from US monetary policy and global risk appetite shocks have larger effects in highly dollarised economies than in those with lower dollarisation, consistent with a stronger financial accelerator.

Despite pervasive financial dollarisation, Peru has remained notably resilient through episodes of global stress. A key factor has been a monetary policy framework that relies not only on the policy rate but also on a standing set of non-conventional instruments – discretionary foreign exchange (FX) intervention, precautionary reserve accumulation and active foreign-currency reserve requirements (RRs). Used in combination, these tools help limit excessive exchange rate volatility, stabilise FX funding conditions and safeguard the operational effectiveness of inflation targeting (IT).

This note argues that in a financially dollarised environment, Peru preserves monetary policy autonomy by running IT alongside active FX intervention, reserve accumulation and foreign currency macroprudential tools. The framework dampens the pass-through of the Global Financial Cycle to domestic financial conditions and allows the policy rate to respond countercyclically to external shocks.

2. Drivers of capital flows in Peru

2.1 Microstructure of the FX market and the role of key participants

Beyond aggregate determinants, the transmission of capital flows to exchange rate dynamics in Peru depends critically on the microstructure of the FX market and on the interaction among its main participants. The Peruvian FX market operates predominantly onshore and is organised around regulated financial intermediaries, with domestic banks acting as the main counterparties between different sources of foreign currency supply and demand (Humala (2023)).

Market participants can be broadly grouped into banks, non-financial corporations, resident institutional investors – most notably private pension funds

(AFPs) – and non-resident investors. Banks play a central intermediation role, absorbing FX positions from other agents and redistributing them across the spot and onshore derivatives markets. Non-financial firms participate mainly to hedge trade-related and balance-sheet exposures. AFPs are relevant participants in the FX market due to the size of their portfolios and their exposure to foreign assets. Their FX operations are associated primarily with portfolio rebalancing and risk management decisions and are conducted predominantly through the domestic banking system. AFPs operate under quantitative limits on foreign exchange exposures and derivatives positions, which constrains the scale and composition of their FX transactions.

Non-resident participation in Peru's FX market is largely intermediated by domestic banks, and price discovery remains predominantly anchored in the onshore market. While offshore trading in PEN derivatives is sizeable – as documented in the Bank for International Settlements' Triennial Survey[2] – these transactions do not play a dominant role in the transmission of capital flow shocks to the spot exchange rate. FX activity relevant for exchange-rate dynamics is concentrated in the spot market and in onshore derivatives – mainly FX swaps and forwards – used predominantly for liquidity management and hedging purposes. As a result, capital-flow shocks are transmitted primarily through the balance-sheet constraints of regulated domestic intermediaries, rather than through self-reinforcing dynamics originating in offshore derivatives markets.

This microstructural configuration shapes the channels through which capital flows affect the exchange rate and provide the institutional backdrop for the transmission mechanisms discussed in the next subsection.

2.2 The transmission of capital flow shocks

The empirical evidence presented in this note suggests that capital flows to Peru are driven primarily by financial conditions – interest rate differentials and deviations from covered interest parity (CIP) – rather than by contemporaneous global risk sentiment or commodity prices.[3] This reinforces the view that capital flows in Peru are closely tied to monetary policy transmission and arbitrage channels.

As discussed in the literature, capital flow determinants are commonly grouped into two broad classes. Push factors reflect global conditions – such as international interest rates, global risk appetite and commodity prices – that shape investors' willingness to rebalance portfolios towards or away from EMEs (Miranda-Agrippino and Rey (2021)). Pull factors, by contrast, capture country-specific characteristics, including interest rate differentials, domestic financial development and deviations from CIP and uncovered interest parity (Koepke (2018)).

[2] As of 2025, total daily average trading activity in the Peruvian sol (PEN) amounts to roughly 2.7% of GDP, a level close to three times the daily average turnover recorded in the domestic FX market (0.9% of GDP).

[3] This does not rule out a role for commodity prices in Peru during particular phases of the commodity cycle. Evidence from boom periods in traditional export prices suggests significant differences in capital flows behaviour and macro-financial dynamics, pointing to potentially state-dependent effects that may not be fully captured by average linear relationships (Central Reserve Bank of Peru (2026)).

Among push factors, shifts in global risk[4] sentiment are traditionally seen as a key driver of capital flow volatility.[5] Risk-on episodes tend to raise investors' exposure to EME assets, particularly in higher-yielding jurisdictions, while risk-off phases typically prompt retrenchment into safe assets in advanced economies (Choi et al., 2023). For Peru, however, a simple contemporaneous correlation suggests only a weak association between risk sentiment and capital flows (≈0.03). This aligns with Forbes and Warnock (2021), who argue that while global risk factors dominated before the Great Financial Crisis (GFC), commodity prices and other drivers have become increasingly relevant in explaining capital flow episodes.

Given Peru's position as a major copper exporter, capital inflows might be expected to co-move positively with copper prices, reflecting their impact on the trade balance, foreign direct investment (FDI) and portfolio allocation. Yet the correlation between copper prices and capital flows is weak (≈–0.01), pointing to other mechanisms as the dominant drivers of short-run dynamics (see Table 1). It is important to note that the relationship between commodity prices and capital inflows may be non-linear, as related work suggests that commodity boom episodes in Peru are associated with stronger capital inflows and distinct financial conditions (Central Reserve Bank of Peru (2026)).

Global and domestic financial conditions also shape cross-border capital flows. Shocks to US monetary policy and movements in cross-border interest rate differentials operate through several channels, including international bank leverage and cross-border lending (Bruno and Shin (2015)). In Peru, the differential between the domestic interbank rate and the federal funds rate is relatively strongly correlated with capital inflows (≈0.48), consistent with higher domestic returns encouraging foreign investment, including via carry trades. CIP deviations likewise create arbitrage opportunities that can draw in capital (Kubitza et al (2024)). Consistent with this channel, CIP deviations are positively correlated with capital flows in Peru (≈0.36).

Drivers of capital flows (correlation matrix) Table 1

	Capital flows	VIX	Copper	Interest rate differential	CIP deviations
Capital flows	1				
VIX	0.0336	1			
Copper	-0.0109	0.1674	1		
Interest rate differential	0.4818***	-0.1375	-0.1526	1	
CIP deviations	0.3563***	-0.1309	-0.3716***	0.8464***	1

Capital flows include portfolio flows, foreign direct investment, debt flows and short-term capital flows. CIP is covered interest parity. VIX is the Chicago Board Options Exchange Volatility Index.

Sources: Authors' calculations.

[4] Among alternative risk dimensions, global uncertainty – rather than domestic measures – appears to be the main factor (Agoraki et al (2024)).

[5] High-frequency indicators such as the Chicago Board Options Exchange Volatility Index (VIX), global uncertainty indices and measures of geopolitical risk are strongly correlated with both the direction and the intensity of capital flows.

The evidence for Peru suggests that interest rate differentials and CIP deviations are important drivers of capital flows, while global risk factors and copper prices display weaker contemporaneous correlations. Simple correlations, however, can mask dynamic relationships and are vulnerable to reverse causality. To address these concerns, we estimate the dynamic effects of these four determinants using the local projections (LP) method of Jordà (2005).[6]

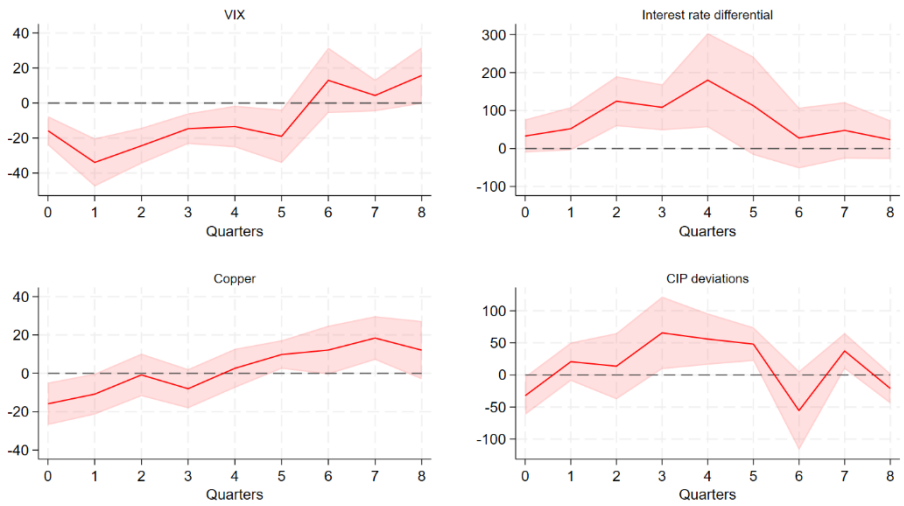
The estimates point to distinct channels through which external and domestic financial conditions affect capital flows (see Graph 1):

1. Global risk aversion: A 0.05-point increase in the VIX (equivalent to one-hundredth of a standard deviation) generates significant net capital outflows for up to five quarters, with the peak effect – around USD 34 million – occurring in the first quarter. This is consistent with capital flows responding to global risk-off episodes.
2. Interest-rate differentials: A 1.57-basis-point widening in the PEN–USD interest rate differential (equivalent to one-hundredth of a standard deviation) generates significant net capital inflows over the first four quarters, peaking at about USD 180 million in quarter four. This is consistent with return differentials drawing in foreign capital.
3. Copper prices: A USD 0.68 increase in copper prices (equivalent to one-hundredth of a standard deviation) is followed by a modest initial outflow, but the response turns positive after five quarters, reaching net inflows of up to USD 18 million. This pattern is consistent with a lagged pass-through from terms-of-trade gains to capital flow dynamics.
4. CIP deviations: A 0.02-basis-point rise in CIP deviations (equivalent to one-hundredth of a standard deviation) induces significant capital inflows, with the response peaking at roughly USD 66 million in quarter three. This is consistent with capital responding to arbitrage opportunities created by CIP deviations.

Taken together, the LP estimates suggest that capital flows are driven primarily by financial-condition variables – interest rate differentials and CIP deviations – while global risk and commodity-price shocks play a smaller, though still statistically significant, role. External financial shocks propagate through local financial markets in economically meaningful ways, underscoring the importance of monitoring exposure to the Global Financial Cycle.

[6] See Appendix 1 for details on the estimation.

Impulse responses of capital flows (USD millions) Graph 1



Impulse response functions show the median response and 68% confidence bands. All variables are available at quarterly frequency over 2010Q1–2025Q3.

The copper price is measured in USD per pound, and the PEN–USD interest rate differential and CIP deviations are measured in basis points. Capital flows include portfolio flows, foreign direct investment, debt flows and short-term capital flows. CIP is covered interest parity. VIX is the Chicago Board Options Exchange Volatility Index.

Source: Authors' calculations.

3. The role of US monetary policy in Peru

This section examines how US monetary policy shocks pass through to domestic financial conditions. In financially dollarised economies, the transmission runs not only through capital flows but also through balance-sheet effects that can constrain monetary policy responses.

Castillo et al (2024) show that contractionary US monetary policy shocks generate sizeable spillovers to EMEs, with stronger effects in economies with high financial dollarisation. In the average dollarised EME, higher US interest rates are associated with a pronounced and persistent exchange rate depreciation, a procyclical tightening of the domestic policy rate – consistent with "fear of floating" – and sharp declines in output and investment driven by balance-sheet effects. These dynamics illustrate how currency mismatches amplify external shocks, with output losses more than three times larger than in non-dollarised economies.

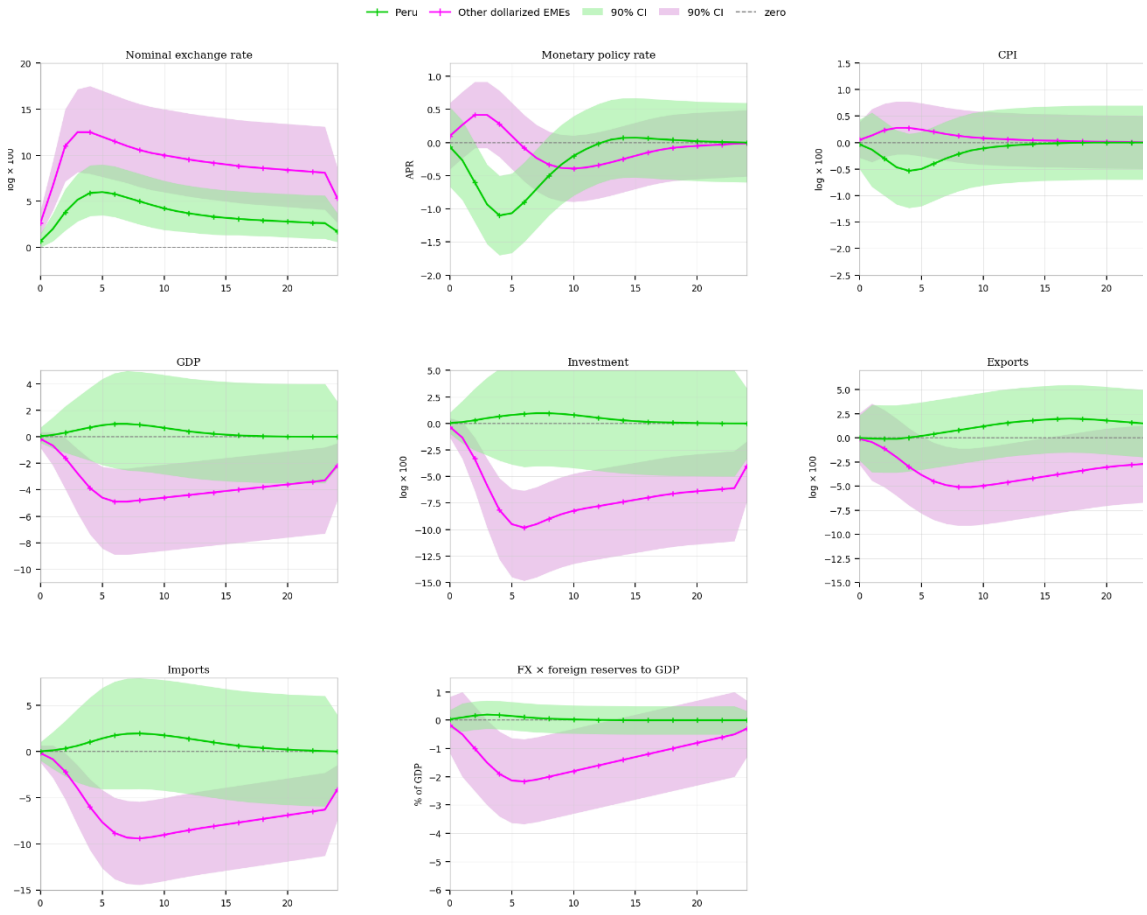
Peru stands out within this group. Despite financial dollarisation, its macroeconomic responses to US monetary policy shocks are substantially more muted. Graph 2 shows that the depreciation of the sol is smaller and less persistent than in comparable economies and – crucially – that the policy rate moves countercyclically, declining after the shock rather than tightening. This pattern suggests greater monetary policy autonomy, allowing the central bank to prioritise domestic stabilisation rather than reacting primarily to exchange rate pressures.

Peru's relative resilience reflects institutional features that differentiate it from other dollarised EMEs. In particular, the central bank's established credibility, its discretionary and symmetric FX intervention strategy and its sizeable stock of international reserves provide stabilising buffers. Following a contractionary US monetary policy shock, reserves are drawn down – by about 4% of GDP on impact – to smooth exchange rate volatility and contain financial disruptions. This reserve response is not observed in the typical dollarised economy in the sample.

Overall, these results indicate that while financial dollarisation increases EMEs' sensitivity to global monetary conditions, Peru's policy framework – combining IT with active FX intervention, cyclical reserve accumulation and macroprudential tools – has mitigated spillovers. By cushioning the exchange rate and moderating balance-sheet effects, these instruments allow the policy rate to respond countercyclically, supporting output and inflation stabilisation even as the Federal Reserve tightens.

Impulse responses to a contractionary US monetary policy shock (Peru and other dollarised emerging market economies)

Graph 2



The graph shows estimated Impulse response functions for Peru and other dollarised emerging market economies (EMEs). The green line with plus markers denotes Peru; the purple line with asterisks denotes other dollarised EMEs.

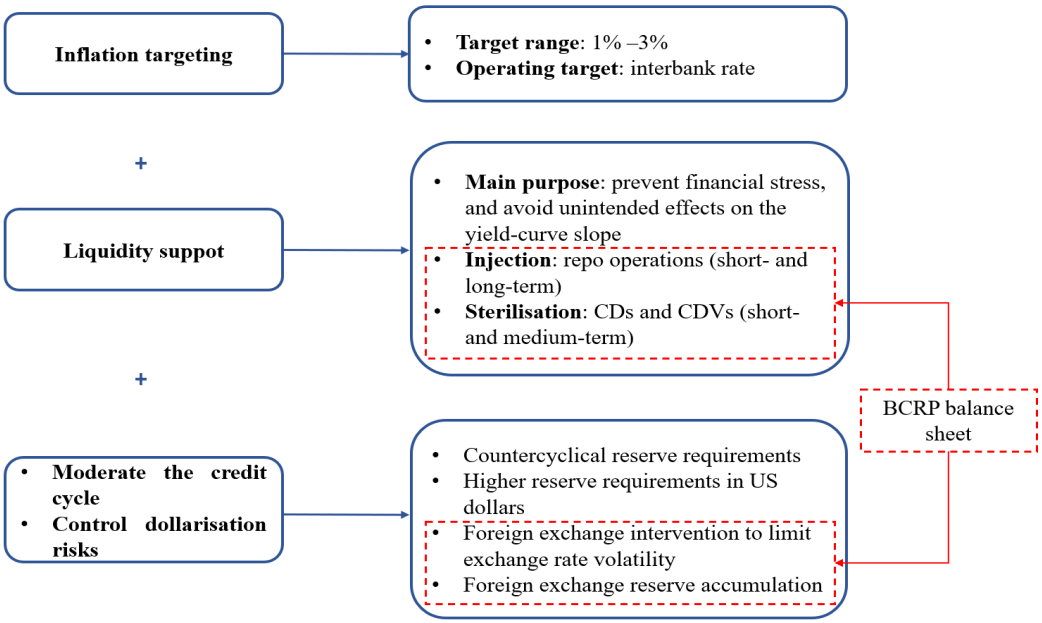
Source: P Castillo, R Lama and J Medina, "Escaping the financial dollarization trap: The role of foreign exchange intervention", *IMF Working Papers*, no 127, 2024, doi.org/10.5089/9798400280795.001.

4. Monetary policy in Peru: The role of non-conventional instruments

The Central Reserve Bank of Peru (BCRP) has preserved monetary policy autonomy – despite operating in a financially dollarised economy and facing strong external spillovers – by combining the policy rate with a standing set of non-conventional instruments. Since adopting IT in 2002, the BCRP has pursued price stability, defined as an inflation target of 2% ± 1%. To keep policy effective in a partially dollarised setting, the BCRP has complemented the policy rate with measures that (i) strengthen monetary transmission to the financial system and (ii) lean against the credit cycle while mitigating risks associated with financial dollarisation. Delivering price stability under dollarisation requires more than adjustments in the short-term policy rate; it also relies on instruments that smooth exchange rate volatility, manage foreign-currency liquidity risks and support orderly financial intermediation (see Graph 3).

Peru's macro-financial environment is shaped by the fact that the BCRP is not a lender of last resort in foreign currency. Sharp exchange rate movements or volatile capital flows can therefore amplify balance-sheet mismatches, weaken confidence in the domestic currency and impair monetary transmission. The BCRP accordingly deploys tools that internalise the risks arising from partial dollarisation, preserve financial stability and safeguard monetary autonomy under IT.

The Central Reserve Bank of Peru (BCRP)'s monetary policy framework — Graph 3



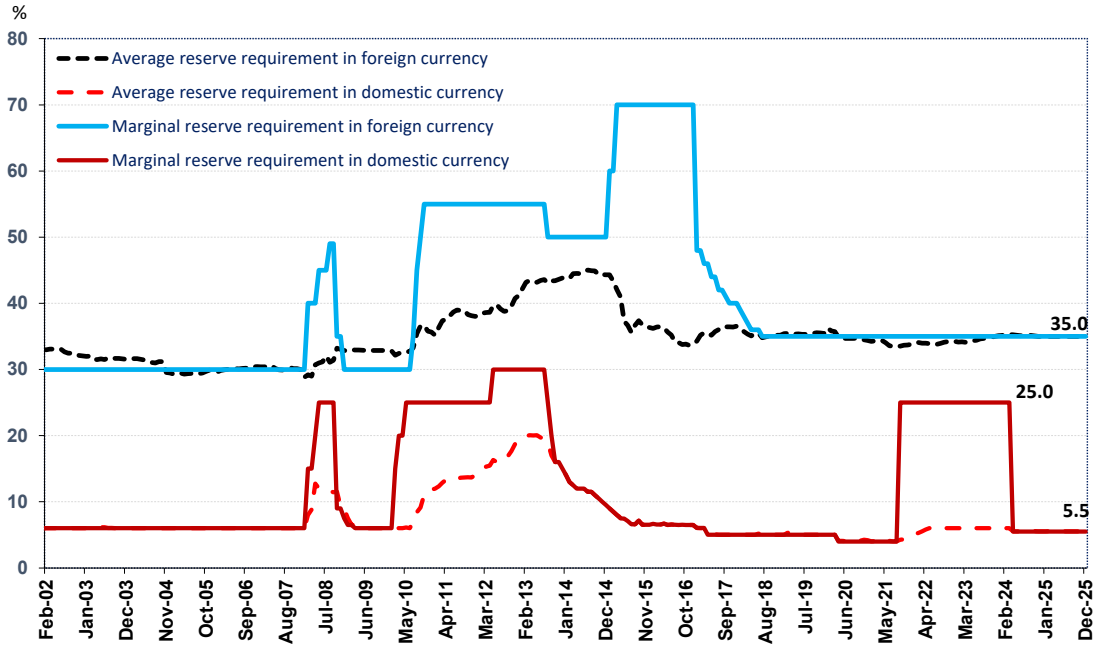
4.1 Reserve requirements: moderating the credit cycle and reducing FX intermediation risks

RRs are a core macroprudential instrument in Peru's policy toolkit. Their design allows BCRP to influence credit conditions, lean against credit booms and discourage excessive foreign-currency intermediation.

Higher RRs raise the cost of intermediation by requiring banks to hold a larger share of deposits as non-remunerated reserves. Wider intermediation spreads, in turn, reduce credit supply for a given level of funding. Through this channel, RRs affect interest rates, liquidity creation and the size of the loanable-funds pool via the monetary multiplier.

Foreign-currency RRs play an even more critical role. By requiring banks to hold adequate FX liquidity buffers, they strengthen resilience to capital outflows and FX funding shocks – particularly in an environment where the BCRP cannot provide last-resort liquidity in foreign currency. They also encourage financial institutions and borrowers to internalise the risks of operating in foreign currency, thereby reducing systemic vulnerabilities and gradually lowering dollarisation (see Graph 4).

Reserve requirement rates in domestic and foreign currency (per cent) Graph 4



Source: Central Reserve Bank of Peru.

4.2 FX intervention: smoothing volatility and protecting monetary transmission

FX intervention is a cornerstone of Peru's strategy to mitigate spillovers from external shocks to domestic financial conditions (see Graph 5). The BCRP does not target a particular exchange rate level; rather, it uses FX intervention to curb excessive volatility that could strain balance sheets, disrupt credit markets or weaken confidence in the domestic currency.

FX intervention serves several purposes:

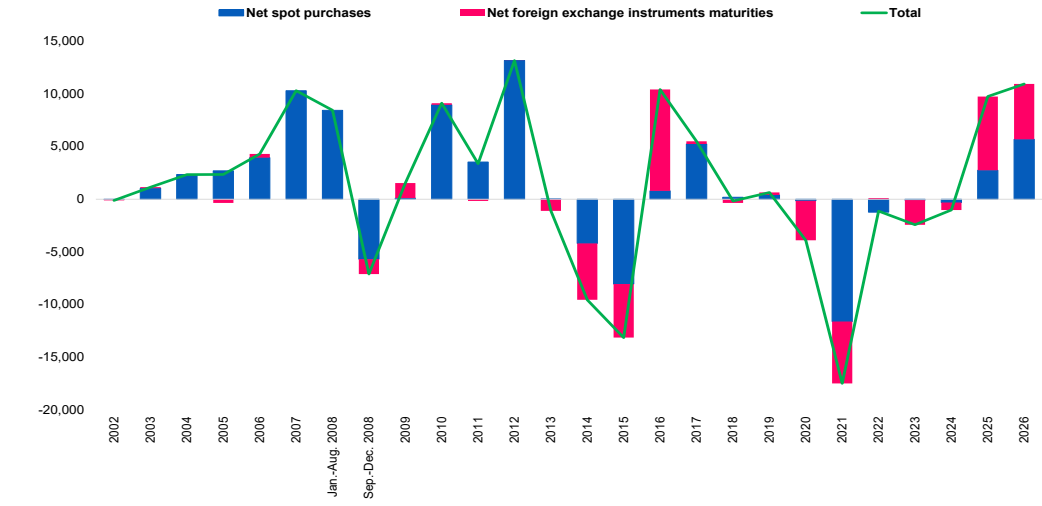
- mitigating balance-sheet effects arising from currency mismatches in firms and households
- providing FX liquidity to the financial system during periods of stress
- smoothing the credit cycle by offsetting capital flow-driven swings in FX funding conditions
- building reserves pre-emptively as insurance against future turbulence
- supporting orderly market functioning and avoiding disorderly adjustment

This strategy has been deployed more actively during episodes of heightened global uncertainty – including the GFC (2008), the 2015 market turbulence in China and the Covid-19 shock (2020–21) – and has been central to Peru's relative resilience during global monetary tightening cycles (see Graph 5), as documented in the empirical section.

The BCRP has expanded its FX intervention toolkit over time. Beyond spot operations, it introduced FX-indexed certificates (CDR BCRP) in 2002 and FX swaps in 2014. These derivative-based instruments allow the BCRP to influence exchange rate expectations without injecting or withdrawing liquidity on impact, providing

The Central Reserve Bank of Peru's foreign exchange intervention, 2002–26 (USD millions)

Graph 5



As of 28 February. Includes net maturities of BCRP CRs and FX swaps (sales), as well as net placements of CDLDs and FX swaps (purchases).

Source: Central Reserve Bank of Peru.

operational flexibility while preserving the monetary stance. In particular, FX swap sales have been used extensively to counter depreciation pressures.

4.3 Complementary macroprudential measures on FX derivatives and SBS regulation

To further contain FX volatility and speculative pressures, the BCRP applies additional RRs when banks exceed limits on net FX-derivatives sales. Since 2025, these RR surcharges rise automatically when weekly net sales or the outstanding stock of sales breach predefined thresholds, creating a countercyclical disincentive to build large FX short positions. This mechanism supports financial stability by curbing speculative exposures that could amplify exchange rate swings.

These measures operate alongside regulatory limits set by the banking, insurance and pension-fund supervisor (Superintendencia de Banca, Seguros y AFP, SBS). The SBS caps the global FX position – defined as the sum of on-balance sheet net FX exposure and net derivatives positions – at ±10% of regulatory capital. It also limits gross derivatives positions to contain systemic risk. In addition, since 2010 the SBS has imposed trading limits on pension fund administrators (Administradoras de Fondos de Pensiones), whose large portfolios can influence exchange rate volatility. Collectively, these complementary regulations reduce the financial system's aggregate exposure to FX shocks and reinforce the effectiveness of FX intervention.

Box A

Pension funds and capital flow dynamics

Pension funds play an increasingly important role in shaping capital flow dynamics and foreign exchange (FX) markets in emerging economies. In some jurisdictions, large institutional investors act as structural hedgers or dominant participants in FX derivatives markets, amplifying exchange rate fluctuations through procyclical hedging and balance-sheet interactions with domestic banks.

In Peru, the macro-financial footprint of private pension funds (AFPs) differs markedly from this pattern. AFPs operate under strict quantitative limits on FX exposures and derivatives positions and conduct their FX operations predominantly onshore and through the domestic banking system. Their FX transactions are driven mainly by long-term portfolio allocation and risk management considerations, rather than by short-term speculative motives. This institutional setting gives AFPs a stabilising role in the FX market.

During periods of heightened volatility, AFPs tend to adjust their foreign currency positions gradually or maintain them, thereby providing liquidity and helping to smooth exchange rate movements (Castillo et al (2019)). By avoiding large, one-sided hedging flows, AFPs reduce the likelihood that capital flow shocks translate into self-reinforcing exchange rate dynamics. This behaviour contrasts with that observed in economies where pension funds operate as large and active participants in FX derivatives markets, including offshore non-deliverable forwards, and where their hedging demand can amplify exchange rate pressures through banks' balance-sheet constraints.

Correlation coefficient: foreign exchange net supply of private pension funds and non-residents

Amount in USD millions — Graph A1

As of February 2026. 180 days rolling window.

Source: Central Reserve Bank of Peru.

Recent pension fund withdrawals have temporarily altered the footprint of AFPs in the FX market. The reduction in assets under management lowered AFPs' structural demand for FX hedging instruments – particularly the sale of non-deliverable forwards – and reduced their participation in derivatives markets. This increased the relative importance of other market participants, including non-resident investors, in FX derivatives transactions. Importantly, this effect reflects a temporary balance sheet contraction rather than a structural change in the regulatory framework or in the long-term behaviour of AFPs.

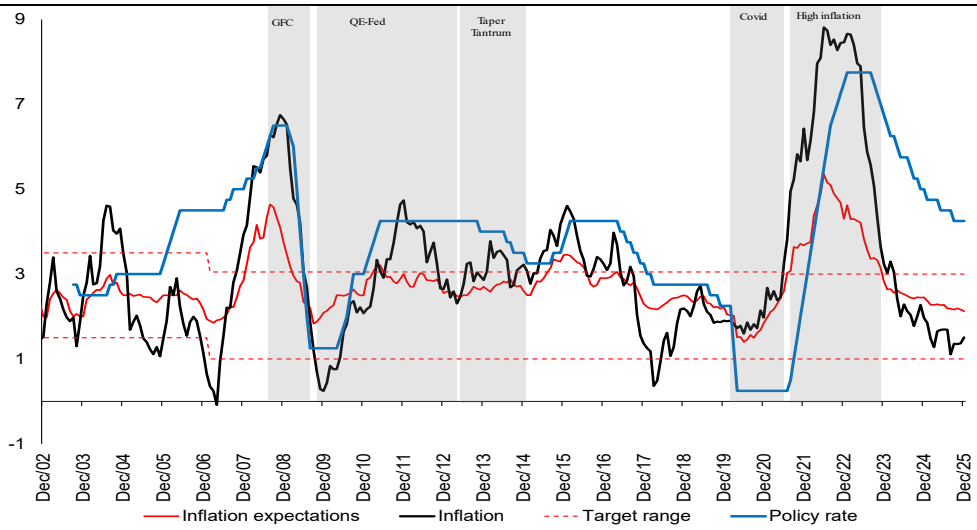
Overall, the Peruvian experience highlights how the regulatory design and investment horizon of institutional investors can shape capital flow transmission. In this framework, pension funds contribute to macro-financial stability by absorbing external shocks rather than amplifying them, complementing FX intervention and macroprudential policies within the broader policy mix.

4.4 The policy mix and monetary policy autonomy

The combination of IT, active FX intervention, foreign-currency RRs and prudential regulation allows Peru to insulate domestic financial conditions from the Global Financial Cycle more effectively than other dollarised EMEs. By stabilising the exchange rate and ensuring FX liquidity, the BCRP limits the amplification of global shocks through balance sheets and credit markets. This, in turn, allows the policy rate to respond countercyclically to external shocks – a pattern documented in empirical comparisons with other dollarised countries.

This ability to keep the policy rate focused on domestic inflation and output, rather than on exchange rate pressures, is central to Peru's restored monetary policy autonomy (see Graph 6).

Inflation, inflation expectations and policy interest rate during crisis episodes (%) Graph 6



Source: Central Reserve Bank of Peru.

During episodes of US monetary tightening, the BCRP has relied on FX intervention and reserve buffers to absorb spillovers rather than raising the policy rate defensively. The empirical analysis shows smaller and less persistent exchange rate depreciations, more muted contractions in output and investment, and a countercyclical policy-rate response – standing in sharp contrast to the procyclical tightening observed in most dollarised EMEs.

Overall, Peru's policy mix mitigates vulnerabilities associated with partial dollarisation and substantially weakens the transmission of global monetary shocks to domestic conditions. By deploying this set of instruments, the BCRP preserves the effectiveness of IT and maintains a high degree of monetary policy autonomy.

Peru's monetary policy framework – centred on IT and complemented by a set of non-conventional instruments, including FX intervention, precautionary reserve accumulation, differentiated reserve requirements in domestic and foreign currency and countercyclical reserve policies – has played a key role in delivering strong macroeconomic outcomes since 2002. Over this period, inflation has remained low and stable, consistently within the target range, with core inflation averaging around

2.4%. At the same time, economic activity has been robust, with GDP growth averaging 4.1% – nearly twice the Latin American average. In parallel, financial dollarisation has declined markedly, from about 80% at the beginning of the century to less than 25% by 2025. These achievements largely reflect the BCRP's capacity to implement countercyclical monetary policy in the presence of significant external shocks and volatile capital flows, while preserving macro-financial stability.

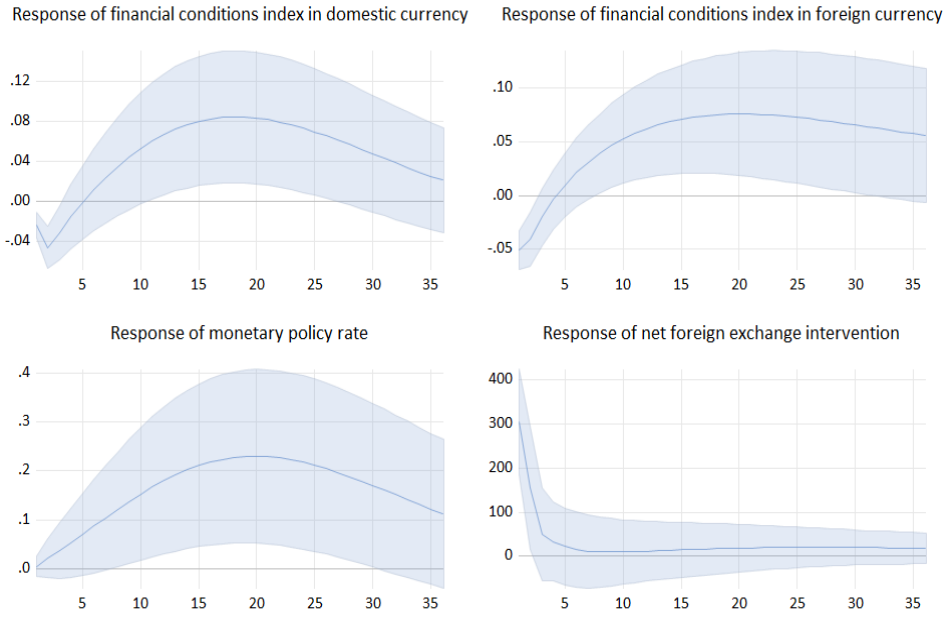
Box B

The global financial cycle and Peruvian financial variables

Using the index constructed by Miranda-Agrippino and Rey (2020), this box examines conditional correlations between the global financial cycle and key financial variables in Peru. A vector autoregression (VAR) with two lags – selected using standard information criteria – is estimated on the Global Financial Cycle index, Peru's policy rate, financial conditions indices (FCIs) in both domestic and foreign currency and net foreign exchange (FX) intervention (interpreted as net purchases).

A positive shock to the global financial cycle index (ie a more favourable global environment) initially loosens financial conditions in soles, but conditions become more restrictive in subsequent periods. A similar pattern is observed for financial conditions in US dollars (See Graph B1). The policy rate increases gradually, consistent with a tightening response as external conditions improve. The shock is also associated with higher net FX purchases by the BCRP, potentially reflecting the expiry of outstanding FX swap contracts or related instruments.

Impact of a global financial cycle shock (95% confidence interval) Graph B1



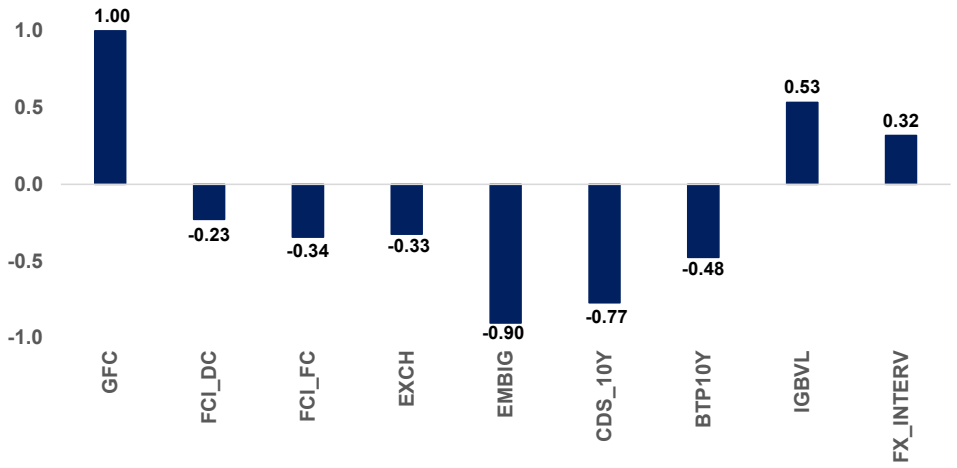
Source: Authors' calculations.

The conditional correlations implied by the VAR results, shown in Graph B2, point to the following relationships:

- a negative correlation with domestic financial conditions in both currencies, indicating that favourable phases of the global financial cycle coincide with easier financial conditions in Peru.
- a moderately negative correlation with Peru's long-term sovereign yield in domestic currency (–0.48), consistent with improved global conditions being associated with lower local bond yields.
- strong negative correlations with sovereign risk indicators, including the EMBI spread (–0.90) and the 10-year CDS spread (–0.77), suggesting that global financial expansions compress sovereign risk premia and strengthen external financing conditions.
- a negative correlation with the term spread between the domestic policy rate and the federal funds rate (-0.21), indicating that this differential tends to narrow when global financial conditions are favourable.
- a moderately negative correlation between the exchange rate (TC) and the global financial cycle (–0.33), consistent with stronger global financial conditions being associated with PEN appreciation.
- a positive correlation between the global financial cycle index and FX intervention, suggesting that improved global financial conditions are associated with higher net FX purchases by the BCRP.

Conditional correlation matrix from the VAR

Graph B2



"Global financial cycle" refers to the Global Financial Cycle index. FCI_DM denotes the financial conditions index in domestic currency; FCI_FC the financial conditions index in foreign currency; EXCH the PEN–US dollar exchange rate; EMBIG the sovereign risk spread (EMBIG); CDS_10Y the 10-year credit default swap spread; BTP10Y the yield on the 10-year Peruvian government bond in domestic currency; IGBVL the broad stock market index; and FX_INTERV BCRP FX intervention, measured as net FX purchases (spot operations, instruments and derivatives).

Source: Authors' calculations.

The conditional correlation analysis suggests that global financial conditions are a key driver of domestic financial conditions. Expansionary phases of the global financial cycle coincide with broad-based easing at home, operating through multiple channels, including asset prices, financial spreads and PEN appreciation. This points to strong external financial transmission in a small open economy.

The results also point to a systematic policy response by the BCRP to swings in global financial conditions. Global financial expansions are associated with net FX purchases, whereas episodes of global tightening coincide with net FX sales. This countercyclical pattern suggests that the BCRP actively deploys FX intervention as a balance-sheet tool to dampen the domestic financial impact of global shocks. By limiting excessive exchange rate movements and containing spillovers to local markets, FX intervention helps preserve monetary policy autonomy, allowing the policy rate to remain focused on domestic stabilisation objectives.

The evidence supports the view that FX intervention in Peru operates as a countercyclical buffer against the global financial cycle, complementing the policy rate and preserving monetary policy autonomy.

4.5 Policy communication and expectation management

The effectiveness of Peru's policy mix is reinforced by a clear and consistent communication strategy. The BCRP explicitly frames FX intervention as a tool to smooth excessive volatility and preserve monetary transmission, rather than as a mechanism to defend a particular exchange rate level. This distinction has been central to anchoring expectations among market participants and preventing the emergence of one-sided speculative dynamics.

Over time, the predictability of this framework has strengthened its credibility. Market participants internalise the conditional nature of FX intervention and the central bank's willingness to act symmetrically in both appreciation and depreciation episodes. This reduces incentives to front-run policy actions and enhances the stabilising role of reserves and macroprudential instruments. By clarifying the respective roles of the policy rate, FX intervention and prudential tools, communication helps ensure that exchange rate movements are interpreted primarily as responses to external conditions rather than as signals of domestic policy weakness. This expectation channel further supports monetary policy autonomy in a financially dollarised environment.

Peru's experience over the past two decades illustrates how a small open, partially dollarised economy has navigated volatile global financial conditions through a flexible but carefully designed policy mix. The episodes below – from the pre-GFC boom to the Covid-19 shock and the 2021–23 capital flow cycle – highlight the interplay between external shocks, domestic financial conditions and the BCRP's policy response.

5.1. The pre-GFC boom: capital inflows, commodity prices and surging domestic demand

In the years preceding the GFC, the external environment was characterised by abundant global liquidity, rapid growth in world trade, strong commodity prices and an intense search for yield. Peru benefited from this exceptionally favourable backdrop. GDP grew by 8.9% in 2007 and 9.8% in 2008, supported by stronger terms of trade and robust private investment. Portfolio and FDI inflows compressed borrowing costs and contributed to PEN appreciation, reinforcing domestic demand.

Between 2001 and 2008, the credit-to-GDP ratio rose from 20% to 35%, with annual credit growth averaging 13.1%. Inflationary pressures emerged in mid-2007, driven by higher food and energy prices and strong domestic demand. The BCRP raised the policy rate from 4.5% to 6.5% between June 2007 and September 2008 and complemented this with higher RRs in PEN and US dollars to moderate credit growth.

Rising carry-trade flows added to appreciation pressures. Non-resident investors increased participation in central bank sterilisation instruments (CDBCRP), intensifying currency pressures. Further policy-rate increases risked reinforcing these flows by widening interest rate differentials. The BCRP responded by redesigning its sterilisation instruments (replacing standard CDBCRP with restricted-negotiation certificates [CDBCRP-NR] in 2008 and imposing a 4% transfer fee) and by introducing a 120% RR on domestic-currency deposits held by non-residents. These measures curtailed speculative inflows and helped restore orderly market conditions.

At the same time, the BCRP conducted sizeable FX purchases to smooth appreciation pressures, raising net international reserves from USD 12.6 billion in 2005 to USD 34.7 billion by August 2008. This pre-emptive reserve accumulation later proved critical when global conditions deteriorated abruptly in late 2008.

5.2. The GFC: liquidity support and exchange rate stabilisation

Lehman Brothers' collapse in September 2008 triggered a sudden stop in capital flows to EMEs and a sharp fall in commodity prices. The PEN depreciated by 12% between September 2008 and February 2009. Despite the shock, GDP still grew by 9.8% in 2008, although activity slowed sharply to 0.9% in 2009.

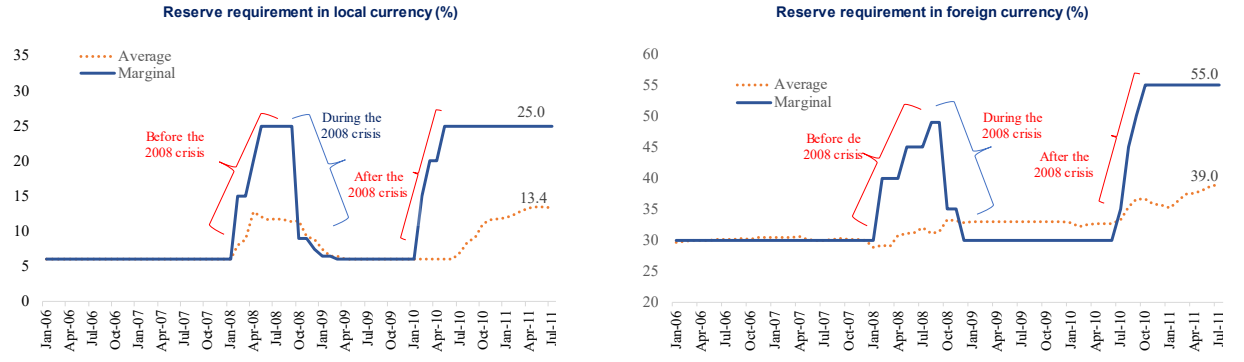
The BCRP's immediate priority was to prevent external financial stress from spilling over into a domestic credit crunch. Between September 2008 and February 2009, it injected liquidity equivalent to 9.3% of GDP through repo operations with maturities of up to one year, the release of RRs and the maturity of central bank securities. It also introduced new liquidity facilities, including FX swaps and repos backed by loan portfolios – innovations later redeployed during the Covid-19 crisis.

Foreign-currency liquidity was reinforced through lower RRs on external liabilities and foreign-currency deposits, as well as through the introduction of FX-indexed instruments (CDRs) to support hedging and limit disorderly FX movements. Earlier reserve accumulation also allowed the BCRP to sell USD 6.8 billion between September 2008 and February 2009 without compromising buffer adequacy (see Graph 7 and 8).

Once markets stabilised, the BCRP began an aggressive easing cycle. Between February and August 2009, the policy rate was cut from 6.5% to 1.25% – its historical minimum – supporting credit and the recovery. Inflation fell from 6.7% in December 2008 to 1.9% in August 2009, reflecting lower commodity prices and subdued domestic demand.

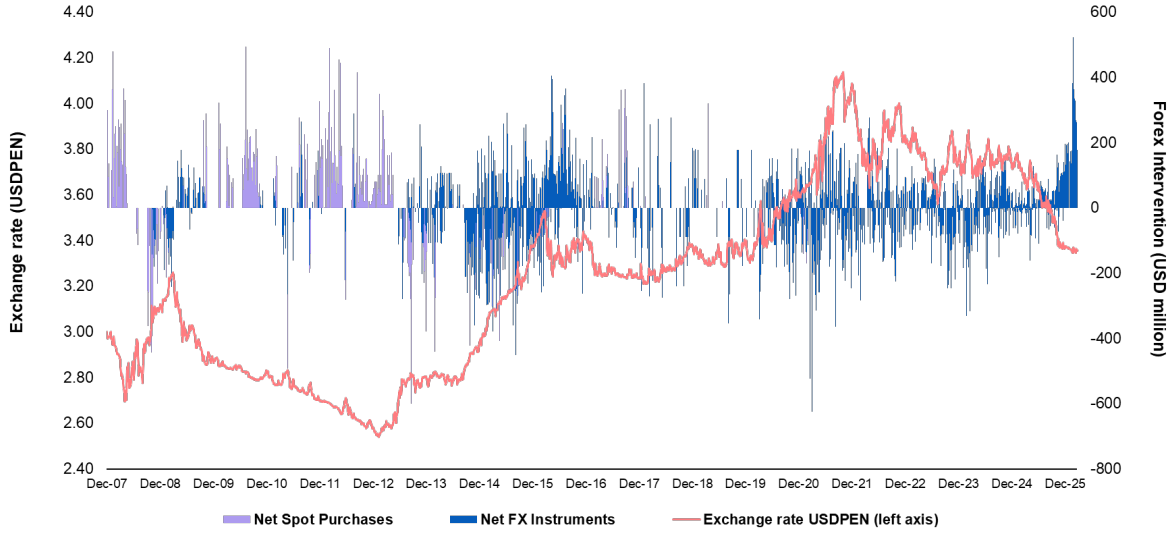
Reserve requirements in local and foreign currency

Graph 7



Source: Central Reserve Bank of Peru.

Exchange rate and foreign exchange intervention* Graph 8



Includes net foreign exchange (FX) purchases and net maturities of Central Reserve Bank of Peru instruments (CDRBCRP, CDLDBCRP and FX swaps). As of 28 February.

Source: Central Reserve Bank of Peru.

5.3. The Covid-19 crisis: unprecedented liquidity support and stabilisation

The Covid-19 pandemic triggered an abrupt and severe contraction: GDP fell by 17.3% in the first half of 2020 and by 11.1% for the year as a whole – the largest decline since 1989. The BCRP responded forcefully, adopting the most expansionary monetary stance in its history. The policy rate was cut to 0.25%, supported by explicit forward guidance signalling a prolonged expansionary stance.

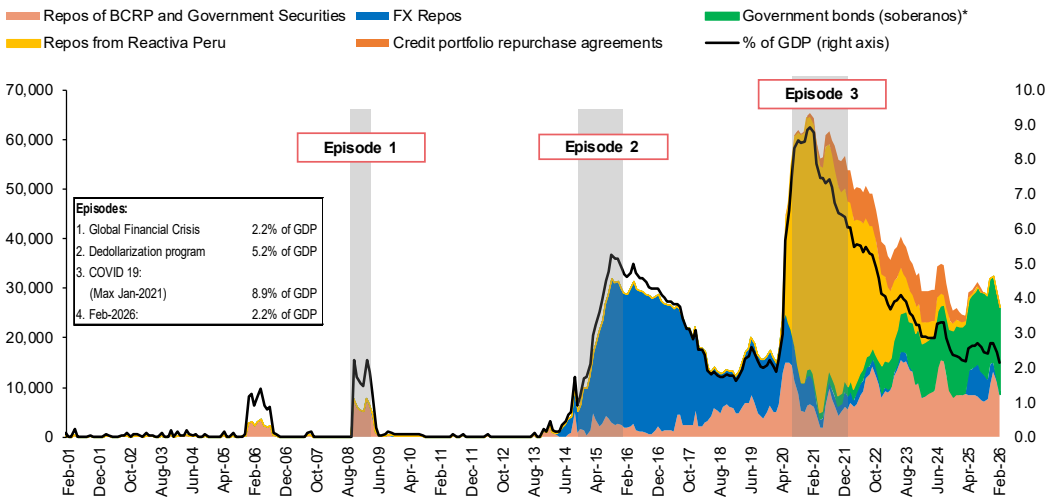
RRs were reduced, releasing PEN 2 billion in liquidity. Repo operations were scaled up sharply, and eligible collateral was broadened to include loan portfolios. Between March and December 2020, liquidity-injection operations rose from PEN 14.8 billion to PEN 64.8 billion (9.1% of GDP), far exceeding interventions in earlier crises (See Graph 9).

A central element of the response was Reactiva Perú, a government-guaranteed lending programme implemented through BCRP repos. Amounting to 8.5% of GDP, it safeguarded the payments chain, enabled credit to expand countercyclically and helped preserve firms' viability during lockdowns. Additional programmes – including credit-portfolio rescheduling and longer-term credit-expansion schemes – further strengthened monetary transmission.

FX volatility rose sharply, reflecting global risk aversion and domestic political uncertainty. Between March 2020 and April 2021, the BCRP sold USD 2.7 billion and placed USD 9.9 billion through FX swaps and CDR instruments to limit disorderly movements. The BCRP also conducted repo operations with AFPs to prevent destabilising bond sales linked to pension withdrawals.

These measures preserved financial stability, protected the credit channel and supported the recovery from late 2020.

Central Reserve Bank of Peru liquidity operations (PEN millions) Graph 9



* Purchase of Public Treasury Bonds, in line with article 61 of the Organic Law of the Central Reserve Bank of Peru.

Source: Central Reserve Bank of Peru.

5.4. Capital outflows amid domestic uncertainty (2021)

In 2021, Peru experienced its most intense episode of capital flight in decades. About USD 15 billion – 7.4% of GDP – flowed out during the presidential run-off and the first months of the new administration (See Graph 10). Exchange rate volatility spiked, and residents increased FX holdings at home and abroad.

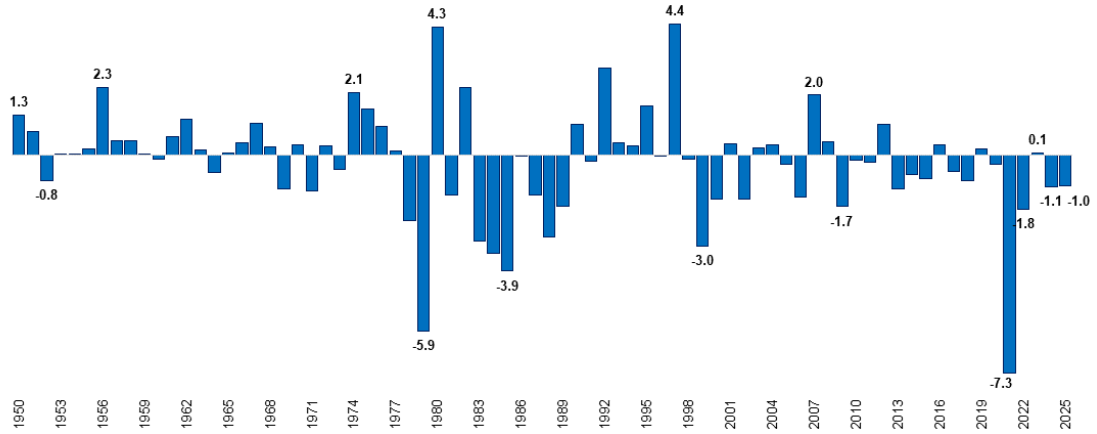
The BCRP countered these pressures through unprecedented FX intervention, selling USD 17.6 billion through a mix of spot operations, FX swaps and CDR placements. Despite these sales, net international reserves remained around USD 78.5 billion, reflecting reserve buffers at historical highs. Peru did not resort to capital controls or restrictions on FX mobility, supporting market confidence.

Capital flows normalised in 2022, with net inflows of USD 8.8 billion, underscoring the temporary nature of the 2021 shock.

During this episode, despite substantial capital inflows, monetary and credit conditions remained expansionary (See Graph 11). The BCRP kept the policy rate below the estimated neutral level – around 2% in real terms – consistent with a countercyclical stance given the prevailing macroeconomic conditions.

Short-term capital flows (% of GDP)

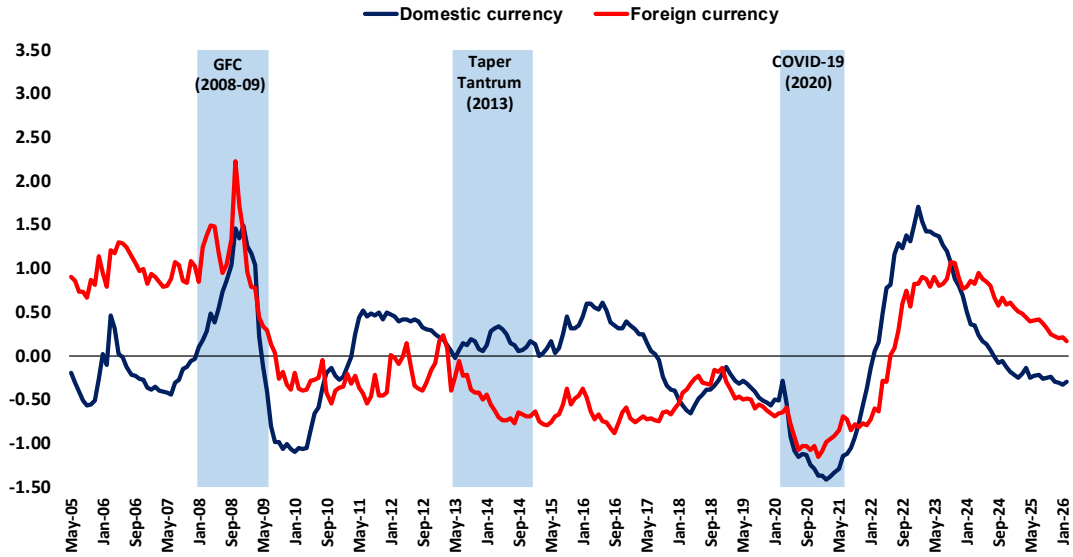
Graph 10



Source: Central Reserve Bank of Peru.

Peru's financial conditions indices*

Graph 11



	Dec. 24	Jan. 25	Feb. 25	Mar.25	Apr.25	May.25	Jun.25	Jul. 25	Aug. 25	Sep. 25	Oct. 25	Nov. 25	Dec. 25	Jan. 26	Feb. 26
Domestic Currency	-0.19	-0.21	-0.25	-0.20	-0.14	-0.25	-0.23	-0.22	-0.26	-0.25	-0.25	-0.30	-0.30	-0.33	-0.29
Foreign Currency	0.61	0.55	0.50	0.49	0.44	0.39	0.40	0.42	0.36	0.31	0.24	0.23	0.20	0.21	0.17

Based on F Pérez, "New indicators for measuring financial conditions in a financially dollarized economy", *Central Reserve Bank of Peru Working Papers*, no 2024-012, 2024.

Source: Central Reserve Bank of Peru.

6. Lessons from Peru's experience

Across episodes, a consistent pattern emerges: despite significant exposure to global financial shocks, Peru's financial conditions adjust more smoothly and with less persistence than in other financially dollarised EMEs. This resilience reflects a policy framework anchored by credibility – built through keeping inflation within the target range – and by a policy rate that can respond in a clearly countercyclical way.

Financial dollarisation remains a defining structural feature and, in principle, could weaken monetary transmission by amplifying global shocks. To preserve policy effectiveness under this constraint, the BCRP relies on a complementary set of instruments:

- active FX intervention to mitigate destabilising balance-sheet effects arising from exchange rate movements
- RRs to moderate the credit cycle and contain currency mismatches
- prudential regulation to curb speculative FX positions
- large precautionary reserve buffers that support countercyclical intervention during periods of stress

Together, these instruments reinforce IT by allowing the policy rate to respond countercyclically – even during episodes of pronounced global tightening. Peru's experience illustrates how a well-designed policy mix can sustain monetary policy autonomy in a small open economy exposed to the global financial cycle.

In this sense, Peru's framework is closely aligned with the logic of the Integrated Policy Framework, combining monetary, FX and macroprudential tools to address multiple transmission channels simultaneously. A key lesson from Peru's experience is that the transmission of external financial shocks depends not only on the scale of capital flows but also on how these flows are intermediated. In Peru, exchange rate dynamics are shaped primarily by conditions in the onshore FX market and by the balance sheet capacity of regulated domestic intermediaries. This configuration allows policy actions to operate effectively where financial constraints bind, supporting orderly exchange rate adjustment without undermining monetary transmission.

Overall, Peru's experience shows that a credible IT regime, combined with a flexible policy framework, has allowed the economy to maintain one of the lowest inflation rates and one of the lowest policy interest rates in the region, while preserving effective countercyclical transmission. Even in the presence of volatile capital flows and significant financial dollarisation, monetary policy has remained focused on domestic stabilisation objectives, reinforcing both macroeconomic and macrofinancial stability. While institutional details differ across countries, Peru's experience highlights general design principles that may be relevant for other financially dollarised EMEs.

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Appendix 1: Determinants of capital flows in Peru: a local projections approach

This appendix outlines the LP method (Jordà (2005)) used to estimate the dynamic effects of the determinants of capital flows in Peru:

$$\Delta_h C_t = \gamma_h + \beta_h \Delta \mathrm{D_t} + Z_t' \delta_h + \varepsilon_{t+h}.$$

Here, $\Delta_h C_t$ denotes the cumulative change in the capital flow measure over horizon h[7]. $\Delta \mathrm{D_t}$ is the first difference of the determinant of interest, Z_t is the vector of control variables and ε_{t+h} is the error term. The model is estimated in long-difference form. Unlike the VAR literature, the LP literature does not provide a settled consensus on lag-selection strategies. For parsimony, the lag order is set to two for all variables, which are available at quarterly frequency over 2010Q1–2025Q3 (Jordà and Taylor (2025)). In addition to lags of capital flows and the determinant of interest, the control vector includes the remaining three determinants and their lags.

Where feasible, $\Delta \mathrm{D_t}$ is instrumented to mitigate endogeneity concerns. The VIX is instrumented using the US macroeconomic uncertainty index constructed by Jurado et al (2015), reflecting the link between uncertainty in the world's largest economy and global risk aversion. The interest rate differential is instrumented using the federal funds rate to reduce contamination from domestic macroeconomic conditions. The CIP deviation measure is instrumented using liquidity in the Peruvian banking system. In the international finance literature, liquidity abundance or scarcity is a key driver of CIP deviations (Bazán-Palomino et al (2025)). The identifying assumption is that banking-system liquidity does not affect capital flows through other channels. Finally, the international copper price is treated as an exogenous determinant.

[7] The analysis focuses on private sector capital flows, which include portfolio, foreign direct investment, debt and short-run capital flows.

Global structural shifts and spillovers to the Philippine financial markets

Juan Luis F. Cayanga, Vanessa T. Español, Roselle R. Manalo and Joaquin Leandro C. Sanchez[1]

1. Introduction

The global financial system is being reshaped by structural shifts in financial intermediation and risk-taking practices. Since the Great Financial Crisis (GFC), financing has increasingly migrated from banks towards capital markets, alongside a rapid expansion of non-bank financial institutions (NBFIs) and a rising share of government debt in global bond markets.[2] These trends have been reinforced by successive global shocks – including the pandemic, geopolitical fragmentation and abrupt shifts in US monetary policy – which have put into focus the still central role of the US dollar in global funding and asset allocation.[3] As a result, financial conditions have become more sensitive to changes in global risk sentiment and dollar liquidity, with cross-border portfolio rebalancing playing a larger role in the transmission of shocks.

For emerging market economies (EMEs) such as the Philippines, these shifts have heightened exposure to external spillovers through volatility in capital flows, as well as pressures on foreign exchange (FX) rates and domestic bond markets. The rise in foreign participation in local debt markets has supported market development. However, it has also partly amplified the pass-through of global interest rate cycles to domestic financing conditions. Similarly, periods of dollar strength – most notably during the US Federal Reserve's tightening cycle – have translated into exchange rate pressures, bond yield volatility and episodic portfolio outflows, with the FX market acting as the primary adjustment channel. At the same time, the expanding role of NBFIs and the emergence of new forms of market-based and digital intermediation have added complexity to liquidity conditions and monetary policy transmission.

In this environment, policy effectiveness hinges on maintaining resilience across markets and institutions. Monetary policy must continue to be complemented by exchange rate flexibility with some scope for targeted FX operations, and by deep, liquid domestic bond markets to absorb global shocks. Strengthened macroprudential oversight – extending beyond banks to NBFIs and emerging digital instruments – is essential to contain systemic risks and preserve the clarity of

[1] Bank Economist III, Senior Economist, Director, and Bank Economist IV, respectively, of the Department of Economic Research. This note was prepared under the guidance of Deputy Governor Zeno Ronald R. Abenoja with assistance from various groups under the Department of Economic Research and Department of Economic Statistics of the Bangko Sentral ng Pilipinas.

[2] See Bank for International Settlements, *Quarterly Review*, September 2025.

[3] See Committee on the Global Financial System, "US dollar funding: an international perspective", *CGFS Papers*, no 65, June 2020.

monetary policy signals. Together, these measures will be critical in safeguarding monetary and financial stability amid an increasingly interconnected and volatile global financial system.

2. Global financial landscape

Funding structure and risk-taking behaviour

Over the past two decades, the global financial system has undergone profound structural changes that have shaped the operating environment of EMEs, including the Philippines. Since the 2008–09 GFC, debt financing has shifted markedly from bank loans towards bond issuances. While the GFC set in motion the shift towards bond financing, it also triggered two related developments.

First, following massive retrenchments by banks in the wake of the GFC, the Bank for International Settlements (BIS) reported that financial assets held by NBFIs such as portfolio investors surged from 167% of global GDP in 2009 to 225% in 2023.[4] In addition, BIS reports indicate that these investors sought to purchase EME currency bonds, which helped support the development of domestic markets.[5]

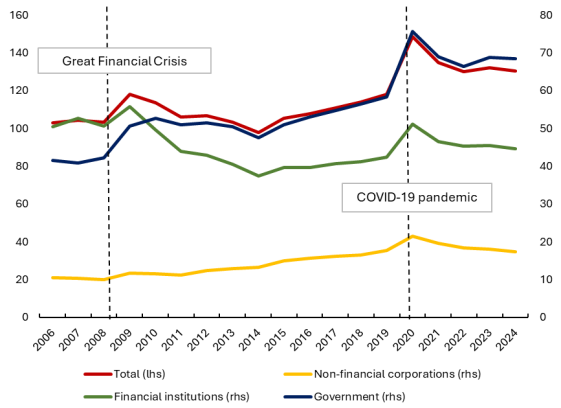
The second shift involved a transition from private sector borrowing to government borrowing. Data compiled from the BIS and the IMF show that outstanding government bonds increased from 51% of global GDP in 2009 to about 68% by the end of 2024 (Graph 1). The largest increases occurred during the GFC and the Covid-19 pandemic, as governments expanded borrowing to finance fiscal deficits to support recovery efforts.

[4] A non-bank financial institution is any financial entity, other than a bank, whose primary business is providing financial services or activities that support financial intermediation (eg fund management). These include special purpose vehicles, hedge funds, securities brokers, money market funds, pension funds, insurance companies, financial leasing firms, central counterparties (CCPs), unit trusts, other financial auxiliaries and captive financial institutions. The term also covers publicly owned financial institutions such as development banks and export credit agencies.

[5] See Bank for International Settlements, *Quarterly Review*, September 2025.

Bonds outstanding

As a percentage of global GDP, 2006–24 Graph 1



Sources: IMF; BIS.

Geopolitical risks and the role of the US dollar

Following the Covid-19 pandemic, unpredictable shifts in the monetary policy of the US Federal Reserve (US Fed), along with the broader effects of restrictive US trade policies, have continued to exert broad influence on global market trends. Moreover, developments in the last few years contributing to rapid economic and geopolitical fragmentation[6] – including Russia's invasion of Ukraine in 2022 and Israel's siege of Palestine in 2023, as well as prolonged tensions between the United States and China – have further heightened global uncertainty (Graph 2).[7]

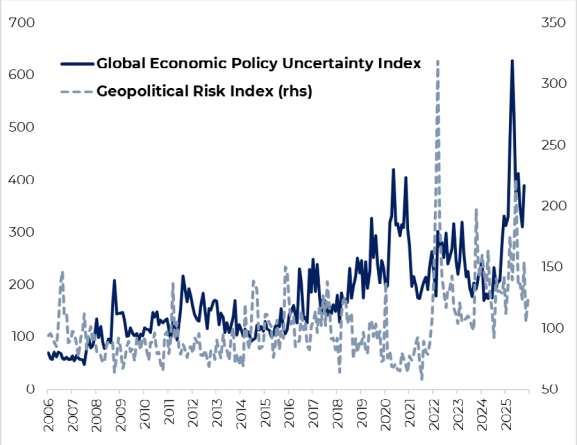
In line with this, the US dollar continues to be a dominant vehicle currency in terms of global reserve holdings. Despite a decline from the 66% share in total reserves in 2015, the dollar remained the dominant component at around 58% in 2024 (Graph 3). Similarly, preference for the dollar in international transactions, including trade- and remittance-related activities, has generally increased. As of 2024, the dollar's share in international payments had increased to 47% from around 32% in 2010. Amid these shifts, the role of the dollar as a global haven, as well as its impact on EMEs, have been amplified. Specifically, episodes of heightened uncertainty often reinforce dollar strength, affecting domestic financial conditions. Given its central role in the global financial system, even economies with relatively sound macroeconomic fundamentals may experience spillovers driven largely by global dollar cycles rather than by country-specific factors.

[6] Data downloaded from https://www.matteoiacoviello.com/gpr.htm on 26 January 2025.

[7] See S Baker, N Bloom and S Davis, *Global Economic Policy Uncertainty Index: Current Price Adjusted GDP [GEPUCURRENT]*, retrieved from FRED, Federal Reserve Bank of St Louis, fred.stlouisfed.org/series/GEPUCURRENT, 26 January 2026.

Global economic policy uncertainty and geopolitical risk indices

In index points, 2006–25 Graph 2

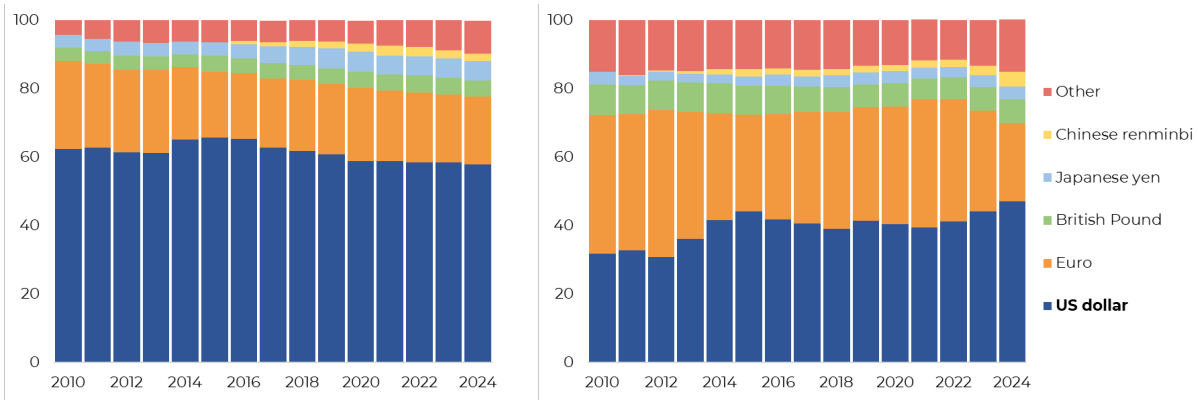


Sources: M Iacoviello; Economic Policy Uncertainty Index.

Share of the US dollar and other major currencies

As a percentage of total, 2010–24 Graph 3

A. Global FX reserves B. International payments



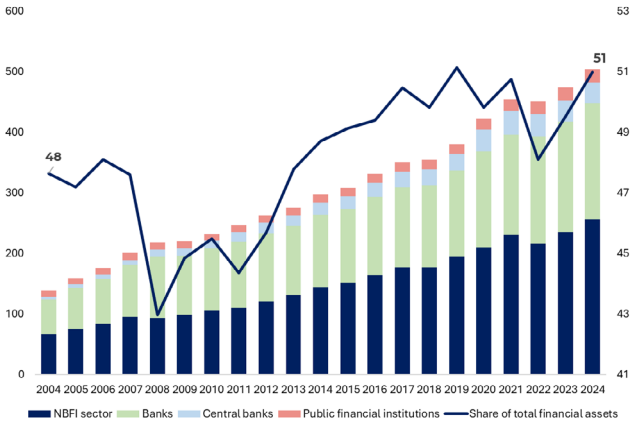
Sources: US Fed; IMF Currency Composition of Official Foreign Exchange Reserves (COFER) database; SWIFT.

Rise of non-bank financial intermediaries

The implications of an unparalleled role of the US dollar also encompass the evolution of financial intermediation. Since the GFC, the rise of NBFIs has become a defining feature of the global financial landscape. According to the Financial Stability Board (FSB), NBFIs now account for nearly 50% of global financial assets, up from 43% in 2008. This growth is driven by technological innovation, demand for flexible financing and the expansion of investment and insurance products to underserved segments (Graph 4).

Breakdown of global financial assets

In nominal terms (lhs) and NBFI share of total financial assets (rhs) Graph 4

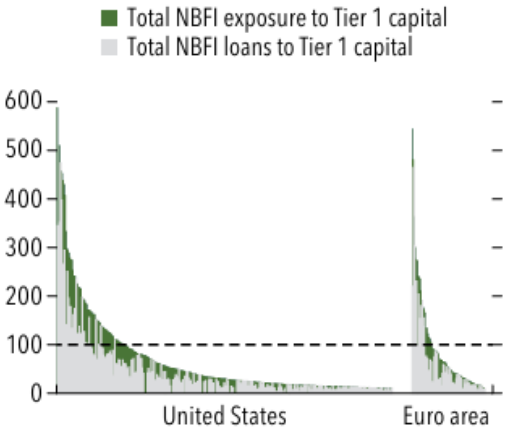


Source: Financial Stability Board.

As NBFIs expand their presence in the global financial system, elevated bank exposures to these institutions heighten the risk that stresses in the NBFI sector could transmit rapidly to the banking system (Graph 5). IMF stress tests show that if risk weights on NBFI exposures were to increase from 20% to 50% alongside full drawdowns of credit lines, Common Equity Tier 1 (CET1) ratios would drop by more than 100 basis points in about 10% of US banks and 30% of European banks, underscoring the potential for solvency pressures. Such vulnerabilities can exacerbate market volatility and liquidity strains.[8]

Banks' NBFI exposure to Tier 1 capital

In per cent, as of June 2025 Graph 5



Source: IMF, *Global Financial Stability Report*, October 2025.

[8] See International Monetary Fund, *Global Financial Stability Report – Shifting Ground Beneath the Calm*, October 2025, www.imf.org/-/media/files/publications/gfsr/2025/october/english/text.pdf.

These dynamics interact with the safe haven role of the US dollar, particularly when NBFIs become heavily involved in sovereign bond markets and FX swap markets. Asset managers, hedge funds and pension funds tend to adjust portfolios swiftly in response to shifts in global risk sentiment and US interest rate movements. In addition, their reliance on FX swaps for cross-currency funding also makes their positions sensitive to dollar funding conditions. As a result, episodes of NBFI stress can trigger sudden capital outflows from EMEs, widen local bond yields and increase demand for US dollars as investors seek safety.

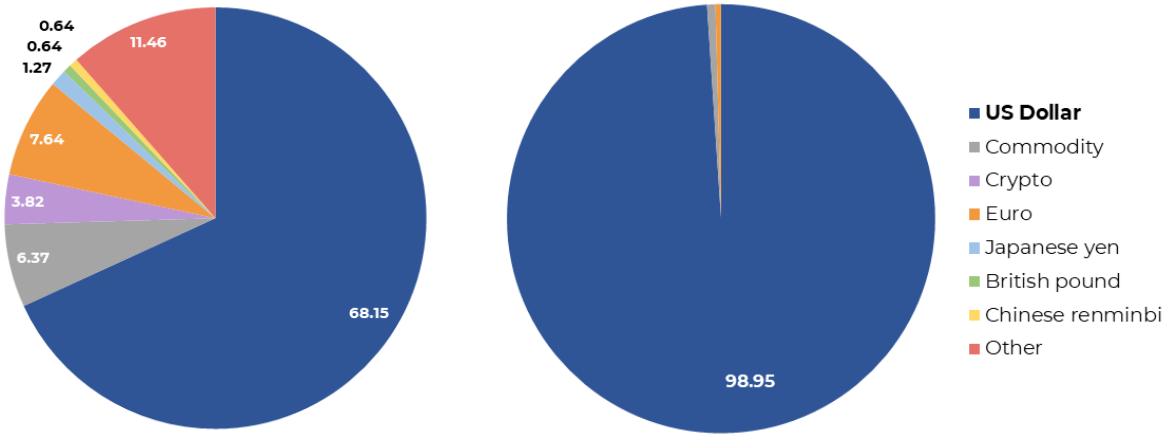
Emergence of digital forms of intermediation

The recent rapid adoption of stablecoins could feed into further US dollar dominance given that the global market remains highly concentrated and heavily pegged to the US dollar. As of the second quarter of 2025, 68% of active stablecoins were dollar-denominated, representing 99% of total market value. Since the underlying value of most active stablecoins is US dollar-denominated, their wider use may come with potential implications for capital flow and currency volatility (Graph 6). In particular, the broader cross-border use of foreign currency-denominated stablecoins could weaken monetary policy signals. If these assets are used to hedge against high inflation and exchange rate volatility, unrestricted access to dollar-denominated assets could undermine the effectiveness of an economy's monetary policy signals.[9] Moreover, limited regulatory safeguards on newer forms of financial services could increase vulnerability to global shocks.

Share of the US dollar in the stablecoin market

In per cent; as of June 2025 Graph 6

A. Volume B. Market capitalisation



Source: I Aldasoro, M Aquilina, U Lewrick and S H Lim, "Stablecoin growth – policy challenges and approaches", *BIS Bulletin*, no 108, July, www.bis.org/publ/bisbull108.pdf.

[9] See I Aldasoro, M Aquilina, U Lewrick and S H Lim, "Stablecoin growth – policy challenges and approaches", *BIS Bulletin*, no 108, July, www.bis.org/publ/bisbull108.pdf.

These shifts have strengthened interconnectedness and diversification in global financial systems. However, deeper linkages have also increased sensitivity to global financial conditions and changes in investor risk appetite. In the Philippines, consistently increasing exposure to foreign investors has made capital flows and domestic financial markets more susceptible to spillovers from external developments.

3. Spillovers on domestic capital flows and financial conditions

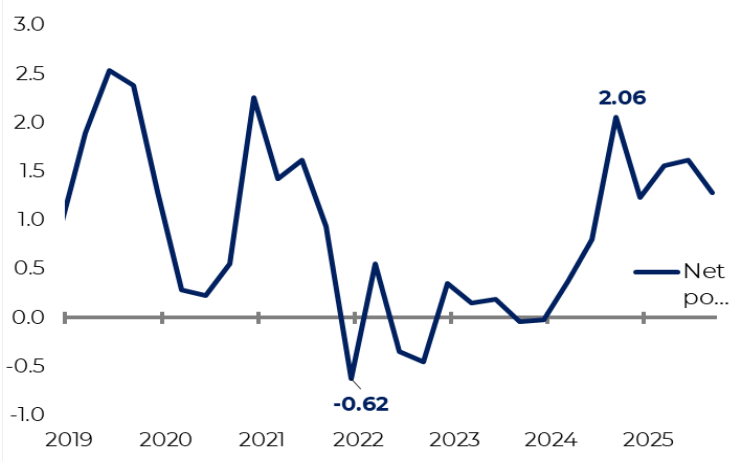
Capital flows and the foreign exchange market

At the height of the US Fed's policy tightening cycle in 2022–23, global demand for US assets increased sharply, reinforced by the Fed's "higher-for-longer" policy guidance. This led to a compression of carry trades and increased capital flow volatility across EMEs. In the Philippines, portfolio investment flows weakened and remained subdued until market focus shifted towards the anticipated start of the Fed's easing cycle in 2024 (Graph 7).

Meanwhile, the impact of heightened global policy uncertainty manifested in the latter half of 2024, as aggressive policy pronouncements from President Trump during his campaign reinforced the dollar dominance narrative. Despite some recovery in early 2025, these flows have since moderated relative to GDP amid major domestic factors, particularly dampened investor confidence over weaker growth prospects, as well as governance and public infrastructure spending issues.

Net portfolio investment inflows

As a percentage of GDP, Q1 2019–Q3 2025 Graph 7



Data are expressed in a four-quarter moving sum prior to calculating the ratio.

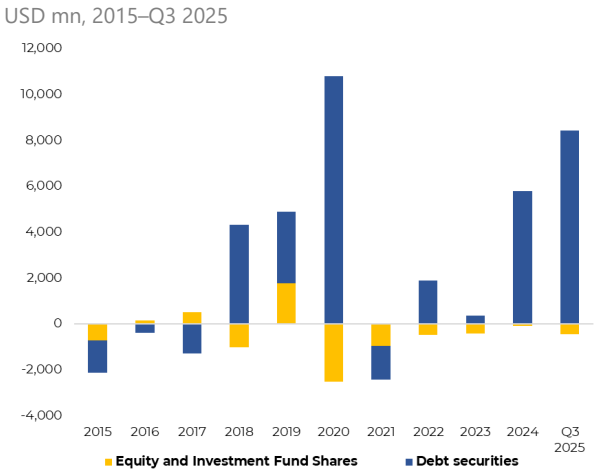
Sources: Bangko Sentral ng Pilipinas (BSP); Philippine Statistics Authority (PSA).

A shift in investor risk perception also appears to have taken place during this time, with increased preference for fixed income securities. From 2015, net portfolio inflows became increasingly concentrated in debt securities, while equity and investment fund shares posted smaller and more volatile net flows, including outright net outflows in several years around and after the pandemic (Graph 8). As a result, the relatively balanced composition of portfolio liabilities at the start of the pandemic has steadily shifted towards debt securities, which have made up most of the portfolio investment stock since 2022.

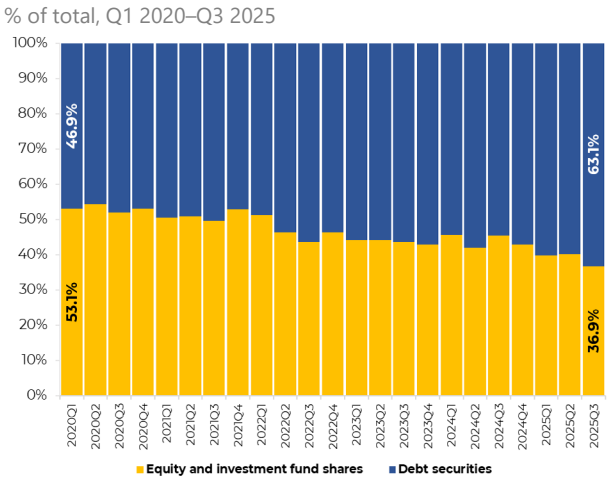
Foreign portfolio investments

Graph 8

A. Net incurrence of liabilities



B. Outstanding liabilities



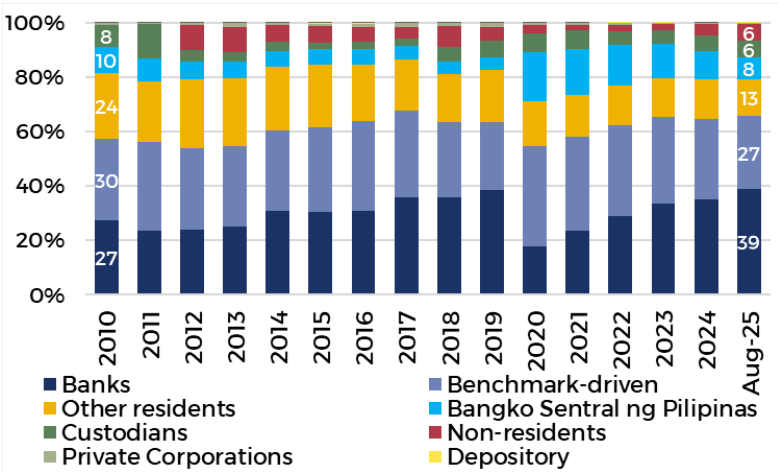
Sources: BSP Balance of Payments (BOP), International Investment Position (IIP); BSP staff calculations.

Nonetheless, this increase in bond-denominated foreign investments has coincided with a growing share of non-resident holders in the local bond market. While banks remain the main holders of onshore government securities, the share of non-resident holders in the market had reached around 6% by 2025, a notable increase compared with the years immediately following the pandemic (Graph 9). Meanwhile, growth in non-resident activity in the equity market has expanded more modestly and is consistent with the persistent outflows recorded since 2021.

More than the changes in investment composition, global preference for the US dollar amid heightened uncertainty has become more evident in domestic financial conditions. In particular, volatility in bond investment inflows has been evident, driven by concerns over the uneven post-pandemic recovery and the successive tightening cycle by the US Fed in 2022. This prompted investors to rebalance away from riskier assets and reinforced demand for dollar-denominated instruments. At the same time, stock prices have remained subdued and have yet to recover from pre-pandemic levels despite short bouts of recovery.

Holders of Philippine onshore government securities (GS)

In per cent, as of August 2025 Graph 9



Sources: Bureau of the Treasury; BSP staff calculations.

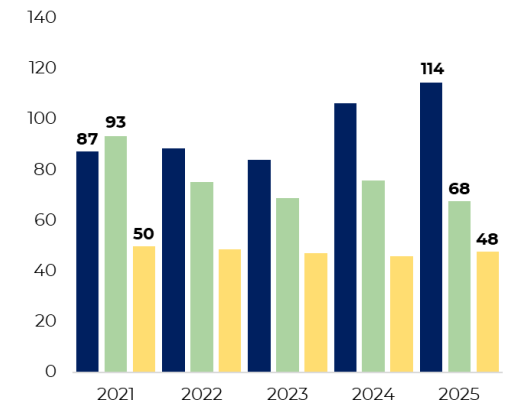
Notably, global dollar dynamics would be most visible in exchange rate movements. As of 2025, the FX market held the largest share in terms of size at around 114% of annual GDP, while the equity and bond markets lagged at 68% and 48%, respectively (Graph 10). The FX market has remained the most liquid market since the pandemic, albeit the gap with the bond market continues to narrow. In line with this, movements in the FX market provide a more immediate and clearer gauge of the impact of shifts in investor risk sentiment.

Philippine financial markets

Graph 10

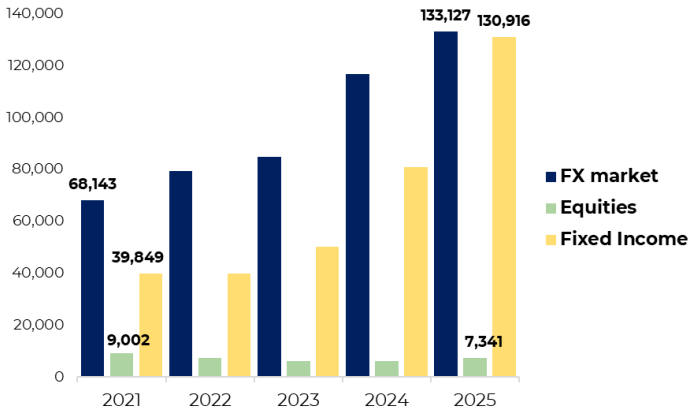
A. Market depth

% of GDP, as of end-2025



B. Market liquidity

PHP mn, as of end-2025



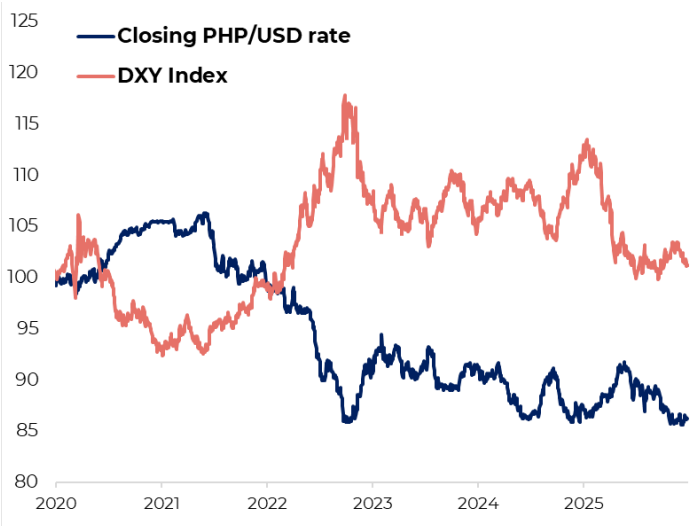
For the FX market, depth refers to the total daily transaction volume for the year while liquidity refers to the average daily transaction volume. For the equity market, depth refers to the market capitalisation while liquidity refers to the year-to-date average daily value traded. For the fixed income market, depth refers to outstanding issuances in the primary market while liquidity refers to average daily trade volume.

Sources: AsiaBonds Online; Bloomberg; Philippine Stock Exchange; BSP staff calculations.

Apart from a brief appreciation in 2020 when the country registered a current account surplus, the peso (PHP) has been steadily depreciating amid a broad strengthening of the US dollar (Graph 11). Gains during the pandemic were more than offset by significant depreciation pressures during the US Fed's tightening in 2022. Since then, demand for the dollar has been largely driven by the anticipated trajectory of the US Fed's monetary policy and has become a consistent factor for peso movements. In late 2024, global trade-related tensions and policy uncertainty surrounding the US presidential elections began to dictate the market narrative until the first half of 2025. From a steep rise in the fourth quarter of 2024, the US dollar subsequently softened beginning mid-January 2025 amid tariff-induced fatigue and increased political scrutiny on the US Fed, raising concerns over its long-standing dominance in the global financial system. Correspondingly, the peso benefited from this shift and appreciated somewhat but it remained relatively subdued and subsequently weakened until the end of 2025. This depreciation was due to domestic factors dominating FX market dynamics in the latter half of 2025. In particular, the peso was weighed down by dampened investor confidence amid ongoing investigations over anomalous public infrastructure spending as well as a weaker economic growth outlook. At the same time, the risk of deeper geopolitical fragmentation – both abroad and in the form of lingering tensions in the West Philippine Sea – has been identified as an additional market driver in recent years but had a short-term and relatively muted impact on the exchange rate.

Peso-dollar and DXY movements

In index points [base = 2 January 2020], 2020–25 Graph 11



An increase (decrease) in the index corresponds to an appreciation (depreciation) of the currency.

Sources: Bloomberg; BSP staff calculations.

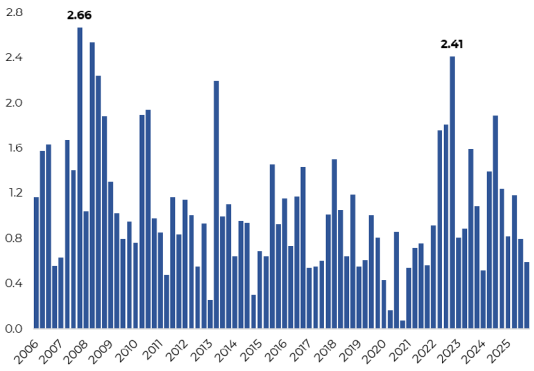
Despite elevated exchange rate levels, the BSP has managed to keep peso volatility broadly in line within the regional range. These periods of volatility have coincided with sizeable exchange rate fluctuations, albeit generally short-lived. In particular, the peso recorded sharp swings in 2022 as significant depreciation pressures from the Fed's tightening kept the peso treading near its historically

weakest level at the time. The resulting volatility in that quarter settled near the levels recorded during the GFC (Graph 12).

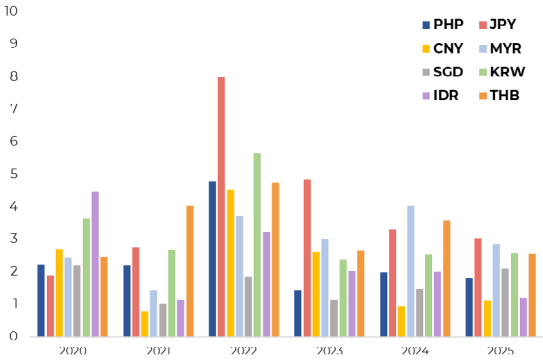
Regional FX volatility

In per cent, 2006–25 Graph 12

A. Peso volatility during the 2022 Fed tightening was comparable to rates during the GFC…



B. …But continues to settle well within the regional range



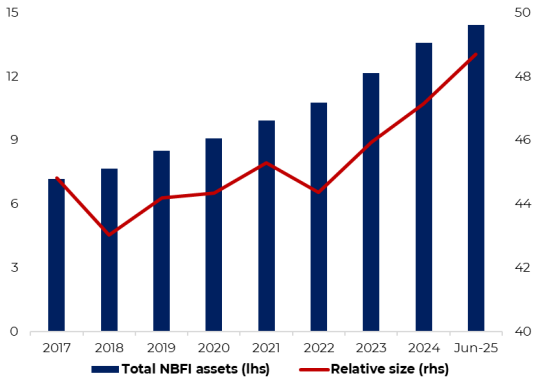
Sources: Bloomberg; BSP staff calculations.

The rising role of NBFIs and financial stability risks…

Philippine NBFIs have become an important driver of financial inclusion and market development. Their expansion has supported broader access to credit, remittances, insurance and investment products, particularly through fintech platforms and microfinance institutions. As of August 2025, total assets held by NBFIs amounted to

Total NBFI assets and size relative to other depository corporations

In trillions of pesos (lhs) and per cent (rhs), 2017–25 Graph 13



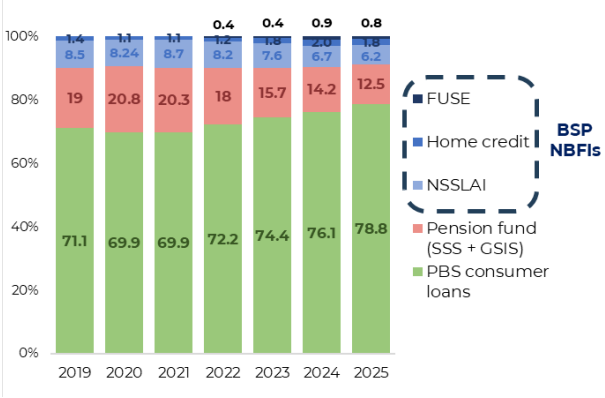
Source: BSP staff calculations.

PHP 14.42 trillion, which is equivalent to about 48.71% of the PHP 29.61 trillion asset size of other depository corporations (Graph 13).[10]

However, banks remain the primary intermediaries in the financial system. Based on preliminary data as of September 2025, the Philippine banking sector (PBS) accounted for roughly 79% of consumer loans in 2025 (Graph 14). Nevertheless, the increasing linkages between NBFIs and non-residents raises potential systemic risk and warrants further monitoring (Graph 15). Moreover, the IMF Global Financial Stability Report has warned that while NBFIs can broaden access to finance, they may also amplify financial shocks if not properly supervised. In response, the Philippine Financial Stability Coordination Council has launched an enhanced NBFI monitoring framework to improve data-sharing and systemic risk assessment, reflecting a shift towards system-wide resilience rather than institution-based oversight.

Banking sector and NBFI consumer loans

In billions of pesos and as a percentage of total, 2019–25 Graph 14

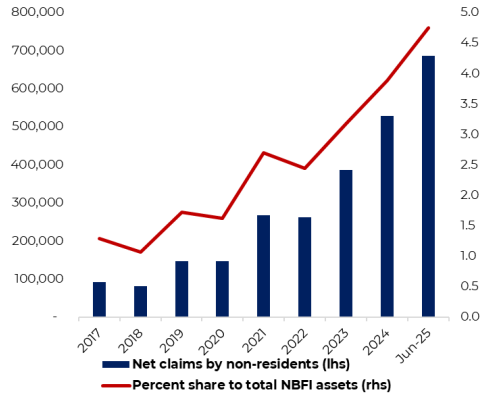


Source: BSP staff calculations.

[10] NBFIs included in this classification are trust entities, private and public insurance corporations, pension funds, holding companies, government financial institutions, non-money market funds (eg unit investment trust funds and investment companies) and other financial intermediaries and auxiliaries (consisting of offshore banking units and non-banks without quasi-banking functions).

Net claims on NBFIs by non-residents

In millions of pesos (lhs) and as a percentage of total NBFI assets (rhs) Graph 15



Source: BSP staff calculations.

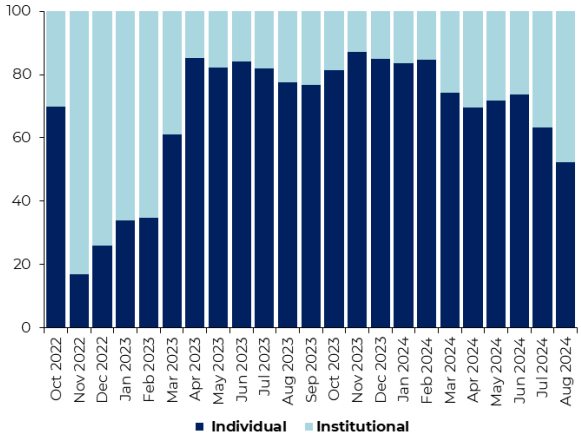
Crypto markets …and funding dynamics in the Philippines

In the Philippines, the scale of crypto activity remains modest relative to traditional stores of value such as bank deposits. In 2024, the total value of crypto transactions, amounting to PHP 330 billion, accounted for only 1.6% of total deposits in the Philippine banking system. However, crypto-related activity showed rapid growth in that year, increasing by 1,474% compared to the total value observed in 2019.

Moreover, partial data from two major virtual asset service providers (VASPs) also indicate that market activity remains concentrated among individual investors and traders, although the share of institutional transactions has been steadily rising (Graph 16).

Value of crypto transactions by investor type

As a percentage of total transactions, October 2022–August 2024 Graph 16



Source: BSP staff calculations.

As cryptocurrencies continue to evolve, there has been growing interest in facilitating transactions through safer, asset-backed channels. While plans for a peso-backed wholesale central bank digital currency (CBDC) remain under consideration, local users have increasingly turned to alternative forms of digital assets. As of 2024, stablecoins comprise a modest share compared with other forms of cryptocurrencies held in the country.[11] Nonetheless – amid the dollar-centric global market – efforts to deepen the stablecoin market in the Philippines have focused on both product innovation and regulatory refinements.

Several stablecoins have been introduced with the common objective of minimising the transaction fees typically associated with traditional payment channels. In 2024, Coins.ph, a leading VASP in the Philippines, launched PHPC, a peso-backed stablecoin that aims to provide faster and cost-efficient services for payment, remittances and trading-related transactions. This stablecoin was taken under the BSP's Regulatory Sandbox Framework – an initiative that supports the development of innovative financial products and services through a controlled environment with specified parameters. In this framework, the BSP can better assess the appropriate regulatory standards for products based on their method of operationalisation as well as the associated risks and benefits of implementation, while promoting product innovation.

Policy implications and conclusions

The evolving global financial landscape poses heightened challenges for the conduct of monetary policy in the Philippines. Greater exposure to US dollar-driven spillovers and recurrent episodes of global risk aversion have intensified trade-offs between price stability and financial stability. External shocks now transmit more rapidly through capital flows, exchange rates and asset prices. At the same time, the expanding role of NBFIs – and their deepening interconnectedness with the banking system – together with the rapid adoption of virtual assets such as stablecoins, has added further complexity to financial intermediation and the transmission of monetary policy.

The increasing reliance on debt financing has also strengthened the role of market-based pricing in shaping domestic financing conditions. As a result, financing costs have become more sensitive to movements in bond yields, global interest rate cycles, and shifts in investor risk appetite. Moreover, broader access to alternative channels for cross-border transactions may weaken the clarity and effectiveness of monetary policy signals, with potential implications for market liquidity and volatility.

In this context, policy responses should focus on enhancing resilience across markets and institutions. Strengthening regional and cross-border cooperation – particularly initiatives aimed at reducing excessive reliance on a single vehicle currency – may provide additional safeguards against external shocks. Continued deepening of domestic financial markets, especially the bond market, remains essential to support debt sustainability, strengthen the economy's shock-absorption

[11] Data from four VASPs as of end-2024 show that stablecoins comprise around only 4% (PHP 747 million) of consumers' outstanding cryptoasset balance (PHP 19.7 billion). Meanwhile, stablecoins comprise around 15% (PHP 769 million) of VASPs' proprietary wallet balance (PHP 5.2 billion).

capacity, and reinforce monetary policy transmission amid shifting global policy cycles.

At the same time, the BSP's broader policy toolkit – including FX interventions, liquidity management instruments and macroprudential measures – will remain critical, particularly during periods when capital flow and exchange rate dynamics diverge from the stance implied by domestic monetary conditions. Finally, enhanced oversight of NBFIs and strengthened regulatory frameworks for virtual assets will be necessary to preserve the effectiveness of monetary policy, while ensuring that the benefits of financial innovation are realised in a manner consistent with the BSP's financial stability objectives.[12]

[12] See International Monetary Fund, *Global Financial Stability Report*, October 2025, www.imf.org/en/publications/gfsr/issues/2025/10/14/global-financial-stability-report-october-2025.

Capital flows, exchange rate dynamics and domestic financial conditions in emerging market economies in an evolving international monetary system: The case of Saudi Arabia

Saudi Central Bank

Introduction

International monetary and financial systems are undergoing a gradual but consequential transformation, shaped by the interaction of post-pandemic macroeconomic adjustments and heightened global fragmentation. Together, these factors have altered the configuration of international capital flows, increasing their sensitivity to global financial conditions and amplifying their procyclical behaviour, particularly in the case of emerging market economies (EMEs). Divergences in monetary policy paths across major economies, persistent uncertainty surrounding inflation dynamics and the repricing of global risk have amplified the frequency, speed and magnitude of capital flow reversals.

At the same time, structural shifts in the global financial architecture have fundamentally reshaped the channels though which external shocks propagate. The growing prominence of non-bank financial intermediaries (NBFIs), with an increasing role of cross-border portfolio reallocations, has increased the complexity of financial interconnections, complicating the attribution of capital flows and the assessment of global financial conditions. These developments may have reduced the share of stable, long-horizon capital flows and increased exposure of EMEs to abrupt shifts in investor risk appetite and funding conditions. As a result, exchange rate movements, asset price volatility and changes in foreign currency funding costs can transmit more rapidly into domestic credit conditions and macro-financial outcomes.

Against this backdrop, exchange rate regimes have re-emerged as a central determinant of domestic financial resilience. Global disturbances increasingly transmit through capital flow volatility that drives exchange rate movements and affects financial conditions, underscoring the importance of monetary policy and financial stability frameworks in shaping domestic outcomes. This note examines how global capital flow dynamics, exchange rate arrangements and evolving financial intermediation interact to shape domestic financial conditions in EMEs – with a particular focus on Saudi Arabia. It analyses the transmission of global financial shocks under a fixed exchange rate regime and assesses the effectiveness of policy frameworks and instruments in preserving monetary and financial stability amid heightened global uncertainty.

Implications for monetary policy in emerging market economies

Over the past decade, EMEs have operated in an increasingly complex monetary policy environment, shaped by profound shifts in global financial conditions and capital flow dynamics. These factors have made monetary policy decisions more challenging. The expansion of NBFIs, the growing dominance of benchmark-driven portfolio allocations and the reinforcing role of the US dollar cycle have increased the sensitivity of EMEs to changes in global risk sentiment, interest rate differentials and financial conditions in advanced economies. This sensitivity is due mainly to EMEs' greater reliance on external funding (often dollar-denominated) and the larger presence of foreign investors in local bond markets.[1] Therefore, capital flows have become more volatile, more procyclical and more highly correlated across jurisdictions, narrowing the scope for insulation through conventional monetary policy instruments.

In this environment, exchange rate movements, once viewed primarily as operating through global trade dynamics, may transmit external shocks – predominantly through the channels of balance sheets, asset prices and credit.[2] Currency movements affect domestic financial conditions by altering the valuation of foreign currency liabilities, influencing funding costs and shaping inflation expectations through financial rather than purely trade-based mechanisms. These dynamics have elevated the importance of financial channels in monetary transmission and increased the policy trade-offs faced by EMEs, particularly those with open capital accounts and deep market-based financial systems.

Overall, in an environment characterised by more synchronised global cycles, mobile capital and heightened sensitivity to financial conditions, maintaining monetary and financial stability requires continuous monitoring of interest rate differentials, proactive management of liquidity and prudent oversight of domestic credit dynamics. This combination of rules-based anchoring and discretionary liquidity management remains central to Saudi Arabia's monetary policy response to evolving global financial dynamics and offers relevant insights for EMEs navigating similar constrains.

Saudi Arabia's monetary and financial framework

Despite global financial market developments, the global financial architecture remains firmly anchored in the US dollar. Its dominant role in trade invoicing, cross-border financial intermediation, global exchange reserve holdings and global funding markets continues to shape capital flow dynamics and exchange rate movements across EMEs. Movements in US monetary policy, particularly shifts in policy stance and long-term treasury yields, remain key drivers of global capital flows, exchange

[1] Bank for International Settlements, *Capital flows, exchange rates and monetary policy frameworks in Latin American and other economies*, April 2021, www.bis.org/publ/othp37.htm.

[2] BIS, ibid.

rate movements and domestic financial conditions across emerging economies. This is evident in the fact that the US dollar accounts for about 57% of global foreign exchange (FX) reserves[3] and 89% of global FX transactions.[4] In Saudi Arabia, the US dollar plays a prominent role in both FX reserves and trade, as reflected in the predominance of USD in the issuance of letters of credit.

Saudi Arabia presents a distinctive and policy-relevant case. The Saudi monetary framework is anchored by a long-standing fixed exchange rate regime, with the Saudi riyal pegged to the US dollar at 3.75 since 1986. This arrangement has served as a durable nominal anchor, supporting price stability. Given the structure of Saudi Arabia as an open economy that relies substantially on international trade for both imports and exports, the benefits of exchange rate stability have outweighed any potential gains from exchange rate flexibility. Under this structural configuration, the exchange rate channel plays a limited role in absorbing external shocks.

Instead, adjustment takes place primarily through capital flows and the management of foreign exchange reserves. When global financial conditions tighten and pressures on capital outflows emerge, the Saudi Central Bank (SAMA) maintains the peg through supplying foreign currency to meet the demand. Conversely, during periods of strong inflows, reserves accumulate and liquidity management tools are used to sterilise excess liquidity and preserve financial stability.

Hence, foreign exchange reserves function as a buffer that absorbs shocks over different periods, substituting for the role that the exchange rate would otherwise play. As a result, shifts in US interest rates are reflected in domestic financial conditions through funding costs, asset prices and portfolio allocation channels, while the reserve position and monetary operations help smooth the adjustment process and support exchange rate stability.

Developments in Saudi Arabia's external position

Saudi Arabia continues to occupy a structurally strong external position, as reflected by a positive net international investment position of approximately SAR 2.93 trillion[5] (USD 781 billion). Saudi Arabia continues to maintain a positive position despite a rise in external liabilities associated with sovereign bond issuance and strong growth of foreign investors in Saudi financial assets, particularly in the equity market. However, these developments signal deeper integration with global capital markets.

Furthermore, rising external liabilities underscore the growing role of market-based financing channels in shaping the structure of the Saudi external balance sheet. External sovereign debt reached SAR 477.7 billion in 2024, an increase of 17.7%

[3] International Monetary Fund, *Currency composition of official foreign exchange reserves* (COFER), 2025.

[4] Bank for International Settlements, "Triennial central bank survey of foreign exchange and over-the-counter (OTC) derivatives markets in 2025", www.bis.org/statistics/rpfx25.htm.

[5] Saudi Central Bank, *Monthly Bulletin*. https://www.sama.gov.sa/en-US/Statistics/Pages/MonthlyStatistics.aspx

compared with 2023.[6] This rise was driven by a sovereign borrowing strategy, strong sovereign credit fundamentals and sustained demand from international institutional investors. In this context, the increase in external sovereign debt points to a gradual evolution in the structure of fiscal financing while maintaining ample external buffers.

The evolving investor mix is increasingly evident in equity markets. Foreign institutional participation has increased following the Saudi's inclusion in major global indices, reinforcing passive and benchmark-driven inflows. By the end of 2024, foreign ownership of listed equities reached SAR 423 billion, accounting for approximately 11% of free-float shares, while net foreign investments totalled SAR 218 billion, representing a 10.1% increase relative to 2023.[7] These developments have diversified the investor base while also increasing exposure to shifts in global risk appetite and benchmark rebalancing dynamics. Thus, they have strengthened the relevance of global financial cycles for domestic asset prices.

Domestic financial conditions in Saudi Arabia

Changes in US policy rates and in the US dollar play a central role in shaping domestic financing conditions. Periods of US monetary easing – typically associated with lower global yields and a weaker dollar – tend to translate into looser domestic financial conditions, reflected as a lower cost of credit and higher asset valuations. Conversely, episodes of US monetary tightening transmit directly as higher domestic funding costs. This mechanism underscores the importance of effective liquidity management and prudential oversight in managing changes in the stock of domestic liquidity – namely, through liquidity operations that smooth the domestic impact of global monetary cycles under a fixed exchange rate regime.

Typically, movements in global yield curves and shifts in investor risk appetite influence both local currency and foreign currency sovereign yields. However, given the still-developing secondary domestic capital market, the transmission of external financial conditions to domestic financial conditions has increased but remains limited. In particular, this reflects the predominantly domestic drivers of credit demand, notably public spending and investment activity. Despite elevated policy rates during the latest tightening cycle and some moderation in portfolio inflows, domestic credit conditions in Saudi Arabia have remained broadly stable. This reflects the role of public spending in steering domestic demand and financing conditions, which tends to dampen the traditional interest rate transmission mechanism. Fiscal policy, anchored by sustained government expenditure and large-scale investment programmes, supports economic activity and private sector credit growth, reducing sensitivity to higher borrowing costs.

This is evident during periods of peak policy rates, such as the first half of 2024, when the policy rates were at 5.5%–6%. Private sector credit growth averaged around 11% year-over-year, while non-oil gross domestic product (GDP) growth remained

[6] National Debt Management Center (NDMC), *Annual borrowing plan report: Fiscal year 2025*.

[7] Capital Market Authority (CMA), Annual Report 2024. https://cma.gov.sa/en/Market/Reports/Documents/CMA_2024_REPORT_EN.pdf.

robust at approximately 5.7% during that same period. Rather than triggering an abrupt tightening in credit conditions, higher interest rates were offset by sustained public spending, which drove resilient private demand. As a result, credit growth remained aligned with underlying economic activity, indicating that public spending plays a key role in protecting the economy from external monetary tightening and limiting the pass-through of higher policy rates to domestic financing conditions.

Generally, Saudi Arabia's domestic financial conditions reflect the interaction of externally anchored policy rates, strong financial sector fundamentals and proactive liquidity management. While the fixed exchange rate regime necessarily limits independent interest rate policy, it has delivered stability by anchoring expectations and reducing volatility related to the exchange rate.

Effectiveness of recent policy mixes in Saudi Arabia

Periods of severe economic disruption provide a critical test of the credibility, flexibility and institutional coherence of monetary policy frameworks, particularly in economies operating under fixed exchange rate regimes. The Covid-19 pandemic constituted an unprecedented global shock, marked by an abrupt collapse in economic activity, severe supply chain disruptions and heightened volatility across global financial markets.

For Saudi Arabia, the shocks coincided with a sharp decline in oil prices and a sudden tightening in global financial conditions, amplifying downside risks to growth, liquidity and private sector financing. In response, SAMA implemented a comprehensive and timely policy package aimed at preserving monetary and financial stability while safeguarding the credibility of the exchange rate peg.[8] In line with the US Federal Reserve's emergency easing cycle, SAMA reduced its policy rates in March 2020, albeit in a lower magnitude, which effectively increased the policy rate premium from 25 to 50 basis points. Complementing interest rate actions, SAMA deployed a broad set of targeted liquidity and credit-support measures under the Private Sector Financing Support Program. The programme was designed to mitigate the impact on segments that were most affected by the pandemic and sustained private sector activity, particularly among small and medium-sized enterprises, which are more vulnerable to funding disruptions during systemic shocks. In parallel, SAMA injected an additional SAR 50 billion (USD 13.3 billion) into the banking system to preserve the smooth functioning of money markets.[9]

The effectiveness of this policy mix is evident in the resilience of domestic financial conditions during the pandemic. Credit growth remained broadly stable and within double-digit levels, rising to 14.5% in 2020 from 10.4% in the previous year. Liquidity in the banking system was adequate, supporting smooth financial intermediation. Households and firms were able to meet essential financial obligations, while banks maintained strong capitalisation and high asset quality.

[8] Saudi Central Bank, "SAMA's Private Sector Financing Support Program", 2020. https://www.sama.gov.sa/en-us/mediacenter/news/pages/news-551.aspx

[9] Saudi Central Bank, "SAMA boosts banking sector liquidity with SAR 50 billion", 2020. https://www.sama.gov.sa/en-US/MediaCenter/News/Pages/news-574.aspx

Notably, monetary operations implemented during the onset of the pandemic contained the impact of the sudden equity market sell-off, which was triggered by around SAR 40 billion (USD 10.6 billion) in foreign investor outflows. Overall, monetary stability was preserved throughout the period, with no material pressures on the exchange rate.

As global demand rebounded following the pandemic, persistent supply constraints and energy price dynamics contributed to a surge in global inflation, prompting a rapid and synchronised tightening cycle by major central banks. In that environment, SAMA adjusted its policy rate stance in line with the Federal Reserve, increasing policy rates to maintain interest rate parity and mitigate the risk of destabilising capital flows. That normalisation phase demonstrated the symmetry, consistency and predictability of the monetary framework across easing and tightening cycles, with foreign exchange reserves acting as the primary shock absorber in a fixed exchange rate regime.

Conclusion

Generally, Saudi Arabia's recent policy experience highlights the effectiveness of a coordinated policy mix under a fixed exchange rate regime. The combination of rule-based interest rate alignment, proactive liquidity management and strong fiscal and external buffers enabled the economy to absorb a severe global shock without compromising monetary or financial stability. This experience underscores the importance of institutional credibility, operational flexibility and close coordination between monetary, fiscal and supervisory policies in navigating large external shocks – particularly for EMEs operating in an environment of heightened global financial volatility.

International capital flow dynamics in Singapore

Prepared by the Economic Policy Group, Monetary Authority of Singapore

Introduction

A large literature has documented the importance of global factors in driving capital flows into and out of open economies. As a small economy with fully open capital markets, Singapore is clearly subject to this dynamic. This note empirically examines the importance of global "push" relative to domestic "pull" factors in influencing the movement of capital into and out of Singapore.

During crises and over the shorter term, global "push" factors often dominate domestic "pull" factors in determining international capital flows. Forbes and Warnock (2012) show that Singapore experienced significant capital surge and flight episodes in the period around the Great Financial Crisis (GFC), supporting the view that capital flows to Singapore are affected by global factors.

The analysis for Singapore in this note confirms the strong influence of global "push" factors on private capital flows, with evidence of a structural shift in the key drivers following the GFC. Before the crisis, Singapore's capital flows were closely tied to growth in the core advanced economies (AEs). However, post-GFC, Singapore's capital flows responded more strongly to Asia and China's growth as well as to global financial risks.

An overview of Singapore's private capital flows

This section summarises a number of stylised facts on Singapore's capital flows, based on quarterly balance of payments data. Under BPM6, the financial account (FA) records two main categories of cross-border transaction flows:

$$FA\ balance = Net\ Acquisition\ of\ Financial\ Assets - Net\ Incurrence\ of\ Liabilities$$
$$= \Delta Assets - \Delta Liabilities$$

First, residents' net acquisitions of foreign financial assets – such as direct investment abroad, purchases of foreign securities, cross-border lending and deposits overseas. An increase in assets is recorded with a positive sign, meaning an *outflow* of funds. Second, residents' incurrence of financial liabilities owed to foreigners, including foreign direct investment into Singapore, foreign purchases of domestic securities and cross-border borrowing by local entities. An increase in liabilities is recorded with a negative sign and is considered an *inflow* of funds.

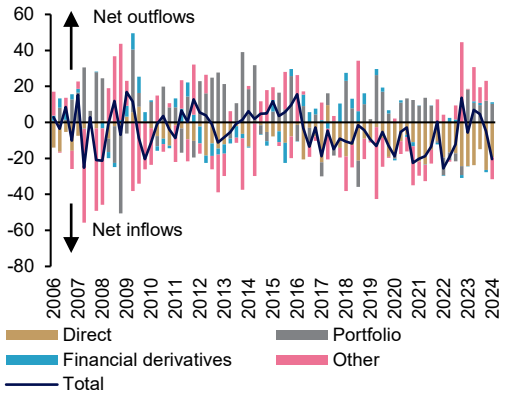
Net capital flows – the balance in the financial account – therefore arise from changes in the economy's foreign asset position minus changes in the liabilities it

owes to creditors abroad.[1] When increases in assets exceed increases in liabilities, the economy is a net lender, recording a net capital outflow. When the order is reversed and liabilities increase more than assets, the economy is a net borrower, experiencing net capital inflows.[2] The definitions of asset classes under capital flows can be found in Table A.1 in the appendix.

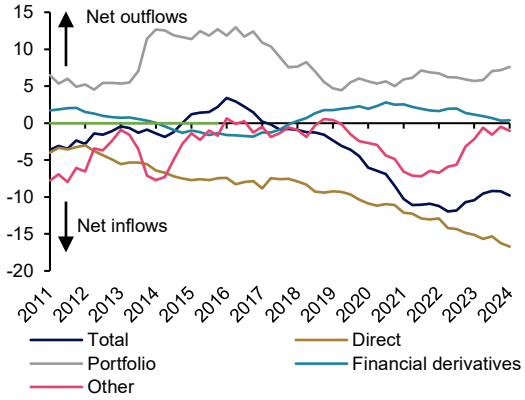
Singapore has been a net recipient of private capital inflows (ie negative net capital flows) from 2006 to 2024 (Graphs 1.A and 1.B). Based on a five-year rolling average, total net inflows as a percentage of nominal GDP have demonstrated a trend increase (Graph 1.B), largely driven by direct investment inflows. Other investment flows have been more volatile, but have seen longer periods of net inflows than of outflows. However, there has been a net outflow of portfolio investment over the period.

Capital flows for Singapore, 2006–24
As a percentage of GDP — Graph 1

A. Net capital flows



B. Net capital flows (five-year rolling average)



In Graph 1.B, the figure plots the five-year rolling average of net capital flows with a starting window of Q2 2006 to Q1 2011. Each point on the x-axis corresponds to the end of the respective rolling window.

Sources: Singapore Department of Statistics (DOS); Haver Analytics.

Reflecting Singapore's role as a regional financial centre, changes in financial assets and liabilities are large and volatile compared to the size of the economy. Summing the absolute magnitudes of the two, the total annual change averaged around 80% of GDP over 1995–2024, compared to about 10% in the United States and Japan. For Singapore, the standard deviations of the ratio of the changes in assets and liabilities to GDP are 57 percentage points (pp) and 60 pp respectively, higher than the 4 pp observed for the United States. The high volatility in Singapore's capital

[1] The changes refer purely to transaction flows; valuation changes do not impact the balance of payment flows.

[2] The sign convention in BPM6 entails that a positive FA balance indicates a net lending position (assets grew more than liabilities) and a negative FA balance indicates a net borrowing position (liabilities grew more than assets). This differs from the definition under BPM5, where the financial account balance is presented as capital inflows less capital outflows, effectively switching the sign convention for the overall financial account.

flows is driven by portfolio, financial derivatives and other investments, whereas direct investments are relatively stable.[3]

As Singapore's changes in financial assets and liabilities are highly correlated and thus largely offset each other (Table 1), net capital flows are consequently more stable. The standard deviation of the ratio of net capital flows over GDP falls considerably, to only around 11 pp (Table A.2).

Correlation of capital flow categories (Q1 1995–Q1 2024) Table 1

Total	Direct	Portfolio	Financial derivatives	Other
0.98***	0.36***	0.33***	0.80***	0.94***

*** p<0.01.

Push and pull factors affecting asset and liability flows

Consistent with the approaches used in the recent empirical literature, including BIS (2021) and Cerutti et al (2015), we use a linear regression framework of global and domestic factors to examine Singapore's capital flows. The empirical model is as follows:

$$Flows_t = \alpha + \beta_1 Push_t + \delta_1 Pull_t + \varepsilon_t \quad (1)$$

$Flows_t$ is defined as the ratio of changes in assets or liabilities to Singapore's nominal GDP at time *t*. Each flow type is analysed separately by investment categories: direct investment, portfolio investment by banks, portfolio investment by non-banks, other investment by banks and other investment by non-banks.[4]

The push and pull variables follow those identified in the literature, with a priority on those with longer time series to capture Singapore's key business and financial cycles (eg the Asian financial crisis (AFC) and the GFC). Table 2 lists a selection of the global business and financial cycle push and pull variables included in the model.[5]

Push factors

Push factors are economic and financial conditions in source countries that influence capital flows into Singapore, the recipient country. Key push factors include source country interest rates, GDP growth and financial market stability (Table 2). High interest rates and robust economic performance abroad can make investments in source countries more attractive, reducing net capital flows into Singapore. Conversely, economic instability or low returns in source countries can drive investors to seek higher returns abroad, increasing flows into Singapore. In addition, global financial conditions, such as liquidity and risk aversion, are also likely to play a role in determining the volume and direction of international capital flows.

[3] See Table A.2 for the standard deviation of Singapore's capital flows.

[4] Financial derivatives flows are not included because of data limitations.

[5] The full list and sources of variables used can be found in Table A.3.

List of push and pull factors Table 2

Push factors	
Business cycle	**Financial cycle**
• Simple average GDP growth rate of the core AEs (US, UK, EU and Japan) • Simple average GDP growth rate of Asian economies excluding China (Indonesia, Korea, Philippines, Chinese Taipei and Thailand) • GDP growth rate for China • US trade balance over GDP ratio in the US[1]	• Bloomberg Dollar Index • Leo Krippner shadow short rate of the US monetary policy rate • Two-year US bond yield • The first principal component from five financial risk indicators: Gilchrist and Zakrajšek (2012) spreads, Moody's Aaa and Baa corporate bond minus federal funds rate spreads and Moody's Aaa and Baa corporate bond minus 10-year Treasury • Change in the USDSGD spot rate
Pull factors	
Business cycle	**Financial cycle**
• A principal component score of Singapore's macroeconomic indicators (real GDP growth, inflation rate, industry productivity, unemployment rate, trade-to-GDP ratio)	• Singapore real interest rate[2]

Table footnote:

1. The Hodrick-Prescott filter is used to extract the cyclical component of the US trade balance ratio, which serves as a proxy for the US business cycle.

2. The real interest rate is computed as the difference between the nominal interest rate and inflation rate. For Singapore's nominal rate, we use SIBOR before 2015 and SORA from 2015 onwards (Table A.3).

Pull factors

Pull variables consist of variables related to Singapore's macroeconomic and financial fundamentals. Macroeconomic variables such as domestic GDP growth and inflation can drive relative changes in the demand and supply of capital. For example, positive shocks to Singapore's GDP growth may raise returns to investment in Singapore, pulling in capital flows. In lieu of incorporating multiple macroeconomic indicators as independent variables, a single, compact principal component score that captures the common variation in Singapore's macroeconomic variables is used.[6] Specifically, the lagged value of the principal component score is used to capture Singapore's underlying economic conditions.

Drivers of Singapore's capital flows

The baseline regression model, as specified in Equation 1, is estimated using quarterly data from Q1 1995 to Q1 2024. The regression results are shown in Tables 3 and 4.

[6] The principal component score of Singapore's macroeconomic indicators is obtained using the method of Hamilton and Xi (2024). Each indicator is first regressed on its own lags with the residual representing the cyclical component. Principal component analysis is then performed on the cyclical components of these indicators to obtain the principal component score.

Regression results for changes in assets (outflows) Table 3

Dependent variable	Total	Direct investment	Portfolio bank	Portfolio non-bank	Other bank	Other non-bank
Pull factors:						
Real interest rate SG	–0.337	0.066	0.525	0.009	–0.052	–0.794
	(3.690)	(0.361)	(0.879)	(0.392)	(3.249)	(0.702)
Macro PCA SG	–3.081	–0.277	0.509	–0.552	–2.534	–0.139
	(3.892)	(0.418)	(1.085)	(0.512)	(4.049)	(0.968)
Push factors:						
Real GDP growth G3+UK	3.594	–0.195	–0.571	0.040	3.773	0.445
	(2.404)	(0.172)	(0.419)	(0.277)	(2.406)	(0.374)
Real GDP growth Asia ex China	0.391	0.191	0.947*	0.515**	–0.778	–0.367
	(3.601)	(0.164)	(0.525)	(0.251)	(3.496)	(0.463)
Real GDP growth China	4.723**	0.506***	0.113	0.159	3.359	0.682**
	(2.112)	(0.191)	(0.371)	(0.213)	(2.034)	(0.339)
Inflation US	2.816	1.391**	–0.088	–1.679*	3.101	–1.907
	(6.512)	(0.563)	(1.698)	(1.005)	(6.693)	(1.265)
Real interest rate US	3.059	1.751***	–1.749	–1.068	3.072	–1.090
	(5.912)	(0.540)	(1.688)	(0.840)	(5.732)	(1.198)
Trade/GDP cyclical US	63.531	14.708***	39.661**	–5.124	17.984	14.244
	(59.300)	(4.467)	(16.149)	(7.694)	(62.956)	(11.425)
Two-year bond yield US	–7.611	–3.611***	2.109	0.233	–5.990	1.922
	(8.638)	(0.748)	(1.953)	(1.122)	(9.204)	(1.659)
USD growth	1.357	0.316***	–0.168	–0.099	1.356	0.036
	(1.410)	(0.078)	(0.261)	(0.116)	(1.268)	(0.233)
Financial risk indicator	–9.408*	–1.461***	–1.252	–0.939*	–5.519	–0.807
	(4.947)	(0.525)	(1.506)	(0.478)	(4.257)	(1.118)
Change in USDSGD spot rate	–3.258	–0.206	–0.177	0.403**	–2.807	–0.188
	(4.120)	(0.136)	(0.500)	(0.195)	(3.649)	(0.398)
Constant	10.216	15.429***	–4.639	5.348**	–9.235	–0.756
	(26.178)	(2.395)	(4.649)	(2.318)	(26.501)	(4.358)
Observations	117	117	117	117	117	117
R^2	0.214	0.286	0.169	0.154	0.131	0.093

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Regression results for changes in liabilities (inflows) Table 4

Dependent variable	Total	Direct investment	Portfolio bank	Portfolio non-bank	Other bank	Other non-bank
Pull factors:						
Real interest rate SG	–2.342	0.295	–0.166	0.386	–2.146	–0.013
	(3.758)	(0.493)	(0.178)	(0.271)	(3.662)	(0.648)
Macro PCA SG	–2.521	0.334	–0.068	0.184	–3.267	0.788
	(4.026)	(0.741)	(0.142)	(0.253)	(3.954)	(0.857)
Push factors:						
Real GDP growth G3+UK	2.774	0.421	0.066	–0.097	2.144	0.203
	(2.356)	(0.518)	(0.149)	(0.123)	(2.505)	(0.470)
Real GDP growth Asia ex China	0.917	–0.457	0.090	–0.016	1.308	–0.157
	(3.829)	(0.927)	(0.096)	(0.120)	(4.294)	(0.422)
Real GDP growth China	4.557**	–0.240	0.005	0.451***	3.909*	0.443
	(2.057)	(0.255)	(0.093)	(0.158)	(2.031)	(0.320)
Inflation US	4.862	2.333**	0.287	0.732	–0.022	0.989
	(6.700)	(1.026)	(0.439)	(0.569)	(6.619)	(1.249)
Real interest rate US	4.403	1.402*	0.025	0.870	–0.571	1.841
	(6.072)	(0.746)	(0.341)	(0.560)	(5.872)	(1.167)
Trade/GDP cyclical US	84.323	12.403	3.545	0.691	79.011	10.204
	(61.846)	(7.992)	(2.617)	(3.925)	(59.456)	(10.528)
Two-year bond yield US	–10.518	–4.153***	–0.140	–1.511**	–0.919	–3.114*
	(9.041)	(1.167)	(0.406)	(0.703)	(8.563)	(1.686)
USD growth	1.285	0.318	–0.041	0.056	1.093	–0.050
	(1.451)	(0.225)	(0.037)	(0.057)	(1.411)	(0.167)
Financial risk indicator	–12.264**	–2.821***	–0.209*	–0.783***	–8.203*	–0.449
	(4.827)	(0.714)	(0.126)	(0.281)	(4.636)	(0.786)
Change in USDSGD spot rate	–3.377	–0.625	0.107	–0.038	–2.782	–0.038
	(4.263)	(0.395)	(0.074)	(0.115)	(4.217)	(0.299)
Constant	17.833	31.657***	–0.276	1.228	–24.668	9.545**
	(26.446)	(3.354)	(0.795)	(1.774)	(25.205)	(4.555)
Observations	117	117	117	117	117	117
R^2	0.237	0.370	0.073	0.197	0.179	0.083

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The key observations from the regression analysis are summarised below.

1. Push factors matter more than pull factors for Singapore's capital inflows (changes in liabilities) and outflows (changes in assets).

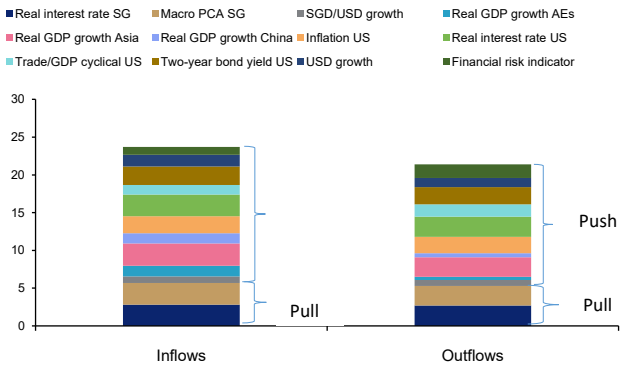
The results indicate that global and regional factors exhibit a strong association with Singapore's capital flows. In contrast, Singapore's pull factors are only weakly associated with capital flows.

- Singapore's financial asset and liability flows tend to increase during periods of robust regional economic growth and decrease when global financial risk is elevated. The coefficients on the financial risk indicator term are –9.4 and –12.6, respectively. This probably reflects the yield-seeking and risk aversion behaviour of Singapore resident and international investors.
- In terms of Singapore's financial assets, stronger growth in Asia leads to an increase in resident bank and non-bank portfolio flows abroad. Singapore's direct investment outflows are strongly sensitive to global financial risk and economic conditions in the United States and China. Non-bank portfolio outflows have a statistically significant and positive relationship with changes in the USDSGD spot rate. A depreciation of the SGD against the USD (positive increase in spot rate), controlling for the broad USD index, is correlated with higher non-bank portfolio outflows.
- For financial liabilities in Singapore, robust GDP growth in China appears to strongly stimulate (non-resident) non-banks' portfolio and (non-resident) banks' other investment flows into Singapore. In comparison, higher global financial risk leads to lower inflows into Singapore across most asset types.

A decomposition of R^2 by regressor[7] affirms that push factors contribute more to the explained variance of flows, relative to domestic pull factors. Among push factors, GDP growth of the AEs and China, global financial conditions and US dollar strength are the most important drivers of both inflows and outflows (Graph 2). The total contribution of pull factors for capital flow dynamics is lower than that of push factors, accounting for less than one third of the overall explained variance.

Decomposition of R^2 by regressors for changes in assets and liabilities

Percentage point contribution — Graph 2



Sources: EPG; MAS estimates.

[7] We apply semi-partial R^2 to quantify the unique contribution of an individual predictor to the total variance explained by a regression model. For further details, refer to the technical note by Shedden (2021) and similar methods applied in studies such as Nakagawa and Schielzeth (2013).

Overall, the results reflect Singapore's role as an international financial centre intermediating capital flows between the region and the rest of the world. They also indicate that resident investors perceive Singapore as a trusted and safe harbour during periods of heightened global financial risk given its macroeconomic and political stability and triple-A credit rating. Indeed, a key stabilising factor for Singapore's net capital flows is that residents tend to retrench their investments (from) abroad when global financial risks are elevated, offsetting the pullback of non-resident capital inflows from Singapore.

2. Regional economic growth and global financial risk factors have become increasingly important drivers of Singapore's capital flows in the post-GFC period.

The GFC led to significant changes in the nature, and thus possibly drivers, of Singapore's capital flows. As backdrop, for instance, AE banks retrenched from lending to the region, even as monetary policy in AEs turned ultra-accommodative.

Segmenting the full sample into the period before and after the GFC shows that Singapore's capital flows are increasingly being driven by regional growth factors.

- Before 2007, economic developments in AEs (United States, European Union, Japan, United Kingdom) were the primary external drivers of Singapore's capital flows. However, this relationship has largely diminished in the post-GFC period, with the estimated coefficients turning statistically insignificant (Tables A.4 and A.5).
- In contrast, Singapore's capital flows have become more strongly correlated with Asia's GDP growth post-crisis. This is consistent with the literature which finds that increased economic and financial integration in Asia since the GFC has led to greater co-movement in capital flows in the region (IMF (2014)).
    - This pattern applies in both directions: inflows to Singapore now respond more strongly to regional growth, whilst outward investment by residents has become positively associated with strong growth in Asia and China, probably reflecting Singapore's role as financial intermediary for regional capital flows.

A decomposition of R^2 analysis also shows that the influence of AEs on inflows and outflows as defined in this paper have shrunk substantially post-GFC (Graphs 3.A and 3.B). This result echoes a more general analysis of recent trends in Asian capital flows,[8] which showed that the impact of global factors on capital flows to leading Asian emerging markets has diminished since the GFC. At the same time, the impact of the global financial cycle on interest rates and other key financial variables remains substantial.

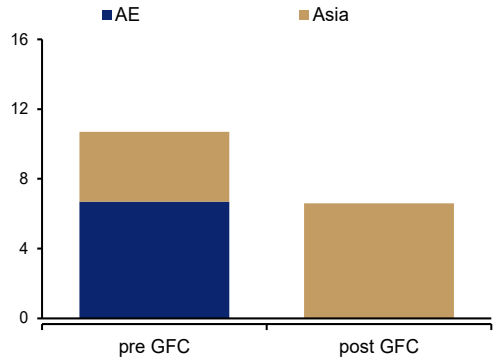
[8] See the special feature on "Asian Capital Flows and the Global Financial Cycle" in the 2024 MAS Financial Stability Report.

Decomposition of R^2, pre- and post- GFC

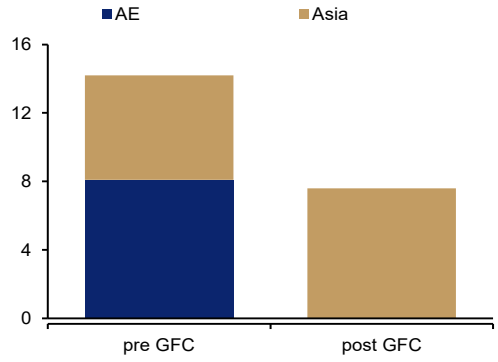
Percentage point contribution

Graph 3

A. Gross outflows



B. Gross inflows



Sources: EPG; MAS estimates.

In addition, in the post-GFC period, the coefficients on the global financial risk variable for both inflows and outflows turned negative and statistically significant, compared to the pre-GFC years where they were statistically insignificant or positive (Tables A.4 and A.5). Higher global financial risk (risk-off periods) is thus associated with reduced capital inflows and outflows, whilst lower global financial risk (risk-on periods) corresponds to increased capital flows in both directions.

Thus, the regressions suggest that domestic and international investors have become more sensitive to changes in global financial conditions since the GFC.[9] During risk-off periods, resident investors scale back on their overseas investments, resulting in a decline in capital outflows. The larger pullback in portfolio investment outflows after the crisis reflects resident investors' increased sensitivity to global risk factors, as well as Singapore banks' expanded regional intermediation role via portfolio investments following the reduced presence of global banks in the region after the GFC (MAS (2017)). Meanwhile, the decline in other investment outflows (cross-border loans, deposits) is consistent with a flight-to-safety response where resident investors increasingly view Singapore as a secure base during turbulent times.

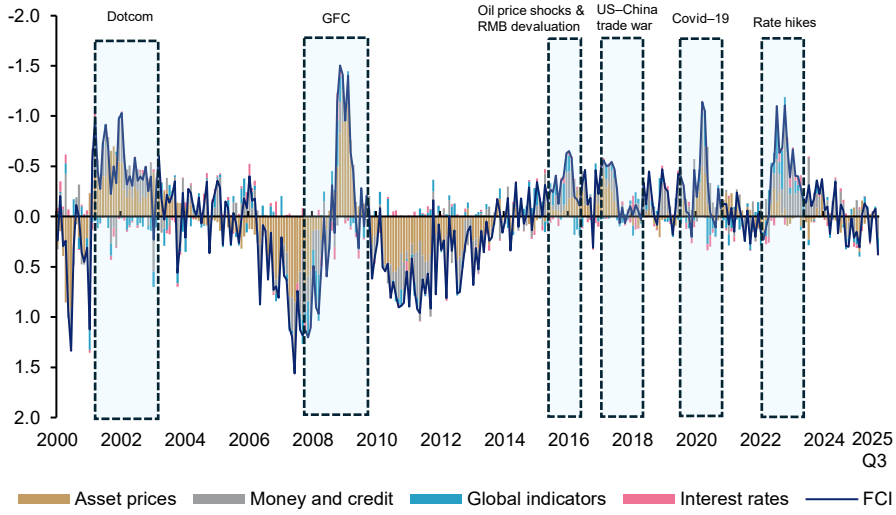
[9] This contrasts with Avdjiev et al (2020), who document reduced sensitivity of cross-border lending to global risk in the post-GFC period across both advanced and emerging market economies. The divergence may stem from differences in risk measurement approaches. Following Engel and Wu (2024), this note employs a corporate bond spread-based risk index, whereas the established literature predominantly utilises the VIX. Substituting the VIX into our specifications for Singapore yields statistically insignificant coefficients, suggesting that risk proxy choice may materially affect estimated relationships.

Capital flows and domestic financial conditions

Global push factors and capital flows can influence domestic financial conditions in Singapore through various channels. For instance, increased demand by non-resident investors for Singapore dollar bank deposits can generate appreciation pressures on the Singapore dollar, while non-resident investors' search for yield could also raise domestic asset prices and depress bond yields. Graph 4 presents a decomposition of MAS' Financial Conditions Index (FCI) into domestic asset prices, credit and money growth, interest rates and global indicators.[10] It shows that cycles of tightening and loosening in Singapore's FCI have been strongly coincident with global shocks such as the GFC, commodity price crashes and trade wars. These affect global and regional growth prospects, sentiment and risk-taking, and consequently domestic financial conditions which have implications for Singapore's output gap and inflation prospects. All else equal, MAS' monetary policy may lean against the impact of shifts in financial conditions, insofar as they induce aggregate demand conditions that may compromise domestic price stability.

Components of MAS' FCI

Graph 4



Sources: EPG; MAS estimates.

Conclusion

In line with a growing literature, Singapore's capital movements primarily reflect global and regional "push" factors such as global risk sentiment and Asia's growth prospects. Singapore's capital flows have become more sensitive to global financial conditions since the GFC. However, as resident investors tend to offset the actions of

[10] See MAS (2024), "Special feature 2: expanding the toolkit for macroprudential surveillance" for a discussion on how the FCI is constructed.

non-resident investors in Singapore, Singapore's net financial flows are relatively stable, even during times of global financial turmoil. Nonetheless, openness to capital flows also means that global factors are a significant driver of domestic financial conditions and thus domestic growth and price stability.

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Appendix

Singapore Department of Statistics definitions of asset classes under capital flows

Table A.1

Asset classes	Definitions	Components
Direct investments	Cross-border investment where a direct investor, residing in one economy, owns 10% or more of the ordinary shares or voting power in an enterprise residing in another country	• Equity and investment fund shares • Debt instruments (differs from securities in that it includes company reserves and net intercompany lending)
Portfolio investments	Cross-border investments by an investor in one economy into an enterprise that is resident in another economy with less influence than that of a direct investment relationship	• Equity and investment fund shares • Debt securities
Financial derivatives	A financial instrument that is linked to another specific financial instrument or indicator or commodity and through which specific financial risks (such as interest rate risk, foreign exchange risk, equity and commodity price risks, credit risk, etc) can be traded in their own right in financial markets. Treated separately from the values of any underlying items to which they are linked	
Others	Other investment is a residual category that includes positions and transactions other than those included in direct investment, portfolio investment, financial derivatives and reserve assets	• Trade credits and advances • Loans • Currency and deposits • Insurance technical reserves • Special drawing rights • Other accounts payables

Standard deviation of the ratio of Singapore's capital flows to GDP

In percentage points

Table A.2

	Total	Direct	Portfolio	Financial derivatives	Others
Net financial account	11.37	8.47	13.62	4.25	18.91
Changes in liabilities (inflows)	60.29	9.69	4.68	6.83	83.78
Changes in assets (outflows)	56.71	5.95	14.43	6.76	52.80

Description of data definitions and sources

Table A.3

Variable	Definition	Frequency	Coverage	Source
Capital flows				
		Net capital flows		
Net capital flows	Net balance between financial assets and liabilities. Computed as assets minus liabilities Transformed as the ratio of capital flows to nominal GDP Can be further broken down into portfolio, direct, other investments and financial derivatives	Quarterly	Q1 1986 to Q1 2024	Singapore Department of Statistics (DOS)
Assets and liabilities	Net acquisition of assets and net incurrence of liabilities Transformed as the ratio of capital flows to nominal GDP Can be further broken down into portfolio (bank and non-bank), direct, other investments (bank and non-bank) and financial derivatives	Quarterly	Q1 1995 to Q1 2024 Financial derivatives: Q1 2006 to Q1 2024	DOS
Pull variables				
SG real GDP	Real gross domestic product by expenditure in terms of 2015 Singapore dollars	Quarterly	Q1 1975 to Q1 2024	DOS
SG inflation	Year-on-year inflation rate for each quarter	Quarterly	Q2 1990 to Q1 2024	DOS
SG industrial production	Quarterly year-on-year percentage change in industrial production level	Quarterly	Q1 1984 to Q1 2024	DOS
SG unemployment	Unemployment rate	Quarterly	Q1 1992 to Q1 2024	DOS
SG trade balance	Nominal trade balance Constructed as the net balance between exports and imports	Quarterly	Q1 1986 to Q1 2024	DOS
SG SIBOR/SORA	Before 2015: Singapore Interbank Offered Rate (SIBOR) 2015 onwards: Singapore Overnight Rate Average (SORA)	Quarterly	Q3 1987 to Q2 2024	MAS
Push variables				
Real GDP growth Asia ex China	Average year-on-year GDP growth rate of Asian economies: Indonesia, Korea, Philippines, Chinese Taipei and Thailand	Quarterly	Q1 1994 to Q1 2024	Haver Analytics
Real GDP growth China	Year-on-year GDP growth rate of China	Quarterly	Q1 1992 to Q1 2024	Haver Analytics
Real GDP growth G3+UK	Average year-on-year growth rate of core real GDP: EU, Japan, UK, US	Quarterly	Q1 1986 to Q1 2024	Haver Analytics
US trade balance	Nominal trade balance	Quarterly	Q1 1992 to Q1 2024	Haver Analytics
Two-year bond yield US	US two-year treasury bond yield	Quarterly	Q1 1986 to Q1 2024	Federal Reserve Economic Data (FRED)
Dollar index	Tracks the performance of a basket of leading global currencies versus the US dollar. The index represents both developed and emerging market currencies that have the highest liquidity	Quarterly, mean of monthly figures	Q1 1990 to Q1 2024	Bloomberg

	in the currency markets and the biggest trade flows with the US			
Leo Krippner SSR	Leo Krippner shadow short rate of the US monetary policy rate Monthly data aggregated as quarterly mean	Quarterly, mean of monthly figures	Q1 1995 to Q2 2024	LJK Macro Finance Analysis
Global financial risk	The first principal component from five risk measures: Gilchrist and Zakrajšek (2012) spreads, Moody's Aaa and Baa corporate bond minus federal funds rate spreads and Moody's Aaa and Baa corporate bond minus 10-year Treasury	Quarterly	Q1 1973 to Q1 2024	Engel and Wu (2024)
USDSGD spot rate	Singapore dollar per US dollar	Quarterly, mean of monthly figures	Q1 1999 to Q1 2024	London Stock Exchange Group (LSEG)

Regression results for changes in assets (outflows) before and after the GFC

Table A.4

	Before GFC (1995–2006)						After GFC (2007–24)					
Dependent variable	Total	Direct invest.	Portfolio bank	Portfolio non-bank	Other bank	Other non-bank	Total outflows	Direct invest.	Portfolio bank	Portfolio non-bank	Other bank	Other non-bank
Pull factors:												
Real interest rate SG	7.936	0.263	0.407	–0.317	8.002	–0.769	0.025	0.009	–0.487	0.484	0.462	–1.027
	(8.961)	(0.641)	(1.291)	(0.347)	(8.849)	(1.407)	(4.248)	(0.448)	(1.280)	(0.604)	(4.036)	(0.790)
Macro PCA SG	4.009	–0.605	1.744*	–0.861**	4.752	–1.095	–7.754*	–0.163	–0.698	–0.291	–7.001	0.703
	(7.278)	(0.777)	(0.994)	(0.363)	(8.149)	(1.710)	(4.186)	(0.342)	(1.568)	(0.657)	(4.322)	(1.083)
Push factors:												
Real GDP growth G3+UK	38.808**	1.483	6.166***	–0.734	32.450	–0.061	–0.198	–0.188	0.253	–0.378	0.790	–0.167
	(18.799)	(1.366)	(2.220)	(0.737)	(21.107)	(3.972)	(2.260)	(0.192)	(0.663)	(0.442)	(2.342)	(0.580)
Real GDP growth Asia ex China	–8.040	–0.100	–0.129	0.431**	–7.458	–0.742	9.486*	0.479	–0.542	1.008	7.163	–0.119
	(6.162)	(0.280)	(0.549)	(0.169)	(6.014)	(0.678)	(5.245)	(0.413)	(1.296)	(0.918)	(5.722)	(1.261)
Real GDP growth China	–0.025	0.196	–1.416	0.482	–0.140	0.212	4.903*	0.629***	1.100*	0.525	2.488	0.883**
	(10.410)	(0.638)	(1.547)	(0.401)	(11.185)	(1.629)	(2.488)	(0.229)	(0.626)	(0.330)	(2.609)	(0.366)
Inflation US	–17.724	8.549**	6.448	1.712	–20.700	–15.953*	1.500	0.262	–4.642*	–2.851*	6.493	–1.453
	(30.736)	(4.094)	(4.848)	(1.976)	(32.709)	(8.133)	(9.515)	(0.840)	(2.350)	(1.591)	(10.081)	(1.436)
Real interest rate US	–17.723	3.747	2.338	4.200**	–24.594	–5.097	–1.677	0.859	–4.983**	–2.047*	2.793	–1.113
	(19.732)	(2.479)	(3.673)	(1.642)	(22.714)	(5.275)	(6.200)	(0.620)	(2.007)	(1.200)	(6.310)	(1.235)
Trade/GDP cyclical US	133.601	28.555**	41.534*	10.738	81.893	–24.635	63.221	16.513**	63.140**	–13.268	–1.622	28.533*
	(111.233)	(12.331)	(21.105)	(6.356)	(120.037)	(25.726)	(82.917)	(7.730)	(23.753)	(12.216)	(90.302)	(16.419)
Two-year bond yield US	6.575	–6.731**	–5.049	–3.315	17.189	6.549	–1.217	–2.076*	6.852**	1.672	–5.700	1.007
	(23.124)	(3.081)	(4.396)	(1.968)	(25.852)	(6.459)	(12.246)	(1.239)	(3.291)	(1.923)	(13.062)	(2.331)
USD growth	4.898	0.606***	0.344	–0.075	3.626	0.392	–1.467	–0.088	–0.340	–0.015	–1.237	0.589*
	(3.052)	(0.164)	(0.276)	(0.098)	(2.967)	(0.469)	(1.637)	(0.140)	(0.489)	(0.307)	(1.681)	(0.340)
Financial risk indicator	3.677	–0.167	1.959	2.249***	–0.377	–0.014	–12.637**	–1.723***	–3.937*	–2.143**	–4.252	–2.595*
	(10.326)	(1.079)	(2.231)	(0.546)	(12.573)	(2.270)	(5.864)	(0.473)	(2.143)	(0.858)	(5.042)	(1.311)
Change in USDSGD spot rate	–11.178	–0.720***	–1.672***	0.184	–8.470	–0.502	2.720	0.542**	0.843	0.656	1.679	–0.717
	(7.910)	(0.249)	(0.467)	(0.147)	(7.488)	(0.683)	(2.740)	(0.254)	(0.800)	(0.474)	(2.808)	(0.606)
Constant	25.143	9.269	9.391	3.228	–19.774	26.005	–23.981	13.702***	–8.454	2.169	–30.891	–2.537

	(136.965)	(9.634)	(19.907)	(7.909)	(147.144)	(22.578)	(23.920)	(2.717)	(7.986)	(4.054)	(25.247)	(6.167)
Observations	48	48	48	48	48	48	69	69	69	69	69	69
R^2	0.289	0.417	0.526	0.650	0.186	0.205	0.400	0.427	0.342	0.347	0.231	0.267

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Regression results for changes in liabilities (inflows) before and after the GFC

Table A.5

	Before GFC (1995–2006)						After GFC (2007–24)					
Dependent variable	Total	Direct invest.	Portfolio bank	Portfolio non-bank	Other bank	Other non-bank	Total outflows	Direct invest.	Portfolio bank	Portfolio non-bank	Other bank	Other non-bank
Pull factors:												
Real interest rate SG	4.115	0.275	0.115	0.037	3.361	0.193	–1.615	0.891*	–0.378	0.482	–2.087	–0.526
	(9.850)	(1.323)	(0.227)	(0.225)	(9.180)	(1.326)	(4.320)	(0.478)	(0.293)	(0.412)	(4.167)	(0.935)
Macro PCA SG	3.261	–0.174	0.166	–0.298	1.703	1.830	–6.458	0.717	–0.243	0.603	–6.743	–0.045
	(7.957)	(1.811)	(0.215)	(0.211)	(8.134)	(1.469)	(4.415)	(0.562)	(0.213)	(0.393)	(4.369)	(0.839)
Push factors:												
Real GDP growth G3+UK	38.222*	2.896	0.167	–1.080**	34.438*	2.022	–1.129	–0.238	0.001	–0.497*	0.431	–0.002
	(19.812)	(3.118)	(0.371)	(0.511)	(18.230)	(2.821)	(2.353)	(0.309)	(0.237)	(0.257)	(2.323)	(0.626)
Real GDP growth Asia ex China	–7.047	–1.162	–0.098	–0.103	–4.927	–0.742	10.041*	1.054	0.374	0.570	6.193	–0.217
	(6.692)	(1.460)	(0.076)	(0.092)	(7.398)	(0.440)	(5.603)	(0.725)	(0.380)	(0.435)	(5.118)	(1.146)
Real GDP growth China	–1.163	0.797	0.089	0.397	–3.550	0.841	4.613*	–0.258	–0.057	0.448*	4.398*	0.625
	(10.949)	(1.610)	(0.415)	(0.286)	(12.222)	(2.171)	(2.478)	(0.238)	(0.134)	(0.227)	(2.349)	(0.446)
Inflation US	–8.739	0.021	1.179	1.970*	–2.833	–9.947*	5.682	1.016	0.092	0.060	–0.585	3.110
	(34.466)	(7.319)	(0.802)	(1.016)	(34.280)	(5.156)	(9.989)	(1.003)	(0.656)	(0.951)	(9.109)	(1.862)
Real interest rate US	–12.340	–0.238	0.229	2.426***	–12.723	–2.721	1.382	–0.562	–0.268	0.013	–2.856	3.722**
	(22.747)	(5.422)	(0.620)	(0.773)	(22.572)	(3.351)	(6.377)	(0.814)	(0.545)	(0.874)	(6.224)	(1.396)
Trade/GDP cyclical US	178.399	1.231	4.179	–3.429	194.249	–16.075	82.736	14.064	6.641*	2.499	69.632	27.951*
	(118.701)	(23.874)	(2.750)	(3.912)	(119.998)	(17.187)	(83.590)	(9.613)	(3.929)	(7.147)	(80.980)	(14.175)
Two-year bond yield US	–1.132	–2.078	–0.795	–4.050***	1.772	4.870	–8.239	–0.377	0.361	0.060	1.378	–8.673***
	(25.711)	(6.645)	(0.795)	(0.925)	(26.064)	(4.235)	(12.669)	(1.581)	(0.905)	(1.604)	(11.791)	(2.738)
USD growth	4.838	0.527	0.036	0.188***	4.124	–0.044	–1.606	0.036	–0.164	0.148	–1.632	0.319
	(3.273)	(0.381)	(0.052)	(0.061)	(3.235)	(0.278)	(1.645)	(0.190)	(0.121)	(0.167)	(1.545)	(0.350)
Financial risk indicator	–0.657	–0.324	–0.143	–0.694**	–2.065	2.567	-15.266***	–3.065***	–0.197	–1.223***	–9.721	–2.383**
	(10.982)	(2.123)	(0.431)	(0.319)	(12.111)	(2.058)	(5.432)	(0.759)	(0.266)	(0.437)	(5.922)	(0.946)
Change in USDSGD spot rate	–11.399	–0.908	–0.074	–0.176*	–10.275	0.034	2.471	0.186	0.379*	0.096	2.527	–0.825
	(8.386)	(0.842)	(0.093)	(0.088)	(8.554)	(0.486)	(2.838)	(0.351)	(0.219)	(0.279)	(2.678)	(0.570)

Constant	39.909	16.700	0.141	11.002***	12.508	0.640	–10.877	22.858***	–1.592	–2.451	–41.793*	15.258***
	(144.734)	(21.294)	(5.652)	(3.773)	(156.796)	(28.193)	(24.518)	(4.192)	(1.766)	(3.305)	(23.160)	(5.586)
Observations	48	48	48	48	48	48	69	69	69	69	69	69
R^2	0.277	0.145	0.209	0.664	0.243	0.242	0.426	0.611	0.156	0.302	0.321	0.228

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Capital flows, exchange rates and financial conditions in emerging market economies in an evolving international monetary system

South African Reserve Bank

Abstract

South Africa's financial landscape has been shaped by shifts in the global financial environment – including the rise of non-bank financial institutions (NBFIs) – that introduce new channels of market volatility and sensitivity. The increased adoption of digital assets globally – including cryptoassets and, more importantly, stablecoins – poses additional challenges for exchange rate management and capital flow oversight.

South Africa's net international investment position (NIIP) has improved due to increased foreign assets holdings by private sector investors and valuation gains. However, it remains vulnerable to global risk sentiment and currency volatility. In South Africa, portfolio flows dominate capital flows, amplifying exposure to external shocks.

Policy responses by the South African Reserve Bank (SARB) have focused on strengthening macroprudential frameworks and enhancing regulatory oversight, particularly in the context of digital assets and cross-border transactions. During the Covid-19 pandemic, for example, South Africa combined liquidity support and targeted interventions to restore normal market functioning, especially in markets considered critical for monetary policy transmission. As the international monetary system evolves, South Africa's experience highlights the need for flexible, coordinated policies to safeguard financial stability, adapt to new risks and foster sustainable growth in an increasingly interconnected global environment.

Emerging market economies' exposure to global financial conditions and gross capital flows

Structural shifts in the global financial system

Structural shifts towards market-based intermediation,[1] particularly the expansion of non-bank financial institutions (NBFIs), have increased the share of emerging market economies' (EMEs') external balance sheets held in market-valued portfolio instruments. NBFIs dominate global portfolio intermediation and adjust their positions in response to changes in global financial conditions. As a result, their

[1] Market-based intermediation refers to a financial system where funding and investment flow predominantly through capital markets – via securities (bonds, equities, derivatives) – rather than through bank balance sheets. It means that NBFIs – such as mutual funds, pension funds, insurers, hedge funds, exchange-traded funds (ETFs), private credit funds and money market funds – play the central role in mobilising savings and allocating capital via traded financial instruments, not via loans or deposits.

behaviour directly influences the valuation and composition of EMEs' NIIPs through equity and bond price movements, benchmark-driven reallocations and liquidity-sensitive flows.

The transmission of global shocks thus increasingly operates through the portfolio components of the NIIP, even when underlying current account positions are stable. This matters because portfolio investments (both assets and liabilities) is the NIIP category most sensitive to global asset prices, exchange rate movements, index-weight changes and shifts in risk sentiment. All of these are channels through which NBFIs transmit global financial conditions.

Since the Great Financial Crisis (GFC), the rise of NBFI-driven, market-priced intermediation has increased the valuation share of NIIP changes and the cyclicality of gross flows in EMEs. NBFIs now account for just over half of global financial assets – approximately 51% of the total and the equivalent of approximately 230.6% of global gross domestic product (GDP). NBFIs are overtaking banks as dominant intermediaries in global portfolio investment.[2]

In EMEs, the NBFI sector accounts for roughly one quarter of financial assets, compared with nearly one half globally. South Africa stands out within the EME group, with NBFIs accounting for approximately 49% of total financial sector assets at the end of 2023, equivalent to 183% of GDP.[3] This elevated share of NBFIs implies that a greater proportion of South Africa's external balance sheet is intermediated through market-valued portfolio instruments.

Another key structural shift is the move of credit flows away from private sector lending towards sovereign debt, with NBFIs playing an increasingly central role in global and EME bond markets. The *Global Debt Report 2025* of the Organisation for Economic Co-operation and Development notes that sovereign debt issuance surged during and after Covid-19, resulting in a cumulative increase of roughly 150% in outstanding government bonds between 2009 and 2024.[4] As NBFIs' holdings of sovereign debt have grown, the external exposure of EMEs has become more sensitive to global financial cycles. This presents some financial stability and systemic risks, especially in economies that rely on market-priced, foreign-held government bonds.

The impact of global shifts on South Africa's external position and net international investment position

Since the GFC, South Africa's NIIP has been highly sensitive to global shocks. Episodes like the GFC, Taper Tantrum and Covid-19 triggered sharp portfolio outflows, especially in the equity market, causing NIIP volatility.

[2] Financial Stability Board, *Global monitoring report on non-bank financial intermediation 2024*, December, www.fsb.org/2024/12/global-monitoring-report-on-non-bank-financial-intermediation-2024/.

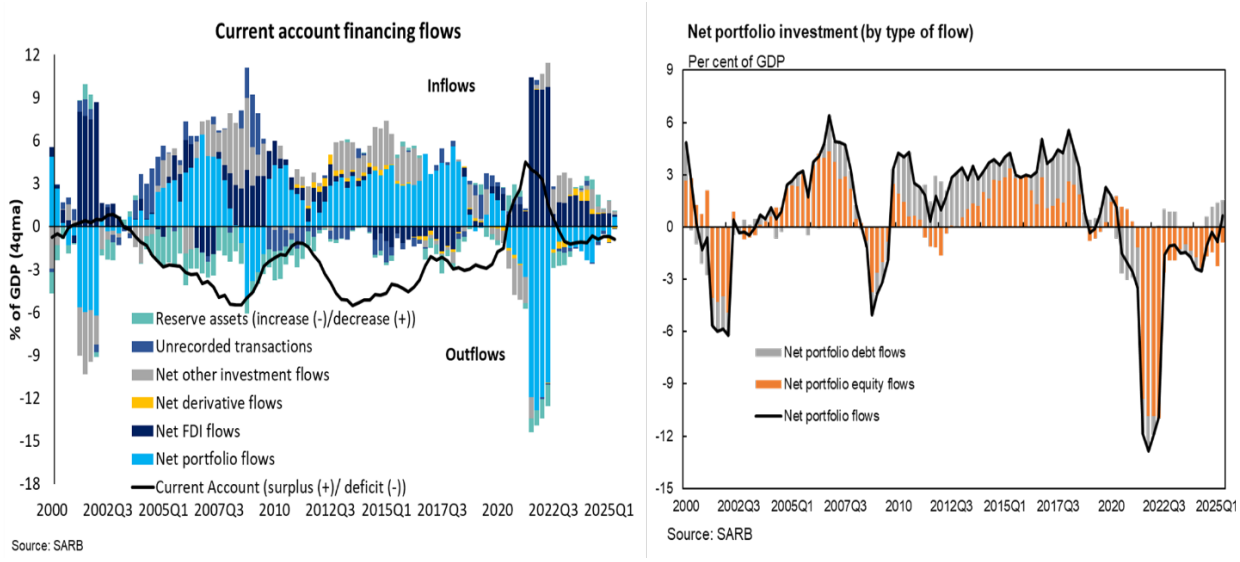
[3] FSB, *Global monitoring report*

[4] Organisation for Economic Co-operation and Development, *Global debt report 2025*, March, www.oecd.org/en/publications/global-debt-report-2025_8ee42b13-en.html.

Structural shifts, including deeper global integration and the expansion of NBFIs, have contributed to a marked improvement in the NIIP, which has moved into a positive position, despite a structural current account deficit financed by persistent net inflows. The year 2015 marked South Africa's first positive NIIP since the inception of this statistic in 1956.[5] This was driven by private sector foreign asset accumulation and valuation gains, which provide an important cushion against external shocks. Despite recent resilience, however, the NIIP remains sensitive to global risk sentiment, valuation changes and currency movements.

More recently, South Africa's positive NIIP increased from a revised ZAR[6] 2.264 billion in December 2024 to ZAR 2.475 billion in March 2025, driven mainly by higher market values of direct and portfolio investment assets, particularly dual-listed entities with foreign headquarters. Overall, outward investment rose 1.6%, from ZAR 9 371 billion to ZAR 9.516 billion over the same period.[7]

Linkages between the transactions and financial account — Graph 1



Graph 1 shows South Africa's structural transition from pre-GFC reliance on volatile, portfolio-financed current account deficits to a more resilient external position supported by sustained outward investment and valuation gains. This evolution reflects both global structural shifts (especially the dominance of NBFIs) and domestic changes in the composition of external assets and liabilities. When South African firms and pension funds invest abroad, the flow shows up as outflows

[5] P Swart and M Qubeka, *Note on South Africa's international investment position*, September 2018, South African Reserve Bank, www.resbank.co.za/content/dam/sarb/publications/quarterly-bulletins/articles-and-notes/2018/8783/03Note-on-South-Africa-s-international-investment-position.pdf.

[6] ZAR is an official currency abbreviation for the South Africa Rand.

[7] South African Reserve Bank, Quarterly Bulletin, September 2025, www.resbank.co.za/content/dam/sarb/publications/quarterly-bulletins/quarterly-bulletin-publications/2025/september/01Full%20Quarterly%20Bulletin.pdf.

in the financial account; but the stock effect is an increase in foreign assets, which is positive for South Africa's net wealth.

Gross capital flows and vulnerability

Gross capital flows in South Africa have grown with financial openness and portfolio investment. These remain highly sensitive to global liquidity and risk sentiment, as seen during Covid-19 and policy tightening cycles.

Portfolio flows, particularly in local-currency government bonds, remain the dominant component of gross capital flows in South Africa, with sharp outflows observed during global shocks (e.g. Covid-19). Episodes of global risk aversion have triggered sharp outflows, however, highlighting the procyclicality of capital movements in EMEs.

Periods of dollar weakness[8] and strong commodity prices have supported outward investment from South Africa by improving corporate balance sheets while simultaneously amplifying valuation gains on existing foreign assets through higher global equity prices and favourable currency effects. These dynamics strengthen the NIIP even in the presence of persistent current account deficits. However, this procyclicality also underscores the dual nature of capital flows: they can deepen financial markets during benign global conditions but also rapidly transmit global shocks. This highlights the importance of robust macroprudential frameworks and adequate foreign exchange (FX) liquidity buffers.

Structural shifts present an increasingly high risk of capital flow and FX volatility for EMEs.[9] These shifts include the growing role of NBFIs and their interconnectedness with the financial system (including their role in cross-border flows, particularly to EMEs), as well as the rapid rise in sovereign debt since the GFC. High-frequency data from the Institution of International Finance show that EME portfolio-flow volatility has recently reached swings of $25–$40 billion within a single month,[10] while evidence from ODI Global shows that oil volatility shocks raise EME asset and FX correlation sharply through NBFI de-risking.[11]

[8] When South Africa holds large outward assets (eg dual-listed firms, pension funds' offshore portfolios), two valuations work in its favour. First, USD weakness implies higher global asset prices. Second, commodity boom strengthens balance sheets of South African firms and supports dual-listed valuations. In turn, firms with strong balance sheets increase their accumulation of foreign assets that later appreciate. These developments are all positive for NIIP, because higher foreign asset values improve the asset side of NIIP (outward investment increases foreign-income receipts). Thus, the structural improvements in the NIIP between 2015 and 2025 is partly due to dollar depreciation cycles, global commodity booms, rising foreign equity valuations and increased outward asset holdings.

[9] FSB, *Global monitoring report*

[10] Institution of International Finance, *Capital flows tracker*, www.iif.com/Products/Capital-Flows-Tracker.

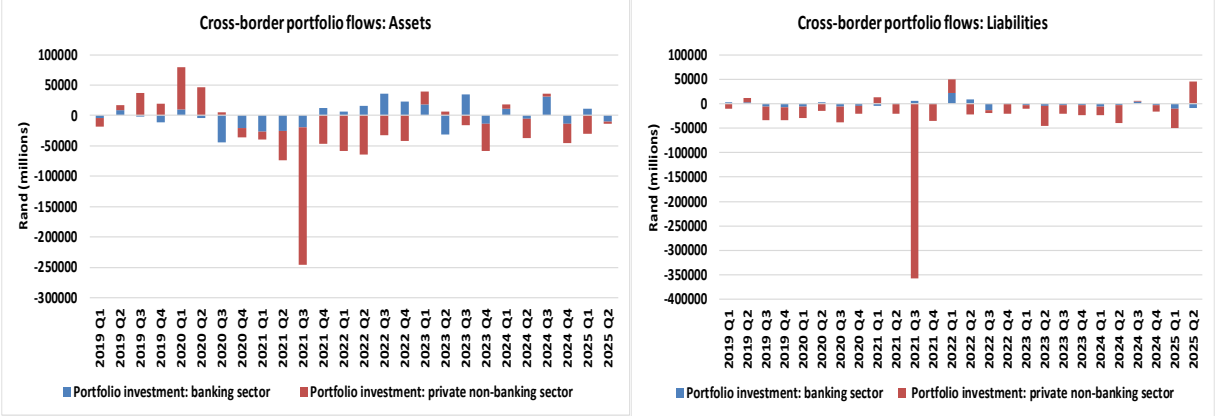
[11] P Papadavid, "How oil price volatility has scope to reshape EMDE capital flows," *This Week in Macroeconomics*, 22 January 2026, ODI Global, odi.org/en/insights/how-oil-price-volatility-has-scope-to-reshape-emde-capital-flows/.

The changing investor base: the rise of non-bank financial institutions

How the investor mix and the shift towards NBFIs have affected the dynamics of capital flows

Graph 2 shows that NBFIs dominate South Africa's cross-border portfolio flows. Between the first quarter of 2019 and the second quarter of 2025, NBFIs consistently drove larger swings than banks – peaking at outflows of about ZAR 250 billion in assets and ZAR 300 billion in liabilities during the 2021 Covid-19 sell-off, versus banks' flows mostly within ±ZAR 20 billion.

Cross-border portfolio flows of private non-banking sector versus banking sector Graph 2



Recent quarters (2025 Q2) reflect renewed inflows of roughly ZAR 55–60 billion on liabilities and smaller asset outflows (between ZAR 20 billion and 30 billion), again led by NBFIs. This shift to market-based intermediation heightens sensitivity to global risk sentiment and valuation shocks, making NIIP more vulnerable to sudden stops despite recent valuation gains and outward asset accumulation.

How South Africa aims to mitigate risks

South Africa has introduced several policy reforms, including adopting a new Capital Flow Management Framework (2020) and harmonising prudential limits for institutional investors.

The Capital Flow Management Framework is designed to reduce administrative barriers for legitimate cross-border transactions while laying the groundwork to strengthen future efforts to detect and disrupt illicit financial flows. Under this approach, all cross-border transactions are permitted except those subject to capital flow management measures or identified as posing a high risk of illegitimate activity. More robust measures will be introduced to detect, deter and disrupt illegitimate cross-border financial flows, while new capital flow management regulations will be drafted to effect this framework. Efforts are also underway to enhance policy

coordination among government, regulators, law enforcement and market participants with the aim of improving the frameworks' effectiveness.

Harmonisation of prudential limits for institutional investors was achieved through increasing the offshore investment limits to 45% of total retail assets under management, which now include African assets (previously capped at 10% on top of the preceding worldwide limit). In this way, the historical segregated approach has been removed, providing institutional investors greater flexibility for portfolio diversification.[12]

Resident institutional investors have acted as a stabilising force in South Africa during periods of volatility, as they typically repatriate funds, limiting the depth and length of stress periods. The banking sector has also acted as a stabilising force, with domestic banks increasing their share of local currency debt during times of crisis. However, this support has its own limitations, including the sovereign-bank nexus. Despite these stabilising factors, global risk conditions and US dollar dynamics remain influential.

Exchange rate dynamics and financial conditions

Patterns in exchange rate movements during the COVID-19 pandemic

The rand is highly sensitive to global risk appetite, interest rate differentials and commodity prices. Non-residents have typically held a large share of local-currency government bonds, at one point exceeding 40%. This is due in part to the country being included in the World Government Bond Index (WGBI). This, together with the fact that South Africa has deep and liquid foreign exchange and bond markets, means that investors use South Africa as a proxy for emerging markets. These factors exacerbate the impact on South Africa's financial markets during times of global stress, as non-resident investors have tended to offload these holdings. Portfolio flows and exchange rates often move together.[13]

During the Covid-19 pandemic, EME currencies, including the rand, experienced sharp depreciation as global uncertainty spiked. The rand depreciated by about 12% during 2020, averaging ZAR 16.44 against USD, and depreciated to over ZAR 19.00 against USD at the height of the crisis. The rand exchange rate subsequently recovered as global conditions stabilised. As the country also suffered a downgrade in the sovereign credit rating, non-resident investors sold local-currency bonds; and due to the significant impact on the bond market, the SARB stepped in to manage the dysfunction. Together with a subsequent softening in the US dollar, markets stabilised.

Rand volatility began moderating much earlier, following the sharp spikes during the Covid-19 period, and it continued to trend lower through 2023 and 2024, reaching a record low implied volatility of 8.76% against the US dollar in October 2025.[14] This

[12] South African Reserve Bank, *Financial Stability Review*, November 2025.

[13] K Miyajima and H Tong "Rand volatility: Does it matter?" IMF, 2020, www.elibrary.imf.org/downloadpdf/view/journals/002/2020/034/article-A001-en.pdf.

[14] FX-implied volatility for emerging markets has eased from an annualised rate of 7.28% to 5.61%, and that for advanced economies from 8.75% to 7.01% (SARB, *Financial Stability Review*, 2025).

sustained decline aligns with a broader trend observed across other EMEs, supported by improved global risk sentiment and stronger domestic fundamentals. In South Africa, factors such as the exit from the Financial Action Task Force (FATF) grey list, a sovereign rating upgrade and an improved fiscal position reinforced this downward trajectory. This was further bolstered by the adoption of the lower 3% inflation target, which strengthened monetary policy credibility, anchored inflation expectations and contributed to improved investor confidence and lower external financing costs.

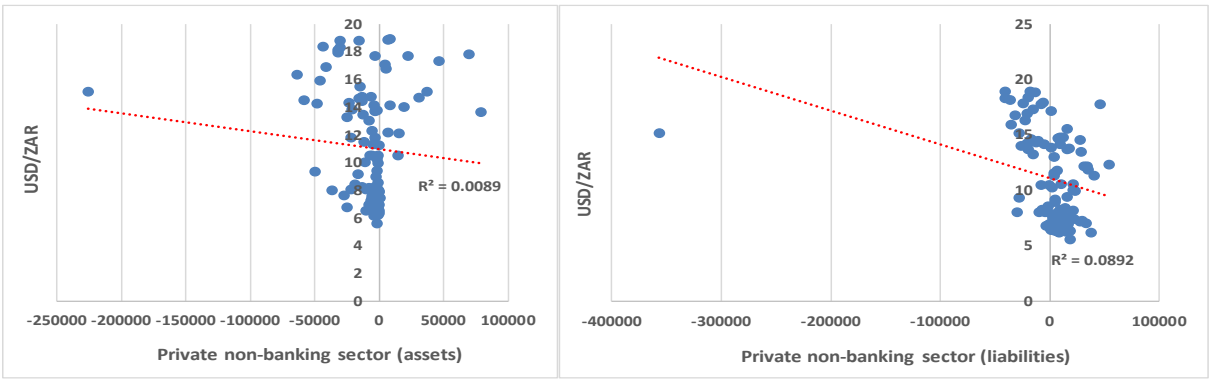
How do capital flows correlate with economic activity and inflation?

Interest rate differentials have been a key driver of both capital flows and currency strength. South Africa's relatively high real yields historically attracted yield-seeking investors, supporting carry trade dynamics. However, as global monetary conditions tightened, this advantage diminished because higher yields in other EMEs pulled capital away.

Positive real yields should continue to underpin investor interest.[15] Capital flows in South Africa tend to be strongly procyclical, posing persistent challenges for monetary policy and financial stability. Despite this, inflation has been generally aligned with the target and financial stability has been maintained. The system has been resilient to capital flow volatility (Graph 3).

Correlation between the NBFI portfolio cross-border and USD/ZAR exchange rate

Graph 3



NBFI = non-bank financial institution.

Source: South African Reserve Bank database and staff calculations.

The role of cryptoassets

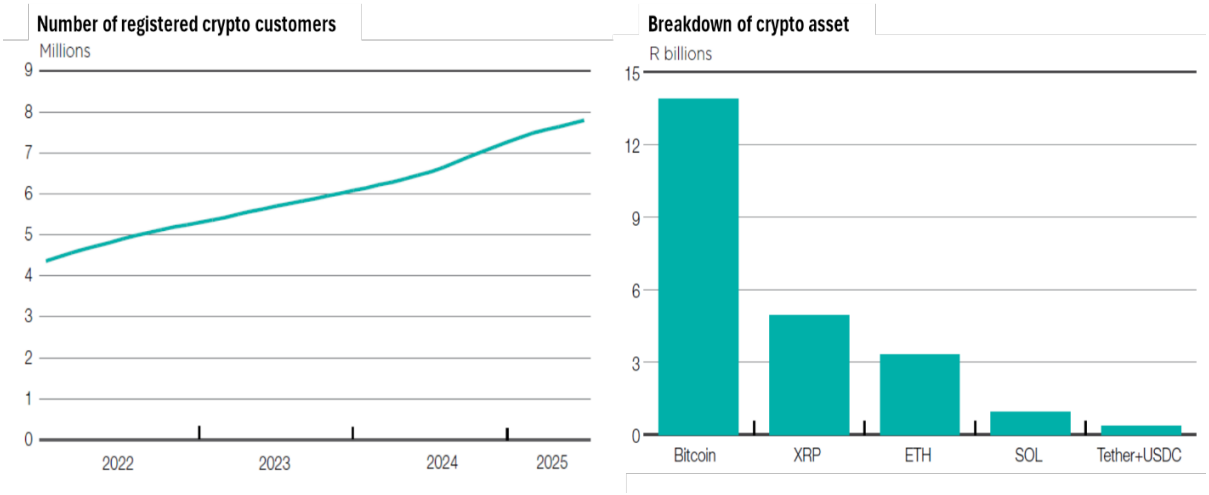
South Africa has seen rapid crypto adoption, with an estimated 7.8 million users reached by July 2025. Stablecoin trading volumes have also surged, from ZAR 4 billion

[15] South African Reserve Bank, *Monetary Policy Review,* October 2025

in 2022 to ZAR 80 billion by October 2025 (Graph 4). This complicates exchange rate management and capital flow oversight in EMEs by enabling cross-border transactions that bypass existing controls and heighten volatility. To address this, the SARB is working with the National Treasury to regulate cross-border crypto flows and to update exchange controls.

Cryptoasset adoption in South Africa

Graph 4



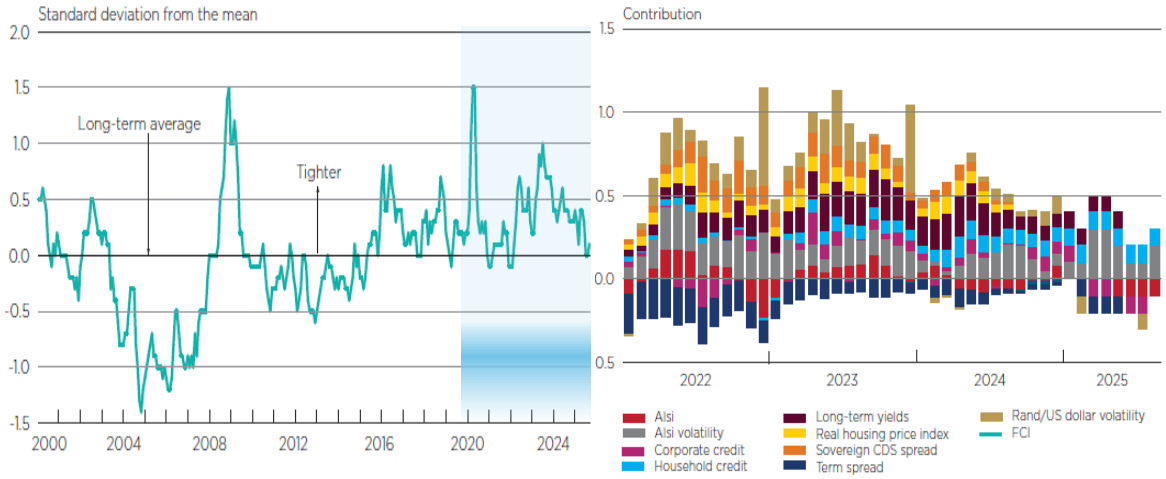
Source: South African Reserve Bank, *Financial Stability Review*, November 2025.

Financial conditions and the dynamic of capital flows and the foreign exchange rate

Impact of dynamics of capital flows and US dollar exchange rates on domestic financial conditions

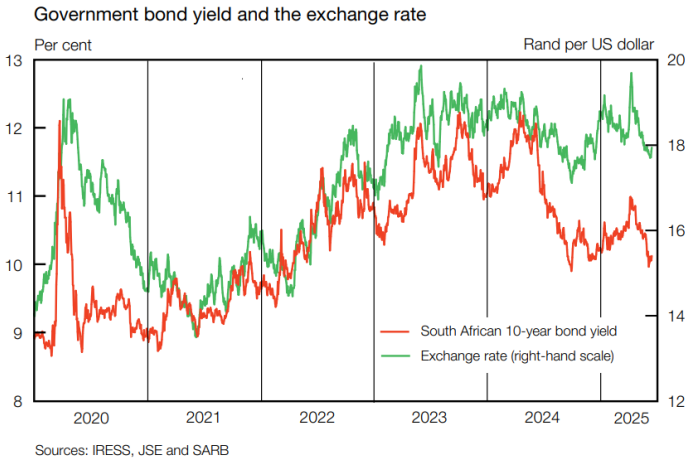
South Africa's financial conditions are influenced mainly by the exchange rate, interest rates, credit extension and the equity market. The South African Reserve Bank's (SARB's) Financial Conditions Index (FCI), which combines these factors, shows that domestic financial conditions have eased steadily, converging towards the long-term average of around zero in June 2025 for the first time since late 2021. Rising equity prices, lower long-term bond yields and increased growth in corporate credit have been the primary drivers of the recent improvement in the FCI (Graph 5).

South African Reserve Bank's Financial Conditions Index (FCI) and contributions Graph 5



As observed in 2025, through the exchange rate channel, periods of US dollar weakness and rand appreciation ease inflationary pressures, enabling more accommodative monetary policy (Graph 6).[16] These lowers borrowing costs directly and supports credit availability, loosening financial conditions. By contrast, rand depreciation raises imported inflation, which influences monetary policy decisions. Exchange rate volatility could also affect unhedged corporate balance sheets with foreign currency liabilities rising, amplifying credit risk and widening spreads.[17]

South African Government bond yield and the exchange rate Graph 6



16 IMF, *Global financial Stability Report. The Last Mile – Financial Vulnerabilities and Risks*, April 2024 https://www.imf.org/-/media/files/publications/gfsr/2024/april/english/text.pdf

17 South African Reserve Bank *Financial Stability Review*, Second Edition 2025; https://www.resbank.co.za/content/dam/sarb/publications/reviews/finstab-review/2025/second-edition/Second%20Edition%202025%20Financial%20Stability%20Review.pdf

Foreign demand for domestic bonds and equities further shapes financial conditions through its influence on bond yields and the exchange rate. For example, during the first quarter of 2025, the yield on 10-year rand-denominated government bonds rose by 77 basis points (bp) – from 10.22% on 29 January to 10.99% on 7 April. This reflected heightened risk perception linked to political uncertainty surrounding the 2025 National Budget and global trade tensions. These developments underscore how external factors amplify domestic vulnerabilities and tighten financial conditions.

More recently, conditions have eased. By 26 November 2025, the yield on South Africa's 10-year government bond declined to around 8.58%, down from levels around 10% earlier in the year. This improvement was driven partially by the SARB's cumulative policy rate cuts (of 50 bp) to 6.75%, sustained rand appreciation amid broad-based dollar weakness, renewed foreign portfolio inflows and fiscal consolidation measures announced in the October 2025 Medium-Term Budget Policy Statement.

Changing patterns over time

The composition and drivers of capital flows have evolved markedly over the past two decades.[18]

- **Prior to the GFC era**: Cross-border bank lending and foreign currency debt dominated external financing, making domestic conditions highly sensitive to exchange rate shocks. Before the GFC, non-residents tended to favour equities, but they moved towards greater holdings of sovereign debt after the GFC owing to the favourable interest rate environment. This was a global phenomenon.
- **After the GFC era**: A shift towards portfolio-driven inflows occurred, particularly in the debt market. This was facilitated by South Africa's inclusion in major bond indices and the global search for yield and loose fiscal policy.
- **Recent trends**: Heightened sensitivity to global risk sentiment and US dollar cycles now dominates,[19] with portfolio flows more strongly correlated with external factors than with local policy rates[20] – notwithstanding the influence of local developments on record bond inflows lately.

Foreign holdings of South African local-currency government bonds remain depressed, at about 25.7% of total outstanding issuance. This is broadly in line with the low levels observed since the sharp decline in non-resident participation that

[18] Committee on the Global Financial System, "Changing patterns of capital flows", *Bank for International Settlements CGFS Papers*, no 66, May 2021, www.bis.org/publ/cgfs66.pdf.

[19] International Monetary Fund, *Global financial stability report: Shifting ground beneath the calm*, October 2025, www.imf.org/en/-/media/files/publications/gfsr/2025/october/english/text.pdf.

[20] P Scaramozzino, "Capital flows and economic performance in South Africa", *South African Reserve Bank Working Papers*, no WP/25/18, November 2025, http://www.resbank.co.za/content/dam/sarb/publications/working-papers/2025/capital-flows-and-economic-performance-in-south-africa.pdf.

began in 2018. However, the outlook has improved significantly following South Africa's removal from the FATF grey list and a sovereign credit rating upgrade at the end of 2025.

These milestones signal progress in strengthening financial integrity and macroeconomic stability. While domestic financial institutions continue to absorb a large share of sovereign debt, banks' exposure to government securities has risen to roughly 16%–17% of total assets in 2025, up from under 10% in 2015. Exposure has been increasing for over a decade, driven by banks' subdued appetite for private sector risks in a weak macroeconomic environment, greater banking sector liquidity and government debt issuance and capital optimisation strategies.[21]

Important financial indicators in determining domestic financial conditions

Three variables consistently emerge as the most influential in determining domestic financial conditions: (i) the exchange rate (as discussed above), (ii) interest rates and (iii) credit spreads (discussed below). These indicators operate through distinct transmission channels, reflecting the economy's high degree of financial openness and vulnerability to external shocks.

The policy rate directly affects funding costs, lending rates and credit conditions. SARB data show strong pass-through to deposit and lending rates, but global liquidity and risk appetite have recently reduced the impact of interest rate changes on capital flows and asset prices.[22]

The SARB tracks credit extension to corporates and households and government bond yields and other indicators in its FCI to monitor systemic risk and assess how evolving domestic financial conditions may influence macroeconomic stability.[23]

The effects of changing financial conditions on economic activity

In support of its macroprudential surveillance framework, the SARB uses the FCI to monitor systemic risk and assess domestic financial conditions, including the transmission of strong monetary policy changes to the domestic economy. The FCI is also a key communication and market signalling tool, and its publication in official reports enhances transparency and anchors expectations regarding the stance of financial conditions and potential policy responses.

Changes in financial conditions influence economic activity through several channels:[24]

[21] Fitch Ratings, "South African Banks' sovereign exposure continues to grow", *FitchWire*, 17 September 2025, www.fitchratings.com/research/banks/south-african-banks-sovereign-exposure-continues-to-grow-17-09-2025

[22] SARB, *Quarterly Bulletin*.

[23] SARB, *Financial Stability Review*.

[24] International Monetary Fund, "Appendix I: Channels of transmission of monetary policy", www.elibrary.imf.org/downloadpdf/display/book/9781589064386/back-1.pdf,

- **credit:** Wider credit spreads and higher lending rates constrain borrowing, dampening investment and household consumption.
- **asset prices:** Declines in equity prices reduce wealth and confidence, curbing spending.
- **exchange rate**. A depreciation increases import prices and inflationary pressures, tightens real financial conditions, and can weigh on domestic demand despite supporting net exports.
- **risk appetite:** Elevated volatility or widening spreads often lead to deleveraging and reduced capital inflows, impacting liquidity and growth prospects.

Empirical evidence suggests that sustained tightening of financial conditions typically leads to slower GDP growth, weaker investment and heightened financial stress. In contrast, easing conditions support credit expansion and economic recovery.[25] However, this could also result in a build-up of vulnerabilities through higher risk-taking and leverage.

The SARB does not react to short-term FCI fluctuations mechanically; rather, it integrates FCI signals into a broader discussion in the Financial Stability Committee.

The growing footprint of non-bank financial institutions in sovereign bond markets

The increasing presence of NBFI in sovereign bond markets, facilitated by FX swap markets,[26] has reshaped capital flow dynamics and amplified the sensitivity of EMEs to global financial conditions. Heavy reliance on FX swaps for currency hedging exposes investors to rising dollar funding costs and liquidity shortages, which quickly translate into higher hedging premia and pressure on local markets.

South Africa's experience during the March 2020 "dash for cash" illustrates this amplification channel**.** Non-resident sales of South African Government Bonds exceeded ZAR 70 billion in a short period. This was driven by a confluence of factors, including flight to safety among global investors; South Africa's credit rating downgrade to sub-investment grade across all major rating agencies; and the resulting passive index rebalancing, which followed from the country's exclusion from the WGBI.

Within this broader context, NBFIs' leverage positions and their reliance on FX-swap-based hedging likely contributed to the speed and the intensity of the sell-off. This is consistent with international evidence on NBFI deleveraging during periods of market stress. Such dynamics can accelerate capital flow reversals and make domestic yields and credit spreads more sensitive to global shocks.[27] Because NBFIs typically

[25] IMF, "Appendix I". https://www.elibrary.imf.org/downloadpdf/display/book/9781589064386/back-1.pdf

[26] Bank for International Settlements (2023), *BIS Quarterly Review*, December. https://www.bis.org/publ/qtrpdf/r_qt2312.pdf

[27] Financial Stability Board, *Holistic review of the March market turmoil*, November 2020, : www.fsb.org/uploads/P171120-2.pdf.

operate with higher leverage and lighter liquidity buffers than banks, their repositioning can accelerate capital flow reversals during periods of global stress. It can also make domestic bond yields and credit spreads more sensitive to global financial conditions and shifts in global risk sentiment.

The impact on domestic financial conditions and the real economy is significant. Sudden shifts in global risk sentiment translate into sharp moves in local bond yields, raising borrowing costs for governments and corporates. Liquidity strains and deleveraging by NBFIs reduce credit availability for households and firms, while macroeconomic spillovers weaken investment and consumption, slow GDP growth and heighten exchange rate volatility, feeding inflationary pressures.

For South Africa, the growing footprint of NBFIs is particularly relevant given the depth of the domestic sovereign bond market and the significant use of FX swaps for currency hedging by non-resident investors. The SARB monitors these exposures closely as part of its macroprudential surveillance framework.

The SARB's policy response emphasises maintaining robust FX liquidity backstops, enhancing transparency in derivative position and strengthening coordination with global regulators to mitigate systemic risks.[28] These measures aim to preserve financial stability while ensuring that domestic monetary policy retains traction in an environment of heightened global interconnectedness.

Implications for monetary policy in emerging market economies

Impact of new dynamics of EME capital flows and exchange rates on monetary policy decisions

Changing capital flows and exchange rates have important implications for South Africa's monetary policy. Because its financial markets are highly integrated with global markets, South Africa is exposed to global risks such as US policy shifts, commodity cycles and investor sentiment.[29]

These external shocks often transmit rapidly through capital flows and the rand's volatility.[30] Episodes of global liquidity expansion have historically attracted large portfolio inflows into South African bond and equity markets, leading to rand appreciation and asset price inflation. Conversely, abrupt reversals, such as during global tightening cycles, have triggered sharp currency depreciation and amplified inflationary pressures.

While the exchange rate is generally viewed as a shock absorber, empirical evidence suggests that exchange rate pass-through to domestic prices remains material in EMEs. This is particularly the case during periods of heightened uncertainty

[28] South African Reserve Bank, Macroprudential Policy Framework (2024). https://www.resbank.co.za/en/home/what-we-do/financial-stability/macroprudential-policy

[29] BIS (2022): "Macro-financial stability frameworks and external financial conditions". https://www.bis.org/publ/othp53.pdf

[30] South African Reserve Bank, *Monetary Policy Review*, October 2022.

or when inflation expectations are weakly anchored.[31] In South Africa's case, exchange rate pass-through is lower.

Are financial condition indices useful for monetary policy communication when they move in the opposite direction to changes in policy rates?

FCIs capture broader market sentiment beyond short-term rates and provide critical insight into the effectiveness of monetary transmission and help calibrate communication strategies. The SARB explicitly references the FCI in its monetary policy communication.

Use of policy mix to support monetary policy and achieve FX stability in market stress periods

During recent stress periods, the SARB deployed a mix of conventional and unconventional measures.

- **Pandemic response (2020):** The SARB reduced the policy rate by 300 bp, introduced regulatory relief measures and provided liquidity support through repo operations and purchases of government bonds. South Africa also introduced funding for lending schemes: a government-guaranteed initiative to provide loans to businesses in support of their operational expenditures.
- **Global tightening (2021–22):** The SARB began a gradual but firm hiking cycle to stabilise inflation. While capital flow pressures persisted, the SARB relied on transparent communication and the maintenance of adequate FX buffers.
- **Uncertainty in 2025:** Several EMEs introduced central bank asset purchase programmes focused on local-currency sovereign bonds to restore market functioning, alongside enhanced FX swap lines and reserve buffers. The SARB emphasised macroprudential resilience through stress-testing and enhanced disclosure of FX exposures.

For South Africa, the experiences above underscore the importance of transparent communication and a strong macroprudential framework to navigate global volatility without compromising financial stability. Across emerging markets, policy mixes have generally been effective in cushioning shocks, preserving financial stability and monetary policy traction.

Consistent with the SARB's non-interventionist approach to the foreign exchange market, the pandemic-response measures were designed solely to restore the functioning of markets integral to the transmission of monetary and financial stability policies. Their purpose was not to influence the exchange rate or bond yields, but to

[31] J Aron, J Muellbauer and B Smit: "Exchange Rate Pass-through to Import Prices, and Monetary Policy in South Africa", South African reserve Bank (2012). https://www.resbank.co.za/content/dam/sarb/publications/working-papers/2012/5152/WP1208.pdf

ensure that liquidity stresses did not impair policy implementation. Any observed FX stabilisation was a by-product of restored market functioning. This guidance is outlined in the *Financial Stability Review* (2nd ed, 2025), which highlights that while unconventional measures can restore market functioning during stress episodes, they must be carefully calibrated to avoid undermining monetary policy credibility and market discipline.

Adjustment of policies in the face of a changing role of the US dollar in the international monetary system

The SARB holds the greater portion of its foreign exchange reserves in US dollars. However, it acknowledges the risks of concentration and the benefits of diversification as global central banks reduce dollar holdings.[32] The reserves management policy of the SARB aims to maintain adequate reserves for self-insurance and reduce external vulnerability. Policy recommendations include:

- enhancing regulatory oversight of digital assets and cross-border payment systems
- integrating crypto exposures into macroprudential and stress-testing frameworks
- strengthening international cooperation to address regulatory and supervisory challenges posed by digital assets

On-chain analysis confirms that since 1 January 2019, the top 10 domestically hosted Bitcoin wallets have processed almost ZAR 63 billion in outwards volume. Should more wallets be tracked and other popular cryptoassets (eg ETH and XRP) be added, the number is likely to be much higher (Table 1). There is currently no evidence that these developments are affecting domestic macroeconomic variables.

Annual value externalised by the top 10 Bitcoin wallets hosted by South African cryptoasset trading platforms

Table 1

Year	Annual value (ZAR)
2019	4.58 billion
2020	12.39 billion
2021	11.05 billion
2022	12.59 billion
2023	8.61 billion
2024	6.60 billion
2025 (year to 9 October 2025)	6.90 billion
Total	**62.75 billion**

Source: Silver Sixpence, South African Reserve Bank, *Financial Stability Review*, 2nd ed, 2025.

[32] S Jacobs, "South Africa's US dollar dilemma", *Daily Investor*, 30 June 2025, dailyinvestor.com/finance/91587/south-africas-us-dollar-dilemma/.

Conclusion

South Africa's experience demonstrates the importance of adaptable and coordinated policy responses in a rapidly evolving global financial environment. Managing capital flows, exchange rate dynamics and financial conditions requires robust institutions, proactive regulation and a flexible mix of monetary, fiscal and macroprudential tools. As global risks and digital innovations reshape financial markets, ongoing vigilance and policy innovation will be essential to safeguard stability and support sustainable growth for South Africa and other EMEs.

Capital flows, exchange rates and financial conditions in emerging market economies in an evolving international monetary system

Bank of Thailand

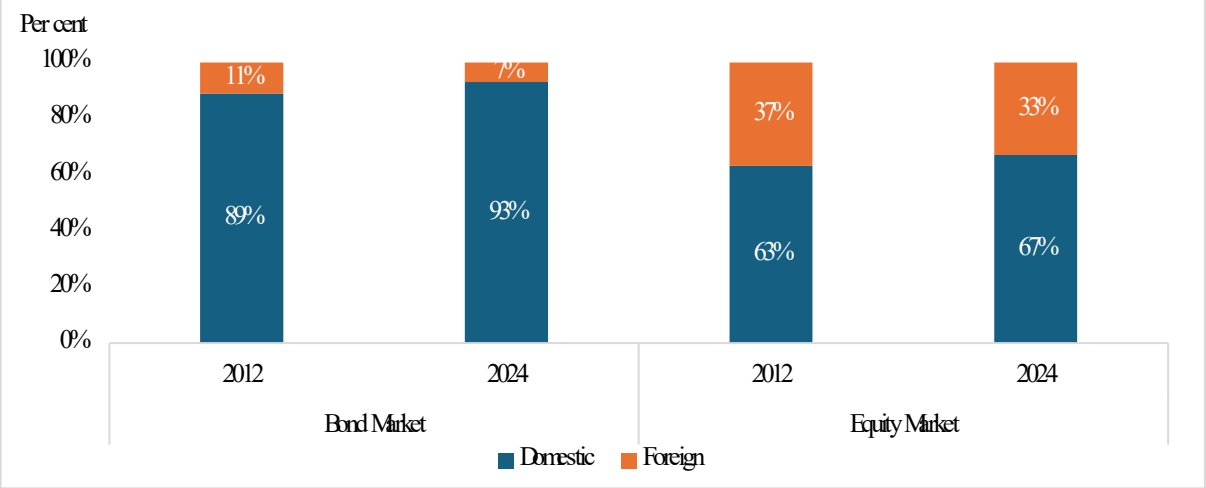
Thailand's exposure to global financial conditions is different from that of other emerging market economies

Many emerging market economies (EMEs) are exposed to global shocks mainly through foreign portfolio investments or dollar-denominated debt. In contrast, Thailand's exposure is largely through the outward portfolio investment of domestic investors. The spillovers of global shocks to foreign portfolio flows, which subsequently influence domestic financial conditions, are limited in the case of Thailand. This is because low levels and declining trends of foreign investors' participation in local capital markets – currently around 7% in the bond market and 33% in the equity market – limit the country's exposure to external factors (Graph 1).

Moreover, the external debt of Thailand is relatively small, roughly around 5% of total debt, softening the transmission of global shocks to domestic financial conditions. In contrast, outward portfolio flows by domestic investors, especially foreign investment funds (FIFs), have rapidly increased over time and roughly tripled since 2014 (Graph 2). Also, the composition of investing assets has shifted from debt securities to equities, resulting in a rise of foreign equity portion to overall residents' portfolio outflows.

Foreign investor holding in Thai bond and equity markets

Graph 1

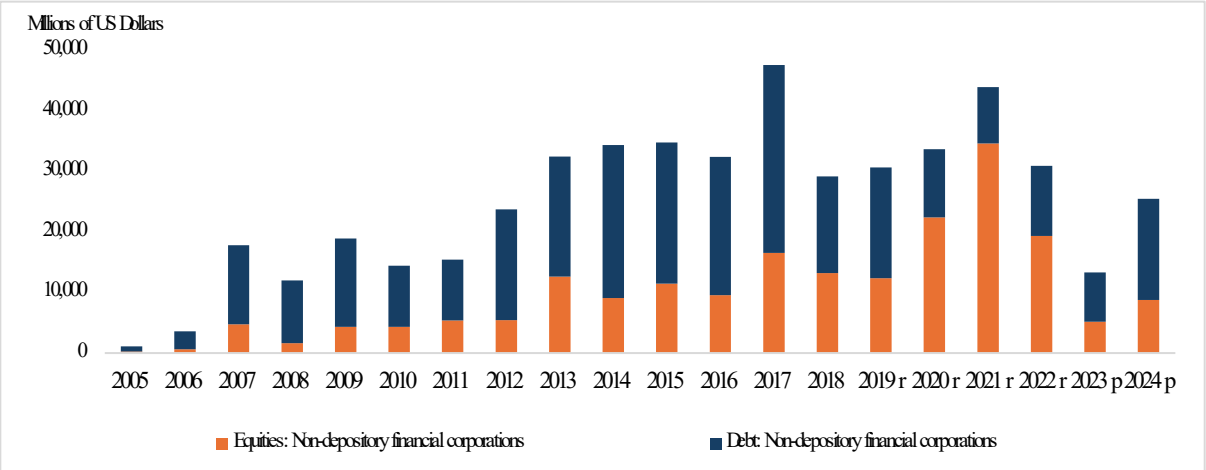


Data as of 2024.

Sources: Bank of Thailand; Stock Exchange of Thailand.

Thailand's resident outflows by asset class

Graph 2



"Non-depository financial corporations" comprises securities companies, insurance companies, mutual funds, holding companies and other non-depository financial corporations – both state-owned and private.

Source: Bank of Thailand.

Regarding **trends in Thailand's capital flows and implications**, outward resident capital flows have increased while non-resident capital inflows have declined. Rising returns of global investments, especially in the US equity markets, and more relaxed regulations on outward portfolio investment have strengthened the push towards foreign markets. In the meantime, domestic structural economic challenges have reduced the attractiveness of local investment. These challenges include low productivity and sluggish investment and innovations, which lead to underperformance of Thai assets. As a result, foreign portfolio investments have declined, while domestic investors tend to invest abroad. **Therefore, Thailand's capital flows have been exposed to global shocks mainly through local investors investing abroad.**

Regarding the **dynamics of short-term capital flows and implications**, domestic financial conditions are influenced through exchange rate movements. The impact on other financial variables, such as domestic yields and stock prices, are marginal because of the low foreign participation in the domestic capital market, as mentioned above.

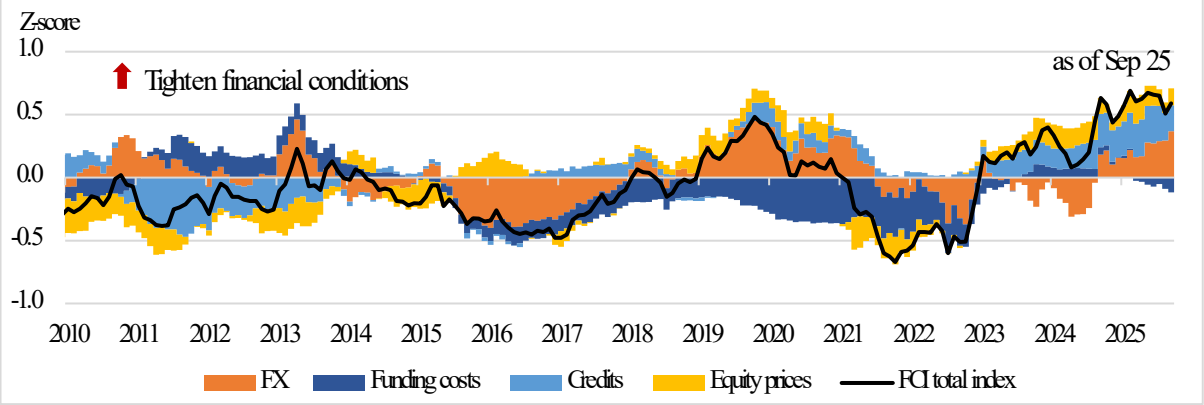
Meanwhile, the increase in FIFs tends to amplify short-term movements of the baht due to hedging dynamics. Most Thai investors are currency home-biased, where the hedging ratio is substantially high in both bond and equity investments. Hedging activities by FIFs occasionally increase the volatility of the baht and exert additional pressure on the currency. For instance, when the value of assets under management rises, as occurs with increasing global equities prices, fund managers increase currency hedging to maintain the hedging ratio. This feedback loop is currently more pronounced because of the dollar-weakening trend.

Financial conditions in Thailand have recently tightened, creating a challenging environment for the economy.

The Bank of Thailand (BOT) has constructed a **financial conditions index (FCI)**, which consists of four major components: (i) funding costs, such as interest rates and bond yields; (ii) credits intermediated by financial institutions; (iii) equity market indicators; and (iv) exchange rates. Each component has distinct characteristics in shaping domestic financial conditions, and their dynamics can be influenced by both internal and external factors (Graph 3). Lending rates and credit supply are driven primarily by domestic factors, mainly determined by banks. Thai equity markets are influenced by both domestic and international factors. Yet, with the majority of participants being local investors, market dynamics are more strongly shaped by domestic economic events. Hence, the only component driven primarily by external factors is the exchange rates.

During 2025, the tightening in the FCI was largely driven by credit variables, especially bank lending. These developments in Thailand were attributed to the high credit risk of borrowers under the economic slowdown. This resulted in tighter bank lending. On top of that, the baht appreciation trend and falling equity prices exerted additional pressures on domestic financial conditions.

Thailand financial conditions index (FCI) Graph 3

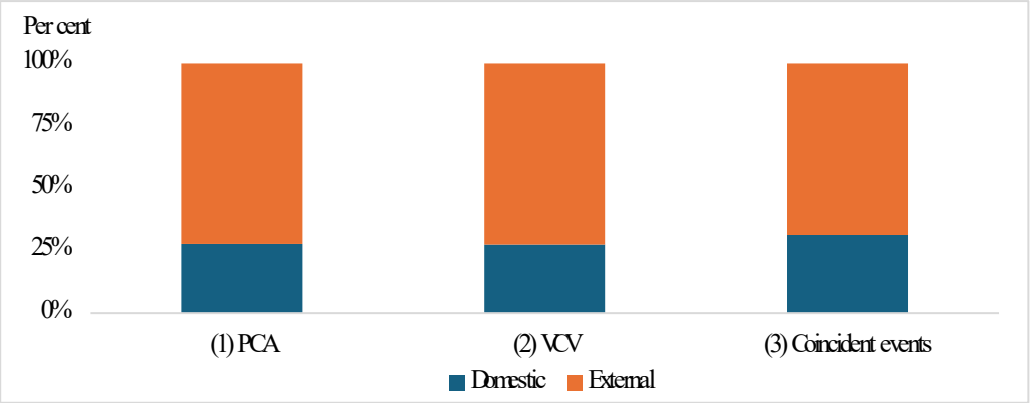


Source: Bank of Thailand.

Global factors impact Thai financial conditions mainly through the exchange rate. The baht is driven largely by global factors, which account for almost three quarters of baht movement (Graph 4). On top of that, the baht also faces a specific factor – ie the price of gold – that creates a tighter connection to global shocks. This is because of retail gold trading preferences. When gold prices increase, Thai people usually sell gold to make a profit, which leads gold dealers to sell gold offshore and sell US dollars simultaneously. This results in baht appreciation pressure during periods of increased gold prices and the opposite during declining periods (Graph 5). In addition, some foreign exchange (FX) traders exploit this correlation, which further amplifies currency movements (Table 1).

Contribution of domestic and external factors to baht movements

Graph 4

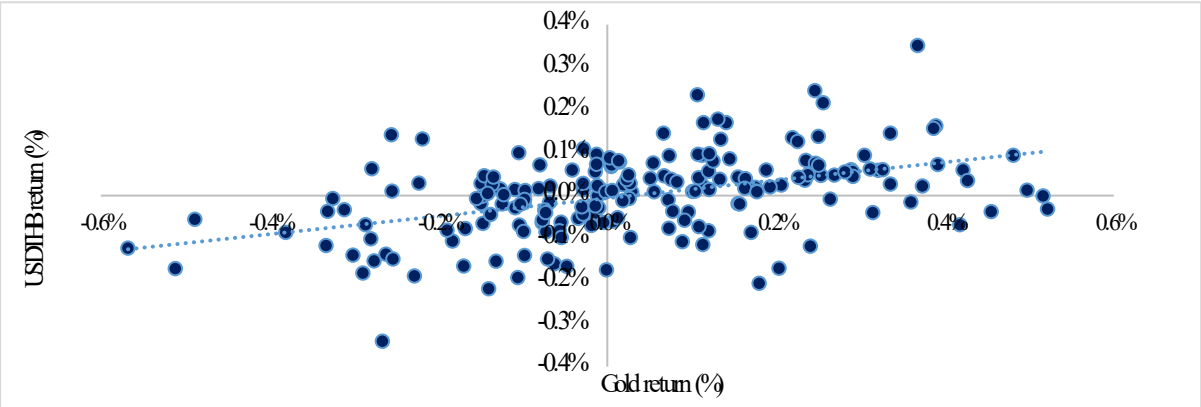


PCA is calculated from 9 currencies, with the first two factors being global factors. Variance Covariance (VCV) model is a function of variance, covariance of beta coefficients. Coefficient of determinants are derived from OLS regression DXY, Gold Purged, 2- and 10-year US-TH interest rate differential S&P index and SET Purged. The regression was conducted on a monthly basis using data from 2015M01–2025M05. Gold and SET Purged variables are the error term from equation dlog(gold) = f(dlog(DXY)) and dlog(SET) = f(dlog(VIX)). They represent the variation in gold and SET return that are not explained by global factors and global sentiment, respectively. Coincident events are defined as the share of days in which USD and THB exhibit co-movements, normalized by total trading days, using data during 2015M01–2025M05.

Source: Bank of Thailand.

Correlation of USDTHB and gold price

Graph 5



USDTHB and gold average monthly return, January 2010–November 2025.

Source: Bank of Thailand.

Average one-year rolling gold correlation of regional currencies Table 1

Year	THB	CNY	IDR	INR	KRW	MYR	PHP
2025	65%	29%	29%	20%	35%	15%	29%
2022 - 2024	46%	33%	27%	19%	29%	19%	18%

Correlation between daily return of USDTHB and gold price (as of 19 September 2025).

Source: Bank of Thailand.

Unlike in most EMEs, exchange rate appreciation in Thailand tightens domestic financial conditions because of the relatively smaller benefits of the financial channel

Baht appreciation tightens domestic financial conditions because gains from the financial channel do not offset the costs. For countries that have mainly dollar-denominated liabilities, currency appreciation should loosen financial conditions, as a smaller amount of local currency is used to repay obligations. However, Thailand's overall external debt remains relatively low; the positive effect is, therefore, marginal. In contrast, the costs of baht appreciation through a decline in dollar-denominated assets in terms of baht is relatively high because of an increase in outward portfolio investments. Although investors can temporarily avoid this by engaging in FX hedging, they will eventually face rollover risk.

The financial channel of the exchange rate thus amplifies the trade channel when the baht strengthens. Thailand is a net-exporting country with USD-invoiced export revenues. As a result, the appreciation of the baht reduces export revenue in baht terms (conversion effect) and also affects the country's price competitiveness (expenditure switching). Moreover, a sizeable proportion of small and medium enterprises are unhedged. As the appreciation of the baht weakens exporters' balance sheets, banks are likely to tighten lending policies, and this further exacerbates credit conditions for exporters. **Therefore, the financial channel does not counter but instead adversely amplifies the trade channel.**

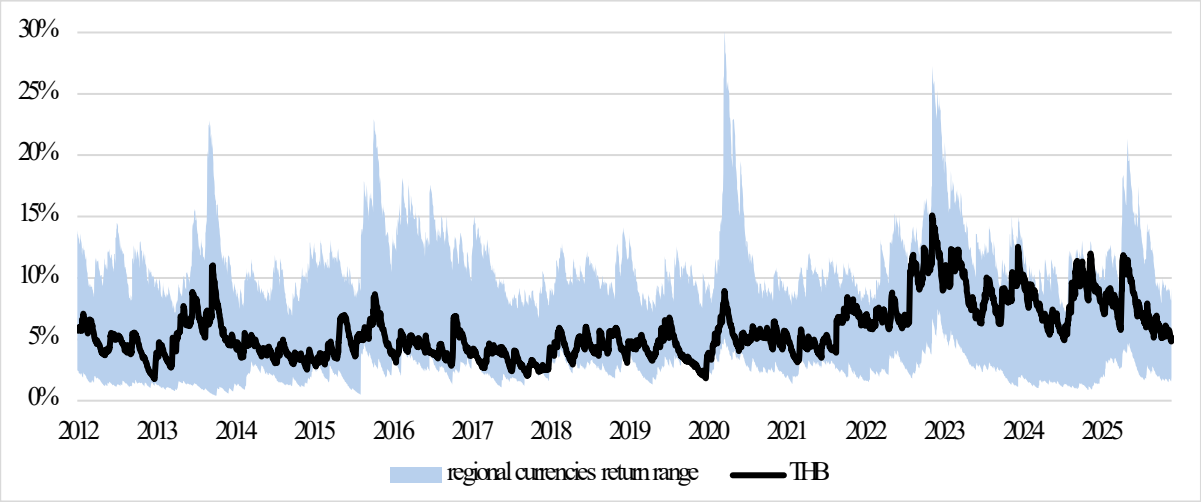
The Bank of Thailand acts as stabiliser in the face of external shocks.

The BOT uses FX intervention as a key instrument to curb excessive exchange rate volatility and mitigate the impact on domestic financial conditions. In tranquil periods, movements of the baht typically reflect underlying economic and financial fundamentals, particularly global factors. However, rises in global uncertainty and the growing footprint of FIFs increase the volatility of the baht and sometimes deteriorate FX market functioning (Graph 6).

The BOT thus conducts FX intervention when the baht exhibits pronounced volatility that signals market dysfunction or when the movements are materially inconsistent with economic fundamentals. The primary objectives of FX intervention are to help economic agents adjust and to ensure that the exchange rate continues to serve as a shock absorber. The action is not intended to counter the exchange rate movement, which reflects underlying fundamentals, or to benefit from an undervalued currency.

Thai and regional currencies' volatility

Graph 6



Data from 4 January 2012 to 25 September 2025; regional currencies include CNY, IDR, INR, KRW, MYR, PHP, SGD and TWD.

Source: Bank of Thailand.

However, some more targeted measures might be used to tackle specific sources of exchange rate volatilities. The baht has exhibited rapid appreciation in some periods as a result of specific factors. For example, in 2025, the baht's appreciation outpaced other regional currencies and signalled some deviations from its fundamentals partly because of gold price movements. The BOT therefore tightened guidelines and required commercial banks to strictly verify documents before processing FX transactions. These measures aim to strengthen oversight, mitigate the risks of potentially illicit financial activities and enhance exchange rate stability.

Moreover, the BOT supplies dollar liquidity as part of open market operations to a diverse set of market participants, including non-bank financial institutions, insurance companies and pension funds, and exporters. A key instrument the BOT uses to absorb surplus baht liquidity to maintain short-term interest rates at the policy rate is FX swaps. Swaps are conducted through an auction to onshore financial institutions, with tenors ranging from one month to one year. These routine FX swap operations partly alleviate the surge in hedging demand from FIFs and thus help limit impacts on exporter's hedging cost. Moreover, during crisis periods the BOT occasionally intervenes in dollar funding markets using these FX swap operations. This is because FIF hedging demand also declines during highly volatile episodes. **The BOT effectively acts as a stabiliser to the onshore dollar**

funding market through routine open market operations, ensuring smooth market functioning.

In conclusion, given Thailand's exposure to **declining non-resident capital inflows** relative to **increasing resident outflows** and given the configuration of US dollar-denominated exporter revenues with a relatively smaller role of dollar liabilities, a strong baht vis-à-vis the dollar tightens financial conditions via the **financial channel**. The BOT uses occasional **FX intervention** to preserve overall market functioning, together with **targeted tools** such as FX swaps to tackle specific issues of dollar liquidity. Finally, given that Thailand is a bank-based economy, with financial intermediation occurring through loans whereby banks raise funds from domestic savers, the **policy interest rate** is formulated based on the outlook and risks being primarily determined by domestic factors.

The unequal effects of global financial conditions on firms' expectations

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Abstract

This note investigates how global financial conditions shape firms' expectations and operating capacity in a small open emerging economy. Using monthly survey data for Turkish firms over 2009–24 matched with balance-sheet information on leverage and export intensity, we relate expectations about macroeconomic outlook, investment, sales, employment, export orders and capacity utilisation to the Chicago Fed's National Financial Conditions Index. We estimate firm-level panel regressions with rich fixed effects and controls and allow the impact of global financial tightening to vary with firms' external finance dependence and export intensity. We find that tighter global financial conditions systematically depress expectations across all dimensions. These effects are markedly stronger for highly leveraged and export-intensive firms; and they become less pronounced after 2020, when domestic inflation, exchange rate dynamics and the evolving policies increasingly dominate firms' expectation formation.

Keywords: Financial conditions, firm expectations, survey data

JEL classification: E12; E24; E52; G10

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[1] The views expressed herein are those of the authors and do not necessarily represent the official views of the Central Bank of the Republic of Türkiye.

Introduction

Financial market conditions have the potential to shape how shocks propagate through the economy and can influence aggregate economic output, as illustrated by the financial accelerator channel (Bernanke and Gertler (1989); Kiyotaki and Moore (1997); Bernanke et al (1998)). In line with the globalisation of the financial system, the financial accelerator channel has also been globalised. International financial conditions, which are significantly affected by the stance of advanced country monetary policies, are now identified as a key source of international spillovers to the real sector in open economies, especially emerging markets (Kalemli-Ozcan (2019); Miranda-Agrippino and Rey (2020); Arbatli-Saxegaard et al (2025)).

The literature suggests that spillovers of global financial conditions would depend on several factors, including potential domestic economic policy responses. Global financial conditions usually operate through three key channels, as argued in Kalemli-Özcan (2019). Two of these channels work through the balance-sheets of firms. In the first one, tighter global financial conditions have a negative impact on investment for the real sector in emerging market countries, in particular for firms that are more leveraged and more dependent on external finance. The second channel works through the exchange rate. Restrictive global financial conditions result in the depreciation of emerging market currencies against the US dollar, which has a negative effect on the real sector balance sheets, especially for firms with large foreign-currency liabilities. The third and last channel works through international trade; however, it has an ex ante ambiguous effect. Tighter financial conditions can lower international demand for imports from emerging markets. However, exchange rate depreciation in these countries might also have the potential to increase international demand for their exports.

The overall effect of these channels on real outcomes and firms' behaviour and expectations is an important empirical question, particularly for emerging markets. A large literature exists on the effects of global financial conditions and advanced country monetary policy shocks on other countries. A big part of this literature has been conducted with country-level data and usually focuses on financial market spillovers rather than real sector firms (Georgiadis (2016); Iacoviello and Navarro (2019); Albagli et al (2019); Gilchrist et al (2019)). In this context, the use of firm-level data is important for identifying the possibly heterogeneous effects of the transmission channels related to global financial conditions. Several studies, including Cloyne et al (2019) and Ottonello and Winberry (2020), examine the effects of domestic financial conditions and the monetary policy stance on real outcomes by using firm-level data. However, research on the heterogeneous effects of external financial conditions across firm characteristics in emerging markets remains limited, with the exceptions of Li et al (2020) and Arbatli-Saxegaard et al (2025).

This note contributes to the literature on financial conditions indices investigating how global financial conditions shape firms' expectations and operating capacities in small open emerging economies. We focus on Türkiye, an economy that is deeply integrated into global financial markets and characterised by episodes of high inflation, pronounced exchange rate movements and changing domestic policies. We use monthly survey data for Turkish manufacturing firms over 2009–24 from the Business Tendency Survey (BTS) of the Central Bank of the Republic of

Türkiye. Matching this data to administrative balance sheet information on leverage and export intensity, we relate expectations about the macroeconomic outlook, investment, sales, employment, export orders and capacity utilisation to Chicago Fed's National Financial Conditions Index (NFCI). Our empirical strategy is based on firm-level panel regressions with rich fixed effects and controls. In addition, we explicitly allow the impact of global financial tightening to vary with firms' external finance dependence, captured by leverage and export intensity.

Our contribution is threefold. First, we provide firm-level evidence from an emerging market on how global financial conditions affect expectations, not only realised outcomes. By combining the BTS with administrative balance-sheet data, we link changes in global financial conditions to a broad set of forward-looking firm indicators in a large high-frequency panel. Second, we document substantial heterogeneity: highly leveraged and export-oriented firms respond more strongly, consistent with financial accelerator and global financial cycle mechanisms. Third, we show that this transmission is state-dependent. The effects are clearly stronger before 2020 and more muted afterward, implying that the role of global financial conditions depends on the broader domestic macroeconomic and policy environment.

The remainder of the note is organised as follows. Section 2 describes the firm-level data and key co-movements with global risk indicators, capital flows and domestic activity. Section 3 outlines our empirical approach. Section 4 presents the effects of global financial conditions on firm expectations and capacity utilisation, including heterogeneous responses by leverage and export intensity. Section 5 discusses policy implications for small open economies. Section 6 concludes.

Firm-level data and the National Financial Conditions Index

Firm-level data

Our analysis combines survey data from the Central Bank of the Republic of Türkiye's BTS with rich administrative firm-level information. The BTS is a monthly panel covering roughly 1,800–2,200 manufacturing firms. It records firms' assessments of current business conditions, expectations and realised outcomes for key indicators, such as capacity utilisation, orders and inventories. Respondents report whether these indicators have improved, deteriorated or remained unchanged over the previous three months and state expectations for the subsequent three months. The BTS also collects numerical 12-month-ahead inflation expectations. By systematically tracking firms' views on operating conditions and production constraints, the BTS provides a timely barometer for the manufacturing sector.

We link the BTS data to firm-level administrative data from the Revenue Administration (RA) by using unique firm identifiers that are common to both sources and handled under strict confidentiality. The universe covers non-financial, private-sector firms: incorporated entities subject to the corporate income tax regime (eg joint-stock and limited liability companies) are legally required to file detailed financial statements, while unincorporated ("unlimited") entities under the personal income tax regime (eg sole proprietorships and partnerships) enter the dataset only when they surpass size-based reporting thresholds. The statements report balance-

sheet and income-statement items such as sales, input purchases, exports and leverage, which we use to construct measures of firms' real activity and financial positions. Matching the BTS data with these RA records yields a rich longitudinal dataset that allows us to relate time variation in the NFCI to firms' expectations in a consistent panel setting. To limit the influence of extreme observations, we winsorise all continuous variables at the 1st and 99th percentiles.

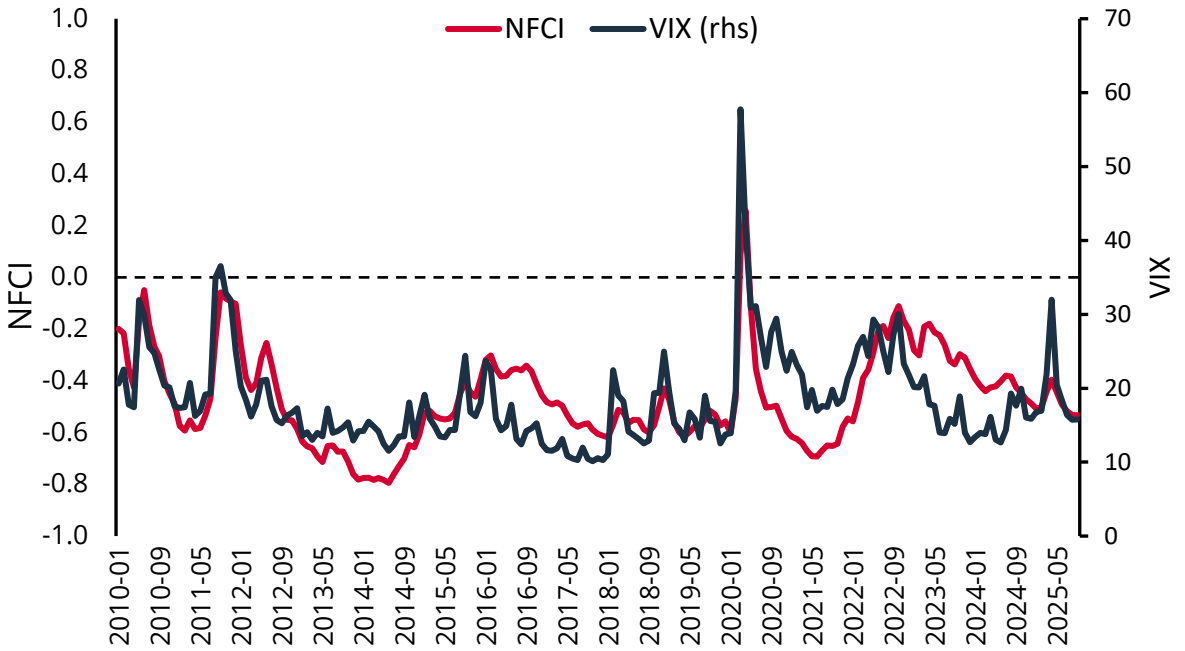
The National Financial Conditions Index and stylised facts

It is important for investors, firms and policymakers to follow the financial market conditions closely to identify the periods of market stress and boom-bust cycles. In the last two decades, a number of composite financial market condition indices have been proposed for this purpose, starting with the seminal work of Illing and Liu (2006), which created a financial stress index for Canada. Hakkio and Keeton (2009) later constructed the Kansas City Financial Stress Index (KCFSI) by selecting 11 financial market-based variables at monthly frequency to capture liquidity, credit spreads and volatility, standardising them and extracting the first principal component (PCA). The St. Louis Fed's Financial Stress Index (STLFSI), created by Kliesen and Smith (2010), extended the PCA approach to a higher frequency: 18 weekly financial market variables. The Cleveland Fed's Financial Stress Index (CFSI), created by Oet et al (2011), assembled daily market data from four financial market sectors (credit, foreign exchange, equity and interbank) by employing a dynamic weighting scheme that allows the weight of sub-indices to vary over time. Finally, Brave and Butters (2011) built the NFCI, which synthesises a very large set of indicators (more than 100 series) and exploits dynamic factor methods to decompose the index into risk, credit and leverage components.

NFCI is the most commonly used of financial condition indices, as it was designed as a coincident weekly summary of overall US financial conditions. However, it can also be used as an indicator of the global financial cycle, as the two are usually intertwined. The index is normalised, so that a zero value in the index corresponds to the historical average over the index sample. That is to say, while positive values of the index mean tighter-than-average financial conditions, negative values indicate looser-than-average financial circumstances. Tighter financial conditions indicated by the index usually coincide with periods when loan conditions are tight, credit spreads are high, equity valuations are weak and risks for funding markets are elevated. Consequently, the NFCI is also highly correlated with the VIX (ie the Chicago Boards Options Exchange Volatility Index), which is often used to capture the "fear" or "uncertainty" level in global financial markets (see Graph 1).

National Financial Conditions Index and VIX

Graph 1



This graph plots the monthly Chicago Fed's National Financial Conditions Index (NFCI, red line, left scale), together with the VIX- implied stock market volatility index (blue line, right scale) over 2009:01–2025:09. The NFCI is standardised so that higher values indicate tighter financial conditions. VIX is the Chicago Board Options Exchange Volatility Index.

Source: Federal Reserve Economic Data.

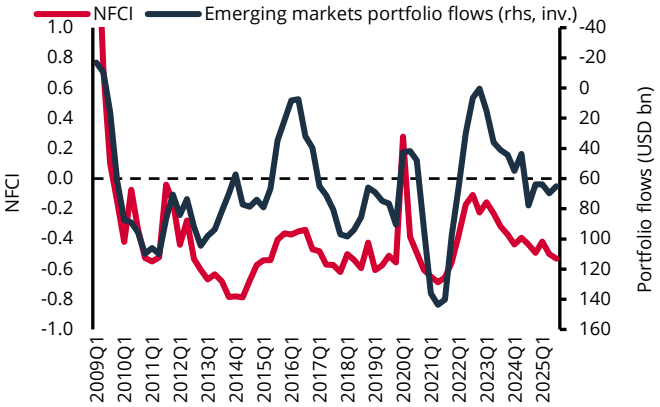
Global financial conditions attract considerable research and policy interest, both for their role in transmitting financial market shocks across borders (Georgiadis (2016); Iacoviello and Navarro (2019); Albagli et al (2019); Gilchrist et al (2019)) and for their influence on capital flows (Forbes and Warnock (2012); Bruno and Shin (2015)). Graph 2 illustrates these linkages by plotting the NFCI against portfolio flows to emerging markets and to Türkiye. Consistent with the notion of a global financial cycle, emerging-market portfolio flows – particularly debt flows –co-move strongly and negatively with global financial tightening episodes (Graph 2.A), and a similar negative association is visible for both non-resident equity and debt flows to Türkiye (Graphs 2.B and 2.C), albeit with notable periods of divergence after the Covid-19 shock.

This pattern is in line with empirical evidence that capital flows to emerging markets are sensitive to global financial developments. However, it also resonates with recent work arguing that global factors account for only about one quarter of the variation in capital flows and that domestic credit quantities and prices can adjust to the global financial cycle even in the absence of actual capital movements (Cerutti et al (2019); Cerutti and Claessens (2024)).

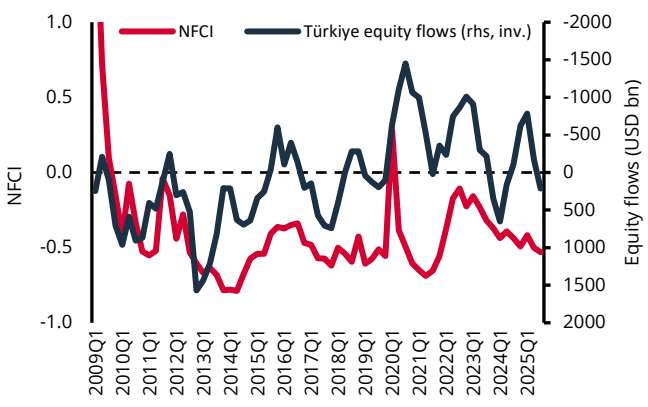
National Financial Conditions Index and Portfolio Flows

Graph 2

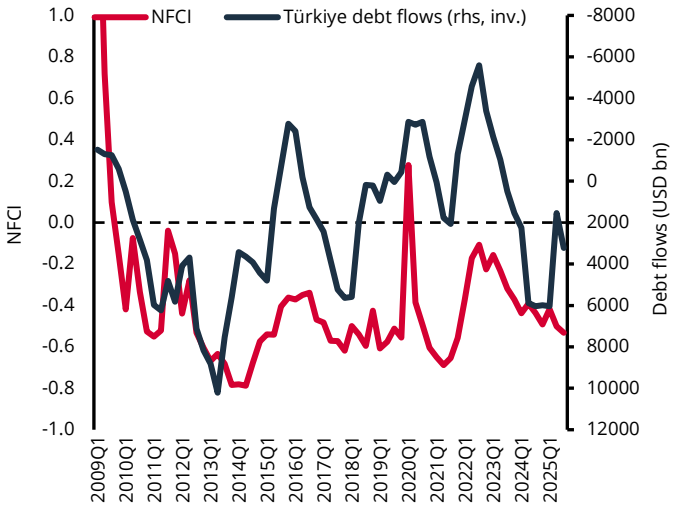
A. NFCI and EM portfolio flows



B. NFCI and Türkiye equity flow



C. NFCI and Türkiye debt flow



This graph plots quarterly Chicago Fed's National Financial Conditions Index (NFCI, red line, left scale), together with portfolio flows (blue line, right scale, inverted). Graph 2.A shows the NFCI and total portfolio flows to emerging markets; Graph 2.B shows the NFCI and non-resident equity flows to Türkiye; Graph 2.C shows the NFCI and non-resident debt flows to Türkiye. Portfolio flows are measured in billions of US dollars, and the right-hand scale is inverted so that upward movements of the blue line correspond to larger outflows. The NFCI is standardised, with higher values indicating tighter financial conditions.

Sources: Federal Reserve Economic Data; Institute of International Finance.

In parallel with the international evidence that financial conditions are informative about future real activity, Graph 3 shows that NFCI co-moves closely and negatively with early indicators of real-sector conditions in Türkiye. Periods of tighter financial conditions (higher NFCI) are typically associated with lower year-on-year industrial production growth, weaker manufacturing purchasing managers' index readings and depressed real-sector confidence. This indicates that global and domestic financial stress is quickly reflected in firms' and purchasing managers' assessments of current and future activity.

However, this relationship weakens noticeably after 2020: while the NFCI still captures bouts of financial tightening, industrial production and survey-based sentiment increasingly diverge from it, especially in the post-Covid period. A likely explanation is the shift to an asynchronous monetary policy characterised by low

policy rates for a long period following the pandemic, extensive credit programmes and regulations that temporarily sustain domestic demand and credit despite adverse external conditions, and high-risk premia. Additional supply-side shocks (such as pandemic-related disruptions and the 2023 earthquakes) and strongly backward-looking inflation expectations further blur the contemporaneous link between financial conditions and real activity.

These patterns motivate our firm-level analysis because they suggest that swings in global financial conditions may affect firms' expectations more strongly and more quickly than actual outcomes. The gap between expectations and realised activity, shaped by the policy response to external financial shocks (Frache et al (2023)), becomes an object of interest for monetary policy.

Table 1 shows that NFCI is tightly linked to global and domestic financial conditions and is systematically countercyclical with respect to real activity, but that this relationship weakened in the post-2020 period. In the full sample, the NFCI is strongly positively correlated with the VIX (0.71) and Türkiye's Credit Default Swap (CDS) premia (0.20) and negatively correlated with stock returns (-0.21), indicating that higher NFCI values coincide with global "risk-off" episodes and local funding pressures. These co-movements – as well as the negative correlations with industrial production growth, capacity utilisation and GDP growth (-0.53, -0.69 and -0.55, respectively) – are markedly stronger in 2009–19.For example, the correlation with the VIX reaches 0.84 and with capacity utilisation -0.78, suggesting a tight link between financial tightening and domestic downturns in the pre-pandemic period.

Correlation of National Financial Conditions Index with financial and economic variables

Table 1

	All sample	2009–19	2020–25
Financial variables			
VIX	0.707	0.837	0.481
Türkiye's CDS	0.202	0.325	0.457
Stock market return	-0.213	-0.311	0.106
Interest rate of the Central Bank of the Republic of Türkiye	0.071	0.085	-0.198
Economic activity			
Industrial production growth	-0.526	-0.663	-0.573
Purchasing managers' index	-0.487	-0.592	-0.491
Real sector confidence	-0.627	-0.652	-0.591
Industrial production index	-0.328	-0.573	-0.245
Capacity utilisation	-0.691	-0.782	-0.345
GDP growth	-0.552	-0.643	-0.351

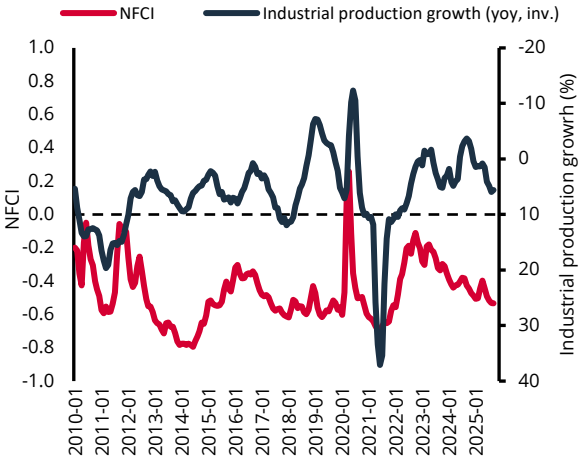
This table reports pairwise Pearson correlation coefficients between the Chicago Fed's National Financial Conditions Index (NFCI) and selected financial and real-economy variables. "All sample" covers 2009:01–2025:09, while the sub-periods 2009–19 and 2020–25 split the sample around the Covid-19 period and the subsequent policy regime. The NFCI is standardised so that higher values indicate tighter financial conditions. Portfolio flows (to emerging markets and to Türkiye, equity and debt) are measured in billions of US dollars. Industrial production, purchasing managers' index, real sector confidence, capacity utilisation and GDP growth are standard macro indicators from the Central Bank of the Republic of Türkiye.

After 2020, however, most correlations decline in absolute value or even change sign. As a result, in these unconditional moments, the effect of tighter financial conditions on domestic financial prices and real activity appears attenuated, consistent with Türkiye's policy stance and idiosyncratic shocks dampening or delaying the transmission of global financial stress.

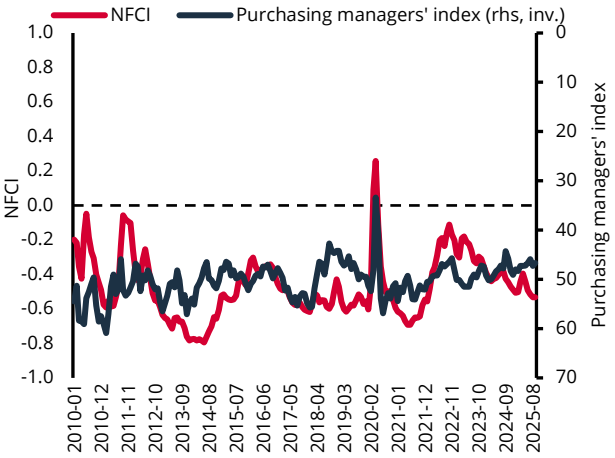
National Financial Conditions Index and real economic activity

Graph 3

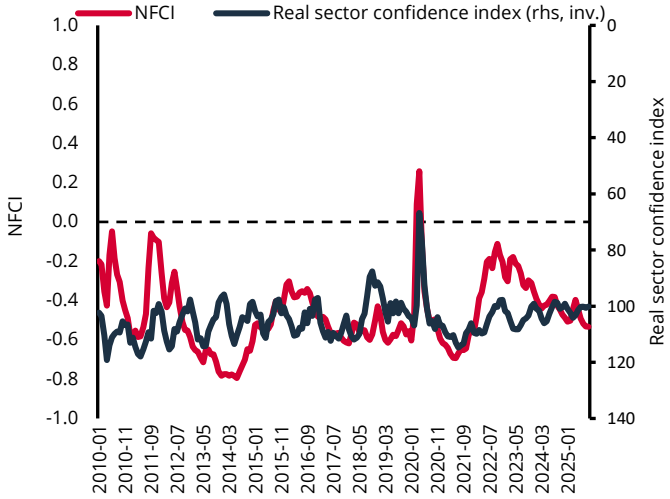
A. NFCI and industrial production



B. NFCI and PMI



C. NFCI and real sector confidence



This graph plots the monthly Chicago Fed's National Financial Conditions Index (NFCI, red line, left scale), together with indicators of real economic activity in Türkiye (blue lines, right scale, inverted). Graph 3.A shows the NFCI and year-on-year industrial production growth; Graph 3.B shows the NFCI and the manufacturing PMI; Graph 3.C shows the NFCI and the Real Sector Confidence Index. The NFCI is standardised so that higher values indicate tighter financial conditions, while upward movements in the blue lines correspond to weaker real activity.

Sources: Federal Reserve Economic Data; Central Bank of the Republic of Türkiye.

Methodology

Global financial conditions can shape firms' expectations through several intertwined channels. When global conditions tighten – eg because risk premia rise or funding markets become stressed – external finance becomes more expensive and less accessible, domestic banks face tighter balance sheet constraints and exchange rate volatility increases uncertainty about future costs and demand. Firms that depend more on outside finance or foreign markets are more likely to be affected: highly leveraged firms may anticipate binding financing constraints and scale back planned investment, employment and capacity, while export-oriented firms may revise their expectations in response to shifts in global demand and exchange rates. In contrast, when global financial conditions ease, funding constraints relax, borrowing costs decline and the perceived outlook for sales, capacity utilisation and macroeconomic conditions can improve, particularly for firms with greater external finance and export dependence.

To quantify how these movements in global financial conditions are transmitted into firms' subjective outlooks, we estimate panel regressions that relate firm-level expectations to the NFCI. The NFCI summarises the tightness of global financial conditions by aggregating information from risk spreads, leverage and funding markets into a single composite indicator. We exploit monthly variation in the NFCI and interact it with proxies for firms' external finance dependence, such as leverage and export intensity, to allow for heterogeneous transmission. This framework allows us to ask whether tightening or easing in global financial conditions has unequal effects on firms' expectations about sales, employment, investment, export orders, macroeconomic outlook and capacity utilisation. Specifically, we estimate the following regression equation:

$$y_{it} = \beta_0 + \beta_1 FCI_t + \alpha_i + \delta_{sq} + \phi_{pq} + \gamma' X_{i(y-1)} + \theta Z_t + \varepsilon_{it}, \qquad (1)$$

where y_{it} denotes the expectation of firm i at month t regarding one of the following outcomes: (i) sales; (ii) employment; (iii) export orders; or (v) economic outlook. The main independent variable FCI_t is the NFCI at time t, with higher values corresponding to tighter financial conditions.

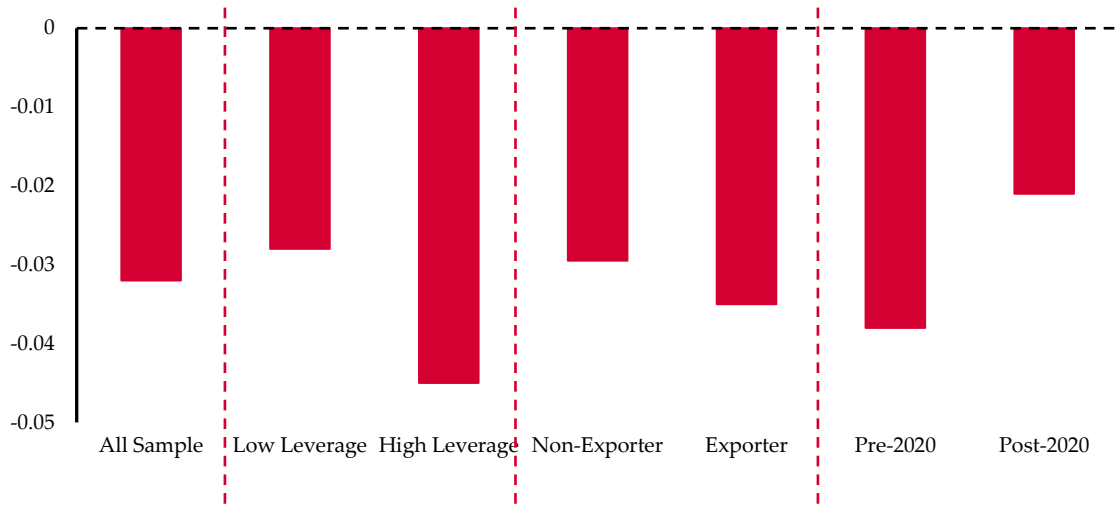
The term α_i denotes firm fixed effects, absorbing all time-invariant firm characteristics, such as business model, long-run productivity or managerial quality. The fixed effects δ_{sq} and ϕ_{pq} are sector x year-quarter and province x year-quarter fixed effects, respectively, which flexibly control for common shocks at the sectoral and regional level within each year and quarter (eg sector-specific demand, local policy changes or regional macro conditions). The vector $X_{i(y-1)}$ collects lagged annual firm characteristics, including leverage, firm age and firm size, so that identification relies on within-firm changes in expectations conditional on a rich set of predetermined controls. The vector Z_t contains monthly macroeconomic controls capturing concurrent domestic conditions: the change in the USD/TRY exchange rate, the unemployment rate, the forecast error of inflation expectations (defined as the deviation of realised CPI inflation from prior expectations), monetary policy surprises (the deviation of the policy rate decision from market expectations) and the slope of the yield curve (the spread between long-term and short-term government bond yields).

Results

Graph 4 shows that tighter global financial conditions are associated with weaker sales expectations. The estimated effect is negative in the full sample and becomes larger in magnitude for high-leverage firms, suggesting that financially more fragile firms revise their sales outlook downward more strongly when external conditions deteriorate. The exporter estimate is also somewhat more negative than the non-exporter estimate, consistent with greater exposure to foreign demand and trade-finance conditions. The pre-2020 coefficient is clearly larger in absolute value than the post-2020 coefficient, indicating that the link between global financial conditions and sales expectations weakened after 2020.

Effect on sales expectations

Graph 4



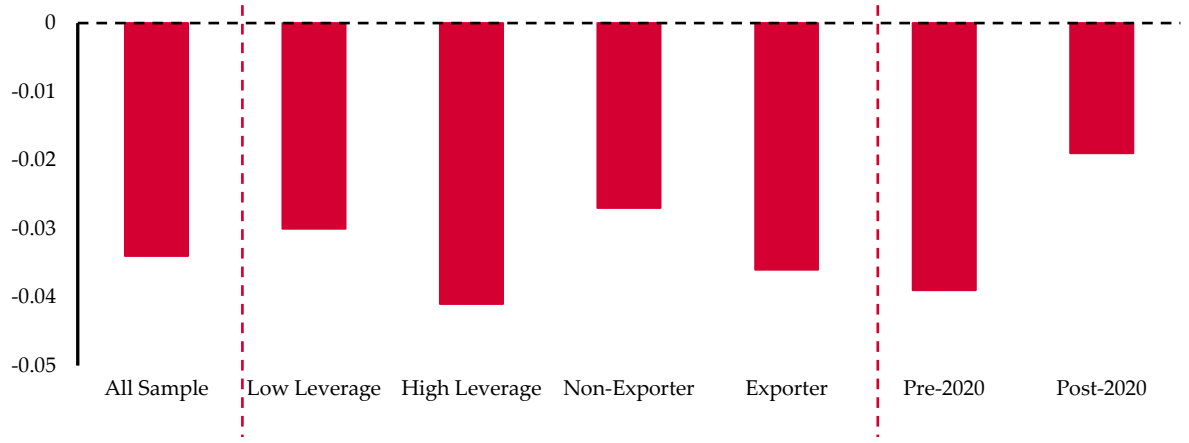
This graph reports coefficient estimates obtained from estimating equation (1). High-leverage firms are defined as firms whose leverage ratio is above the sector-year distribution; low-leverage firms are those below this threshold. Exporters are firms whose export share exceeds 10% in a given year. The pre-2020 period covers 2009M1–2019M12, and the post-2020 period covers 2020M1–2024M12. The dependent variable is measured on a three-point ordered scale, where 1 denotes a decrease (pessimism), 2 denotes no change (neutral) and 3 denotes an increase (optimism).

Graph 5 indicates a similar pattern for employment expectations. Tighter global financial conditions reduce firms' hiring outlook in the full sample, and the decline is again more pronounced among high-leverage firms than among low-leverage firms. Exporters also appear to respond somewhat more negatively than non-exporters, although the difference is smaller than in the sales results. As in Graph 4, in Graph 5 the pre-2020 estimate is notably more negative than the post-2020 estimate, suggesting that firms' employment plans became less sensitive to global financial conditions in the later period.

Graph 6 shows that export expectations are especially sensitive to global financial tightening. The full-sample effect is negative, but the magnitude is considerably larger for exporters and for high-leverage firms, pointing to stronger vulnerability among firms that are more exposed to foreign markets and external financing conditions. Non-exporters also show a negative response, though it is smaller, which likely reflects broader spillovers from weaker global demand. The contrast between

Effect on employment expectations

Graph 5



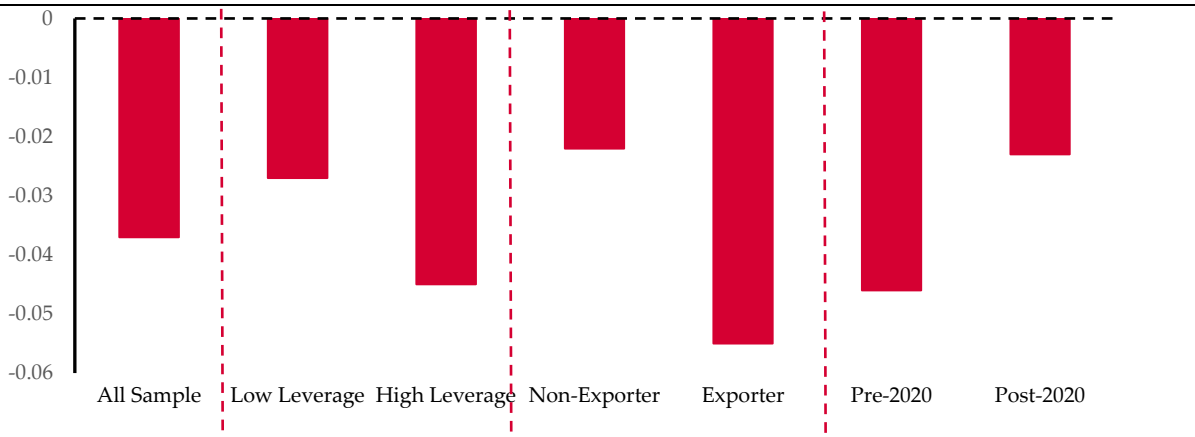
This graph reports coefficient estimates obtained from estimating equation (1). High-leverage firms are defined as firms whose leverage ratio is above the sector-year distribution; low-leverage firms are those below this threshold. Exporters are firms whose export share exceeds 10% in a given year. The pre-2020 period covers 2009M1–2019M12, and the post-2020 period covers 2020M1–2024M12. The dependent variable is measured on a three-point ordered scale, where 1 denotes a decrease (pessimism), 2 denotes no change (neutral) and 3 denotes an increase (optimism).

the pre-2020 and post-2020 estimates is again clear: the negative effect is much stronger before 2020 and becomes more muted afterwards.

Graph 7 shows that tighter global financial conditions also worsen firms' overall economic outlook. This is the largest effect among the expectation measures reported here, with a sizeable negative estimate in the full sample and even stronger responses among high-leverage firms and exporters. The pattern suggests that external financial stress affects not only firm-specific demand expectations but also broader perceptions of macroeconomic conditions. As in the other graphs, the pre-

Effect on export expectations

Graph 6



This graph reports coefficient estimates obtained from estimating equation (1). High-leverage firms are defined as firms whose leverage ratio is above the sector-year distribution; low-leverage firms are those below this threshold. Exporters are firms whose export share exceeds 10% in a given year. The pre-2020 period covers 2009M1–2019M12, and the post-2020 period covers 2020M1–2024M12. The dependent variable is measured on a three-point ordered scale, where 1 denotes a decrease (pessimism), 2 denotes no change (neutral) and 3 denotes an increase (optimism).

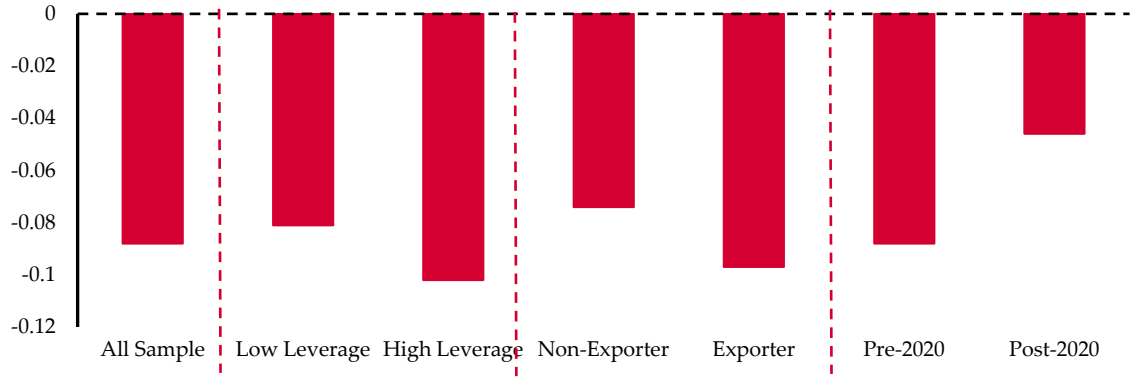
2020 estimate is substantially more negative than the post-2020 estimate, consistent with a reduced role for global financial conditions relative to domestic factors after 2020.

Overall, Graphs 4 to 7 show that tighter global financial conditions systematically depress firms' expectations and that these negative effects are generally stronger for highly leveraged and export-oriented firms, especially before Covid-19. In the post-pandemic period, the impact of global financial conditions becomes noticeably weaker, consistent with a shift in the relative importance of external shocks towards domestic macroeconomic and policy conditions.

These heterogeneous patterns are consistent with standard balance-sheet and global-financial-cycle mechanisms. The stronger response of high-leverage firms fits financial accelerator models, in which weaker balance sheets amplify adverse financial shocks by raising the external finance premium and forcing more indebted firms to cut investment, capacity and hiring more sharply (Bernanke et al (1999); Gertler and Gilchrist (1994); Campello et al (2010); Gilchrist and Zakrajšek (2012)). The larger effects for export-oriented firms are also consistent with the global financial cycle view: firms more exposed to foreign demand and cross-border funding are more vulnerable to swings in global risk appetite and dollar funding conditions. As a result, tighter financial conditions simultaneously weaken demand prospects and restrict trade finance (Bruno and Shin (2015)). In this sense, any positive effect operating through depreciation appears to be dominated by the contractionary effect through weaker global demand.

Effect on economic outlook

Graph 7



This graph reports coefficient estimates obtained from estimating equation (1). High-leverage firms are defined as firms whose leverage ratio is above the sector-year distribution; low-leverage firms are those below this threshold. Exporters are firms whose export share exceeds 10% in a given year. The pre-2020 period covers 2009M1–2019M12, and the post-2020 period covers 2020M1–2024M12. The dependent variable is measured on a three-point ordered scale, where 1 denotes a decrease (pessimism), 2 denotes no change (neutral) and 3 denotes an increase (optimism).

A complementary channel operates through uncertainty. Tightening in global financial conditions is often accompanied by higher risk premia, greater volatility and more uncertainty about future demand, cost, and financing conditions. This raises the option value of waiting and makes firms more cautious about investment and production decisions (Bloom (2009)). The mechanism is especially relevant for highly leveraged and export-oriented firms, for whom refinancing risk, rollover pressures and foreign-demand uncertainty are more salient.

The weaker heterogeneity after Covid-19 suggests, however, that domestic factors increasingly dominated firms' decision environment. In Türkiye, high and volatile inflation, exchange-rate pressures, changing credit regulations and shifts in the domestic policy regime likely became more important than global conditions alone. As a result, while NFCI shocks still mattered, their marginal effect on expectations and plans diminished relative to domestic sources of risk and uncertainty (Jurado et al (2015); Adrian and Shin (2010); Bruno and Shin (2015)).

Implications for monetary policy

Our findings have several implications for the conduct of monetary and macroprudential policy in small open economies that are exposed to the global financial cycle.

First, the fact that tighter global financial conditions systematically depress firms' expectations and capacity utilisation, particularly for highly leveraged and export-intensive firms, underscores that domestic policymakers operate under an external financial constraint. When the global financial conditions index tightens, domestic financing conditions and firms' perceptions of future demand and costs deteriorate even if domestic policy itself does not change. This limits the extent to which monetary policy can stabilise domestic activity and expectations independently of global risk appetite and external funding conditions. Under the scenario that the tightening of external conditions is accompanied by domestic currency depreciation, the monetary policy action against exchange-rate pass-through would potentially depress output further. In sum, global financial spillovers have the potential to disrupt effective monetary policy transmission. They may work against domestic policy efforts by weakening the link between policy actions and real economic outcomes.

Second, the unequal transmission of global financial conditions across firms highlights both the need to incorporate heterogeneity in balance-sheet outlook into monetary policy analysis and the importance of the policy mix. High-leverage and export-intensive firms are the main margin along which global financial tightening translates into downgrades in expectations and cuts in operating capacity. As a result, a given policy rate path may be more contractionary than aggregate indicators imply. This suggests that, at times, relying solely on interest-rate policy to counter global shocks may be inefficient, as it affects all firms uniformly while vulnerabilities are highly concentrated. Macroprudential and capital-flow management tools that lean against excessive leverage, foreign-currency borrowing and maturity mismatches in tranquil times – and that limit foreign exchange exposures or support trade finance in stress episodes – can attenuate the amplification of global shocks without requiring large swings in the policy rate (Adrian and Shin (2010); Korinek and Sandri (2016)).

Third, the weakening link between global financial conditions and firms' expectations in the post-pandemic period highlights the central role of domestic policy credibility and communication. In our data, global financial conditions continue to matter for actual capacity utilisation, but expectations about macroeconomic outlook, investment, sales, employment and exports become increasingly driven by domestic inflation dynamics, exchange rate developments and the evolving domestic policy regime. For monetary policy, this has a dual implication. On the one hand,

successful stabilisation of domestic inflation and a credible nominal anchor can insulate expectations from external noise and reduce the pass-through of global financial volatility into firms' perceived environments. On the other hand, when domestic policies themselves become a major source of uncertainty, they can overshadow external signals and weaken the information content of global indicators such as the NFCI. In such an environment, the design and communication of monetary and macroprudential policy – clarity about objectives, reaction functions and the policy mix – become crucial for anchoring firms' expectations and preventing abrupt shifts towards pessimism when uncertainty rises (Bloom (2009); Jurado et al (2015)).

Conclusion

This note examined how global financial conditions shape firms' expectations and whether these effects differ by firms' balance-sheet strength and external orientation. Using a large panel of Turkish firms over 2009–24, we relate firm-level expectations to the NFCI and allow the effect of global financial tightening to vary with leverage and export status. Our specification absorbs firm fixed effects, granular sector– and province–time effects, and a rich set of macro controls, so that identification comes from within-firm variation in responses to changes in global financial conditions.

Three main conclusions emerged. First, tighter global financial conditions are systematically associated with more pessimistic firm expectations. As shown in Graphs 4 to 7, firms become less optimistic about sales, employment, export performance and the overall economic outlook when external financial conditions deteriorate. Second, these effects are heterogeneous. Highly leveraged firms and exporters respond more strongly, consistent with balance-sheet vulnerabilities and greater exposure to global demand and financing conditions. Third, the effects are stronger before 2020 and weaker thereafter. This pattern suggests that, in the post-Covid-19 period, domestic inflation, exchange-rate developments, credit regulations and policy shifts became more important than global financial conditions alone in shaping firms' expectations.

These findings carry clear policy implications for emerging markets. Aggregate responses can conceal important differences across firms, with more indebted and externally exposed firms bearing a disproportionate share of the adjustment when global conditions tighten. This highlights the importance of sound macroeconomic policies and macroprudential frameworks that limit corporate vulnerabilities before stress episodes occur. More broadly, the results suggest that the transmission of the global financial cycle depends not only on external shocks themselves, but also on domestic conditions and the distribution of fragilities across firms.

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Volatility in international financial markets: Implications for Viet Nam's monetary policy conduct

State Bank of Vietnam

1. Overview

Over the four decades since the implementation of the Đổi Mới (renovation), Viet Nam has achieved significant progress in socio-economic development and financial system restructuring. With an average annual gross domestic product (GDP) growth rate of 6%–7%, Viet Nam's total value of export and import turnover exceeded 180% of GDP by the end of 2025, and annual foreign direct investment (FDI) averaged USD 20–25 billion. As a member of 17 free trade agreements with over 60 countries and territories, Viet Nam is among the most deeply integrated economies in Asia. While this high degree of openness has driven economic development and strengthened the capacity of the financial system, it has also heightened vulnerability to external shocks.

In recent years, the global economy has been profoundly affected by the Covid-19 pandemic, the 2022–23 monetary policy tightening cycle in response to inflation, trade tensions, geopolitical conflicts, supply chain disruptions and protectionist policies. Shifts in the international financial system – stemming from policy changes in major economies alongside trade and investment shocks – have interacted with one another. Furthermore, the growth of non-bank financial institutions (NBFIs), alongside the rise of digital assets and cross-border payment methods, has contributed to a more complex and fragile global financial environment.

Given its high level of openness and integration, Viet Nam, along with other developing and emerging economies, faces risks from capital flow cycles, rapid and sharp exchange rate movements and the strong transmission of global financial conditions into the domestic market – posing significant challenges for the conduct of monetary policy in a small and open economy. These challenges require the State Bank of Viet Nam (SBV) to conduct monetary policy in a flexible and proactive manner: adapting to domestic and international developments, prioritising inflation control, maintaining macroeconomic stability and fostering a sustainable environment for economic growth.

2. The global financial landscape and its impact on Viet Nam

2.1. The global financial landscape

The uncertainty of the global financial environment has made international capital flows increasingly unpredictable. This uncertainty is driven by geopolitical conflicts,

the explosion of new technologies, trade tensions, supply chain disruptions and rapid reversals in the monetary policy cycles of major central banks. Escalating trade barriers, tariffs and geopolitical conflicts have prompted multinational corporations to adopt strategies to diversify production.

In addition, many investors have shown a growing tendency to "reshore" amid rising tariffs or to shift production from high-tax countries to neighbouring nations (near-shoring) or friendly jurisdictions (friend-shoring), thereby further disrupting global supply chains. This trend has led to a contraction in global FDI flows, which have declined from a peak of USD 2.06 trillion in 2015 to USD1.33 trillion in 2023 (OECD (2025b), followed by a further decrease of 11% in 2024 (ASEAN and UNCTAD (2025)).

At the same time, global responses to the Covid-19 pandemic have led to continuous volatility in global financial conditions. Major central banks have rapidly and aggressively recalibrated monetary policies – from an accommodative stance during the Covid-19 pandemic, to tightening to curb inflation throughout 2022–23, and then returning to easing to bolster economic recovery as inflationary pressures gradually subsided. All of these movements combined with heightened public debt pressures resulting from large-scale fiscal stimulus packages during the pandemic.

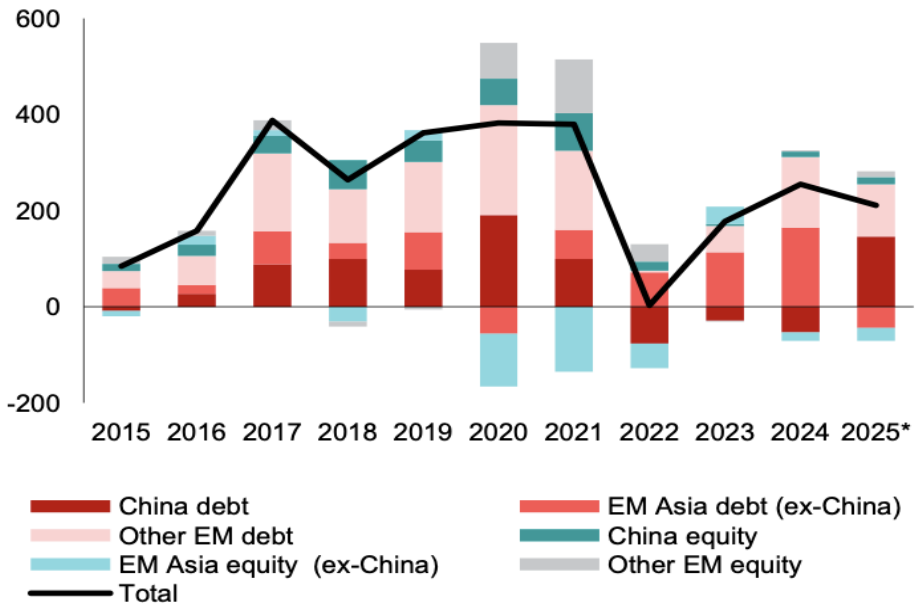
Furthermore, the "boom" in emerging technologies, semiconductors, artificial intelligence and cryptoassets has diverted short-term capital flows from emerging economies to tech-centric markets or safe-haven assets. This shift has exerted significant pressure on the exchange rates of several emerging market economies (EMEs), including Viet Nam.

2.2. Impact on Viet Nam

Given its deep and extensive integration in the global economy, Viet Nam is highly sensitive to the aforementioned changes in international financial conditions. Since March 2022, the Fed has adjusted its policy interest rates 17 times, including 11 rate hikes and 6 rate cuts. These adjustments have contributed to continuous fluctuations in the Global Financial Cycle, whereby global financial variables – like capital flows, asset prices and credit growth – move together largely independently of country-specific conditions in EMEs (Rey (2015); Miranda-Agrippino and Rey (2020)).

Consequently, international capital flows, particularly foreign indirect investment (FII), into EMEs have undergone frequent reversals. As illustrated in Graph 1, FII flows into EMEs plummeted in 2022, followed by a recovery trend during 2023–24. However, these flows remain below the pre-2021 average level and are projected to decrease slightly in 2025.

Foreign indirect investment flows into emerging market economies (USD billions) Graph 1



EM = emerging market.

Source: ASEAN Secretariat and United Nations Conference on Trade and Development (2025): *ASEAN investment report 2025: Foreign direct investment and supply chain development*, Figure 1.29, Chapter 1.

For Viet Nam, balance of payments data indicate that FII flows and external borrowing have also experienced net capital outflows. This is broadly in line with the general trend observed across Asian EMEs (excluding China). In contrast, FDI inflows and remittances have continued to record steady growth over the years. In particular, net FDI inflows amounted to USD 15.2 billion in 2022, USD 20.1 billion in 2023, USD 19.6 billion in 2024 and USD 14.5 billion in the first nine months of 2025. Within the ASEAN region in 2024, Viet Nam's realised FDI disbursement reached USD 25.4 billion, ranking second only to Singapore (USD 143 billion) and exceeding that of other regional peers, including Indonesia (USD 24.2 billion), Malaysia (USD 18.5 billion) and Thailand (USD 13.1 billion).

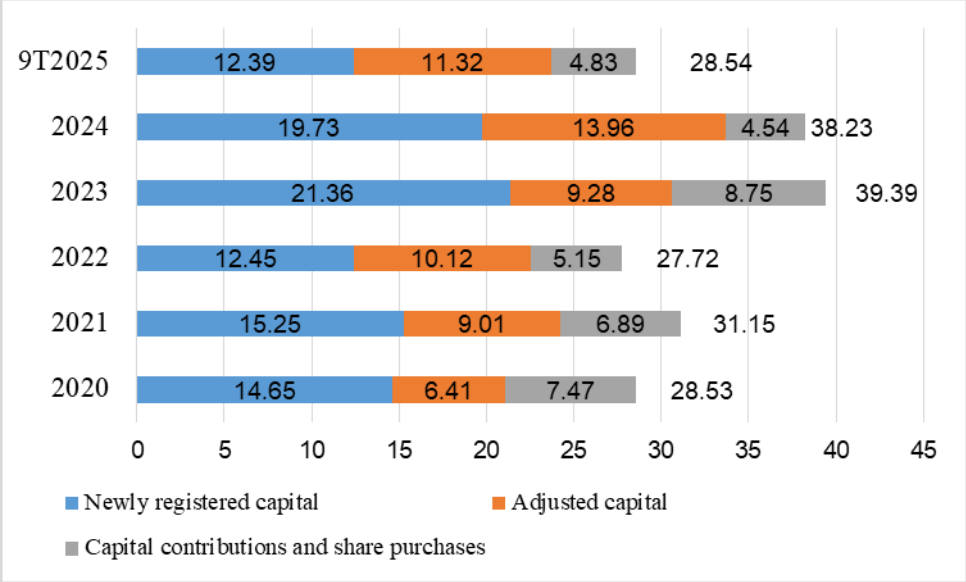
Notably, Viet Nam has recorded steady annual growth across all categories of FDI over time, including newly registered, adjusted and disbursed FDI. This reflects the sustained commitment of multinational corporations to Viet Nam. There is, so far, no clear evidence of large-scale production relocation away from Viet Nam, particularly following the announcement of reciprocal tariffs by the United States. This positive trend is attributed to Viet Nam's continued political and macroeconomic stability, inflation, which consistently averages of 3–4% per year (significantly below the global average), and its steadily improving and stable sovereign credit ratings.

However, increasingly complex and unpredictable geopolitical developments, together with the rapid reversals of global short-term capital flows, have also exerted pressure on the exchange rate. Against this backdrop, the SBV has employed flexible management and a synchronised coordination of monetary policy instruments to

mitigate the pressure on the Viet Namese dong (VND). Consequently, during 2022–24, the VND was relatively moderate compared with regional peers, with an average depreciation of 3.6%.

Foreign direct investment in Viet Nam

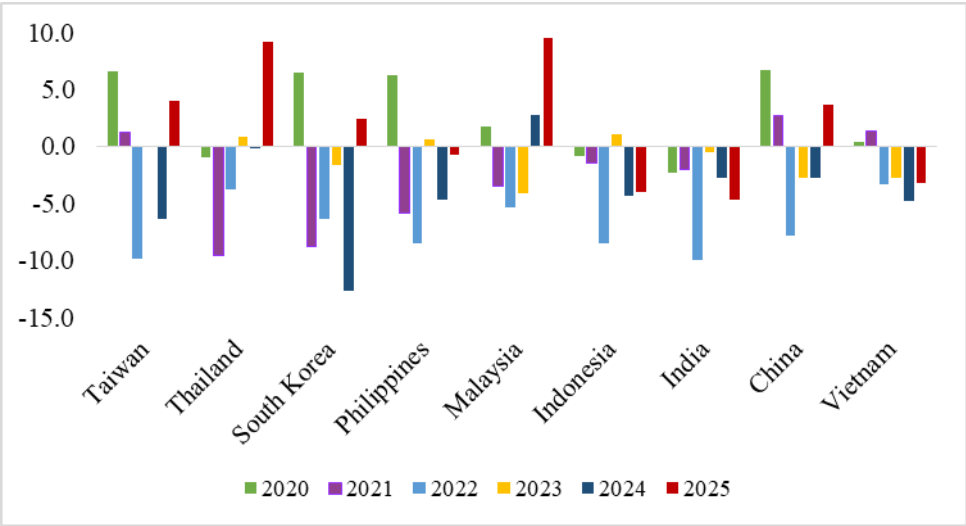
Graph 2



Sources: General Statistics Office; Ministry of Finance.

Exchange rate movements of selected Asian currencies against the USD, 2020–25

Graph 3



Exchange rates are taken at year-end. Positive (+) values indicate currency appreciation, while negative (-) values indicate depreciation against the USD. Data for 2025 are as of December 18, 2025.

Sources: State Bank of Viet Nam; Reuters.

2.3. Monetary policy management amidst heightened volatility

During the aforementioned periods of heightened and unpredictable volatility, the SBV has flexibly managed and synchronised monetary policy instruments – including exchange rates, interest rates, liquidity regulation for the credit institution system and foreign exchange market interventions – together with proactive policy communication. These measures helped anchor market expectations and stabilise sentiment while mitigating the negative impacts of external shocks on macroeconomic stability and the financial-monetary markets. In this way, they contributed to a stable business environment that continued to attract foreign investment and support the recovery of domestic production and business activity.

The following are specific measures taken:

- In 2022, amid global interest rate hikes by major central banks and domestic pressures, the SBV increased exchange rate flexibility by widening the trading band from ±3% to ±5%. At the same time, the SBV raised policy interest rates twice (by 100 basis points each) in September and October to stabilise markets in the face of heightened exchange rate and liquidity pressures. In this way, it helped to restore market stability and ensure the safety of the credit institution system.
- In 2023, while global interest rates remained elevated, domestic inflation was kept under control and pressures on the domestic market gradually eased. The SBV cut policy interest rates four consecutive times to support the economic recovery. However, the widening differential between domestic and international interest rates, combined with capital outflows, exerted pressure on the exchange rate and the foreign exchange market. In response, the SBV implemented a coordinated set of monetary policy tools to maintain an appropriate VND-USD interest rate differential, combined with foreign exchange intervention and proactive communication, to stabilise market sentiment.
- From 2024 to the present, the US dollar has strengthened as the Fed delayed its rate-cutting cycle, while FII flows have continued to trend outward. The SBV has continued to deploy market intervention tools to support exchange rate stability while steadfastly maintaining the objective of inflation control to restore confidence in the VND. As a result, the foreign exchange market has functioned smoothly, liquidity has remained stable and the exchange rate has adjusted in both directions in line with market conditions, helping absorb external shocks.

In recent years, Viet Nam has continuously strengthened and refined its policy framework to enhance the economy's resilience, implemented measures to diversify the investor base, and improved the legal framework for investment, securities and foreign exchange management in a coordinated manner aligned with international practices. In this way, it has fostered a stable, transparent and conducive investment and business environment.

At the same time, Viet Nam has promoted the development of capital markets to mobilise domestic savings, improved its sovereign credit ratings to attract long-term and sustainable capital inflows and fostered the development of NBFIs to broaden financing channels for the economy and reduce reliance on bank credit.

3. The role of non-bank financial institutions and digital assets in financial stability

3.1. Development trends of non-bank financial institutions

The rapid expansion of NBFIs has significantly reshaped the global financial structure. According to the Bank for International Settlements (BIS) (Gelos (2025)), during 2009–23, total NBFI assets increased from 167% to 224% of global GDP, while total assets of the banking system rose more modestly from 164% to 177% of global GDP. This underscores the growing importance of NBFIs.

NBFIs have also become increasingly influential in the allocation of cross-border capital flows. NBFIs account for more than 40% of external funding to emerging Asian economies (OECD (2025a)), which increases these markets' sensitivity to global shocks. The growth of investment funds and hedge funds has been particularly striking. Private credit is another segment of the NBFI sector that has grown rapidly, with total assets of private credit funds rising from USD 0.2 trillion in the early 2000s to USD 2.5 trillion in 2024.

Alongside these developments, NBFIs have expanded their role to become major investors in government bond markets. Private investors are increasingly important relative to institutional investors or governments in government bond markets. Capital flow volatility has become a key channel through which global financial conditions are transmitted across countries. As a result, NBFIs have emerged as major players in global financial markets, playing a leading role in driving cross-border capital movements.

In Viet Nam, although NBFIs have grown at a relatively rapid pace, the banking system remains the primary channel for capital provision to the economy. The credit-to-GDP ratio exceeded 144% by the end of 2025, making Viet Nam's credit-to-GDP ratio the highest among lower-middle-income economies. In addition, in the government bond market, the main investors are the Viet Nam Social Security Fund and the commercial banking system (holding around 90% of outstanding government bonds), while the participation of other NBFI investors remains limited. Consequently, the impact of NBFIs on the domestic capital market has so far been modest. Viet Nam's stock market upgrade from frontier market to secondary emerging market status (effective from September 2026) is expected to strengthen the role of NBFI investors going forward, attract larger international capital inflows and therefore contribute to expanding and deepening the market.

However, systemic, liquidity and market volatility risks associated with sudden reversals of capital flows could propagate more rapidly and with greater intensity, as NBFIs have complex financial linkages with global markets. This, in turn, may amplify the transmission of global and regional shocks to the domestic financial system and impact the effectiveness of monetary policy transmission channels to the real economy. Moreover, despite the rapid growth of NBFIs, the regulatory framework, supervisory arrangements and governance standards remain under development and are not yet fully comprehensive. The risks originating from the NBFI sector are therefore potentially more significant and less predictable than those arising from the banking sector.

These potential risks underscore the need for regulators to promptly strengthen and complete an effective regulatory framework to ensure robust risk control, supervision and prevention, as well as well-defined crisis management and resolution mechanisms. At the same time, regulators should place greater emphasis on assessing and containing interconnected risks between NBFIs and the banking system, closely monitoring complex financial linkage and enhancing coordination and data sharing among relevant authorities. These measures are essential to prevent risk contagion, safeguard financial stability and ensure the effective conduct and transmission of monetary policy.

3.2. The rise of cross-border capital flows via digital assets

In recent years, cross-border capital flows through digital assets, including stablecoins, have expanded rapidly, driven by the increasing role of digital assets as new cross-border payment solutions that operate 24/7 at relatively low cost. According to BIS estimates (BIS (2023)), during 2020–21, the total market capitalisation of cryptoassets surged sharply, rising by around 15 times from early 2020 to the end of 2021 to approximately USD 2.9 trillion.

Within this movement, the stablecoin market experienced explosive growth, expanding from a negligible base to around USD 230–255 billion by 2025 (Schaaf, 2025)), with transaction volumes reaching USD 2.019 trillion in 2024 across more than 138 million transactions (Reuter (2025)). The growing interconnectedness between major stablecoin issuers (Tether with USDT, and Circle with USDC) and the traditional financial system, together with issuers' holdings of government bonds and bank deposits as backing assets, has created significant channels of spillover to financial system stability.

USD stablecoins – USDT and USDC – dominate the market, accounting for 59% and 25% of the global stablecoin market, respectively. As a result, while stablecoins offer benefits in terms of faster payments and lower transaction costs, international organisations (ie BIS and the International Monetary Fund) have warned that their use in emerging economies may lead to "digital dollarisation." This risk is particularly pronounced in countries with political and economic instability, where declining public confidence in the domestic currency increases demand for stablecoin-denominated assets.

Such developments can weaken the role of central banks and the effectiveness of monetary policy transmission channels. The diversion of domestic currency into cryptoassets outside the central bank's regulatory perimeter may weaken confidence in the local currency, amplify the impact of external shocks and complicate monetary policy management. Moreover, financial flows through cryptoassets significantly accelerate the speed of cross-border capital movements. This heightens the risks to macroeconomic and financial stability due to the potential of abrupt reversals. It also poses significant challenges for the design and implementation of new financial safety regulations to adapt to the digital financial environment.

In response to the rapid development of crypto assets, the Government of Viet Nam has issued a foundational legal framework to identify and manage digital assets (the Law on Digital Technology Industry, 14 June 2025) and established a legal corridor for the pilot implementation of a crypto asset market (Resolution No.

05/2025/NQ-CP, 9 September 2025). At the same time, Viet Nam is also paying close attention to and researching global development trends in stablecoins and cryptoassets, as well as the regulatory approaches adopted by other countries.

4. Orientation of Viet Nam's monetary policy management

Heightened global uncertainty, unpredictable monetary policy outlooks among major central banks and the trend of repositioning global supply chains create significant volatility in international capital flows and put pressure on domestic foreign exchange supply and demand. In response, the SBV will focus on implementing the following measures to continue attracting investment capital effectively:

- managing monetary policy proactively and flexibly, in close coordination with fiscal policy, while remaining steadfast in the priority goal of controlling inflation and maintaining macroeconomic stability to create a solid foundation for sustainable economic growth
- continuing with research on emerging and unprecedented issues such as stablecoins and cryptoassets to enhance the efficiency of monetary policy transmission in line with international practices, while mitigating potential negative impacts on the financial system
- diversifying the investor base and developing the domestic capital market to minimise negative impacts and limit risks in the event of a reversal in foreign investment flows

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