

Securing the foundations for tomorrow in a changing global financial system

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On the occasion of the Bank's Annual General Meeting in Basel on 29 June 2025

Profound changes are reshaping the global monetary and financial system. These changes are partly driven by technology. That is certainly true for stablecoins, which have burst onto the scene as a policy issue for central banks, but there are other important structural forces at work.

Chapter II of this year's BIS Annual Economic Report takes stock of these structural changes in the global financial system since the Great Financial Crisis (GFC) and the implications for central banks. Chapter III examines what the next-generation monetary and financial system might look like.

One common thread is the rise in interconnectedness. Despite the fragmentation of the real economy, the monetary and financial system is now more tightly connected than ever. There are implications for central banks, for monetary policy, for financial stability and for the central bank's role as the guardian of the monetary system.

Structural changes in the global financial system

Let me start with the discussion on structural changes in the global financial system. The GFC was a watershed event that set in motion two related structural changes which define the state of the system today.

The first is the shift in underlying claims from those on private sector borrowers to claims on the government in the form of sovereign bonds. The runup to the GFC saw the banking sector engage in a headlong expansion through the rapid growth of lending, mainly in the form of household mortgages (Graph 1). After the GFC, lending to the private sector levelled out, but credit to the government picked up and outpaced credit to the private sector. Covid-era fiscal expansions gave this trend a further upward boost.

At the same time, global portfolio managers have taken centre stage as the main intermediaries rather than banks. This is the second structural shift.



Government bond issuance has outpaced lending to the private sector¹



¹ Outstanding amounts of credit in local currency rebased to 100 at Q1 2000; GDP-PPP weighted average across AU, CA, EA, GB, JP and US. General government debt at nominal value; it covers debt securities, loans and currency and deposits. Private non-financial sector includes non-financial corporations, households and non-profit institutions serving households.

Sources: IMF; national data; BIS.

The open and international nature of the bond market has made this a global phenomenon. Global cross-border bond holdings have increased substantially as a result. Graph 2 shows the changes between 2015 and 2023 across the major regions of the world. Notably, the largest increases in portfolio holdings have been between advanced economies, especially between the United States and Europe. While current account imbalances crop up a lot when discussing international capital flows, it is worth bearing in mind that portfolio choice determines **gross flows**. And gross flows are only loosely related to net flows and current accounts.



Global cross-border bond holdings, excluding official reserves¹

Changes in outstanding stocks over 2015–23, in billions of US dollars



¹ Changes in international portfolio debt investment holdings excluding official reserves. Blue (grey) arrows indicate increase (decrease) in holdings. The reported changes in outstanding stocks also include valuation effects. For details, see the endnote for Graph 4 in Chapter II of the BIS Annual Economic Report 2025.

Sources: IMF; BIS.

The role of sovereign bonds and foreign exchange swaps

The global nature of sovereign bond markets means that currency choice is an integral part of investment decisions. Pension funds and life insurance companies have obligations to their beneficiaries or policyholders in their respective domestic currency. They nevertheless hold a globally diversified asset portfolio in several currencies. Currency hedging is therefore a key theme, and the system has evolved to allow such hedging.



FX swaps are crucial in this process, as they make money fungible across currencies. Simply put, an FX swap is a collateralised borrowing operation. A euro area pension fund, for example, borrows US dollars to invest in dollar bonds. It pledges euros as collateral with a promise to unwind the transaction at a pre-agreed exchange rate. At the conclusion of the contract, the parties exchange the full principal amount. Despite this, accounting convention does not count FX swaps as debt, but rather as an off-balance sheet entry. I will return to this later, as it has important implications for financial stability.

The FX swap market grew rapidly after the GFC and is now very large. Outstanding FX swaps reached \$111 trillion at the end of 2024 (Graph 3.A). The largest and fastest-growing segment of this market are contracts for financial use, as in the example of pension funds and insurance companies I gave earlier. This segment has tripled since 2009.



¹ Including FX swaps, outright forwards and currency swaps; notional amounts outstanding. The BIS OTC derivatives statistics comprise data reported every six months by dealers in 12 jurisdictions (AU, CA, CH, DE, ES, FR, GB, IT, JP, NL, SE and US) plus data reported every three years by dealers in more than 30 additional jurisdictions. For periods between Triennial Surveys, the outstanding positions of dealers in these additional jurisdictions are estimated by the BIS. ² The share is calculated as a percentage of the data for which maturities are reported.

Sources: BIS OTC derivatives statistics; BIS.

FX swaps can be used to purchase securities in foreign currency on a hedged basis. For example, imagine we have a euro area pension fund which aims to have a globally diversified portfolio, including assets in dollars (Graph 4.A). Using an FX swap, it borrows dollars by pledging euros as collateral (Graph 4.B). The investor now has dollar deposits and an obligation to repay a fixed amount of dollars. Using the dollars, the pension fund can then purchase a dollar-denominated security (Graph 4.C). The pension fund owes dollars, but it has the dollar security. The currency risk cancels out, and the pension fund only bears the price risk.



FX swap-enabled bond investment

Example of euro area investor



The triangular relationship between FX swaps, portfolio flows and financial conditions

This property of the fungibility of money across currencies means that FX swaps tell us a lot about portfolio flows. Since portfolio flows affect prices, there are implications for financial conditions. In fact, there is a triangle between portfolio flows, FX swaps and financial conditions (Graph 5.A). Start with the base of the triangle, between FX swaps and portfolio flows. Portfolio inflows into US debt securities are closely related to the growth of FX swaps for financial use (Graph 5.B). The example of the euro area pension fund just discussed fits this story.

Portfolio inflows would tend to support asset prices and financial conditions. Using an off-theshelf measure of financial conditions for the United States, we see how they vary over time (Graph 5.C). Upward bars indicate tightening of financial conditions. Capturing the left edge of the triangle, tighter financial conditions tend to coincide with slower growth in FX swaps (blue line). Completing the triangle, easier US financial conditions are associated with more rapid portfolio inflows into the United States (red line).

To sum up, **FX swaps** can tell us a lot about **portfolio flows** and **financial conditions**. The three move together as three corners of a triangle.

Graph 4





FCI = financial conditions index; GS = Goldman Sachs.

¹ Including FX swaps and outright forwards; notional amounts outstanding. The BIS OTC derivatives statistics comprise data reported every six months by dealers in 12 jurisdictions (AU, CA, CH, DE, ES, FR, GB, IT, JP, NL, SE and US) plus data reported every three years by dealers in more than 30 additional jurisdictions. For periods between Triennial Surveys, the outstanding positions of dealers in these additional jurisdictions are estimated by the BIS. Other financial institutions (OFIs) are one of the three main sectors reported in the counterparty sector breakdown of the BIS OTC derivatives statistics (alongside reporting dealers and non-financial customers). ² The sample covers CA, CH, EA, GB and JP over H1 2012–H1 2024. *** denotes statistical significance at the 1% level. For details, see the endnotes for Graph 6.B in Chapter II of the BIS Annual Economic Report 2025.

Sources: T Nenova, A Schrimpf and H S Shin, "Global portfolio investments and FX derivatives", *BIS Working Papers*, no 1273, June 2025; Goldman Sachs Global Investment Research; US Treasury International Capital (TIC) data; BIS OTC derivative statistics; BIS.

Unpacking financial conditions

Composite measures of financial conditions need careful interpretation, as different components can pull in opposite directions. For example, in the last few years, even as policy rates rose in response to inflation, credit spreads stayed compressed and stock markets remained strong (Graph 6). When the different components pull in opposite directions, we need a way to extract patterns in the data that can shed light on what is happening.



Components of US financial conditions



For this reason, we have developed a model¹ of financial conditions where market variables are distilled into two factors. The first factor tracks short-term interest rates and so follows the monetary policy cycle; we call this the "level factor" (Graph 7.A). The second tracks the waxing and waning of risk appetite. Higher credit spreads and lower stock prices point to tighter financial conditions. Hence, we call this the "risk factor" (Graph 7.B).

According to this second measure, financial conditions have remained loose since the pandemic, reflecting tighter credit spreads and strong stock markets. So the two factors tell very different stories of the last few years. Higher policy rates tightened financial conditions according to the level factor, but financial conditions have been loose according to the risk factor.

¹ See M Lombardi, C Manea and A Schrimpf, "Financial conditions and the macroeconomy: a two-factor view", *BIS Working Papers*, no 1272, June 2025.



The factor structure of the BIS FCI¹





FCI = financial conditions index.

¹ Factors are obtained from a dynamic factor model applied to a large set of financial indicators for the United States over 2 January 2002– 5 February 2025. The level factor reflects the prevailing level of various interest rates, while the risk factor loads on corporate bonds, risky spreads and equity returns. The set of variables includes short-term rates and funding costs for banks and financial institutions, the yield curve of government bonds, yields on corporate bonds of different ratings as well as various spreads, and returns and measures of valuations in equity markets as well as various "bank rates" (prime rates, rates on loans to small businesses and 15- and 30-year mortgage rates); note that this latter bloc is only observed at monthly frequency.

Source: M Lombardi, C Manea and A Schrimpf, "Financial conditions and the macroeconomy: a two-factor view", *BIS Working Papers*, no 1272, June 2025.

These graphs are for the United States, but the risk factor also follows a similar pattern in the six other economies for which estimates are available: the euro area, Japan, the United Kingdom, Canada, Australia and Korea.

The key question is then how financial conditions co-move across economies over time. One key finding is that the transmission of financial conditions goes in both directions (Graph 8). The United States affects other economies, and in turn the other economies affect the United States. The fact that we have a two-way flow is perhaps not so surprising. But notably, the transmission of financial conditions has strengthened since the pandemic.

I opened my presentation by saying that we live in a highly interconnected world. This result is one piece of that story.



Directional transmission of BIS FCI risk factor¹



¹ The risk factor loads on corporate bonds, risky spreads and equity returns. The methodology follows that proposed by Diebold and Yilmaz (2012): the shares of variance are derived from the GFEVD matrix of VARs featuring, the risk factors for a sample of countries comprising AU, CA, EA, GB, JP, KR and US, estimated on different subsamples. ² Share of variance that is explained by each country (over a 10-business day horizon) in market developments occurring in other countries. ³ Share of variance that is not explained (over a 10-business day horizon) by domestic market developments, and is instead attributed to transmission from other countries.

Sources: B Korukmez, M Lombardi and A Schrimpf, "Exchange rates and financial conditions", BIS Working Papers, forthcoming; BIS.

Short-term funding markets and financial stability risks

There are important implications for monetary policy, but let me turn to the financial stability implications. Most FX swaps are short-term. Indeed, three quarters of outstanding contracts have maturities shorter than one year (Graph 3.B). But turnover data suggest that most FX swaps have maturities shorter than one month.

FX swaps are closely linked to another major short-term funding market – the repo market. In both markets, short-term funding is provided by the banking sector. Accounting convention does not treat FX swaps as debt, and so it doesn't figure in the Basel III leverage ratio. But both repos and FX swaps are forms of collateralised lending, and banks' behaviour strongly suggests that both count towards the risk budget of the banking sector. When there is stress in the repo market and banks retrench, the FX swap market also experiences stress. We saw that during the GFC, and we also saw it during the Covid stress in March 2020.

Currently, financing conditions are very accommodative in the repo market. More than 70% of bilateral repos are offered at zero haircuts, meaning that creditors are not imposing any constraint on leverage using government bonds. Central banks and supervisors would need to monitor market conditions carefully to avoid excessive procyclicality.

To the extent that banks are at the centre of repo and FX swap markets, they are critical to the operation of non-bank financial intermediaries (NBFIs). We have come full circle, as the focus on NBFIs brings us back to banks. Addressing the financial stability implications of NBFIs entails addressing the role of the banking sector in channelling the risks posed by NBFIs. Regulation should be aimed at applying similarly stringent rules for banks and non-banks.



The two-tier monetary system

Let me now turn to Chapter III and the discussion on the monetary system. Stablecoins have burst onto the scene, and the theme of interconnectedness is highly relevant here, too.

At the heart of the monetary system is trust. Central banks play a critical role in anchoring this trust by providing the most stable and reliable form of money, ensuring settlement finality and safeguarding the stability of the unit of account.

Building on this secure foundation, private financial intermediaries play a vital and complementary role by issuing money for use by households and businesses. This two-tier monetary system has stood the test of time, and for good reason.

The system is built on three key attributes (Graph 9):

- *Singleness*, which ensures that money is accepted at par, regardless of its form. There is a "no questions asked" principle, so that money can perform the coordination role in the economy. In the current system, settlement using central bank money is key to singleness.
- *Elasticity*, which allows the system to provide liquidity during shocks, preventing gridlocks in payments. Elasticity is essential for large-value payments in a highly interconnected global economy, as it ensures that working capital is available in a world with cash flow shocks.
- *Integrity*, which safeguards the system against financial crime and other illicit activities. Any system that is wide open to abuse will lose trust, and our current system relies on compliance checks by regulated intermediaries at the time of account updates.



10



Stablecoins, by contrast, fare poorly on these attributes. They lack singleness, as their value fluctuates relative to central bank money (Graph 10.A).

They lack elasticity, as they need to be backed by reserve assets; they are subject to a cash-inadvance constraint. This feature makes them unsuitable for large, interconnected payments which make essential use of overdrafts and lines of credit that allow users the discretion to create money balances to discharge obligations promptly, without waiting for incoming payments. Such elasticity has proven critical during shocks. Even very recently, in response to tariff-related uncertainty, undrawn credit lines have grown much more than actual credit (Graph 10.B). These commitments are made possible by the elasticity of the two-tier system, and they offer firms the flexibility to meet payment obligations immediately in the face of shocks to cash flows.

Finally, bearer instruments such as stablecoins fare poorly in terms of integrity. The issuer typically has little control over how such instruments are transferred, especially when transfers take place in a public blockchain.



¹ Seasonally adjusted medians. Outstanding credit includes commercial paper, revolving credit and term loans.

Sources: 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; R Banerjee, J Frost, M Chui and J M Vidal Pastor, "Elasticity in the monetary system", *BIS Bulletin*, no 101, June 2025; BIS.

Stablecoins are poised to present challenges to the implementation of foreign exchange regulations and to monetary sovereignty more broadly, as cross-border flows grow (Graph 10.C). Many economies have foreign exchange regulations that impose reporting requirements or restrictions on certain types of activity. These rules hark back to an era when capital controls were the norm rather than the exception, even in major advanced economies. These rules have been eased in major advanced economies, but they remain on the books for many economies, especially emerging market economies. They also figure centrally in discussions of



macroprudential policy frameworks. It is time for us to examine how the rules may be brought up to date to be fit for purpose.

Stablecoins' growing role underscores the broader theme of interconnectedness I have been laying out. Central banks will need to take the lead to secure the benefits of innovation while preserving policy effectiveness and the broader trust in the monetary system.

Tokenisation and the next-generation monetary system

Looking ahead, tokenisation offers a way to enhance trust in the monetary system while introducing new efficiencies. It integrates records with programmable rules, enabling seamless asset transfers and reducing operational risks. The core idea of tokenisation is to integrate records in a traditional database with the rules and logic governing the transfers of claims. It thus enables the contingent performance of actions and capabilities of programmable platforms. It allows for the integration of messaging, reconciliation and asset transfer into a single, seamless operation.

The best illustration of the capabilities of tokenisation is in correspondent banking, which is the backbone of the current international commercial payment system. Correspondent banking has its origins in an era when merchants were also bankers (hence the expression "merchant banker"), when bilateral trust relationships underpinned large-value commercial payments. Our current system still bears the hallmarks of that origin in the sequential balance sheet updates that take place when a payment is executed.

Graph 11 illustrates how this process works today. Firm A, on the left, pays Firm B, on the right, but this entails a sequence of account updates based on the principle that a trusted intermediary debits the payer's account and credits the receiver's account. Central banks are also involved, as the payment involves the domestic payment system. The separation of messaging and account updates, as well as the sequential nature of those updates, give rise to delays and operational risks. Together with the chain of messages comes a chain of account updates in multiple currencies. And know-your-customer (KYC) and anti-money laundering (AML) checks also have to be done sequentially, which gives rise to duplication of effort along the chain.



In today's correspondent banking, know-your-customer (KYC) and anti-money laundering (AML) checks give rise to duplication of effort along the chain

Graph 11

Screening	Information checks	Information checks	Information checks	Information checks	Information checks	Information checks	
Messaging	~		~	~		~	
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Firm A	Firm A's bank	Central bank	Origin correspondent bank	Destination correspondent bank	Central bank	Firm B's bank	Firm B
Account updates	> Debit USD 100 from Firm A's deposit account at Firm A's bank	 > Debit USD 100 from Firm A's bank's reserve account > Credit USD 100 in the correspondent bank's reserve account 	> Credit USD 100 in Firm B's bank's nostro account	> Credit KRW equivalent amount in Firm B's bank's vostro account	> Credit KRW equivalent amount in Firm B's bank's reserve account	> Credit KRW equivalent amount in Firm B's deposit account at Firm B's bank	0

--- > Payment messages in a successful transaction

Source: R Garratt, P K Wilkens and H S Shin, "Next-generation correspondent banking", BIS Bulletin, no 87, May 2024.

The next-generation correspondent banking system envisaged in Project Agorá uses tokenisation to combine messaging and settlement into one atomic transaction (Graph 12). This reduces delays, operational risks and compliance burdens. In addition, platform resources can be utilised for KYC/AML compliance to achieve "integrity by design".



Source: Adapted from R Garratt, P K Wilkens and H S Shin, "Next generation correspondent banking", BIS Bulletins, no 87, May 2024.



Here, machine learning and artificial intelligence (AI) can help to find needles in the haystack of payments, supporting efforts to combat money laundering and financial crime (Graph 13). For example, machine learning tools can leverage account and transaction behaviour, KYC and other information to deliver explainable detections to prevent fraud, reducing false positives. In turn, AI agents can help with individual financial institutions' compliance burdens, acting as co-pilots to support the production of suspicious activity reports.



The next-generation monetary system will be built on a trilogy of tokenised assets (Graph 14):

- 1. Tokenised central bank money, which provides a stable settlement asset.
- 2. Tokenised deposits, which build on the proven two-tier system.
- 3. *Tokenised government bonds*, which support collateral management and monetary policy operations.

Together, these elements can deliver the three key attributes of singleness, elasticity and integrity, ensuring that the monetary system remains robust and trusted. Realising the vision will require central banks, as guardians of the monetary system, to light the path.



A trilogy of tokenised central bank money, tokenised deposits and tokenised government bonds to ground the next-generation monetary and financial system

Graph 14



Source: BIS.

Conclusion

Let me conclude.

Despite the fragmentation of the real economy, the global monetary and financial system is more interconnected than ever.

There are deep implications for central banks, for both monetary policy and financial stability. For monetary policy, the transmission of financial conditions across jurisdictions is stronger than ever, and needs to be factored in. For emerging market economies, the growing role of stablecoins will impinge on monetary sovereignty and the effectiveness of monetary policy. For those countries that rely on foreign exchange regulations, recent developments present a good opportunity to review those rules to bring them up to date so that they are fit for the new realities.

On financial stability, both FX swaps and stablecoins demand clear thinking and pragmatic policy approaches to deal with the challenges.

As guardians of the monetary system, central banks must adapt to these changes while preserving trust and stability. Needless to say, the BIS stands ready to support them as a trusted partner on this journey.