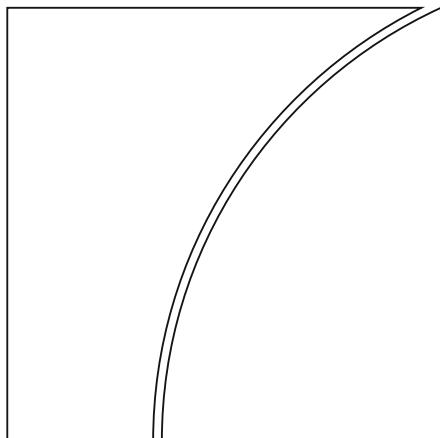




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Contents

BIS background papers

Financial market development and monetary policy	
Aaron Mehrotra and Jochen Schanz.....	1
Financial market development and financial stability	
Carlos Cantú and Michael Chui.....	19

Contributed papers

Financial market development, monetary policy and financial stability in an emerging market economy	
Jorge Carrera, Horacio Aguirre and Marcelo Raffin.....	39
Financial market development, monetary policy and financial stability in Brazil	
João Barata R.B. Barroso and Fernanda Nechoi.....	55
Financial market developments in Chile	
Joaquín Vial.....	67
How foreign participation in the Colombian local public debt market has influenced domestic financial conditions	
José Vicente Romero, Hernando Vargas, Pamela Cardozo and Andrés Murcia.....	83
From float to currency floor and back to float: the Czech National Bank's temporary exchange rate commitment	
Jan Frait and Marek Mora	121
Foreign participation in the local currency bond markets of emerging market economies: good or bad for market resilience and financial stability?	
Hong Kong Monetary Authority.....	133
Market development and monetary policy – the case of Hungary	
Márton Nagy, Gabriella Csom-Bíró, Dániel Horváth and Szabolcs Pásztor	141
Financial market development in Indonesia	
Destry Damayanti, Yoga Affandi, Indra G Sutarto, Mario S Simatupang	155
Developments in Israel's foreign exchange market and the implications for the conduct of monetary policy and financial stability	
Andrew Abir.....	163
Financial market development, monetary policy and financial stability in Korea	
Bank of Korea.....	173
How has financial market development affected monetary policy and financial stability in EMEs: the Malaysian experience	
Bank Negara Malaysia	183
Financial market development, monetary policy and financial stability in emerging market economies (Mexico)	
Bank of Mexico	195

Financial market development and monetary policy: the Peruvian experience Renzo Rossini, Carlos Montoro and Miriam Luna.....	207
The development of financial markets in the Philippines and its interaction with monetary policy and financial stability Francisco G Dakila Jr	219
How to benefit from financial deepening while preserving financial and macroeconomic stability: the case of Poland Piotr J Szpunar.....	243
Financial markets in EMEs – what has changed in the last two decades Central Bank of the Russian Federation	255
Financial markets in EMEs – what has changed in the last two decades? Saudi Arabian Monetary Authority	267
Balancing the risks and rewards of fintech developments Monetary Authority of Singapore.....	279
Financial market development, monetary policy and financial stability in emerging market economies South African Reserve Bank	293
Financial market development, monetary policy and financial stability in emerging market economies Bank of Thailand	307
Chartpack - Financial market development in emerging market economies – an overview Mathias Drehmann and Agustin Villar.....	315
List of participants.....	337
Previous volumes in this series	339

Financial market development and monetary policy

Aaron Mehrotra and Jochen Schanz

Abstract

Financial market development (FMD), monetary policy regimes and monetary policy implementation are closely intertwined. We discuss their evolution in emerging market economies (EMEs) since the early 2000s. Sufficiently developed local money and debt markets were seen as a prerequisite for inflation targeting. However, many EME central banks also chose monetary instruments and targets with a view to develop these markets. We argue that FMD largely improved domestic monetary transmission. At the same time, greater financial integration has increased the importance of global factors for domestic monetary conditions. We conclude by discussing how FMD has enabled central banks to extract useful information from financial markets.

JEL classification: E44, E52, F3, O16.

Keywords: financial market development; monetary policy; monetary policy implementation; monetary policy transmission; market-based indicator.

Introduction

Financial markets in emerging market economies (EMEs) have seen major structural shifts over the past two decades. While bank-based finance has remained dominant, capital markets have developed, local currency bond markets have deepened, and repo and derivatives markets have evolved in tandem with cash instruments. This market deepening has gone hand in hand with rising indebtedness, mainly of households and corporates, but also of some EME sovereigns. The composition of investors has also changed. As domestic banks have reduced their exposure, domestic institutional investors have gained ground and foreign participants have also become more prominent in the investor base (see chartpack).

This note discusses how these aspects of financial market development (FMD) have affected monetary policy in EMEs since the early 2000s. It first reviews the interaction between FMD, monetary policy regimes and monetary policy implementation before turning to the implications of FMD for monetary policy transmission. Finally, the note documents how the quality of information that central banks can derive from macro-financial indicators has shifted as markets develop.

FMD and monetary policy implementation

The adoption of inflation targeting (IT) in most EMEs by the early 2000s both promoted FMD but also depended on it, with major implications for monetary policy implementation.¹ In fact, sufficiently developed local money and debt markets were seen as a prerequisite for IT (IMF (2004)). The shift towards IT coincided with a broader trend towards more market-based approaches for monetary policy implementation. By the mid-2000s, interest rates had superseded money aggregates as operating targets (Graph 1). Market-based instruments, such as repos, moved to the core of monetary policy implementation, developing the market segments in which they were used.

Since then, FMD and policy implementation have continued to reinforce each other. This is evident from central bank contributions to this meeting. Even without major shifts in most EME policy frameworks since the mid-2000s, 86% of survey respondents indicate that monetary policy instruments have affected FMD, while 75% believe that FMD has influenced the choice of instruments (Annex Table A1).

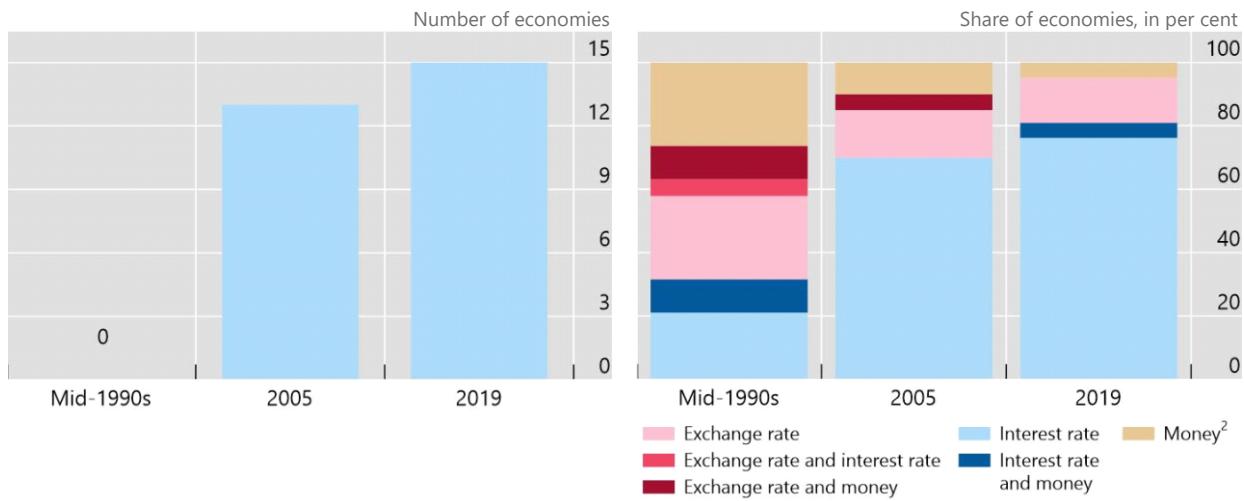
¹ The transition to IT regimes was supported by policies to strengthen economic fundamentals, notably reforms to overcome fiscal dominance and to bolster banking system soundness. In turn, a more stable macro-financial environment also facilitated FMD.

Interest rates have become common operating targets with the introduction of IT

Graph 1

EMEs with an inflation targeting regime¹

EME central banks' main operating targets



¹ Out of 21 EMEs. ² Monetary aggregate or bank reserve target.

Sources: Archer (2006); Jahan (2015); Markets Committee (2019); BIS calculations.

Monetary policy implementation has continued to foster FMD...

Over the past two decades, many EME central banks have used their discretion in choosing monetary instruments and targets to develop financial markets. They could do so because any desired policy stance can be achieved by various permutations of the central bank's balance sheet, and because markets used in operations become more liquid thus supporting FMD.

Many EMEs have focused on developing their money and local government bond markets. For example, the use of repos has boosted the growth of repo markets.² Greater use of repo, typically against government paper, has leveraged the initial development of the government bond market to facilitate banks' liquidity management. In turn, repo use has supported the secondary market liquidity of government bonds. Where local government bond markets were small relative to liquidity absorption needs, central banks have issued central bank securities, *inter alia* to develop the yield curve (Annex Table A2). Issuance has taken place at short maturities, partly to avoid adverse interactions with the treasury's issuance of government bonds (Annex Table A3).

A few EMEs have also implemented monetary policy with a view to developing other markets. For instance, the central bank of Hungary's mortgage bond purchase programme in 2018 stimulated the issuance of mortgage bonds to help banks manage duration risk. And the People's Bank of China has started to accept green credit and green bonds as eligible collateral for its monetary policy operations as part of range of measures to encourage banks to engage in green finance.³

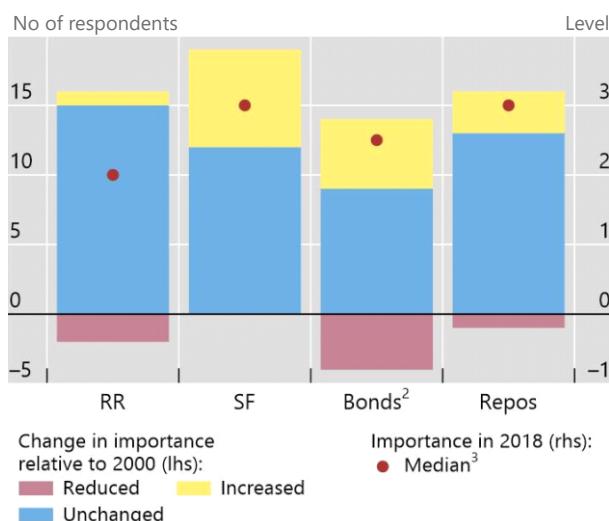
² While there is much cross-country variation, repo markets in AEs experienced a similarly rapid growth a couple of decades earlier, often encouraged by the central banks themselves (Borio (1997)).

³ See People's Bank of China, *PBC Releases China's Green Finance Development Report*, 2019.

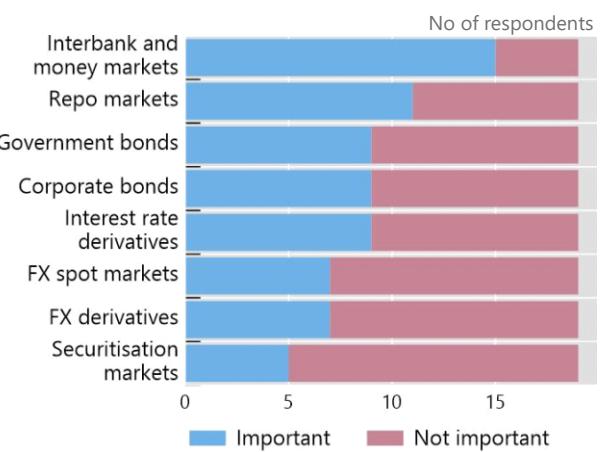
Continued FMD could further strengthen policy implementation

Graph 2

Change in importance of MP implementation tools from 2000 to 2018¹



Policy implementation could benefit in particular from money market development¹



SF = Standing facility in domestic currency; RR = Reserve requirements.

¹ Based on survey answers of 19 respondents. ² Issuance of central bank bonds or government bonds for monetary purposes. ³ High = 3, Low = 0.

Sources: BIS survey; BIS calculations.

Having nurtured a market, sustained FMD may require central banks to reduce their engagement. For example, the Bank of Thailand reports that a private repo market only developed once it ceased to intermediate all repos and instead entered into repos only with primary dealers.

... while FMD has influenced monetary policy implementation

Over the past two decades, some EME central banks have continued adjusting their operating targets to take account of FMD. Adjustments have included, for example, a move towards market segments where liquidity had increased, or an adjustment of the targeted maturity. Targets with shorter maturities are easier to control but, at the same time, require sufficiently developed markets to ensure a stable transmission to the private sector's key funding rates. As an example, the existence of deep repo markets has allowed Mexico to target collateralised rates.

As markets develop, central banks have gained flexibility in their policy implementation, making greater use of market-based instruments. With such instruments, policymakers are increasingly able to influence funding costs outside their direct regulatory net. For example, the reliance on repos against domestic currency-denominated assets has continued to increase over the past two decades (Graph 2, left-hand panel). And relative to outright market transactions, repos require no liquid underlying market for securities (indeed, they can foster the underlying market's liquidity, as seen above); have only an indirect impact on the price of the securities transferred; and break the link between the maturity of the paper and that of the monetary policy operation.

Meanwhile, standing facilities and, to a lesser extent, reserve requirements have remained important. In part, this reflects the continued dominance of banks in financial intermediation. Standing facilities can also complement market-based implementation of policy, for example, in a corridor system where they limit interest rate volatility.

While domestic financial markets have continued to develop, foreign currency instruments have naturally kept a role in monetary policy implementation in many EMEs. When domestic government securities are scarce, foreign currency can serve as collateral in repurchase agreements, specifically in FX swaps. In addition, almost all EME central banks intervene at times in FX markets to stabilise exchange rates, in part as the private sector cannot always smoothly manage the FX risks associated with shocks to capital flows.⁴

In the future, FMD could further enhance monetary policy implementation. Survey respondents emphasise the development of interbank, money, repo and government bond markets (Graph 2, right-hand panel). For example, the South African Reserve Bank is reviewing the compliance of reference and benchmark rates with global standards to promote efficient pricing of financial instruments. And the Annex discusses how central banks can support the development of benchmark government bonds to improve bond market efficiency.

Effects on monetary policy transmission

Over the past two decades, FMD has affected monetary transmission through both domestic and external channels.⁵ Most central banks report that the pass-through from policy rates to private sector lending rates has improved since 2000, with FMD playing a supportive role (Annex Tables A4 and A5).

FMD and domestic channels of transmission

Domestic FMD has seemingly strengthened monetary transmission in several ways over the past two decades, even as a number of caveats remain.

First, deeper local currency government bond markets, with longer maturities, have tended to strengthen the interest rate channel (see contributions from Russia and Thailand). In particular, at the short to medium end of the yield curve, most survey participants judge government bond markets to be highly liquid nowadays, facilitating monetary transmission (Annex Table A6). That said, other than for mortgages, private sector benchmark rates in the majority of EMEs remain linked mainly to short-term interest rates (Graph 3).⁶

⁴ See BIS (2019a) and the 2019 Emerging Markets Deputy Governors meeting, BIS (2019b).

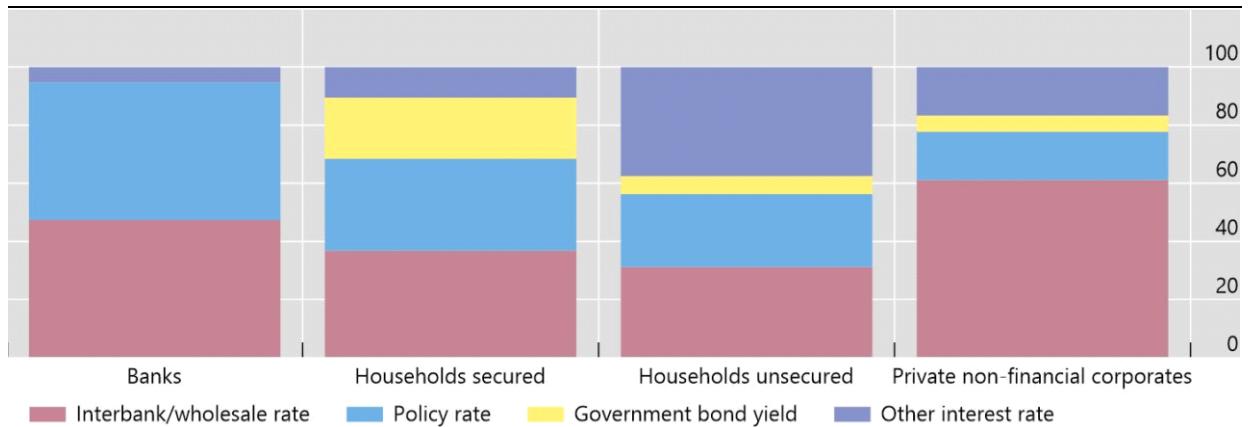
⁵ See Table 1 in Singh et al (2008) for a conceptual framework.

⁶ For all the sectors considered in Graph 3, most survey respondents indicated that financial market development had played a role in affecting the key funding rate. See Annex Table A7.

Key funding rates for different sectors follow various market benchmarks¹

Share of economies, in per cent

Graph 3



¹ Based on central bank responses regarding the interest rate that best summarises the funding conditions for each of the four sectors.

Source: BIS survey.

Second, EME firms and households are likely to have become more sensitive to changes in interest rates as a consequence of financial deepening.⁷ Financial inclusion has allowed more households and firms to borrow. Growing private sector balance sheets have strengthened collateral and wealth effects.⁸ And given higher levels of indebtedness, cash flow effects arising from changes in debt servicing costs have become more important.⁹ Higher debt service can have large effects: some estimates find that the peak impact of a 1 percentage point contractionary monetary policy shock on GDP amounts to -0.9% in countries with high debt, about twice as large as when debt is low (Graph 4, left-hand panel).¹⁰ Transmission may be stronger particularly when policy rates are tightened. When rates are cut, highly indebted household and firms may deleverage rather than spend more in the short term.¹¹

Third, in the light of more developed financial markets, the expectations channel of monetary policy may have strengthened. With more liquid markets, market-based interest rate benchmarks, and a significantly broader investor base (see below), interest rates quickly incorporate any changes in expectations about monetary policy.

That said, the central bank's audience may not always observe or react to signals in the ways intended by policymakers. For example, global investors may at times be driven mainly by trends in global risk aversion. This underscores the need for precise

⁷ Secular shifts in the economy could counteract such effects. For example, economic activity could be increasingly driven by sectors that tend to be less interest rate-sensitive, such as business investment.

⁸ See for instance Central Bank of Malaysia (2015).

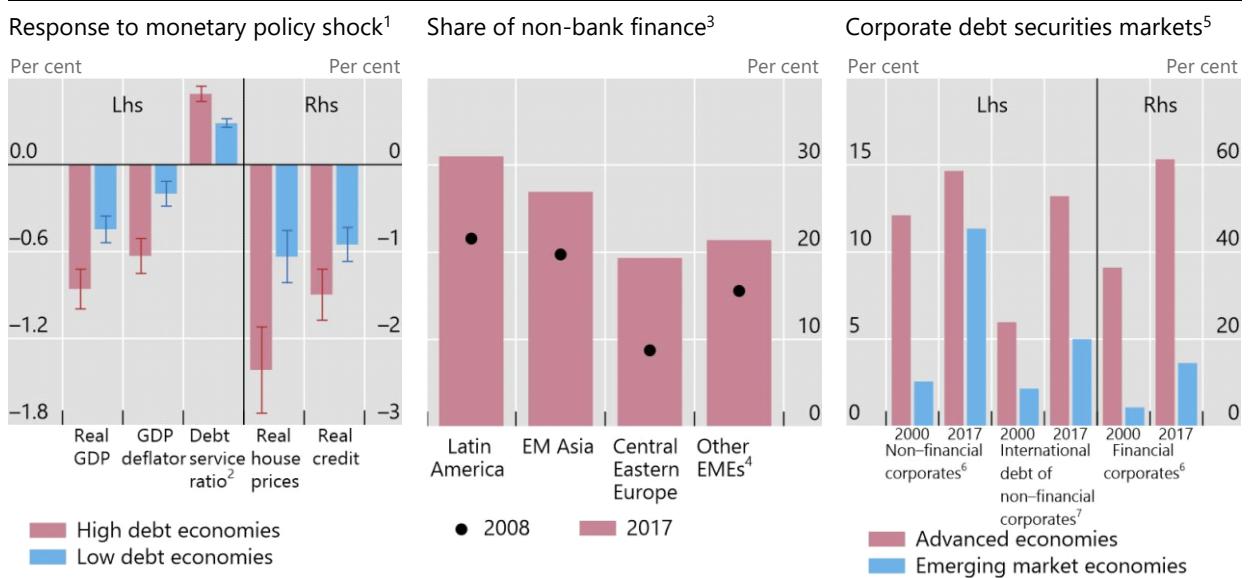
⁹ Drehmann et al (2017) document the strong negative impact of debt service costs on GDP, and how a credit boom leads to a delayed rise in debt service, and thus a decline in output over time.

¹⁰ While these estimates are obtained over the 1985–2008 sample, which includes mainly advanced economies, private sector indebtedness in several EMEs, including China, Hong Kong SAR, Korea and Singapore, has now reached comparable levels.

¹¹ Alpanda et al (2019) report that the effects of expansionary monetary policy shocks on output are weaker when household indebtedness is high.

and forward-looking communication with both resident and non-resident investors, as some central bank contributions highlight.¹²

Stronger transmission when debt is high; share of non-bank finance rises Graph 4



¹ The panel shows the peak response of the different variables to a monetary policy shock of a 1 percentage point increase in the policy rate, over the next 28 quarters. The lines show the one-standard error confidence intervals. Estimates are based on the panel VAR results in Hofmann and Peersman (2017). The sample includes 16 advanced economies (AEs), together with Hong Kong SAR and South Africa, from Q1 1985 to Q4 2008. ² Unit for debt service ratio is percentage points. ³ Non-bank credit to the private non-financial corporate sector, as a percentage of bank credit and debt securities. Non-financial corporate sector debt securities measured as total debt securities if available, or domestic debt securities plus international debt securities. Simple averages across regions. ⁴ IL, TR and ZA. ⁵ Bars show median of debt securities outstanding as a share of GDP. If total debt securities are not available, sum of international and domestic debt securities. ⁶ By residence. ⁷ By nationality.

Sources: Hofmann and Peersman (2017); CGFS (2019).

Last, the role of non-bank finance has increased, with ambiguous implications for monetary transmission (Graph 4, centre and right-hand panels). Increased non-bank finance could strengthen monetary transmission to the extent that it has exposed banks to more competition and intensified the risk-taking channel of monetary policy.¹³ The risk appetite and funding costs of non-bank intermediaries may be more sensitive to monetary policy than those of banks. Indeed, the effect of a monetary policy shock on output appears to be somewhat larger in economies with sizeable non-bank financial sectors.¹⁴ But increased non-bank finance may amplify the effects of global financial conditions, potentially weakening transmission, as discussed next.

¹² See eg the notes from Malaysia and Thailand.

¹³ See Borio and Zhu (2012) and Adrian and Shin (2009). The Bank of Thailand's contribution highlights the effect on competition.

¹⁴ See IMF (2016).

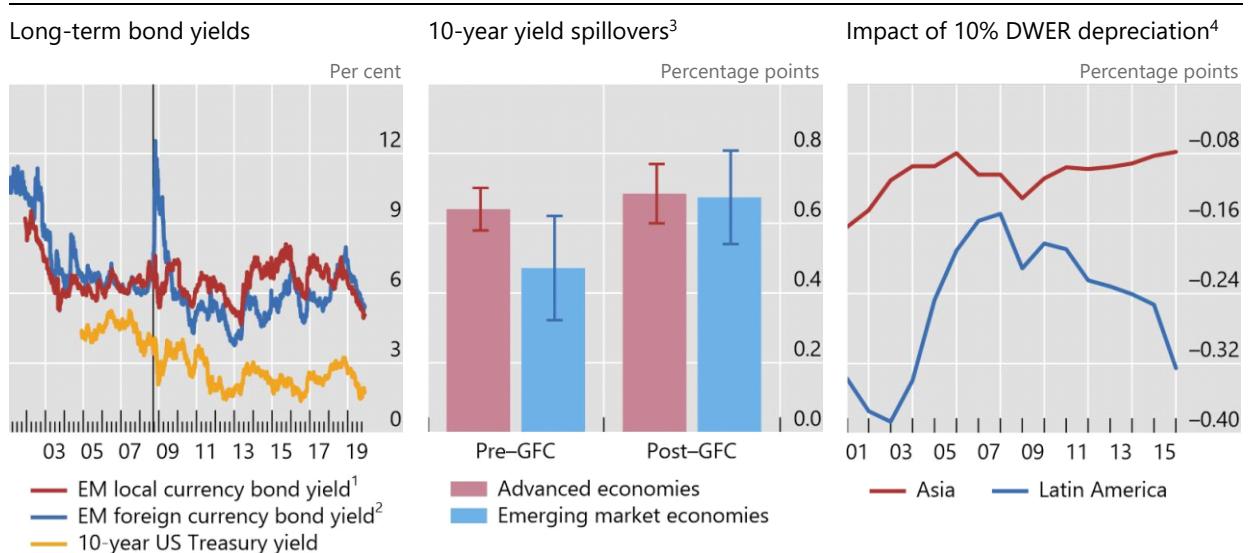
FMD, monetary transmission and the international dimension

The international dimension has always been crucial for the conduct of monetary policy in EMEs, but FMD has changed some of the underlying structures. As EMEs have liberalised their capital accounts and exchange rate markets, reaping in many ways the benefits of financial globalisation, they have become more exposed to large swings in capital flows and exchange rates. If anything, this sensitivity has increased post-GFC. To cope with these challenges, most EME inflation targeters have adopted a controlled floating exchange rate regime and have added macroprudential and, in some cases, capital flow management measures to their monetary policy toolkit (BIS (2019a)).

The growing influence of global financial conditions on domestic ones in EMEs is apparent from the increase in the co-movement of US and EME yields (Graph 5).¹⁵ Simple panel regressions with monthly EME yield changes suggest a coefficient of 0.47 on US yields pre-GFC, and 0.67 thereafter. This correlation is very close to that observed between bond yields in small open advanced economies and their US equivalents, which has remained stable over time.

External factors affect domestic monetary conditions

Graph 5



¹ JP Morgan Government Bond Index – Emerging Markets (GBI-EM), seven to 10 years. ² JP Morgan Emerging Market Bond Index (EMBI), seven to 10 years. ³ The panel shows the response of the local currency 10-year yield to a 1 percentage point increase in the US 10-year yield, using monthly data and the specification in Mehrotra et al (2019). The lines show the two-standard error confidence intervals. Pre-GFC period covers M1 2001 to M6 2008; post-GFC includes M1 2010 to M9 2017. The sample of AEs includes AU, CA, CH, DK, NO, NZ and SE; the one for EMEs covers 21 EMEs. ⁴ The graph shows the impact of a 10% depreciation in the debt-weighted exchange rate on the ratio of capex to total assets in the following year, for a firm at mean net FX leverage. EM Asia includes CN, ID, IN and KR; Latin America includes BR, CL and MX. Based on the specification in Banerjee et al (2020).

Sources: Banerjee et al (2020); Bloomberg; Datastream; JP Morgan Chase; national data.

¹⁵ The increased co-movement could also reflect greater co-movement in macroeconomic conditions.

The effects of global financial conditions transmitted through capital flows have also tended to weaken the transmission of monetary policy. They have reduced the central bank's ability to steer the economy through policy rate adjustments.¹⁶

That said, even if long-term interest rates have become more susceptible to global factors, monetary transmission to household and corporate loans rates may have remained broadly constant. Several country contributions point this out, given the prevalence of floating and short-term benchmark rates (Graph 3).¹⁷

This still leaves room for the so-called financial channel of the exchange rate – the impact of exchange rate changes on domestic financial conditions through the balance sheets of domestic borrowers and foreign lenders/investors. Two major elements of FMD have likely strengthened this channel (see the companion note for a detailed discussion of these trends).¹⁸ First, non-financial EME corporates have increasingly relied on foreign currency borrowing, often unhedged. Second, foreign investors have substantially increased their holdings of local currency government bonds. All else equal, the foreign currency exposures of these actors ease domestic financial conditions when the exchange rate appreciates because financial constraints are relaxed. This counteracts the tightening effects of higher policy rates, weakening transmission.

The importance of this channel is supported by evidence suggesting that an exchange rate depreciation against funding currencies reduces business investment (Graph 5, right-hand panel). Moreover, this effect is found to be stronger for corporates that are more highly leveraged in foreign currency, and it is more powerful in EMEs than in AEs.¹⁹ Due to currency mismatches, an interest rate cut is therefore less likely to be expansionary in EMEs than in AEs.

FMD seems to have aligned the dynamics in EMEs more closely with those in small open AEs. Not only has the correlation of domestic yields with US rates become more similar across the two country groups, but the median effects of domestic monetary policy shocks on exchange rates in EMEs with large FX markets and fully flexible exchange rates are broadly similar to those in small open AEs (Graph 6). In response to a contractionary monetary policy shock of 10 bp, high-frequency data suggests that the median appreciation of the exchange rate against the USD on announcement has been 74 bp in Mexico, 34 bp in South Africa, 69 bp in Australia and 140 bp in Canada (left-hand panel).²⁰ However, monetary transmission seems to be still much more uneven in EMEs, as indicated by the considerable variation in the EME exchange rate responses to a domestic monetary policy tightening (right-hand panel). The wide interquartile ranges even include many instances of exchange rate depreciations, particularly in South Africa.

¹⁶ See Rey (2014) and Obstfeld (2015).

¹⁷ For country experiences, see the contributions by Korea, Malaysia and Thailand. See also BIS (1994).

¹⁸ See also BIS (2019a), Bruno and Shin (2015a,b) and Hofmann et al (2019).

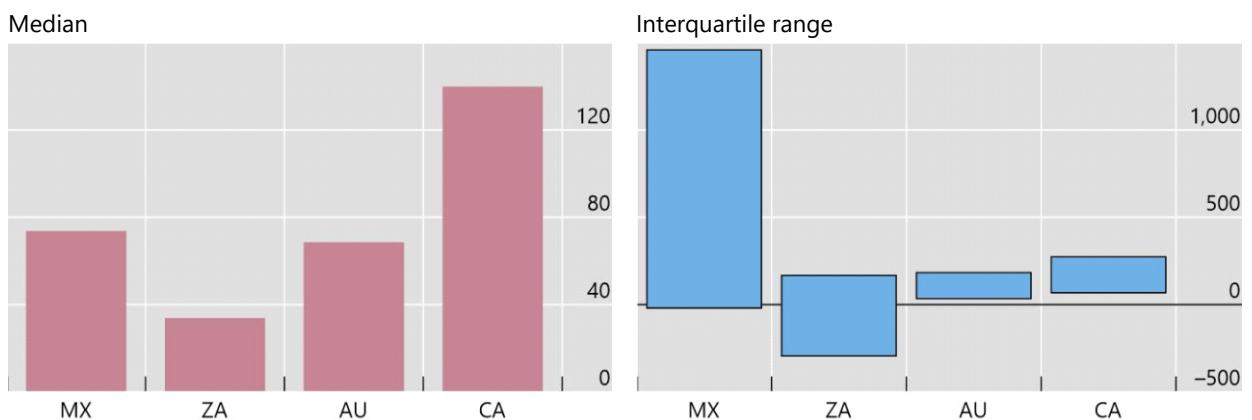
¹⁹ See Banerjee et al (2020) and Avdjiev et al (2019).

²⁰ The stronger median response in AEs could be driven by the prominent role of exchange rates in monetary transmission close to the zero lower bound; see Ferrari et al (2017).

Monetary transmission to FX more uneven in EMEs than in AEs¹

In basis points

Graph 6



¹ Based on high-frequency tick data. Change in the bilateral exchange rate against the USD, in response to a 10 basis point increase in a three-month interest rate, 15 minutes before and after monetary policy announcements. A positive sign denotes an appreciation of the local currency. Only events with at least five bids during the 30-minute time period are included. Sample covers Dec 2015–Sept 2019 (Mexico); Jan 2016–Sept 2019 (South Africa); Feb 2010–May 2019 (Australia) and Jan 2010–Apr 2019 (Canada).

Sources: Thomson Reuters; BIS calculations.

In the future, advances in digital technology could affect monetary transmission through the international dimension. One channel is potential currency substitution to global stablecoins (GSCs). In their contributions to the meeting, some central banks discuss how GSCs could reduce the traction of domestic monetary policy.²¹ The note from Singapore mentions how even stable fiat currencies could risk being displaced if technological platforms provide cheap and efficient means of payment and transfers.

Deriving information from macro-financial indicators

FMD has also affected the information content of various macro-financial indicators that central banks use to calibrate policy.

For one, FMD has reduced the information that monetary aggregates contain about future inflation. Since 1995, the conventional relationship between money growth and inflation in EMEs has collapsed and is now as weak as in AEs (Graph 7, left-hand panel). FMD has played a role here by making the ratio of GDP to money (the velocity of money) less stable. The adoption of IT has recognised this development (Graph 1).

Correspondingly, and as markets have deepened and become more liquid, central banks have relied more on market-based indicators, in particular on inflation and interest rate expectations.²² For example, in South Africa, FMD has allowed the central bank to assess the market expectations for interest rates from contracts benchmarked against interbank rates and inflation expectations from break-even

²¹ See the contributions from Saudi Arabia, Singapore and South Africa.

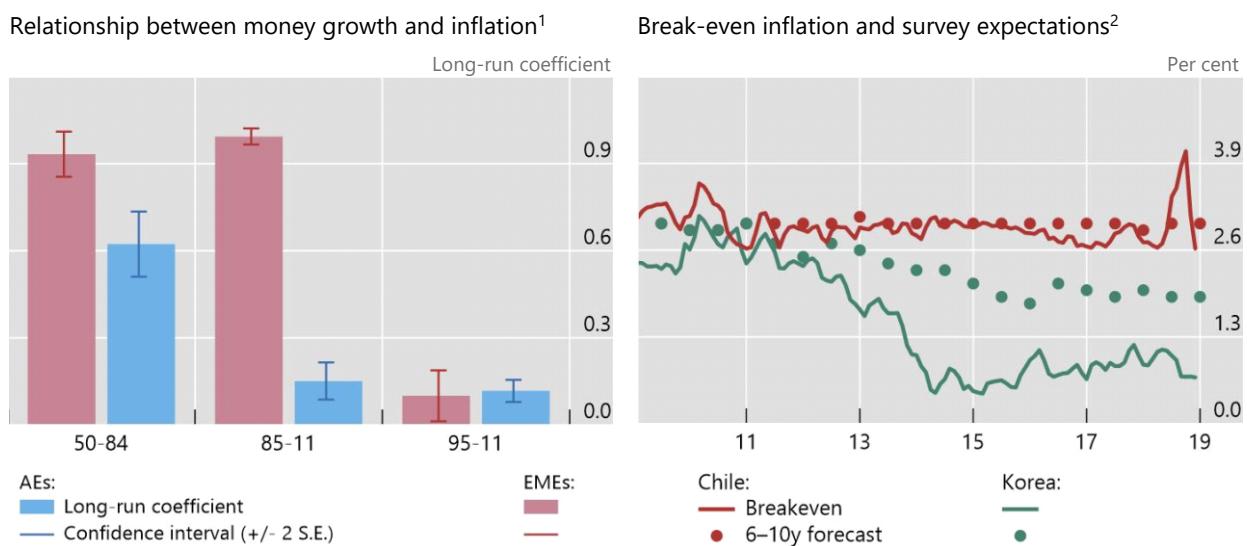
²² See also De Pooter et al (2014) and Sousa and Yetman (2016).

rates. Similarly, in Mexico, a deeper and more liquid money market has enabled the central bank to extract expectations of policy rate decisions. Other indicators have also proved relevant for monetary policy, for example, credit default swap spreads to measure country risk premia, and option-implied measures of currency and stock market volatility (see contribution by Russia).

That said, the number of available market-based indicators generally remains small in most EMEs. Their use can be constrained by illiquidity and varying risk premia. For example, the Bank of Korea reports that the volume of inflation-linked bonds remains small and the yields are volatile, even though issuance started over 10 years ago. As a result, break-even inflation rates are much more volatile than survey expectations (Graph 7, right-hand panel).

Shifting information content of macro-financial indicators

Graph 7



¹ The graph shows the long-run impact of money growth on inflation, estimated by the pooled mean group estimator. Based on Gertler and Hofmann (2016), Table 5. ² 10-year break-even inflation rates based on government bonds.

Sources: Gertler and Hofmann (2016); Bloomberg; Consensus Economics.

The use of market-based indicators for calibrating policy is generally not free of challenges. In addition to volatility, as discussed above, one issue is that the central bank may simply tease out of the market the information that the central bank itself has provided – a kind of “echo chamber” effect. Listening to market signals with self-awareness of the central bank’s outsized role in financial markets can give central banks space to take a more detached position and facilitates decision making (Shin (2017)).

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Appendix

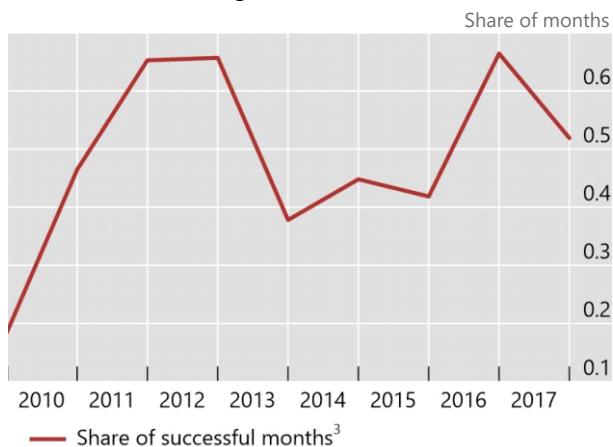
Establishing benchmark domestic currency bonds

Thanks to their superior liquidity, benchmark bonds are the primary instruments that market participants use to take positions and adjust prices in response to new information. Those prices then serve as a reference for the rest of the bond market, thus helping to improve the market's efficiency. They also support the development of local currency bond markets. While benchmark bonds seem to have arisen spontaneously (although over many decades) in the deepest and most liquid markets, such as in the United States,²³ authorities in many EMEs have taken steps to support their emergence. Recent research indicates that these policies can be successful, so that the benefits of benchmark bonds need not be confined to the largest and most liquid bond markets (Remolona and Yetman (2019)). With suitable prodding, much smaller markets can support benchmark bonds.

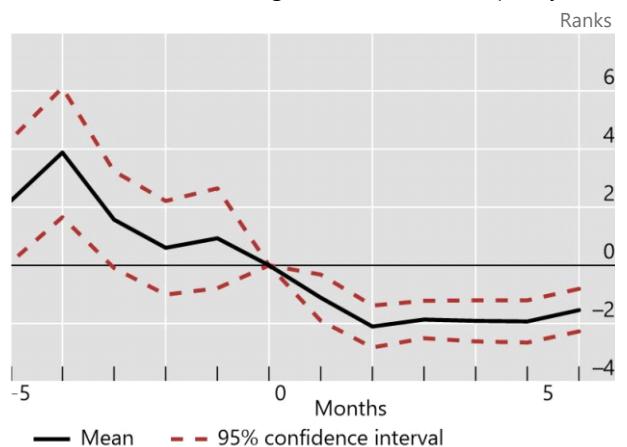
Making benchmark bonds¹

Graph A

Success in establishing benchmarks



Effect of benchmark designation on relative liquidity²



¹ Based on a study of local currency sovereign bonds of Indonesia, Malaysia and Thailand. ² Liquidity, by rank within market segment, measured relative to month 0, defined as the final month before a bond becomes a designated benchmark. The decrease in rank (increase in liquidity) around designation is highly statistically significant. ³ Displays the share of months for which designated benchmarks are the most liquid in their market segment, combining maturities and markets.

Source: Remolona and Yetman (2019).

Policymakers in EMEs have relied on a range of tools to develop benchmark bonds. Table A shows a selection. These include concentrating issuance on a limited number of maturities and issuing these on a large scale, exchanging nominated benchmark securities for non-benchmark ones, and frequent re-openings, ie issuing additional amounts of previously issued bonds. Indonesia, Malaysia and Thailand offer examples in which authorities have taken such measures (Table A).

These steps appear to have been generally successful (Graph A). In 60% of the sample, the designated benchmark is the most liquid bond within its market segment

²³ In the United States, for example, the on-the-run issues at two, five, 10 and 30 years are widely recognised as benchmarks. In Japan, there is a single benchmark that is a recently issued 10-year government bond (Boudoukh and Whitelaw (1991)).

(left-hand panel). This rises to 78% in the case of Malaysia. And around the time of the designation, the relative liquidity of the designated benchmark increases to a quantitatively large and statistically significant degree (right-hand panel).

The analysis indicates that several factors contribute to this success. Based on a probit model, these include (a) choosing as benchmarks bonds those that are already very liquid; (b) recycling bonds as benchmarks by reusing those that have previously been designated benchmarks at longer maturities; and (c) selecting bonds that will be issued frequently during their benchmark designation period. By contrast, neither the stock of past cumulative issuance nor the predictability of the authorities' benchmark choices play an important role.

Benchmark bonds in some EMEs

Table A

Economy	Maturities (years)	Additional steps taken
Argentina	1.5–10	Re-openings of outstanding instruments.
Chile	5, 10, 20, 30 (nominal and indexed)	Additional issuance of benchmark bonds to exchange for other non-benchmark Treasury securities.
Colombia	5, 10, 15 (nominal) 5, 10, 20 (indexed)	
Hong Kong SAR	0–15	
Indonesia	5, 10, 15, 20	Regular re-openings. Recycling benchmarks. Primary dealers required to make markets.
Israel	3, 5, 10, 30 (nominal) 5, 10, 30 (indexed)	
Korea	3, 10 becoming more important	Improving issuance and trade system.
Malaysia	3, 5, 7, 10	Regular re-openings. Recycling benchmarks. Primary dealers required to make markets.
Mexico	3, 10, 30 (at times also 5, 7 and 20)	
Poland	2, 5, 10	Regular issuance in sizes of at least EUR 5 billion.
Russia	Up to 20	
Singapore	2, 5, 10	Regular re-openings.
Thailand	5, 10, 15, 20, 30, 50	Regular re-openings. Recycling benchmarks. Primary dealers required to make markets.

Additional tables

Impact of FMD on instrument choice and vice versa

Table A1

	Little impact	To some extent	To significant extent	NA
Impact of FMD on instrument choice ¹	4	7	5	5
Impact of instrument choice on FMD ²	2	7	5	7

¹ The row shows the number of central banks with answers in the different categories, to the question: To what extent has the development of financial markets influenced the choice of instruments to implement monetary policy? ² The row shows the number of central banks with answers in the different categories, to the question: To what extent has the choice of monetary policy instruments affected the development of the respective markets?

Source: BIS survey.

Motivation for issuing central bank securities¹

Table A2

	Important	Not important	NA
Absorption of excess liquidity	14	0	7
Development of markets	9	5	7
Other	5		

¹ The table shows the number of central banks with answers in the different categories, to the question: What has been an important motivation for issuing central bank securities?

Source: BIS survey.

Maturity distribution of central bank securities, % of outstanding

Table A3

%	2000	2010	2018
< 1yr	68.4	81.6	81.6
1–3yrs	18.4	14.9	15.2
> 3 yrs	13.2	3.5	3.2

Note: If a country provided information for at least one maturity bracket, any missing replies in other brackets are counted as zero. Some country-year observations are missing from the sample.

Source: BIS survey.

Changes in interest rate pass-through since 2000¹

Table A4

No changes	Weaker	Has become stronger	NA
1	3	10	7

¹ The table shows the number of central banks with answers in the different categories, to the question: How has the pass-through from policy rates to lending rates for households and non-financial firms changed in your economy since 2000?

Source: BIS survey.

Role of FMD for changes in interest rate pass-through¹

Table A5

No impact	To some degree	Strongly	NA
2	10	3	6

¹ The table shows the number of central banks with answers in the different categories, to the question: To what extent does the possible change in interest rate pass-through reflect FMD?

Source: BIS survey.

Increased share of long-term domestic government bonds

Maturity distribution, % of outstanding debt

Table A6

Maturity bucket	2000	2010	2018	Degree of liquidity in 2018
< 1yr	33%	19%	14%	Low
1–5 yrs	38%	37%	34%	High
5–7 yrs	11%	8%	9%	High
7–10 yrs	11%	15%	18%	Moderate
Longer than 10 yrs	7%	21%	25%	Moderate

Note: Shares for maturity buckets are calculated on the basis of outstanding debt, for each year shown in the table. The degree of liquidity is the mode across responses. Some country-year observations are missing from the sample.

Source: BIS survey.

Role of FMD for changes in key funding rates¹

Table A7

Banks	Household (secured)	Households (unsecured)	Private non-financial corporates
No impact: 3	No impact: 2	No impact: 3	No impact: 2
To some degree: 5	To some degree: 7	To some degree: 7	To some degree: 8
Strongly: 3	Strongly: 3	Strongly: 1	Strongly: 2
NA: 10	NA: 9	NA: 10	NA: 9

¹ The table shows the number of central banks with answers in the different categories, to the questions: Has FMD played an important role in affecting the key funding rate? For which borrowing sector(s) has this been the case?

Source: BIS survey.

Changing importance of communication with target audiences¹

Table A8

Topic	Communication with resident investors (increased/unchanged importance) ²	Communication with non-resident investors (increased/unchanged importance) ²
Policy objectives	12/4	10/5
Policy strategy	13/3	11/4
Policy operations	16/1	12/3
Prudential policy, incl. CFM	13	11/1

¹ The table shows the number of central banks with answers in the different categories, to the question: In the light of FMD, such as the increasing size of certain types of investor, has communication with certain stakeholders become more or less important for achieving monetary policy objectives over the past decade? ² No central bank indicated decreased importance, in any category.

Source: BIS survey.

Financial market development and financial stability

Carlos Cantú and Michael Chui

Abstract

This paper analyses the financial stability implication of financial market development in emerging markets. On the one hand, financial market development has enhanced resilience and improved domestic financial stability by providing new tools to raise funds and manage risks. On the other hand, high foreign participation in local currency government bond markets, growing private sector foreign currency debt levels and the growing role of non-bank financial institutions have increased external vulnerabilities. These trade-offs raise several policy challenges such as developing hedging markets, improving monitoring of FX flows and implementing macroprudential tools and FX intervention. The paper concludes with some financial stability implications of fintech.

JEL classification: D47, G23, G28, G38, O3.

Keywords: financial market development, financial stability risks, capital markets, fintech.

Introduction

Financial market development (FMD) has improved overall financial resilience in emerging market economies (EMEs) over the last two decades, according to many of the central bank contributions for this meeting. But FMD has also meant a greater role for market dynamics, bringing “new” risks to the fore, in particular as EMEs become increasingly integrated into the global financial system.

This paper analyses the financial stability implications of FMD over the last 20 years. It begins with a brief overview of how FMD has interacted with domestic financial stability. Concentrating on the areas where FMD has had the greatest impact in recent decades, it then turns to the main focus of this paper: the financial stability implications of greater global integration of EMEs’ government and corporate bond markets as well as their FX markets. The subsequent section evaluates the measures EME central banks have introduced to monitor and mitigate these risks. The note concludes with a forward-looking section that explores the financial stability issues that are raised by fintech companies which provide credit.

FMD and domestic financial stability risks

In the aftermath of the crises in the 1990s, many EMEs sought to encourage FMD. As a result, capital markets have deepened, becoming more liquid and resilient. On some measures, equity and government bond markets in some EMEs are now comparable in size with those in small open AEs. That said, financial intermediation remains heavily bank-based, in particular for household lending.¹

As markets have developed, the private non-financial sector has become more indebted. Corporate borrowing has been rising rapidly. And total credit to EME households has almost doubled over the past decade. In several Asian EMEs, household credit relative to GDP has now reached levels similar to, or even higher than, those in the United States and some other advanced economies (AEs) (Graph 1, left-hand panel).

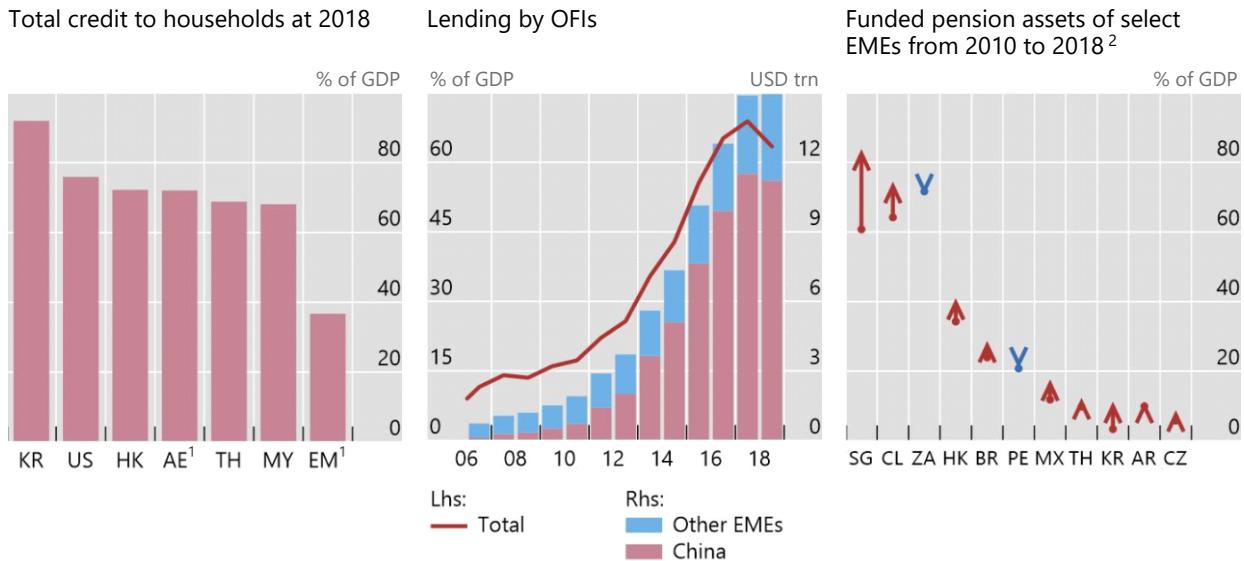
Although banks maintain their dominance, lending by non-bank financial intermediaries (NBFIIs) has increased quickly, their financial assets almost tripling from 2007 to reach 86% of GDP in 2018.² Expansion was especially rapid in China, where the assets of other financial intermediaries (OFIs), a sector dominated by investment funds, soared from \$270 billion in 2007 to \$11 trillion in 2018 (Graph 1, centre panel). Assets of pension funds have also grown in many EMEs, reflecting the strengthening of existing voluntary pension systems or the launching of new mandatory schemes (Graph 1, right-hand panel). But, except in a few jurisdictions, their size remains relatively small.

¹ See accompanying chartpack for details.

² See FSB (2020).

Household credit, OFI lending and pension assets

Graph 1



¹ Aggregates of all jurisdictions. ² Red arrow: an increase from 2010 to 2018; blue arrow: a decrease from 2010 to 2018.

Sources: FSB; IMF, *World Economic Outlook database*; BIS survey; BIS.

On balance, these developments have enhanced resilience and reduced domestic financial stability risks, as judged by several contributions to this meeting. Deeper financial markets should improve efficiency, by providing new tools to raise funds and manage risks. At the same time, a more diverse investor base can improve risk-sharing. And, despite rapid credit growth, key indicators generally suggest the banking sectors of many EMEs are healthy.

But growing private sector debt levels and the growing role of NBFIs may also mean increased vulnerabilities. High and rising private debt levels have been at the centre of many financial crises, including in EMEs. And shadow banking lay at the heart of the Great Financial Crisis. That said, other than in China, India and Korea, the size of the NIFI sector is still very small. Several country contributions do not consider shadow banking a significant source of systemic risk.³

FMD and cross-border vulnerabilities

Cross-border capital flows have long been a major driver of financial stability risks in EMEs. FMD over the past two decades has changed the currency composition of EMEs' assets and liabilities as well as the investor universe. These changes have important implications for EMEs' external vulnerabilities.

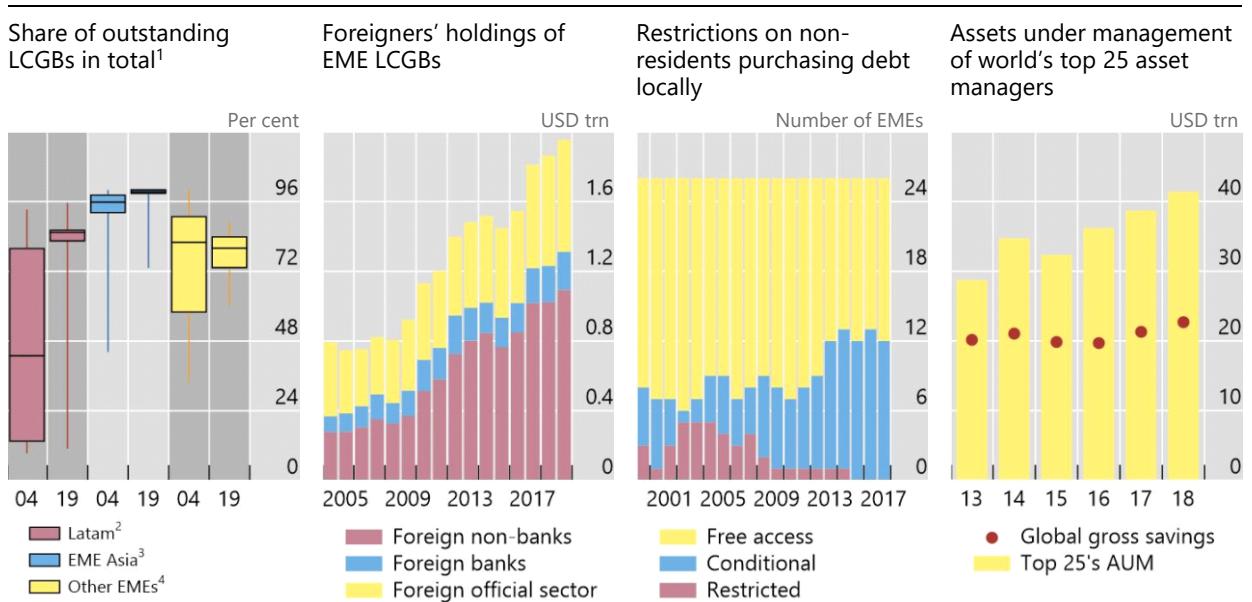
³ Furthermore, to reduce regulatory arbitrage between NBFIs and banks, some jurisdictions subject NBFIs to the same regulatory provisions as banks or "right-size" regulatory measures based on the scale and risks posed by the activities (eg Russia, Saudi Arabia or Singapore).

High foreign participation in local currency government bond markets

The deepening of local currency government bond (LCGB) markets has been one of the most successful aspects of FMD in many EMEs. This has been particularly so in Latin America, where the median share of government bonds denominated in domestic currency rose from 43% at end-2004 to 85% at end-2019 (Graph 2, first panel).

Foreign participation drove the development of LCGB markets

Graph 2



¹ Box and whisker plots show median, interquartile range and range. ² Argentina, Brazil, Chile, Colombia, Mexico and Peru. ³ China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand. ⁴ The Czech Republic, Hungary, Israel, Poland, Russia, Saudi Arabia, South Africa and Turkey.

Sources: Thomson Reuters Refinitiv; IMF, AREAER, Sovereign Debt and World Economic Outlook databases; IPE.

Policies to encourage foreign participation, coupled with the search for yield amid global low interest rates, have been important drivers. Non-resident holdings of EME LCGBs rose steadily from \$800 billion in 2004 to almost \$2 trillion in 2019 (Graph 2, second panel). Several FMD developments helped: first, as part of the efforts to diversify the investor base, many EMEs relaxed capital account restrictions on foreign participation in local bond markets (Graph 2, third panel).⁴ Second, as the size and liquidity of these markets grew, EME local government bonds emerged as a global asset class, stoking demand from institutional investors. For example, both the Bank of Mexico and the Central Bank of Colombia papers note that the inclusion of LCGBs into a global index was supportive for the domestic bond market development.

⁴ Since 2010, an increasing number of EMEs have introduced conditional requirements to allow foreign participation, coinciding with the start of what the World Bank termed the fourth wave of debt accumulation (Kose et al (2019)).

These changes have benefited EMEs in many ways. Most importantly, by borrowing in local currency governments have overcome the “original sin” problem, ie the inability to borrow internationally in domestic currency.⁵ Doing so can shield EME governments from the debilitating effects of large domestic currency depreciations, which at times has led to crises historically.

However, several central bank notes see the growing share of foreign participation in LCGB markets, especially by large global asset managers, as a risk.⁶ The top 25 asset managers, almost all based in the United States and in Europe, manage some \$40 trillion of assets, almost double the value of the world’s gross savings (Graph 2, fourth panel). Even small changes in the asset allocation of one asset manager could lead to large capital flows for small EMEs.

Destabilising price dynamics could also arise from the institutional and governance features that may impinge on asset manager behaviour. For example, tightened value-at-risk constraints during stressed periods could lead to forced asset sales or increased hedging activity, further amplifying volatility in the system. Moreover, the reliance on peer comparisons or benchmark indices to monitor fund performance could lead to herd behaviour by fund managers or too much risk taking in efforts to beat the benchmark (Morris et al (2017)). Finally, there is run risk.⁷ In times of stress, this may force asset managers into fire sales, which can lead to destabilising price spirals for less liquid assets such as corporate bonds.

In addition, increased foreign participation in LCGB markets may not completely shield EMEs from the risks of currency mismatches and sudden stops, or as coined by Carstens and Shin (2019), “original sin redux”. In effect, the currency mismatch is no longer borne by EME governments but by foreign investors, whenever they are unhedged.⁸ This can give rise to unwelcome feedback spirals. As large increases in domestic-currency bond yields often coincide with currency depreciation, this “double whammy” can trigger risk limits, leading to asset sales or more hedging.

The Hong Kong Monetary Authority (HKMA) note finds empirical support for this mechanism. For a start, low foreign investor participation has no impact on the dynamics of nominal yield spreads in Asian EMEs. Yet, once a critical threshold – estimated to be 13% – is breached, increases in participation widen yields when the local currency is expected to depreciate in line with the “original sin redux” hypothesis (red line Graph 3, left-hand panel). By decomposing the yield spread into its credit and currency risk components, the paper finds that the overall effect is only driven by currency risk (Graph 3, centre and right-hand panel).

⁵ Eichengreen et al (2003) coined the phrase “original sin” to describe the tendency for foreign investors to lend to EMEs only in foreign currencies due to EMEs’ structural weaknesses and lack of market credibility.

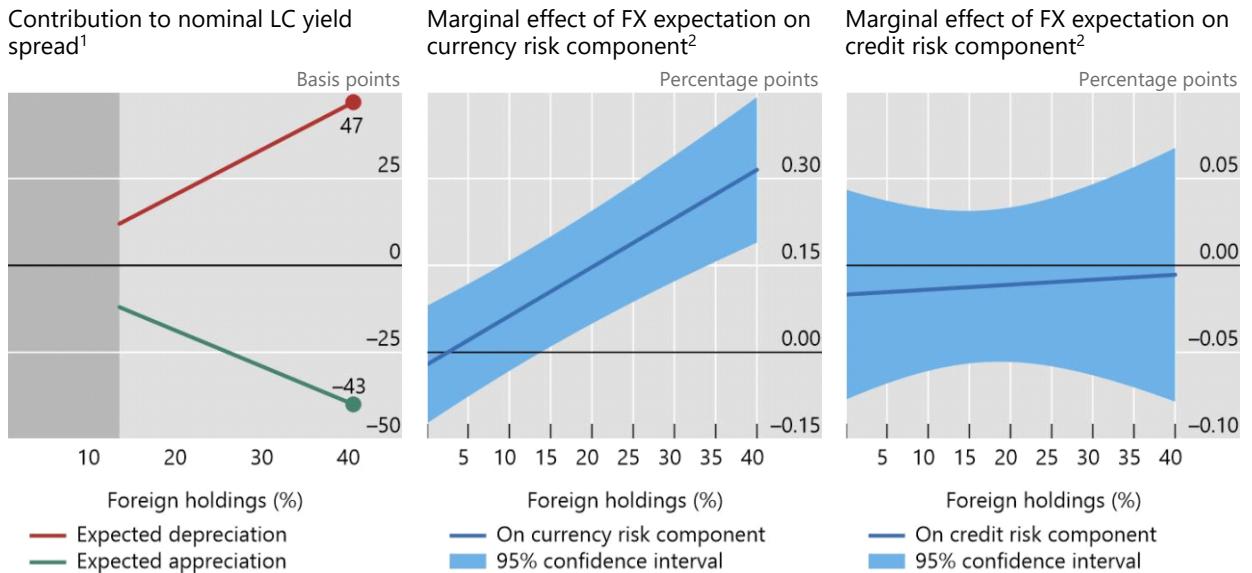
⁶ Argentina, Colombia, Hungary, Indonesia, Malaysia, Mexico and the Philippines.

⁷ At times of stress, an investor has the incentive to redeem from a fund earlier than others as the liquidation value of fund shares declines when there are large withdrawals.

⁸ The survey for this meeting shows that about half of the central banks do not know whether foreign investors have hedged their LCGB FX exposures or not. Those who do have information believe that foreign investors have hedged only partially (Graph 6).

Foreign participation affects sovereign yields through currency risk

Graph 3



¹ Shaded area denotes insignificant impact of changes in foreign holdings on LC yield spread. Expected appreciation and depreciation are represented by the cross-economy historical 1st and 99th percentile, respectively, of changes in risk reversal. ² Marginal effect of changes in lagged FX expectation on LCGB yield spread when the share of foreign holdings exceeds 13%.

Source: HKMA (2019).

Some model-based simulations suggest that “original sin redux” is a welfare improvement over “original sin” when there are global shocks (Annex A). For instance, after an increase in global interest rates, the decline of output in a small EME is sharpest in the case of “original sin” as the currency mismatch on EME balance sheets triggers financial constraints, negatively affecting output. In comparison, “original sin redux” helps mitigate the impact on EME output and investment, as the currency mismatches are on foreign balance sheets. But as EME borrowers still rely on foreign banks, they are not fully shielded from the tightening in global financial conditions. Accordingly, the decline in output can be further mitigated if the EME lender has a larger domestic investor base to draw on.

Non-financial corporate bond markets: surge in foreign currency debt

Despite the progress in the LCGB segment, most EME local currency non-financial corporate bond markets have lagged behind those of AEs in terms of volume and liquidity (see chartpack). Between 2009 and 2017, the median share of EME non-financial corporates’ local currency issuance was only 35% (Graph 4, left-hand panel), some 15 percentage points below the median in AEs. The exceptions are some large Asian EMEs, where the share exceeds 70%.⁹ One reason for their subdued development could be the lack of foreign participation. The survey for this meeting reveals that foreign participation is generally below 5% (Graph 4, centre panel), much

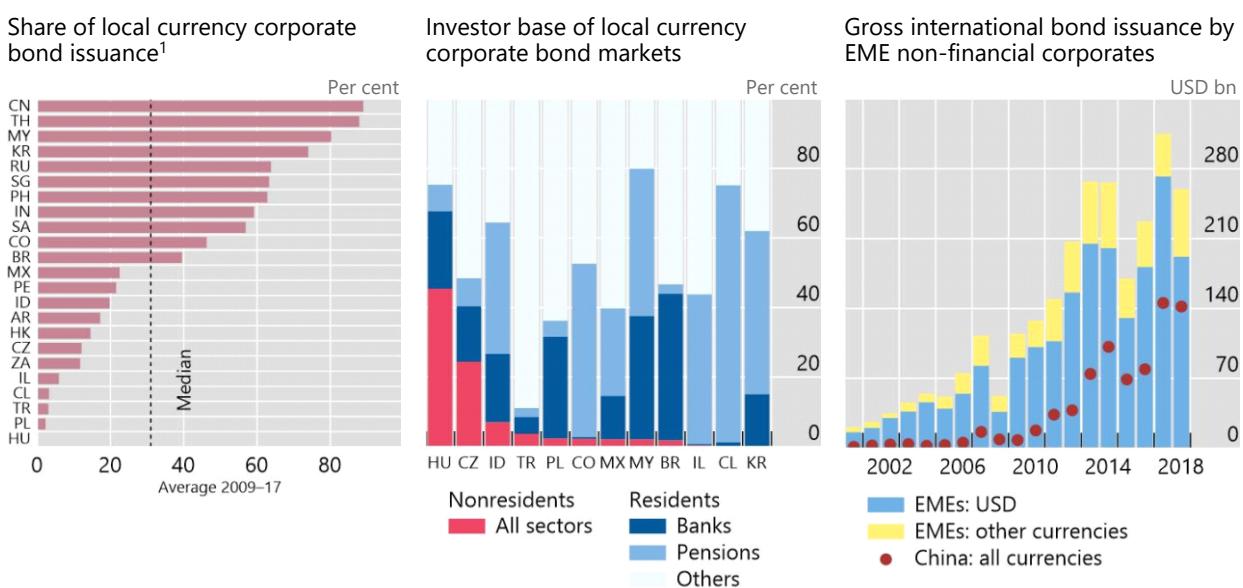
⁹ The note submitted by Brazil points out that the decline in longer-term yields associated with fiscal adjustment has spurred local capital markets by encouraging domestically based corporations to prepay their foreign currency liabilities and raise funds in local currency.

lower than the “threshold” level suggested in the HKMA note when foreign participation could lead to negative feedback spirals.

As an alternative to raising funds from banks, non-financial corporates have relied on international issuance in dollars. Aided by the search for yield in AEs and driven by Asian corporates – Chinese firms in particular – their annual new external dollar bond issuance more than doubled, from \$52 billion in 2008 to almost \$259 billion in 2018 (Graph 4, right-hand panel). Similar to the LCGBs, the growing inclusion of EME hard currency corporate bonds in global investors’ benchmarks has supported this trend.

EME corporates’ international debt issuance rose sharply

Graph 4



¹ By nationality. Average 2009–17.

Sources: CGFS (2019); BIS survey; BIS international debt securities statistics.

The latest surge of corporate external foreign currency debt issuance is likely to have increased EME vulnerabilities.

First, corporates’ leverage and foreign currency debt service burdens have increased, raising financial stability risks and potentially limiting policy space.¹⁰ High leverage makes EME corporates vulnerable to increases in borrowing costs. But even a moderately levered firm may not be able to cover its interest expense, however low that may be, if it is not profitable. For EME firms, a broad decline in earnings since 2010 has weakened their debt-servicing capacity (Beltran et al 2017). That said, the maturity of bonds has lengthened. The share of bonds with a maturity of less than five years has fallen from 40% in 2010 to 25% in 2018. This significantly reduces rollover risks.

¹⁰ The note from the Bank of Russia stresses that high levels of foreign currency-denominated corporate debt severely limited policy space during the 2008 and 2014 crises.

Second, amid the continued search for yield, credit quality has deteriorated. Issuance by lower-rated firms has been rising and there are signs that debt proceeds have been used less productively. The private capital stocks of many EMEs grew less than non-financial corporate debt over the last decade, suggesting the increased take-up of debt by EME non-financial corporates might not have been used for a corresponding increase in long-term investments (UNCTAD (2019)).

Finally, half of total EME hard currency corporate debt is owed by state-owned enterprises (SOEs), whose credit quality and profitability have been deteriorating in several cases. Further losses or downgrades could in some cases translate into elevated sovereign risks (Annex B).

FX markets: rise in derivatives turnover and offshore trading

FMD has also contributed to a strong growth in FX markets for EME currencies in recent years.¹¹ The average daily turnover of EME currencies, in both spot and derivative transactions, rose by almost 60% between 2016 and 2019, to \$1.6 trillion, representing almost 25% of global FX turnover. Apart from the gradual internationalisation of the Chinese renminbi, other general global macro and financial developments, FMD played a role here. The broadening of FX trading systems and their electronification have encouraged the participation of new players such as hedge funds, proprietary trading firms and algorithmic traders in a market traditionally dominated by inter-dealer trading among large banks (Patel and Xia (2019)).

FX derivatives have expanded strongly. The latest data show that the volume of trading in derivatives, on average, was twice that of spot transactions in April 2019. The robust growth of non-deliverable forwards (NDFs) stood out.

The impact of higher turnover in FX markets on financial stability is not clear-cut. On the one hand, higher turnover boosts market liquidity, and it can smooth price adjustments, enhancing markets' capacity to absorb shocks. On the other hand, it can also amplify global market spillovers and increase exchange rate volatility. Some central banks also worry that NDFs are not only used for hedging but for speculative purposes when the domestic currency is not fully convertible, with potentially destabilising effects.

Led by the robust growth in NDFs, offshore markets have grown in importance. Offshore turnover is larger than onshore turnover for emerging Asia currencies as a group and the ratio is above 3 for Latin America and some other EME currencies.

Views differ on the cost/benefit balance of the growing role of offshore markets. In a textbook world, this should not matter as the location of trading is immaterial.¹² In practice, though, offshore trading can have benefits. It can increase liquidity, which in turn reduces transaction costs, triggering a welcome feedback spiral. Overlapping time zones can also allow agents to trade around the clock, helping them manage

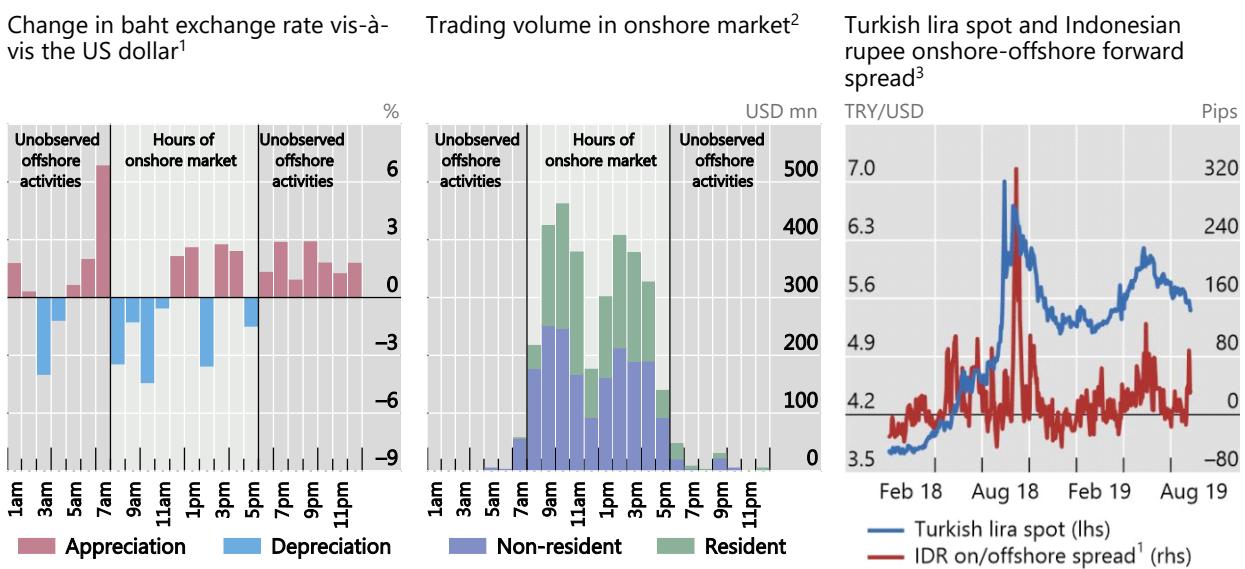
¹¹ There are exceptions. For example, the Central Bank of Israel note states that the recent increase in the turnover of foreign institutions in the FX market has not been matched by an increase in their involvement in domestic capital markets.

¹² For currencies with deep and liquid markets, this may even be so in practice most of the time. But in some instances, the location and time zone of trading matters, even for the most liquid currencies as illustrated by the role of early Asian trading during the sterling and yen flash events in recent years.

risks flexibly. Yet, offshore trading can contribute to exchange rate misalignments and adverse exchange rate dynamics for EME currencies with less liquid markets. For example, the Bank of Thailand's research shows how trading outside Asian trading hours has tended to have a very large price impact in recent years due to their one-way nature and subdued counter flows (Graph 5, left-hand and centre panels). The Central Bank of Malaysia notes a negative spillover impact from the offshore ringgit market on onshore spot after the US presidential election. The spike in the Turkish lira spot rate in September 2018 also coincided with a sharp increase in the offshore NDF rates in a few EME currencies (Graph 5, right-hand panel).

Non-residents' operating outside of the Asian session amplify market reaction

Graph 5



¹ Calculated from sum of hourly changes of THB since 2017. ² Trading volume is proxied by the average hourly volume of spot and forward transactions of the onshore market since 2019 (data inception). ³ Asia movement: change in the THB/USD during onshore market trading hours. London movement: change in THB/USD during the subsequent London trading hours.

Sources: Bank of Thailand; JPMorgan Chase.

Policy implications

FMD has changed the external financial stability risks in the past two decades, raising several policy challenges.

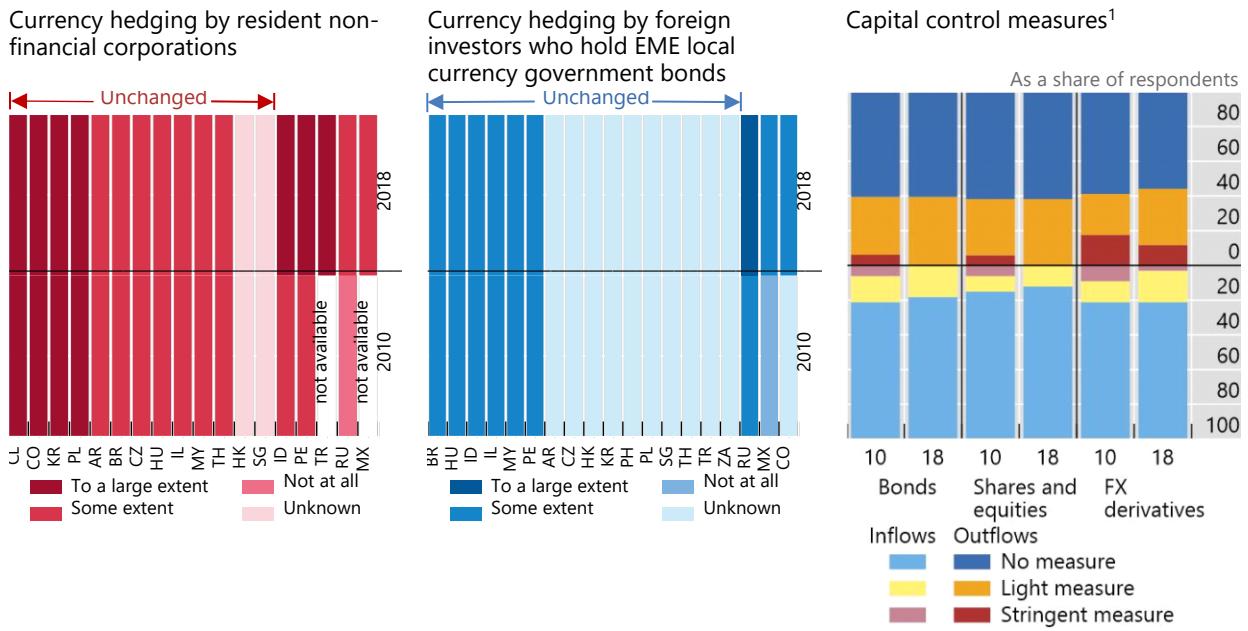
Developing hedging markets. The survey reveals that it is rather common for non-bank financials and non-financial firms in EMEs to hedge only a small portion of their FX exposures. And that has not changed much over the past decade (Graph 6, left-hand and centre panels). An often cited obstacle is the high hedging cost due to underdeveloped derivatives markets.

Various central banks have employed different strategies to promote these markets. For example, the Central Bank of Malaysia has launched a dynamic hedging programme to allow foreign investors to enter into NDF contracts onshore. Bank Indonesia has introduced mandatory corporate hedging requirements. A few central banks (eg those of Indonesia, Mexico and Turkey) have started to conduct FX interventions using NDFs settled in local currency to encourage a private sector

hedging culture. Annex C shows that allowing domestic institutional investors to purchase foreign securities and foreign investors to hold local currency bonds can help promote derivatives markets.

Qualitative hedging surveys by central banks

Graph 6



¹ For inflows, corresponds to restrictions on purchases locally by non-residents and restrictions on sales or issued abroad by residents. For outflows, corresponds to sales or issued locally by non-residents and purchased abroad by residents.

Source: BIS survey.

Improving monitoring of FX flows. The broader investor base in EME debt and FX markets has contributed to market depth and liquidity. But it could also generate destabilising price dynamics, especially when transactions are speculative in nature. In the current low global interest rate environment, FX carry trades involving EME currencies have become increasingly popular. This raises the risk of sudden capital outflows.¹³

It is important for EME central banks to continue monitoring flows in the FX market, including their size, composition and underlying drivers. But the increase in non-bank activities raises data challenges. Bank Indonesia and the Bank of Israel have recently introduced new reporting regulations, requiring market participants with a daily turnover above a certain threshold to report transactions. Yet it remains difficult to track data on offshore transactions, in particular when liquidity pools are fragmented. In this context, sharing of market intelligence between central banks could be an important way forward.

¹³ Some global investors have chosen to fund EME-focused carry trades with another highly correlated EME currency to reduce risk. For example, investors may fund long positions of the Brazilian real with the Mexican peso as both are perceived to be economies with commodity exposure. And this could lead to further increase in short-term capital flows to EMEs.

FX intervention. The evolving FX market structure has required central banks to adapt FX intervention strategies, such as the use of instruments.¹⁴ Although spot market interventions still remain most common, in recent years EME central banks have increased the use of derivatives. This has partly been driven by the heightened participation of non-bank financial intermediaries, which rely more on FX forwards and other derivatives. But it also seems to reflect the growing importance of financial stability considerations. Derivatives may be better suited to mitigate the tail risks associated with rising FX debt levels and increased foreign asset holdings as they provide market participants with instruments to self-insure.

The greater market fragmentation and the greater role of offshore markets can also have implications for the effectiveness of interventions. For instance, if the objective is to affect the exchange rate level, intervening in a less liquid, possibly offshore, market may provide "more bang for the buck". By contrast, if the objective is simply to build up reserves, intervening in a deep and liquid market may be more effective and less costly.

The prevalence of algorithmic trading can also influence aspects of FX intervention approaches such as transparency and the choice between rules and discretion. Transparency is indispensable if the central bank intends to provide a signal to the market and is required when central banks rely on rules and wish to anchor expectations. Yet, market participants may exploit a transparent, rules-based approach to profit from the predictability of automatic triggers.

Macroprudential tools and capital flow management measures. Many EME policymakers opt to use macroprudential measures to dampen the build-up of FX-related risks and liquidity risks. This is especially relevant when derivatives markets are still underdeveloped. A common example is to impose a reserve requirement on banks for foreign currency derivative transactions (eg FX swaps) vis-à-vis non-residents. The aim is to make these trades less profitable by effectively reducing the yield on the transaction. In addition, given that correlated and procyclical trading by asset management funds could destabilise asset markets, resulting in large losses that could propagate through the financial system, some AEs and EMEs have introduced macroprudential tools to ensure domestic mutual funds to have enough liquidity to cope with sudden increased demand for redemptions (BIS (2018), Chapter IV).

Some central banks have turned to capital flow management (CFM) measures. It is generally agreed that CFMs are no substitute for warranted macroeconomic adjustment, and should only be considered a last resort measure.¹⁵ In fact, against the background of strong global appetite for EME local currency government bonds, a rising number of EMEs have adjusted their capital account regulations to dampen volatile capital inflows in recent years (Graph 6, right-hand panel).

International investment positions. FMD coupled with massive accumulation of reserves has affected EMEs' international investment positions (IIPs). EME governments are now net foreign asset holders, while the private sector is a net international debtor. The overall IIP positions are strongly negative for many EMEs,

¹⁴ For a detailed discussion, including how goals and objectives of FX intervention have evolved see the 2019 Emerging Markets Deputy Governors meeting, BIS (2019b).

¹⁵ Question remains about whether CFMs should be applied preemptively or on an ad-hoc basis. ASEAN (2019) argues for a preemptive use of those CFMs that are aimed at ensuring financial stability.

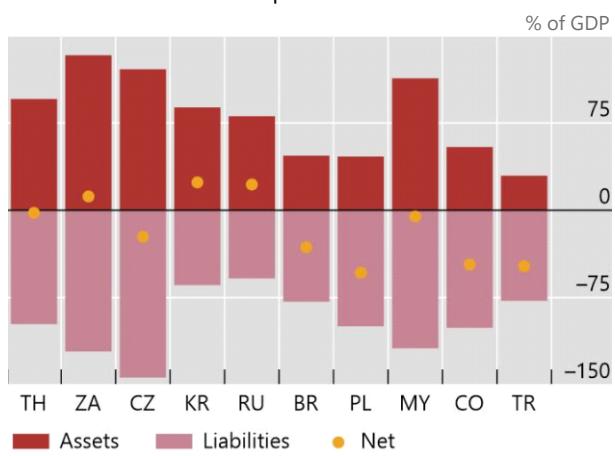
but not so once the currency composition is taken into account (Graph 7). IIP liabilities are often in domestic currency, suggesting a major role for the domestic equity holdings of foreign investors.

This suggests that, in aggregate, countries are now long or balanced in foreign currency – unobserved off-balance sheet positions aside. Yet, the distribution matters. The key current vulnerabilities are located in the private non-financial corporate sector. This puts a premium on the official sector's ability to transfer foreign currency funding or help hedge those in need at times of stress. It also raises questions concerning the possibility that large official sector FX holdings may have encouraged unhedged positions in the private sector – a form of moral hazard.

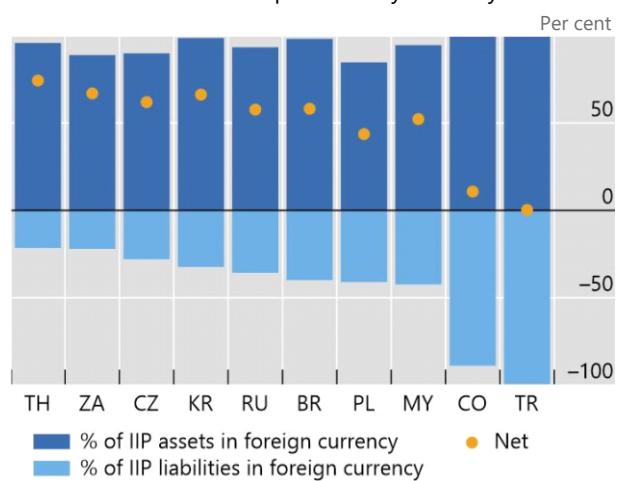
International investment positions and currency mismatches

Graph 7

International investment positions in 2018



International investment positions by currency in 2018



Sources: BIS survey; IMF, Balance of payments statistics and World Economic Outlook database.

Fintech and FMD

Going forward, fintech, big tech and other sources of innovation will be important drivers of FMD. In several EMEs, these developments have already started transforming financial services, including payments, money management, insurance and lending. While innovations can lower costs and improve financial sector efficiency, they could also erode the franchise value of existing financial institutions, leading to excessive risk-taking or regulatory arbitrage. Thus, central banks and regulators need to balance financial stability concerns and the benefits of innovation, as discussed in detail in the Monetary Authority of Singapore (MAS) note.

The role of technology firms in the provision of credit is particularly important given the core aim of FMD is to promote a financial system that enables the efficient pooling savings and foreign capital for productive long-term investment and consumption.¹⁶ Some successful examples in this area include the quick approval of

¹⁶ See chartpack for a definition of FMD. BIS (2019a), Chapter III provides a detailed discussion of Big techs' impact on credit provision as well as many other financial services.

microloans to small and medium-sized companies or individuals (the “missing middle”) based on credit scores created with social media footprints and mobile agency banking network microfinance (for the “bottom of the pyramid”).

As yet, fintech and big tech credit constitutes only a small part of total supply, but financial stability risks could emerge, in particular given the rapid pace of developments in other areas such as payments.¹⁷ For example, if these firms become significant suppliers asset backed securities or other structured products to fund their lending, that could transmit the risks to the broader financial system, in particular in times of stress.¹⁸ And even if fintech-based lending platforms evolve to start using their own balance sheet to intermediate funds, maturity mismatches could arise and opening up the possibility of runs without the protection of the standard safety net for banks. Finally, as highlighted by the MAS note, P2P lending is susceptible to swings in investor sentiment and risk appetite. This could result in more procyclical credit provision.

¹⁷ At the first instance, these firms’ growth could pose risks to consumer and investor protection.

¹⁸ Take China as an example, a large tech firm has used securitisation to finance its microlending business. The outstanding amount of these microloan-backed securities has grown from a negligible amount in 2015 to a peak of CNY 470 billion in 2017.

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Annex A: The original sin redux - a model-based evaluation

On the back of rapid growth in local currency debt markets over the last two decades, EMEs have reduced their reliance on external foreign currency borrowing – the so-called original sin. But this has not eliminated their financial vulnerability entirely. EMEs still rely heavily on foreign sources of funding, albeit in local currency, as their bond markets have a less developed base of domestic institutional investors. Carstens and Shin (2019) have termed this the “original sin redux”. They argue that this still leaves EMEs vulnerable to capital flow reversals on account of currency mismatches on the balance sheets of global lenders.

This annex discusses a model-based evaluation of the original sin redux and the vulnerability of EMEs to foreign shocks. It finds that, while the original sin redux reduces the vulnerability compared with original sin, it falls short of matching the benefits that ensue from a large domestic investor base.

The model is a two-country new Keynesian DSGE setup featuring a small open EME (the home country) and a large global economy (the United States). For ease of modelling, the currency mismatches are assumed on banks’ balance sheets but results would be similar if the mismatch affects other domestic balance sheets such as those of firms or governments and banks are hedged. In particular, EME firms borrow from domestic banks to finance investment. EME banks in turn obtain their funding from global banks and deposits from domestic households. Both domestic and foreign banks face a funding constraint that is governed by their net worth.¹⁹ This gives rise to a financial channel via the exchange rate. For instance, if the EME currency depreciates, the value of loans, which are in local currency, declines relative to the value of the liabilities, which are in foreign currency. This leads to a drop in net worth for the EME bank in the case of the original sin, and for the global bank in the case of the original sin redux.²⁰ In either case, there is a tightening in lending conditions that affects the real economy.

Graph A shows the impulse responses of EME variables to a 100 basis point increase in the US interest rate. The first panel shows that the shock leads to a depreciation of the exchange rate, which triggers the financial channel. As a result, GDP declines (second panel).

The decline is sharpest in the case of the original sin, where the currency mismatch is on the balance sheet of EME banks. In comparison, the original sin redux helps mitigate the impact on EME output and investment. In particular, while the exchange rate still depreciates, there is no direct impact on the balance sheet of domestic banks. As a result, net worth of domestic banks declines by less (Graph A, third panel), tightening in credit spreads is lower, and lending to EME firms declines by less than in the original sin scenario.²¹ Finally, the impact on the real economy is further mitigated in the presence of domestic sources of funding, as EME banks can

¹⁹ In this framework, banks could also be interpreted as asset managers more broadly.

²⁰ The drop in net worth could be mitigated if the global bank also has liabilities denominated in the EME currency. In the case where the EME currency liabilities and assets of the global bank are perfectly matched initially, the shock would lead to an increase in its capital to asset ratio (see for instance Fukao, 1991). In this model however, all liabilities of global banks are in dollars.

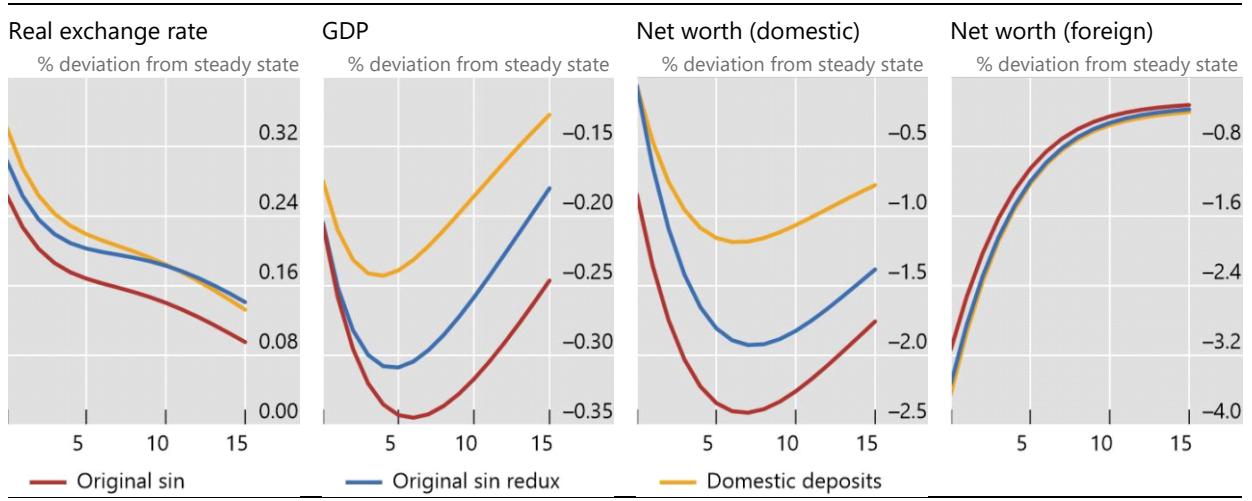
²¹ Conversely, the decline in net worth and output in the US is larger under the original sin redux scenario compared to original sin (Graph A, fourth panel).

also borrow directly from domestic households and are to some extent shielded from the tightening in lending conditions by foreign banks. These results are qualitatively similar in their response to other foreign shocks, such as a financial shock to the leverage constraint of global banks, as considered by Gertler and Karadi (2011).

However, risk-sharing across continues to be beneficial. For domestic shocks, the fall in output is higher in the presence of domestic deposits as foreign sources of funding act as a stabilising force. This suggests that having diversified sources of funding is optimal, even though it is hard to quantify where this optimum lies.

Response of EME to a US monetary policy shock of 100 basis points¹

Graph A



¹ Impulse responses are in percentage deviations from the non-stochastic steady state. The exchange rate is defined as the number of EME currency units per unit of foreign currency, so that an increase denotes an EME depreciation. "Original sin" denotes a scenario where the EME borrows entirely from abroad in foreign currency. "Original sin redux" is a scenario in which the EME borrows entirely from abroad in local (EME) currency. "Domestic" deposits denotes a scenario in which half of the EME borrowing is from domestic deposits and half is from abroad, both in local (EME) currency.

Source: BIS calculations.

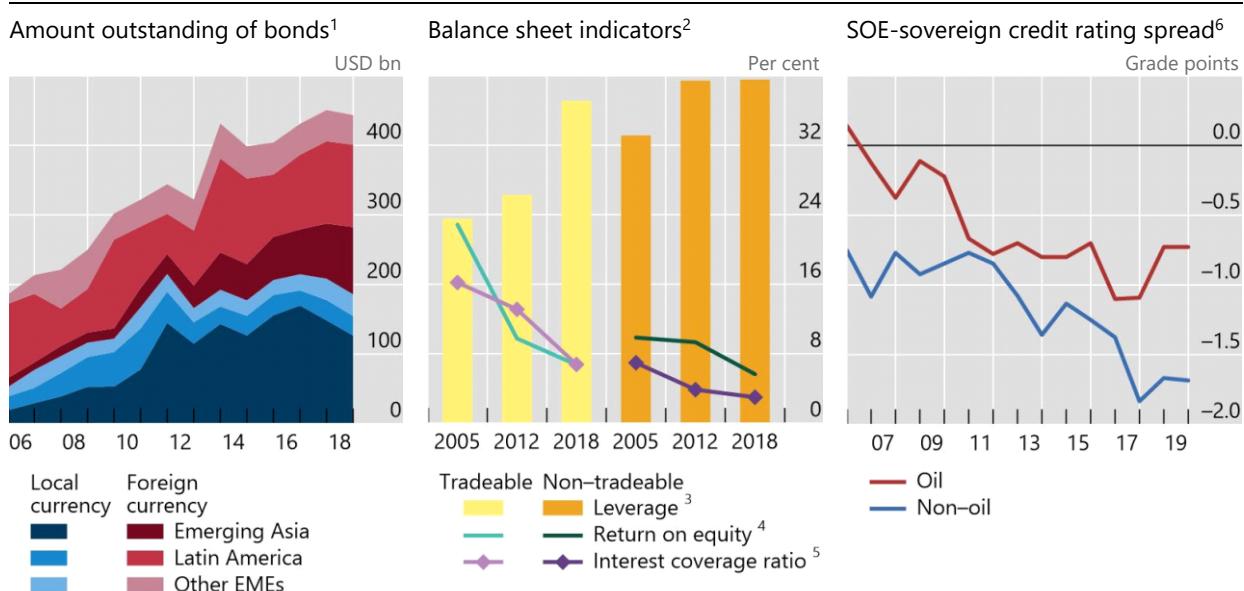
Annex B: Too-big-to-fail: state-owned enterprises

Many state-owned enterprises have been in a better position than private firms to reap the benefits of capital market development. First, their creditworthiness is often perceived as stronger, due to explicit or implicit government guarantees. For similar reasons, banks are more willing to lend to SOEs than to firms with a similar financial position. A contributing factor is that these firms tend to be big, with tangible assets that can serve as collateral. Second, funding for these large firms has benefited from growing investor demand for sovereign and corporate bonds.

These factors have enabled EME SOEs to raise significant amounts of funding in international and local bond markets (Graph B, left-hand panel). From 2005 to 2018, the value of outstanding bonds more than doubled, surging to \$450 billion. The currency composition of debt, which has remained broadly constant over time, differs substantially across regions. In 2018, the share of foreign currency bonds of Latin American SOEs was around 80%, compared with 44% for Asian SOEs.

SOEs financial strength has deteriorated sharply

Graph B



¹ Based on data from 34 SOEs. Latin America (eight SOEs): AR, BR, CL, CO, MX, PE; Emerging Asia (19 SOEs): CN, IN, ID, KR, MY, SG, TH; Other EMEs (seven SOEs): CZ, RU, AE, ZA. ² Non-tradeable sector (16 SOEs) includes electricity, construction/real estate/ports, transportation and utilities. Tradable sector (18 SOEs) includes oil and gas, aluminium, chemicals, and copper. ³ Debt over equity. ⁴ Net income over equity. ⁵ Earnings before interest and taxes over interest expenses. ⁶ Based on S&P's long-term foreign currency issuer rating of 31 SOEs and their respective sovereigns.

Sources: Capital IQ; Bloomberg.

As SOEs have accumulated debt and their leverage increased, their profitability and debt servicing capacity have fallen (Graph B, centre panel). As a result, SOE credit ratings have dropped (Graph B, right-hand panel). Non-economic factors have helped to erode the financial strength of some major SOEs. For instance, weak corporate governance has led to the inefficient use of resources, and revenues have been diverted to government coffers. In 2015, some Latin American SOEs were on the verge of bankruptcy due to political corruption scandals.

The weak performance of SOEs has also affected the credit standing of their sovereigns. For most, SOE credit ratings have declined to levels just above investment grade. If SOEs' ratings dropped below this threshold, this would lead to forced bond selling by many investment funds. The reduced market access could force a government rescue, which in turn could put the stability of public finances at risk. A decomposition of changes in credit spreads suggests that, in recent years, the heightened credit risk of SOEs has spilled over into sovereign spreads (IMF (2019)).²²

²² Another financial stability issue is the degree of domestic banks' exposure to SOEs debt, including to the firms that provide services to them. Although bank solvency is not a major risk, a rating downgrade of the SOE could trigger higher capital requirements and increase credit costs.

Annex C: Institutional investors, FX derivatives and banking stability

Allowing domestic institutional investors to hold foreign securities and currency hedging practices can spur growth in FX derivatives market. This annex shows some examples.

Over the past decades, authorities have started to allow institutional investors to increase their foreign securities holdings. This has boosted their demand for hedging.²³ For example, in Israel, the increase in institutional investors' foreign assets holdings since 2009 has coincided with a less than proportionate rise in foreign currency exposure, pointing to the growing use of hedging (Graph C, left-hand panel).

The growth in derivatives markets depends on the development of two-sided markets. The Chilean experience is a case in point (CGFS (2009)). Following the relaxation of capital controls in 2001, pension funds started to include foreign assets in their portfolios. In 2008, it was estimated that these pension funds hedged up to 80% of their FX exposure. Typically, this would involve Chilean pension funds selling long forward positions in foreign currencies to the local banking system. Local banks, in turn, would sell long forward positions in foreign currency to their clients. Notably, these would include domestic firms that had issued foreign currency-denominated debt or importers who needed to pay for imported raw materials. As such, banks' foreign currency exposures would net out to some extent, and would be kept close to zero if the two sides were of similar magnitude. To be sure, banks in many jurisdictions are required by regulations to keep net foreign currency exposures close to zero. However, in the Chilean case, the participation of pension funds allowed local banks to expand their role as matching agents, thereby facilitating the development of derivatives markets.

Matching demand in this way is important if banks are to reduce their foreign currency exposures, thereby enhancing their stability. This can be illustrated with data from Korea. When a Korean pension fund purchases a foreign bond and wants to hedge the FX risks, it can enter into a forward (or swap) contract with a local bank. In doing so, the bank effectively assumes the foreign exchange risk, recording an increase of FX position on the asset side of its balance sheet. The bank can offset this risk in two ways. It can borrow foreign currency. Alternatively, it can transfer the currency risk by signing an offsetting forward contract with a foreign bank branch or foreign investor. The difference between the two is that, in the latter case, the bank will not need to build up short-term external debts by meeting the hedging needs of its clients.²⁴ It can be seen that, despite the increase in swap contracts in banks' assets during this period, banks have reduced their FX debt due to an increase in NDFs on the liability side of the balance sheet (Graph C, centre and right-hand panels).

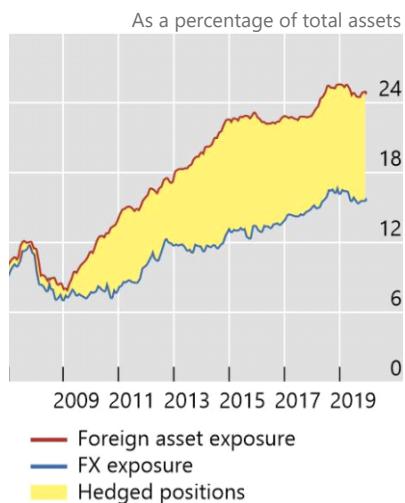
²³ In many jurisdictions, authorities also set limits on pension funds' foreign currency exposure to accompany the relaxation on their foreign securities holdings. In Hong Kong SAR, for example, there is no limit on a mandatory pension fund scheme's foreign investments but the fund must restrict its foreign currency exposure to not more than 70% of its total assets (CGFS (2009)).

²⁴ It should be noted that in both cases, Korean banks are building up debt vis-à-vis foreigners; but the difference is that by signing an offsetting forward contract with a foreign bank branch, the banks' debt are "collateralised" by the other currency leg.

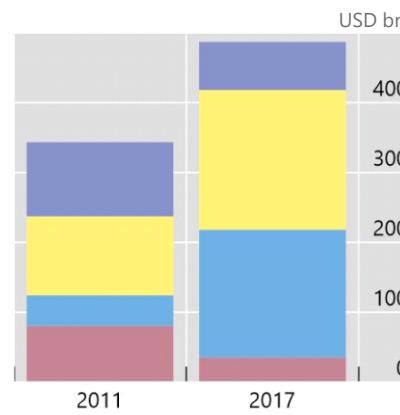
Domestic institutional investors and the development of hedging markets

Graph C

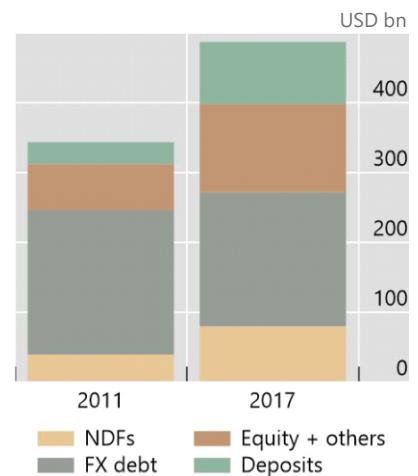
Foreign assets of Israeli institutional investors



Korean banks' assets



Korean banks' liabilities



Sources: Bank of Israel; Bank of Korea.

Financial market development, monetary policy and financial stability in an emerging market economy¹

Jorge Carrera, Horacio Aguirre and Marcelo Raffin

Abstract

This note describes the Argentine financial system, explains how monetary policy is shaped by the degree of financial development, and how it interacts with financial stability. The degree of financial market development weighs substantially on monetary policy and financial stability in emerging market economies such as Argentina. How far financial markets carry out effective intermediation, in which currencies and at what maturities, all influence the way in which monetary and financial stability policies are implemented, and their transmission to the rest of the economy. We also look at the lessons from the recent experience of full capital account liberalisation, rapid indebtedness and the ensuing financial turbulence in Argentina.

JEL codes: E58, G28, F30.

Keywords: financial market development, monetary policy, financial stability, emerging market economies.

¹ Central Bank of Argentina.

Note prepared for presentation at the meeting of Emerging Market Deputy Governors, BIS, Basel, 13-14 February 2020. We wish to thank Germán Feldman, Martín Corvo, Jorge Golla and Manuel Duarte Inchausti for valuable inputs.

The degree of financial market development weighs substantially on monetary policy and financial stability in emerging market economies (EMEs). How far financial markets carry out effective intermediation, in which currencies and at what maturities, all influence how monetary and financial stability policies are implemented and transmitted to the rest of the economy. In this note, we review the basic features of the Argentine financial system, outline how monetary policy is shaped by the degree of financial development, and how it interacts with financial stability. We conclude with the lessons drawn from the recent experience of rapid capital account liberalisation and indebtedness in Argentina.

Financial market development in Argentina

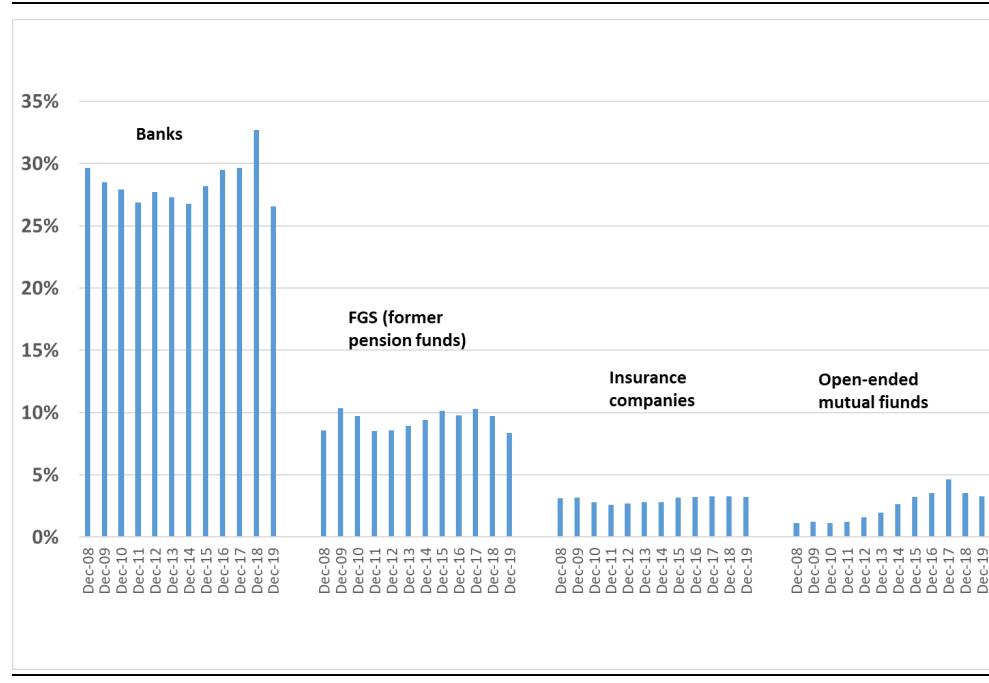
Financial market structure

Argentina's financial system is moderate in size compared with the average of other EMEs. The total assets of financial entities and the main institutional investors are equivalent to 41% of GDP as of December 2019. The financial system is mainly bank-based, with the total assets of banks equivalent to almost 27% of GDP. In terms of institutional investors, the Sustainability Guaranty Fund (*Fondo de Garantía de Sustentabilidad* (FGS), a government-managed portfolio resulting from the nationalisation of pension funds in 2008) has a leading role. The FGS portfolio is bigger than the combined assets of other relevant investors (ie insurance companies and mutual funds).

Argentina's financial system – main participants

Assets in terms of GDP (%)

Graph 1



Sources: BCRA based on ANSES-FGS, SSN CNV and CAFCI.

Local capital markets are less deep and liquid than others in Latin America. This is due to persistent macroeconomic imbalances, changing policies (including different monetary regimes) and a succession of crises in the last two decades (including the 2001 default). .

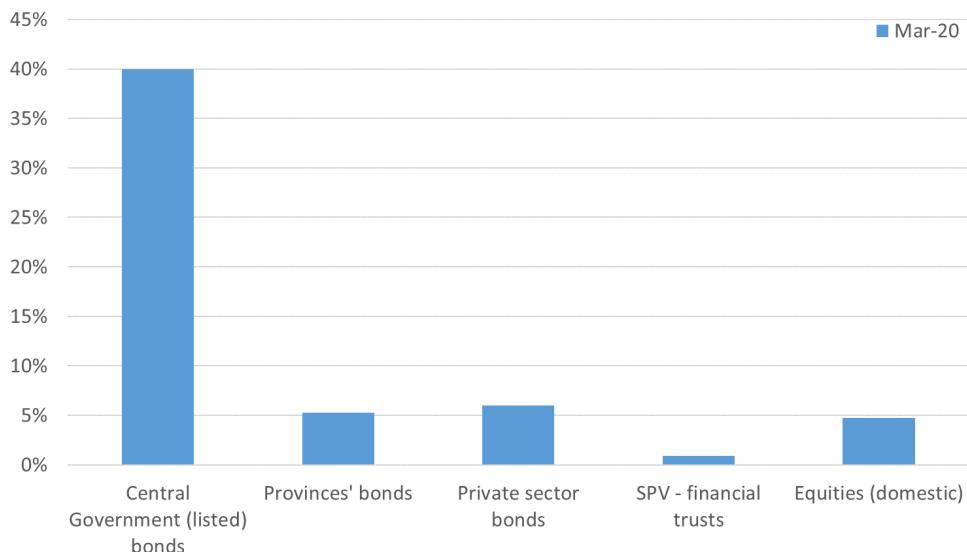
Government bonds play a large part in Argentina's capital markets in terms of total outstanding securities (including those issued locally and/or in international markets). On the other hand, the weight of private sector securities (such as corporate bonds, equities and securities associated with financial trusts) is more subdued than in other markets. This is reflected in the structure of institutional investors' portfolios, with sovereign bonds accounting for 70% of total FGS assets.²

Two laws have been passed to address the small scale of domestic capital markets during the past decade. In 2012, Law 26,831 sought to increase the regulatory and enforcement powers of the regulator (*Comisión Nacional de Valores* (CNV)), changing the map of agents and markets (including the demutualisation of markets) and introducing improved links between different domestic markets (federalisation), among other reforms. More recently, in 2018, Law 27,440 revised the regulatory framework, introducing new instruments/agents (including, for instance, new SME instruments) and modernising existing ones (such as closed-ended mutual funds and mortgage-backed securities (MBS)) and reducing tax burdens.

Argentine capital markets

Securities stocks in terms of GDP (%) – March 2020

Graph 2



Sources: BCRA estimates, based on MECON, CNV and IAMC.

² With a significant but lower weight for government bonds when considering the portfolios of insurance companies (34%) and mutual funds (15%).

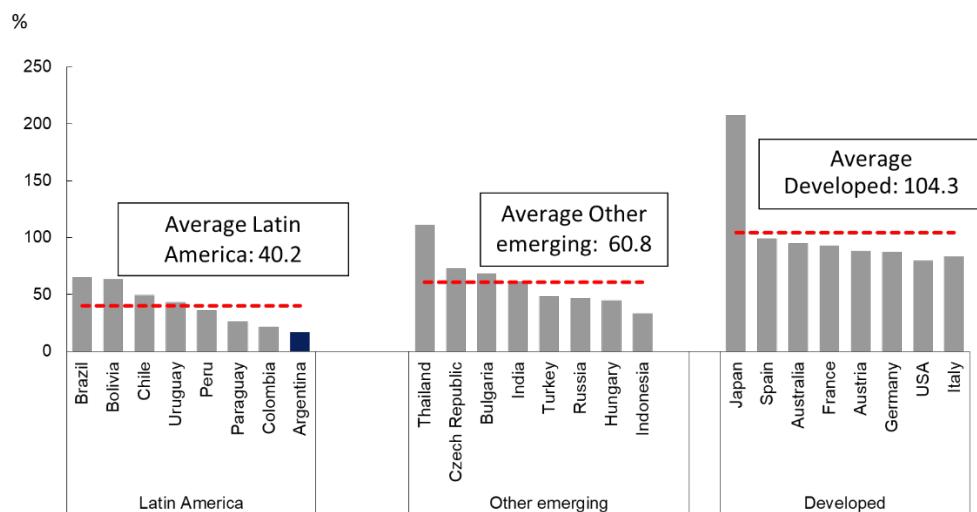
Banking sector³

One relevant feature of the Argentine banking sector is its relatively low depth. Private sector deposits represent nearly 16.8% of GDP, which is low compared with many other EMEs.

Private sector deposits – international comparison

As % of GDP

Graph 3



Sources: BCRA and IMF. Latest available data.

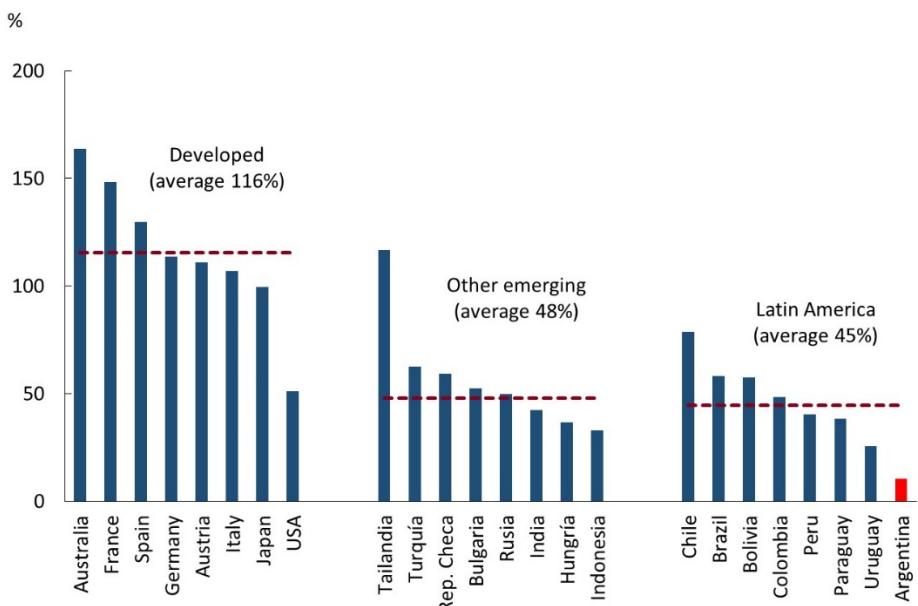
Loans to the private sector are currently equivalent to 10.5% of GDP, almost half the historical peak, and well below levels in other EMEs. This ratio has fallen in recent years, reflecting the slowdown in the real economy. Lending in pesos represents almost 76% of total credit. Corporate funding accounts for 52% of total private sector financing, with households accounting for the rest. Mortgage lending (to both households and firms) represents only a small share of total bank credit, equivalent to only 1.5% of GDP in December 2019 (14% of total private sector financing), with household mortgages accounting for almost 82% of that figure.

³ Including all financial institutions (banks and non-bank deposit-takers) under the supervision of the BCRA. For a more detailed assessment, see Financial Stability Report.

Credit to the private sector – international comparison

As % GDP

Graph 4



Sources: BCRA and IMF. Latest available data.

Credit to the private sector is the most important component of local banks assets, accounting for approximately 40% in December 2019. Liquid resources (including monetary regulation instruments) account for almost 37% of assets and lending to the public sector nearly 10%.

Total deposits represented 72% of banks' total funding as of December 2019, mainly from the private sector (60% of total funding). Total net worth amounts to 13% of total funding. Other sources of funding, such as foreign credit lines, corporate bonds and subordinated debt, remain small (4% of total funding).

It should be highlighted that local banks' activity is mostly transactional in nature, while financial intermediation is characterised by limited maturity transformation. Bank funding and assets are mainly short-term in nature. A significant portion of the financial system's funding is relatively stable (comprising sight deposits in pesos), being linked to the transactional needs of households and businesses' operational requirements. The effective term of these liabilities tends to be longer than the contractual period.

The impact of financial market development on monetary policy

The degree of financial market development (FMD) weighs substantially on the design and implementation of monetary policy in Argentina. The features outlined above go a long way in shaping the choice of monetary policy instruments and their

expected effectiveness. Low FMD means that maturity transformation is carried out only to a very limited extent.

In its conventional form, monetary policy influences private sector decisions through intertemporal substitution (making current consumption more or less costly vis-à-vis future consumption). This allows policymakers to regulate aggregate demand and, through the impact on the output gap, inflation dynamics. Inflation expectations are formed based on this monetary policy impact, and so the (credible) announcement of interest rate setting can move inflation expectations as desired. The links in this chain are altered, or even broken, when FMD is low.

Under low financial intermediation, interest rate changes have only a subdued impact on consumption. In shallow financial markets, maturity decisions may be compressed to, say, less than a year, with scarce long-term credit to speak of. In Argentina, the average maturity of the most representative lines of loans to companies range from less than two months (discounted notes) to one year (bills or documents). This in turn lessens the leverage that monetary policy can bring to bear on aggregate demand, and its ability to influence the output gap. Therefore, inflation expectations will change very little due to the intended impact on intertemporal substitution. Short bond maturities in underdeveloped capital markets also constrain the transmission from short-term to long-term interest rates. Finally, at the operational level, the menu of instruments available for open market operations is limited as well. Episodes of default have led to the use of central bank-issued securities to carry out such operations.

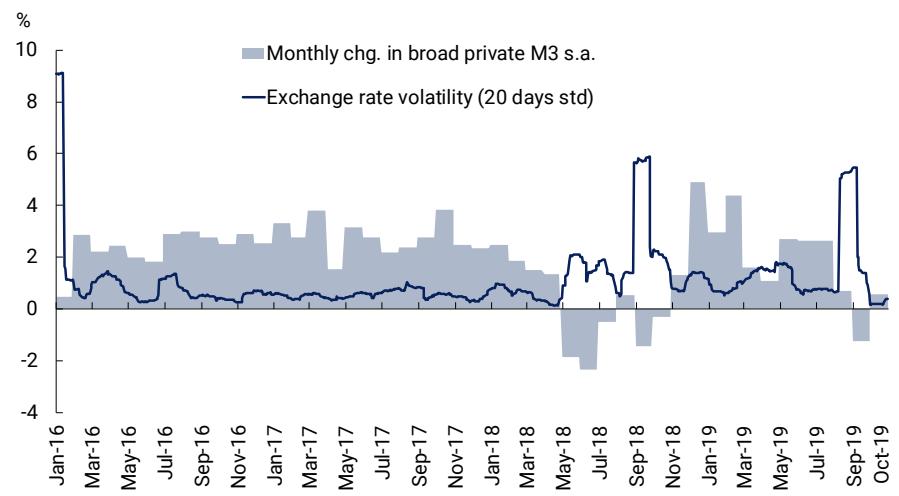
Rather than intertemporal substitution through financial intermediation, private sector decisions are about the degree of portfolio dollarisation, ie currency substitution. In other words, consumers and companies are making decisions not so much about whether to save or lend at shorter or longer terms (and in which instruments), as about saving in the local or a foreign currency (in typically a narrow variety of instruments). Financial decisions "across currencies" tend to dominate those "over time".

The exchange rate channel of monetary policy becomes more important. Changes in monetary policy rates may have an impact on inflation expectations, but this is exerted through their effect on exchange rate dynamics. The role of the exchange rate for expectations formation stands out in estimated Phillips curves for Argentina in different periods (D'Amato and Garegnani (2009); Krysa and Lanteri (2018)), where the coefficient for the exchange rate is systematically higher than that of the output gap. DSGE models of the Argentine economy also reveal the fundamental role of the exchange rate in inflation dynamics. While pass-through is endogenous and dependent on the monetary policy stance, ERPT coefficients in Argentina continue to be four to eight times higher than other Latin American countries.

But currency factors also have a financial stability dimension. As savings decisions are not so much about how to smooth intertemporal consumption over time, but about how to allocate wealth in local or foreign currency, exchange rate swings may weigh on financial stability much more than could be expected. The relationship between savings in local currency and FX volatility provides a clear illustration (Graph 5). The sum of time deposits and private non-financial sector holdings of central bank bills shows a negative correlation of 72% with nominal exchange rate volatility.

Foreign exchange volatility and savings in local currency

Graph 5



Source: BCRA.

For the reasons just outlined, FX intervention policy becomes a relevant monetary policy tool (Aguirre et al (2019)). In a relatively small foreign exchange market like that of Argentina, very small movements can become easily amplified: this reinforces the motivation for central bank intervention when such movements are unrelated to economic fundamentals.

The importance of FX intervention is underscored by the small size of the domestic market for currency hedging: open interest in Rofex (the main FX futures market) accounted for 94% of traded amounts in 2018, which in turn represented 0.6% of GDP as of December 2018. The use of FX hedging using derivatives by banks is limited: according to the BIS Triennial Central Bank Survey of Foreign Exchange and OTC Derivatives Markets, only 5% of total derivatives transactions reported as of December 2018 were motivated by hedging.

Recent experience also indicates that the use of the interest rate as the only policy tool, together with full capital mobility, leaves the economy exposed to sudden stops of capital flows, with adverse consequences for price and financial stability (see Section 3). This is compounded by the high portfolio dollarisation of the Argentine private sector, as a consequence of a history of macroeconomic crises. In this light, capital flow management measures have become part of the macroprudential policy package, as they can prevent excessive risk-taking in the currency market and limit negative spillovers from the financial system to the economy at large.

More generally, an integrated monetary policy approach (Agénor and Pereira da Silva (2018)) contemplates the use of standard tools (such as interest rates) with foreign exchange intervention and macroprudential policy, including capital flow management measures. Such an approach may be called for in the presence of one or more of the following conditions: a high impact of nominal exchange rate movements on inflation or inflation expectations; real exchange rate variability that distorts consumption and investment decisions; an impact of portfolio shifts between local and foreign currency-denominated assets on financial stability; and underdeveloped financial and foreign exchange markets. Indeed, models estimated

and calibrated for the Argentine economy suggest that the optimal policy mix includes interest rate policy, foreign exchange intervention and capital flow management measures (Escudé (2015)). The following section deals in more detail with the financial stability dimension.

Impact of FMD on financial stability

The size of Argentine capital markets expanded from 2016 to mid-2018, based on the implementation of several macroeconomic policies. Those included: the liberalisation of capital controls; corrections in relative prices; the normalisation of public sector debt that was in dispute; the introduction of an inflation targeting regime; and policy measures that aimed to foster the construction of a yield curve in domestic currency (national government issuance of the so-called BONTEs). In this context, securities issuance from both the public and private sectors rose sharply between 2016 and mid-2018 in nominal terms (although annual gross flows to the private sector in terms of GDP remained low). This was accompanied by increasing portfolio inflows until the second quarter of 2018.

Nevertheless, this trend was interrupted by mid 2018 due to the sudden stop in capital flows undergone by EMEs since May 2018. Although the overall magnitude of the event was smaller than that of previous sudden stops for EMEs (ie the 2013 taper tantrum), it had a more significant impact on certain economies. Argentina was among the countries that suffered the most from the tightening of financial conditions for EMEs since late April 2018, with significant portfolio outflows and pressures on the FX market (which ultimately led to a standby arrangement with the IMF).

The episode illustrates the kind of risks frequently associated to market-based finance. The sudden stop hit Argentine assets in both local and foreign currency, but its trigger was the sale of central bank bills (LEBACs) by foreign funds. In a few days, the initial shock was amplified by sales from local money-market mutual funds, which were also large holders of LEBACs. While the banking system was largely isolated from the disruption, market volatility escalated and led to changes in monetary policy implementation, including a new policy regime in place from October 2018.

Volatility resumed in 2019 (a presidential election year), in both the FX and government debt markets. After the primary elections (August 2019), the risk perception of Argentine assets went up, eroding the public sector's ability to roll over short-term debt at maturity. This caused a sharp drop in the price of all Argentine assets (corporate and sovereign bonds, as well as equities), together with a fall in the exchange rate and a withdrawal of dollar deposits. With limited access to the debt market, the repayment terms of Treasury bills were rescheduled (reprofiling), and the intention to proceed with a voluntary extension of the terms of some sovereign bonds was announced. In addition, the BCRA implemented a series of measures to regulate access to the foreign exchange market, limiting the purchases of foreign assets for no specific use and adjusting the settlement terms of export collections. Although higher volatility did impact certain market segments (eg fixed income and money market mutual funds recorded significant redemptions), financial system soundness has been largely unaffected.

Banking sector: liquidity and solvency

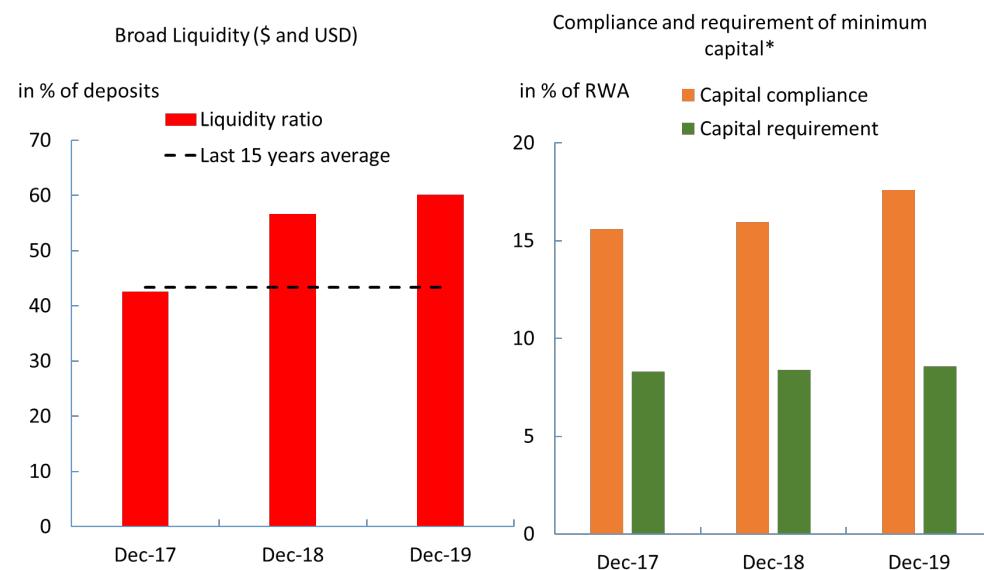
In spite of recent developments, the financial system has continued to function with a high level of soundness, operating within a regulatory framework in line with international standards. The financial system maintains sizeable prudential margins in terms of liquidity and solvency.

Broad liquidity in terms of bank deposits has remained well above its historical peak values, standing at around 66% as of April 2020. It is worth mentioning that there is a high coverage in foreign currency (around 73% of foreign currency deposits) despite the high withdrawal of private sector deposits in 2019.

In addition, Basel-based liquidity ratios widely exceed the regulatory minimum. The Liquidity Coverage Ratio (LCR) stood at an aggregated 2.4 in March 2020, well above the regulatory minimum of 1 (as of 2019). Likewise, by December 2019, the aggregated Net Stable Funding Ratio (NSFR) exceeded the domestic regulatory minimum (equivalent to 1 as from its implementation in 2018).

Liquidity and solvency – financial system

Graph 6



Note: Includes exemptions.

Sources: BCRA.

The financial system's solvency ratios continued to surpass minimum prudential requirements. Regulatory capital totalled almost 17.6% of risk-weighted assets in December 2019. The financial system as a whole complied fully with additional capital buffers. Moreover, the sector's leverage remains quite small. In terms of the Basel standard, the leverage ratio (capital loss-absorbing capacity to total exposure measure) reached 11.9%, considerably exceeding the domestic regulatory minimum of 3% (in line with international recommendations).

Meanwhile, the private sector non-performing loans ratio increased to 5.7%, as of December 2019. Reflecting weak economic activity, this was due mainly to lending to the corporate sector. Nevertheless, total provisioning has continued to be high, covering 98% of the non-performing portfolio (80% if minimum provisions made for the performing portfolio are excluded). Given the financial system's capital levels as detailed above, balance sheet exposure to private sector credit risk – non-performing portfolio net of provisions in terms of capital – is limited for the banking sector in aggregate.

Banking sector: main macroprudential local regulations

As seen above, the macroprudential regulatory framework has helped to ensure that the financial intermediation process in pesos is decoupled from that in foreign currency, and to keep the exposure of banks to public sector credit risk at low levels.

Taking into account the lessons from the 2001–02 local economic and financial crisis,⁴ financial authorities have made progress in adjusting the regulatory framework so that exchange rate fluctuations have the least possible adverse effect on the net worth of depositors, debtors and banks, and on the economy as a whole.

To address potential vulnerabilities from foreign exchange market stress, the BCRA ruled in 2002 that foreign currency deposits may be used by banks only to finance borrowers who have receivables from foreign trade transactions and related activities. This macroprudential measure was intended to limit banks' exposure to credit risk arising from potential exchange rate fluctuations on a debtor's balance sheet. Even though the domestic prudential regulations already provided for minimum reserve requirements on deposits, further measures were implemented to strengthen liquidity risk coverage, drawing from the lessons of the 2001 crisis. Specifically, the BCRA established an obligation for banks to keep available (liquid) all funds from foreign currency deposits that were not applied to loans (in foreign currency).

In addition, regulators sought to limit mismatches in bank balance sheets. The prudential regulation on the Net Global Position in Foreign Currency, implemented in 2003, restricts the net currency exposure on bank balance sheets, setting both minimum and maximum limits (expressed in terms of regulatory capital).

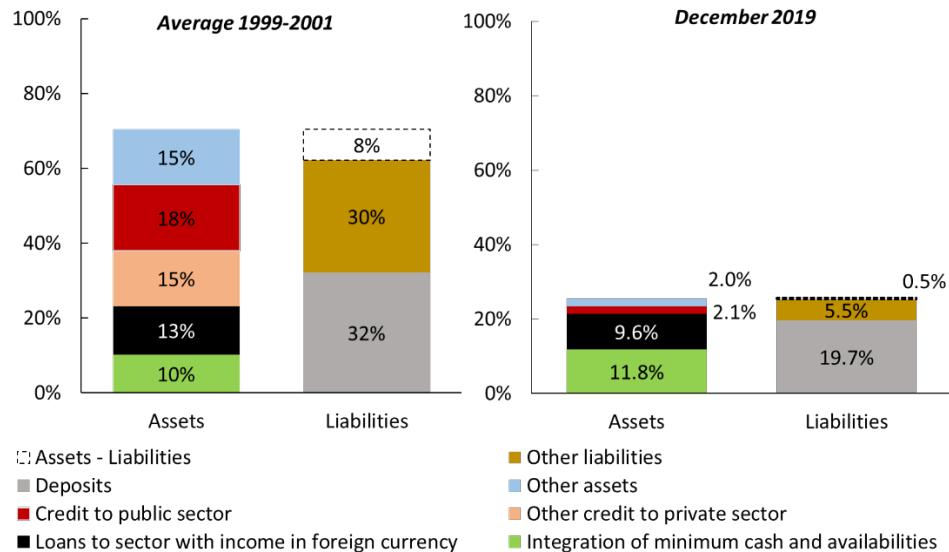
On the other hand, the aggregated exposure of financial institutions to the public sector has remained at historically low levels for over 10 years. This is partly due to macroprudential regulations adopted since 2002, which aim to limit concentration risk, ie the exposure of financial institutions to any single sector of the economy. Currently, the exposure of each financial institution to aggregated public sector financing is limited to 35% of its total assets.⁵

⁴ See "Boletín Monetario y Financiero", 2002 edition.

⁵ Additionally, limits were also set on the basis of an institution's net worth: (a) 50% of each entity's net worth for financing to the national public sector; (b) 10% of net worth for financing to any provincial jurisdiction or the Autonomous City of Buenos Aires; and (c) 3% of net worth for financing to any municipal jurisdiction. The total financing granted according to (c) shall not exceed 15% of the bank's net worth. Total aggregated financing (cumulation of items (a), (b) and (c)) may not exceed 75% of the institution's net worth.

Foreign currency assets and liabilities

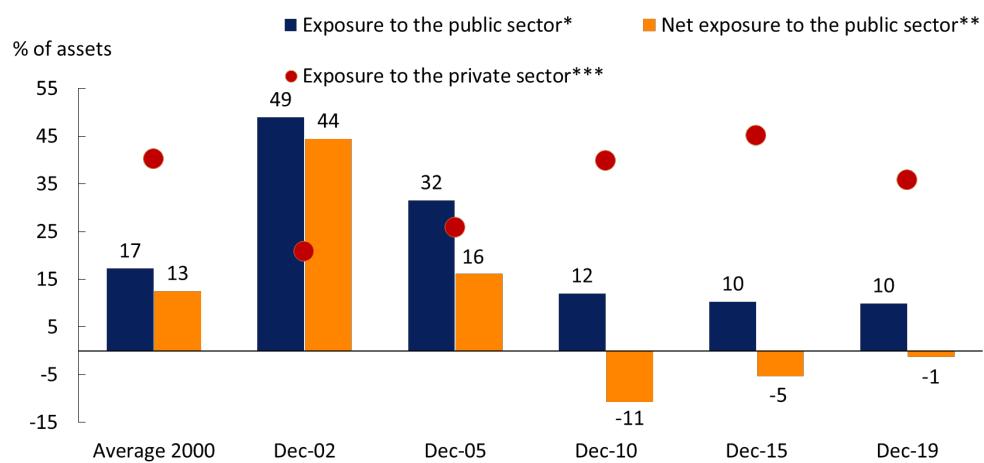
Graph 7



Sources: BCRA.

Exposure to the public and private sectors – financial system

Graph 8



*(Position in government securities (not including BCRA securities) + Loans to the public sector) / Total Assets.

(Position in government securities (not including BCRA securities) + Loans to the public sector - Public sector deposits) / Total Assets. Public sector includes all jurisdictions (national, provincial and municipal). * Total loans to the private sector / Total assets.

Sources: BCRA.

Lessons from Argentina's experience

Argentina's financial system is underdeveloped, basically bank-based and mostly transactional in nature. Low financial market development means that maturity transformation is carried out only to a limited extent. Rather than intertemporal substitution through financial intermediation, private sector decisions focus on the degree of portfolio dollarisation. This limits the effectiveness of conventional monetary policy tools, and calls for an integrated approach. This combines standard tools (such as interest rates or monetary aggregates) with foreign exchange intervention and capital flow management measures.

Argentina's experience in the last three decades provides an excellent illustration of the preceding points. In the 1990s, and after 2016, Argentina implemented two monetary regimes that involved full and fast deregulation of the capital account. Because of their degree of openness and the high speed of their implementation, these two processes can be considered as extreme shocks.

The first policy reform took place in the 1990s. It combined full capital account liberalisation with a pegged foreign exchange regime. It lasted for ten years and ended with a "triple crisis" in the currency, banking and debt markets. The external debt-to-GDP ratio almost doubled between 1994 and 2001 (from 31.4% to 57%), reflecting public and private spending decisions based on a favourable outlook and good conditions at the start of the period.

The second episode started in 2016. It combined full current account openness with a flexible exchange rate regime. It lasted three years, ending with a sudden stop in capital flows and an ensuing current account crisis. It finished with an IMF rescue comprising an extraordinary credit that represented 57% of its lending capacity. The fiscal stance meant that public debt almost doubled in a few years, reaching almost 90% of GDP by end-2018.

Both shocks proved very disruptive and ended up in macroeconomic crises. Yet, notably, these negative outcomes were linked to two very different exchange rate regimes.

A first lesson is to avoid fast and disruptive deregulation of capital flows: this is much like navigating in uncharted waters. A vast amount of literature has dealt with issues of sequencing in the order of liberalisation, sectoral allocation of inflows through the financial system and the subsequently destabilising role of short-term inflows, to name but a few issues associated with a sudden opening-up of the capital account (McKinnon and Pill (1996); Montiel (1998); IMF (2012)).

A second insight has to do with exchange rate regimes. "Corner" systems, such as hard pegs or full flexibility, always tend to start off promisingly, appearing to be the perfect match for a liberalising shock. However, as imbalances mount, they bring on specific problems that are hard to correct. This is especially the case when these regimes are combined with fully fledged capital account liberalisation that opens the way for carry trades and, ultimately, sudden stops.

A third lesson concerns financial system regulation: beware of hidden currency mismatches. In Argentina during the 1990s, banks treated local and foreign currency deposits and credit almost indistinctly, based on the implementation of a one-to-one peg with the US dollar. Meanwhile, the banking system tripled in terms of GDP in only five years. Apparently, banks were not exposed to currency mismatches: they

accepted US dollar deposits and lent in the same currency. But borrowers were heavily exposed to currency mismatches, which proved fatal in the 2001–02 crisis. Once an adverse shock to competitiveness took place, devaluation was unavoidable: a growing current account deficit, with growing foreign indebtedness as its counterpart, became unsustainable. In turn, banks realised that most borrowers had income in local currency only. This produced a large-scale and costly financial crisis.

In fact, a key difference between the currency board regime and the 2016–19 experience was the regulation of the banking system. In this episode, the central bank kept strict limits on currency mismatches and government financing, as well as restricting differential liquidity requirements by currency, as described in Section 2. Thus, the banking sector was basically unaffected by the recent crisis. When the current account deficit proved unsustainable in 2018 and capital flows suddenly reverted, the ensuing devaluation affected asset markets but not the banking system.

Finally, the development of local currency bond markets (LCBMs) is no “silver bullet” for financial stability and financial sector development. In the episode starting in 2016, there was significant development of LCBMs in order to diversify currency risk. A key novelty was the heavy involvement of international hedge funds in this market. What was the reason? In a context of very demanding inflation targets, the central bank used high interest rates as its main instrument for curbing inflation expectations.

The combination of capital account liberalisation, very high interest rates, capital inflows and real exchange rate appreciation made short-term peso investments very profitable. Short-term foreign investors such as hedge funds conducted carry trades using peso-denominated central bank bills and notes. But after April 2018, financial conditions worsened globally, with growing expectations of policy tightening by the Federal Reserve. Foreign short-term investors sold off their positions in peso instruments, and subsequently foreign currency bonds too.

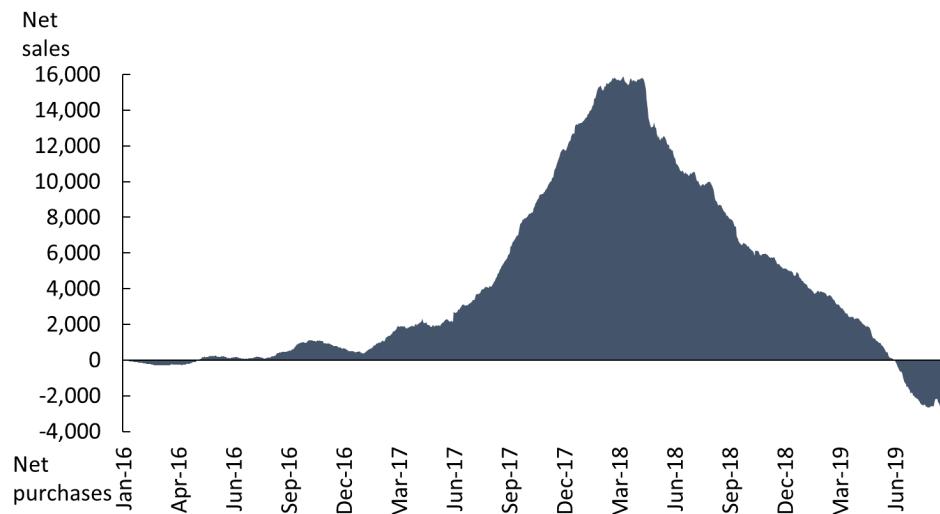
The sudden outflow of foreign funds took place on a scale that could only be processed in a disruptive way by the small domestic market. Cumulative foreign inflows through the foreign exchange market between January 2016 and April 2018 were estimated at almost USD 16 billion (Graph 9). This compares with FX market daily turnover of around USD 2 billion during the same period. Disruption was made worse by the fact that the sell-off comprised, to a substantial extent, the same instruments that the central bank was using to conduct open market operations to achieve its operational interest rate target. All this produced a deleterious signalling effect that was soon followed by local investors.

Although the involvement of foreign hedge funds in LCBMs was useful in diversifying currency risk, it also introduced a direct channel of transmission from the global financial cycle to domestic policy conditions. EME governments and central banks have the same counterparties in both local and foreign currency markets. Thus, decisions taken at hedge fund head offices, based on exogenous shocks or internal preferences, are channelled to both markets. In other words, the participation of these actors in LCBMs increases the interconnectedness and ultimately lessens the autonomy of monetary policy.

Foreign exchange market

Daily cumulative evolution of non-resident flows + Securities traded in the secondary market, USD millions

Graph 9



Source: BCRA

Concluding remarks

To sum up: Argentina's recent experience shows that the use of the interest rate as the only monetary policy tool, together with full capital mobility, leaves the economy exposed to sudden stops of capital flows. This has adverse consequences for price and financial stability. The local financial system was able to cope with the sudden stop that broke out in May 2018, while keeping high levels of liquidity and solvency. This was due to a macroprudential policy that limits key risks, notably foreign currency mismatches and exposure to the public sector. In the same breath, risks to financial stability were contained by the reintroduction of foreign exchange regulations. The design and implementation of both monetary and financial stability policy must factor in the constraints imposed by low financial market development and – looking ahead – by its interaction with new technologies.

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Financial market development, monetary policy and financial stability in Brazil

João Barata R.B. Barroso¹ and Fernanda Nechoi²

Abstract

Financial market development affects financial intermediaries, corporations and households, setting the grounds on how these agents can act in the economy. Brazil's comprehensive reform agenda in recent years has promoted the deepening of credit markets, with households and corporations gaining increased access to credit domestically. These developments have a wide range of implications for monetary policy transmission and financial stability.

JEL classification: E5, E51, E62, G1.

Keywords: financial market development, crowding in, financial inclusion.

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Introduction

Financial market development affects financial intermediaries, corporations and households, setting the grounds on how these players can act in the economy. To the extent that the transmission of monetary policy hinges on credit access, financial market development becomes a first-order concern for most central bankers.

Brazil has come a long way with regard to financial market development in recent years. Changes to legislation, as well as specific government policies, have promoted the deepening of local credit markets. Households and corporations are gaining increased access to domestic credit markets, a development with a wide range of implications for monetary policy transmission and financial stability. These developments, combined with the global liquidity trends in place since the Great Financial Crisis, also affect the foreign exchange rate markets.

This note discusses financial market development in Brazil, focusing on local credit and FX markets, and the impact on monetary policy. It concludes with a discussion of the Central Bank of Brazil's programme to foster financial inclusion and development.

Domestic credit markets

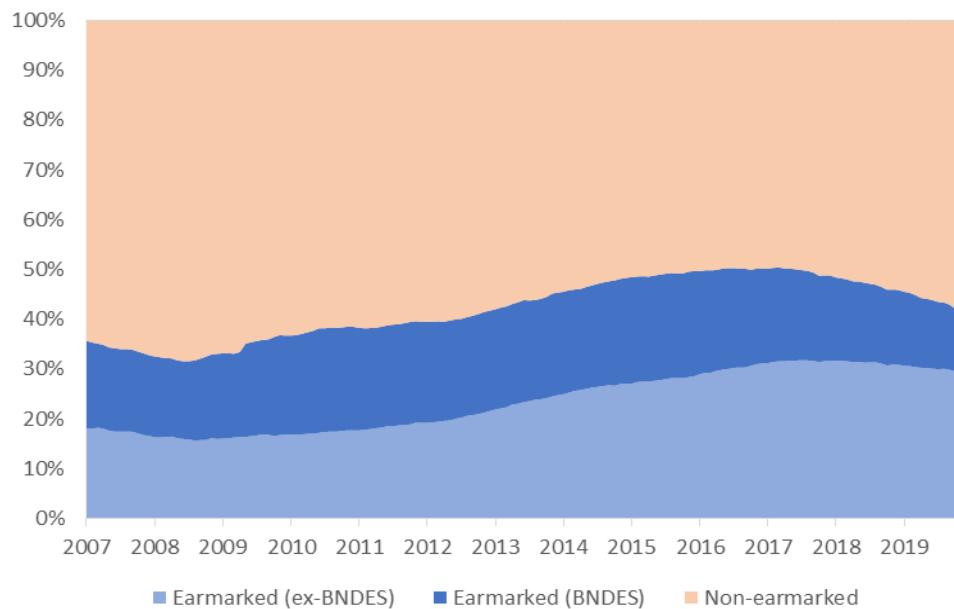
Development banks are important players in credit markets in many emerging market economies (EMEs). This has also been the case for Brazil. During the past decade, earmarked credit in Brazil corresponded to roughly 40% of total credit in the country, with nearly half of it provided by the national development bank, BNDES. Graph 1 shows that the overall contribution of earmarked credit increased following the Great Financial Crisis, reaching about 50% of overall credit in Brazil. But credit through this channel is frequently subsidised. Therefore, this large share of subsidised earmarked credit in Brazil has effectively isolated a relevant segment of the credit market from monetary policy.³

Since 2016, Brazil has taken important steps to reduce the scope of earmarked credit in the economy. One of the main initiatives in that direction was the alignment of long-term lending rates offered by BNDES with those offered by the private sector.

³ Ma and Lin (2016) and Aysun et al (2013) find that large credit markets make the economy less sensitive to monetary shocks – since corporations are not constrained by low amounts of credit to begin with. This literature arguably does not fully account for market incompleteness and earmarked credit. Indeed, a very small credit market could potentially leave a large fraction of the economy unaffected by monetary policy through the credit channel, while earmarked credit adds slack to credit constraints for the targeted sectors.

Earmarked and non-earmarked loans in Brazil

Graph 1



Source: BCB.

Historically, BNDES offered subsidised loan rates that were sometimes out of line with those offered by the private sector. The large-scale provision of subsidised rates hampered the development and deepening of private sector credit markets, in addition to imposing significant costs on the public sector accounts. Moreover, recent evidence suggests that these subsidised loans were frequently directed to households and corporations that faced easier credit constraints than their peers, instead of being directed to those who would have had greater difficulty in accessing credit through more standard and market-based channels. Bonomo et al (2015), for example, show that between 2012 and 2014, larger and less risky corporations have benefited the most from such credit arrangements.

Legislative changes have, however, established a new framework for credit provision by the BNDES. Since 2018, all new loans feature rates referenced by public sector bond rates. This change has allowed BNDES to focus on activities where market incompleteness is more severe, such as long-term infrastructure projects. Most importantly, the alignment of public and private sector rates has significantly reduced the fiscal burden of the previous loan arrangements.

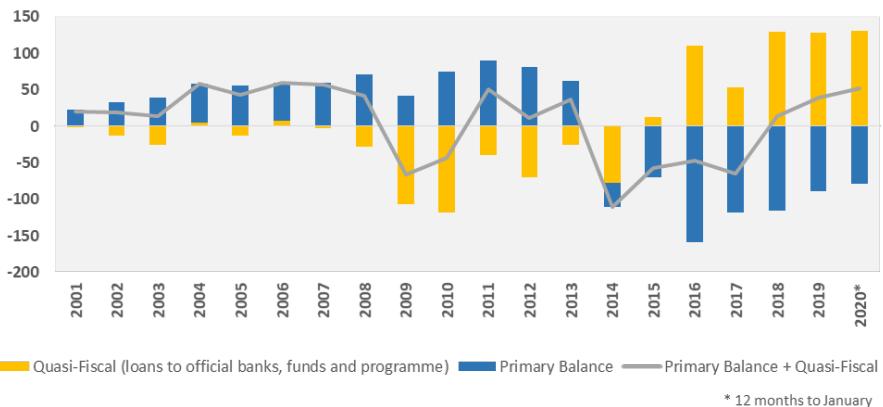
This shift in the role of the public sector in credit markets is only one of many measures taken to improve the public accounts and enhance credit markets. Other fiscal measures included a cap on government spending, a divestment programme for the sale of minority shareholdings held by state-owned enterprises, real estate assets and privatisation and, more recently, the approval of a comprehensive pension reform. Recent legislative changes have provided for the establishment of a credit registry bureau and paved the way for longer-term investments in infrastructure.

As a result of these measures, the public sector has substantially reduced its role in Brazil's credit markets, improving the prospects for the fiscal accounts. Graph 2 depicts the primary and quasi-fiscal balances. Quasi-fiscal balances correspond to the results of loans to official banks, funds and state programmes. The graph shows that,

since 2016, the quasi-fiscal results have turned positive, reflecting a significant change in the role of the public sector in credit markets. It also shows that during that period, fiscal deficits have been on the decline.

Primary and quasi-fiscal balances (R\$ bn)

Graph 2

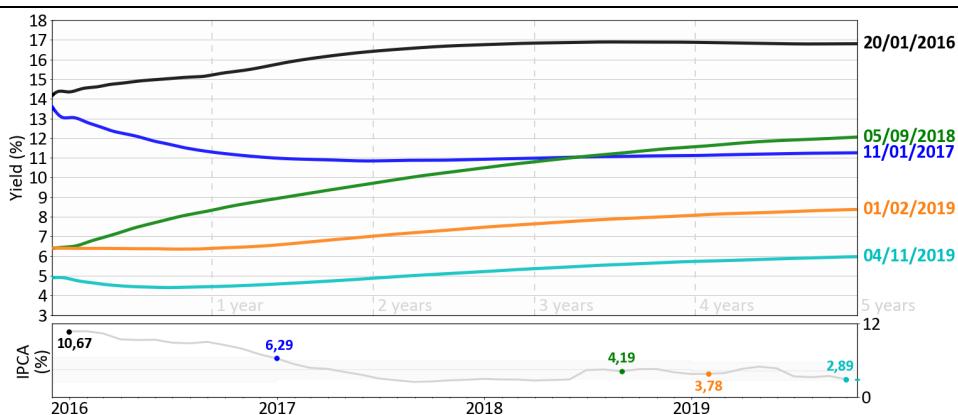


Source: BCB.

These developments had a significant impact on credit markets in Brazil. The ongoing improvements to the government fiscal stance were accompanied by a significant decline in risk premia, particularly after the approval of the spending cap and the pension reform. Consequently, there has been a significant decline in long-term interest rates, with a downward shift of the yield curve. Graph 3 highlights these movements on the yield curve by showing that only recently, and after the change in the country's fiscal stance, the decline in policy rates (in the short end of the yield curve) was also reflected along longer maturities. The graph additionally shows how Brazil's main inflation gauge has fallen to within the target range during this period.

Brazilian yield curve 2016–19

Graph 3



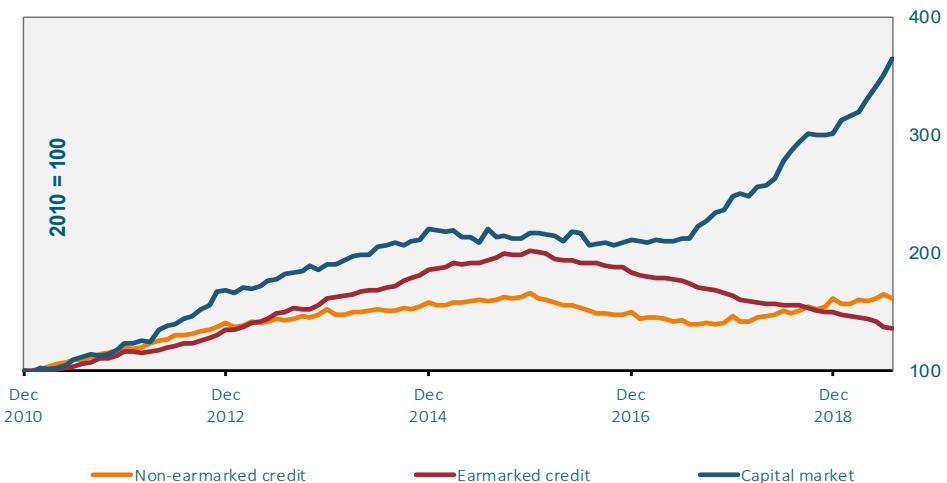
Source: BCB.

The public sector's reduced role in credit markets has opened up scope for the private sector. Graph 4 shows that, with the decline in earmarked credit, combined

with the decline in long-term rates, private securities markets have doubled in volume since 2016.

Credit and capital markets

Graph 4



Source: BCB.

Foreign exchange market

The developments in credit markets have had an impact on FX markets. The onshore deliverable FX market in Brazil comprises primary and secondary markets. The primary deliverable market consists of over-the-counter trading in which participants buy/sell foreign currency from/to agents authorised by the central bank. This primary market supports export, import, financial and remittances transactions, among other business. The secondary (or interbank) market consists of deliverable FX transactions exclusively between institutions authorised by the central bank, such as banks and FX brokers. Alongside the primary and the interbank deliverable markets, a significant volume of FX is traded in the derivatives market, where all contracts are non-deliverable.

In terms of turnover, the Brazilian FX market is well placed relative to other EMEs such as South Africa, India, Mexico, and Turkey.⁴ The deliverable FX market in Brazil has an average daily turnover of USD 7 billion, while the futures market is much larger, with an average turnover of USD 16 billion (see Graph 5). Taking into account both deliverable and non-deliverable markets, the Brazilian FX market is commonly considered deeper than those of its peers by international investors. The relatively

⁴ See BIS (2016a) for a survey of foreign exchange spot markets and foreign exchange and interest rate OTC derivatives markets. Considering execution by country, the survey reports that while daily turnover in the Brazilian spot market in 2016 was USD 7.4 billion, turnover in South Africa, India, Mexico, and Turkey was, respectively, USD 3.1 billion, USD 15 billion, USD 6.4 billion and USD 6.7 billion.

smaller size of the spot market partially reflects historical regulatory constraints and the relatively late integration of the Brazilian economy into global markets.⁵

Over the last two decades, Brazil has benefited from global developments and the country has become an important recipient of global investment flows, further contributing to the development of the FX futures market.

As the Brazilian FX market becomes more integrated, however, spillovers from other markets can affect capital flows and the currency. In times of stress, EMEs may suffer from contagion and investors may turn to more liquid markets to withdraw needed resources. When these movements become disruptive, well designed intervention strategies can smooth the effects on the exchange rate.⁶

FX turnover – daily average

Graph 5

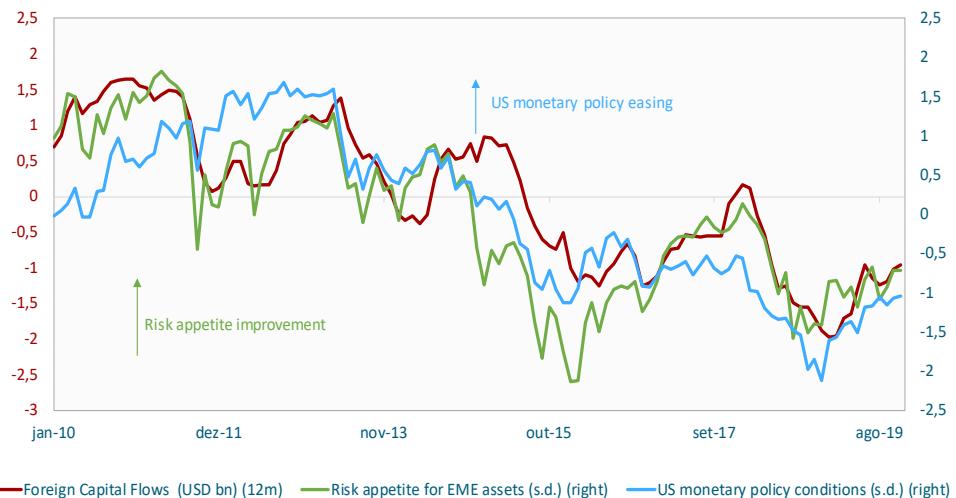


Sources: BCB; Bloomberg.

Indicators of global liquidity conditions and risk aversion towards EME assets are broadly consistent with this picture. Graph 6 shows such indicators based on the first principal component of a comprehensive list of asset prices. It shows that, apart from idiosyncratic pull factors, there is a clear relationship between global liquidity and risk aversion and capital flows to emerging markets. Details are provided in Box A.

⁵ Brazil has historically faced shortages of international reserves and problems with its balance of payments. As a result, the spot market has always been tightly regulated, although the country no longer faces problems with its balance of payments. For instance, regulation traditionally constrained access to the spot market for purposes such as speculation and hedging, and only banks authorised by the BCB can operate in this segment.

⁶ Exchange rate risk can be hard to cope with even in global financial centres, to say nothing of EMEs. Gabaix and Maggiori (2015) argue that global financiers require a premium in terms of expected currency appreciation to enter carry trades, the more so when they face tighter financial constraints or higher exchange rate volatility. The authors argue that strong capital inflows due to a high interest rate differential could drive up the exchange rate so far that the economy could slow as a result of a weaker tradable sector. This seems at odds with the recent experience of major EMEs that experience high growth during appreciation episodes. The complete picture requires domestic credit constraints. Large depreciations increase foreign currency liabilities and reduce the collateral value of domestic assets, leading to a reduction of external credit lines and market access. The opposite happens during large appreciations, loosening credit constraints. The effects of loosening or tightening constraints on domestic demand could be larger than the countervailing effects of the exchange rate on external demand. This is the case in a relevant class of models, such as Jeanne and Korinek (2010), where the reduction in domestic demand falls more heavily on non-tradables. The recent experience in EMEs, including Brazil, seems consistent with this mechanism.



Sources: Authors' calculation based on Bloomberg data.

In Brazil, foreign exchange market interventions have smoothed exchange rate movements when markets have been disrupted. These interventions have allowed the country to ameliorate the effects of cross-border balance sheet and risk aversion shocks. Barroso (2019) describes the foreign exchange intervention strategies adopted in Brazil in recent decades. In periods of abundant global liquidity, the central bank has accumulated international reserves or reduced short positions in the derivatives markets.⁷ Historically, in periods of short and volatile global liquidity, the central bank has intervened in FX markets using an array of instruments with transparent operational guidelines. Spot interventions were favoured when onshore dollar rates have come under pressure; otherwise derivatives have been an important alternative. Indeed, the greater depth of the FX non-deliverable market and the search for hedges against FX fluctuations in times of stress have guided most of the central bank's interventions in FX markets following the Great Financial Crisis. Interventions using non-deliverable currency swaps have proved to be efficient in coping with short-term market dysfunctions. Considerable discretion has been used in the timing and scope of intervention to avoid excessive risk-taking by private agents.

In the last few quarters of 2019, Brazil experienced a new phenomenon. The decline in long-term yields (see Graph 3) associated with the quasi-fiscal adjustment (Graph 2) galvanised the local capital markets, reducing demand for external funding in US dollars. This environment led some domestic-based corporations to consider tapping local markets by prepaying their foreign liabilities and reissuing debt domestically in local currency. The result was a decline in US dollar liquidity in the local market, which put pressure on onshore dollar rates despite ample global liquidity.⁸

⁷ In a swap contract, the central bank pays the onshore dollar interest plus any dollar appreciation and receives the domestic interbank rate. Operationally, to reduce its swap position, the central bank can issue reverse swaps, taking the opposite side of the contract.

⁸ Note that, during this period, the Fed and other major central banks shifted their monetary policy to an easing stance.

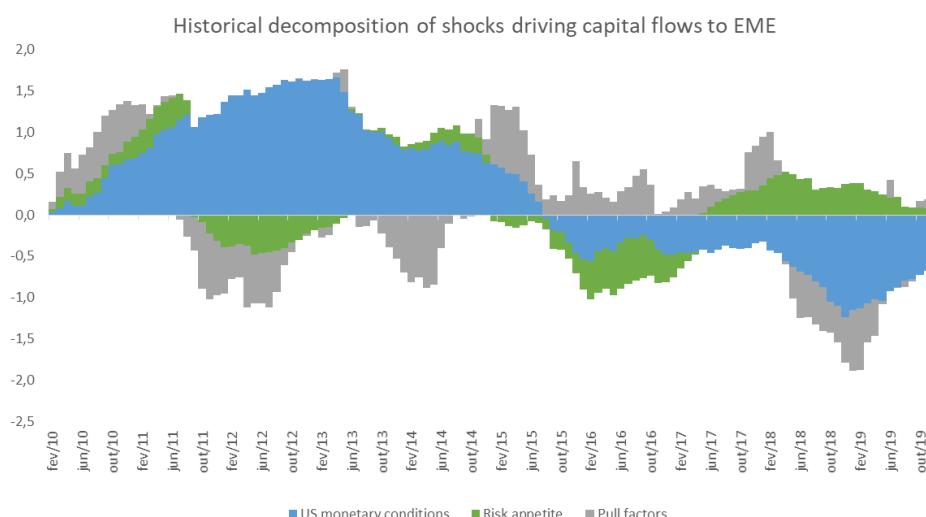
Drivers of capital flows to EMEs

EMEs are commonly subject to a high degree of volatility in portfolio capital flows. It is important to understand the drivers of such volatility. As in Central Bank of Brazil (2019), we follow an identification strategy based on the contemporaneous relationship between US monetary policy and indicators of risk appetite and capital flows for EMEs. The main assumption is that US monetary policy does not react contemporaneously to capital flows or risk appetite towards EMEs, a reasonable assumption given the preponderance of domestic factors in the conduct of US monetary policy. We also assume that risk appetite does not respond contemporaneously to our indicator of capital flows, a reasonable assumption given that we use fast-moving asset prices to build the risk indicator and a moving average of capital flows to capture cross-border quantity activity.

These assumptions are incorporated in a structural vector autoregression. It is often the case that a large vector autoregression produces inferences similar to those of factor-augmented autoregressions (Bańbura et al (2015)). For simplicity, we focus only on a couple of factors. Our monetary policy factor is constructed as the first principal component of US daily data on interest rates, stock market returns, inflation and bilateral exchange rates against those of other advanced economies. This has the virtue of capturing monetary easing during quantitative easing and forward guidance episodes, as well as capturing market reactions to expected monetary policy movements. For risk appetite, we extract the first principal component from implicit volatility and returns for commodity prices, along with exchange rate and stock markets returns for Brazil, India, Indonesia, Mexico, Russia, South Africa and Turkey. Finally, the monthly portfolio flow data is the sum of foreign portfolio flows to the same set of countries accumulated over a 12-month window. Although we focus on monthly data, the exercise can be reproduced at different frequencies. We restrict the sample from January 2010 to November 2019. The variables are shown in Graph 6 of the main text.

The main result is that US monetary policy is the most important driving force when explaining risk appetite and capital flows to EMEs – the strong correlation between risk appetite and flows is explained largely by the third factor. For capital flows, a forecast error variance decomposition shows that, in the long run, US monetary policy shocks account for about 80% of the variance. For horizons shorter than 12 months, US monetary policy accounts for more than 50% of the variance. Focusing on specific events, Graph A1 shows that US policy was a major driver of capital inflows between 2010 and 2014, after which risk appetite and monetary policy acted as a drag on portfolio flows, in spite of important pull factors in EMEs. The 2018 tightening and ensuing 2019 easing of US monetary policy were also a big driver of flows in that period, along with important negative pull factors affecting EMEs in 2018.

Historical decomposition of shocks driving capital flows to EMEs Graph A1



Source: Authors' calculation

These developments led the central bank to design a new intervention strategy. This consisted in selling at the spot exchange rate and the same amount of reverse swap contracts (equivalent to selling US dollars via derivatives) simultaneously. This operation met the demand for hard currency liquidity while keeping the net foreign exchange position – roughly, international reserves holdings net of derivatives positions – constant. The central bank was careful to issue a detailed statement and to disclose the internal documents that informed the Board's deliberation. Between 21 August and 20 December, these "matched" interventions totalled USD 33.4 billion, with the net international reserve position staying almost unchanged at about USD 327 billion.

The central bank fosters financial development

The Central Bank of Brazil's agenda to foster the development of credit markets consists of four main pillars: inclusion, competitiveness, transparency and financial education.

Not all Brazilians have access to capital markets and those who do face elevated credit costs. Aiming at increasing access to credit to households and firms, the Central Bank of Brazil (BCB) has fostered competition by promoting the development of credit coops, microcredit, and credit fintechs. Some policies have already been implemented. Coops now have access to more stable long-term funding methods and have been authorised to operate in rural real estate markets. Microcredit has been stimulated by broadening the qualifying criteria, increasing the scope of approved transactions (including online relationship management and credit-scoring services together with more products for clients), and streamlining the legal framework to reduce regulatory compliance costs.

The BCB's agenda also includes simplifying and modernising the legal framework for the foreign exchange market. The aim is to align the Brazilian legislation with international standards and the current economic environment, to increase the Brazilian real's degree of international use. Similarly, the BCB has been pushing forward an initiative to streamline the country's capital markets and reduce costs for international investors, by promoting the development of private equity and securitisation. The agenda also includes efforts to increase market efficiency and competition, which includes the development of an instant payment system and an open banking initiative. The instant payment framework is designed to be a 24/7 payment system using QR codes and cell phones, with a centralised settlement infrastructure operated and managed by the BCB. The new system is expected to be operational from November 2019. The open banking initiative will promote competition by reducing the information advantage of incumbents and fostering innovation and new entrants. The agenda also includes developing a new emergency liquidity assistance facility that will help optimise the level of liquidity in the system, promoting financial market deepening and development.

Finally, the BCB has increased the transparency of its own decision-making process and it is promoting financial education. Besides virtual interactions with the public online, the BCB is working closely with schools and other institutions to promote financial knowledge, as well as developing partnerships to inform and promote better financial choices by market participants. Financial education

combined with other microeconomic efforts is designed to increase market participation, reduce credit costs and deepen the Brazilian credit markets.

Implications for monetary policy

The government's reform agenda has important implications for credit markets and for monetary policy. The reforms and other changes to the economic environment may affect the structural rate of interest. The pension reform, for example, could affect the equilibrium rate of interest in Brazil through various channels. By adapting retirement rules to the country's demographic structure and dynamics, it should slow the pace of government spending growth, increasing public savings. In addition, it will generate incentives for the population to increase its savings rate to sustain a given pattern of consumption after retirement. Through these channels, the reform will help to reduce the risk-free component of the structural interest rate of the Brazilian economy. The pension reform also affects the risk premium component of the structural rate and will affect labour supply investment decisions. The latter channels will put upward pressure on the structural interest rate.

In addition, and no less importantly, the ongoing regulatory reforms and the Central Bank of Brazil's agenda will encourage the rise of new players and new business models in credit markets, which will also have a significant effect on monetary policy transmission.

Conclusion

Financial market development ultimately allows the economy to better cope with stressed and changing conditions, providing better anchoring for monetary policy and financial stability. Recent and ongoing economic reforms that enhance fiscal sustainability tend to deepen Brazil's financial markets.

Moreover, the central bank's agenda for financial inclusion, education, transparency and efficiency should increase participation of households, corporations and financial institutions. In such an environment, the transmission channels of monetary policy will be enhanced.

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Financial market developments in Chile

Joaquín Vial¹

Abstract

The paper reviews the financial development of the Chilean economy in recent decades, including some references to economic reforms dating back to the 1970s and 1980s, and then examines the interaction between the financial sector and the implementation of fiscal and monetary policies. The final section analyses these interactions in the crises of 2007–09 and 2019, together with the policy response and its economic impact.

JEL classification: E32, E52, E58, E61, F31, F41.

Key words: Chile, financial development, exchange rate policy, monetary policy, fiscal policy, financial crisis.

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Introduction

The development of financial markets in Chile has proceeded from the financial reforms that started in the mid-1970s. A rapid financial liberalisation started in the second half of the 1970s, which was followed by a major financial and economic crisis in the early 1980s. The banking system was restructured, a new banking law was enacted in 1986, and several financial market modernisations were introduced in the ensuing decades. The Banking Law set strict standards and regulations, and much of the ensuing legislation in the 1990s and 2000s introduced gradual relaxations. The most recent revision of the Banking Law was approved in 2017, and is currently being implemented. It was designed to update regulations to the Basel III standards and makes deep changes to the financial regulation and supervision of the financial system, merging the existing Banks Superintendence with the Securities and Insurance Superintendence into the new Financial Markets Commission headed by a board of five members.

In a parallel development, a new pension system was introduced in 1981, replacing a fragmented and very unfair pay-as-you go-system, which was already in deficit in the early stages of the demographic transition, for a fully funded privately managed system of individual accounts in privately managed pension funds (AFP). The volume of financial assets managed by these institutions gradually rose from zero to about 70% of GDP over the decades, becoming a driving force behind the development of the financial system.

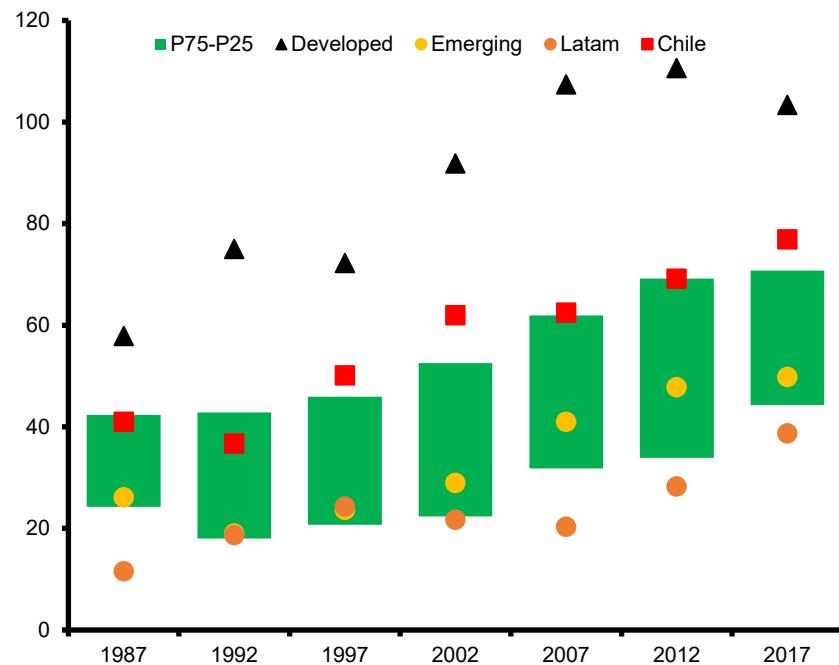
This note is organised in three sections: the first describes the main characteristics of the Chilean financial system, the second discusses its role in the operation of monetary policy as well as the monitoring of financial stability, and the final one compares the interaction between the financial sector and the evolution of the economy during the global financial shocks of 2007–09 and the recent crisis.

A brief description of the Chilean financial system

Chile has a relatively large and well developed financial system, compared with countries with similar levels of per capita income as well in comparison with the rest of Latin America (Graph 1). This is reflected in the depth of the financial system, as measured by the ratio of domestic credit to the private sector, as well as in people's access to financial products, such as bank accounts. Since most international capital controls were phased out at the end of the 1990s, the market is well integrated into the global financial system, with the active participation of Chilean firms investing in foreign financial assets, either directly or via institutional investors, as well as foreigners participating in the Chilean market.

Domestic credit to the private sector (percent of GDP)¹

Graph 1



¹ The financial resources provided to the private sector by domestic banks as a share of GDP. Domestic banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Countries included in the sample: Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, China, Iceland, Ireland, Italy, Japan, Luxembourg, Holland, New Zealand, Norway, Portugal, Singapore, Slovakia, Spain, Sweden, Switzerland, the United Kingdom and the United States; Argentina, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Czech Republic, Ecuador, Egypt, El Salvador, Estonia, Gabon, Georgia, Ghana, Hungary, India, Indonesia, Iraq, Israel, Jamaica, Jordan, Kazakhstan, Korea, Lebanon, Lithuania, Malaysia, Mauritius, Mexico, Morocco, Nigeria, Pakistan, Panama, Peru, the Philippines, Poland, Russia, Saudi Arabia, Slovenia, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, Ukraine, the United Arab Emirates, Uruguay, Venezuela and Vietnam.

Sources: Central Bank of Chile; World Bank, Global Financial Development Database.

One specific feature of the Chilean financial system is the large volume of securities indexed to past inflation, as measured by a daily unit of account (UF). This is used in medium- and long-term debt (public and private) including mortgages. This provides "insurance" against inflation risks, a legacy from the previous century. Institutional investors, especially AFPs and life insurance companies providing annuities are big players in this market, since pensions are indexed to the UF. Since these investors mainly buy and hold, liquidity in this segment of the market is lower than what might otherwise be expected. The fraction of sovereign Chilean debt held by foreigners is relatively small, and has been growing only in the last few years, as this debt grew and special measures were taken in the auctioning of new debt (eg larger amounts distributed into fewer auctions) in order to make it more attractive to large foreign investors. These investors prefer peso-denominated bonds with medium-term maturities (two to five years)

Financial assets by institutions, percent of GDP (2018)

Table 1

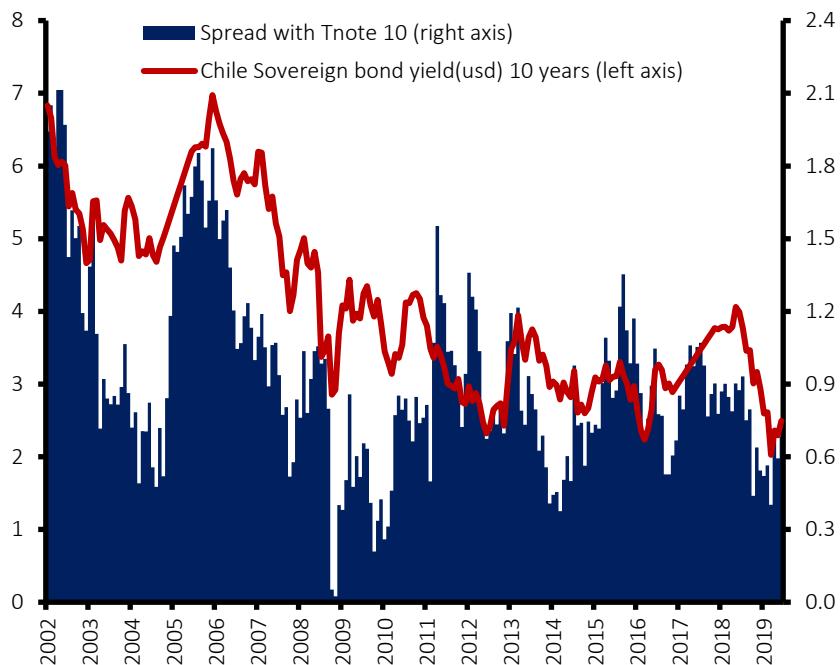
	Central Bank	Commercial Banks	Mutual and Investment funds	Insurance Companies	Pension Funds	Total Financial assets (Domestic)	Non resident financial investors
Cash and Deposits	1.8	9.6	10.7	0.9	5.4	28.4	1.0
Securities short term	0.0	2.6	0.4	0.0	0.3	3.3	0.0
Securities long term	12.4	5.8	11.7	14.2	32.8	76.9	25.5
Loans short term	0.1	9.7	0.6	0.0	0.0	10.4	2.1
Loans long term	0.2	75.0	2.5	4.7	0.0	82.4	34.9
Shares	0.1	3.1	66.8	3.1	36.3	109.4	86.8
Other	0.3	3.2	10.6	1.7	-0.3	15.5	4.7
Total	14.9	109.0	103.3	24.6	74.5	326.4	155.0

Source: Central Bank of Chile.

One important feature of the Chilean economy in recent decades is the combination of economic growth and a stable macroeconomic and financial environment. These factors have translated into low and stable interest rates, allowing for a significant development of the local financial market, as well as providing medium- and long-term funding for households and companies at an affordable cost.

Interest rates and spreads of Chilean sovereign debt (%)

Graph 2



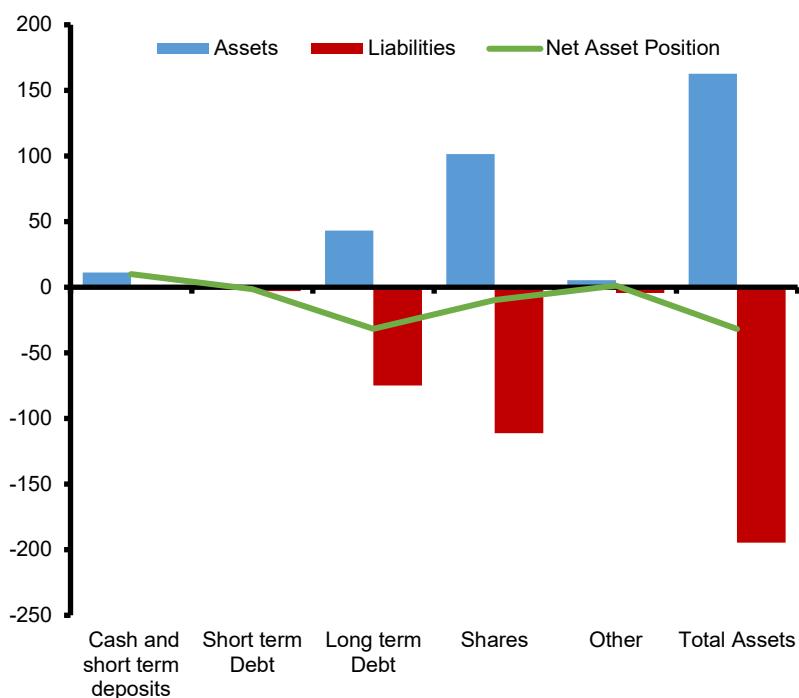
Sources: Central Bank of Chile; Bloomberg.

In terms of financial integration with international markets, the Chilean economy has evolved from being a closed capital account economy between the Great Depression and the late 1970s into a very open one, with significant assets and

liabilities in all major classes of assets, as shown in Graph 3. Two issues must be noted in that chart, though: one is that the classification of maturity is based on the original one at issuance and not actual duration. The other has to do with investment in foreign stocks (shares of public companies): some are portfolio investments (unmanaged) and the rest are FDI (managed). In the past, almost all Chilean assets abroad were unmanaged, but as Chilean companies began to expand abroad in the 1990s and 2000s, FDI began to gain importance. In any case, investment abroad in all asset classes has risen with the expansion of Chile's pension funds and the gradual relaxation on their investment limits abroad.

International assets position of Chilean economy in 2018 as percentage of GDP

Graph 3

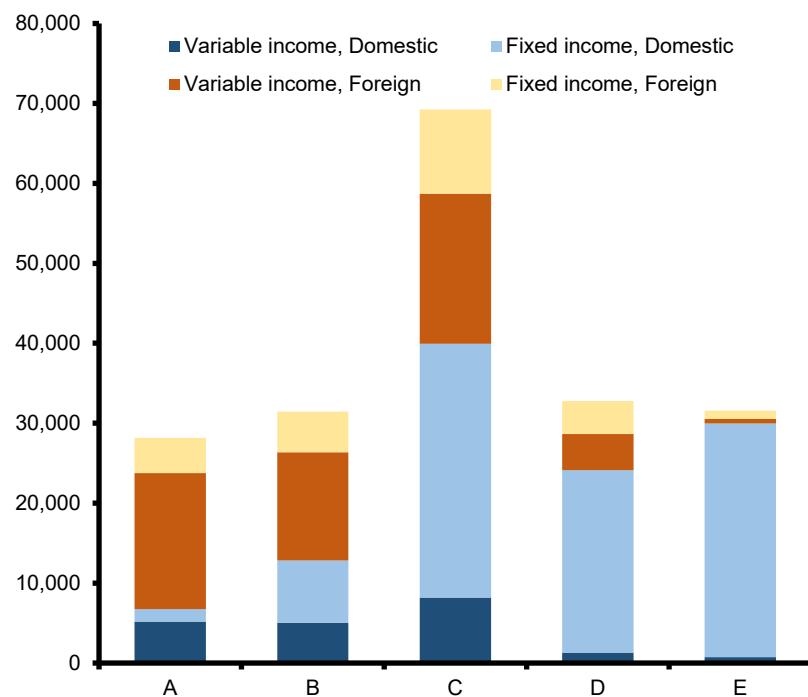


Source: Central Bank of Chile.

Given the size of the pension funds, changes in their portfolio have become increasingly significant for the operation of the financial system. They can be originated by the decisions of fund managers, and also from switches between different funds by affiliates of the system. Since 2003 there have been five classes of funds, ranging from Fund A, invested mostly in variable income assets, with a large fraction of them invested abroad, to Fund E, invested mostly in fixed income assets in Chile. In the last 10 years, recommendations by unregulated "advisers" operating through websites have resulted in significant switches between funds. Graph 4 shows the composition of the five funds in December 2018, expressed in US dollars.

Composition of the different types of pension fund by major asset class in December 2018 (millions of US dollars)

Graph 4



Source: Chilean Pensions Supervisor.

These funds have been labelled according to the regulators perception of risks, Fund A being marketed as the “riskiest” and Fund E as the “safest” fund, based on the assumption that variable income is riskier than fixed income. Another assumption was that investing abroad was riskier than investing at home, given that pensions will be paid in pesos, and foreign investments are exposed to exchange rate risk. As recent events show, this perception concerning the currency composition breaks down when there are large idiosyncratic domestic shocks.

Given that the local financial market is relatively small and less liquid than foreign markets, massive switches between extreme funds (A to E or vice versa) or between the large middle Fund C and the extremes (E or A) might cause liquidity problems in specific segments of the domestic financial market or in the foreign exchange market (more on this later).

The financial system and the implementation of monetary and financial stability policies

Since 2001, Chile has had a fully-fledged inflation targeting policy, combined with a free-floating exchange rate and a fiscal policy based on a cyclically adjusted deficit

target.² The inflation target is 3%, and monetary policy is calibrated to achieve this forward-looking target within the next two years, which is a prudent way to do so given the lags involved in the transmission of monetary policy into actual inflation figures. Average inflation for this period has been 3.2% and deviations of two-years-ahead inflation expectations from 3% have been few and small, despite large fluctuations in the monthly figures for actual annual inflation.

Monetary policy is conducted through open market operations in the overnight funding rate in the interbank market. The aim is to keep this market rate aligned with the Monetary Policy Rate, which is the rate charged by the central bank in that market. The central bank is allowed to provide liquidity in pesos only to commercial banks. Given the large role of commercial banks in the short-term financial market (see Table 1), this is a powerful instrument. However, large portfolio switches, especially by institutional investors, who are mostly buy-and-hold investors, may have a temporary effect on other market participants, especially mutual funds and even on some banks, where these investors tend to "park" assets for liquidity reasons.

As regards financial stability policy, the mandate of the Central Bank of Chile is limited to ensuring the smooth operation of the payments system, including the role of lender of last resort to the banking system. The supervision and regulation of banks is the responsibility of the Financial Markets Commission (FMC), a separate entity created two years ago by combining the former bank supervisor and the securities and insurance supervisor. The recent reform of the Banking Law set up a number of coordination arrangements between the central bank and the FMC, including cross-reports on specific sets of regulations. One such instance is the activation of the countercyclical buffer established by that law, which is determined by the central bank, subject to a favourable report by the Ministry of Finance.

Given the systemic nature of the central bank mandate, the main policy instrument for financial stability purposes is the monitoring of financial system participants, as reported twice a year in the Financial Stability Report. This includes top-down aggregate stress tests for the banking system, as well as for other main participants in the financial system. Given the variety of participants in the system, there has been a major effort to explore the sensitivity of their financial positions to changes in the exchange rate, interest rates and real macroeconomic shocks in Chile and abroad. What these exercises show is that financial and exchange rate risks have only a limited impact in the financial system in Chile, but there are vulnerabilities to either short but very deep recessions, or shallower but prolonged ones. Even though capital seems sufficient to address these vulnerabilities at the aggregate level, the central bank has noted for some time that these ratios have not kept pace with the increases we have seen in Latin America and the advanced economies. In the coming years, banks will have to raise capital in order to comply with the new Banking Law.³

² The adjustment is applied both on the domestic activity cycle and to the price of copper, which is the main export of Chile and represents a significant fraction of the government budget.

³ The financial system has been able to absorb two major shocks in less than nine months. First the social upheaval that took place in the last quarter of 2019 when GDP went from a 3.4% annual growth rate in the third quarter to -2.1% in the final one. More recently, the negative impact of the pandemic that began affecting the economy in the second half of March 2020 and was reflected in a 14.1% annual drop in April of the IMACEC (the monthly GDP indicator). This resilience is consistent with our stress tests results, but it reflects in part the effect of different policy measures taken by the central bank and authorities to provide liquidity in the emergency.

In terms of liquidity concerns, the central bank has also noted that overreliance on funding from mutual funds and institutional investors might be a vulnerability for the financial sector.

One issue of special interest in Chile is the interaction between monetary policy, exchange rate fluctuations and financial stability considerations. A free-floating exchange rate is a prerequisite for an effective monetary policy in a small open economy. This is especially true for a country like Chile, which is subject to large terms of trade shocks given the concentration of exports in copper (about 50% of total). Copper prices are subject to medium- and long-term cycles, while experiencing high short-term volatility, due to very low price elasticities both of supply and demand. In addition, as shown in Graph 3, this is a country with a very open financial account. As discussed in previous meetings in this forum (Naudon and Vial (2016)), this has been a useful instrument in the case of Chile, and one of the main reasons we have been able to focus on inflation control, while allowing short-term adjustments of the exchange rate as an external shock absorber. One reason for that success is that the government has built up sovereign funds to self-insure against copper price volatility, while holdings of foreign assets in pension funds have protected households' (future) incomes from adverse external shocks. Of course, the central bank also holds international reserves, of 13–15% of GDP, to provide foreign exchange liquidity to the economy as a whole (Vial (2019)). However, there are two conditions for a successful free-floating exchange rate in such an economy: first, domestic agents, including the financial sector, should be well prepared to cope with exchange rate volatility, and second, in the occasional cases in which the central bank has to intervene in the FX market, monetary policy should be conducted in a consistent manner. This might call for a more active role of fiscal policy in short-term macroeconomic stabilisation during these events.

The vulnerability of domestic actors (banks, other financial institutions, corporations and households) to exchange rate fluctuations is addressed regularly in the biannual Financial Stability Report. In recent years, concerns have been raised about the private sector's external debt. Our analysis shows that the situation looks more normal once allowance is made for the large debt of Chilean subsidiaries of multinationals with their matrices (a common way to finance FDI in capital-intensive sectors like mining). Other factors also mitigate currency risks: most corporations issuing external debt are involved in FDI abroad or exports, so that they have a natural hedge, and the rest tend to make use of financial derivatives to hedge against short- and medium-term fluctuations in the exchange rate.⁴

Regarding the mix of fiscal and monetary policy, tensions might arise if inflation requires a more expansionary stance, while the central bank feels it should intervene to prevent excessive volatility of the peso. Our experience shows that central bank credibility and monetary policy effectiveness could be compromised in the absence of coordinated policies (more on this in the last section of this note). If the government has the resources and the ability to act quickly, then coordination between these two sets of policy might help solve the problem. In 1998, Chile had a dual target of preventing excessive depreciation and following a crawling band, while at the same time pursuing an inflation target. When the Russian crisis broke out, the Bank decided to adhere to the exchange rate commitment at the cost of amplifying

⁴ See Chapter IV in Central Bank of Chile, *Financial Stability Report*, Second Semester 2019, for further details.

the negative external shock. Ten years later, when inflation was climbing due to an overheated economy during the global commodity boom and the exchange rate was deemed overvalued, the central bank started to accumulate reserves, and a few months later inflation expectations began to diverge from the inflation target. The September 2008 events in the global financial markets solved these tensions for the central bank, even though high inflation and deviations of expectations from target delayed the reaction of monetary policy to these events, but when it came, it did so forcefully.

Financial markets performance during crisis periods⁵

The Chilean economy has experienced two major economic shocks since the introduction of the current policy framework, based on inflation targeting, a flexible exchange rate and a fiscal policy based on a structural budget target.⁶ The first was the 2007–09 global financial crisis, and the second, the recent period of social unrest and economic turmoil in Chile starting in the last quarter of 2019. In both cases, economic activity deteriorated sharply, the peso depreciated and asset prices slumped. In both cases, the financial system came under stress and the central bank had to act to prevent a crisis. Interestingly, these episodes differed in two key dimensions: the first one was a purely external shock, with local consequences, while the more recent crisis was a purely domestic shock, related to the role of the financial sector. In 2007–09, the (international) financial sector was one of the principal channels of transmission into the Chilean economy. The second crisis originated in a real shock and the financial sector had to be supported in order to assure an adequate flow of credit to firms and households.⁷ In what follows, I will further compare these events:

1. Background (initial situation): in 2008, copper prices were extremely high, causing an appreciation of the currency. The economy had been growing fast and inflation was on the rise in spite of the peso's appreciation. The central bank started to accumulate reserves at the beginning of 2008, but shortly afterwards began to hike the Monetary Policy Rate to curb inflation, which was running well above target and causing some deviations of expectations from the two-years-ahead target. The fiscal position was solid, after a solid accumulation of resources in the sovereign funds, thanks to the application of the Fiscal Rule. In 2019, the economy had been growing below potential for more than four years, and the modest recovery that started at the end of 2017 was stalling. Inflation had been below target for more than two years and monetary policy had been quite expansionary for several years. Part of the explanation was a positive supply

⁵ I do not discuss the current coronavirus crisis. A summary of central bank actions (in Spanish) can be found at www.bcentral.cl/en/web/banco-central/medidas-excepcionales. Fiscal policy measures and budgetary projections (in Spanish) can be found at www.dipres.gob.cl/598/w3-propertyvalue-24862.html#recuadros articulo 5520 group_pvid 25190 0.

⁶ The current coronavirus crisis began to unfold in Chile in mid-March, after the initial draft of this paper was written. However, the policy reactions to the so-called social crisis that took place at the end of 2019 were similar to the current ones, but on a smaller scale. The coronavirus is a global crisis, but one in which the financial sector did not originate the shock.

⁷ The coronavirus crisis is a global crisis caused by a real shock disrupting all economic activities, sharing much in common with both of the previous crises.

shock caused by a massive immigration flow that eased pressures on the labour market. The currency was stable and close to average historical values. Even though the government had been in deficit for a number of years, the fiscal position was solid, but instead of a positive net asset position, the government was now a net debtor, with gross public debt close to 28% of GDP.

Initial conditions at the onset of the two critical events

Table 2

	Crisis 2008-2009	Crisis 2019
Average growth of the last 5 years (%)	5.7	2.2
Output Gap (%)	0.6	-0.8
Inflation Rate (ann.%)	9.2	2.5
Monetary policy rate (%)	8.15	1.75
Government gross debt (% of GDP)	4.2	26.8
Government net debt (% of GDP)	-17.8	6
International Reserves (% of GDP)	14.2	14.3

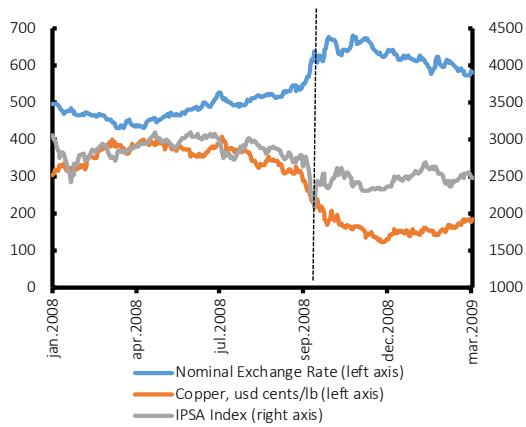
Source: Central Bank of Chile.

- Initial events: in 2007–09, the shock originated in the international financial markets, with a sudden stop in interbank lending after the Lehman crisis. As confidence deteriorated, economic activity fell off sharply in the advanced economies, rapidly eroding global trade and economic growth. Commodity prices and financial conditions deteriorated across the globe. In Chile, this was felt immediately through a sudden stop of short-term bank credit from international lenders (something that did not happen in the debt crisis of the 1980s), copper prices fell sharply and domestic confidence sank, with a major impact on consumption and investment decisions. The peso depreciated by 23% in nominal terms, putting additional pressure on short-term inflation. However, the real effective depreciation was much more modest due to the fact that almost all currencies were depreciating against the US dollar. In 2019, the crisis resulted in domestic social unrest, characterised by massive popular protests all over the country, triggered by a rise in Santiago's subway fares, which quickly escalated into a wide range of demands on a diverse range of issues. These protests were accompanied by civil unrest, widespread looting and arson with destruction of private and public property and infrastructure, lasting for more than a month. There was a political crisis followed by an agreement to write a new constitution over a period of two years with a set calendar and requiring super-majorities (two thirds) for each article of the new text. Two referendums were agreed upon: one at the start to ratify or reject the decision to write a new constitution and the composition of the constitutional body, the other at the end to ratify or reject the proposed text. Although the crisis was overcome, there are still regular protests by smaller groups, resulting in severe confrontations with the police.

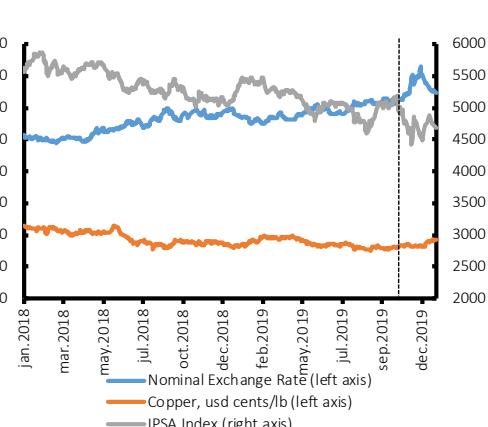
Key economic prices during the two critical events⁸

Graph 5

Graph 5a: Crisis 2008–09



Graph 5b: Social crisis 2019



Sources: Bloomberg; Central Bank of Chile.

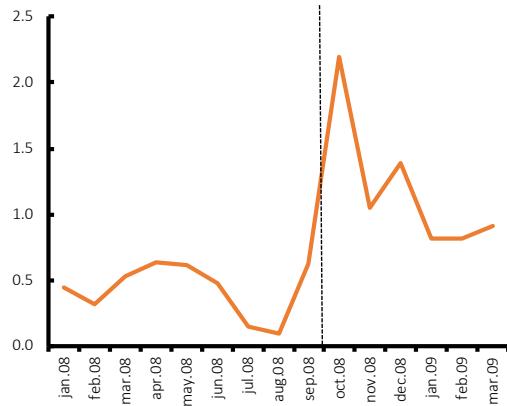
The transmission mechanisms: In 2008, there was a sharp drop in copper prices and a sudden stop in short-term lending by international banks, while confidence indicators plummeted. The financial sector experienced severe liquidity problems in the US dollar market. Domestic asset prices fell (IPSA index and pension funds brought funds back to the country). In 2019, there was a strong drop in economic activity (an instantaneous supply shock) and confidence indicators also fell sharply. Domestic portfolios, including pension funds, moved away from peso-denominated assets. This movement was exacerbated by recommendations from online (unregulated) advisers, creating liquidity tensions for non-banking financial intermediaries as well as in the FX market, since pension funds were forced to quickly sell off positions in the domestic fixed income market to buy variable income assets abroad. In both cases, there were massive drops in domestic asset prices, nominal depreciations of the peso and sharp contractions in investment and domestic demand, especially for durables. In 2019, the initial reaction was milder, but shifts in portfolios by pension funds caused liquidity tensions for mutual funds and a few smaller banks, followed by FX market stress as the political crisis deepened. During the period, net flows from foreigners were positive.

⁸ A rise in the exchange rate reflects a depreciation of the peso.

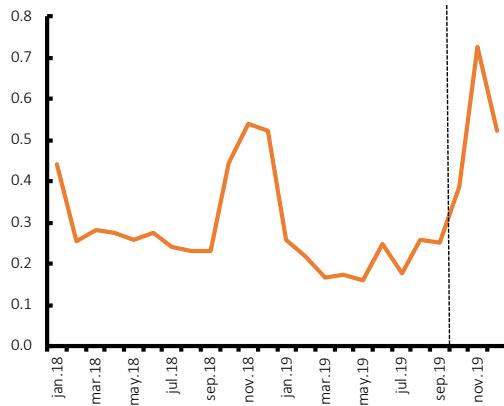
Domestic and external costs of access to liquidity during the two events

Graph 6

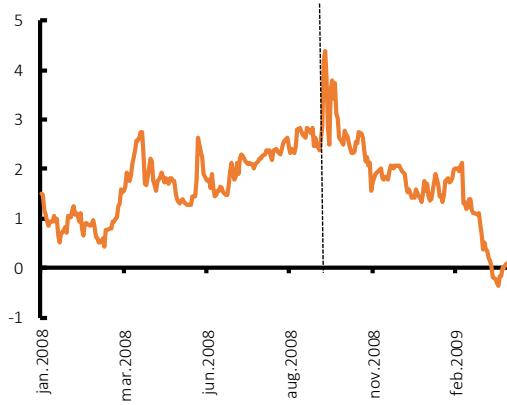
Graph 6a: Cost of domestic liquidity in 2008. (Spread DAP-Swap six months)



Graph 6b: Cost of domestic liquidity in 2019. (Spread DAP-Swap six months)



Graph 6c: Cost of USD liquidity in 2008. (Spread onshore six months)



Graph 6d: Cost of USD liquidity in 2019. (Spread onshore six months)



Sources: Bloomberg; Central Bank of Chile.

3. Policy reactions: Some of the reactions to the two events were similar. For instance, in both cases, large fiscal stimulus packages were put in place, even though with differences in funding: in 2008, the stimulus was funded mostly by drawing down the sovereign funds. In 2019, the sovereign funds were used in combination with borrowing (domestic and external) and tax increases. In both cases, there was provision of liquidity in US dollars, but in 2008 this was somewhat delayed, and was initiated by the government through the State Bank, and followed up by the central bank. In the more recent episode, the central bank was the only player, reacting quickly.⁹ Early provision of liquidity in pesos to

⁹ The most recent crisis had a severe fiscal impact, due to the need to provide solutions for some short-term demands, as well as for the commitment of medium and long-term increases in social spending, particularly in pensions.

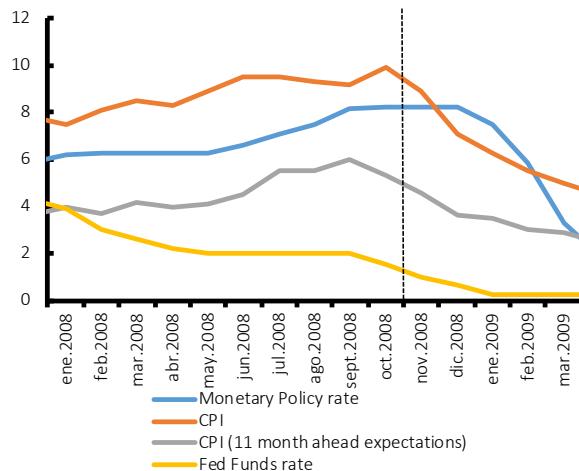
facilitate an orderly shift of portfolios by the pension funds was important to avert pressure on non-bank financial intermediaries. The speed of the monetary policy reaction was significantly different in each case, due to the differences in initial conditions. In 2008, the external crisis struck when the central bank was grappling with high and rising inflation. The cycle of increases in the MPR was ended on 4 September, at 8.25%, and kept at that level until January 2009, when a series of drastic cuts was started, bringing the MPR to 2.25% in March. This was followed by more moderate reductions that ended in July with the MPR at 0.5% when the central bank signalled that it had reached the minimum. It is important to recall that inflation as measured by the annual headline CPI reached a peak in October 2008 at 9.9%, falling to 8.9% in November and to 7.1% in December, despite the sharp depreciation of the peso after the September events. In 2019, the situation was different: headline inflation had been below target since the last quarter of 2016, partially due to low economic growth, but also due to a positive supply shock caused by massive immigration. Monetary policy had been expansionary during this period, and a moderate tightening began in 2018 after the economy showed some recovery, but it was reversed in 2019 when the economy slowed again. The MPR was brought down from 3% in May 2019 to 1.75% in October, just before the social crisis struck. Given the nature of the shock, it was clear that inflation was going to rise, at least in the short term, while domestic activity was going to contract. The medium-term effects, especially on inflation, were far less clear. Given that the central bank was selling dollars in the FX market, the Board decided in the December Monetary Policy Meeting to keep the MPR constant, since the rate was considered low enough to boost domestic demand without putting additional pressure on the peso. A factor in this decision was the fact that the government had already sent a proposal to Congress to modify the budget for 2020 to give it a significant countercyclical impulse. The December Policy Meeting was accompanied by the publication of the Quarterly Monetary Policy Report and a hearing in the Finance Committee of the Senate. This event attracted a lot of media attention, since the Bank had already announced a revision of its forecasts, taking into consideration the short-term impact of the events in October and November. The message was sobering, with projections showing a rise of inflation above the 3% target in the coming months, a fall in GDP in the short term followed by a significant slowdown in 2020, and a warning that unemployment could exceed 10% in the first half of 2020.¹⁰

¹⁰ Even though the central bank includes labour market considerations in the Quarterly Monetary Policy Report, it seldom makes explicit projections of the unemployment rate.

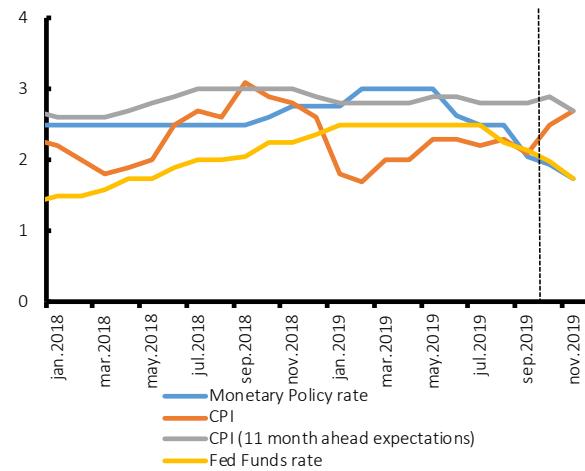
Monetary policy reactions in the two critical events (in per cent)

Graph 7

Graph 7a: Monetary policy reaction in 2008



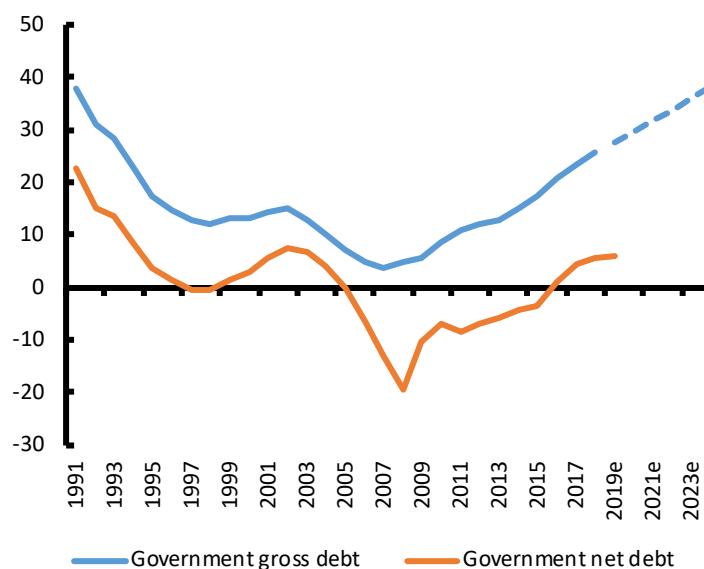
Graph 7b: Monetary policy reaction in 2019



Sources: Bloomberg; Central Bank of Chile.

Public debt as percent of GDP

Graph 8



Sources: Central Bank of Chile and Budget Office, Ministry of Finance.

- Resolution and medium-term effects: in 2009 the economy recovered quickly, helped both by the fiscal and monetary stimulus, but perhaps more importantly, because China's large fiscal stimulus caused a quick recovery in commodity prices, particularly for copper. This convinced almost everybody that the commodity price supercycle was still going strong and mining investment projects that were put on hold in 2008 came back quickly in 2009 and 2010. In addition, a very strong earthquake struck the central zone of the country in

February 2010. In the short term, this caused some disruption (loss of working days, damage to critical infrastructure etc) but the reconstruction costs added some additional impulse to investment in the ensuing quarters.¹¹ In the medium term, the most lasting effect was a deterioration of the public finances, since the medium-term forecasts for copper prices were slow to recognise that the supercycle in copper prices had ended in 2011–12. In the 2019 crisis, a sharp recovery started in December 2019 and, by mid-March, GDP had reached its pre-crisis level when the coronavirus pandemic hit Chile and lockdowns started. The medium- and long-term effects of the social crisis and the coronavirus will be difficult to disentangle. Perhaps the only thing that is clear is that the relatively prolonged period for discussing the specifics of the new constitution will bring about a lot of opportunities for shocks in business confidence (some negative, perhaps some positive), complicating a recovery in investment after the coronavirus crisis. An additional complication is the severe deterioration of confidence in all Chilean institutions that the social crisis has made evident, aggravated by political divisions. Lack of social discipline might have been a factor in the propagation of contagion during lockdown.

Concluding remarks

The combination of a coherent and stable macroeconomic policy framework with a significant development of the financial market has served to support macroeconomic stability, cushioning the economy from external shocks. The contribution of a large and still rising pool of domestic financial savings originated by the pension system has been an important driver for the development of the financial system and its integration with the global markets. This combination proved effective in the event of large external shocks, such as the 2007–09 crisis and the copper price cycles, as well as during milder ones such as the “taper tantrum”. In these cases, the Central Bank of Chile was able to conduct an expansionary policy without significant effects on capital flows or long-term interest rates, and without the deviation of inflationary expectations from target.

The recent social crisis shows that things might work differently in the event of a major domestic stagflationary shock. The good news is that the pre-existing strengths already mentioned gave enough fiscal and monetary policy space to provide a major countercyclical impulse. The lessons from the 2007–09 episode were applied, and the central bank was quick to provide liquidity when needed. The tools for monitoring the health of the financial system helped greatly during this episode.¹² Good coordination with financial regulators and supervisors, especially the Ministry of Finance, was essential. At the same time, information-sharing and coordination with the fiscal authorities proved extremely useful.

¹¹ It is worth mentioning that most highways, airports, power plants and ports damaged were private or run under private concessions, and were insured against this type of event, so that they were not subject to fiscal constraints or lengthy budgetary processes.

¹² An important consequence of the autonomy of the central bank has been the fact that government changes and political shifts since 1990 had no discernible effect on personnel changes at the Bank, preserving valuable experience and providing a fruitful learning environment within the staff.

In spite of all these positives, the central bank had to draw on its international reserves to restore stability to the FX market, while at the same time the government had to redefine the Fiscal Rule targets. These actions made this crisis as challenging as the global crisis in 2007–09, or even more so, at least in terms of the short-term impact on the Chilean economy and the macroeconomic policy reactions.

One important consequence of these two events, combined with the protracted deficits after the end of the copper cycle boom, has been that most of the slack in public finances has been used up. The coronavirus crisis has further strained public finances and international reserves, forcing the government to commit its resources to the limit, and the central bank to seek for new (contingent) sources of international liquidity, while entering into the uncharted territories of unconventional monetary policy with a large expansion of its balance sheet.

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How foreign participation in the Colombian local public debt market has influenced domestic financial conditions

José Vicente Romero, Hernando Vargas, Pamela Cardozo and Andrés Murcia¹

Abstract

Since 2014, the Colombian local public bond market has experienced a substantial increase in the participation of foreign investors due to a reduction of the tax rates on foreign portfolio investment returns and the increased weight of Colombia in the JP Morgan GBI-GD. Some evidence suggests that the resulting inflows have reduced bond and loan interest rates and raised loan supply. There is also evidence of an increased sensitivity of local public bond yields to CDS and EMBI, although the influence of external financial conditions on domestic lending rates has remained subdued. Finally, no evidence is found of a shift in the transmission of domestic monetary policy shocks to public bond and lending interest rates after the increase in foreign participation in the local bond market.

JEL classification: E52, E58, G11, G19.

Keywords: monetary policy, interest rates and transmission mechanism, portfolio choice and investment decisions, portfolio inflows.

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1. Introduction

In recent years, foreign investors have increased their participation in local financial markets of emerging economies. Low interest rates in advanced economies have induced investors to search for yield in emerging market economies (EMEs). Consequently, the latter have received significant financial flows during the last decade and foreigners now represent an important part of their public debt market,² allowing EMEs' external and fiscal deficits to be funded in domestic currency. However, these changes might have also altered their domestic financial conditions and monetary policy transmission.

Colombia is a case in point. The participation of global investors in the local public debt market has significantly risen over the last five years (Graph 1). The factors behind this trend include a robust macroeconomic policy framework, the reduction and simplification of the withholding tax on foreign portfolio investment earnings,³ the significant increase of Colombia's weight in the JPMorgan GBI index,⁴ and increasing global interest in EMEs.

In March 2014, JP Morgan announced that Colombia's weight in the GBI-EM Global Diversified (GBI-GD) index would be increased from 3.9% to 8%, by the end of September 2014. Given the estimated size of funds that followed the index in 2014, USD 218 billion, expected inflows for Colombia were USD 9 billion, which was close to the actual amount received during 2014.⁵ This was also the year with the highest public bond portfolio inflows ever (Graph 2). This shows that most foreign investors in the Colombian public bond market at that time followed the index very closely. Today, the central bank estimates that 80% of the investors with a significant presence in Colombia use this index as a benchmark.⁶

² Between Q1 2010 and Q2 2019, foreign participation in the local currency government debt market, measured as their share of the outstanding, increased significantly in Peru (17% to 54%), Colombia (4% to 26%), Mexico (14% to 30%), Thailand (4% to 18%), Russia (2% to 29%) (Arslanalp and Tsuda (2014)). For more details see www.imf.org/en/Publications/WP/Issues/2016/12/31/Tracking-Global-Demand-for-Emerging-Market-Sovereign-Debt-41399.

³ In 2012, it was reduced from 33% to 14%, and in 2018 to 5%.

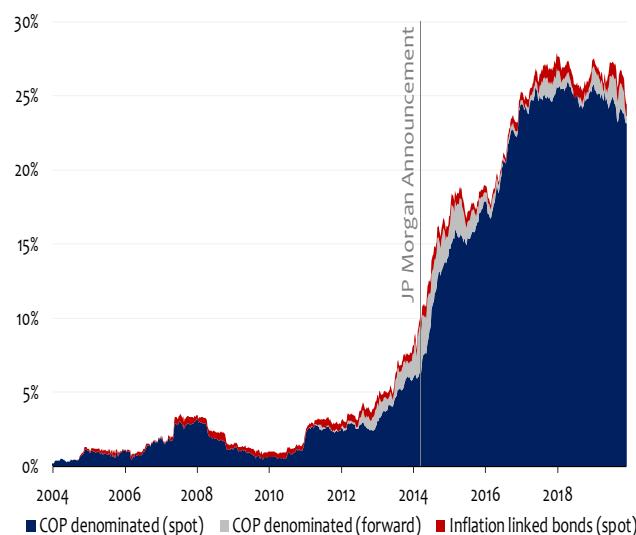
⁴ A benchmark that tracks local currency bonds issued by EME governments.

⁵ For more details see <https://publicaciones.banrepultural.org/index.php/emisor/article/view/7888/8268> (in Spanish). Between 18 March and 1 October 2014, foreign inflows into TES (local public bonds) were \$7 billion, from 18 March to 31 December 2014 they were \$8.6 billion.

⁶ Based on communications with the main investors.

Offshore investors' stock in local sovereign bonds as percentage of outstanding

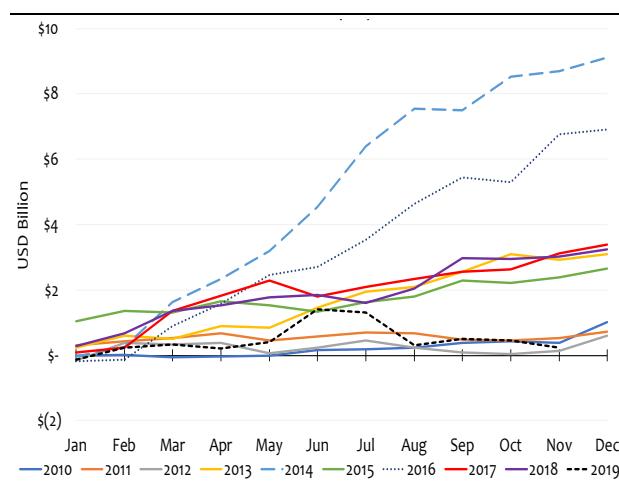
Graph 1



Non-resident net purchases in sovereign local bonds

Accumulated yearly sum

Graph 2

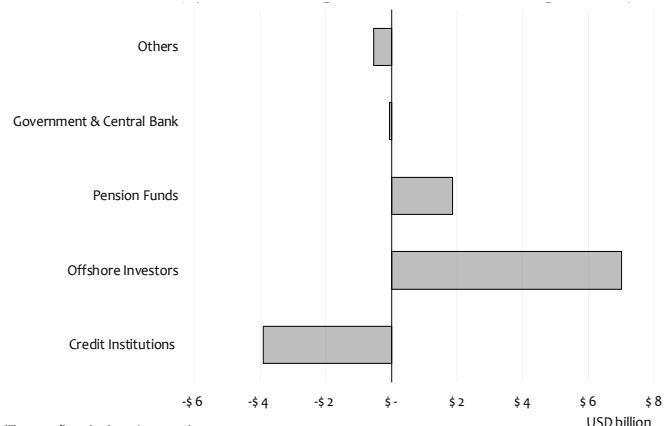


Foreign investors bought Colombian sovereign bonds in local currency (TES) from banks (Graph 3). The reduction of TES in the hands of banks increased their liquidity and translated into an increased credit supply (Graph 4). From March to December 2014, the 10-year government bond yield declined from 7.22% to 6.54%, and the spread between commercial, consumer and mortgage loan rates and the central bank policy interest rate fell as well (Graph 5).

Net sovereign bond purchases in 2014 by type of investor

Between 18 March (before JP Morgan announcement) and 1 October (after the 2014 change was in place)

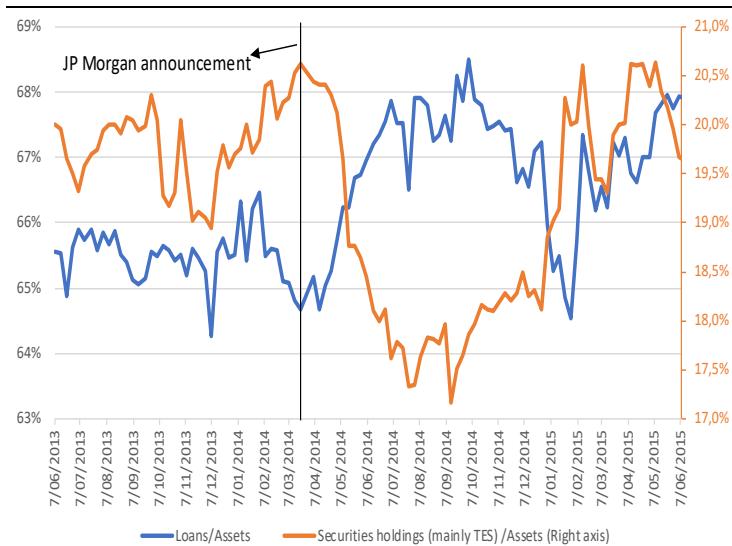
Graph 3



Source: Central Bank of Colombia

Assets of credit establishments

Graph 4

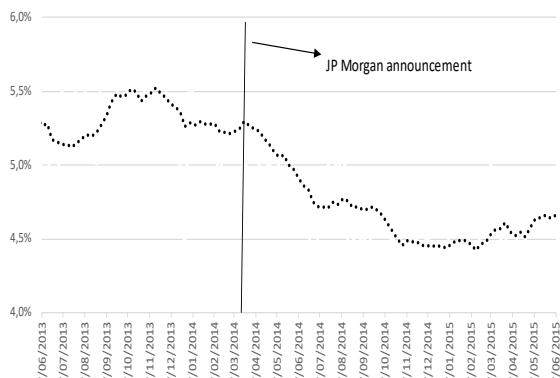


Source: Central Bank of Colombia

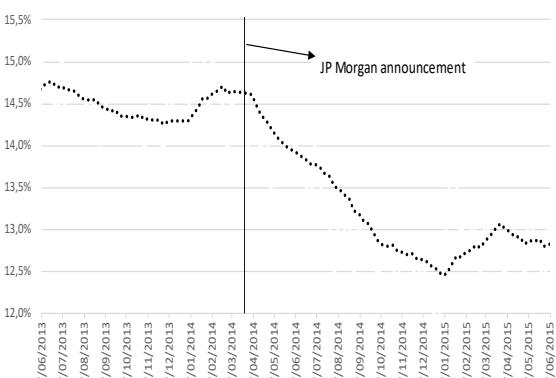
Selected interest rates before and after the JP Morgan announcement

Graph 5

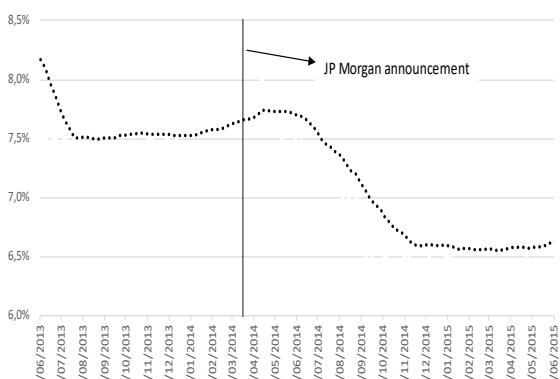
A. Commercial loan rate – policy rate spread
(12-week moving average)



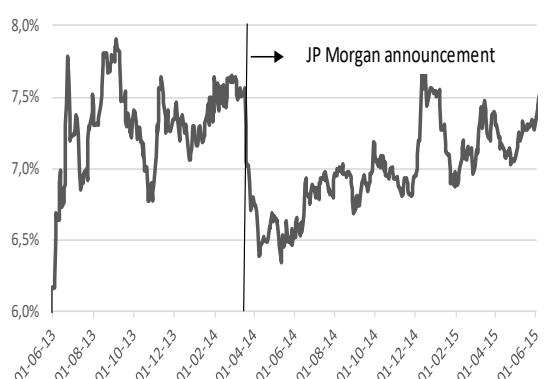
B. Consumer loan rate – policy rate spread
(12-week moving average)



C. Mortgage loan rate – policy rate spread
(12-week moving average)



D. Zero coupon 10Y TES yield



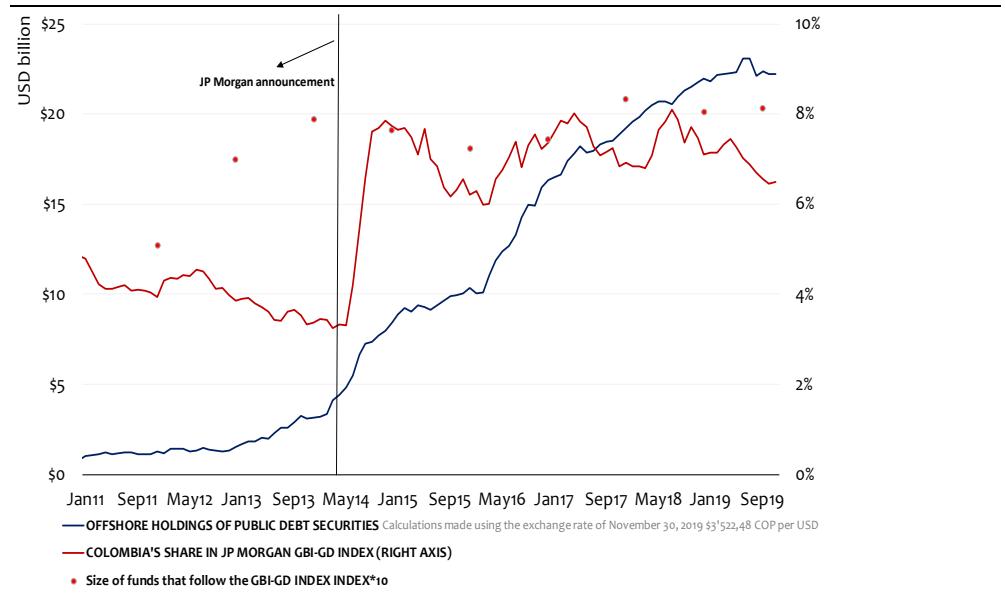
Source: Central Bank of Colombia

Even though since 2015 Colombia's weight in the JP Morgan index has experienced changes, foreigners' holdings of TES have continued to increase in the last couple of years (Graph 6). This occurred because some investors in Colombia have not followed the JP Morgan index and because the funds that use the index have grown in size. According to JP Morgan, in 2019 funds benchmarked to the GBI family stood at USD 228 billion, of which USD 203 billion was linked to the GBI-GD. Another interesting fact is that, from 2011 to 2013, there was no positive relationship between Colombia's weight in the GBI-GD and foreigners' holdings of TES, probably again because as the country's weight went down, the size of the funds that followed the index increased.⁷

⁷ In December 2011, the value of funds that followed the index was USD 127 billion, which would have implied foreigners' TES holdings of USD 5 billion. However, actual holdings were USD 2.3 billion of TES, most of which were in the hands of foreign banks (Graph 7). This shows that the funds did not follow the index passively at that time, or that the index that was effectively followed was adjusted to exclude Colombia.

Colombia's weight in the GBI-GD and foreign participation in the local sovereign bond market

Graph 6



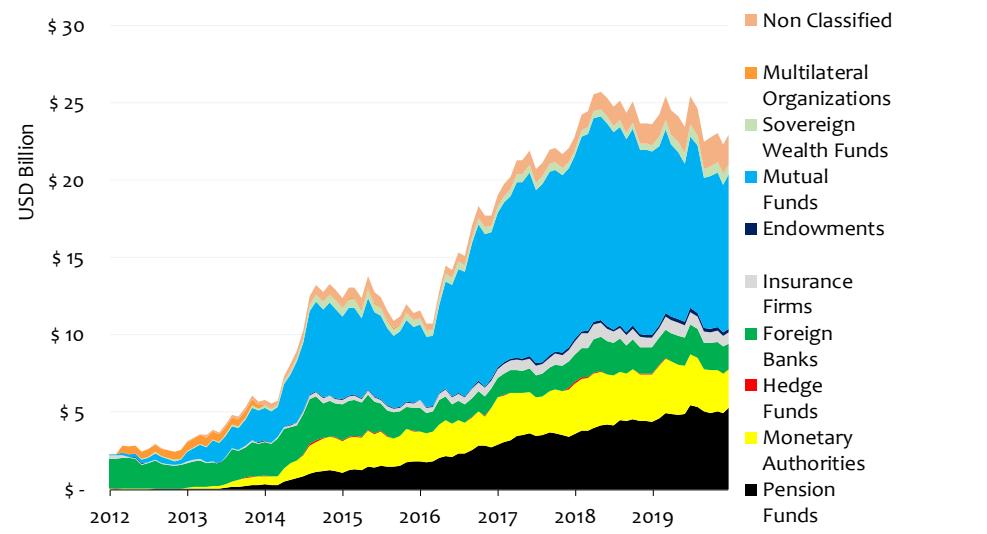
Source: Central Bank of Colombia; JP Morgan.

The type of foreign investor in the local public debt market (Graph 7) has also changed in recent years. In 2012, international banks were the main investors. While they have maintained a stable level of investments, mutual funds, pension funds and monetary authorities have increased their holdings considerably.

This paper addresses three questions. First, what were the effects of the increased foreign participation in the domestic sovereign bond market on credit markets and local public bond and lending interest rates? Second, has the higher participation of foreigners in the local public bond market changed the transmission of external financial conditions into the Colombian economy? And third, has the higher participation of foreigners in the local public bond market changed the transmission of domestic monetary policy shocks?

Foreign investors holdings of local sovereign bonds by investor type

Graph 7



Source: Central Bank of Colombia

2. Effects of foreign investors on local financial conditions

To study the influence of foreign investors on domestic financial conditions in circumstances resembling the experience of Colombia since 2014, a simple two-period model of a small open economy is developed in which “portfolio balance channels” in the local banking sector and the foreign investment decisions are important. The model is presented in Appendix 1. In particular, the model is used to explore the effects of changes in (i) the size of the foreign portfolios in which local bonds are included; (ii) the taxes on foreign portfolio earnings; and (iii) the external interest rate. The main results of the model may be summarised as follows:

- In the absence of any change in external interest rates, increases in the size of foreign portfolios including domestic public bonds have a downward effect on local bond, loan and deposit interest rates only in the presence of imperfect substitution between foreign and domestic bonds. Close substitution would imply a low or negligible impact in this regard. Intuitively, expanded foreign portfolios entail a smaller share of local bonds, making them more valuable in the eyes of foreign investors.
- Reductions in the tax rate on foreign portfolio earnings have stronger effects on local interest rates when they occur at higher initial tax rate levels. This occurs because a greater drop in local bond interest rates is required to balance external and domestic net returns after a given reduction in the tax rate.
- The effects of tax rate cuts are smaller in the presence of imperfect substitution between foreign and local bonds in the foreign portfolios, or between loan and bonds on the banks' asset side. A tax cut increases the exposure of foreigners to local bonds, increasing the “premium” that they require to accommodate a larger

share of them in their portfolio. This partially offsets the direct effect of the tax rate reduction. Likewise, as foreign investors buy bonds from banks, the latter's exposure to loans (relative to bonds) increases, pushing loan interest rates upwards and partially offsetting the direct negative effect of the tax cut.

- For the same reason, increases in external interest rates have a more subdued effect on domestic interest rates in the presence of imperfect substitution of foreign and local bonds in foreign portfolios, and of bonds and loans in banks' assets.
- Increases in external interest rates have stronger effects on local interest rates when the tax rate on foreign portfolio earnings is higher. Again, this happens because a given rise in external interest rates requires a larger response of the local bond rate to balance net internal and external returns when the tax rate is higher.
- Under imperfect substitution between foreign and local bonds in foreign portfolios, the impact of an increase in external interest rates on domestic rates is smaller, the larger the size of foreign portfolios. Given a fixed supply of local bonds, larger foreign portfolios imply a lower share of domestic bonds in them. An increase in external interest rates induces a reduction in those already low shares and, thus, makes local bonds more valuable to foreign investors. Consequently, the premium that they require to hold local bonds falls, partially offsetting the direct impact of the external interest rate hike.

In addition to the channels posited in the model, external financial conditions may affect local ones in other ways. Monetary policy in advanced economies (AEs) could be transmitted to EMEs through changes in financial conditions.⁸ For instance, Takáts and Vela (2014) suggest that market sentiment could work as a transmission mechanism. As the 2013 *taper tantrum* episode showed, actual and perceived changes in AEs monetary policy may alter agents' expectations and have consequences for EMEs. This channel could be amplified by the presence of foreign agents in local markets. Another possible transmission channel is present through variations in cross-border bank flows, since differences in relative monetary policy could affect cross-border claims, which in turn could disturb the credit channel of monetary policy. However, it is not clear if the presence of foreign investors amplifies this transmission channel (Correa et al (2018); Albrizio et al (2019)).⁹

There is evidence that higher foreign participation in the local bond market is associated with lower yields (Peiris (2010); Andritzky (2012); Bernanke et al (2004)). For example, Peiris (2010) finds that for emerging markets a 10-percentage point increase in the share of foreign holdings leads to a 60 bp decrease in sovereign yields. In the same line, Garcia (2019) uses causal inference methods to conclude that Colombian sovereign bond yields in local currency decreased by up to 94 bp after the jump of foreign participation in the TES market brought about by the country's increased weighting in the JP Morgan GBI-EM.

In the case of advanced economies, Warnock and Warnock (2009) study the effects of higher foreign demand for treasuries on yields in the United States. They

⁸ For example, Takáts and Vela (2014) find that "advanced economy monetary policy seems to drive EMEs' policy rates beyond what domestic factors would suggest", a relation observed both for short-term and long-term rates.

⁹ Albrizio et al (2019) find evidence that an exogenous increase in funding costs in advanced economies leads to statistically significant declines in cross-border bank lending.

find that the two-year bond yields remain closely linked to the monetary policy rate and are less affected by foreign flows. For long-term rates however, the participation of foreign investors explains a higher proportion of yields, thus implying a weaker influence of the policy rate.

Besides affecting yield levels, a higher participation of foreign agents in local financial markets could increase yield volatility. There is evidence that foreign investors are more sensitive to international financial conditions, as compared with local agents (Ebeke and Kyobe (2015); Peiris (2010)). Hence, a higher participation of foreign investors in local markets could amplify spillover effects from foreign financial conditions.¹⁰ This could be challenging for central banks, as a higher sensitivity to external conditions and more volatile markets might hamper the transmission of monetary policy shifts to market interest rates.

2.1 Effects of foreign participation in the TES market on domestic credit and interest rates

The increased participation of foreign investors in the Colombian local public bond market affected domestic financial conditions in at least two ways. First, given its size and timing, it had a substantial impact on TES yields. Second, by reducing the latter, it may have pushed down bank loan rates. Moreover, since banks were important sellers of TES to foreign investors, the enlarged foreign participation in the TES market implied changes in banks liquidity and credit supply that influenced corporate real and financial variables.

This is in accordance with the results of the model presented in Appendix 1, in which a cut of the tax rate on portfolio investment earnings results in increased participation of foreign investors in the local markets and a reduction in local interest rates. Likewise, if “portfolio balance effects” are allowed, an increase in the size of foreign portfolios in which local bonds are included also produce greater foreign participation in local markets and lower domestic interest rates, even if foreign interest rates remain unchanged. Interestingly, TES yields dropped markedly around the time of the JP Morgan announcement without a significant concomitant move in the yields on USD-denominated Colombian government bonds (Graph 8), indicating that “portfolio balance channels” may be relevant.¹¹

¹⁰ Ebeke and Kyobe (2015) provide evidence that higher foreign participation in local-currency bond markets increases the transmission of global financial shocks to local markets and is also associated with higher volatility and lower yields.

¹¹ Alternatively, this divergence could be explained under a UIP hypothesis by strong COP appreciation expectations. The latter would have been consistent with a sharp instant depreciation of the COP, which did not happen at the time, or with the expectation of higher levels of the COP in the future, which would require an explanation.

10-Year TES and USD-denominated Colombian government bond yields

Graph 8



Source: Central Bank of Colombia

The 2014 JP Morgan rebalancing makes it possible to analyse the effects of higher foreign participation on local interest rates in Colombia, as it caused an exogenous inflow of foreign investors into the local sovereign bond market. As a first illustration, a Wald test suggests that the spread between the TES yield and the policy rate decreased after the JP Morgan announcement (Graph 9).¹² This result is confirmed with causal inference techniques that isolate the effect of the index rebalancing from other sources of changes in local yields. Based on both a difference-in-difference estimation and a synthetic control method, Garcia (2019) finds that the JP Morgan index rebalancing produced a permanent reduction of up to 94 bp in the TES 10-year yield.

In the case of lending interest rates, the Wald tests also point to a significant decrease of average commercial, preferential, consumer and mortgage loan rates minus the policy rate after the JP Morgan rebalancing. These results also hold at a more disaggregated level by maturities (Graph 10).

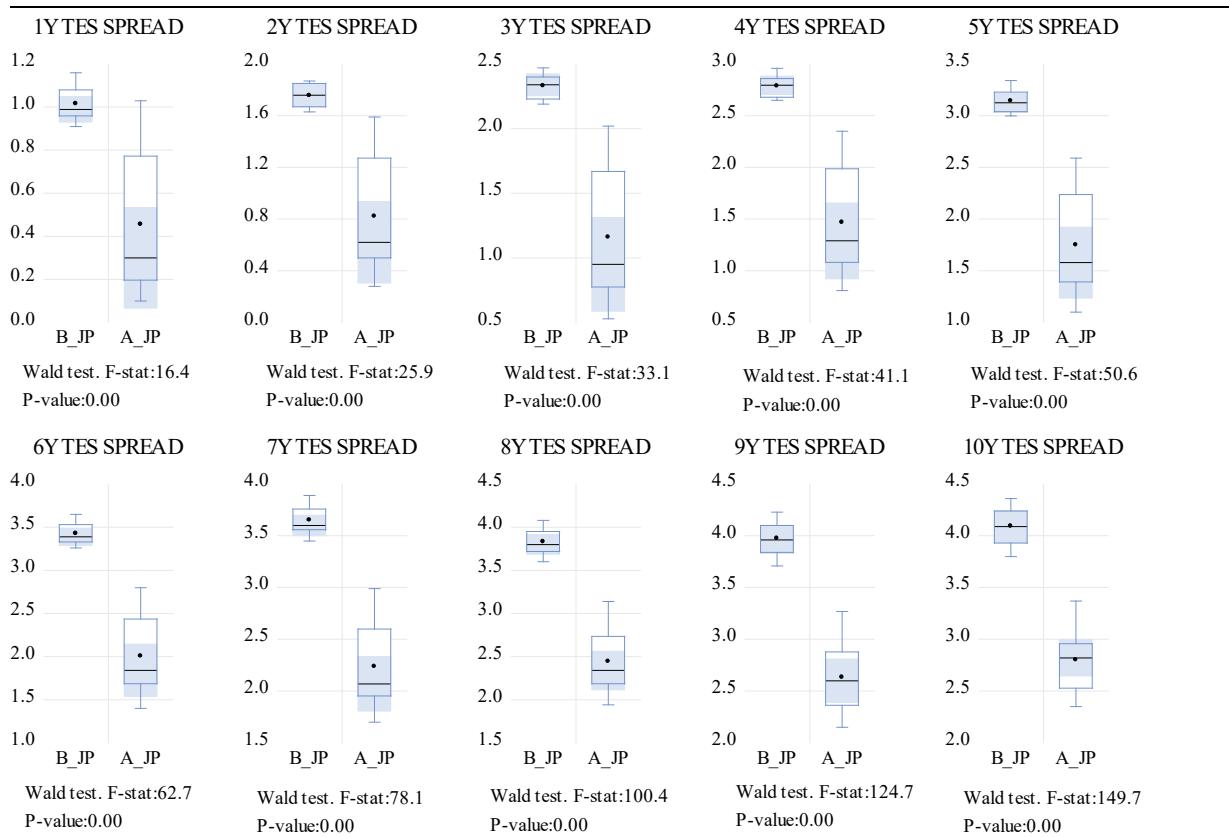
Between February and June 2014, bank liquidity increased after foreign investors purchased a significant portion of banks' TES holdings. As a result, bank credit supply rose, stimulating economic activity. Using a two-stage estimation procedure, López et al (2020) show that firms obtained larger amounts of credit in 2014 from banks that sold more TES, and that the increased loan supply was associated with larger levels of debt, revenues and investment at the firm level in that year. Williams (2018) reaches similar results by comparing the responses of TES market-maker banks and non-market-maker banks to the JP Morgan announcement. Market-maker banks sold

¹² The comparison of these subsamples does not include exclusively the effect of the JP Morgan announcement. It may also be influenced by the impact of the "Taper Tantrum" on interest rates in 2013.

TES to foreign investors, increased loan supply and induced higher levels of sales, output, GDP and employment in industries that were more exposed to them.

TES-policy rate spread before and after the JP Morgan announcement (2013–15)

Graph 9

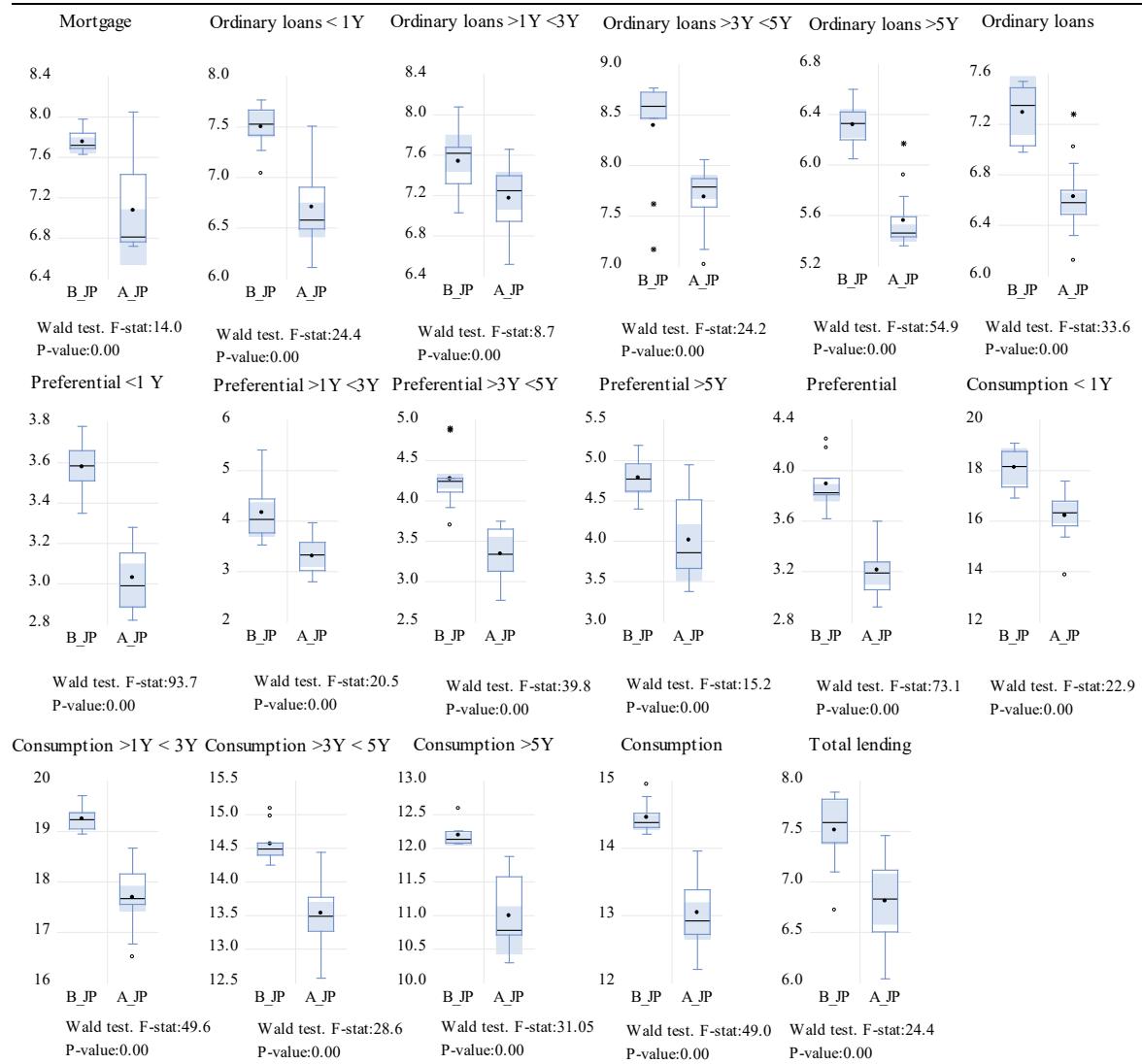


Note: Wald test (F-statistic and probability) is used to test the difference between the subsamples (H₀: the spread is the same in both periods). B_JP: before JP Morgan change in 2014 (June 2013 to March 2014). A_JP: after JP Morgan change in 2014 (April 2014–June 2015). The box portion represents the first and third quartiles (middle 50% of the data). The mean is represented by the black dots, the black line stands for the median and the blue shaded areas are the median 95% confidence interval.

Source: Central Bank of Colombia and authors' estimates.

Lending rates-policy rate spreads before and after the JP Morgan announcement

Graph 10



Note: Wald test (F-statistic and probability) is used to test the difference between the subsamples (H0: the spread is the same in both periods). B_JP: before JP Morgan change in 2014 (June 2013 to March 2014). A_JP: after JP Morgan change in 2014 (April 2014-June 2015). The box portion represents the first and third quartiles (middle 50% of the data). The mean is represented by the black dots, the black line stands for the median and the blue shaded areas are the median 95% confidence interval. Points above and below the boxplot are outliers.

Source: Central Bank of Colombia and authors' estimates.

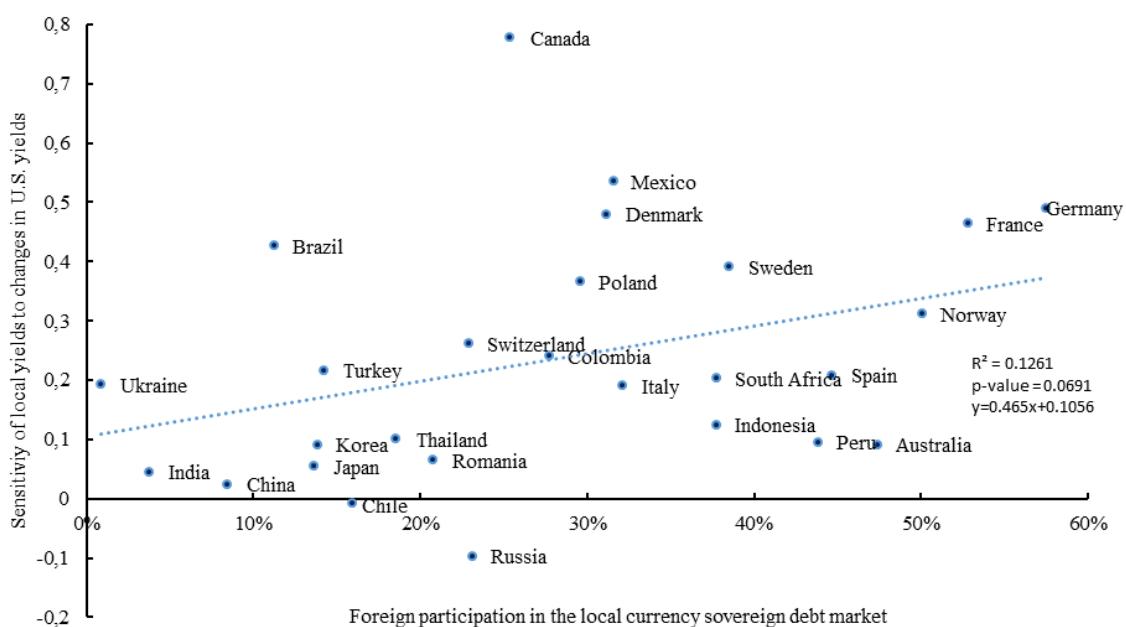
2.2. Effects of foreign participation in the TES market on local sensitivity to international conditions

According to the model presented in Appendix 1, if an increased participation of foreigners in the local bond market is the result of lower taxes on the proceeds of foreign investment or of larger foreign portfolios, then local interest rates would be generally *less* sensitive to changes in external interest rates after the increase in foreign participation. However, in more complex settings, if foreign and local investors were to behave differently, the results might change in this regard.

For example, greater foreign participation in the domestic sovereign debt market can make local yields more sensitive to international financial conditions if foreign investors weigh external factors in their portfolio allocation more than investors confined to local markets do. Foreign investors' higher responses to global shocks imply that they could amplify spillover effects from international financial conditions to local markets. In particular, passive investment strategies could increase the sensitivity of local markets to global factors, as investors benchmarked to financial indices focus less on country-specific developments (IMF (2019)). Graph 11 shows that there is a statistically significant positive correlation between the percentage of local sovereign bonds held by foreigners and the sensitivity of local yields to changes in US yields, after controlling for international risk aversion.

Sensitivity of local yields to changes in US yields and foreign participation in the local currency sovereign debt market

Graph 11



The sensitivity of local interest rates is calculated as the β coefficient in the following regression: $dy = \alpha + \beta dy^* + \theta VIX + \xi$, where dy is the difference in the 10-year yield of sovereign bonds denominated in local currency, dy^* is the difference of the 10-year yield of U.S. treasuries, and VIX is the Chicago Board Options Exchange Volatility Index. The information regarding foreign participation in the local currency sovereign debt market is obtained from Arslanalp and Tsuda (2012) and Arslanalp and Tsuda (2014).

Source: Central Bank of Colombia.

An examination of the importance of external variables in the determination of TES and local lending interest rates (Graph 12) suggests that¹³ (i) TES yields have been influenced by the five-year Colombia CDS, the EMBI, the VIX and the return and volatility of the JP Morgan EM currency index throughout the whole 2008–19 sample; (ii) there is some evidence that the sensitivity to the CDS and EMBI may have

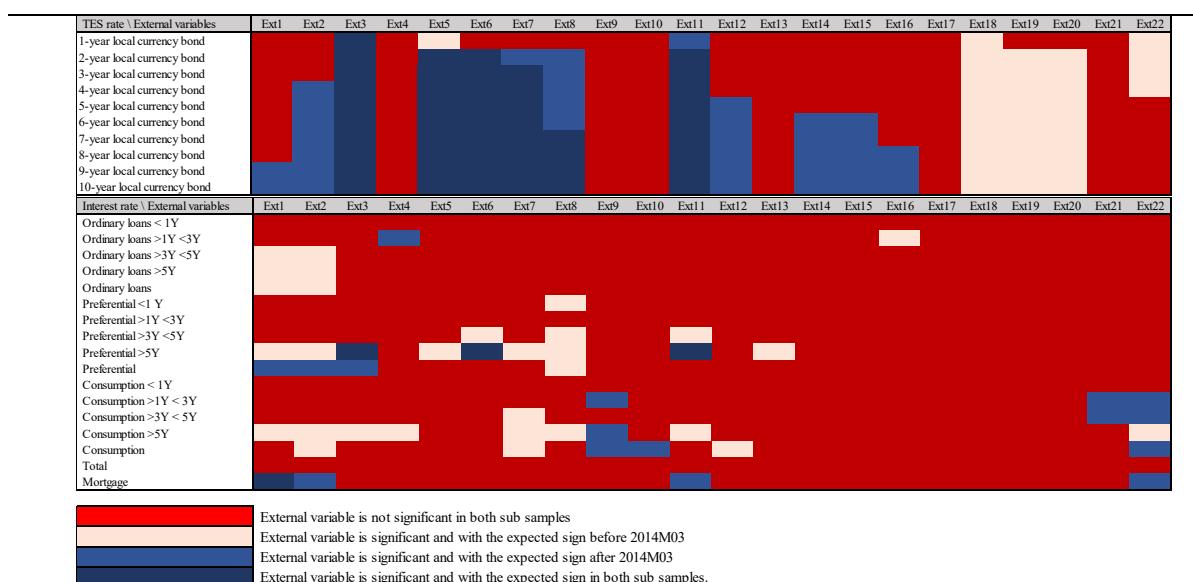
¹³ Graph 12 indicates whether the external variables were significant (and with the expected signs) determinants of domestic interest rates before the JP Morgan announcement (light red), after the announcement (light blue), during the whole sample period (dark blue) or not significant across sub-samples (red). The estimation sample goes from January-2008 to October-2019.

increased between samples;¹⁴ (iii) the correlation of the Brent oil price, the US shadow interest rate and the short-term US Treasury rates with long-term TES rates became important after 2014 (the year of the jump in foreign participation in the TES market); (iv) in contrast, the correlation between long-term US treasury yields and TES rates weakened after 2014; (v) domestic lending rates do not exhibit strong correlation with external variables in the whole 2008–19 sample; and (vi) US monetary policy shocks do not seem to strongly influence either TES or lending rates in the whole sample.

The above results indicate that the sensitivity of TES yields to shifts in external conditions experienced some changes after 2014, when the participation of foreigners in the local TES market increased markedly. However, there were no significant changes in the influence of external variables on domestic lending interest rates.

Significance of the relationship between local interest rates and external variables

Graph 12



Note: The threshold for significance used in the table is 10% (HAC s.e.)

Code	Description
Ext1	Log of WTI oil price
Ext2	Log of Brent oil price
Ext3	Colombian 5-year CDS
Ext4	Log DXY index
Ext5	VIX index
Ext6	JP Morgan EM currency volatility index
Ext7	Log of JP Morgan EM currency index
Ext8	S&P 500 index
Ext9	LIBOR rate
Ext10	FED Funds rate
Ext11	EMBI Colombia

Code	Description
Ext12	US shadow rate
Ext13	1- month US yield
Ext14	3-month US yield
Ext15	6-month US yield
Ext16	1-year US yield
Ext17	2-year US yield
Ext18	3-year US yield
Ext19	5-year US yield
Ext20	10-year US yield
Ext21	US monetary policy shock Jarociński & Karadi
Ext22	US equity shock Jarociński & Karadi

To assess the sensitivity of local interest rates to external drivers the following equation is estimated: $\Delta_t^j = (1 - d)(\gamma_0^{j,k,b} + \gamma_1^{j,k,b} \Delta ext_t^k + \sum_{l=1}^L \lambda_l^{j,k,b} x_t^k) + d(\gamma_0^{j,k,a} + \gamma_1^{j,k,a} \Delta ext_t^k + \sum_{l=1}^L \lambda_l^{j,k,a} x_t^k) + \varepsilon_t^{j,k}$. Where i_t^j represents the interest rate j , ext_t^k is the external variable k , and x_t^k are control variables (the first difference of the logarithm of CPI, the economic activity index, a local monetary policy shock). The dummy variable d equals 0 before March 2014 and 1 thereafter. US monetary and equity shocks are obtained from Jarociński and Karadi (2020) and are available from January 2005 to December 2016. US monetary and equity shocks are included in levels since they are stationary variables (Appendix 2).

Source: Central Bank of Colombia.

¹⁴ The Wald test shows that the sensitivity of TES rates at different tenors to CDS and EMBI could have increased after the JP Morgan announcement (March 2014). In the case of the VIX, JP Morgan EM FX index and JP Morgan EM FX volatility, the estimated parameters are statistically equal (Appendix 2).

2.3 Effects of foreign participation in the TES market on monetary policy transmission

To examine the possible effects that a greater foreign participation in the TES market may have on the transmission of domestic monetary policy, a methodology is used in which monetary policy shocks are identified and their transmission to market and lending rates is estimated recursively. The identification of unanticipated monetary policy shocks may reduce potential bias in the estimation of transmission parameters, as the effects of anticipated policy shifts are incorporated in market interest rates before the shifts occur.

The policy shocks were constructed as the difference between actual policy rates and their expected values.¹⁵ The latter were obtained from the one-month overnight IBR¹⁶ index swap. The transmission to market interest rates was estimated by means of local projections methods (Jordà (2005)), based on the following specification:

$$\Delta i_{t+h}^j = \mu_h^j + \beta_h^j \psi_t + \sum_{l=1}^L \gamma_h^{j,l} x_t^l + \xi_{h,t}$$

Where $h = 1 \dots H$ represents the projection horizon, i_t^j is the interest rate j , ψ_t is the domestic monetary policy shock, x_t^l are control variables (the first difference of the logarithm of CPI and the economic activity index), $\xi_{h,t}$ is the projection residual and β_h^j and $\gamma_h^{j,l}$ the projection coefficients. The local projection impulse-response function of Δi_t^j with respect to the monetary policy shock is given by $\{\beta_h^j\}_{h \geq 0}$.

Graph 13 shows the estimated transmission coefficients for commercial ordinary, commercial preferential, consumer, mortgage and average lending interest rates, as well as for the 10-year TES yield, for the whole 2008–19 sample.¹⁷ Transmission is stronger for commercial loan rates, with the total effect on their level being completed after eight months.¹⁸ For consumer and mortgage loan rates, transmission is lower, while the 10-year TES yield only responds contemporaneously to the policy shock.¹⁹

¹⁵ Vargas et al (2012), Huertas et al (2018) and López et al (2020) use similar strategies to compute responses to monetary policy shocks, although they used different methodologies to identify the shocks. Vargas et al (2012) obtain them by regressing policy interest rates on a wide set of macroeconomic variables available before the monetary policy decision. Huertas et al (2018) use a survey of interest rate expectations to calculate the policy shock. López et al (2020) estimate the shocks using the methods of Romer and Romer (2004) and Bañbura et al (2010). A comparison of the monetary policy shock used by López et al (2020), the Bloomberg survey surprises, and the proposed measure are shown in Appendix 2.

¹⁶ IBR stands for "*Indicador Bancario de Referencia*", which is the transactions-based, one-day Colombian "Libor". Appendix 2 compares this shock with other shocks that have been used in the literature.

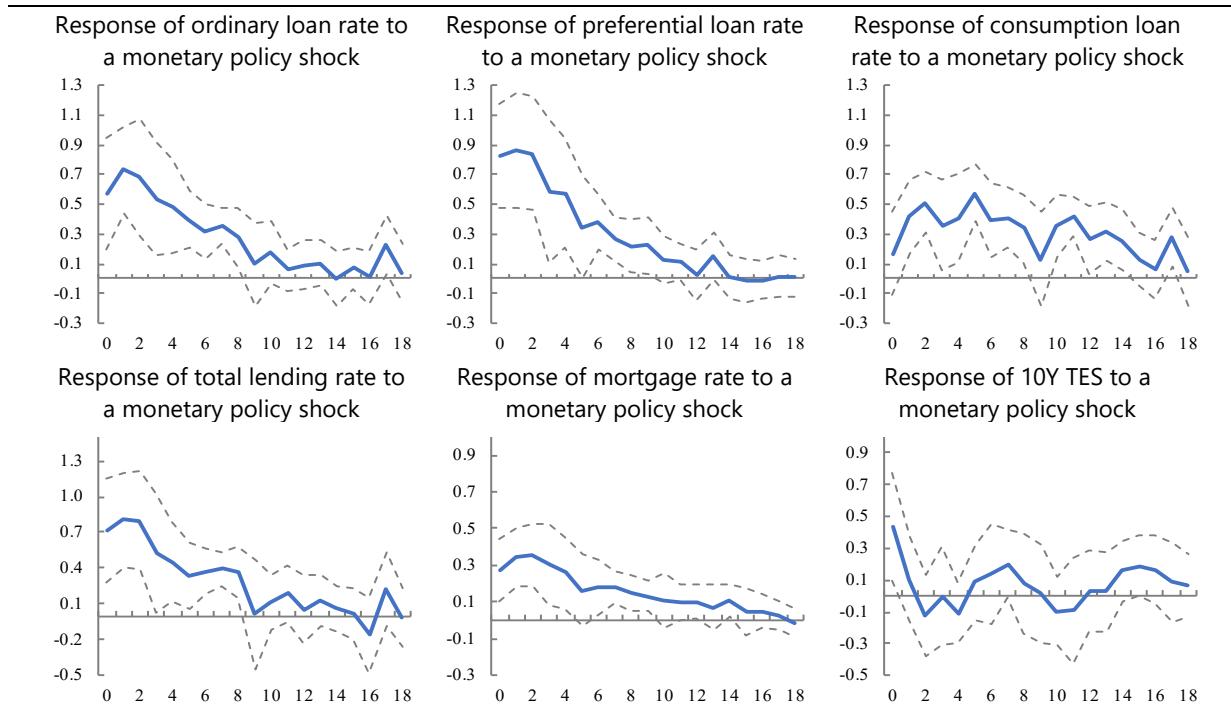
¹⁷ Graph 13 includes the contemporary effect of the shock on interest rates ($h=0$).

¹⁸ Since the econometric specification is based on the monthly first differences of the interest rates, the response of their level to the monetary policy shock is given by the cumulative sum of the estimates shown in Graph 12.

¹⁹ As shown in Graph 13, the contemporaneous transmission coefficient is statistically different from zero for all but consumer loan interest rates. This is odd, since market interest rates were included as monthly averages and, thus, should not be affected by the contemporaneous shock, as the latter generally occurs at the end of each month. This might suggest that the shock was not completely unanticipated by the agents that form prices in the loan and bond markets. It might also be the case that some Board meeting dates in the sample were not exactly at the end of the month, but some

LP impulse response to a monetary policy shock (M01 2008–M10 2019)

Graph 13



Source: Authors' estimates.

To test for changes in the transmission of monetary policy shocks after the increase of Colombia's weight in the JP Morgan GBI-GD, recursive least squares (RLS) were applied to the above specification and CUSUM tests were performed.²⁰ Graph 14 indicates that the RLS estimates of the one-month-ahead transmission coefficients have been stable since well before the change in Colombia's weight. Graph 15 shows the corresponding CUSUM tests, which confirms the coefficient stability results. The same outcomes are obtained for all transmission coefficients, as illustrated by the recursive estimates of the transmission coefficient for a rolling sample (Graph 16).

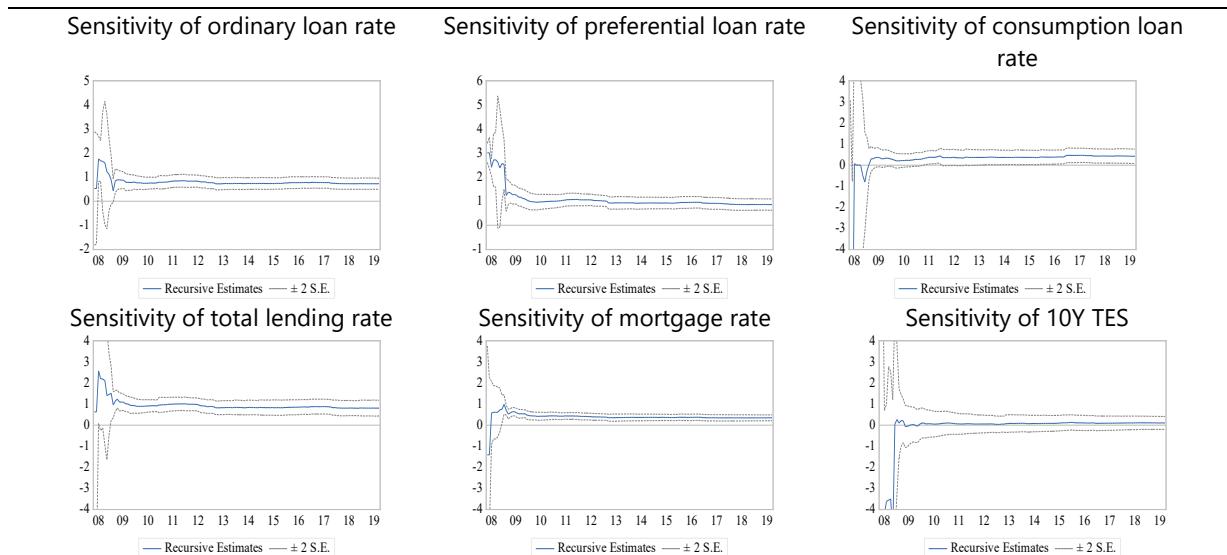
weeks earlier. In these circumstances it is possible that a policy surprise be included in the contemporaneous average market interest rates. Miranda-Agrippino and Ricco (2017) remark that policy shocks calculated with the methodology used in this exercise are *assumed* to be exogenous and unanticipated, but they might not be so. Hence, they suggest regressing the calculated policy shocks on "Greenbook" forecasts and shock lags, and to use the resulting residuals as a more appropriate measure of monetary policy surprises.

²⁰ This approach was preferred to an estimation in separate samples because of the short length of the 2014–19 period. In the presence of short samples, the estimation of the transmission coefficients may be biased downwards by "perceived policy mistakes", since in these cases monetary policy shocks are not followed by a response in market interest rates.

Sensitivity of interest rates to a monetary policy shock at projection horizon h=1

(recursive estimates)

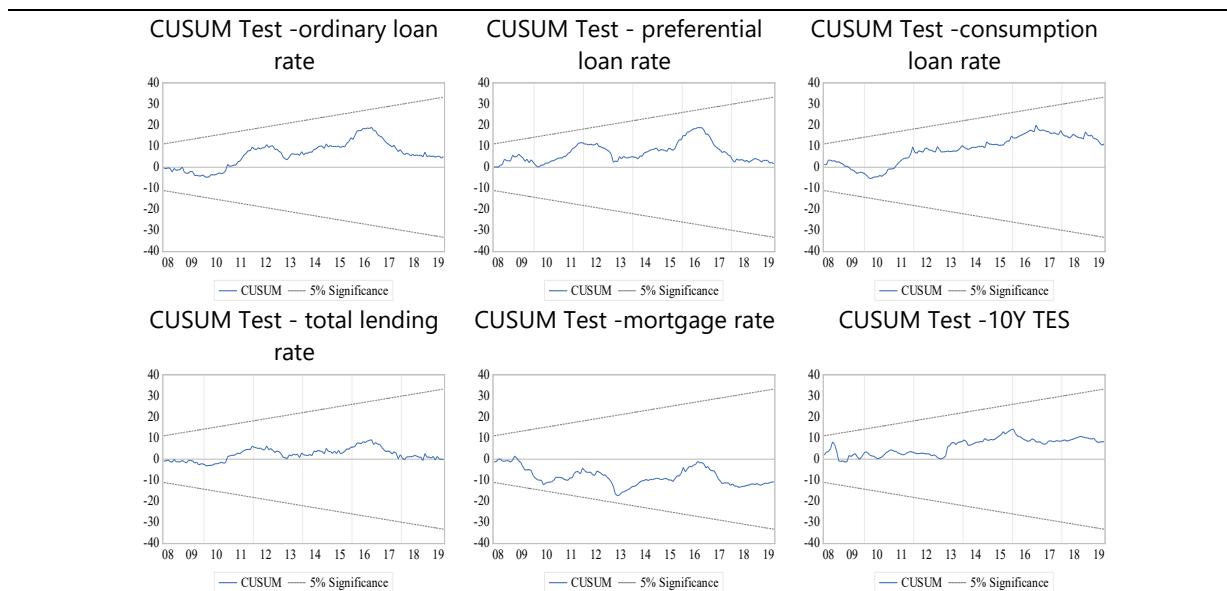
Graph 14



Source: Authors' estimates.

CUSUM Test for interest rates at projection horizon h=1

Graph 15

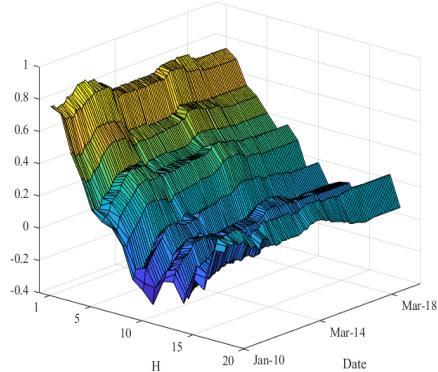


Source: Authors' estimates.

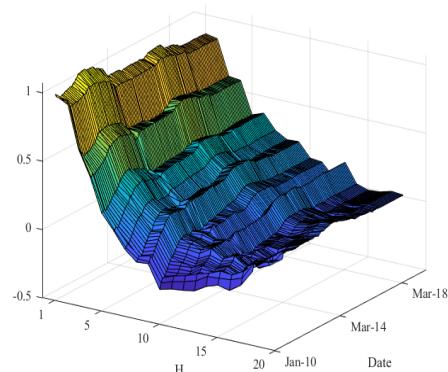
Response of interest rates to a monetary policy shock. Local projections estimated recursively from 10M01 to 19M10

Graph 16

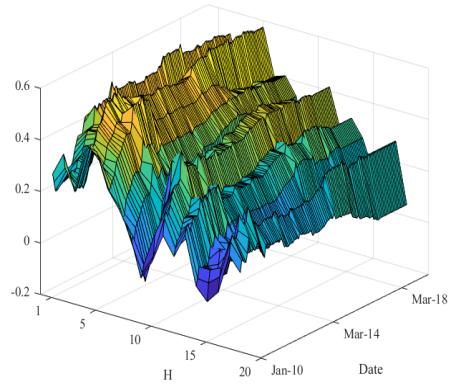
Response of ordinary loan rate



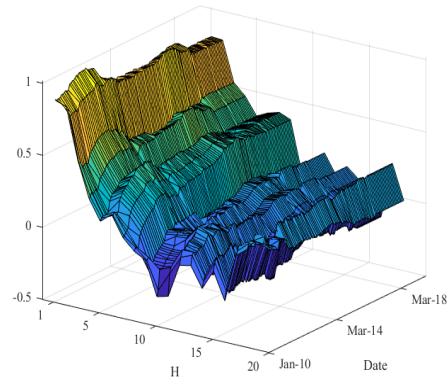
Response of preferential loan rate



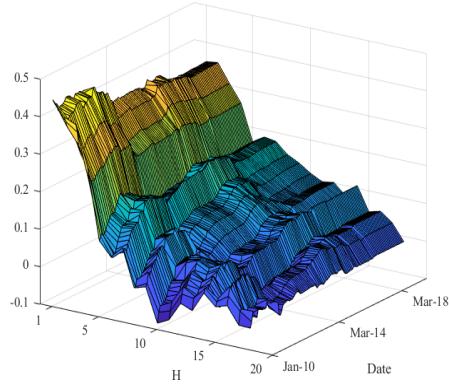
Response of consumption loan rate



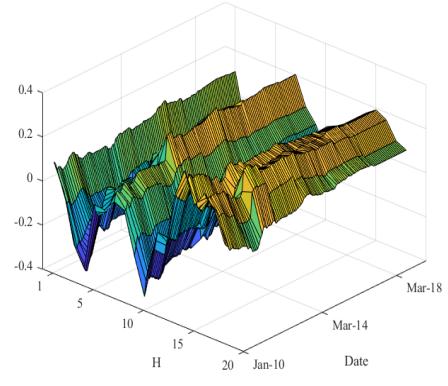
Response of total lending loan rate



Response of mortgage loan rate



Response of 10Y TES



Source: Authors' estimates.

3. Conclusions

The Colombian local public bond market experienced a substantial increase in the participation of foreign investors during 2014 due to a reduction of the tax rates on foreign portfolio investment returns and the increase in Colombia's weighting in the JP Morgan GBI-GD. The resulting inflows reduced bond and loan interest rates and raised loan supply. Since then, foreign investors have maintained a high participation in the public bond market and there is some evidence that the sensitivity of TES yields to CDS and EMBI may have increased, although the influence of external financial conditions on domestic lending rates has remained subdued. US monetary shocks are not found to have a direct impact on TES or loan interest rates, although "shadow" US policy rates have become a significant driver of TES yields since 2014. Finally, there does not seem to have been a shift in the transmission of domestic monetary policy shocks to TES and lending interest rates after the rise in foreign participation in the local bond market.

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Appendix 1

A macroeconomic model of foreign investor effects on a small open economy

A simple two-period, small open economy model is presented to illustrate the effects that changes in the size of foreign investor portfolios or the tax rates on the profits of foreign portfolio investment may have on local interest rates.

A small open economy is assumed to be populated by two households that differ in their time discount rates. As a result, the "patient" household, p , will be net creditor and the "impatient" one, i , will be net debtor. Both households receive exogenous endowments in both periods and pay lump sum taxes to the government. There is no production in the economy. Households can only save in or borrow from a local bank. Hence, the net creditor household takes the first period bank deposit interest rate, r_d , as the relevant price for its consumption/saving decisions, while the net debtor household takes the first period bank loan rate, r_l , as the relevant price for its consumption/borrowing decisions.

The households' problem is the following:

$$\begin{aligned} & \text{Max } u(c_1^j) + \beta^j u(c_2^j) \\ & \text{s.t. } c_1^j + (1+r_k)^{-1} c_2^j = (y_1^j - T_1) + (1+r_k)^{-1} (y_2^j - T_2) \text{ for } j \in \{p, i\} \text{ and } k \in \{d, l\} \end{aligned}$$

$u(c)$ is assumed to be a CRRA utility function. The solution of this problem implies the standard Euler equations, in which the relevant interest rate is the deposit or loan rate for the patient or impatient household, respectively. Optimal consumption paths are derived from the Euler equation and the inter-temporal budget constraint for each household. Demand for bank deposits, D , and loans, L , are then given by:

$$D = (y_1^p - T_1) - c_1^p \quad (1)$$

$$L = c_1^i - (y_1^i - T_1) \quad (2)$$

There is a local bank that receives deposits from the patient household and uses these resources to make loans to the impatient household and to buy government bonds, B_b . The bank acts as a price taker in all markets. The problem of the bank is as follows:

$$\begin{aligned} & \text{Max } r_l L + r_b B_b - r_d D - C^B(D, B_b, L) \\ & \text{s.t. } L + B_b = D \end{aligned}$$

The cost function, $C^B(\cdot)$, is set to explicitly allow for imperfect substitution between bonds and loans in the bank's asset side. Based on Benes (2013) and Vargas et al (2013), the following specification is assumed for the cost function:

$$C^B(D, B_b, L) = \theta_d D + \theta_b B_b + \theta_l L - 2 \lambda (B_b L)^{1/2}$$

The bank optimisation problem first-order conditions imply:

$$r_l = r_d + \theta_d + \theta_l - \lambda (B_b/L)^{1/2} \quad (4)$$

$$r_b = r_d + \theta_d + \theta_b - \lambda (L/B_b)^{1/2} \quad (5)$$

Equations (4) and (5) imply:

$$r_l = r_b - \theta_b + \theta_l + \lambda ((L/B_b)^{1/2} - (B_b/L)^{1/2}) \quad (6)$$

If $\lambda > 0$, then bonds and loans will be imperfect substitutes. Consequently, the marginal cost of bonds will increase with the exposure of banks to bonds relative to loans, and something similar applies to the marginal cost of loans. Thus, a bank "portfolio" channel is introduced.

The small open economy can trade inter-temporally with the rest of the world. There is a single good in the model, so that the exchange rate is always equal to one. The only way in which foreign investors may finance the small open economy is through purchases of government bonds. They are subject to a tax, t , on the return on their investment in local bonds. They allocate a portfolio of size W^* between local, B_x , and foreign bonds, B^* , by solving the following problem:

$$\begin{aligned} \text{Max } & (1 + r_b (1-t)) B_x + (1+r^*) B^* - C^F(B_x, B^*) \\ \text{s.t. } & B_x, B^* \\ & W^* = B_x + B^* \end{aligned}$$

Domestic and foreign bonds may be imperfect substitutes in the foreign investors' portfolio. Again, this is captured by the cost function $C^F(\cdot)$:

$$C^F(B_x, B^*) = \phi_x B_x + \phi^* B^* - 2 \phi (B_x B^*)^{1/2}$$

The first-order condition for the foreign investors' problem implies:

$$(1-t) r_b = r^* + \phi_x - \phi^* + \phi ((B_x / (W^* - B_x))^{1/2} - ((W^* - B_x) / B_x)^{1/2}) \quad (7)$$

Therefore, in the presence of portfolio balance effects ($\phi > 0$), to hold local bonds, foreigners will charge a premium on the return of foreign assets (adjusted for constant marginal costs) that depends on their relative exposure to domestic bonds. Thus, a foreign "portfolio" channel is introduced as well.

The government collects lump sum taxes from households in each period and the tax on foreign portfolio investment returns in the second period. A first-period public deficit is financed through the issuance of bonds that are purchased by the local bank and foreign investors. It is assumed that the second-period public expenditures are adjusted so that the government fulfills its inter-temporal budget constraint. The period-government budget constraints are as follows:

$$G_1 - 2T_1 = B_b + B_x \quad (8)$$

$$2T_2 + r_b B_x t = G_2 + (1+r_b) (B_b + B_x) \quad (9)$$

There is neither money nor a central bank.

Finally, since it is assumed to be the only way for foreigners to invest in the local economy, the foreign funding of the government must also finance the trade deficit of the economy:

$$B_x = c_1^P + c_1^L + G_1 - y_1^P - y_1^L \quad (10)$$

A macroeconomic equilibrium is defined as the interest rates, r_b , r_d and r_l , consumption paths, $\{c_1^P, c_2^P\}$ and $\{c_1^L, c_2^L\}$, deposits and loans, D and L , bank and foreign public bond holdings, B_b and B_x , and second-period government expenditure, G_2 , such that the Euler equations and equations (1) through (10) are met.

This model is used to explore the effects of changes in t , r^* and W^* on domestic interest rates. When "portfolio balance effects" are ignored (ϕ and $\lambda = 0$), the solution of the model is straightforward. r^* will directly determine local interest rates on the basis of equations (4) through (7), and the quantities of consumption, deposits, loans and bonds will follow from the rest of the model. When "portfolio balance effects" are present (ϕ and $\lambda \neq 0$), the solution of the model becomes cumbersome due to the

non-linear nature of the marginal costs. Because of this complexity, in what follows numerical simulations are used to illustrate the main results of the model,²¹ which are presented below:

Result 1: Increases in the foreign portfolio size, W^* , *ceteris paribus*, do not have any effect on local interest rates in the absence of “portfolio balance effects”, but they reduce local interest when “portfolio balance effects” are present (Graph A-1.1). Without these effects, foreign and local bonds are (almost) perfect substitutes. Hence, only the foreign interest rate, r^* , and the tax rate on portfolio investment returns, t , determine the local bond interest rate. The size or composition of the foreign portfolio do not matter. The domestic bond rate reflects the opportunity cost of funds for the bank and determines the deposit and loan interest rates, which are, therefore, unaffected as well by changes in W^* . When “portfolio balance effects” are important, an increase in W^* that by assumption is initially invested in foreign bonds implies, *ceteris paribus*, a decrease in the relative exposure of foreign investors to local bonds. Hence, the premium that investors require to hold them falls, driving down bond rates (equation (7)). This cuts the opportunity cost of funds for banks and pushes down deposit and loan interest rates (equations (4) through (6)).

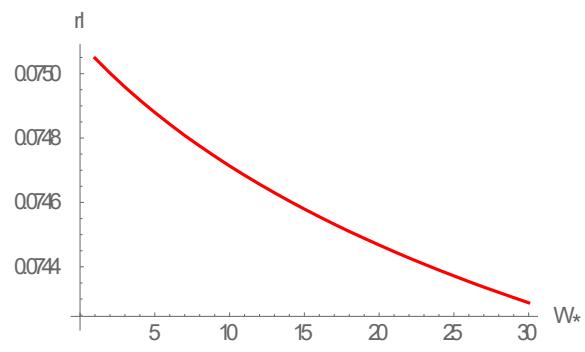
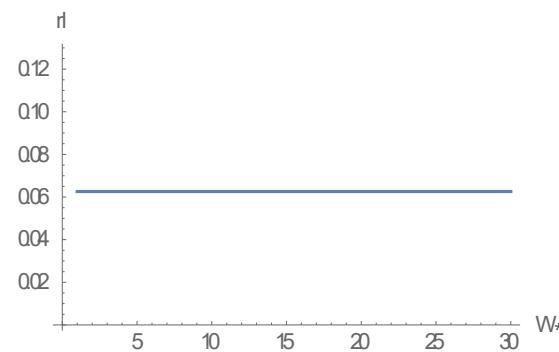
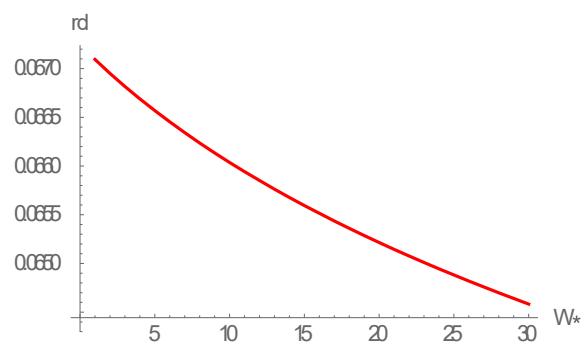
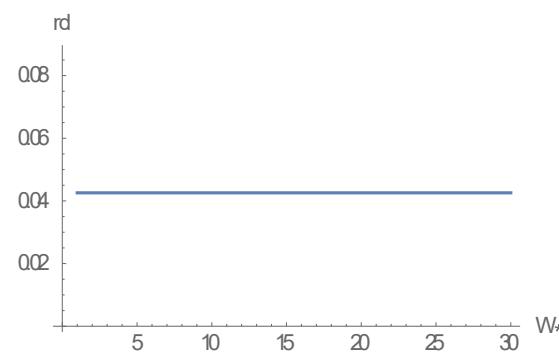
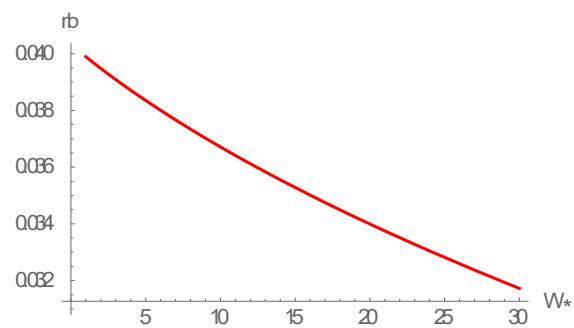
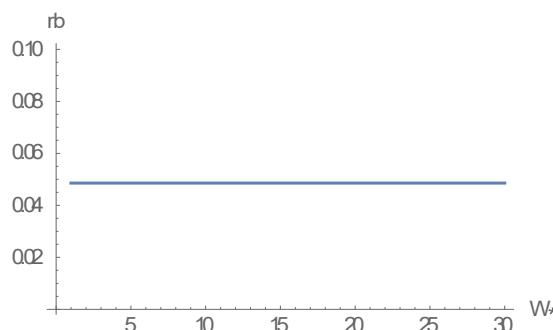
Result 2: As expected, decreases in the tax rate on the proceeds from foreign portfolio investment reduce local interest rates. However, the size of this effect is smaller in the presence of “portfolio balance effects” (Graph A-1.2). Higher tax rates are associated with lower levels of foreign investment and higher exposure of the bank to public bonds. A reduction of the tax rate raises foreign investment, which, *ceteris paribus*, implies sales of bank-held bonds to foreign investors. The local bonds’ weight in the external portfolios increases and so does the premium demanded by foreign investors, partially offsetting the direct negative impact of the tax reduction on bond interest rates (equation (7)). In turn, as bonds fall in the bank’s portfolio, the composition of bank’s assets becomes more tilted toward loans and this pushes loan interest rates up, partially offsetting the downward effect of the fall of bond interest rates (equation (6)). Deposit interest rates behave similarly. In this case, the effect of the reduction in bond rates is partially offset by the decrease in the marginal cost of bond holdings that results from their decreased weight in the bank asset portfolio (equation (5)).

²¹ These simulations assumed the following values for the parameters and the exogenous variables: inter-temporal elasticity of substitution in the CRRA utility function = 1, $\beta^p = 0.98$, $\beta^i = 0.90$, $\theta_d = 0.005$, $\theta_b = 0.001$, $\theta = 0.015$, $\lambda = 0.02$, $\phi_x = 0.005$, $\phi^* = 0.001$, $\phi = 0.001$, $y^p = 50$, $y_1^i = 50$, $y_2^p = 50$, $y_2^i = 50$, $T_1 = 7.5$, $T_2 = 7.5$, $G_1 = 18$, $t=0.3$ and $W^* = 200$.

Responses of local interest rates to changes in W^*

Blue lines: No Portfolio balance effects. Red lines: Portfolio balance effects

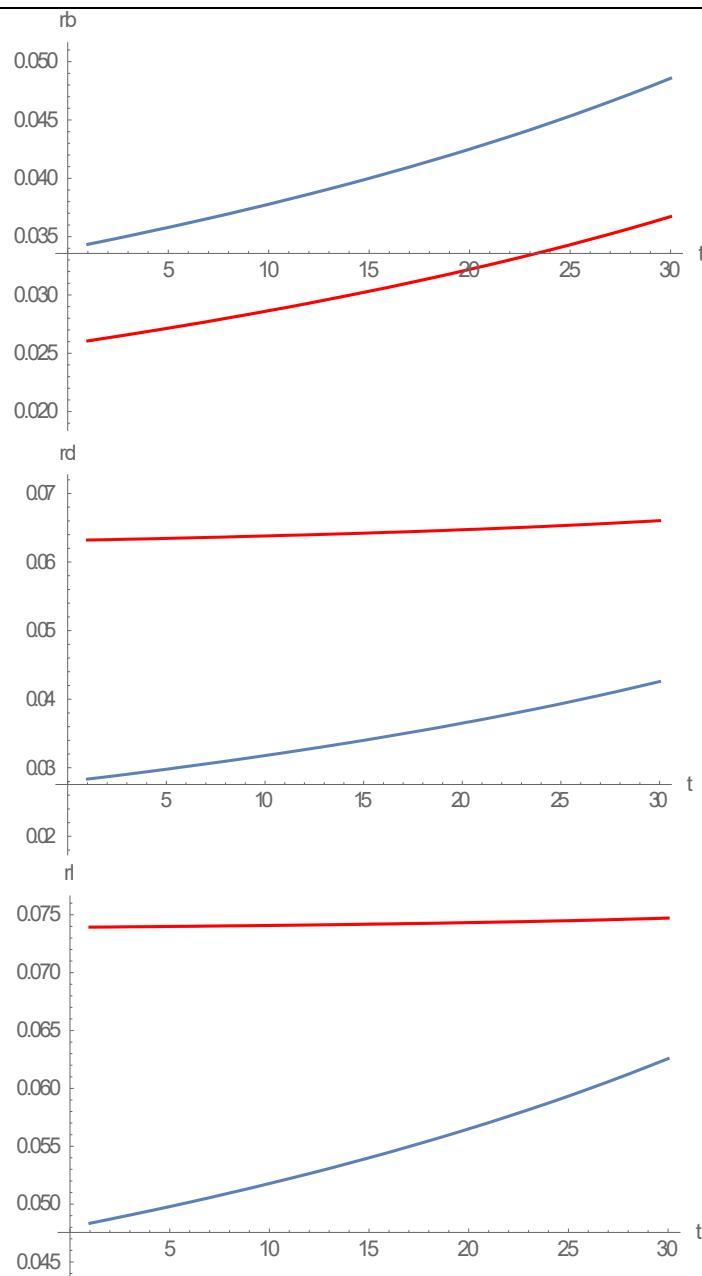
Graph A-1.1



Responses of local interest rates to changes in t

Blue lines: No Portfolio balance effects. Red lines: Portfolio balance effects

Graph A-1.2



Result 3: The effect on local interest rates of a tax reduction is greater for larger initial levels of the tax rate. This can be seen directly from the left-hand side of equation (7). Suppose that “portfolio balance effects” are absent ($\phi = 0$). Then, the right-hand side of equation (7) is unchanged by t . Under these circumstances, a given decrease of t implies an increase in $(1-t)$ that is proportionally larger for higher values of t (lower values of $1-t$). Hence, a larger proportional downward response of r_b is required to balance the equation. Moreover, higher initial values of t are associated with higher initial values of r_b (Result 2). Then, the absolute response of r_b to a fall in t is greater for larger initial values of t , since a higher proportional decline is applied to a larger initial value of the bond rate.²² The same result is obtained in the presence of “portfolio balance effects”, but with the moderating influence introduced by imperfect substitution between foreign and local bonds, and bonds and loans in the foreign investors’ and bank’s portfolios, respectively.

Result 4: The increases in local interest rates produced by rises in foreign interest rates, r^* , are smaller in the presence of “portfolio balance effects” (Graph A-1.3). When foreign interest rates go up, foreign investors drop part of their local bond holdings and sell them to the domestic bank. Consequently, the weight of local bonds in foreign portfolios decreases and the premia required by investors falls, partially offsetting the direct, positive impact of the increase in the foreign interest rate (equation (7)). Likewise, a growing share of local bonds in the bank’s asset portfolio pushes down loan rates, partially offsetting the direct impact of the increase in the opportunity cost of funds for the bank (the bond yield) (equation (6)). Deposit interest rates respond similarly. In this case, the effect of the rise in bond rates is partially offset by the increase in the marginal cost of bond holdings that results from their increased weight in the bank asset portfolio (equation (5)).

Result 5: The response of local rates to changes in external interest rates is higher for greater values of the tax rate, t . This is related to Result 3 and basically reflects the fact that for larger values of t in equation (7), a given hike of r^* requires greater responses of r_b to balance the net returns on foreign and domestic bonds.²³ The same result is obtained in the presence of “portfolio balance effects”, but with the moderating influence introduced by imperfect substitution between foreign and local bonds, and bonds and loans in the foreign investors’ and bank’s portfolios, respectively.

Result 6: Without portfolio balance effects, the response of local rates to changes in external interest rates is invariant with the size of the foreign portfolio, W^* (left panels in Graph A-1.4). This is a reflection of Result 1. In this case, local rates are affected only by foreign interest rates and the tax rate. In contrast, with “portfolio balance effects”, the response of local rates to changes in external interest rates is lower for greater values of the foreign portfolio, W^* (right-hand panels in Graph A-1.4). This follows from the functional form assumed for the cost function, that implies high valuation of those assets with very low shares in the portfolios. When W^* grows, the share of local bonds in foreign portfolios declines (since supply remains limited), making them more valuable. An increase in r^* that prompts a reduction of an already small share of local bond holdings in external portfolios strongly reduces the

²² Assuming $\phi = 0$, equation (7) implies $r_b = (r^* + \phi_x - \phi^*)/(1-t)$, $dr_b/dt = (r^* + \phi_x - \phi^*)/(1-t)^2 > 0$ and $d^2r_b/dt^2 = (r^* + \phi_x - \phi^*)/(1-t)^3 > 0$.

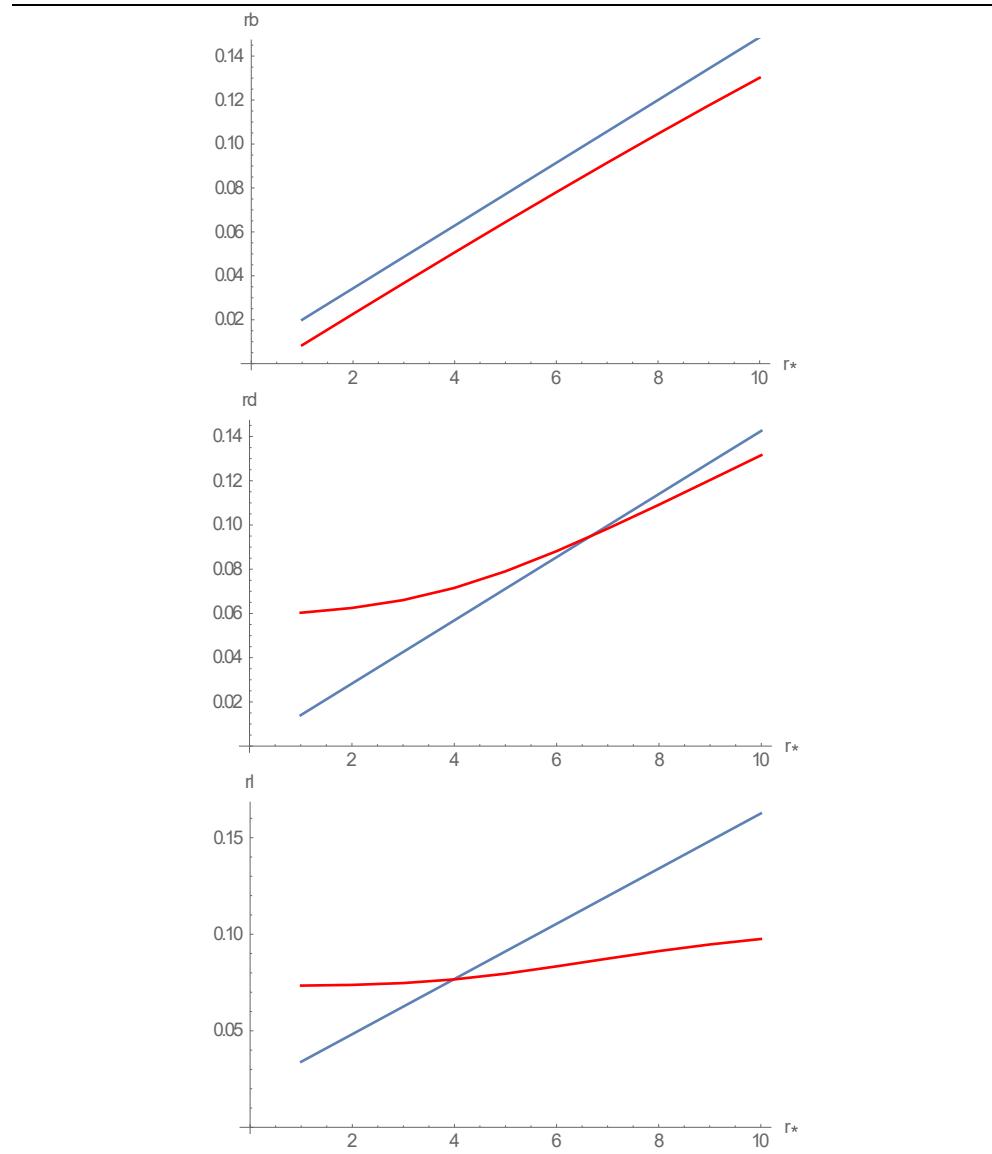
²³ Assuming $\phi = 0$, equation (7) implies $r_b = (r^* + \phi_x - \phi^*)/(1-t)$, $dr_b/r^* = 1/(1-t) > 0$ and $d^2r_b/dr^*dt = 1/(1-t)^2 > 0$.

premium demanded by foreign investors, partially offsetting the direct impact of the increase in r^* .

Responses of local interest rates to changes in r^*

Blue lines: No Portfolio balance effects. Red lines: Portfolio balance effects

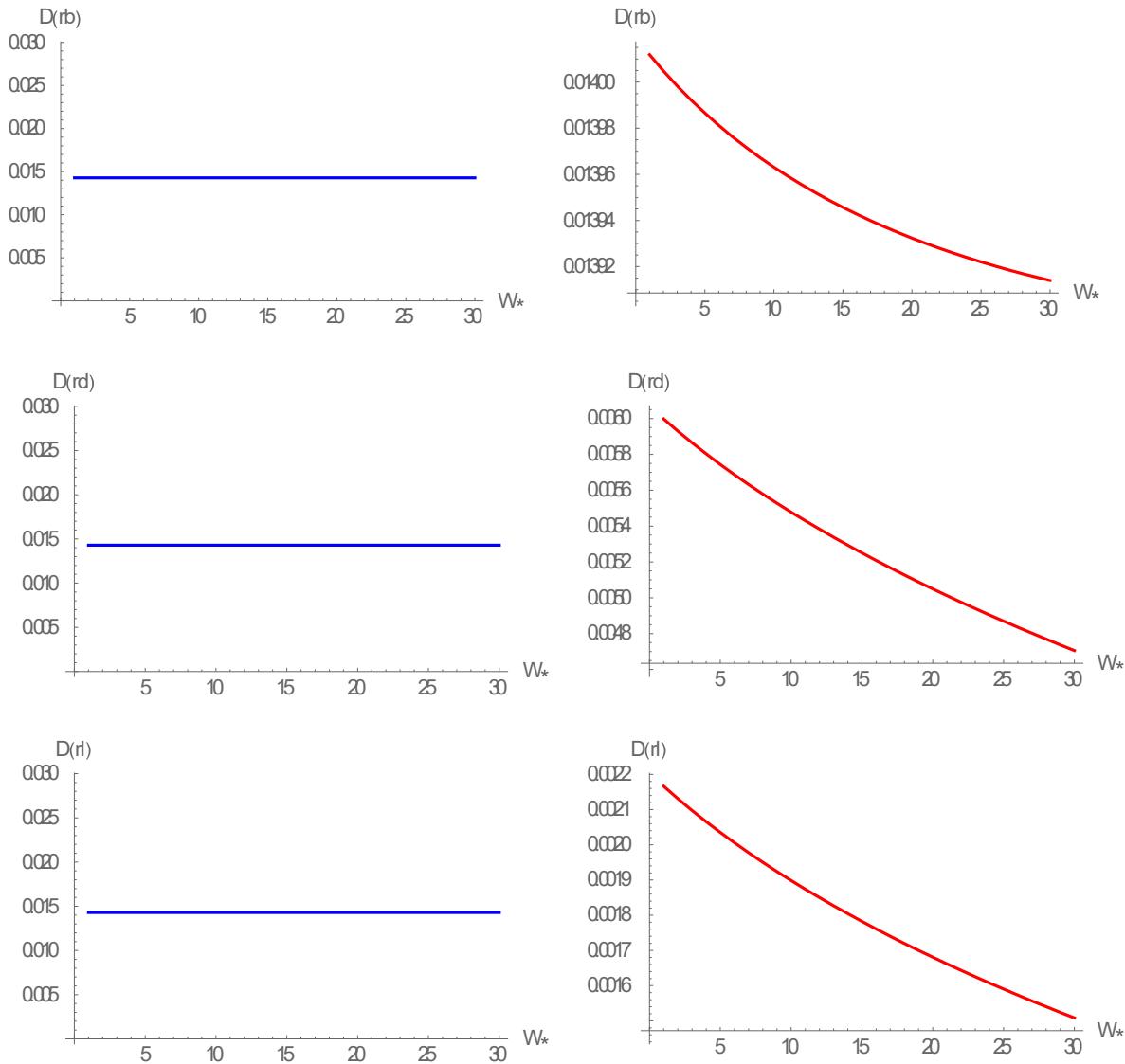
Graph A-1.3



Responses of local interest rates to changes in r^* as a function of the size of the foreign portfolio, W^*

Blue lines: No Portfolio balance effects. Red lines: Portfolio balance effects

Graph A-1.4



Appendix 2

A. Unit root tests (local interest rates – 2005–19)

Interest rate	ADF - Trend and Intercept		ADF - Trend		ADF - None		Evidence
	t-Stat	P-Val	t-Stat	P-Val	t-Stat	P-Val	
Ordinary loans < 1Y	(2.3)	0.4	(1.5)	0.5	(0.8)	0.4	Unit root
Ordinary loans >1Y <3Y	(2.9)	0.2	(2.1)	0.2	(0.9)	0.3	Unit root
Ordinary loans >3Y <5Y	(2.9)	0.2	(2.1)	0.2	(0.9)	0.3	Unit root
Ordinary loans >5Y	(2.7)	0.2	(2.5)	0.1	(0.9)	0.3	Unit root
<u>Ordinary loans</u>	(2.4)	0.4	(1.8)	0.4	(0.8)	0.4	Unit root
Preferential < 1 Y	(3.4)	0.1	(2.4)	0.1	(1.0)	0.3	Unit root
Preferential >1Y <3Y	(3.4)	0.1	(2.8)	0.1	(0.9)	0.3	Unit root
Preferential >3Y <5Y	(3.4)	0.1	(2.6)	0.1	(0.8)	0.4	Unit root
Preferential >5Y	(3.1)	0.1	(2.5)	0.1	(0.9)	0.3	Unit root
<u>Preferential</u>	(3.2)	0.1	(2.4)	0.1	(0.9)	0.3	Unit root
Consumption < 1Y	(4.6)	0.0	(4.6)	0.0	(0.4)	0.6	Unit root
Consumption >1Y < 3Y	(3.3)	0.1	(3.2)	0.0	(0.7)	0.4	Unit root
Consumption >3Y < 5Y	(3.4)	0.1	(2.3)	0.2	(0.7)	0.4	Unit root
Consumption >5Y	(3.7)	0.0	(1.7)	0.4	(0.9)	0.3	Unit root
Consumption	(3.3)	0.1	(1.9)	0.3	(0.9)	0.3	Unit root
<u>Total loan rate</u>	(3.0)	0.1	(2.8)	0.1	(0.6)	0.5	Unit root
Mortgage (No VIS) in COP	(3.7)	0.0	(2.2)	0.2	(1.4)	0.1	Unit root
Mortgage (No VIS) in UVR	(2.7)	0.3	(2.3)	0.2	(1.1)	0.3	Unit root
Mortgage (VIS) in UVR	(2.5)	0.3	(1.3)	0.6	(1.0)	0.3	Unit root
Mortgage (VIS) in UVR	(2.3)	0.4	(2.2)	0.2	(0.9)	0.3	Unit root
<u>Mortgages</u>	(2.9)	0.2	(1.8)	0.4	(1.2)	0.2	Unit root
2Y-TES	(2.5)	0.3	(2.0)	0.3	(1.1)	0.3	Unit root
5Y-TES	(3.1)	0.1	(2.4)	0.1	(1.6)	0.1	Unit root
10Y-TES	(3.2)	0.1	(2.7)	0.1	(1.7)	0.1	Unit root

B. Unit root test (external variables – 2005–19)

	ADF - Trend and Intercept		ADF - Trend		ADF - None		Evidence
	t-Stat	P-Val	t-Stat	P-Val	t-Stat	P-Val	
Log of WTI oil price	(3.2)	0.1	(3.0)	0.0	(0.2)	0.6	Unit root
Log of Brent oil price	(2.9)	0.2	(2.7)	0.1	(0.1)	0.7	Unit root
Colombian 5-year CDS	(3.1)	0.1	(2.9)	0.0	(1.2)	0.2	Unit root
Log DXY index	(2.4)	0.4	(1.5)	0.5	0.4	0.8	Unit root
VIX index	(3.3)	0.1	(3.1)	0.0	(1.2)	0.2	Unit root
JP Morgan EM currency volatility index	(3.2)	0.1	(3.0)	0.0	(0.8)	0.4	Unit root
Log of JP Morgan EM currency index	(2.5)	0.3	(0.3)	0.9	(1.1)	0.2	Unit root
S&P 500 index	(1.9)	0.7	(0.1)	0.9	1.4	1.0	Unit root
LIBOR rate	(3.4)	0.0	(3.7)	0.0	(2.5)	0.0	Unit root
FED Funds rate	(3.3)	0.1	(3.2)	0.0	(3.0)	0.0	Unit root
EMBI Colombia	(3.5)	0.0	(3.5)	0.0	(1.5)	0.1	Unit root
US shadow rate	(2.5)	0.3	(2.7)	0.1	(2.7)	0.0	Unit root
1-month US yield	(3.3)	0.1	(3.3)	0.0	(3.0)	0.0	Unit root
3-month US yield	(2.8)	0.2	(2.7)	0.1	(2.5)	0.0	Unit root
6-month US yield	(2.5)	0.3	(2.5)	0.1	(2.4)	0.0	Unit root
1-year US yield	(1.4)	0.9	(1.8)	0.4	(1.7)	0.1	Unit root
2-year US yield	(1.2)	0.9	(2.6)	0.1	(1.4)	0.1	Unit root
3-year US yield	(1.2)	0.9	(1.4)	0.6	(1.4)	0.2	Unit root
5-year US yield	(1.7)	0.7	(1.6)	0.5	(1.3)	0.2	Unit root
10-year US yield	(2.7)	0.3	(1.6)	0.5	(1.2)	0.2	Unit root
US monetary policy shock Jarociński & Karadi	(2.7)	0.2	(2.5)	0.1	(2.2)	0.0	I(0)
US equity shock Jarociński & Karadi	(12.0)	0.0	(11.9)	0.0	(11.9)	0.0	I(0)

C. Sensitivity of local interest rates to external drivers (Wald test)

To assess the sensitivity of local interest rates to external drivers the following equation is estimated:

$$\Delta i_t^j = (1 - d) \left(\gamma_0^{j,k,b} + \gamma_1^{j,k,b} \Delta ext_t^k + \sum_{l=1}^L \lambda_l^{k,b} x_t^k \right) + \\ d \left(\gamma_0^{j,k,a} + \gamma_1^{j,k,a} \Delta ext_t^k + \sum_{l=1}^L \lambda_l^{k,a} x_t^k \right) + \varepsilon_t^{j,k}$$

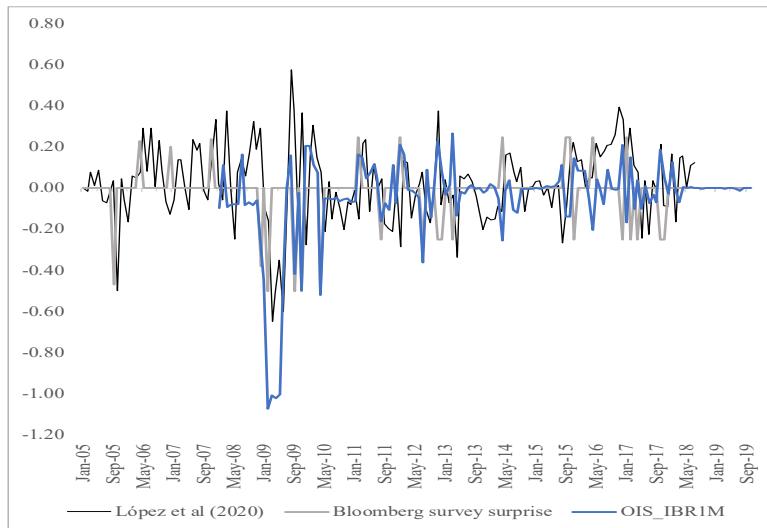
Where i_t^j represents the interest rate j , ext_t^k is the external variable k , and x_t^k are control variables, namely the first difference of the logarithm of CPI, the economic activity index and the one-month IBR monetary policy shock. The dummy variable d equals 0 from January 2005 to March 2014 and 1 thereafter. The US monetary policy and the equity shock variables are included in levels since they are stationary. Using this specification, the significance of the selected external variables is evaluated before and after March 2014. The equation was estimated using OLS and HAC standard errors and covariance. From this equation, the null hypothesis is $\gamma_{before}^k = \gamma_{after}^k$ for the variables that were significant for the local TES yields before and after March 2014. The results show that the sensitivity of TES yields to CDS and EMBI between the two subsamples may have increased.

Δ(CDS)				Δ(EMBI)				
	ΥCDS, before	ΥCDS, after	Wald test (F-stat)	P-value	ΥEMBI, before	ΥEMBI, after	Wald test (F-stat)	P-value
2-year TES	0.002*** [0.0008]	0.005*** [0.0009]	5.555	0.020	0.002*** [0.0006]	0.004*** [0.0007]	7.056	0.009
5-year TES	0.003423*** [0.0016]	0.008*** [0.0010]	6.535	0.012	0.003*** [0.0009]	0.007*** [0.0007]	11.140	0.001
10-year TES	0.005148*** [0.0017]	0.00949*** [0.0010]	4.561	0.035	0.005*** [0.0009]	0.008*** [0.0009]	6.183	0.014
Δ(VIX)				Δ(JP Morgan EM currency volatility index)				
	ΥVIX, before	ΥVIX, after	Wald test (F-stat)	P-value	ΥJPVOL, before	ΥJPVOL, after	Wald test (F-stat)	P-value
2-year TES	0.0145*** [0.0049]	0.012** [0.0049]	0.110	0.740	0.038* [0.0197]	0.070** [0.0347]	0.663	0.417
5-year TES	0.0271*** [0.0093]	0.022*** [0.007]	0.137	0.711	0.080*** [0.0263]	0.102*** [0.039]	0.220	0.640
10-year TES	0.035*** [0.0115]	0.028*** [0.0094]	0.232	0.631	0.116*** [0.0283]	0.134*** [0.0423]	0.133	0.716
ΔLOG(JP Morgan EM currency index)				ΔLOG(S&P 500)				
	ΥJPFX, before	ΥJPFX, after	Wald test (F-stat)	P-value	ΥSP, before	ΥSP, after	Wald test (F-stat)	P-value
2-year TES	-0.017 [0.0111]	-0.037** [0.0148]	1.226	0.270	-0.688 [0.6121]	-1.784** [0.7158]	1.347	0.248
5-year TES	-0.039** [0.0195]	-0.072*** [0.0201]	1.380	0.242	-1.416 [1.0380]	-3.216*** [1.2217]	1.257	0.264
10-year TES	-0.061*** [0.0205]	-0.100*** [0.0223]	1.689	0.196	-2.428** [1.1277]	-3.578** [1.4382]	0.395	0.531

Parameter estimates, [Std. error] and Wald test. HAC standard errors *** Significant at 1%, ** Significant at 5%, * Significant at 10%.

Source: authors' estimates.

D. Monetary policy shocks comparison



Note: López et al (2020) monetary policy shock is computed following Romer and Romer (2004) and is available from January-2005 up to June-2018. The Bloomberg survey surprise is computed as the difference of the policy rate and the survey expectations. The OIS_IBR1M monetary policy shock is computed using the one-month IBR swap rate set before the monetary policy meeting.

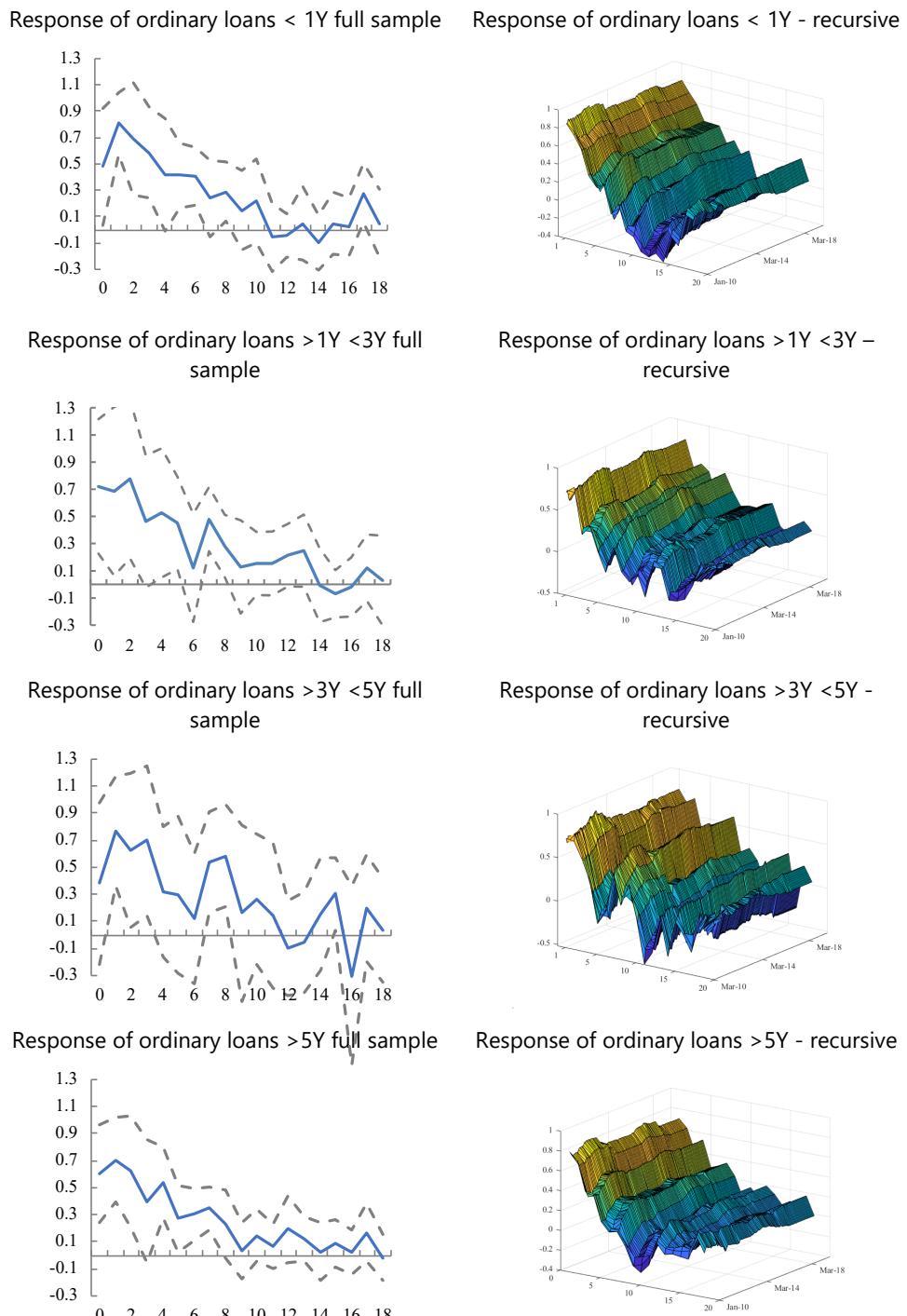
Sources: López et al (2020); Bloomberg; authors' estimates.

E. Diagnostic statistics for interest rate equations at $h=1$

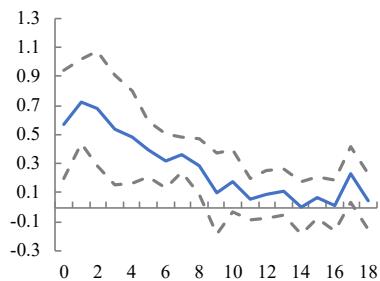
The following table shows the diagnostic statistics $\Delta i_{t+h}^j = \mu_h^j + \beta_h^j \psi_t + \sum_{l=1}^L \gamma_h^{j,l} x_t^l + \xi_{h,t}$ at $h=1$ for the equations used to compute the LP impulse responses exhibited in Graph 12.

Interest rate equation	Monetary policy shock parameter at $h=1$	P-value (HAC)	R2	DW-Stat.	LM-test up to 24 lags (P-value)	Jarque-Bera Stat.	Jarque-Bera P-value.	Heteroskedasticity Test:	
								Breusch-Pagan-Godfrey (P-Value, H0)	Homoskedasticity \square
Ordinary rate	0.73	0.00	0.28	2.20	0.02	2.25	0.32	0.14	
Preferential rate	0.86	0.00	0.32	1.63	0.12	5.00	0.08	0.47	
Consumption rate	0.42	0.00	0.05	2.28	0.00	51.12	0.00	0.32	
Total lending rate	0.81	0.00	0.16	2.72	0.00	9.25	0.01	0.88	
Mortgage rate	0.35	0.00	0.23	1.59	0.19	16.98	0.00	0.25	
TES 2Y	0.47	0.01	0.15	1.47	0.04	14.95	0.00	0.20	
TES 5Y	0.20	0.30	0.03	1.50	0.01	112.69	0.00	0.45	
TES 10Y	0.10	0.45	0.01	1.57	0.03	114.57	0.00	0.76	

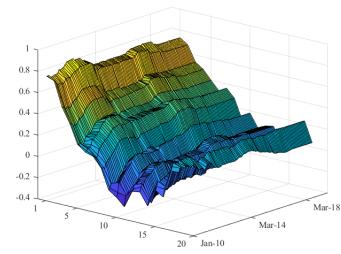
F. Response of interest rates to a monetary policy shock. Local projections and local projections estimated recursively from 10M01 to 19M10



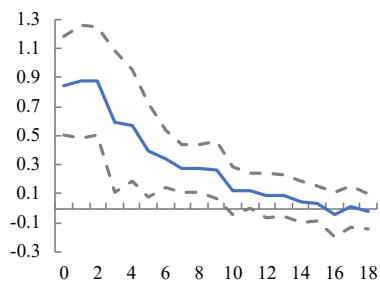
Response of ordinary loans full sample



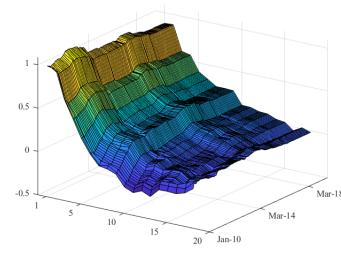
Response of ordinary loans - recursive



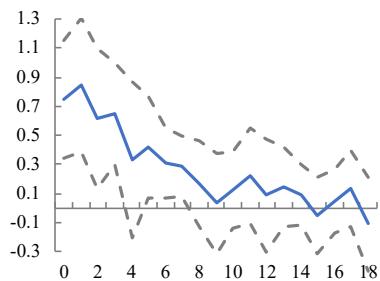
Response of preferential <1 Y full sample



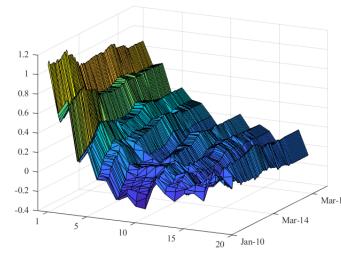
Response of preferential <1 Y - recursive



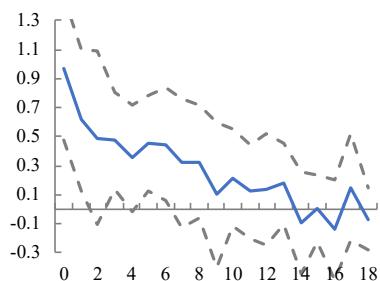
Response of preferential >1Y <3Y full sample



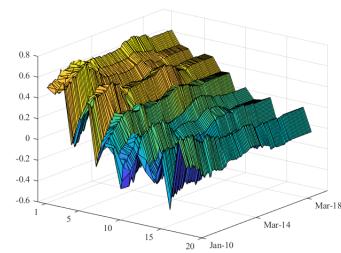
Response of preferential >1Y <3Y - recursive



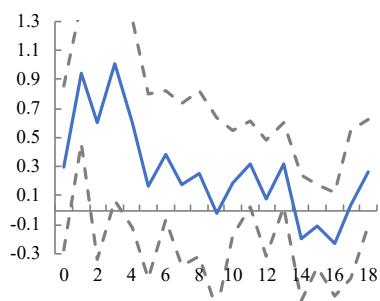
Response of preferential >3Y <5Y full sample



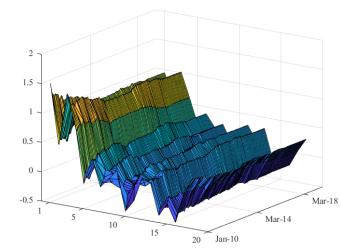
Response of preferential >3Y <5Y - recursive



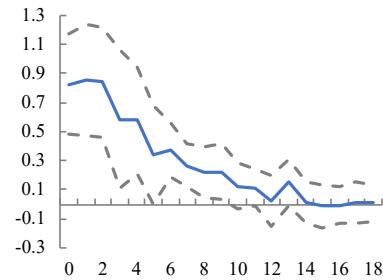
Response of preferential >5Y full sample



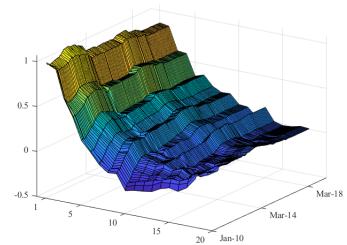
Response of preferential >5Y - recursive



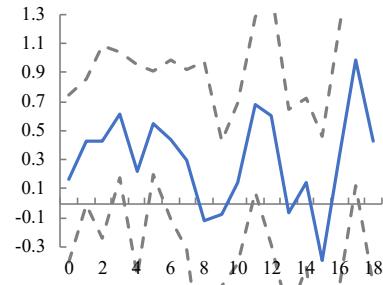
Response of preferential full sample



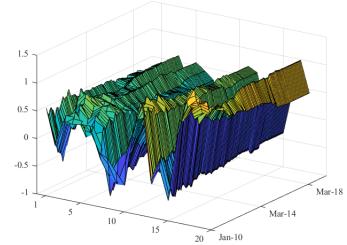
Response of preferential - recursive



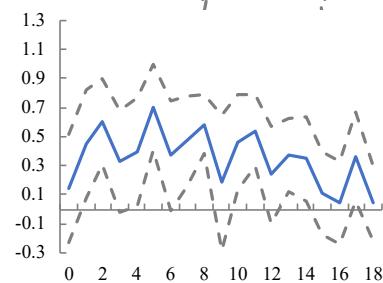
Response of consumption < 1Y full sample



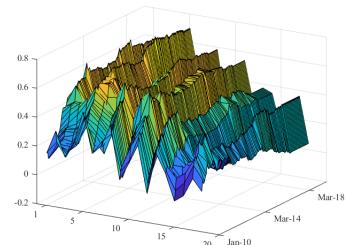
Response of consumption < 1Y – recursive



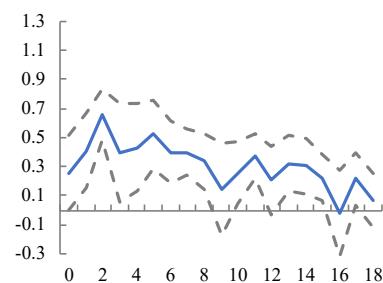
Response of consumption >1Y < 3Y full sample



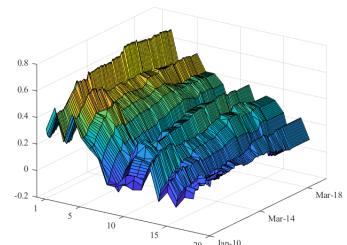
Response of consumption >1Y < 3Y - recursive



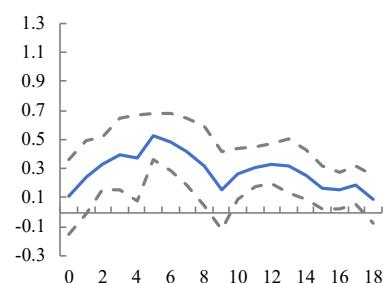
Response of consumption >3Y < 5Y full sample



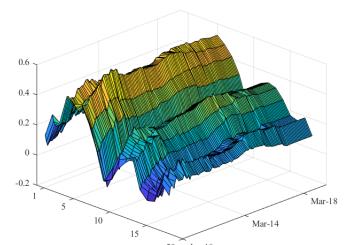
Response of consumption >3Y < 5Y - recursive



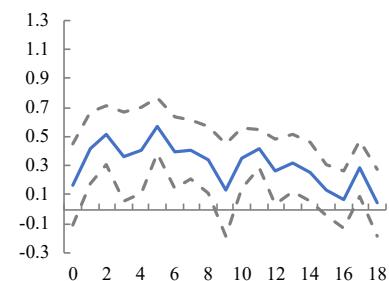
Response of consumption >5Y full sample



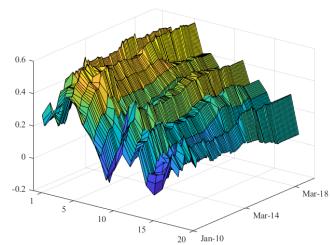
Response of consumption >5Y - recursive



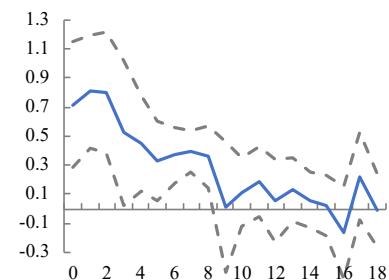
Response of consumption full sample



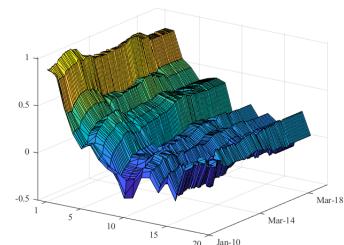
Response of consumption - recursive



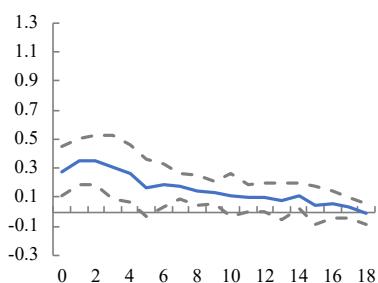
Response of total loan rate full sample



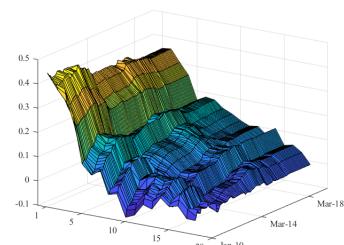
Response of total loan rate - recursive



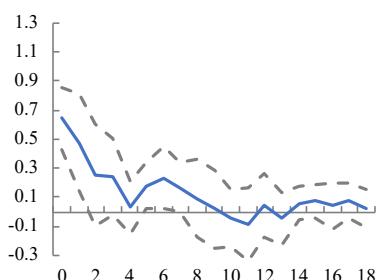
Response of mortgages full sample



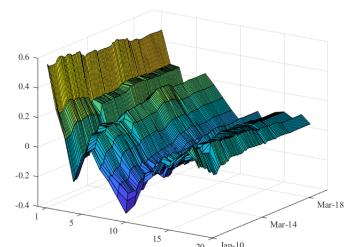
Response of mortgages - recursive



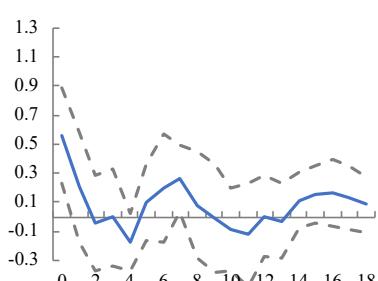
Response of 2Y-TES full sample



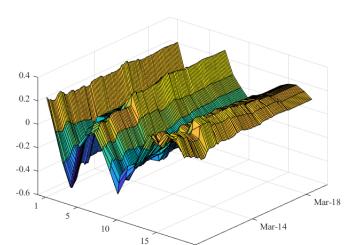
Response of 2Y-TES - recursive



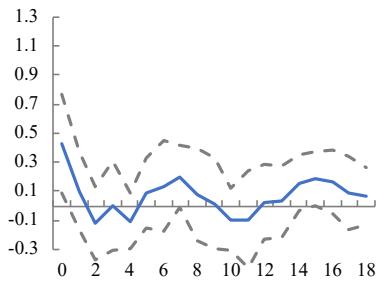
Response of 5Y-TES full sample



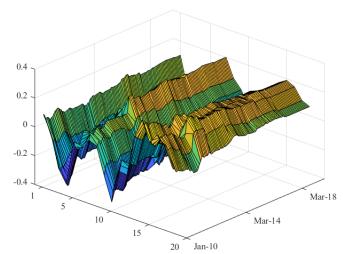
Response of 5Y-TES - recursive



Response of 10Y-TES full sample



Response of 10Y-TES - recursive



From float to currency floor and back to float: the Czech National Bank's temporary exchange rate commitment

Jan Frait and Marek Mora¹

Abstract

In this note, we discuss the Czech National Bank's experience with the one-sided exchange rate commitment it applied from November 2013 to April 2017 as an additional monetary policy instrument to ease monetary conditions. We describe the CNB's operations in the foreign exchange market and developments in the Czech government bond and money markets in relation to the commitment. The CNB's experience with its temporary exchange rate commitment and with the subsequent exit serves as a case study of a successful policy measure in a small open inflation targeting economy facing a severe risk of deflation and zero monetary policy interest rates.

JEL classification codes: E58, F31, E52, G11.

Keywords: Czech National Bank, monetary policy instruments, zero interest rates, government bond market, money market.

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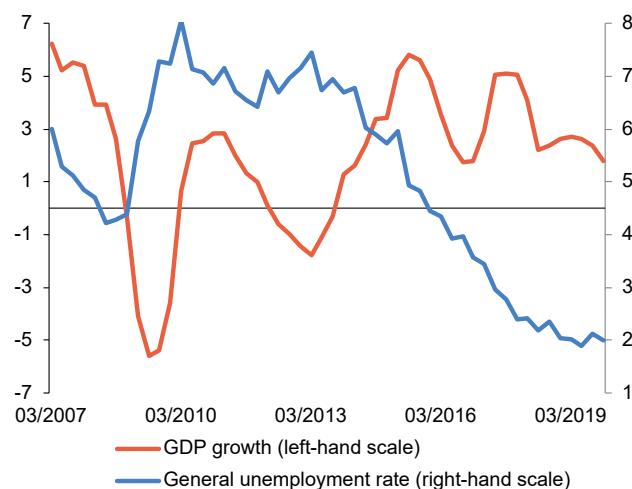
Marek Mora, Deputy Governor, Czech National Bank, Na Prikope 28, 115 03 Prague 1, email: marek.mora@cnb.cz.

Following the Great Financial Crisis (GFC) and the subsequent European debt crisis, the Czech economy slipped into a protracted period of sluggish growth in 2012–13 (Graph 1). Facing strong disinflationary pressures (Graph 2), the Czech National Bank (CNB) gradually eased monetary conditions by lowering its policy rates. Between August 2008 and November 2012, it cut its policy rates by almost 4 percentage points. The key rate hit “technical zero” in autumn 2012 (Graph 2), and thereafter the CNB used forward guidance to further ease monetary conditions (Franta et al (2014)). This, however, was not sufficient, as the 2013 inflation forecasts predicted that inflation would turn negative in 2014. On 7 November 2013, therefore, the CNB introduced a floor for the Czech koruna exchange rate as its instrument: it committed to keeping the rate weaker than 27 koruna/euro (ie a one-sided commitment). The introduction of the currency floor and, later on, expectations of an exit resulted in increased capital flows, large-scale FX interventions and major shifts in the investor structure of Czech government bonds (CGBs) and their yields.

GDP growth and unemployment rate

(in %)

Graph 1

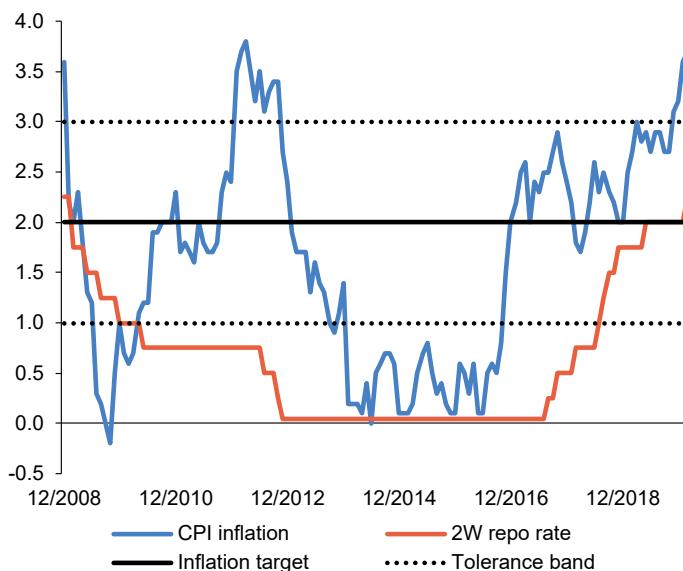


Sources: CNB; CZSO.

Inflation and key policy rate

(in %)

Graph 2



Source: CNB.

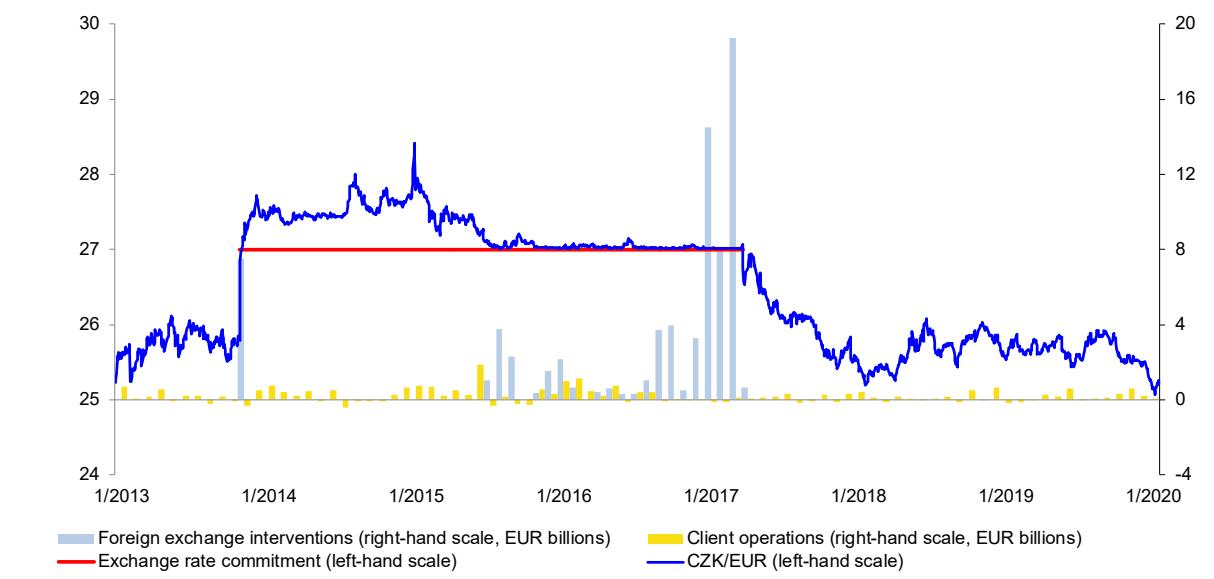
During 2014 and 2015, the Czech economy moved to positive growth. Besides the favourable effects of the weaker koruna, factors such as a recovery in growth in the euro area, domestic fiscal policy and a fall in oil prices contributed to stronger economic activity and a sharp decline in unemployment (Graph 1). Inflation returned to the 2% inflation target in late 2016 (Graph 2). Given the prospect of sustainable fulfilment of the target at the monetary policy horizon, the exchange rate commitment was discontinued on 6 April 2017. The exit from the commitment was the first step towards gradually returning overall monetary conditions to normal. Persistent domestic cost pressures coupled with fading foreign anti-inflationary effects increased the need to return the CNB's monetary policy to a neutral stance. Part of this shift was delivered by appreciation of the koruna, while the rest was a result of regular increases in the policy interest rate, which reached 2.25% in February 2020 (Graph 2).

Before the GFC, the CNB had not been active on the FX market and had conducted no interventions between 2002 and 2013. Nevertheless, to establish the exchange rate commitment and build its credibility, the CNB had to purchase foreign exchange reserves worth EUR 7.5 billion (Graph 3) during the first few days of the commitment. For the next 19 months, the CNB did not have to intervene in the foreign exchange market as the exchange rate was above the floor. In this period, its foreign exchange reserves were increasing solely due to the drawdown of EU funds (client operations). In mid-2015, however, the exchange rate moved close to the floor, influenced by the quantitative easing of the ECB and continued favourable developments in the domestic economy. The CNB thus had to start intervening whenever needed (Graph 3). The most pronounced wave of interventions took place in the first quarter of 2017. By then, it was apparent that the exchange rate commitment was coming to an end, and exporting companies were thus hedging against possible future exchange rate appreciation. At the same

time, financial investors were building massive long positions in koruna (Franta et al (2018)). Altogether, the FX interventions amounted to EUR 75.9 billion between November 2013 and April 2017 (another EUR 11 billion was purchased as part of client operations in the same period).

CZK/EUR exchange rate and CNB operations in FX market

Graph 3



Since the exit, there have been no foreign exchange interventions, as the exchange rate developments have been very smooth. By January 2020² the koruna had appreciated by approximately 5%, which was less than the markets had generally expected (Graph 3). Several factors might explain this. First, the exchange rate was slightly overvalued before the CNB intervention. As a result, the initial weakening of the currency by around 5–6% did not lead to any dramatic undervaluation of the koruna vis-à-vis its equilibrium level. Second, the depreciated exchange rate meanwhile passed through to all other domestic nominal variables, including wages and inflation. Therefore, the real equilibrium appreciation materialised through an inflation differential vis-à-vis the country's major trading partners, most notably the euro area. Third, the pace of the koruna's real equilibrium appreciation is now much slower compared with the pre-crisis trend. Fourth, exporters pre-hedged their future euro-denominated revenues while the exchange rate commitment was in place.

Lastly, foreign financial speculators who opt to close their long koruna positions might therefore face difficulties in finding a counterparty (due to the koruna's "overboughtness"). If they tried to close their large positions, the koruna would depreciate, thus reducing the yield on those positions. Some of the original speculators have thus probably become long-term investors in koruna assets, hoping for a reasonable yield compared with similar assets from other advanced

² We use data up to the end of January 2020, before the markets started being affected by the coronavirus.

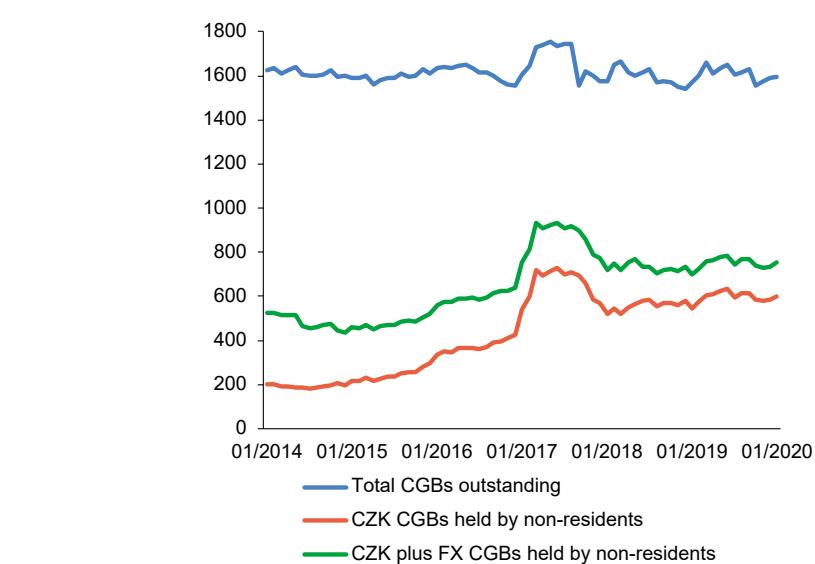
economies. The overboughtness thus to a large extent automatically prevents the CNB's monetary policy rate hikes and the widening of the interest rate differential relative to the euro from giving rise to appreciation pressures. This has significantly enhanced the autonomy of the CNB's interest rate policy compared with the pre-2008 times.

The expectation that the koruna would appreciate after the exit from the currency floor, combined with search for yield associated with the quantitative easing of the ECB, has boosted the attractiveness of koruna-denominated assets. There are two major channels through which foreign investors try to achieve higher yields here. First, non-residents have invested massively in koruna-denominated CGBs (Graph 4). At the peak, in summer 2017, they held more than 50% of all CZK CGBs (Graph 5). The share has since gone down, but it still exceeds 40%. Including CGBs denominated in foreign currency (FX CGBs) the share of non-residents peaked at 58% and has fallen to a current 47%. Second, non-resident banks – primarily the parent institutions of local subsidiaries – were depositing more money at local banks after the introduction of the currency floor. These institutions collectively moved soon from being a modest net lender – their usual position for most of history – to being a significant net borrower (Graph 6).

Size and structure of CGB market

(in CZK billions)

Graph 4

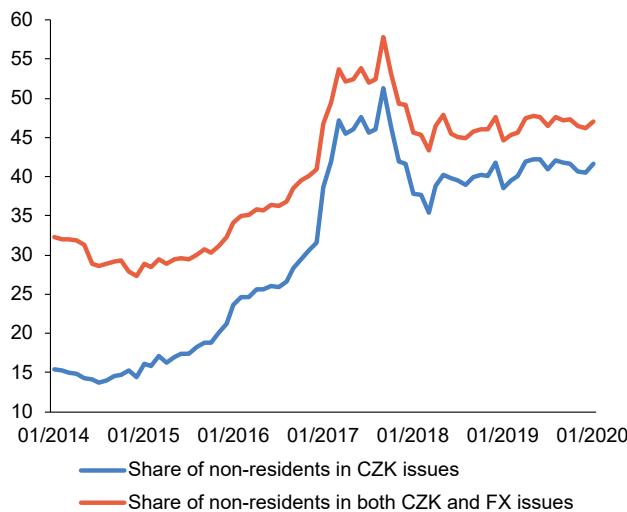


Sources: CNB; MoF of the Czech Republic.

Size and structure of CGB market

(in %)

Graph 5

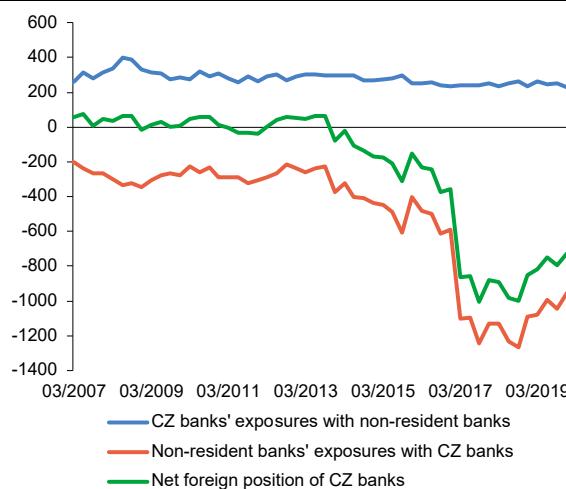


Sources: CNB; MoF of the Czech Republic.

Foreign position of banks in CZ

(in CZK billions)

Graph 6



Source: CNB.

CZK GGB yields

(in %)

Graph 7



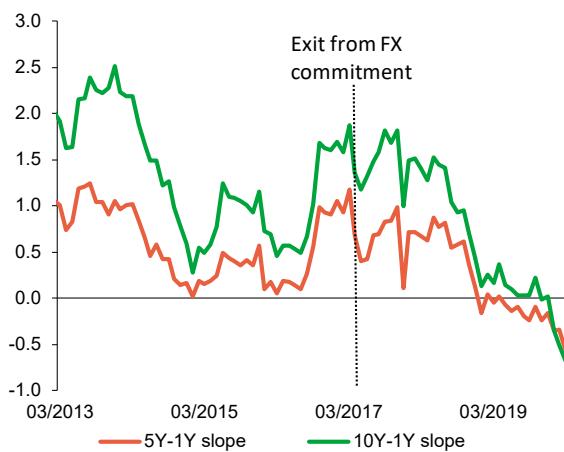
Source: CNB.

Sizeable investments in the CZK CGB market from non-residents are having a major impact on yields. There was a sharp decline in yields after the currency floor was introduced (Graph 7). Once expectations of an exit and of subsequent koruna appreciation emerged, both the one-year and the five-year yields turned negative. The gradual normalisation of monetary policy after the exit produced higher yields and restored the normal yield curve slope (Graph 8). However, the steps taken by key central banks, in particular the ECB's announcement of a new wave of quantitative easing, contributed to a significant decline in yields. The yield curve became negative up to five years (Graph 7), while the five-year and 10-year IRS rates, which are important for mortgage pricing, both dropped temporarily below 1% (Graph 9). Interest rates on new mortgages thus started to decline again – from close to 3% at the beginning of 2019 to 2.4% at the end of the year (Graph 9). This indicates that the loose monetary policy of the ECB and other central banks in advanced economies is – through the resultant search for yield – constraining the CNB's monetary policy autonomy as regards long-term lending rates.

CZK GGB yield curve slope

(in percentage points)

Graph 8

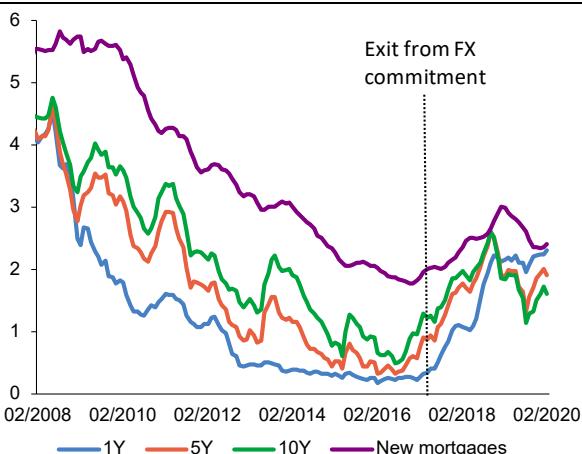


Source: CNB.

CZK IRS rates and average new mortgage rate

(in percent)

Graph 9



Sources: CNB; Fincentrum Hypoindex.

Analysts from financial firms, international institutions and rating agencies tend to raise two questions related to the developments described above when talking to CNB representatives. The first concerns the potential side effects of the large excess of structural liquidity in the local banking sector. Banks' koruna-denominated exposures held with the CNB reached the equivalent of USD 150 billion at the end of 2019 and represented roughly one third of banks' assets. Some argue that banks searching for yield could try to utilise this pool of liquidity to extend client loans with higher interest rates relative to the CNB's policy rates. The outcome could be a major credit boom financed de facto from sources drawn from abroad. For the CNB, this kind of situation is not new. A considerable liquidity excess has prevailed in the Czech banking sector for more than two decades without ever having become an extra impetus for credit expansion. Graph 10 reveals that the liquidity excess was

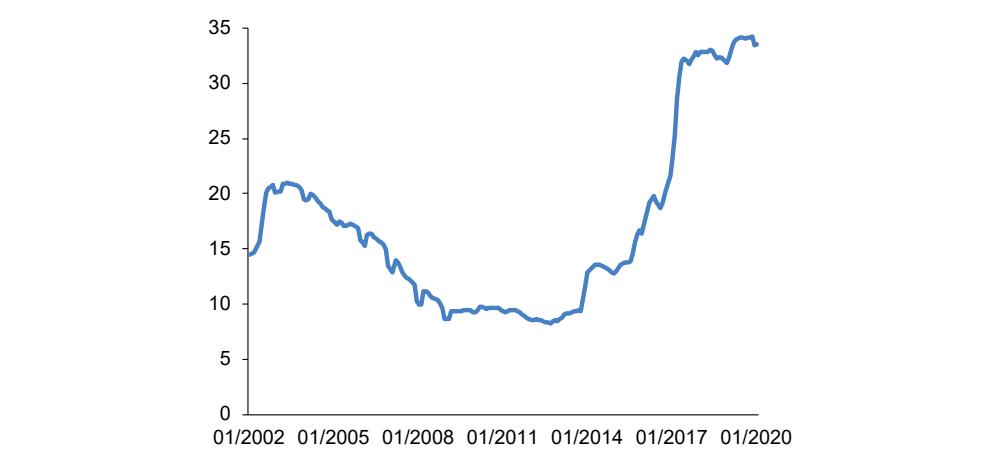
relatively large at the beginning of the century and expanded further following the introduction of the exchange rate commitment. The reason for this is that local banks generally have generous funding from client deposits. In such a situation, the excess liquidity, no matter how large, has practically no role in generating extra credit. As an integrated monetary, supervisory and macroprudential authority, the CNB can closely and comprehensively monitor developments in the whole financial system.

The second question is whether non-residents' large holdings of CZK-denominated CGBs could become the source of a strong shock if investors were to start collectively selling. Should this happen, there would be simultaneous upward pressure on CGB yields and downward pressure on the koruna. It is likely that domestic financial institutions would be able and willing to buy CGBs from non-residents if the yields were sufficiently attractive. Their CGB holdings were much higher before yields dropped while the exchange rate commitment was in place (Graph 11). In addition, should the sell-off by non-residents exert significant depreciation pressure on the koruna, with this pressure potentially endangering the fulfilment of the central bank's inflation target, the CNB could react by using its major monetary policy instruments, ie by hiking nominal interest rates and – in the extreme case – possibly also by reducing its large foreign exchange holdings via forex interventions. Overall, even in the event of relatively large sales of CGBs by non-residents, the CNB has sufficient instruments on hand to avoid a significant impact on domestic price and financial stability.

Share of banks' exposures held at CNB

(in per cent of banks' assets)

Graph 10

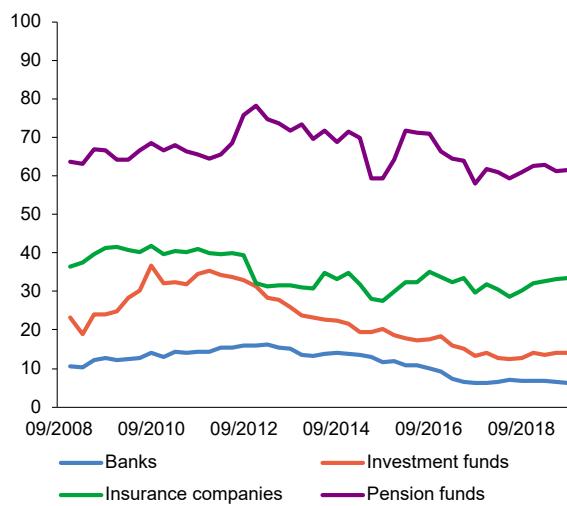


Source: CNB.

Share of CGBs in assets of domestic sectors

(in %)

Graph 11



Source: CNB

Source: CNB.

To sum up, the CNB's experience with its temporary exchange rate commitment and with the subsequent exit serves as a case study of a small open economy facing a severe risk of deflation. The use of the exchange rate floor as an additional tool for monetary policy easing proved effective in averting the risk of deflation and returning inflation to the 2% target. Subsequent research (Brůha and Tonner (2017)) shows that the exchange rate floor had significantly positive effects on core inflation and prevented inflation from turning negative. It can therefore be retrospectively assessed as a successful policy measure for the Czech economy. Active communication about the duration of the exchange rate floor was a key element of the policy. The CNB notified the public and markets of the minimum duration of the floor (a "hard commitment") and the expected timing of the exit (a "soft commitment"). Although the hard commitment was postponed several times due to persistent deflationary shocks from abroad, it was ultimately fully met. The soft commitment provided information on the exit date expected or considered likely by the Bank Board and on the timing of the exit assumed in the forecast. The CNB's transparent communication on the duration of the exchange rate commitment and the likely timing of the exit had some effects on capital flows and financial markets. These nevertheless did not adversely affect the autonomy and effectiveness of the CNB's monetary policy.

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Foreign participation in the local currency bond markets of emerging market economies: good or bad for market resilience and financial stability?

Hong Kong Monetary Authority

Abstract

This note studies the implications of increased foreign participation in the local-currency (LC) bond markets of emerging market economies (EMEs) from the perspective of market resilience and financial stability. While the rapid growth of LC bond markets might have overcome the "original sin" of EMEs, our findings suggest that foreign investors are sensitive to currency risk (ie the yield spread widens further) during market distress. Volatility spillover for local currency bond funds is significantly larger than that for hard currency bond funds. Two important policy implications can be drawn from the analysis. First, the development of foreign exchange derivatives markets is crucial for market stability. Second, the investor base of EME markets should be diversified by increasing the presence of domestic investors.

JEL classification: G15, F31, F32.

Keywords: local currency bond markets, currency risk, volatility spillover.

Introduction

Increased participation by foreign investors is an effective way to promote the financial market development of emerging market economies (EMEs).¹ First, these investors bring in new capital and enable better risk-sharing with domestic investors, thus help driving market growth and reducing the cost of capital. Moreover, they prompt EME markets to align with international standards by demanding better corporate governance, which is crucial for long-term market development.

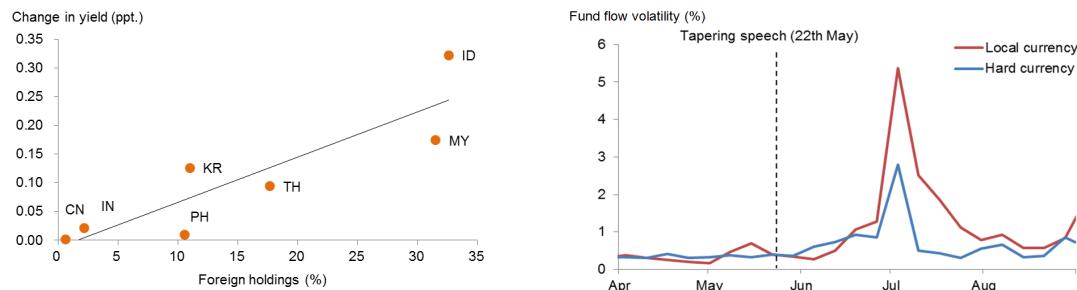
However, foreign participation also implies greater sensitivity to external shocks, notably those associated with currency risk. According to a survey by the Committee on the Global Financial System (CGFS), about a quarter of the market participants in EMEs expected their local securities and foreign exchange markets to experience notable increases in volatility as foreign participation increases (CGFS (2019)). These concerns reflect market developments in recent years. Between April and October 2018, for instance, EME currencies depreciated by 14.9% amid heightened geopolitical tensions.² Meanwhile, EME bond funds saw significant outflows, with local currency (LC) bond funds suffering more severe outflows than hard currency (HC) bond funds, suggesting that EME fund flows and EME exchange rate volatility are closely linked.

The role of foreign participation was also noteworthy during the taper tantrum. Amid concerns that the United States would tighten its monetary policy earlier than expected, EME bond and FX markets sold off precipitously in the months after May 2013.³ The left-hand panel of Graph 1 shows the weekly change in the LC yield spread against the share of foreign holdings. The positive relationship indicates that Asian EMEs with higher exposures to foreign investors experienced a larger increase in yields than those with lower exposures. Meanwhile, fund flows to LC EME bond funds were more volatile than HC EME bond fund flows (Graph 1, right-hand panel).

¹ See CGFS (2019) for more discussion about the promotion of financial market development in EMEs.

² EME currencies are measured by the JP Morgan Emerging Market Currency Index. During this period, a much sharper depreciation was seen in some currencies, such as the Argentine peso (45.4%), the Turkish lira (27.7%), South African rand (17.6%), Indian rupee (11.2%) and Indonesian rupiah (9.2%)

³ On 22 May 2013, the then US Federal Reserve Chairman Ben Bernanke mentioned in his testimony that the Fed would slow the pace of its asset purchase programme.



Note: (1) Change in yield is measured by the difference of five-year generic government bond yield between 21 and 29 May 2013; (2) The R-squared of the simple linear regression is 0.78. (3) Local currency bond funds invest 75% or more in local currency-denominated debt, whereas hard currency bond funds invest 75% or more in hard currency-denominated debt.

Sources: Bloomberg; EPFR Global; HKMA staff estimates.

Against this backdrop, this note presents the role of increased foreign participation in the domestic financial markets of EMEs in general and emerging Asia in particular. Specifically, it answers two questions: (1) does a larger presence of foreign investors in Asian local currency government bond market affect the yield spread? And, if so, which component of the spread does it affect? And (2) does currency denomination of EME bond funds matter for bond fund flow during market distress?

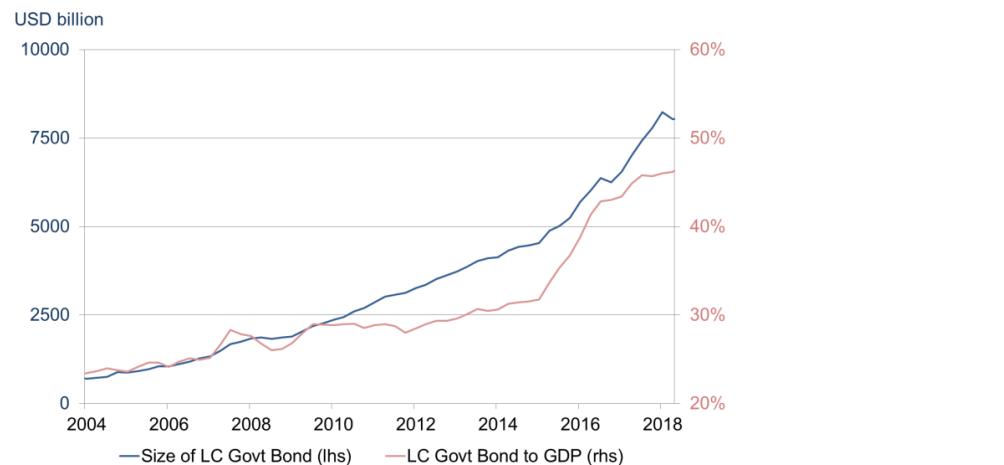
To preview our findings, while high foreign participation generally leads to the tightening of LC government bond yield spreads in emerging Asia, it significantly exacerbates the widening of the currency risk component of the spread when there is strong expectation for currency depreciation. In addition, LC EME bond funds are found to experience significantly larger foreign exchange (FX) volatility spillover than HC bond funds. These findings are likely to reflect the rapid flight of foreign investors from LC bond markets in anticipation of FX-related losses.

Local currency bond markets in emerging Asia

Prior to the 2000s, few EMEs could borrow abroad in local currency or for the long term, thus creating a double mismatch (for both currency and maturity). This phenomenon is often dubbed the “original sin” of EMEs (Eichengreen and Hausmann (1999)). In emerging Asia, such mismatches were a major vulnerability that exacerbated the Asian financial crisis (AFC) in 1997–98 (Park et al (2018)). After the AFC, Asian EMEs cooperated to develop LC bond markets, for example through the Asian Bond Markets Initiative (Park (2017)). Between 2004 and mid-2018, the size of LC government bond markets surged more than tenfold and the market size-to-GDP ratio also doubled (Graph 2). The region’s robust economic performance has attracted foreign investors in their search for yield (Burger et al (2012)) especially during the low yield environment after the 2007–09 global financial crisis (GFC), accelerating the growth of LC bond markets in Asia.

Size of LC government bonds and market size-to-GDP ratio in EME Asia

Graph 2



Note: Includes China, Hong Kong SAR, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand.

Source: Asian Bonds Online.

At first glance, the rise in LC bonds should be good news for EMEs as this would alleviate their currency mismatch. The increase also suggests that these economies might finally overcome their “original sin”. However, it is important to note that denomination in local currencies per se does not eliminate FX risk. It only means that foreign investors now bear more FX risk than previously, making them more responsive to FX movements. Thus, with the increased foreign participation in LC bond markets through bond funds, EME bond fund flows have become more sensitive to FX risk.

Recent empirical findings

Impact of foreign holdings on yield spreads

Ho (2019) analysed the impact of foreign holdings on the local currency government yield spread in emerging Asia.⁴ In summary, conditional on FX rate expectations, foreign holdings and yield spread are found to display a positive relationship when the level of foreign holdings is larger than about 13%. Graph 3 presents this relationship, focusing on two tail scenarios for FX expectations. With strong expected appreciation (green line), the yield spread could be narrowed by about 43 basis points when foreign holdings are at 40%, as compared with about 10 basis points when foreign holdings is at 13%.⁵ By contrast, when there is strong expected depreciation

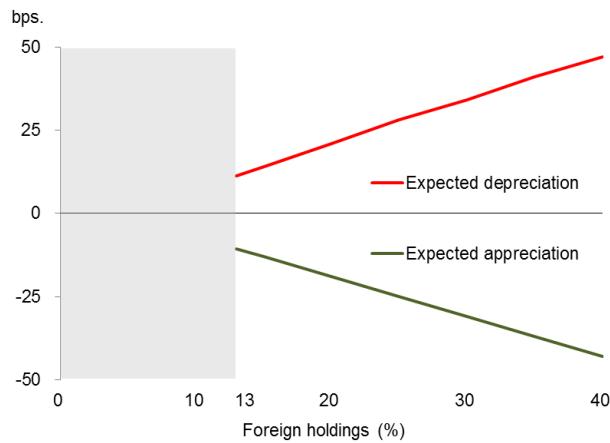
⁴ In this study, emerging Asia refers to China, India, Indonesia, Malaysia, the Philippines, South Korea and Thailand.

⁵ “Strong expected depreciation” is defined as the case when change in risk reversal is at its cross-economy historical 99th percentile. “Strong expected appreciation” is the case when the risk reversal is at its first percentile.

(red line), the spread would widen more as foreign participation increases, peaking at 47 basis points when foreign holdings are at 40%.

Estimated contribution to nominal LC yield spread (bps)

Graph 3

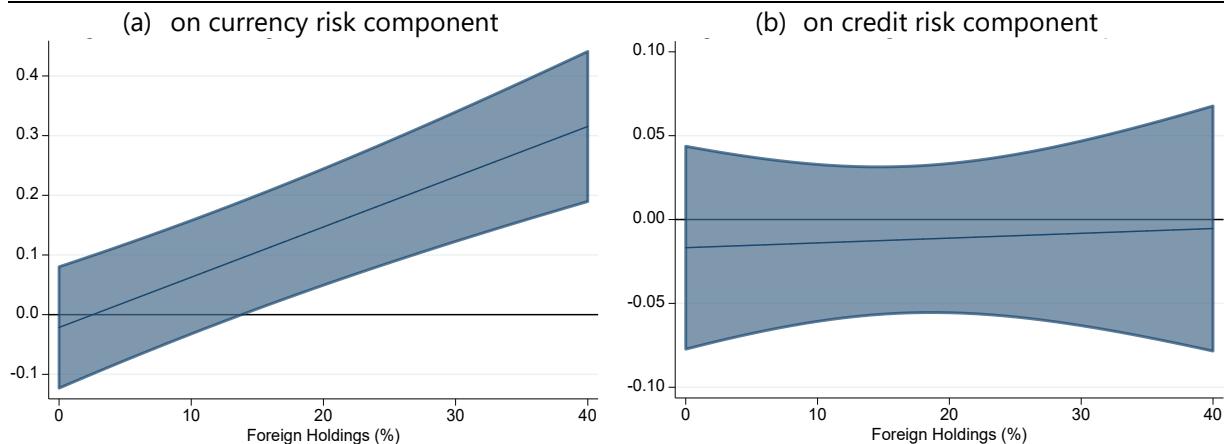


Note: Grey area denotes insignificant estimated change. Expected appreciation and depreciation is represented by cross-economy historical first and 99th percentile of the change in risk reversal, respectively.

Furthermore, the effect of foreign holdings is found to work through the currency risk component of the yield spread. As shown in Graph 4(a), the margin plot of the currency risk component is largely similar to the baseline results, ie foreign holdings start to have an impact on yield spread when they are large enough, possibly because the currency risk premium would increase upon expectations for FX depreciation.

Marginal effect of change in lagged risk reversal (%)

Graph 4



Note: Shaded area represents 95% confidence interval.

However, foreign holdings have no significant impact on the credit risk component of the yield spread (Graph 4(b)). A possible explanation is that both foreign and domestic investors should face a similar potential loss in the case of credit events in the LC bond market. Therefore, the level of foreign holdings does not augment the credit risk sensitivity to FX expectations.

Impact of exchange rate risk on EME bond fund flows

Leung and Wan (2019) found that EME exchange rates affect the volatility of EME bond fund flows through the volatility spillover channel. In particular, during market distress⁶ in the post-GFC period, volatility spillover for LC fund flows is significantly larger than that for HC funds (Table 1). In addition, under normal market conditions, volatility spillover is found to affect only LC fund flows, but not HC fund flows. These findings suggest that LC fund flows are more susceptible to exchange rate volatility than are HC fund flows.

Moreover, a negative volatility effect is found for LC and HC bond funds, ie an increase in EME exchange rate volatility has a negative impact on the level of EME bond fund flows, during market distress. The results suggest that volatile currency movements might discourage foreign investors from holding these bond funds. Lastly, positive mean effects are found, ie FX appreciation (depreciation) leads to more (less) EME bond fund flows, whether or not the market is in considerable distress. These results are consistent with the return-chasing hypothesis⁷ (eg Bohn and Tesar (1996), Bekaert et al (2002)). However, statistical test results suggest that the mean effect of LC funds is not significantly different from that of HC bond funds.

Impact of EME exchange rates on EME bond fund flow in the post-GFC period

Table 1

	LC bond fund flow (a)	HC bond fund flow (b)	(a) and (b) significantly different at 5% level?
Market distress			
Mean effect	0.10*	0.12^	No
Volatility effect	-2.31*	-3.01***	No
Volatility spillover	15.10***	6.47***	Yes
Whole sample period			
Mean effect	0.16***	0.12***	No
Volatility effect	0.03	0.05	No
Volatility spillover	0.07*	0.25	Yes

Note: ***, * and ^ denote the estimated coefficient is statistically significant at 0.1%, 5% and 10%, respectively.

Source: HKMA staff estimates.

⁶ Market distress is defined as the 10th percentile in fund flow or the 90th percentile in fund flow volatility.

⁷ The return-chasing hypothesis states that investors tend to move into markets where returns are expected to be high and retreat from markets when predicted returns are low.

Discussion

The increased participation of foreign investors could be a double-edged sword for EME financial markets. As shown by the analysis of emerging Asia local currency government bonds, these investors help stabilise bond markets in good times by reducing the yield spread by increasing demand and providing liquidity. However, during an episode of market distress with strong depreciation expectations, large foreign holdings tend to further widen the yield spread, raising borrowing costs and eroding liquidity. Furthermore, in response to an increase in FX volatility, fund flow volatility for LC EME bond funds is found to increase significantly, whether or not the market is in distress. In other words, the volatility spillover for LC bond funds is significantly larger than that for HC bond funds.

While the rapid growth of LC bond markets might have overcome the "original sin" of EMEs, it is no panacea in financial stability terms. Even when a large LC bond market is well developed, allowing domestic investors to borrow abroad in local currency, these economies still have to confront reversals of capital flows when FX risk materialises.

Two important policy implications can be drawn from the analysis. First, the development of FX derivative markets is crucial for market stability. If FX hedging tools are available to foreign investors, they can separate exchange rate risks from other risks (eg credit risk, duration risk) and thus be less inclined to stampede out of EME bonds in response to heightened exchange rate risk. Second, the investor base of EME markets should be diversified by increasing the presence of domestic investors. As domestic investors are less sensitive to FX risk, their presence should help contain the impact of FX risk. In particular, institutional investors should be a core part of the domestic investor base as they help create market liquidity and enhance the price discovery process. As many of these investors (eg pension funds, endowment funds, sovereign wealth funds) have long-term investment horizons, they tend to be less responsive to short-term market movements or, indeed, they may adopt a contrarian investment strategy, thus providing a stabilising force for the markets (Fong et al (2018), Timmer (2018), de Haan and Kakes (2011)).

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Market development and monetary policy – the case of Hungary

Márton Nagy, Gabriella Csom-Bíró, Dániel Horváth and Szabolcs Pásztor¹

Abstract

Changes in market structure and mechanisms are of great importance for central banks as these developments can materially influence their monetary policy transmission channels. Following the global financial crisis, central banks adopted new forms of unconventional policy. Liquid and well established markets have allowed the central banks of the advanced economies to easily introduce measures that directly influenced monetary conditions (eg quantitative easing). In contrast, the monetary authorities of emerging market economies (EMEs) must always consider obstacles to market efficiency, quickly changing market structures and occasionally poor liquidity conditions. It is therefore essential for EME central banks to monitor, understand and even actively manage these market processes and facilitate the development of market infrastructure.

This study examines the monetary policy implications of the three major areas of development in the Hungarian financial markets in recent years: changes in interbank depo and repo markets, in household lending conditions, and in the ownership and currency structure of government debt.

JEL classification: E43, E52, E58, G21.

Keywords: interbank benchmark rate, repo market, development of financial market, fixed interest rate loans, self-financing, structure of debt financing.

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1. Development of the interbank depo and repo market

1.1 Reforming the interbank benchmark rate (BUBOR)

Post-crisis, the information content of BUBOR fell significantly, and quotes became “stuck” so that it could no longer serve effectively as a reference rate.

As the lighthouses of the financial system, reference rates are public goods that provide a reference point for market participants, improve the efficiency of lending and other financial products, and reduce transaction costs. Like its international peers, the Budapest Interbank Offered Rate (BUBOR) is typically used as a benchmark, for forint-related products. BUBOR is used to price a volume of debt and interest rate derivatives that is roughly equivalent to Hungary's GDP.

In Hungary, the BUBOR reforms implemented between 2012 and 2015 primarily concerned the organisational background, the averaging methodology, the number of maturities, and the terms related to panel banks. If it is to be a reliable basis for pricing financial products, BUBOR must represent all relevant market information. The fact that quotes for the most important maturities were becoming increasingly “stuck” up to April 2016 indicated that it was failing to do so, despite the reforms, and thus BUBOR was no longer serving its purpose.

The problems were exacerbated by the fact that, during the crisis, trading practically ceased in the longer segments of the unsecured interbank market, while counterparty limits fell close to zero. In addition, due to the LIBOR scandal and the ensuing regulatory tightening, “herding behaviour” became stronger and stronger, ie panel banks sought to submit interest rates that were close to the group average or to their earlier quotes. Ultimately, except for the possible reputational kudos, there was no longer any incentive for banks to provide quotations.

International benchmark reforms

Following the scandals related to the major global interest rate benchmarks, international organisations and national authorities started to examine potential ways forward (see eg the Wheatley Report, the IOSCO Principles, or reports by the FSB). These reviews identified two possibilities: the reform of existing interest rate benchmarks and the creation of new ones. In most of the advanced economies (USD, EUR, JPY, CHF), new benchmarks were initiated. As Table 1 points out, there is no consensus about the best format for the new benchmarks: there are both secured and unsecured interest rate benchmarks. However, there is consensus about one important aspect: both new and reformed benchmarks should as far as possible rely on the interest rates of actual transactions.

New interest rate benchmarks in developed markets

Table 1

Currency	Benchmark	Start	Type
JPY	TONAR	2016Q2	Unsecured
CHF	SARON	2017Q4	Secured
USD	SOFR	2018Q2	Secured
GBP	SONIA (reformed)	2018Q2	Unsecured
EUR	ESTER	2019Q4	Unsecured

Source: MNB.

Responding to international best practice and the EU Benchmark Regulation, the central and eastern European (CEE) countries have also started to develop domestic benchmarks in recent years. Due to their low liquidity and limited market size, all the CEE countries have retained their original unsecured benchmarks. One of the key differences is that Hungary, Poland and Romania have adopted a "firm quote regime". This reflects the new international standards for the transactional basis. Poland is planning to adopt a purely transactional basis for the WIBOR fixing for overnight and tomorrow/next maturities in future. Furthermore, in Hungary and in Romania, central banks are the administrators of the benchmarks. Thus, they do not fall under the scope of the EU Benchmark Regulation.

Interest rate benchmarks in CEE markets

Table 2

	Hungary	Poland	Romania	Czech Republic
Benchmark	BUBOR	ROBOR	WIBOR	PRIBOR
Type of administrator	Central bank	Private sector - local	Central bank	Private sector - international
No. of panel banks	12	10	10	6
Type	Unsecured	Unsecured	Unsecured	Unsecured
Firm quotes	Yes	Yes	Yes	-
Fee liable	-	-	-	Yes

Source: MNB.

The BUBOR Rules were revised to facilitate higher liquidity, with the central bank taking over the benchmark's administration.

The above-mentioned factors suggest that the information content of BUBOR fixings was inadequate. In order to increase their soundness, the BUBOR Rules were revised and the quotation system reshaped on the MNB's initiative in May 2016. This followed on from discussions with the Quotation Committee and panel banks. As a result, a quotation system based on transaction obligations was set up, similar to the case in Poland and Romania. In line with international recommendations, this reform

increased the role of real market transactions related to submissions. Additionally, at the request of the Hungarian Forex Association, as of November 2016 the MNB took over the administration of benchmarks, which it carries out through the operations of the Benchmark Quotation Committee (BQC).

The main features of the new system:

- The MNB invites the top 12 banks to participate in the BUBOR panel.
- Executable quotes were introduced on the one- to three-month maturities.
- There is a 15 minutes trading session after the 11:00 publication of the fixing, when panel banks can trade at their respective quotes.
- For the purpose of trading in this session, bid quotes are determined based on a fixed 15 bp bid-ask spread, which ensures that trades can take place.
- Later, executable quotes were extended to the six-month tenor and the 15 bp fixed spread has been lowered to 10 bp.

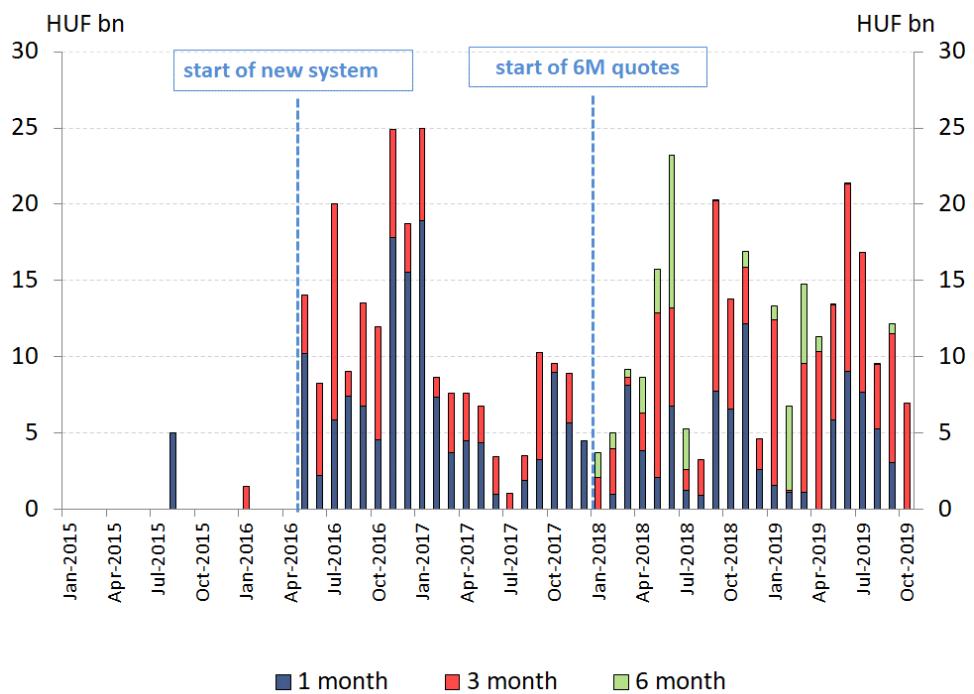
The new system facilitates a sound informational content, which is crucial as the new monetary transmission framework depends on BUBOR's responsiveness to liquidity conditions.

As a result of the reforms implemented in May 2016, for the one-month and three-month maturities in the unsecured interbank market, the volume of transactions between panel banks reached levels last seen before the crisis. Activity in the longer segment was further supported by the introduction of the transaction obligation on the six-month maturity from 2018.

In connection with the launch of the new quotation system, the MNB requested the banks to provide a "reasonable" level of partner limits towards other panel banks, as required for the operation of the system. Responding to that request, in recent years, most banks have managed to set (or increase) limits for the rest of the panel banks. The aggregate counterparty limits for the one-, three- and six-month transactions have more than tripled at system level. We consider that the resulting "limit net" provides the space required for the operation of the system.

One-, three- and six-month interbank transactions on the HUF depo market

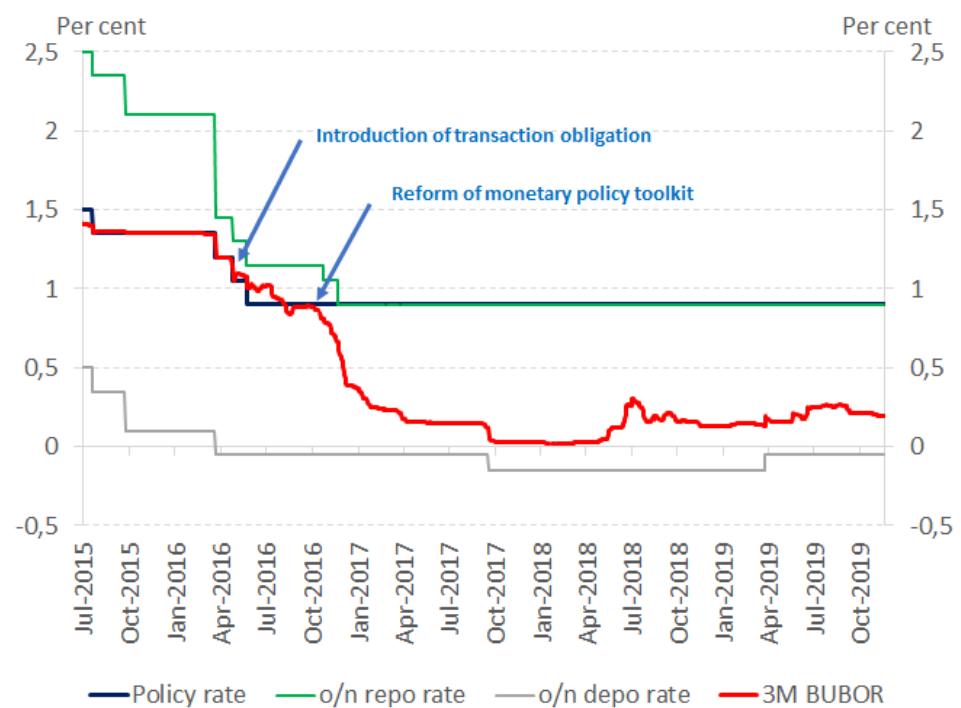
Graph 1



Source: MNB.

Hungarian central bank rates and three-month BUBOR

Graph 2



Source: MNB.

Following the introduction of the new quotation system in May 2016, the responsiveness of BUBOR increased, and quotes became unanchored from the base rate. The new quotation system therefore strengthened the information flow between the domestic money markets. As a result, even in periods of low liquidity, changes in quotes reflected developments in market conditions. This has allowed the MNB to fine-tune its monetary policy close to the zero lower bound while leaving the base rate unchanged.

The new framework's fundamental feature was that the MNB restricted commercial banks' access to the three-month deposit instrument in order to facilitate the intended easing in monetary conditions using unconventional instruments through a change in the banking sector's liquidity structure. As a result of banks' limited access to the main policy instrument, their holdings of the three-month deposit dropped, while the bulk of the banking sector's surplus liquidity shifted to overnight deposits. The downward pressure on the yields of the liquidity thus crowded out was seen in all relevant markets: following the announcement of the transformation of monetary policy instruments in July 2016, short-term interbank and government bond market yields declined by 70–80 bp by March 2017. Supplemented by the use of the fine-tuning FX-swap instrument designed to adjust unexpected movements in the liquidity path, the cap system eased monetary conditions, with the key policy rate remaining unchanged.

As the effectiveness of this new monetary transmission framework depends on BUBOR's responsiveness to liquidity conditions, the central bank closely monitors and reacts to market developments. This includes the monitoring of systemic and individual liquidity conditions; panel bank quotes and methodologies; partner limits; and movements in other markets that are used as inputs for BUBOR quotes.

1.2 Development of the repo market

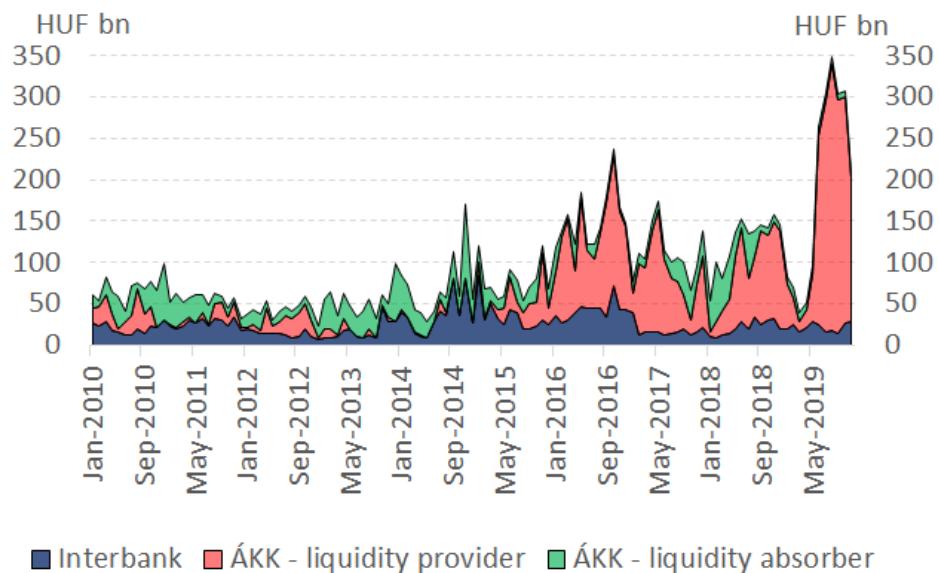
Liquidity in the Hungarian repo market is relatively low and the market is dominated by the debt management agency.

In the current Hungarian framework, ample excess liquidity does not require banks to redistribute liquidity in large amounts on the market. However, if liquidity becomes scarcer and more asymmetrically supplied in the future, the channels through which it may be distributed will become an important question. The repo market may be a key venue for the distribution of interbank liquidity in such a situation: the capital and limit requirements for repurchase transactions tend to be lower, and a pickup in the volume of business could also have a beneficial liquidity effect on the government securities market, while also providing a viable interbank trading opportunity for longer maturities.

In recent years, the domestic repo market has been fundamentally determined by the activity of the Government Debt Management Agency (GDMA, ÁKK). This activity has become one-sided in recent years, with GDMA appearing only as a liquidity provider. Interbank turnover has stagnated at around HUF 25 billion a day over the last 10 years, with significant growth only in transactions with GDMA. Looking ahead, however, in the event of declining systemic liquidity, increasing asymmetry, and any eventual fall-off in GDMA activity, market participants may increasingly rely on the repo market for liquidity management and thus this market segment may become more relevant from a monetary policy perspective as well.

Daily average turnover on the HUF repo market

Graph 3



Source: MNB.

At the central bank's initiative, the main obstacles to repo market development have been removed.

At the initiative of the MNB, a working group was set up in 2017 with market participation and the aim of developing the repo market. The working group carried out several market surveys to identify the factors limiting repo market activity, and based on the results, progress was made in three areas:

1. National implementation of the standard international repo market framework contract (GMRA).
2. Launching a reliable daily repo market report from 2020.
3. Removal of technical barriers identified on the KELER's (Hungarian central counterparty) and GDMA's side.

The lack of a GMRA framework contract adapted to domestic conditions was clearly cited by market participants as a major barrier to the growth of the repo market. This is because, in the domestic market, the parties that regularly engage in repo transactions have typically entered into individual bilateral agreements on terms and conditions. As a result of the working group's discussions, the Hungarian version of the GMRA agreement was completed by autumn 2018. So far eight of the 12 BUBOR panel banks have entered into at least one GMRA agreement. The MNB regularly monitors contracts and repo counterparty limits in a manner similar to those for the BUBOR market.

Market participants also asked for a reliable repo market data source to help them assess market conditions (liquidity, yields etc). To this end, the MNB has prepared a new, targeted repo market daily report, to be launched in January 2020.

The MNB has notified the Central Clearing House and Depository (KELER) and the GDMA about the issues identified in the meetings with market participants. As a

result, several obstacles have already been removed (eg technical issues regarding negative interest rates).

2. Lending conditions from a monetary policy perspective

2.1 Facilitating the proliferation of fixed interest rate loans

The recent resurgence in household and corporate lending has increased the importance of whether lending is on a fixed or variable rate basis. This question is important from a policy point of view to ensure that credit growth will be sustainable. For the first time after the crisis, both retail and corporate lending started to pick up again in the middle of 2016. As foreign currency loans have been phased out, virtually no exchange rate risk remains in the retail sector. Given persistently low interest rates, the relative share of fixed and variable interest rate lending has become the only significant source of risk. This is particularly important in the case of long-term loans.

Interest rate types are relevant to central banks as they affect monetary transmission and financial stability. Changes in the benchmark interest rate affect the real economy partly through changes in lending rates. The strength of the interest rate channel of the transmission mechanism depends on the ratio of fixed and variable interest rate loans. From a financial stability point of view, an increase in the reference interest rate leads to an increase in instalments if interest rates are variable. However, in the case of fixed interest rates, an increase in the reference interest rate increases funding costs for banks, if interest rate exposures are not well hedged.

Variable interest rates might be more advantageous under normal economic conditions from a monetary policy point of view, but historically low interest rates present a significant risk, which can erode financial stability. The interest rate of variable rate loans is linked to a short-term reference rate. The higher the proportion of variable rate loans, the sooner the effect of a benchmark interest rate change feeds through to lending rates. This would seem to speed up monetary transmission, but the revaluation of loans can lead to negative side effects which may outweigh the initial benefits in the longer term. (Previously in Hungary, the large volume of foreign currency loans has constrained monetary policy, because interest rate cuts increased the principal amount of loans through exchange rate depreciation.) The likelihood of a potential interest rate increase is higher in the current low interest rate environment, which may increase the proportion of overdue loans through increased instalments. Therefore, fixed rate loans are currently more likely to mitigate interest rate risks. This has been repeatedly communicated by the MNB in recent years.

An appropriate supply of fixed rate, long-term funding is a prerequisite for fixed rate lending, to alleviate asset-liability mismatches. The high proportion of fixed rate loans ensures that credit expansion is sustainable. A further condition for financial stability is the availability of large amounts of fixed rate funds for the purpose of financing the large amounts of fixed rate loans appearing on the banking system's balance sheet. The MNB contributed to the expansion of the supply of such funds in two markets, namely the interest rate swap and the mortgage bond markets.

In January 2018, the MNB introduced two unconventional monetary policy instruments to provide an appropriate amount of fixed rate funds, namely the general, unconditional monetary policy interest rate swap (MIRS) facility and the

targeted mortgage bond purchase programme. Both contribute to the sustainable growth of the proportion of fixed rate loan contracts by reducing maturity mismatches. The MNB determined the total amount of the general purpose MIRS to be HUF 1,100 billion, which by the end of 2018 appeared as an additional fixed rate liability item on the banking system's balance sheet. Through its mortgage bond purchase programme, the MNB directly provided the banking system with fixed rate funds. In addition, it led to an increase in mortgage bond issuance and boosted market activity.

The presence of liquidity by itself is not sufficient. In addition, financial markets should be properly developed. Therefore, the MNB's mortgage bond purchase programme covered only bonds that were listed and continuously quoted on the Budapest Stock Exchange (BSE). Furthermore, the BSE in collaboration with the MNB developed several mortgage market indices to improve market transparency. Subsequently, the MNB introduced a swap facility with which bonds with a shortening maturity could be exchanged for longer-maturity ones. A repo facility was also introduced, which allowed financial institutions to borrow long-term mortgage bonds. These measures jointly contributed to the proper functioning of the mortgage bond market.

2.2 Macroprudential measures related to interest rates

A holistic macroprudential policy approach can preserve manoeuvring space for monetary policy by limiting the potential financial stability implications.

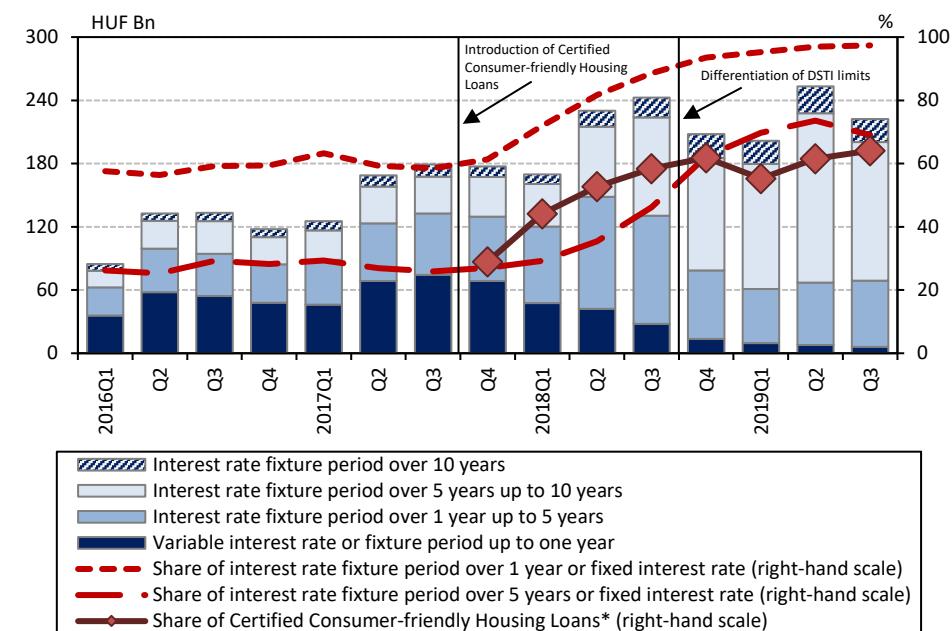
The higher the interest rate risk exposure of market participants, the higher their sensitivity to monetary policy actions. Hence, macroprudential policies that increase the resilience of market participants could contribute to the effectiveness of monetary policy. The MNB has applied several macroprudential policy measures in recent years to limit the interest rate risk of borrowers, thus increasing their resilience to shocks.

In June 2017, the MNB introduced the **Consumer-friendly Housing Loan certification programme** to increase competition in the banking sector and to curb the interest rate risk of mortgage loans. The conditions for certification set limits for the applicable interest rate spread above the reference rate, applicable fees and administrative deadlines and sets the minimum length of the interest rate fixture period at three years (five years since October 2018).

In October 2018, **lower debt service-to-income (DSTI) limits were set for new variable rate mortgage loans**, if their remaining maturity exceeds five years, to take account of the interest rate risk exposure of households. The amendment of the DSTI regulation ensured that the borrowers with higher interest rate risk have an ample income buffer to withstand the potential rise of their debt servicing cost due to a potential interest rate shock.

Additionally, since October 2018, the **Mortgage Funding Adequacy Ratio (MFAR)** further enhances the disbursement of mortgage loans on long-term interest rate fixtures. Based on the MFAR regulation, at least 25% of mortgages must be financed with long-term funds. The higher share of fixed rate long-term funds that are available at favourable rates may support the further spread of mortgages with longer interest rate fixture periods.

New housing loans by the length of the interest rate fixture period



Note: *Without loans disbursed by building societies.

Source: MNB.

Due to the MNB's various initiatives, the share of variable rate loans in new lending declined to negligible levels by the end of 2018. While the share of variable rate housing loans had been around 40–50% in the new housing loans up to 2018, their share started to decline with the advent of Certified Consumer-friendly Housing Loans, stabilising at around a 2–5% share following the amendment of the DSTI limits, by the end of 2018.

The MNB also recommends the refinancing of the outstanding variable rate loans with fixed rate ones. According to the recommendation, banks should inform their vulnerable clients about their interest rate risk exposure and offer them an opportunity to amend the contract and fix the interest rate for at least five years. Due to current expectations regarding the low-interest rate environment, the number of contract modifications based on the offers of the institutions has remained limited so far.

3. Market development through "self-financing": greater reliance on domestic funding

Following the 2007–09 global financial crisis, external vulnerability, financial stability risks and rising risk premia have significantly narrowed room for manoeuvre in monetary policy, making the recovery more difficult. After 2010, Hungary's key policy goals have been to reduce its economic vulnerability, eliminate funding from multilateral institutions, and lessen the country's external financial dependence.

In the autumn of 2008, foreign investors began to rapidly cut their holdings of government securities, in response to the country's perceived vulnerability to financial and economic stability threats. External and foreign currency debt had indeed increased during the crisis: from November 2008 to the end of 2009, Hungary had drawn down a total of EUR 14.4 billion from the IMF-EU credit line. One of the main sources of external vulnerability post-crisis was the unsound debt structure: foreign investors had a high share due to the low risk appetite of the domestic market, and because domestic financial institutions were very cautious vis-à-vis government debt.

From the beginning of 2012, Hungarian economic policy aimed to increase the proportion of public debt that was funded domestically. To this end, GDMA's newly introduced retail securities offered private investors more favourable terms. As a result, household savings started to play a larger part in the government securities market. Meanwhile, the issuance of large forint-denominated bond series to reduce foreign exchange exposure led to an increase in the share of forint denominated debt held by foreign investors. As a result, it became possible to gradually repay loans from international institutions and to shift to market-based funding.

The concept of self-financing called for policy measures aimed at reducing external vulnerability and for related measures on the part of the central bank. This process started with the launch of the GDMA's retail government securities programme, and continued from 2014 with the involvement of the banking system in the central bank's Self-Financing Programme, which provides for the replacement of foreign and foreign currency debt with domestic funding.

A number of MNB proposals support self-financing, debt financing and the development of submarkets:

1. modifications to monetary policy instruments to limit and steer liquidity;
2. supporting the more efficient operation of the forint interest rate swap (IRS) market through central bank tools;
3. stronger involvement of household savings in the financing of public debt;
4. expanding BIRS (Budapest Interest Rate Swap) maturities and initiating settlement of long-forint IRS; and
5. extending the maturity of forint-denominated bonds, which may encourage take-up by domestic institutional investors.

Through the Self-Financing Programme, and by revising its monetary policy instruments, the MNB has redirected the excess liquidity of the banking sector into the market for eligible collateral, especially government securities. The programme's success was due to the cooperation of the GDMA, as the debt manager financed the maturing foreign currency debt by issuing a sufficient amount of HUF government securities, so that demand from banks could adjust to changes in the supply side through central bank measures. In particular, in line with the completion of the interest rate reduction cycle and the maintenance of the base rate, the central bank's targeted unconventional instruments have been playing an increasingly important role in monetary policy since mid-2016.

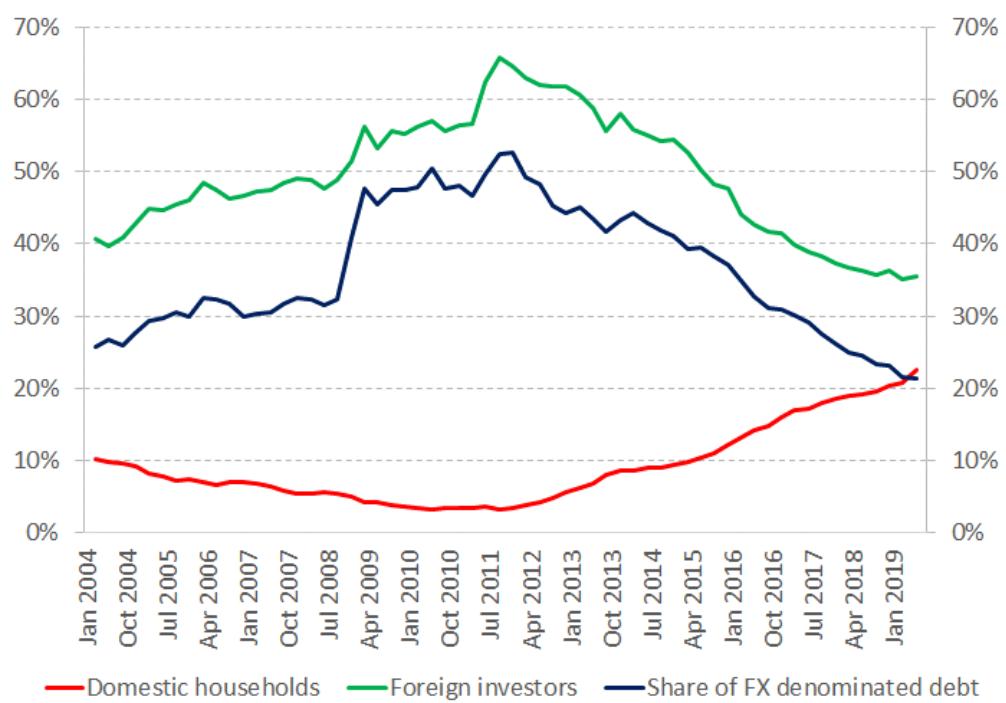
Between 2014 and 2016, the MNB announced the Self-Financing IRS instrument for three-, five- and ten-year maturities to enable credit institutions to replace the fixed interest rate on their securities with a floating rate, which the banks could use to reduce their interest rate risk. The central bank also sought to influence long-term

yields and reduce banks' interest rate risk through the use of unconventional central bank instruments with long-term yields, such as MIRS tenders.

The MNB has supported the launch of long-term government bond benchmarks by introducing a 20-year BIRS quotation and developing the HUF interest rate swap market. Long-term HUF IRS settlement provided by the London Clearing House (LCH) would be a key development in this regard. Currently, the longest maturity of forint IRS settled with LCH is 11 years. With the introduction of the 20-year forint bond, pension funds and life insurance companies may be gradually developing and transforming their investment policies and portfolios, potentially creating demand for longer-term government securities, complemented by demand from other sectors such as banks and foreign investors.

Share of FX debt and the holdings of domestic households and foreign investors as a proportion of total government debt

Graph 4



Source: MNB.

Continued high savings in domestic sectors have allowed the self-financing process to gain new momentum with the 2019 renewal of the retail government securities strategy. In designing this strategy, the GDMA took into account the central bank's proposals. With the restructuring of the retail government securities portfolio and the introduction of the new instrument, the Hungarian Government Security Plus (MÁP Plusz), in June 2019, the GDMA continued to encourage the financing of public expenditures and the renewal of maturing foreign currency bonds from domestic sources, while reducing the risks of external financing. The aim was to increase the popularity of government securities savings by eliminating the transaction tax on purchases of government securities (there is no transaction tax on transfers to and from the Hungarian Treasury) and the interest tax on series issued after 1 June 2019. As most sales took place in Budapest, the sale of MÁP Plusz in materialised form

started in early November, which was designed to attract customers with smaller amounts of savings.

In recent years, the domestic ownership ratio of government debt has increased significantly, owing to the active role of credit institutions and the more active role of households in financing.

The modifications to the monetary policy instruments, which started in 2014, contributed significantly to the growth of the domestic banking system's demand for government securities, which resulted in a significant restructuring of the ownership structure of forint government securities. The forint-denominated government securities portfolio of the credit institutions sector increased by HUF 2,400 billion, while their forint market share rose gradually to 35-40%. The fact that nearly 90% of bank purchases involved longer-term, fixed-rate government bonds suggests that the abovementioned IRS facilities of the central bank had a significant role in this process. The forint issuance strategy also supported the extension of the average remaining maturity. As a result, the average maturity of forint-denominated government securities held by banks has risen from 2.8 years to almost four years by the end of 2016 and is currently fluctuating at around four years.

In recent years, growing household wealth has been partly funnelled into public debt. This was supported by the fact that the GDMA has offered households a wider range of savings vehicles. The agency has also sought to increase the attractiveness of retail government securities by raising their coupons. Between 2012 and 2016, households invested on average half of their new savings in government securities, with their forint-denominated market share rising from 15% to 23%. However, changes in retail preferences have led to a slight slowdown in purchases since early 2018, with government securities accounting for only about 25% of households' new financial assets.

In recent months, the MÁP Plusz has contributed to (i) an increase in the total retail government securities portfolio; (ii) a shift in the maturity structure towards longer maturities through a shift in retail product types; and (iii) an increase in households' share of the market for forint-based government securities to above 31%. Through its effects on savings and consumption decisions, the MÁP Plusz may also cool inflation generated by strong wage growth. Savings in retail government securities reduces import-intensive domestic consumption, which reduces external debt, strengthening the current account balance.

Prompt and effective action to address temporary side effects is important when addressing market stress.

Coordination of government and central bank measures may broaden the room for manoeuvre for monetary policy. At the same time, continuous and detailed monitoring is needed to deal adequately and effectively with temporary market side effects. Some recent examples include:

1. The introduction of MIRS tenders increased the volatility of long-term yields, owing to the rapid build-up and subsequent decline in demand during the first auction.
2. Following the launch of the MÁP Plusz, interbank liquidity temporarily dried up, as also indicated by an increase in BUBOR. In response, the MNB announced an extraordinary HUF-liquidity-providing FX swap tender.

3. In connection with the MÁP Plusz, some market players attempted to arbitrage the issue by taking out a Lombard loan (with the MÁP Plusz as collateral) on favourable terms, with which they made a leveraged purchase of MÁP Plusz. The MNB and the GDMA acted jointly to stop such transactions at an early stage.

4. Conclusion

Since the crisis, it has become common practice for central banks to intervene more actively in market processes, most notably through quantitative easing, which can only work effectively in advanced markets. In EMEs, liquidity provision may not be effective due to market inefficiencies, and therefore more emphasis must be placed on the development of market infrastructure. This creates more room for the central bank to manoeuvre, and can increase the effectiveness of monetary policy.

A number of conclusions can be drawn from the Hungarian experience:

- The interbank rate's responsiveness to liquidity conditions is a key aspect for monetary transmission frameworks that rely on controlling liquidity conditions. Central banks need to closely monitor systemic and individual liquidity conditions; panel bank quotes and methodologies; partner limits; and price movements in a wide range of market segments.
- It is essential to facilitate new channels for the distribution of interbank liquidity (eg via the repo market). This includes being ready to monitor markets that may become more important in the future.
- The ratio of fixed and floating rate loans in the market influences monetary policy transmission and financial stability. From the point of view of monetary policy transmission, variable interest rates may be more advantageous in a normal economic environment, but stability considerations will prevail in a low interest rate environment.
- A holistic macroprudential policy approach can preserve monetary policy room for manoeuvre by limiting any potential financial stability implications. Macroprudential policies that increase the shock resilience of market participants could contribute to the effectiveness of monetary policy.
- High external vulnerability and risks to financial stability may, at critical times, significantly limit the room for manoeuvre of monetary policy. Central banks can use innovative tools to support the reduction of external indebtedness. While central banks have only a limited direct influence on the level of public debt, they can influence the structure of debt and its ownership. Improvements in the ownership structure of debt, its currency composition and maturity structure can significantly reduce vulnerabilities.

In the interests of market development, central banks sometimes need only to take the first step and then wait for market forces to take effect (eg the process of switching from variable rate to fixed rate loans in Hungary). In other cases, there is a need for a permanent central bank presence due to special emerging market conditions (eg the administrator role of BUBOR could not be fulfilled by the market due to the strict rules set out by the new European Benchmark Regulation).

Financial market development in Indonesia

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Abstract

In the last two decades, financial market development in Indonesia has progressed mainly via industry-led initiatives. But this changed in 2014, the year in which the authorities started to play a more active role in the acceleration of financial market deepening via so-called policy-led initiatives. Indonesia's experience, on the one hand, indicates the need to encourage market participants to have greater role in leading the initiatives. On the other hand, financial stability has to be maintained at the same time. This two-pronged approach is the key feature of recent financial deepening in Indonesia.

Financial market development in Indonesia has a significant impact on monetary transmission and financial stability. Policy responses to optimise financial market deepening with the aim of strengthening the monetary policy transmission have consisted of reformulating the policy interest rate into the BI seven-day reverse repo rate (BI7DRR); implementing an averaging method for reserve requirements; and establishing a more credible benchmark money market rate. Meanwhile in managing financial stability, Bank Indonesia continuously promotes institutional resilience against financial risks. One notable initiative has been the development of hedging instruments to address currency and interest rate risks.

JEL classification: E44, E52, G23.

Keywords: financial market, monetary transmission, financial stability.

¹ Bank Indonesia.

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Introduction

In the last two decades, financial market development in Indonesia has advanced mainly via industry-led initiatives. But this changed in 2014, the year in which the authorities started to play a more active role in the acceleration of financial market deepening via so-called policy-led initiatives. The shift was due mainly to, first, the limited role of financial markets as a source of financing for economic development, particularly infrastructure, and second, the growing need of market participants for risk mitigation. This approach was also influenced by the experience of the 1997 Asian crisis and the 2007–09 Great Financial Crisis, which inflicted massive costs from lost output on most emerging market economies. Simultaneously, ill-judged financial liberalisation exposed structural weaknesses and policy distortions.² This experience indicates the need to encourage market participants to have greater role in leading the initiatives. On the other hand, financial stability has to be maintained at the same time. This two-pronged approach is the key feature of financial deepening in Indonesia over the last decade.

Bank Indonesia has been actively involved in initiatives to develop financial markets. Policies for financial market deepening and development are designed to support monetary and financial stability as well as to support infrastructure financing. Financial market deepening officially became a national agenda item, when in 2015 Bank Indonesia together with the Ministry of Finance (MoF) and the Financial Services Authority (OJK) established the Coordination Forum on Financial Market Development. The National Strategy of Financial Market Development sets out a phased programme for completion in 2024, envisaging the development of deep, liquid, efficient, inclusive and prudent financial markets. The forum has set up programmes to develop financial markets in terms of their accessibility, instruments, financial market infrastructures, benchmark rates, and the regulatory framework.³ Six markets are covered: the money market, foreign exchange, bonds, equities, sharia financing and structured products.

As a central bank, Bank Indonesia focuses on financial market development with two main goals. First, to support the effectiveness of monetary policy transmission and, second, to support economic financing including infrastructure. Deep and developed financial markets are less susceptible to global market spillovers, so that monetary policy transmission is more effective. Liquid and developed financial markets including derivatives markets will eventually improve the stability of financial system. Along with the development of derivative instruments for hedging purposes, there have also been initiatives to deregulate FX transactions vis-à-vis the Indonesian rupiah, develop money market instruments and improve two-way coordination with market participants to support financial market development programmes. Improving the liquidity of financial markets will include providing market participants with alternative short- and long-term financing instruments, including commercial paper and negotiable certificate of deposits as short-term instruments; as well as stocks and bonds, as long-term instruments.

² ADB Briefs, no 85, 2017.

³ www.bi.go.id/en/moneter/pasar-keuangan/snpppk/Contents/default.aspx

Financial market development and monetary policy

Financial markets are central to monetary policy operations, where monetary transmission depends on financial market structure. The relationship between the deepening of financial markets and the effectiveness of monetary policy transmission is therefore a two-way street. Strengthening policy transmission through market-based instruments will encourage financial market deepening, much as the repo market encourages the development of the bond market. In the same way, the deepening of financial markets will increase the effectiveness of transmitting monetary policy.

After adopting its inflation targeting framework in 2007, Bank Indonesia has continued to enhance its monetary policy framework. **The first enhancement** in 2016 was to replace the BI rate with the BI seven-day reverse repo rate (BI7DRR). The new policy rate is expected to reflect the monetary policy stance as a tool for anchoring economic agents' inflation expectations. At the same time, the BI7DRR is used as a benchmark interest rate for transactions in financial markets and to influence general interest rates and banking interest rates. **The second enhancement** is the start of reserves requirement averaging in 2017, to deepen the money market and to reduce the need for banks to hold high precautionary reserves. This was also supported by regulation for the use of the local global master repurchase agreement (GMRA) and capacity-building with market participants.

Following this reform, there has been significant progress in the repo market. Daily repo transactions have increased quite substantially since 2016. Liquidity has also improved in the uncollateralised money market (interbank call money market). Within this framework, the interbank call money market rate must be maintained close to the policy rate and within the narrow range between the Deposit Facility (DF) and Lending Facility (LF) rates as the upper and lower boundaries marked by repo and reverse repo transactions. The short-term repo rate, which acts as the operational target, will affect the short and long interest rates, thus influencing financing conditions. In addition, Bank Indonesia also oversees the movement of the government bond yield by conducting monetary operations to buy and sell bonds in the secondary market.

To further support monetary policy transmissions, Bank Indonesia continues **its third enhancement** by introducing a reform of the benchmark rate. This initiative is designed to provide a more credible benchmark money market rate. In 2018, Bank Indonesia introduced the Indonesia Overnight Index Average (IndONIA) and enhanced the Jakarta Interbank Offered Rate (JIBOR) to create a credible short-term money market yield curve (or term structure). IndONIA is designed to serve as one of several money market benchmark rates, for use by market players as a reference in determining loan interest rates and financial instrument prices and performance.⁴ IndONIA is an index of the interest rate for unsecured overnight interbank rupiah lending transactions. It is calculated periodically and made public. IndONIA is based on the average interest rate for unsecured overnight rupiah lending, as reported by all banks to Bank Indonesia. As an interest rate based on market transactions, IndONIA took over from overnight JIBOR as the money market benchmark rate on 2 January 2019. In the future, once the liquidity of all tenors in the money market

⁴ www.bi.go.id/en/moneter/jibor/indonesia/Contents/Default.aspx.

improves, IndONIA-based overnight index swap is expected to replace JIBOR for all other tenors.

JIBOR is the average of unsecured interbank lending indicative interest rates, as offered for rupiah lending in Indonesia for a tenor longer than overnight. JIBOR is determined by Bank Indonesia based on the indicative offer rates quoted by contributor banks. In order to increase the reliability and credibility of JIBOR, it is hittable for certain tenors and within a certain time frame. In addition, contributor banks must quote rates by underpinning them to the greatest extent possible with transactions data in order to better reflect market rates. In addition, the process of JIBOR quotations must be well governed. This is in line with the global best practice specified in the International Organization of Securities Commissions (IOSCO) principles for financial benchmarks.

In addition to the benchmark rate reform, Bank Indonesia continues to develop the money market by introducing a negotiable certificate of deposit (NCD) and commercial paper (CP) to support liquidity management for financial institutions and corporations. The development programme for short-term paper is also part of the effort to support economic financing.

Financial market development and financial stability

The exchange rate is a highly relevant link between financial market development and financial stability in emerging markets. As in many other countries, exchange rate stability plays an important role in achieving monetary and financial stability. Indonesia adopted a free-floating foreign exchange (FX) regime in 1999, so that the rupiah exchange rate is determined by market supply and demand. Hence, to support the stability of the exchange rate, Bank Indonesia plays an important role by keeping the FX market properly functioning. Moreover, a flexible exchange rate is a key feature of the inflation targeting regime. FX intervention is conducted only to smooth adjustments and only if volatility is seen as potentially disrupting the economy.

To stabilise the currency, since 2001 Bank Indonesia has adopted a policy of non-internationalisation for the rupiah. There are restrictions on the offshore transfer of the rupiah, and ownership of the rupiah onshore by non-residents must be authorised and documented. As a result, the rupiah is not accessible outside Indonesia, except for NDF transactions using the rupiah as the benchmark but settling in foreign currency. Rupiah can only be accessed and settled domestically in Indonesia.

FX market development was improved through deregulation and simplification of FX regulations in 2014 and further reformed in 2016. The regulation stipulating the requirements on underlying economic activity for FX transactions against the rupiah above a certain threshold has been improved to support economic activity while at the same time maintaining prudential principles. The introduction of more efficient hedging instruments, such as call spread options in 2016, supports improved risk management by market participants.

Since the financial market development programmes conducted by Bank Indonesia in 2014, the market has started to provide more liquid and efficient instruments. In the Indonesian FX market, the degree of interaction between the onshore and offshore markets has been quite high in recent years, especially for the offshore FX NDFs, which significantly influence the movement of the onshore rupiah

FX spot market. This high correlation between the two markets has somewhat affected the monetary transmission mechanism. In order to reduce the price volatility of NDF offshore market, which causes price volatility in the domestic spot market, in November 2018, Bank Indonesia introduced a new FX hedging instrument, the domestic non deliverable forward (DNDF), to provide a hedging alternative for market players, especially investors who own rupiah assets.⁵ The instrument is similar to an NDF in the offshore market but is settled in domestic currency. Since the introduction of the DNDF, the price of offshore NDFs has largely moved in line with those of DNDFs and the spot market, which BI can access for stabilisation purposes.

Indonesia's financial market regulation continues to be principles-based, except where explicit monitoring and supervision by the financial authorities is required. In the FX market, for example, FX transactions above a certain threshold must still be based on underlying economic activity, such as trade and investment, and documented to that effect. Most FX derivative instruments in Indonesian market are "plain vanilla", and monitored closely by Bank Indonesia and the OJK. Only a limited range of structured derivative products is permitted.^{6, 7}

In developing its FX market, Bank Indonesia, together with the Central Bank of Malaysia and the Bank of Thailand, has put in place a local currency settlement (LCS) framework to support trade and investment between the three countries. Introduced in January 2018, the framework has been adopted quite widely, with more than 500 customers using this framework regularly. One of the framework's aims is to mitigate the risk of overreliance on hard currencies, especially the US dollar. Further improvements to the LCS framework are expected soon.

In the market for interest rate hedging instruments, Bank Indonesia introduced an overnight index swap (OIS)/interest rate swap (IRS) in 2018, following the introduction of the IndONIA benchmark. This instrument is expected to further support the ability of banks and corporations to manage their liquidity and market risk.⁸ This will help to strengthen the monetary transmission mechanism, support the formation of the yield curve and make price discovery more effective in the money and bond markets. Further development of the OIS market is expected to provide a benchmark yield curve based on real transactions rather than price quotations. Since the OIS is seen as a near-risk-free asset and based on other countries' experience, the OIS yield curve is potentially a good candidate for establishing a benchmark rate.

Additionally, in response to the G20's OTC derivative market reforms, Bank Indonesia has enhanced its financial market infrastructure by establishing regulations on market operators and central counterparties (CCPs). At the Pittsburgh Summit in September 2009, the G20 recommended five steps to reform the bilateral OTC derivative transactions, namely that all standardised OTC derivatives should be: (i) traded through exchange or electronic trading platforms (ETPs); (ii) cleared through a central counterparty (CCP); and (iii) reported through a trade repository. Non-

⁵ BI Regulation No.20/10/PBI/2018 regarding domestic non-deliverable forwards.

⁶ In 2008, some corporations and retail investors became insolvent due to the overuse or inappropriate use of structured products such as callable forwards, or knock-in/knock-out options with leverage.

⁷ BI Regulation No.18/18/PBI/2016 and No.18/19/PBI/2016 regarding FX transactions against rupiah between banks and domestic party and foreign party.

⁸ BI Regulation No. 20/13/PBI/2018 regarding interest rate hedging instruments.

cleared OTC derivatives should be (iv) subject to higher capital requirements; and (v) subject to margin requirements. The progress report shows that G20 countries are following these recommendations and continue to advance the implementation of the financial market reforms.⁹

In Indonesia, market operators are regulated to strengthen governance, interconnectivity and credibility in providing facilities for rupiah-related transactions in the domestic market. This regulation supports the implementation of requirements for OTC derivative transactions that must be traded through exchanges or ETPs. In addition, Bank Indonesia aims to develop a CCP for OTC derivative interest rates and exchange rates within the next two years.¹⁰ The CCP is designed to support financial market risk management and to reduce interconnectedness between OTC derivative market participants, as well as to increase transparency and market efficiency through netting. Ultimately, the CCP will enhance the stability of the financial system.

Policy response in strengthening financial stability

Managing financial stability risks is a key part of a central bank's role. The task has become more challenging as financial globalisation increases both the interconnectedness of global market players and the volatility of capital flows among emerging market economies. In this light, Bank Indonesia is continuously reviewing and improving its policies with the aim of responding effectively to sudden shocks from capital reversals on the one hand but still promoting market mechanisms on the other. Thus, Bank Indonesia has implemented an array of different measures spanning monetary and macroprudential policy with the aim of mitigating financial stability risks. In recent years, these measures have included:

1. Regulating the exposure of non-bank corporations when issuing offshore debt, with three main prudential provisions: (1) for addressing currency risk: a hedging ratio (25% for up to three months, and three to six months, net FX liabilities must be fully hedged); (2) for addressing liquidity risk: a liquidity ratio (70% of FX liabilities that are due in three months must be in cash); and (3) for addressing credit risk: the minimum credit rating when issuing FX-denominated bonds must be equivalent to BB.
2. Managing currency risk exposures by developing a local currency settlement (LCS) framework to support trade and investment in Indonesia, Malaysia and Thailand. The framework was introduced in January 2018, and has been widely adopted. A key aim is to mitigate the risk of overreliance on hard currencies, especially the US dollar. This offers importers and exporters an alternative way of managing their currency risks. Further improvements to the LCS framework are expected in the near future.
3. Amending regulation to support the development of innovative FX hedging instruments to address currency and interest rate risks, such as local currency-settled non-deliverable forwards (DNDFs), call-spread options (CSOs) and overnight index swap-interest rate swaps (OIS-IRS).

⁹ FSB, *OTC Derivatives Market Reforms: 2019 Progress Report on Implementation*, 2019.

¹⁰ OTC derivative transactions in Indonesia are mostly related to the exchange rate.

4. Amending regulation on macroprudential intermediation ratios (an extended version of the loan-to-deposit ratio) with provision to expand the scope of loan and deposit items to include securities such as corporate bonds, medium-term notes and green bonds. The policy aims to broaden the investor base as well as to promote market liquidity.
5. Amending regulation on the macroprudential liquidity buffer (MLB) as a countercyclical tool to anticipate liquidity shock in banks. The main provision is that the bank is obliged to maintain 4% of third-party funding in the form of government bonds, as a buffer additional to the traditional reserve requirement that must be in form of cash (now 5.5% of third-party funding). In 2018, a new measure expanded from 50% to 100% the eligibility of the government bonds pledged as MLB to be used as collateral in repo transactions with Bank Indonesia. The policy is designed to broaden the investor base as well as to promote market liquidity.
6. Ensuring banks comply with macroprudential capital standards such as the countercyclical capital buffer (CCB).

Indonesia's financial market deepening since 2014 has shown encouraging results but a number of aspects could give rise to concern: (i) the high participation rate of foreign investors in the government bond and equity markets. However, this is not the case in other market segments such as corporate bonds and structured products; (ii) a narrow investor base as a result of the low accumulation of pension and insurance assets, and fund management practices which are still geared towards short-term and low-risk instruments; (iii) the significant role of the central bank as a liquidity provider for a number of instruments due to the undeveloped market; and (iv) a lack of adequate feedback from the domestic market for policy formulation, for instance, regarding inflation expectations, because of the limited range of instruments, low liquidity and inefficient prices.

In overcoming these various challenges, Bank Indonesia will pursue a number of strategies: (i) continue coordination with the OJK and the Ministry of Finance, among others, through the Coordination Forum on Financial Market Development, with the aim of harmonising the financial market deepening measures taken by each authority, in particular on cross-cutting issues such as long term saving, taxation and capital market development; (ii) strengthening the legal framework for facilitating financial market transactions, by addressing, among others, non-netting jurisdiction issue and margining rules as part of incentive and dis-incentive regulations regarding the OTC derivative market reform; (iii) continue initiatives to encourage the development of innovative financial instruments, including the relaxation of some regulations; (iv) explore the appropriate incentive-disincentive model to encourage more participation, in particular from the private sector, in financial market transactions; and (v) develop financial market infrastructure (FMI) such as a central clearing counterparty (CCP), a multilateral and exchange trading platform (ETP), a trade repository and credible financial benchmarks – eg the further development of IndONIA, JIBOR, and the Jakarta Interbank Spot Rate (JISDOR).

Developments in Israel's foreign exchange market and the implications for the conduct of monetary policy and financial stability

By Andrew Abir¹

Abstract

This paper looks at how developments in the microstructure of the foreign exchange market can impact monetary policy. It looks at the example of Israel as a small open economy where the exchange rate has an important influence on inflation and the real economy. The paper identifies changes in the behaviour of the main agents in the foreign exchange market in recent years. It also illustrates how these developments can affect the interaction between external factors such as price action in international equity markets and flows in the foreign exchange market.

JEL classification codes: E58, F31, F32.

Keywords: FX market, capital flows, monetary policy.

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Introduction

The dollar-shekel exchange rate is probably the most visible and best known price of any financial asset in Israel, reflecting both its historical importance as a nominal anchor and also its influence today on inflation and the real economy. If you stopped a random person on the street in Israel, the dollar-shekel exchange rate is probably the only financial variable they will be able to recite. In this short note, we will look at how developments in the structure of the foreign exchange market have affected the evolution of the exchange rate and its implications for monetary policy and financial stability.

The foreign exchange market is by far the largest market in Israel in terms of turnover, dwarfing the fixed income and equity markets and has been free of controls for over two decades. Daily turnover in the onshore shekel foreign exchange market is around US\$ 5.5 billion compared with US\$ 0.3 billion in the equity market and US\$ 0.9 billion in the fixed income market. In addition, the turnover in the offshore shekel foreign market is estimated to be at least the size of the onshore market. The size of the market in general and of capital flows in particular make it challenging for a central bank to predict how its monetary policy will be interpreted by the market. The flows that go through the market far exceed those that emanate from just the trade account. This has implications for how monetary policy is transmitted through the exchange rate into inflation and the real economy.

The relevance of the foreign exchange market for monetary policy

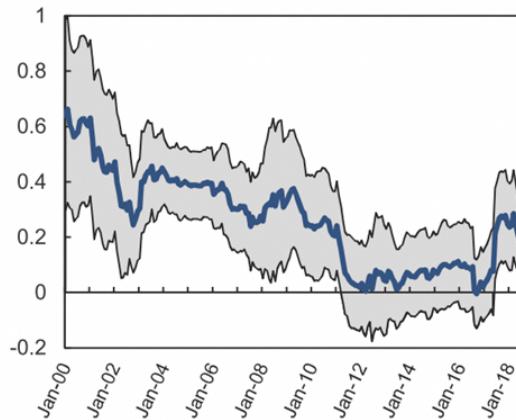
As in many small open economies, the foreign exchange market in Israel plays an important role in the transmission of monetary policy. Its relevance for monetary policy derives from the relatively high pass-through of the exchange rate into inflation and from the exchange rate's impact on the tradeable sector of the real economy. The pass-through from the exchange rate into consumer prices has diminished over the past two decades but remains important. Graph 1 below shows the estimate² for pass-through over a 48-month rolling window, falling from around 60% in 2000 to around 20% today.

² "Exchange rate pass-through to prices", *Selected Research and Policy Analysis Notes*, Bank of Israel Research Department, February 2019.

Exchange rate pass-through, 48-month rolling window 2000–18

Graph 1

Figure 1.1 - Inflation

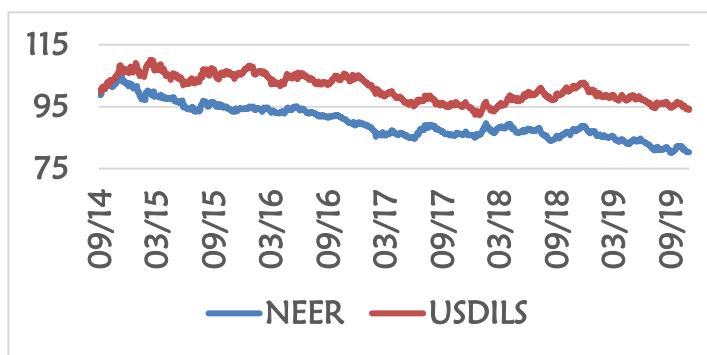


Source: Bank of Israel, "Exchange rate pass-through to prices", Selected Research and Policy Analysis Notes, February 2019.

The very high pass-through up to the early 2000s resulted from the widespread practice of indexing prices to the dollar, particularly in the housing market, a hangover from the hyperinflation period in the first half of the 1980s. With the decline in inflation to low single digits and a period of considerable appreciation in the shekel exchange rate in the early 2000s, this practice of indexation disappeared, but there remains a marginally significant pass-through of around 10–20%. The appreciation of the trade-weighted shekel exchange rate over the past few years (Graph 2) has been one of the factors behind the consistent undershooting of the 1–3% inflation target.

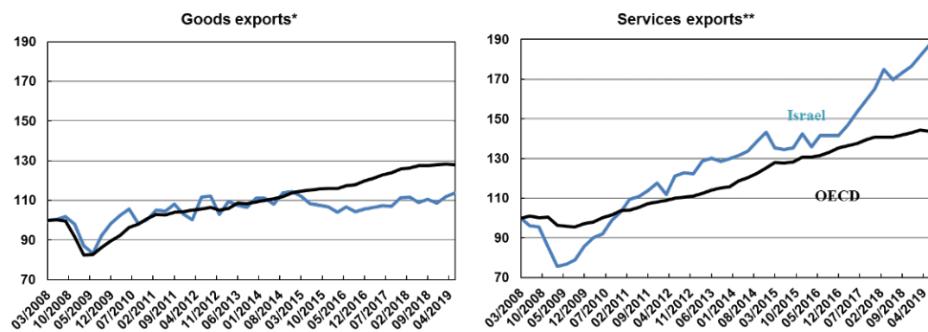
Shekel nominal effective exchange rate (NEER) and \$/ILS (2014–19)

Graph 2



Source: Bloomberg, Bank of Israel.

The currency's appreciation has also been a factor behind the somewhat sluggish performance (Graph 3) of goods, which have been more sensitive to the exchange rate because of lower margins and less pricing power. Service exports have continued to grow strongly, particularly in the high-tech sector, which has been less sensitive to exchange rate pressure.



Source: Bureau of Statistics and OECD.

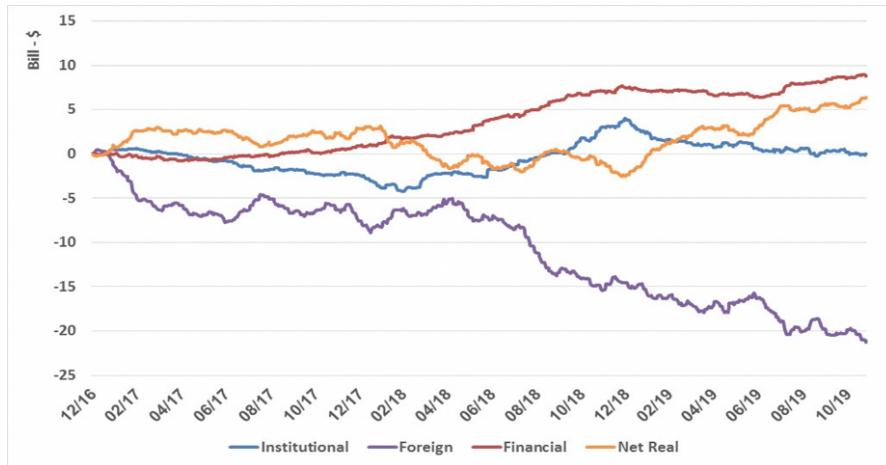
Structure of the foreign exchange market

The major participants in the foreign exchange market are corporate treasurers (importers and exporters), the institutional savings sector (pension funds, mutual funds and insurance) and foreign institutions. Each sector has different motives for transactions and has a differing sensitivity to changes in the exchange rate or in the interest rate. Therefore, information on the microstructure of the market and on real-time flows can be a helpful input into monetary policy deliberations. Accordingly, in June 2016, the Bank of Israel enacted a reporting requirement on financial transactions in the shekel foreign exchange and interest rate markets. The information, provided daily by market participants, enhance the Bank of Israel's ability to monitor and analyse the behaviour of different market segments and even that of individual players. The deeper understanding of market flows is a valuable ingredient for improving monetary policy and macroprudential tools.

The order requires domestic and foreign market participants with a daily turnover of at least US\$ 15 million to report on any transaction in the shekel spot, forward and options markets. In addition, all shekel interest rate derivatives and inflation derivatives are included in this order. The order is helpful for identifying market participants who are very involved in certain instruments. If necessary, the Bank of Israel can approach the market participant in order to understand the motives behind the transactions. Graph 4 outlines recent flows in the foreign exchange market from the data provided under the reporting requirement.

Cumulative purchases of foreign exchange by sector

Graph 4



Source: Bank of Israel.

One can see that, after a period of relative stability, foreign institutions returned to being significant net purchasers of shekels from mid-2018 onwards. The detailed reporting allows us to better understand the nature of foreign demand for shekels. Thus, we are able to assess that short-term players, sometimes referred to as "speculators", who expect the shekel to further appreciate in the short run, were dominant since mid-2018. At the same time, domestic institutional investors and local financial agents were sellers of shekels in the second half of 2018.

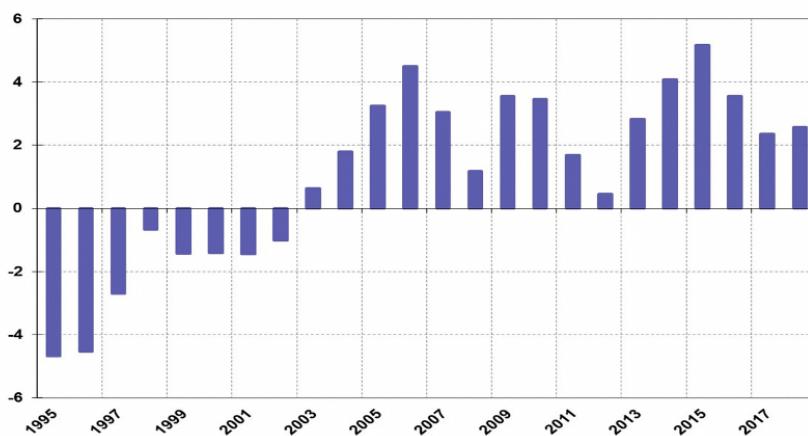
Certain sectors are more sensitive than others to the exchange rate and monetary policy. For instance, flows related to FDI tend to be less sensitive to exchange rates and interest rates. Much of these flows are directed to the high-tech sector, where the margins or potential capital gains far outweigh concerns about exchange rate volatility or interest rate differentials. The funding for high-tech startups is predominantly from overseas and these companies then steadily sell some of the foreign exchange funding into shekels to pay for salaries and other local costs.

Implications of recent developments in the foreign exchange market

Two important developments over the last two decades have affected flows in the foreign exchange market. The first was the move from a structural deficit in the current account to a structural surplus (Graph 5).

Current account as a percentage of GDP

Graph 5

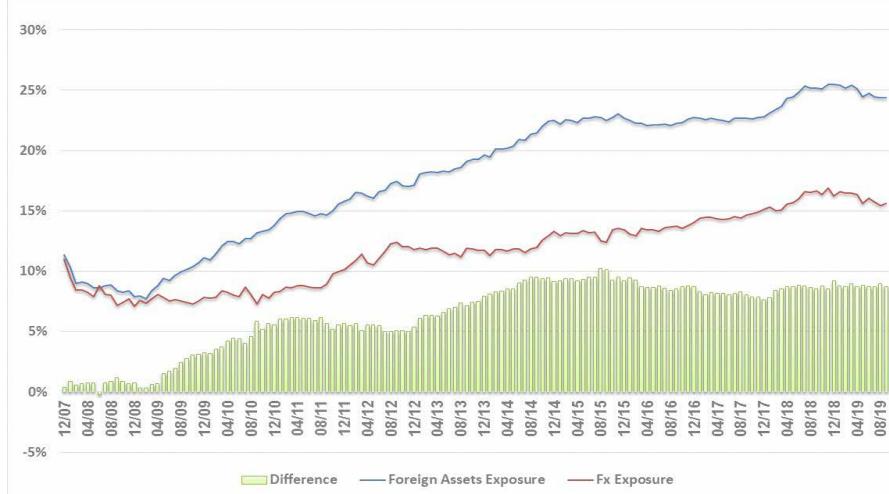


Source: Balance of Payments, Central Bureau of Statistics.

This move was accentuated in the present decade by the discovery of natural gas, which reduced Israel's dependence on imported energy. The second has been the liberalisation of capital flows, which has allowed domestic savers to access foreign capital markets. The institutional savings sector has been progressively increasing the percentage of its portfolios invested in foreign assets. As the domestic capital market is too small to absorb the flows from domestic savings, it has looked to allocate a growing part of its portfolio abroad. This development can be seen in Graph 6. Foreign assets now make up close to 25% of the overall portfolio, which, although low by international comparison, is still much higher than it was a decade or so ago. However, in terms of foreign currency exposure, the figure is lower at around 15%, as part of the allocation to foreign assets is hedged back into shekels.

Institutional investors' foreign assets as percentage of total assets

Graph 6



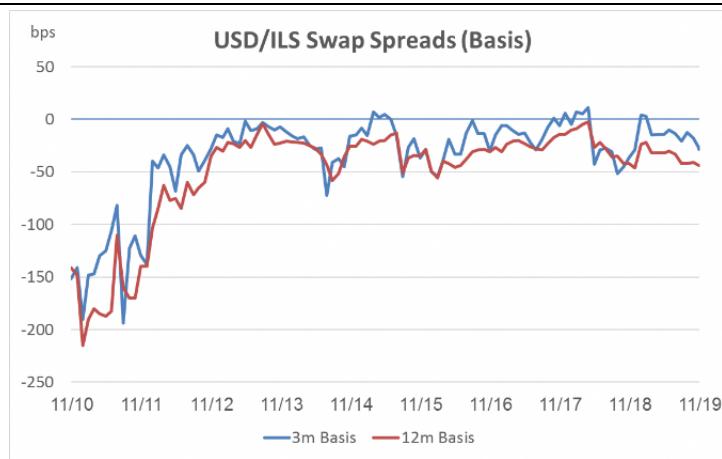
Source: Bank of Israel.

A number of factors influence the activity of the institutional investors in the foreign exchange market: the rate of accumulation of savings, their desired level of foreign assets and foreign exchange exposure, and the mark-to-market of the different classes in their portfolios. Since much of their foreign assets are allocated to the equity markets, large changes in the P&L on their overseas equity portfolio can lead to hedging changes in the foreign exchange market. An interesting example of this was the 20% correction in the S&P equity market at the end of 2018, which resulted in foreign exchange buying by institutional investors who had to provide margin to cover their losses in these markets and maintain their target equity exposure.

The institutional investor sector tends also to be more sensitive to interest rate differentials as this differential affects the hedging costs on their foreign assets. The interest rate differential is derived not only from the relative yield curves between Israel and the United States but also the basis in the cross-currency swap market, which has accentuated the interest rate differential in recent years. In general, a negative basis is the by-product of a scarcity of dollars in the foreign exchange swap market. Hedging of foreign assets by institutional investors is consequently made more expensive and can lead to a large cost for institutions that hedge part of their foreign asset holdings. This cost comes on top of the interest rate differential, as in recent years interest rates in Israel have been lower than in the United States. This also applies to foreign entities who are players in the local market but are not looking for real assets and are just making a play on the possible appreciation of the exchange rate or are planning to benefit from the positive carry (in periods where this is relevant). These foreign entities enter the market through foreign exchange trades and then roll over their exposure through swaps. Consequently, at times, the cross-currency basis can be an important cost for both these sectors. Graph 7 shows the development of the basis over time and highlights periods when the negative basis spiked.

Cross-currency basis in the shekel/dollar market

Graph 7



Source: Bloomberg.

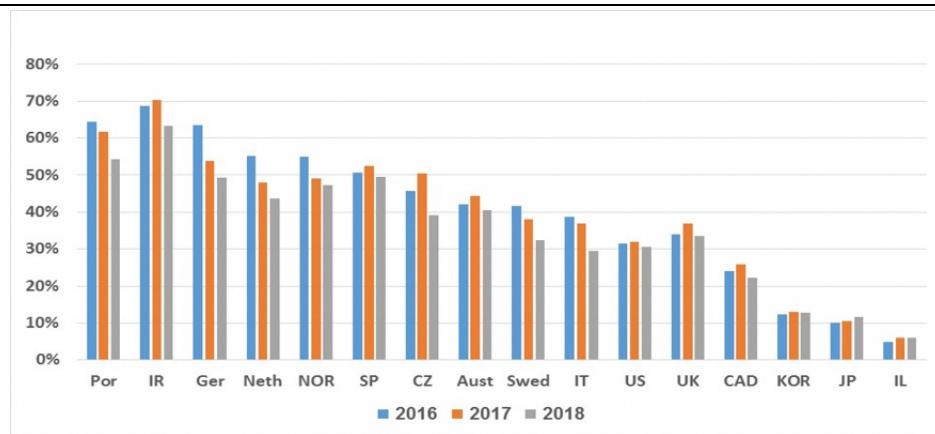
The end-2010 spike in the cross-currency basis was accompanied by a rapid increase in activity in the foreign exchange swap market, which was triggered by speculative activity expecting further appreciation in the shekel as these agents rolled over their positions in the swaps markets. The central bank's intervention in the

foreign exchange market to reduce the pace of the shekel's appreciation may also have exacerbated the movement in the basis as it absorbed dollars from the local market. The ballooning volume of swap transactions in the Israeli banking system was seen as a potential systemic risk. To counter this, in January 2011 the Bank introduced a macroprudential measure imposing a reserve requirement on banks for foreign currency derivative transactions vis-à-vis non-residents. A 10% reserve requirement was applied to shekel/foreign currency swap transactions (FX swaps) and foreign currency forwards. The liquidity requirement made these trades less profitable by effectively reducing the yield on the swap transaction. At that time, the local interest rate was higher than the international rates, and the shekel was targeted as a carry currency. Thus, the reserve requirement also reduced the yield of the long shekel positions that were being rolled over in the swap market. The Bank re-assessed annually the necessity of the liquidity requirement and decided in October 2014 to cancel it as it had fulfilled its purpose. At that time, the activity in foreign exchange swaps had calmed down and the effectiveness of the liquidity requirement was in any case severely curtailed, as interest rates had fallen to 0.25%.

What is interesting is that the increase in the turnover of foreign institutions in the foreign exchange market has not been matched by an increase in their involvement in domestic capital markets. On an international comparison, the holdings of foreigners in the local capital markets are very low. (Graph 8). It will be interesting to see if the future inclusion of Israel in the WGBI index will change this.

Foreign participation in government bond markets

Graph 8



Sources: Bank of Israel, IMF.

While foreign involvement in capital markets remains low, foreign investors have reached dominant positions in other areas. One recent example has been the growth in the turnover from model-driven accounts. These are mostly offshore funds that trade in the shekel foreign exchange market based on technical models, predominantly momentum-driven. These may very well accentuate trends initiated by real flows. These flows are also probably less sensitive to interest rate differentials as they are mainly influenced by price action. Such flows, which are negatively perceived by the public as "speculative", might have undesirable effects on inflation and the real economy in the short run, but they are a typical feature of the floating exchange rate regime. As such, and as long as the floating exchange rate regime is deemed beneficial, one should be very careful when considering whether to curb these flows.

Conclusion

In small open economies, the microstructure of the foreign exchange market needs to be closely studied to understand how it affects the transmission of monetary policy. Obtaining data at the individual economic agent level is a key requirement for this. However, the raw data are insufficient. One needs to understand the motives of the different agents involved in the market and so good old-fashioned market intelligence still has a role to play.

The degree of sensitivity to the central bank's interest rate policy can be affected by changes in the microstructure of the foreign exchange market. Different agents are variously influenced and this can change over time. Similarly, changes in the size, liquidity and structure of the market are important for the implementation of other monetary tools of the central bank, such as direct intervention in the foreign exchange market. They will also affect questions such as the adequacy of foreign exchange reserves. As authorities liberalise their foreign exchange and capital markets, they need to be aware that they are entering into a new era of complexity that will make the life of the monetary authority more challenging.

Financial market development, monetary policy and financial stability in Korea

Bank of Korea

Abstract

Over the last 20 years, Korea's financial markets have developed very considerably, driven mainly by domestic demand and trade volumes. The government's efforts to improve financial infrastructure and larger inflows of foreign portfolio investment have also contributed to financial development in Korea.

In parallel, the Bank of Korea has enhanced the efficiency of monetary policy by changing its monetary policy framework and operations. As a result, interest rate linkages between different markets have increased, reinforcing the transmission of the policy rate to market rates. Long-term rates are greatly affected by global factors as the influence of foreign investors on bond markets has expanded since the global financial crisis. Therefore, the transmission of the Bank of Korea's policy rate to long-term rates has been somewhat weakened. The volatility of capital flows, however, has been limited, as financial market resilience has improved.

The depth of the financial market has increased with growing bond issuance and transaction volumes. But growing foreign investment in the domestic financial market has strengthened linkages between the global and domestic financial markets, which could help external shocks to spill over onto the domestic economy. Accordingly, Korea has introduced macroprudential policies to counter FX-related systemic risk since the global financial crisis. These policy measures have reduced capital flow volatility and the share of short-term external debt, helping to manage systemic risks.

Regarding future financial market development, fintech or big tech firms are providing an increasingly broad range of financial services in Korea. These new types of financial service could necessitate significant changes in monetary policy. Financial innovation could increase operational risks and pose a threat to information security, and financial stability. In order to mitigate these risks without undermining financial innovation, we need to strengthen the monitoring of potential risks while contributing to the establishment of infrastructure for the technologies employed by fintech and big techs.

JEL classification: E44, E52, F38, G18.

Keywords: financial market, monetary policy, financial stability, international financial policy.

Changes in Korea's financial markets over the last two decades

Main drivers of financial market development and the impact of the global financial crisis

Over the last 20 years, Korea has witnessed a remarkable development of its direct financial markets, including the short-term money markets, capital markets, foreign exchange markets and derivatives markets.

The major growth engines behind this development include, first, demand from corporates and households for the procurement and management of funds, which has increased in line with economic development, and thus the demand for various financial instruments has also risen. The growth in exports and imports has also led to greater demand for foreign exchange transactions.

Second, the government's policy efforts – easing of financial regulations, improvement of financial infrastructure and the promotion of advanced financial trading techniques – have helped the sound development of markets, improving their self-adjustment function. In particular, the Treasury bond market has become far more efficient thanks to the primary dealer system and the nurturing of the Korean Treasury bond futures market. The inter-institutional RP (repo) market has also developed substantially, owing to an easing of regulations.

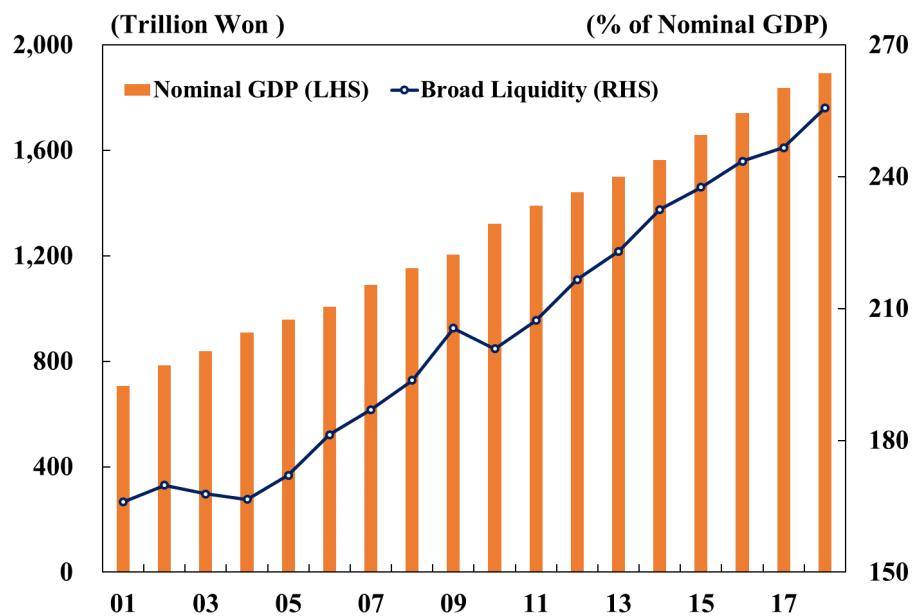
Third, larger inflows of foreign portfolio investment in line with greater market opening, as well as a rise in domestic and overseas financial investments by the National Pension Service (NPS) and insurance firms, have helped to expand the demand base for domestic bond investments and foreign exchange swaps.

Meanwhile, the 1997 Asian financial crisis and the 2007–09 global financial crisis had a significant influence on the development of the domestic financial markets. The financial reforms in the wake of the Asian financial crisis improved the financial soundness and international credit standing of institutions, while market-friendly structural reforms laid the groundwork for financial market development. In conjunction with financial reforms in the capital markets, including improvements to the ownership structures and governance of institutions, and tighter regulation of management, the authorities have helped to strengthen the self-adjustment function of prices such as interest rates and exchange rates. In accord with international reform efforts since the global financial crisis, policymakers have tightened measures to ensure the stable development of the financial markets by introducing foreign exchange-related macroprudential policies¹ in order to mitigate the volatility of capital flows.

¹ Caps on FX derivatives positions (October 2010), the Macroprudential Stability Levy (August 2011) etc.

Nominal GDP and broad liquidity¹

Graph 1

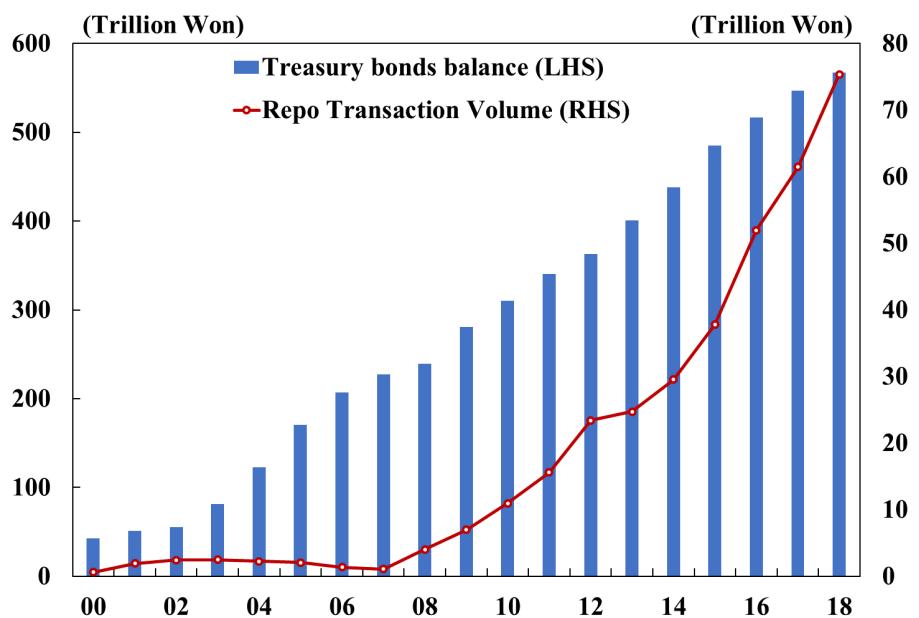


¹ Liquidity aggregates of financial institutions (Lf) +Government bonds+municipal bonds+corporate bonds +corporate bills etc.

Source: Bank of Korea.

Outstanding balances of Treasury bonds¹ and inter-institutional RP transaction volumes²

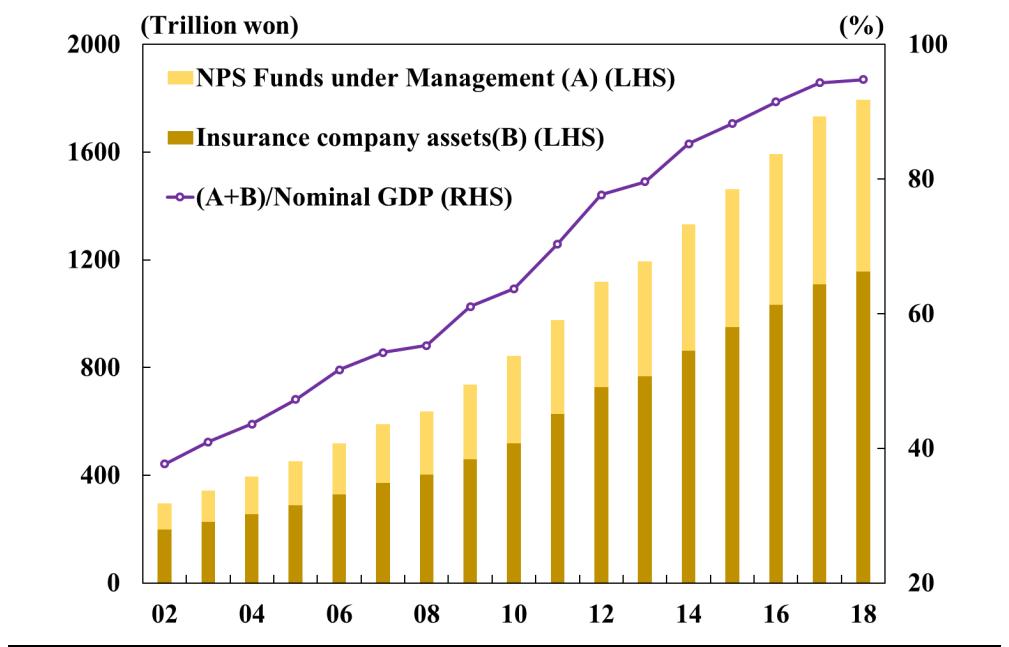
Graph 2



¹ Outstanding balances at period-ends.

² Daily average outstanding balances during the periods.

Sources: Bank of Korea, Korea Securities Depository.



Source: Statistics Korea.

Impact of financial market development on monetary policy

Monetary policy implementation

The Bank of Korea has enhanced the efficiency of monetary policy by changing its monetary policy framework and operations, in accordance with Korea's financial market development. With the development of Korea's direct financial markets, the transmission effect of interest rates has increased. In consideration of this, the Bank of Korea adopted inflation targeting as its framework for monetary policy in 1998 and refocused its monetary policy operations from the money supply to the interest rate, taking the "call rate target" as the policy rate.

However, the functioning of the call market weakened as the call rate was unable to properly reflect the supply and demand for funds. Accordingly, the Bank of Korea changed its policy rate to the "Bank of Korea Base Rate"² in 2008 to improve the functioning of the call market. In addition, it also uses policy instruments such as open market operations to help keep the call rate near the Base Rate.

² The base rate used for transactions between the Bank of Korea and financial institutions (seven-day RP transaction interest rate).

Monetary policy transmission

As the financial markets – including the short-term money market, the bond and stock markets and the derivatives market – have developed, the interest rate linkages between them have strengthened. This has reinforced the transmission of the policy rate to market rates. However, as the influence of foreign investors on the bond markets has expanded since the global financial crisis, long-term rates are now strongly affected by global factors. Therefore, the transmission effects of the policy rate on long-term rates have been somewhat weakened.

Most household and corporate loans are at floating rather than fixed rates, and as floating rates are linked to short-term rates, it seems that the transmission of monetary policy to lending rates has not changed greatly. In addition, the expectations channel of monetary policy transmission is seen to have strengthened, as market participants' expectations concerning monetary policy are being priced pre-emptively into derivatives products.

Monetary policy autonomy and foreign monetary policy spillovers

The Bank of Korea has adopted an interest rate-oriented monetary policy framework under inflation targeting. Under this framework, exchange rates, which are largely affected by global factors such as major countries' monetary policies, and capital flows, are not a major consideration for monetary policy decision-making. However, the Bank of Korea does take into account the effects of capital flows and exchange rate fluctuations on the domestic economy and financial sector as it conducts monetary policy. Price variables including bond yields are significantly affected by major economy monetary policies, but the volatility of capital flows has been limited as financial market resilience has strengthened, thanks to the increased depth of the financial markets and the higher international credit standing of financial institutions.

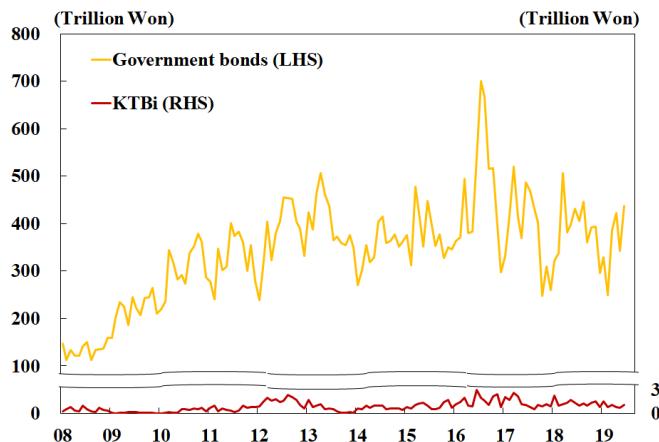
Measurement and use of market price-based inflation expectations

Inflation-linked Korea Treasury Bonds (KTBi) have been issued since 2007, but their issuance volume is not large and yields are volatile. Therefore, the KTBis do not provide a useful indication of a break-even inflation rate.³ As only 10-year KTBis are issued, it is not feasible to measure inflation expectations for other periods.

³ 10-year BEI = Government bond yields (10-year) – KTBi yields (10-year).

Trading volumes of government bonds and KTBI

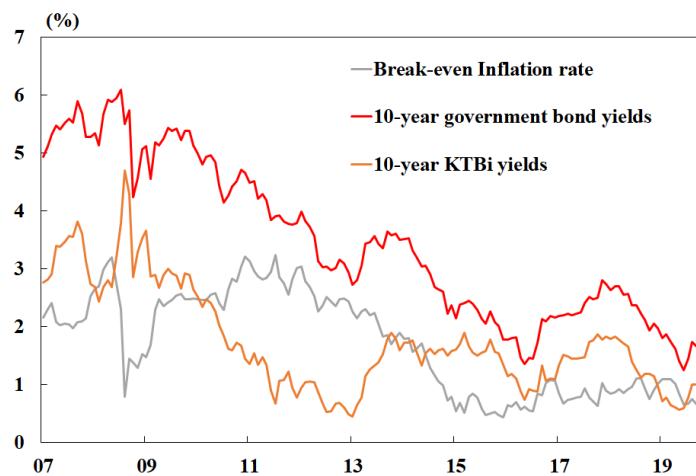
Graph 4



Sources: Korea Financial Investment Association; KOSCOM.

Government bonds, KTBI yields and BEI

Graph 5



Source: KOSCOM.

Monetary policy communication

At Korea's level of financial market development, market participants' expectations of monetary policy are reflected rapidly in prices. Therefore, smooth and efficient communication with the market has become important. Accordingly, the Bank of Korea uses various communication tools to explain its monetary policy decisions and their background to economic agents at home and abroad, in an effort to enhance the transparency and accountability of monetary policy. Immediately after each monetary policy-setting meeting, the Bank of Korea explains the background of its policy decision through a press briefing and reveals the names of any Monetary Policy Board members with dissenting opinions. The minutes of the policy-setting meeting are released about two weeks later and the English version is published about four weeks later. In addition, the Governor attends the National Assembly two to three

times a year to explain the state of monetary policy operations. The Bank of Korea also seeks to strengthen communication with experts from various sectors and market participants, by holding regular meetings with domestic and foreign economic experts and the heads of financial institutions.

Effect of financial market development on financial stability

Financial system stability

The diversification of financial products along with financial market development increases bank efficiency in terms of raising and managing funds, and strengthens risk management. In particular, as markets for high-quality liquid products, such as government bonds and monetary stabilisation bonds, have expanded, it has become easier for banks to manage their liquidity risks, while the development of the asset-backed securities market has facilitated credit risk management.

In the meantime, counterparty risks and mis-selling of financial products have increased due to the complexity of derivative and securitisation structures. Also, non-bank financial institutions have increased their presence, based on market-based financial products such as RPs, financial debentures and asset-backed commercial paper. These have all contributed to expanding the shadow banking sector, which in Korea is estimated to be worth about USD \$1.9 trillion as of 2017 (115% of GDP), relatively low when compared with the United States (\$30.8 trillion, 159%) or to the United Kingdom (\$10.2 trillion, 353%).

External position and FX risk

With the development of financial markets and the continuing current account surplus, it has become increasingly straightforward for businesses and financial institutions to raise funds in Korea. So external borrowing has not risen much while investments in external bonds have increased, which has led to an improved external position. With inflows of foreign investor funds and the current account surplus, funding conditions in the swap market have continued to be favourable. This has contributed to better risk management at pension funds and insurance companies, both of which hedge their FX risks on external investments in the swap market.

Net external assets¹ position

Table 1

	(USD 100 millions)			
	Non-bank financial institutions	Banks	Public sector	Non-financial corporations etc.
End of June 2008(A)	2	-1,302	2,163	-381
End of June 2019(B)	1,505	47	3,158	2
B-A	+1,503	+1,348	+995	+382

¹ External assets – external liabilities.

Spillover effects of external shocks and resilience

The depth of the financial market has increased with growing bond issuance and greater transaction volumes, and with an expansion of the market participant base. This has strengthened the market's external shock absorption capacities and resilience. Meanwhile, the development of relevant derivatives markets, such as Treasury futures⁴ and interest rate swaps,⁵ has worked positively in terms of risk management. On the other hand, growing foreign investment in the domestic financial markets has increased the linkages between global and domestic financial markets, which could help to transmit external shocks into the domestic economy. However, such spillovers have been limited so far, as most foreign bond investment funds are long-term investors from public institutions (73%, as of the end of 2018).

Shares of domestic bond¹ holdings by major investors

Table 2

		Institutional investors				(%)
	Individuals, etc.	Banks	Insurance companies	Securities companies	Pension funds	
End of 2002	11.2	30.6	10.9	1.3	10.2	0.1
End of 2018	11.5	20.8	22.7	6.1	14.6	6.0

¹ Government bond, financial bond, monetary stabilisation bond, corporate bond etc

FX market volatility and the role of offshore markets

With the growing size of spot exchanges and derivative products, FX liquidity has become ample, and the auto-adjustment function of prices has been enhanced. This has resulted in enhanced shock absorption capacities, increasing the resilience of domestic FX markets. In the meantime, offshore won/dollar non-deliverable forward markets have catalysed the won's role in global transactions, complementing the spot market, and influencing the domestic FX spot market. For example, won/dollar NDF transactions between non-residents and domestic banks directly affect spot exchange rates, as domestic banks hedge NDF positions using spot exchange products.

Trading size volumes of in Korea's FX markets¹

Table 3

	2007	2010	2013	2016	(USD 100 millions, %)
Total FX products	352	438	475	478	
Spot	174	185	198	202	
Derivatives	178	253	277	276	
Share of won transactions in the global market	1.2	1.5	1.2	1.7	

¹ Daily average, based on April in each year.

⁴ Trading volume for three-year treasury futures (daily average, contracts): 52,000 in 2002 → 94,000 in 2018.

⁵ Trading volume for interest rate swaps (trillion won): 169 in 2002 → 3,064 in 2018.

Policies for mitigating financial stability risks

Since the global financial crisis, Korea has introduced macroprudential policies, such as ceilings on FX derivative positions,⁶ and a macroprudential stability levy,⁷ to mitigate FX-related systemic risks. These FX-related macroprudential policy measures are seen to have had a positive effect on reducing the share of short-term external debt, easing capital flow volatility and managing systemic risks. In addition, Korea has strengthened its macroprudential regulations, such as loan-to-value and debt-to-income ratios, in response to the growing risks of financial imbalances, such as a sharp rise in household debt ratios in the current low interest rate environment.

Looking ahead

Development of fintech and big tech

If fintech or big tech firms provide a broader range of financial services and gain greater access to the central bank's settlement infrastructure, this could affect monetary policy transmission channels. Enhancing the efficiency of financial markets through financial innovation could have a positive impact on monetary policy transmission, but financial innovation could also limit the effectiveness of traditional monetary policy transmission channels or give rise to new ones. Expanded financial services from fintech or big tech firms could lead to a surge in their holdings of customer deposits.⁸ If they manage these deposits on their own in money markets, this would possibly affect those markets. If fintech, big tech firms and stablecoins (for example, Libra) were to be combined to create new types of financial service, this could bring about considerable change in the current implementation and transmission of monetary policy based on the legal tender system. For instance, monetary policy might not be transmissible to economic activities that involve stablecoins, which are not legal tender. Increasing investment in stablecoins could also affect global capital flows.

Financial innovation could also increase cyber and operational risks, information security risks, and financial instability risks. If innovative financial sectors were to become more closely linked with traditional financial institutions, and the regulation and supervision of these sectors were not as systematic as that of traditional financial institutions, the risks arising from these sectors could spread across the financial industry as a whole. For instance, to cope with a deterioration in the asset quality of P2P institutions, the authorities are working to set a minimum level of capital (KRW 500 million) for such institutions, and also to strengthen investor protection measures.

In order to mitigate the related risks without undermining financial innovation, we need to strengthen the monitoring of potential risks while contributing to the establishment of infrastructure related to technologies used by fintech and big tech

⁶ Domestic Banks/Foreign Bank Branches: 50%/250% (2010) → 30%/150% (2013) → 40%/200% (2016).

⁷ Impose levies of 0.02% to 0.2%, depending on maturity, on non-deposit foreign currency liabilities of banks (2011) → Impose levies of 0.06% to 0.1%, depending on maturity, on securities companies, credit financed companies, and insurance companies as well as banks (2015).

⁸ Korea's fintech firms currently deposit these funds at financial institutions.

firms. In doing so, appropriate regulation needs to be applied to sectors that could undermine financial system stability so as to ensure the risks are duly managed. In addition, in order to support financial innovation, experimentation with new technologies should be strengthened through virtual spaces, such as regulatory sandboxes. In addition, policymakers could support the development of regulatory technology (RegTech) of financial companies, so that they can strengthen their compliance and risk management.

Tasks for future financial market development

As Korea's financial markets have developed significantly in terms of size and institutional framework, market efficiency has improved, and resilience has also strengthened. However, as financial markets have become substantially dependent on global factors, monetary policy transmission effects have weakened somewhat. If the volatility of capital flows were to increase, this could limit room for manoeuvre in terms of monetary policy. In this respect, it is necessary to continuously strengthen the resilience of capital markets against FX and other external shocks. To this end, it is very important to increase market capacity by developing financial products and expanding market demand, and also to continuously improve financial infrastructure, for example, by strengthening credit and transaction information disclosures. Furthermore, it is also necessary to strengthen regulations on shadow banking and OTC derivatives in line with recommendations from international organisations.

How has financial market development affected monetary policy and financial stability in EMEs: the Malaysian experience

Bank Negara Malaysia

Abstract

This paper examines the drivers behind financial market development and the implications for monetary policy and financial stability, from the Malaysian experience. The paper reviews the financial market landscape over the past two major crises and how policy responses have shaped financial market development and its impact on monetary policy transmission and financial stability.

JEL classification: E44, E52, E58, E61, F31, G12, G23.

Keywords: market development, financial market, spillovers, financial stability, offshore derivatives, surveillance.

Financial markets in EMEs – the last two decades

Main drivers of financial market development (FMD)

Financial market development in Malaysia after the Asian financial crisis (AFC) was driven mainly by the need to develop an efficient local currency bond market, thus making the economy less dependent on the banking system for credit intermediation. In 1996, pre-AFC, bank loans accounted for 81% of financing to Malaysian corporates, while corporate bonds made up the remainder, resulting in a significant concentration of risks in the banking sector.

Providing an alternative to domestic bank lending would foster resilience of the financial system to external shocks, as seen in the case of Australia during the AFC. Complementing the development of the domestic bond market, short-term funding markets and the foreign exchange markets were further enhanced to address potential risks from currency mismatches and increase the availability of hedging instruments to manage interest rates and FX exposures. Developments in these markets were designed to provide a competitive source of financing across a wide range of tenors as well as fulfilling the investment needs of a diverse set of investors.

Pre-AFC, the repo and derivatives markets were non-existent, resulting in a lack of avenues for market participants to hedge their positions. This was compounded by an illiquid secondary bond market due to the presence of large and less diversified institutional investors, which, at the time, usually held bonds to maturity. Moreover, market conventions and risk management practices were highly varied and inconsistent due to the lack of standardised guidelines and documentation.

Recognising that liquid secondary markets are key building blocks for a market-driven financial system, the repo and derivative markets were targeted for development. This has led the Central Bank of Malaysia (BNM) to publish official guidelines on repo and short-selling to promote best practices through the adoption of the Global Master Repurchase Agreement (GMRA). It has also encouraged the introduction of the Institutional Securities Custodian Programme (ISCAP) to release captive holdings of bonds via repo to market participants. Continuous growth of the domestic financial markets has positioned Malaysia among the more developed markets in Asia, with the third largest markets after Japan and Korea and the largest in Southeast Asia.

However, increased foreign participation in the domestic financial markets is not without its risks and trade-offs. The Great Financial Crisis (GFC) underlined the role played by international capital flows from a financial stability perspective.¹ Capital flows can exacerbate two main features of the financial system, namely the importance of system-wide linkages and the procyclicality of systemic risk. Subsequent financial market development initiatives arise from the need to manage global spillovers to domestic financial market stability.

¹ "Assessing international capital flows after the Great Financial Crisis of 2007–09", *IFC Bulletin*, February 2017.

FMD has benefited the Malaysian financial market

In the wake of these financial market development initiatives, the Malaysian financial market experienced significant growth. The domestic bond market has grown to RM 1.4 trillion or 104% of GDP as at end-2018 from just RM 264 billion or 74% of GDP in 2000. Malaysia also has one of the largest sukuk markets in the world. The country's deep capital markets have allowed it to be a proxy for capital markets in emerging markets in Asia.

Liquidity in the bond market has continued to increase, recording an average daily bond trading volume of RM 3.2 billion in 2018 compared with RM 1.5 billion in 2000. In line with these developments, the bond market has also attracted more diverse investors, with foreign holdings of Malaysian government securities increasing to 22.7% of outstanding as at end-2018 from less than 1% in 2000.

Greater liquidity in the bond and sukuk markets from capital inflows has supported further growth in the FX market, while greater foreign investor participation has led to development of the FX derivatives segment to meet increasingly sophisticated investor needs. The Malaysian FX market has grown significantly in the past two decades, from a daily average interbank FX volume, the largest segment of total FX volume being traded, of just USD 15.6 million in 2000 to a total average daily FX volume of USD11.5 billion in 2018.

The growth in bond market activities also serves as an impetus to further development of the domestic interest rate swap (IRS) market. Growth in interest rate derivatives has helped market participants to improve the efficiency of their risk management. Insurers have also benefited from a deeper financial market, in that the availability of a wider spectrum of bonds has facilitated closer asset-liability matching for them. The growth of a sustainable insurance industry allows for the effective mobilisation of long-term savings to support economic growth.

The impact of FMD on monetary policy

Monetary policy implementation and transmission remains potent

The focus on developing financial infrastructures since the AFC also facilitated the BNM's transition to a market-based interest rate targeting framework in 2004. The framework introduced the Overnight Policy Rate (OPR) as the target for the average overnight interbank rate (AOIR). The AOIR acts as the benchmark for short-term interbank money market rates, which in turn influences the funding costs of banks and prices and returns in the financial markets, thereby enhancing monetary policy transmission.

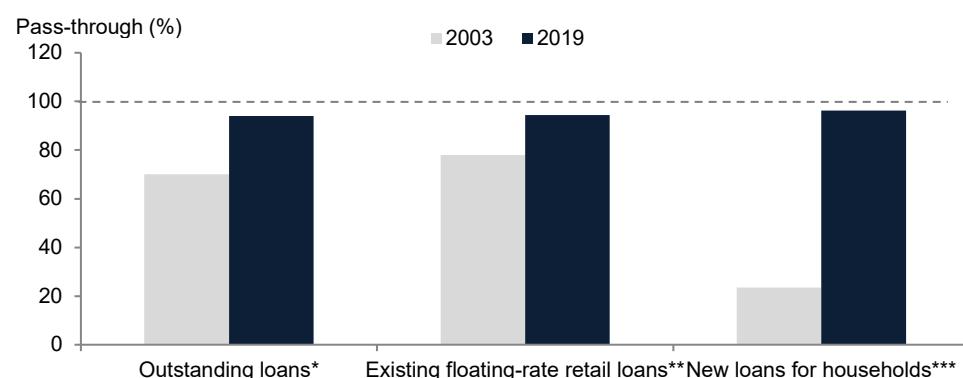
The transition to the new framework was well timed given the favourable economic and financial environment, sufficiently developed infrastructure and the proliferation of structured financial products. The framework was designed to enhance the effectiveness of monetary policy by facilitating the transmission of changes in the policy rate (Overnight Policy Rate) to the other market rates and ultimately to key macroeconomic objectives. Under this framework, a wider range of instruments including central bank securities, repo and foreign exchange (FX) swaps,

are used in monetary operations to manage the banking system liquidity to achieve the operating target.

The pass-through of adjustments in the policy rate to retail lending rates has become progressively stronger. This is in some measure, due to the increasing use of financial market rates as benchmarks for pricing of loans, such as the three-month Kuala Lumpur Interbank Offered Rate (KLIBOR) as these rates tend to adjust quickly and strongly to changes in OPR. In addition, the introduction of the Base Rate (BR) in 2015, replacing the Base Lending Rate (BLR) as the reference rate for retail floating rate loans also enhanced monetary policy transmission, given that the BR is intended to reflect fluctuations in banks' cost of funds stemming from changes in monetary policy.

Pass-through of reductions in OPR to lending rates

Chart 1



Note: Pass-through in rates was calculated as the average over six months before and after the policy rate change. For the reduction in the OPR in May-19, the average rate after the OPR reduction was taken over five months given data availability.

*For 2003, the pass-through is based on the average lending rate on outstanding loans by commercial banks. For 2019, the pass-through is based on the rate weighted by the share of outstanding loans of commercial banks.

**For 2003, the pass-through is based on the average Base Lending Rate (BLR) of commercial banks, while for 2019, it is based on the weighted average Base Rate (BR), weighted by the share of floating-rate loans of commercial banks.

***Based on the weighted average lending rate on new loans approved for households, with fixed weights based on long-run average share of new loans approved by loan purpose.

Source: Central Bank of Malaysia.

As the Malaysian financial market became more accessible to a wider spectrum of investors, Malaysia attracted increased capital inflows. These have led to additional domestic liquidity, and new monetary instruments were introduced to absorb surplus liquidity on a longer-term basis. In December 2006, the BNM introduced Bank Negara Monetary Notes (BNMNs) to increase efficiency in absorbing surplus liquidity. The total outstanding of BNMNs peaked at RM154 billion in 2012 following the adoption of quantitative easing (QE) in the advanced economies. However, the use of BNMNs has subsequently declined significantly due to the outflows arising from QE reversal and monetary policy normalisation. In November 2017, Bank Negara Interbank Bills were introduced to expand the capacity of the interbank market to intermediate liquidity, complementing the central bank's monetary operations. These tradable interbank bills provide banking institutions with an additional avenue to better

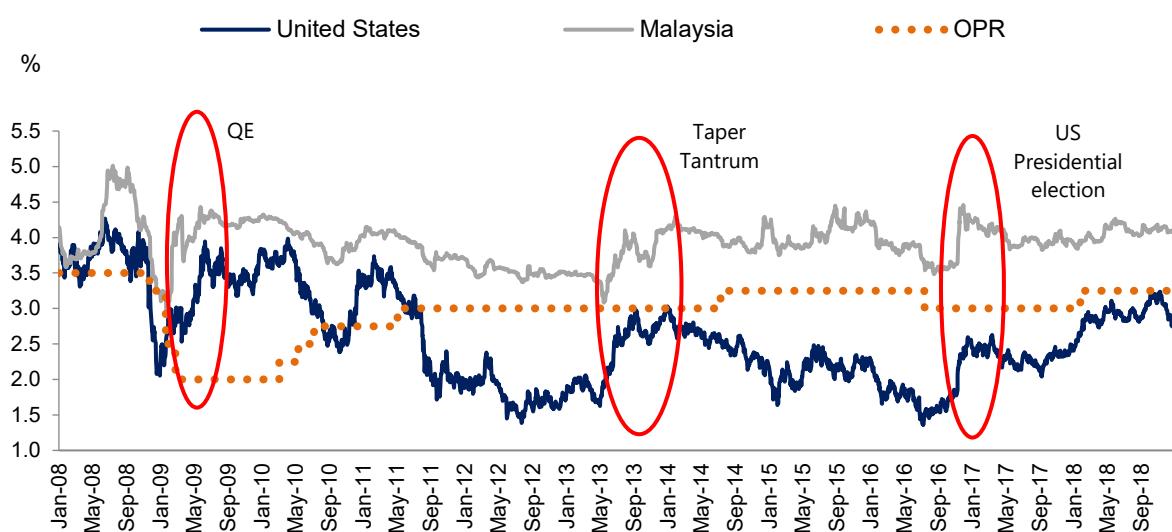
manage their ringgit liquidity and interest rate exposures besides qualifying as high-quality liquid assets (HQLA) under the Liquidity Coverage Ratio (LCR) requirements.

Global spillovers may have impacted monetary policy autonomy

While the Malaysian economy has benefited from a more developed and open financial market, an increasingly globalised investor base has posed risks and trade-offs that have to be managed. Higher non-resident participation has led to greater procyclicality between the domestic debt market and the global financial cycle.² This may present challenges to the conduct of monetary policy. Global monetary spillovers transmitted via non-resident capital flows have led to stronger co-movement between domestic long-term bond yields with those in advanced economies such as the United States. There have been instances where the movement of the 10-year MGS yields trended more closely with movements in the 10-year US Treasury yield, even when there were no changes in the OPR, altering domestic financial conditions. This phenomenon is common among EMEs with more developed financial markets and large non-resident participation.

Movement of 10-year government bond yields

Chart 2



Source: Bloomberg.

Nevertheless, these developments do not substantially weaken the effectiveness of the monetary policy transmission mechanism for Malaysia, as bank-based credit still forms a large part of financing for the economy. Banks' retail lending rates are priced predominantly off money market rates instead of MGS yields. In this respect, the monetary policy transmission mechanism in Malaysia remains effective.

² "Assessing international capital flows after the Great Financial Crisis of 2007–09", *IFC Bulletin*, February 2017.

Monetary policy communication to provide clarity

The BNM has also placed greater emphasis on providing clarity on the outlook affecting the balance of risks to growth and inflation as the domestic financial markets become more exposed to large non-resident capital flows and periods of volatility. Managing expectations on this front has become an essential part of the central bank's communication strategy. This is particularly the case for the narrative on the factors underpinning the central bank's assessment on the outlook in the Monetary Policy Statement (MPS) in order to better anchor expectations. However, the OPR remains the sole indicator for signalling the monetary policy stance.

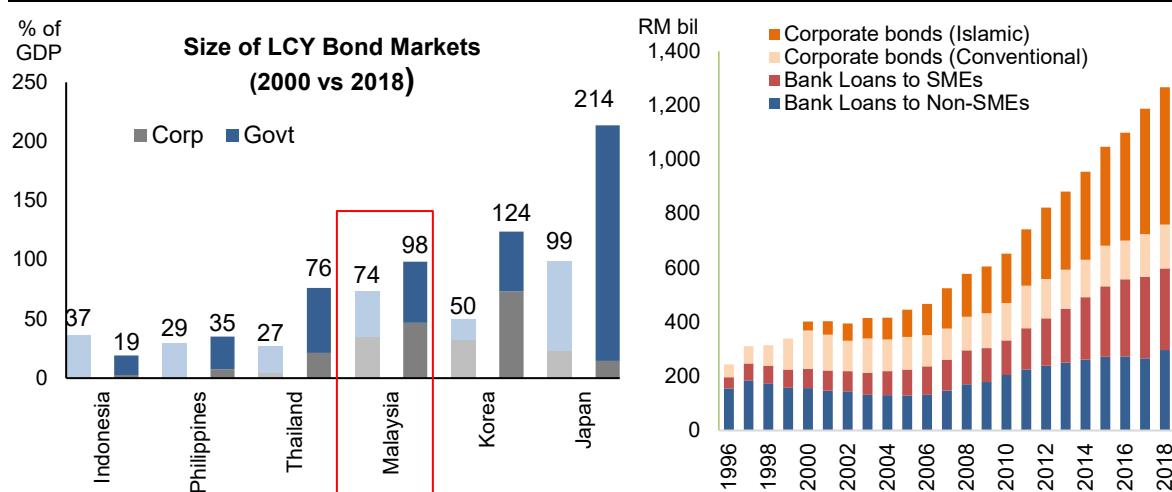
The impact of FMD on financial stability

FMD has improved banking system stability

Developments in the bond market have led to a rise in corporate bond and sukuk issuances, reducing the concentration of bank-based financing to the corporate sector. Corporate bonds and sukuk outstanding have over time grown to be marginally larger than bank-based financing to businesses (end-2018, bonds: 46% of GDP vs loans: 41% of GDP). The development of the debt market has also allowed for the diversification of bank-based lending down the value chain, particularly towards supporting the financing needs of SMEs. This allows the risks from large corporate credit to be distributed rather than be concentrated solely within the banking system.

Growth in corporate bond market reduced concentration of bank-based financing

Chart 3



Sources: Central Bank of Malaysia, Asian Bonds Online.

FMD has fostered growth in non-bank financial institutions rather than in shadow banking

The developments in the financial markets have played a role in the expansion of non-bank financial institutions (NBFIs). The bond market provides an avenue for cheaper financing options for non-bank credit intermediaries such as credit or leasing businesses, spurring growth in their domestic lending activities. Most of these NBFIs are either regulated or subject to some form of oversight by various government ministries. Their services expand beyond those provided by banks, providing households with further avenues to diversify financial wealth besides supporting credit intermediation.

FMD has improved Malaysia's external position

With greater depth and breadth in the domestic financial markets, domestic entities and the government are able to efficiently tap into domestic market liquidity to raise financing. Prudent risk management by financial institutions and limited risks from external borrowings of Malaysian corporates have also contained potential market risk exposures at manageable levels. Moreover, reflecting the progressive liberalisation of Malaysia's foreign exchange administration rules and the decentralisation of international reserves, Malaysian entities have accumulated significant external assets abroad. Against a potential shock and sharp ringgit depreciation, external assets will increase more than the rise in external liabilities, enhancing the external position from a balance sheet perspective.

FMD have amplified global spillovers to domestic financial markets

The development of international finance has multiplied channels that could transmit contagion effects of a systemic nature. One view is thus that the development of financial liberalisation and globalisation has been instrumental in generating "excess financial elasticity" in the global system. The degree of procyclical or the system's elasticity hinges on domestic policy regimes and their evolution has increased it. The interaction of financial regimes, through the free mobility of capital across currencies and borders reinforces and channels these effects.³

One way this could manifest itself is via the domestic financial markets. Risks to the orderly functioning of the domestic financial markets with implications for financial stability were observed when large capital inflows suddenly reversed during the GFC and contributed to volatility spikes in exchange rates. A similar trend was also observed during periods coinciding with US quantitative easing and more recently the US presidential election. To illustrate the impact of global spillovers to the domestic financial market, non-resident holdings of Malaysian government bonds reached a peak of 34.7% prior to the US presidential election in November 2016 and declined sharply to 24.7% over a short period of four months. These abrupt and disruptive flows, particularly from speculative investors, have exacerbated volatility during periods of market stress, affecting bond yields and the foreign exchange market.

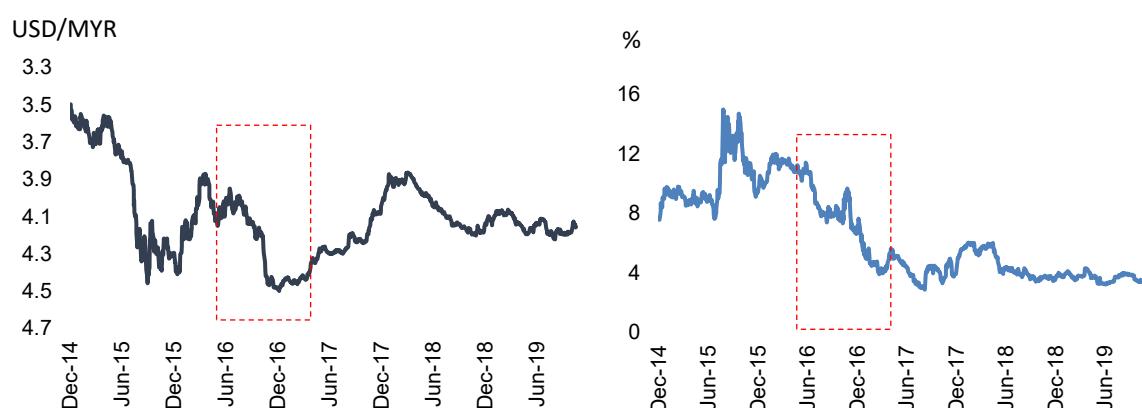
³ BIS, *85th Annual Report*, 2015

The offshore derivatives market has exacerbated volatility in the onshore FX market

The hedging markets are often used for leveraged position-taking based on expectations for future movements in the underlying asset. The role of offshore trading has been increasing over the last 15 years.⁴ The impact of spillovers from offshore markets poses a significant risk to the ability of the domestic market to effectively intermediate capital flows. With an increasingly liberalised capital market, the resulting foreign exchange volatility has had a major effect on the ability of foreign asset holders and the real sector alike to hedge their foreign currency exposures. Furthermore, while the offshore NDF⁵ markets provide a means of managing foreign currency exposures during normal times, volatility spikes over the recent years have had a destabilising effect on the domestic financial markets. The negative spillover from the offshore ringgit market was evident during the period after the US presidential election as the ringgit depreciated by 4.17% while the average daily ringgit volatility onshore rose as high as 10% during that period compared with only 4.6% in 2018.

Ringgit movement (LHS) and ringgit volatility (RHS)

Chart 4



Source: Bloomberg.

The adverse impact from the offshore NDF market was similarly highlighted in AMRO's Annual Consultation Report on Malaysia in November 2017. The Granger causality test results suggested that the NDF one-month ringgit rate Granger-caused the ringgit spot rate, with a p-value of almost zero. McCauley et al (2014)⁶ also concluded that, while for other countries there is two-way causality between offshore NDF markets and onshore deliverable forward markets, this is not the case for Malaysia, where the causality is unidirectional from the offshore NDF market to the

⁴ The evolving structure of FX markets and its policy implications – BIS note for meeting of Governors from major EMEs September 2019.

⁵ Non-deliverable forwards.

⁶ R McCauley, Robert, C Shu and G Ma, "Non-deliverable forwards: 2013 and beyond," *BIS Quarterly Review*, March 2014, www.bis.org/publ/qtrpdf/r_qt1403h.htm.

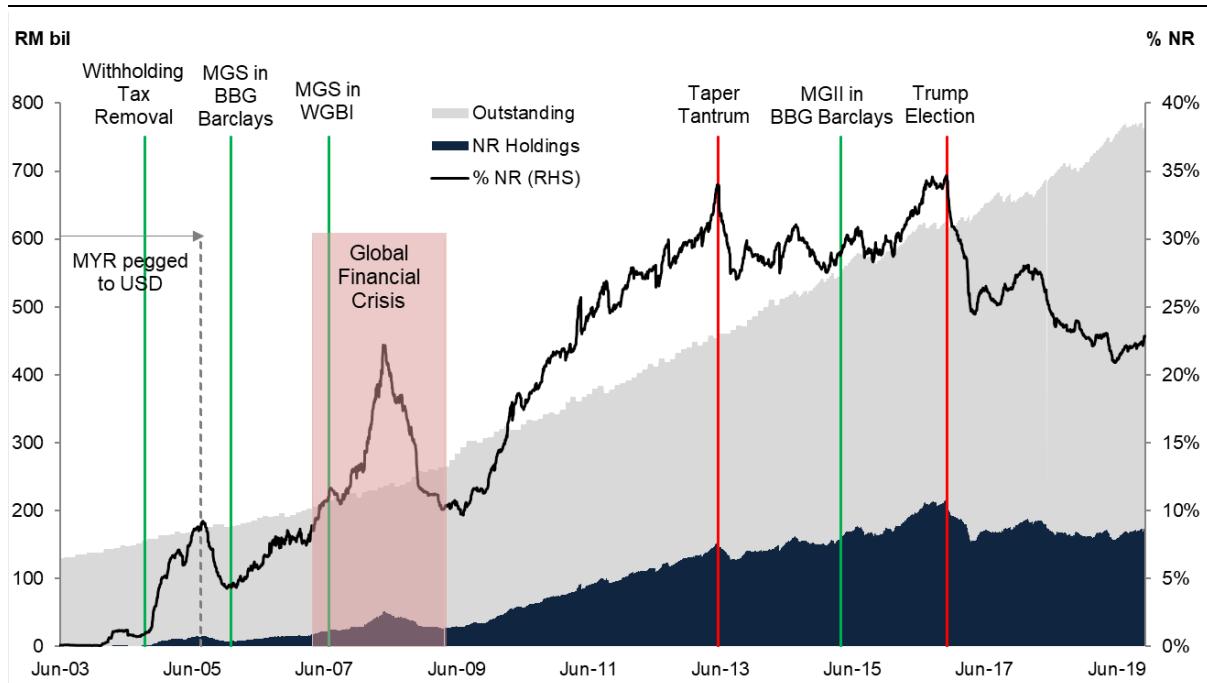
onshore deliverable forward market. This has led to initiatives to further strengthen the resilience of the Malaysian financial market.

Greater diversification of investor types cushioned impact of global financial shocks

Although the impact of imported volatility on the onshore foreign exchange market was prominent, that on domestic bond yields was cushioned by the presence of a large and diversified domestic investor base. Strong support from large domestic institutional investors (DIIs) in the domestic bond market has allowed Malaysia to weather global financial shocks. During periods of heightened non-resident outflows from the bond market, active buying by domestic institutional investors has helped to mitigate excessive adjustments to domestic bond yields. For example, during the broad-based portfolio outflows from emerging market economies in 2018, DII purchases of Malaysian Government Securities (MGS) amounting to RM 34.7 billion largely offset the RM19.8 billion of outflows from non-residents. As a result, the 10-year MGS yield increased by just 13 bp during this period, compared with a regional average of 46 bp. Similar outcomes were also observed during other episodes of external shocks, namely the 2013 taper tantrum and the 2016 US presidential election.

Non-resident holdings of Malaysian government bonds – event timeline

Chart 5



Source: Central Bank of Malaysia.

Policy options to mitigate financial stability risks

Balanced development agendas to mitigate financial stability risks

While the initial stages of bond market development focused on establishing primary markets, post-AFC developments placed greater emphasis on establishing a deeper and broader secondary market. This has attracted greater foreign participation through various market liberalisation measures. However, high foreign participation may have a destabilising impact on domestic financial markets, particularly during global crises, when these capital flows suddenly reverse. Disorderly exits from the market have in the past adversely impacted the domestic FX market in particular, which has an unwarranted spillover impact on the real sector.

In managing the potential implications of global spillovers for domestic financial markets, post-GFC developments focused on balancing market accessibility while ensuring financial stability. Balancing these opposing policy objectives has proved to be a challenge for a small emerging market such as Malaysia with its open economy. While the domestic financial market was further enhanced to manage shifting needs of a more sophisticated investor base, further liberalisation policies have to take into account financial market stability to safeguard the interests of the real sector.

With enhanced transparency and surveillance, more targeted development initiatives were implemented

In realigning BNM's development agenda to balance further liberalisation while preserving financial stability, emphasis is placed on enhancing transparency and strengthening surveillance. The segregated securities accounts at the Real-time Electronic Transfer of Funds and Securities System (RENTAS), the country's large-value payment system, was implemented to provide BNM with information and data for more targeted development initiatives besides increasing efficiency by reducing the reporting burden for investors and lowering the cost of investing in the Malaysian bond market.

With a developed bond and FX market, the current focus is on further broadening and deepening of the Malaysian financial market to meet the diverse and more complex demands of a more developed and internationally integrated economy. Financial market development initiatives are aligned towards enhancing market liquidity and accessibility for real money investors. In the bond and repo market, emphasis has been placed on the development of an effective hedging platform as well as providing greater flexibilities for the conduct of repo. Market infrastructure has also been strengthened for greater surveillance capacity and transparency in the bond market.

In the FX market, a dynamic hedging programme has been introduced to provide accessibility for investors to actively manage their FX exposures of their invested assets via forward hedging activities without the need to show documentation. To date, the programme has benefited 104 registered investors, managing a ringgit assets worth a total of USD 37 billion. The Appointed Overseas Offices (AOOs) framework, an extension of the onshore banks with 151 offices in 36 different countries, has also been enhanced to provide ringgit liquidity after Malaysian hours.

With greater accessibility to the onshore market, the FX market continues to grow, with the average daily value of FX transactions increasing to USD 12.3 billion (year-to-date) compared with only USD 8.0 billion pre-2016. The bond market also remains resilient, with lower volatility and non-resident holdings of Malaysian government bond stable at around 22%. More than half of these holdings were accounted for by long-term investors such as central banks, government, pension funds and insurance companies.

Current focus: Enhancing market accessibility and liquidity while preserving financial market stability

- Increase repo market liquidity and flexibility by increasing availability of off-the-run bonds for market-making activities as well as extension of the maximum tenor of repo to five years and an expansion of eligible securities for repo to accord flexibility to market participants in their conduct of repo.
- Development of an effective hedging platform for investors via enhancements to the delivery mechanism for MGS futures market.
- Expansion of dynamic hedging programme to include trust banks and global custodians.
- Greater dynamic hedging flexibility to manage FX risks beyond the current 25% threshold.
- Simplified FX trade and documentation process for ease of investors' access to the onshore FX market.
- Improve ringgit liquidity beyond local trading hours through the introduction of the Appointed Overseas Offices (AOO) pilot programme aimed at enhancing market liquidity and reducing transaction costs through more efficient price discovery.

Fintech and big tech – risks and benefits from financial sector development

The entry of large technology firms ("big techs") into financial services holds the promise of efficiency gains and enhancements to financial inclusion but presents new and complex trade-offs between financial stability, competition and data protection.⁷ Intense competition between incumbent banks with new fintech and big tech entrants may lead to depressed interest margin environment, reducing the overall profitability of the banking system. Heightened competition may also contribute to behavioural distortions through excessive risk-taking, looser lending standards and potential under-pricing of risks, leading to overexpansion of credit and thus a build-up of systemic risk.

In the light of ongoing digital disruption, Malaysian banks are hastening their digital adoption and accelerating investments in infrastructure and human capital to align internal processes and existing business models with digital strategies. Technologies such as advanced analytics, artificial intelligence and open application programming interfaces (APIs) promise to enhance operational efficiency, improve service quality and tap into new growth opportunities. There is also growing traction in partnerships between banks and fintech firms, as evidenced by initiatives piloted by BNM's fintech regulatory sandbox. Such collaborations offer significant advantages by combining access to capital and funding, a broader customer base and banking expertise with innovative ideas and the expertise on emerging technologies provided by new entrants and start-ups. This has in turn produced applications and financial solutions ranging from electronic know-your-customer

⁷ BIS, *Annual Economic Report*, Chapter III, "Big tech in finance: opportunities and risks", June 2019.

(eKYC) processes to alternative credit scoring models, robo-advisory services and trade financing solutions using blockchain technology.

In the face of rapid and global digitisation of the economy, policymakers need institutional mechanisms to stay abreast of developments and to learn from and coordinate with each other.⁸ It will be interesting to see what other changes will be brought about by technology in the domestic financial market landscape.

Financial market development, monetary policy and financial stability in emerging market economies (Mexico)

Bank of Mexico

Abstract

This paper outlines how the aftermath of the 1994 "Tequila" crisis set the course for crucial financial market development (FMD) in Mexico. In order to pursue it, the Bank of Mexico (i) adopted a new nominal anchor, which evolved into the current fully fledged inflation targeting regime; and (ii) promoted the development of the foreign exchange market, with the result that the Mexican peso became one of the most traded emerging market economy currencies. This paper details the efforts towards developing the FX, money and derivatives markets. Also assessed is the crucial role of FMD in improving monetary policy implementation and its transmission, as well as the impact of new financial technologies on monetary policy. Finally, the paper analyses the effect of FMD on financial stability risks and assesses areas where monetary policy transmission and its implementation could be improved.

JEL classification: F31, E52, G15.

Keywords: Financial market development, foreign exchange, monetary policy, foreign holdings, securities, derivatives, spillovers, financial risks, new financial technologies.

Introduction

In Mexico, the starting point for financial market development (FMD) was the “Tequila” crisis of 1994–95. One effect was that the Bank of Mexico depleted its international reserves due to aggressive FX market intervention, forcing it to adopt a flexible exchange rate regime. The monetary authority then faced two challenges. On the one hand, it had to adopt a new nominal anchor instead of the exchange rate, and on the other, prompt action was necessary to develop the foreign exchange market.

The first challenge, the sidelining of the exchange rate as the nominal anchor of the economy, was particularly complex. This variable had been an important anchor for expectations over a number of years. To accomplish the change, in 1995, the central bank limited the growth of net domestic credit to a level consistent with growth in the monetary base, the evolution of the exchange rate and inflation. Additionally, the Bank of Mexico began to announce its inflation forecast and to set its monetary policy in order to keep inflation below that target. Eventually, in 2003, this framework evolved into the current fully fledged inflation targeting regime. The target was set at 3% annual inflation within a range of +/-1%. These were all major steps towards FMD.

The second challenge facing the Bank of Mexico under the free-floating exchange rate regime was how best to quickly enhance the foreign exchange market's liquidity and depth. In this regard, the Bank's legislation to prevent the economy's dollarisation was helpful in establishing the new regime and advancing market development. For example, bank accounts in foreign currency were made available only to corporations, foreign government offices and citizens living at the border. Other examples include laws on bank capitalisation, freedom of capital flows and efforts towards the development of the derivatives, money and securities markets. Moreover, the risks faced by local banks when taking long positions in US dollars were kept in check by imposing position limits. Currently, those limits are on average +/-15% of a bank's capital. As a result, the Mexican peso has become one of the few fully convertible currencies among the emerging market economies (EMEs) and it is now the second most traded EME currency.

This note details the efforts towards FMD in Mexico from the Mexican financial crisis of 1994–95 until the present. Section 2 describes the main drivers of FMD in terms of FX and money markets, and on bank capitalisation measures. Section 3 reviews the effects of FMD on monetary policy implementation and its transmission and the effectiveness of monetary policy communication. New financial technologies, in the context of FMD, and their potential effect on monetary policy implementation and transmission, are assessed in Section 4. Section 5 looks at the impact of FMD on financial stability risks and Section 6 concludes.

Main drivers of financial market development (FMD)

As mentioned above, the aftermath of the Tequila crisis set the course for the main drivers for FMD in Mexico. Post-crisis, the financial authorities moved to strengthen bank capitalisation and promote the development of derivatives, FX and money markets, as follows:

Bank capitalisation

After the 1994 crisis, many regulatory efforts focused on ensuring that banks were sufficiently capitalised. In fact, Mexico was one of the first countries to adopt the Basel III principles, which include a minimum capitalisation ratio of 10.5% and a Tier 1 capital ratio of 7%, because from 1994 onwards the local regulation already required a minimum capital ratio of 8%. Today, the requirement is even higher, at 10.5%, and is met by all banks in the Mexican banking sector. Additional lessons in terms of capitalisation came with the 2007–09 global financial crisis. As Mexico's banks were well capitalised at the time, the aftermath of the crisis was not as severe as it could have been. Nonetheless, some corporates were less well capitalised, and sustained heavy losses on risky FX derivatives exposures. As a result, corporates are now more prudent in their asset-liability management and risk management policies.

FX markets

There are no capital controls in Mexico. However, since the adoption of the free-floating exchange rate regime in December 1994, macroprudential measures have been instituted to prevent the dollarisation of the economy. The Mexican authorities are confident that there is no need for capital controls or similar measures. The reason is that Mexican authorities believe, on past experience, that an economy with free capital flows has more benefits than costs. However, it may be the case that some costs are imposed by the flexibility of the FX market. For instance, the Mexican peso has proved susceptible to extreme volatility during the global financial crisis and the financial turmoil arising from Covid-19 and the fall in oil prices. This suggests that the peso may sometimes be used as a proxy for other, correlated assets, thus serving as an adjustment instrument for risky investment strategies that have led to disorderly trading of the currency. This contrasts with the approaches of other EMEs, for example, Brazil, Colombia and Peru, which have opted for more protectionist approaches during episodes of stress.

As a result of the regulatory changes described in the introduction, and because of the absence of capital controls, the Mexican foreign exchange market has become one of the most liquid and deep among those of EMEs. According to the September 2019 BIS Triennial Survey (with data as of April 2019), the Mexican peso is the second most traded currency in the EME world, after the renminbi. The peso's daily turnover is USD 114 billion (in both the spot and the derivatives markets), of which the greater part is traded abroad. In fact, only 20% of this volume is traded with at least one Mexican counterparty, making the Mexican peso more of a global currency than a local one.

Exchange rate flexibility has been key to promoting FMD and developing the FX market. As already mentioned, once the exchange rate was fully floated, the FX derivatives market began to develop. Moreover, the absence of capital controls has promoted portfolio and foreign direct investment. Without a floating exchange rate and without capital controls, FMD would have been different and, most likely, slower.

The development of the FX market and its derivatives has come with a price, as reflected in occasional extraordinary volatility. As the Mexican peso is traded 24 hours a day without restrictions, market participants can use the peso as a proxy hedge for positions in other risky assets. For example, when another EME currency cannot be

traded due to a time zone constraint, investors can use the peso instead, to synthetically replicate the desired exposure.

FMD has also been key for the development of the peso as a global currency. As over 80% of the peso's daily turnover is traded outside Mexico, much of the price discovery process also takes place abroad. Yet the soundness of the market is unaffected. This is a liquid and deep market without major distortions under normal conditions, although amplified volatility and significant disruptions are possible during episodes of financial turmoil, as mentioned above.

The effects of FMD on the FX market have allowed the central bank to enhance the effectiveness of its FX interventions, taking into account that most trading of the peso takes place offshore. For example, in its most recent FX spot market intervention in February 2017, the central bank sold US dollars to foreign-based counterparties for the first time in its history. Meanwhile, the evolution of the FX derivatives market allowed the central bank to introduce an FX hedging intervention programme in February 2017, using FX non-deliverable forwards. These allow the Bank of Mexico to intervene in the FX market while maintaining its stock of international reserves.

Money and local securities markets

In 2000, the Ministry of Finance (Secretaría de Hacienda y Crédito Público, SHCP) and the Bank of Mexico implemented measures to develop the Mexican money and securities markets. For its part, the Ministry set up the Market Makers (*Formadores de Mercado*)¹ programme to foster the market for fixed rate government debt securities. The programme increased the participation of eligible institutions in the primary auctions and at the same time expanded the secondary market for government bonds.

Along with the introduction of the Market Makers programme, the federal government was able to increase its local financing relative to its external financing, using fixed rate securities. For example, in 1998, domestic government securities amounted to around 8% of GDP, comprising mainly floating rate notes (55%) and short-term zero-coupon bills (28%). As of October 2019, the total value of domestic government securities outstanding stood at 27% of GDP, of which over 50% are long-term nominal fixed bonds (M-bonos). This has helped the federal government to manage both its refinancing risk and the effect of interest rate movements on its interest expenditure. The changes have also helped to reduce the FX exposure of the government's finances. As of September 2019, 71% of the Federal Government's total debt consisted of securities denominated in local currency, compared with only 15% at the end of 1994.

Other government measures that have contributed to FMD relate to the predictability and transparency of debt securities issuance. To this end, the government has set clear financing objectives and defined auction calendars.²

¹ Market Makers are credit institutions and brokerage houses designated by the Ministry of Finance as participants in the government fixed rate securities market. These institutions must bid at competitive prices in each primary auction, and must also continuously quote buy (bid) and sell (offer) prices in the secondary market to provide liquidity and facilitate investment. This is a voluntary programme.

² According to the Public Debt General Law, the Congress authorises the annual amount of both domestic and external net indebtedness needed to finance the federal government and public sector

Another measure is the syndication of issues, whereby government securities are sold to a pool or syndicate of financial institutions that commit to purchase a certain amount of market-priced securities for a fee. These securities are then onsold to other market participants. Syndication gives the federal government access to a broader base of investors than it would reach through a traditional primary auction.

The development of the government securities market has created a solid and deep interbank funding market based on repurchase transactions instead of unsecured loans. Daily trading volume was MXN 1.24 trillion (6.7% of GDP) in the most recent full year. The liquidity and depth of the repo market have been instrumental for the establishment of a new near risk-free reference rate (the Overnight TIIE, similar to SOFR in the United States).

FMD has also been very important in fostering foreign participation in the domestic financial markets. For example, in April 2010, Citibank announced that Mexico's peso-denominated government bonds would be included in its World Government Bond Index (WGBI). For inclusion in this index, a country must be rated as investment grade by at least two of the major rating agencies. There is no doubt that Mexico's FMD during the 2000s was a deciding factor for WGBI inclusion.

Derivatives markets

In 1995, the Bank of Mexico began to develop the derivatives market to provide market participants with additional exchange rate hedging methods. The first steps were to allow local banks to trade FX derivatives and to set rules to facilitate the trading of MXN futures contracts on the Chicago Mercantile Exchange (CME). Eventually, an over-the-counter market was developed too. Moreover, in May 2008, the Mexican peso was included in the Continuous Linked Settlement system, a global multicurrency settlement system that aims to eliminate FX settlement risk due to time zone differences. As a result, the Mexican peso can now be traded round the clock.

The development of the derivatives market has been of crucial importance in reinforcing Mexico's financial stability. Thanks to the development of the FX derivatives markets, it is now possible to hedge FX exposures. Market participants can also hedge interest rate risk via the interest rate swap (IRS) market. In fact, the IRS market is even deeper and more liquid than the long-term fixed rate local currency bond market. Thus, market participants can easily find a way to hedge their risks.

There is also a futures market linked to the main benchmark rate, the 28-day TIIE (the interbank equilibrium interest rate, Mexican IBOR) – most variable-rate credits are referenced to this rate. The futures market linked to this benchmark expanded strongly prior to the global financial crisis, and has developed stably since then.

FMD and global spillovers to EME financial markets

After the inclusion of Mexican government bonds in the WGBI, other global indexes began to add Mexican local bonds. As a result, foreign investors started to buy a

institutions, as included in both the country's Income Law and Expenditures Budget. Additionally, during the months of March, June, September and December, the Quarterly Program of Government Securities Auctions is announced for instruments to be placed in the local financial market, which must be consistent with the general criteria approved by the Congress for this fiscal year in the context of sound fiscal policy.

significant share of local Mexican bonds. Foreign holdings of Mexican government local currency fixed rate bonds with maturities of less than one year went from MXN 0.3 trillion in January 2010 (market share of 24%) to MXN 1.8 trillion in November 2019 (market share of 55%). Of course, this increase was also due to the interest rate differential between the Mexican peso and the major currencies after 2010.

The high share of foreign participants in local bonds can be seen as a risk for financial stability. If, for example, the Mexican government were to lose its investment grade, a massive liquidation of these positions could occur, jeopardising financial stability. So far, these holdings have proved to be resilient to risk events, but this might not always be the case. For instance, in 2016, despite the uncertainty surrounding the outcome of the US elections, there was a significant increase in foreign holdings of local bonds. This reflected the sharp increase in peso interest rates, which incentivised investors to add to their peso-denominated positions in the context of very low yields abroad, or adjust their positions by buying Mexican bonds to keep their share constant.

FMD and monetary policy

FMD has been crucial to improving the implementation of monetary policy via market operations such as repo operations or securities auctions, in the place of non-market operations such as compulsory deposits or reserve requirements.

Effects of FMD on monetary policy implementation and its transmission

Prior to December 1994, the crawling peg-exchange rate regime reduced the scope for improving monetary policy effectiveness. However, the regime changed after the central bank was forced to fully float the exchange rate after running out of international reserves during the Mexican financial crisis. Due to volatility in the FX and money markets in the aftermath of the crisis, it was not possible to set an interest rate target. Therefore the growth of monetary aggregates was set as the operational target of the central bank.

From 1995 to 2003, the operational target was the average balance of commercial banks' current accounts at the central bank over a 28-day period (the "corto"). Targeting current account balances avoided the need to set a specific level for short-term interest rates. Furthermore, in an environment of falling inflation, the "corto" objective allowed interest rates to fall in line with changing inflation expectations (between 1995 and 2003, inflation fell from 52% to 4%). From 2003 through January 2008, the operational target changed to a daily target of the balance of commercial banks' current accounts, and an inflation targeting regime was adopted at the start of that period. Finally, in 2008, when the central bank had gained more credibility and market volatility was low, the operational target was changed to the overnight interbank funding rate.

FMD has also influenced the choice of instruments used to sterilise excess liquidity in the money markets. The excess was historically explained by the accumulation of international reserves. After the Mexican financial crisis, the central bank implemented a programme to replenish its international reserves. As Mexico's

oil production ran at up to 3.4 million barrels per day during the early 2000s, Mexico received ample inflows from the oil sector at that time, given that Pemex, the state oil company, can sell its foreign currency revenues only to the central bank. As a result, from 1996 to 2015, the Bank of Mexico accumulated a significant amount of international reserves that had to be sterilised.

During the 1990s and the early 2000s, this sterilisation was done through compulsory deposits imposed on local banks. This was not well received by the market since the withdrawal of liquidity was not market-determined. By the second half of the 2000s, once money markets in Mexico were more developed, it was possible to sterilise excess liquidity by auctioning government securities.

The aim of sterilising excess liquidity is to ensure that on a daily basis local banks have to attend the open market operations of the central bank (OMO) in order to receive credit. In this regard, FMD has been crucial to facilitating OMO as a way of providing liquidity to local banks. With the development of the market for government securities, it is easier to provide short-term liquidity through repo operations collateralised with government securities.

FMD has also been fundamental to enhancing the transmission of monetary policy. Before the first issuance of a fixed rate bond at the beginning of 2000, it was impossible to conduct analysis based on market prices but, today, thanks to the depth and liquidity of the money market, it is possible to extract from the yield curve implicit monetary policy expectations and inflation premiums, among other information. Moreover, as mortgages and corporate loans are now linked to long-term fixed rate government bonds, it is easier to influence aggregate demand through changes in the monetary policy stance.

Additionally, the development of a market linked to a benchmark rate was also important in enhancing monetary policy transmission. As already mentioned, the main benchmark rate in Mexico is the 28-day TIIE. Because most variable rate credits are referenced to this rate,³ and because the rate reacts promptly to any change in the monetary policy stance, the transmission of monetary policy is enhanced. Before 2000, because the market tied to the TIIE was shallow, the transmission of monetary policy was weaker.

It is important to mention that the interest rate channel is still thought to be less important than the other channels, such as those of expectations and the exchange rate. In fact, the effects on aggregate demand from the interest rate channel are weaker in Mexico than in other economies. This result may reflect the low level of financial inclusion and the size of Mexico's informal sector.⁴ On the other hand, given its openness, the Mexican economy is highly exposed to external shocks, which may explain the greater relative importance of the exchange rate channel. In addition, progress in the control of inflation and the greater credibility of the central bank may explain the growing importance of the expectations channel. In this context, even though the transmission of monetary policy has improved substantially due to FMD, there is scope for further development.

³ Approximately 80% of bank loans to firms are variable rate in Mexico. Moreover, most interest rate swaps (IRS) are linked to the TIIE, representing 70.7% of the total IRS market at end-August 2019. The notional amount of those contracts was USD 829 billion, or roughly 70% of GDP.

⁴ According to BIS date, in 2018 Mexico's bank credit-to-GDP ratio was 19.5%, while in Brazil, Chile and Colombia it was 59.5%, 82.3% and 45.3%, respectively.

Foreign monetary policy spillovers to the local economy

Mexico's financial integration into the global economy has been positive for the domestic economy. In particular, it has made possible to complement domestic savings with external resources and it has helped to make domestic financial markets deeper and more liquid. Since Mexico is a small open economy, domestic financial markets and inflation are naturally affected by external factors. That is why the central bank, when assessing the appropriate monetary policy stance, takes into account the international situation, and how it might affect the Mexican economy and, particularly, its inflation dynamics.

For instance, given the high degree of economic integration between Mexico and the United States, Mexico's business cycle depends heavily on the evolution of the US economy. As such, US monetary policy is an important factor among the many elements that influence monetary policy decisions. Nevertheless, this does not mean that the Bank of Mexico mechanically adjusts the reference rate in response to changes in the US federal fund rate; this is simply one factor, among many others that are monitored.

Going deeper into the issue of monetary policy independence in small open economies, such as the Mexican one, some scholars have argued that in the absence of capital controls, international financial integration significantly reduces monetary policy independence.⁵ However, empirical studies conclude that countries that do not peg their exchange rates enjoy significant scope for adjusting their short-term interest rates independently of foreign ones. As changes in short-term rates seem to reflect changes in domestic macroeconomic variables such as inflation and output, such countries exercise substantial monetary independence over short-term interest rates.⁶

However, long-term interest rates are highly correlated across countries, suggesting that the connection between long-term rates and domestic macroeconomic variables is weaker. Thus, independence for long-term interest rates seems to be weaker. But these results may vary between countries. For example, in the case of Mexico, long-term interest rates have been influenced by global factors, such as US long-term interest rates. Yet, some components of these rates may also have been influenced by domestic factors. First, sound macroeconomic policies may have had a positive impact on the sovereign risk premium. Second, the decline in inflation may have helped to reduce the inflation risk premium.

Effectiveness of monetary policy communication

The Bank of Mexico's communication policy has evolved in line with domestic FMD. After the domestic financial markets and inflation stabilised, it became less desirable to send monetary policy signals through the above-mentioned "corto". Accordingly, in 2008, the Bank of Mexico switched its operational target to the Fondeo rate (the

⁵ See H Rey, "Dilemma not trilemma: the global financial cycle and monetary policy independence", in *Global dimensions of unconventional monetary policy*, proceedings of the Federal Reserve Bank of Kansas City Jackson Hole symposium, August 2013.

⁶ See M Obstfeld, "Trilemmas and trade-off: living with financial globalisation", *BIS Working Papers*, no 480, 2014.

overnight interbank rate) and changed its communication accordingly. For instance, the Bank of Mexico has published quarterly inflation reports since 2000.

In regard to monetary policy decision-making, the number of monetary policy meetings per year fell from 14 in 2003 to eight starting in 2011. Since market development required more transparency, the Bank of Mexico added its monetary policy minutes to its communication toolkit starting in 2011. Finally, in 2018 the central bank strengthened its communication policy through four measures: (a) monetary policy releases that now indicate if there were any dissenting voters without revealing their names (although the minutes now include the identity of dissenting voters and the arguments behind their votes); (b) from May 2021, transcripts of central bank board meetings will become available to the public three years after the corresponding meetings; (c) monetary policy releases and minutes are now available both in Spanish and English; and (d) board members' speeches and public presentations are now available to the public.

In addition, the central bank has added to its communication toolkit: (a) **meetings with local market participants** to brief them on its liquidity facilities; (b) **monetary policy instrumentation educational seminars and conferences** for universities and academic researchers; and (c) a **market operations-related publication**.

New financial technologies and their impacts on monetary policy implementation and transmission

Central banks are aware that technological advances, along with declining cash usage and the rising use of electronic payments, have paved the way for the development of new financial assets. In particular, the advent of digital currencies calls for a comprehensive evaluation of their effects over monetary policy implementation and transmission, as well as their impact on financial stability.

Implementation of monetary policy: The creation of digital assets by big tech companies has not yet affected the implementation of monetary policy so far, but it could have unforeseen effects in future. Typically, central banks implement monetary policy by setting a "target" or a "desired level" for excess reserves that is compatible with the policy rate target (excess reserves are the stock of deposits of commercial banks at the central bank that exceed the deposits that arise from the reserve requirement). In the case of Mexico, that target is set at zero, so that at the end of each day, bank deposits in the central bank must be zero on aggregate. In this context, the challenge for the central bank will be to accurately forecast the demand for bills and coins under any new scheme of digital currencies, but the basic principles of the framework should remain the same.

However, if there is a generalised adoption of these assets in place of traditional bank accounts, there could be a high risk of financial disintermediation, as commercial banking deposits might shift into these new assets. In this scenario, the monetary policy transmission channels could be affected by the weakening of the banking deposits channel. At this point, if the digital assets were to pay an interest rate determined by another jurisdiction or in the case of an FX gain (if the digital currency were denominated in a foreign currency), the elasticity of commercial banking deposits in terms of interest rate movements would fall.

On the other hand, if the central bank were to issue a digital currency itself, the effects on monetary policy implementation would depend on the details of the framework. For example, if the central bank were to open digital currency accounts for all individuals in the economy, significant changes to the monetary policy framework might be required. In this case, the balance of personal deposits at the central bank (amount of reserves) would be more difficult to forecast and, therefore, monetary policy might become more difficult to implement.

Transmission of monetary policy: New financial technologies can also provide new tools for conducting and transmitting monetary policy. Remunerated central bank digital currencies (CBDCs) could help central banks to overcome the so-called zero lower bound. Negative interest rate policies do not directly affect the physical cash market and therefore place a restriction on the central bank's scope for stimulating the economy. Thus, interest-bearing CBDCs could serve as a monetary policy tool, by allowing central banks to directly alter the cost of money in the cash market by affecting the credit channel of monetary policy implementation.

Financial stability risks: At first sight, as long as the digital assets issued by big techs are fully backed up by real money or by actual deposits of money in a commercial bank, financial stability should not be jeopardised. However, the large number of users these companies have might imply competition and concentration issues. For example, Facebook has over 80 million active users in Mexico. As such, the company has the potential to become the institution with the largest number of financial services users, making it "too big to fail" but falling outside the appropriate prudential regulation.

Moreover, a greater share of fintech credit could reduce bank profitability, which could lead to a weakening of their lending standards and eventually jeopardise financial stability. Finally, if fintech credit intermediation continues to expand, this could create new transmission channels where risks generated in fintech lending industry could spread to the entire financial system.

Impact of alternative investment instruments on financial stability risks

Over the past decade, FMD has not led to increased risks stemming from the issuance of complex structured products or investment instruments in Mexico. The domestic market for securitisations is still small, has not shown abrupt growth, and has adhered to simple structures with strong credit enhancement. The main securitisation issuers are the two institutional housing funds (Infonavit and Fovissste), which follow a very conservative approach. Moreover, non-bank credit intermediaries are still relatively small, although growing at moderate rates.⁷ Their assets (excluding central bank

⁷ The FSB has established a high-level policy framework that includes a monitoring methodology for member jurisdictions to apply in a consistent manner for the purpose of measuring the shadow banking sector or, under the current terminology, non-bank financial intermediaries (NBFIs). Under the FSB methodology, a narrow measure captures the NBFIs that are deemed to be involved in potential systemic risk-related activities. This aggregate measure, which is the sum of five economic functions or categories of activities, registered a 5% annual growth rate as of end-2018. However, some sectors, such as broker-dealers, registered an annual growth rate of 21% during the same

assets) account for about 16.2% of total financial system assets, as of June 2019.⁸ During the global financial crisis, some non-bank financial institutions dependent on short-term market funding (so-called Sofoles, which are the predecessors to Sofomes),⁹ especially those investing in illiquid long-term loans (mortgages), faced significant stress in rolling over their market-based funding. In response, the financial authorities have set out a regulatory path that led to the disappearance of Sofoles. These were replaced by other non-regulated entities such as the Sofomes, which offer a broader span of financial services and credit segments. Subsequent regulation was amended to reflect that potential vulnerabilities could arise in market-based funding-dependent entities with high liquidity and maturity transformation. These entities remain under the surveillance of authorities and the regulatory perimeter is periodically reviewed.¹⁰

Other market-based investment vehicles specialising in certain business sectors have grown in size in the last 10 years without posing material risks to financial stability. These include alternative financing sources or entities that fund themselves through the issuance of various structured products recognised in the securities regulations. These alternative financing sources may take the form of, for instance, fibras inmobiliarias, which are equivalent to real estate investment trusts (REITs). Others are similar to private equity trusts, financing infrastructure or commercial ventures that issue participation certificates (trust units similar to shares).¹¹ These have increased the menu of investment products available mainly to institutional investors (particularly those invested in Capital Infrastructure Certificates), improving their long-horizon investment strategies, but in some cases have also proven attractive to foreign investors.

period, while collective investment vehicles (the largest economic function) grew at an annual rate of 2%. For comparison purposes, total financial assets (including central bank assets) grew at a rate of 6%.

⁸ Mostly, this corresponds to regulated and supervised entities participating in credit intermediation activities, which are included under the FSB's narrow measure of shadow banking (eg investment funds, broker-dealers, microfinance companies, credit unions, cooperatives, non-bank banks known as Sofomes etc). Sofomes are non-bank financial intermediaries that take on lending, leasing and/or factoring activities but which are not allowed to take deposits from the public. They fund via loans, equity and/or public debt issuance. When they have public debt outstanding, Sofomes are regulated by the National Banking and Securities Commission (CNBV). In addition, Sofomes with equity links to banks are regulated as banks to avoid regulatory arbitrage. However, regulation also applies on a solo basis.

⁹ When Mexico joined NAFTA, Sofoles were introduced as a type of entity similar to finance companies in the United States and Canada. The aim was to harmonise the financial systems of the three countries. At the outset, Sofoles specialised in particular credit segments, whereas the Sofomes that replaced them were active in a broader range of financial services and credit segments. Sofoles were abolished in 2013 as legal entities, as were factoring and leasing companies, so that Sofomes took over the whole gamut of services and products offered by non-bank finance companies in Mexico.

¹⁰ Mexico's Financial Stability Council periodically assesses the regulatory perimeter for NBFIs.

¹¹ These include Capital Infrastructure Certificates (CCDs or CKDs), Fibras E, Investment Project Certificates (Cerpis). The aims of these investments differ somewhat. CCDs and Cerpis are similar to private equity investment structures and are managed by professional managers. Cerpis are a new form of structured vehicle. In contrast to CCDs, Cerpis investors are not involved in investment decision-making.

Final remarks

Mexico has made significant progress in terms of FMD since the Tequila crisis. The liberalisation of the exchange rate, the elimination of capital controls, the development of the FX market and the derivatives market, and the adoption of macroprudential measures were essential in promoting a sound FMD. The benefits have included the adoption of an inflation targeting regime, the development of a deeper government securities market and a highly liquid FX market that facilitates inward investment.

At the same time, the Mexican authorities are aware of the risks that FMD may bring, and have responded with measures to increase bank capitalisation and promote the development of derivatives, FX and money markets. The development of the FX market and its derivatives has come at a price, which is reflected in some occasional additional volatility. Furthermore, there are still areas where monetary policy transmission and implementation could be improved. The same is true for financial inclusion. Efforts have been made by the government and by the central bank to encourage digital payments via a platform developed by the Bank of Mexico (CoDi). This platform is free for all users and is designed to pay and receive payments instantly through QR codes. To use CoDi, the user must have a bank account. Thus, the platform is expected to increase the number of account holders around the country. Additionally, financial authorities must continue to develop transactions-based reference rates in order to move away from the Ibor rates with their well known failings. In this respect, Mexico is following the global trend and is on track to launch a new reference rate based on overnight repo transactions.

Financial market development and monetary policy: the Peruvian experience¹

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Abstract

In parallel with IT adoption and the use of the interest rate as operational target in Peru, the creation of a secondary market for central bank securities and government bonds has improved the depth and liquidity of the fixed income market and promoted the creation of a risk-free yield curve. Other factors contributing to this result are good macroeconomic fundamentals, the improvement in sovereign credit ratings, an external environment of low interest rates, and abundant global liquidity after the great financial crisis (GFC). In particular, the development of the sovereign bonds market has improved the pass-through of the reference interest rate to other domestic-currency market rates.

In Peru, financial intermediation is mostly through banking, with corporates as the main participants in the capital markets. Therefore, while the bond market is not yet fully developed, monetary policy transmission is as effective as in other countries in the region. This structure of the Peruvian financial system also contributes to the effectiveness of unconventional monetary policies, since the macroprudential instruments used (ie reserve requirements) act through their impact on banking.

JEL classification: E43, E44, E58, H63.

Keywords: financial markets, monetary policy operations, emerging markets.

¹ Central Reserve Bank of Peru.

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Introduction

The Central Reserve Bank of Peru (BCRP) adopted an inflation targeting (IT) regime in 2002. In addition to the interest rate, the BCRP uses other instruments such as reserve requirements (RRs) and foreign exchange (FX) intervention to preserve macro-financial stability; ie together with monetary policy to control inflation, the BCRP uses countercyclical RR adjustments to moderate the financial cycle and FX intervention to reduce excessive exchange rate volatility with potentially negative effects on the economy.

The operational tool of monetary policy is the short-term interest rate; ie the overnight interbank rate for uncollateralised loans. This policy framework operates through an interest rate corridor, with the interest rate on liquidity injection standing facilities as a ceiling and the interest rate on overnight deposits with the BCRP as a floor. Changes in the interbank interest rate pass through to other market rates, mainly short-term and lower-risk rates such as corporate rates, over a horizon of up to one year. Additionally, since Peru is a partially dollarised economy, the BCRP can influence the cost of dollar financing by adjusting RRs on FX deposits or their remuneration.

IT adoption and the use of an interest rate operating target has significantly reduced interbank interest rate volatility; and the impact of changes in this interest rate on other interest rates has become stronger and more predictable. Additionally, IT was adopted while financial markets were still shallow, particularly the fixed income market. One of the factors behind sluggish financial market development was the absence of a risk-free yield curve that could serve as a benchmark for the issuance of private sector securities.

However, in parallel with IT adoption, progress has been made in creating a fixed income market in domestic currency, which has enhanced market liquidity and depth. This has also contributed to improving the pass-through of the monetary policy interest rate to other interest rates.

Development of the fixed income market (2001–19)

BCRP Securities (CDBCRPs) and the formation of the CDBCRP yield curve

In 1992, the BCRP began to issue its own securities (*Certificado de Deposito BCRP–CDBCRP*) as a sterilisation instrument, due to a lack of government securities to carry out open market operations at that time. Other BCRP sterilisation instruments include RRs, public sector deposits with the BCRP, and time deposits of less than one month.² The BCRP can inject liquidity to the market through repo operations, which use mainly CDBCRPs and BTPs as collateral.

In addition to regular CDBCRPs, the BCRP has exceptionally used two additional types of security: restricted-negotiation CDBCRPs (CDBCRP-NRs), with participation in the primary issuance confined to certain market participants (mainly residents) to

² CDBCRPs with maturities of less than one month were replaced in 2008 by term deposits.

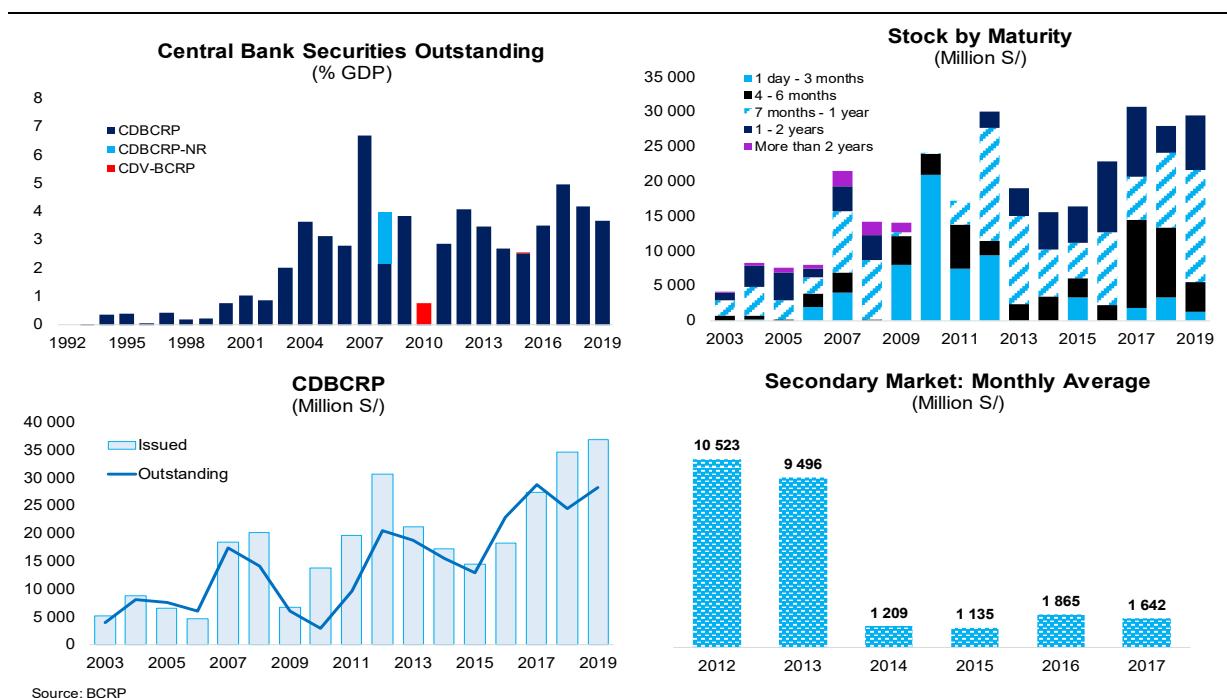
reduce capital flow-related speculation (which distorted the CDBCRP yield curve in 2008); and variable-rate CDBCRPs (CDVBCRPs), which are floating-rate securities (re-adjustable in line with the monetary policy rate) used to reduce investor interest rate risk in a context of expected monetary policy tightening in 2010.³

The CDBCRP primary market has grown in line with greater demand from local banks and domestic investors for high-quality liquid securities. The monthly average amount placed prior to the GFC fell from around PEN 1,548 million in 2007 to PEN 572 million in 2009.

Frequent issuance of CDBCRPs with maturities of up to 18 months (with selective issuances of two and three years between 2003 and 2007) has facilitated the creation of a short-term yield curve that serves as a benchmark for local issuances of domestic-currency securities. Since January 2014, the BCRP has made weekly issuances of CDBCRP of six, 12 and 18 months maturity to foster secondary market liquidity.

Peruvian central bank securities

Graph 1



The Market Makers Program and the formation of a sovereign bond yield curve

In 2003, the Ministry of Economy and Finance (MEF) established a Market Makers Program (PCM) to develop a public debt market in domestic currency, thereby encouraging the development of a domestic capital market. The PCM comprised (i) the issuance of domestic-currency sovereign bonds (BTPs) at a fixed rate and at an inflation-adjusted (constant purchasing power, VAC) rate; and (ii) active BTP trading

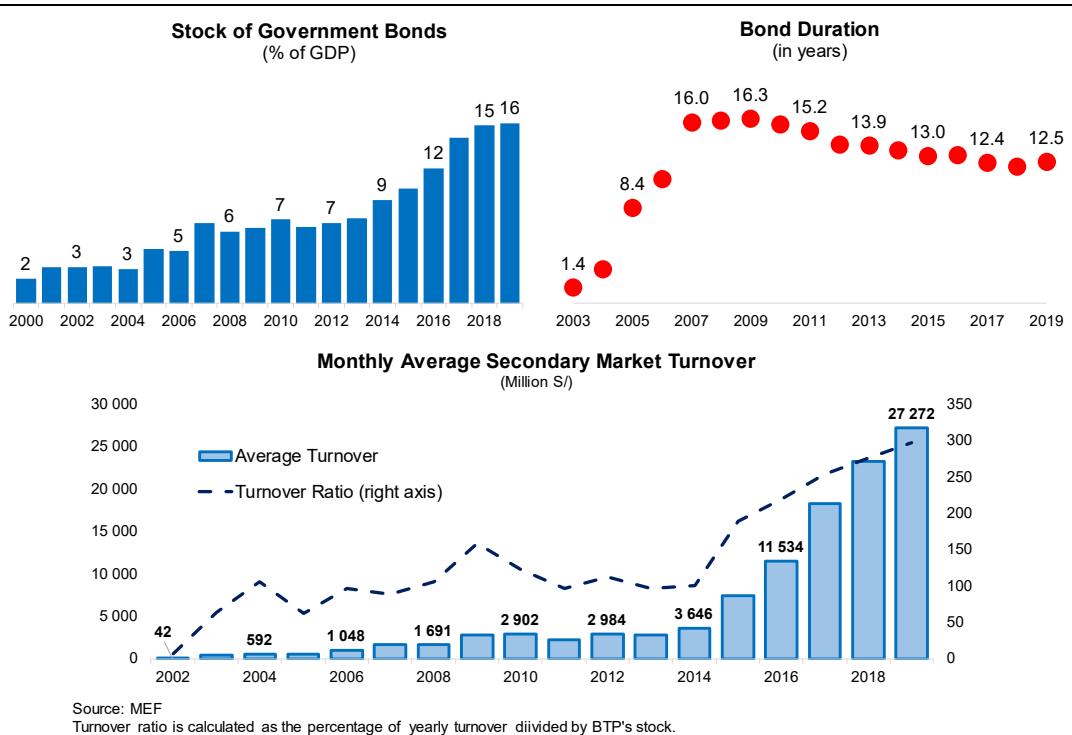
³ In addition, the BCRP also issues securities that can be redeemed in US dollars (CDLDBCRP) and others that are indexed to the exchange rate (CDRBCRP) as indirect instruments for FX intervention. The former is analogous to a temporary sterilised FX purchase and the latter to a temporary sterilised FX sale. For more details, see Tapia and Torres (2017).

in the secondary market, which allow the formation of the yield curve in domestic currency, thereby increasing the share of domestic currency public debt.

Prior to the PCM, in 2002 public debt (49% of GDP) consisted mainly of external debt (78% of total) from multilateral agency loans and the debt renegotiation with the Paris Club. Under the PCM, the BTP stock increased from 2% of GDP in 2002 to 16% of GDP in 2019. Thus, 68% of the public debt is currently denominated in domestic currency and the average BTP maturity of nominal bonds has increased from 1.4 years in 2003 to 12.5 years in 2019. While, in 2004, there were only BTPs with maturities up to six years, since 2010 there have been 30-year BTPs (and 40-year BTPs since 2014). Additionally, BTP turnover in the secondary market is around three times the BTP stock (0.1 times in 2002).

Sovereign bonds

Graph 2

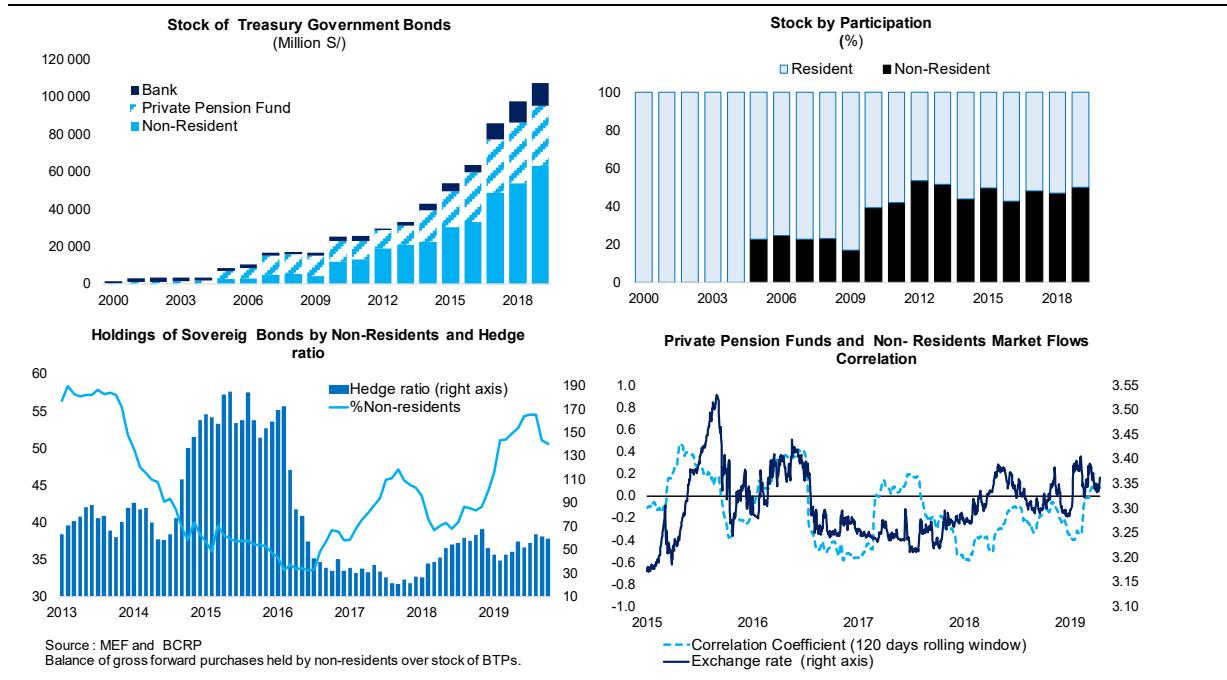


The main BTP market participants are non-resident investors, pension funds and domestic banks. The participation of non-resident investors varies over time and is associated with the commodity price and capital flow cycle. Moreover, non-resident investors hedge their BTP position partially with non-derivative forwards, which has also contributed to the development of the FX derivatives market.

In recent years, FX market flows originated by the participation of non-residents in the BTP market have been offset by transactions conducted by pension funds to hedge their foreign investments. In particular, there is a predominantly negative correlation between the flows created by these operations since end-2016; eg in 2018 non-resident investors required USD 3 billion, while pension funds supplied USD 2 billion. Between January and December 2019, non-resident investors required USD 0.5 billion, while pension funds supplied USD 0.6 billion.

Non-resident investors

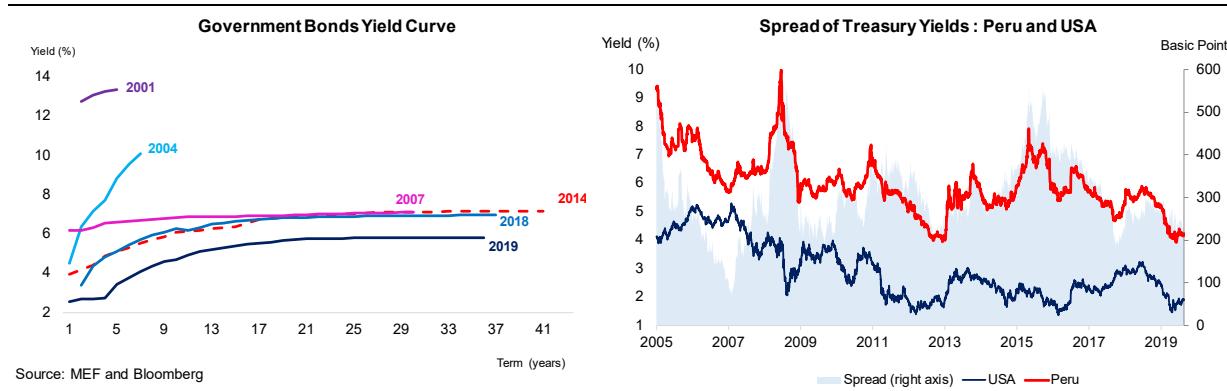
Graph 3



The greater depth and liquidity of the BTP market has allowed financing at lower interest rates and the development and expansion of the domestic-currency risk-free yield curve, with maturities of up to 40 years. Thus, at end-2019, the 10-year yield rate in domestic currency is one of the lowest in the region (with the lowest spread relative to the US Treasury Bill rate since 2007).

Peruvian local currency government yield curve

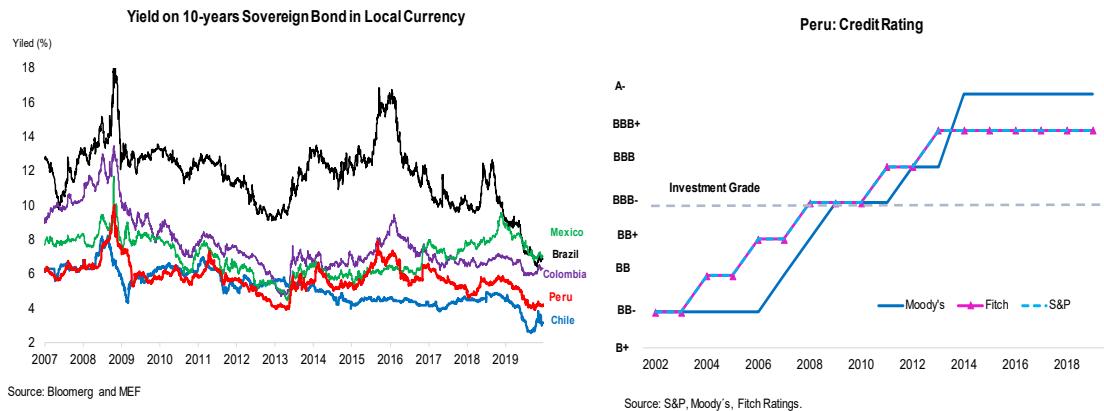
Graph 4



There are domestic factors behind the development of Peru's BTP market, such as the creation of a risk-free domestic currency yield curve (a composite of CDBCRP yields for short-term rates and BTP yields for long-term rates), good macroeconomic fundamentals, and the improvement in credit ratings (investment grade from 2008 and currently up to A- with stable outlook). Additionally, external factors include the low-interest environment in the advanced economies and ample global liquidity.

Spread Treasury yield and credit rating

Graph 5

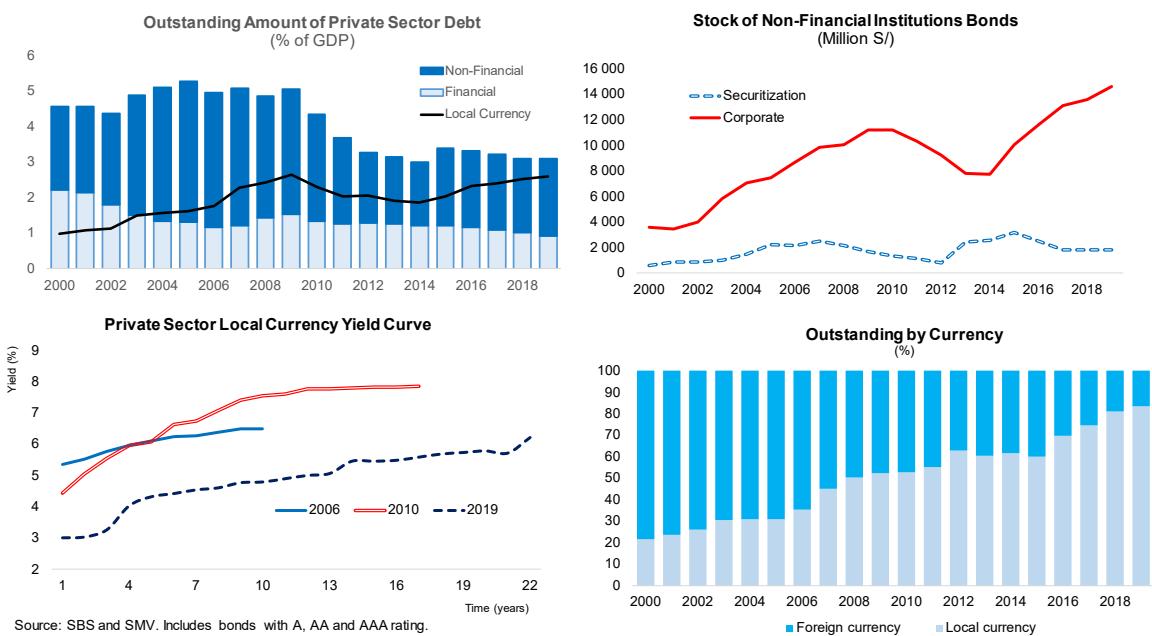


Development of the private sector market

The private domestic market in domestic currency increased in size from 1% of GDP in 2000 to 3% of GDP in 2019. Maturities are up to 30 years (mainly between two and five years) in domestic currency. Financial institutions represent 67% of the total amount issued at end-2019. Issuances are mainly in domestic currency (83% of total in 2019). The high level of dollarisation in Peru explained the initial concentration of debt instruments in US dollars (from 78% in 2000 to 17% in 2019).

Domestic private bond market

Graph 6



Development of the international bond market

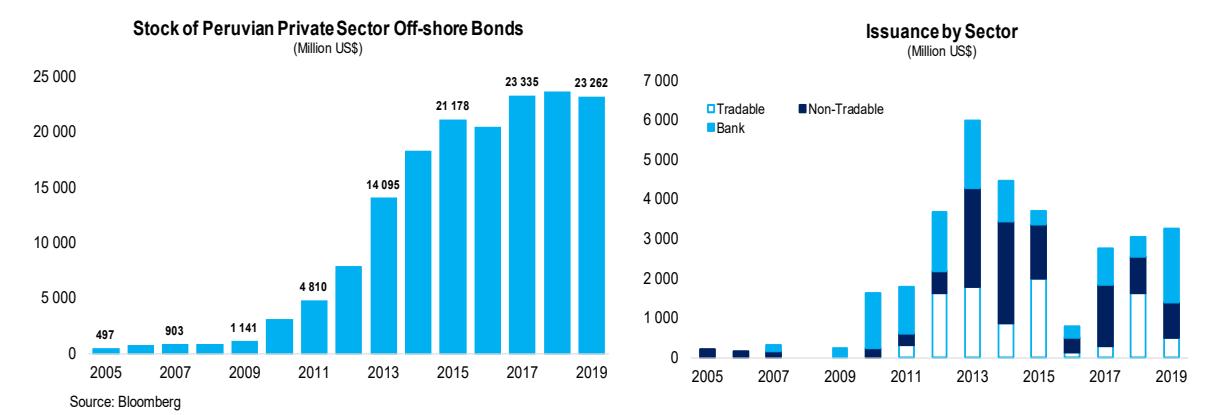
At the same time, in recent years Peruvian firms have taken advantage of the strong demand for debt instruments from emerging market economies (EMEs) in amounts

greater than they could obtain in their local markets. Thus, the stock of outstanding international bonds increased from USD 1.1 billion in 2009 to USD 23.2 billion in 2019, with Peruvian banks as main participants in these overseas issuances.

Issuance of international securities is mainly in US dollars (93%), with a median maturity of 10 years (up to 61 years). The average spread of corporate issuances relative to the US Treasury Bill rate was around 165 basis points at end-2019.

Private international bond market

Graph 7



Implications of fixed income market development for monetary policy

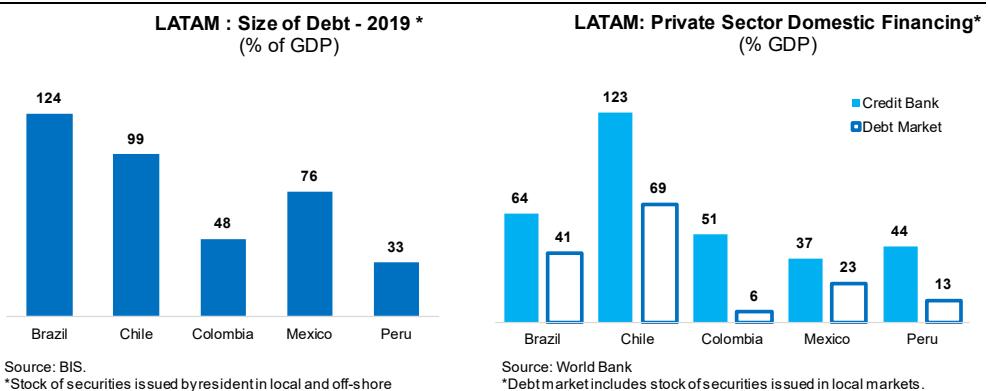
The lower degree of financial market development in EMEs, as compared with the advanced economies, limits the transfer of risk between economic agents, the effectiveness of monetary policy, the financing options of the private sector, and the capacity of the economy to absorb capital flows.⁴

In Peru, as in most Latin American EMEs, the development of financial markets (mainly for fixed income government instruments) has been considerable. According to the IMF's Financial Development Index, Peru has improved in terms of access, depth, and efficiency in the financial market (although it remains well below developed countries).

⁴ Stone et al (2008).

Stage of financial market development

Graph 8



In particular, Peru's debt market as a percentage of GDP is relatively small (33%) compared with those of other countries in the region. Additionally, in Peru banks predominate in private firm financing (44% of GDP) over the bond market (13% of GDP, below the regional average of 30%).

However, although Peru's fixed income market is still small, the increase in the liquidity and depth of this market in recent years has had a positive effect on the transmission of monetary policy to other interest rates. In particular, the pass-through of the interbank interest rate to the average lending rate and the stock of CDCCRP is almost complete after one year in the most recent period, while it was around 0.4–0.7 in 1995–2004.

Peru one-year interest rate pass-through*

Table 1

Interest Rate	Sub-samples	
	1995-2004	2005-2019
Average lending rate	0.4	1.0
Average deposit rate	0.3	0.7
Stock of CDCCRP	0.7	1.1

*The Interest Rate Pass-Through is defined as the cumulative response of the variable divided by the interest rate orthogonal shock in a FAVAR context. Median values are computed using a Bootstrap simulation with 2 000 draws.

In the recent monetary policy easing cycle, the BCRP reduced the reference rate from 4.25% in April 2017 to 2.75% in March 2018; and extended monetary stimulus by further reducing the reference rate to 2.25% in November 2019. During this period, all the relevant lending interest rates showed a downward trend, in line with the easing of monetary conditions in domestic currency.

Interest rates in domestic currency

Table 2

	Dec. 16	Dec. 17	Dic. 18	Mar. 19 Jun. 19 Oct. 19 Nov. 19 Dec. 19					Average 2010-2019	Accumulated Change Dec. 19 (Basic Points)		
				Month	Dec. 18	Dec. 17				Month	Dec. 18	Dec. 17
Money Market												
Policy Rate	4.25	3.25	2.75	2.75	2.75	2.50	2.25	2.25	3.7	0	-50	-100
Interbank Rate	4.39	3.26	2.76	2.75	2.77	2.51	2.25	2.25	3.7	0	-51	-101
Corporate Prime												
1 Month			4.3	3.7	3.8	3.2	2.9	3.0		14	-124	
3 Month	5.4	3.6	4.5	4.0	4.0	3.5	3.2	3.3	4.5	4	-126	-37
6 Month			4.8	4.3	4.3	3.7	3.4	3.5		2	-130	
12 Month			4.9	4.7	4.6	4.0	3.7	3.7		1	-123	
Credit												
Corporate	5.9	4.0	4.9	4.7	4.5	3.6	3.9	3.9	5.4	-2	-98	-11
Large Companies	7.1	6.2	6.4	6.5	6.3	6.1	5.9	5.9	7.0	-2	-52	-33
Medium-sized Companies	10.4	9.7	9.8	10.3	9.9	9.9	9.7	9.6	10.4	-13	-27	-11
Small businesses	21.7	19.8	18.5	18.5	18.8	18.3	18.3	18.1	21.2	-15	-39	-165
Consumer	46.8	48.6	44.9	40.8	41.1	39.5	39.6	40.3	41.8	73	-460	-822
Mortgage	8.5	7.7	7.6	7.9	7.7	7.1	7.1	7.0	8.7	-6	-56	-61

Source: BCRP and SBS

Similarly, the results from an estimated factor-augmented vector autoregressive (FAVAR) model, which allows factors outside monetary policy to be controlled for, show a significant impact on the pass-through of the interbank interest rate to financial system interest rates one year later (Perez (2020)).

FAVAR one year interest rate pass-through¹

Table 3

(Median value and 20 percent of high probability interval)			
CDBCRP 3 month	(0.7-0.8-0.9)	Small Businesses	(0.2-0.6-1)
CDBCRP 6 month	(0.7-0.8-0.9)	Mortgage	(0.5-0.6-0.8)
CDBCRP 12 month	(0.5-0.7-0.8)	FTAMN	(0.5-1-1.5)
CDBCRP 18 month	(0.6-0.8-0.9)	90-day Prime Corporate	(0.6-0.8-1)
Treasury Bond 1 year	(0.8-1-1.3)	Deposit < 1 year	(0.4-0.5-0.5)
Treasury Bond 2 year	(0.5-0.7-1)	FTIPMN	(0.8-0.9-0.9)
Corporate	(0.6-0.7-0.8)	Deposit 1 month	(0.9-1-1.1)
Large Companies	(0.6-0.7-0.7)	Deposit 2 month	(0.7-0.8-0.9)
Medium- sized companies	(0.5-0.6-0.8)	Deposit 3 month	(0.6-0.8-0.9)

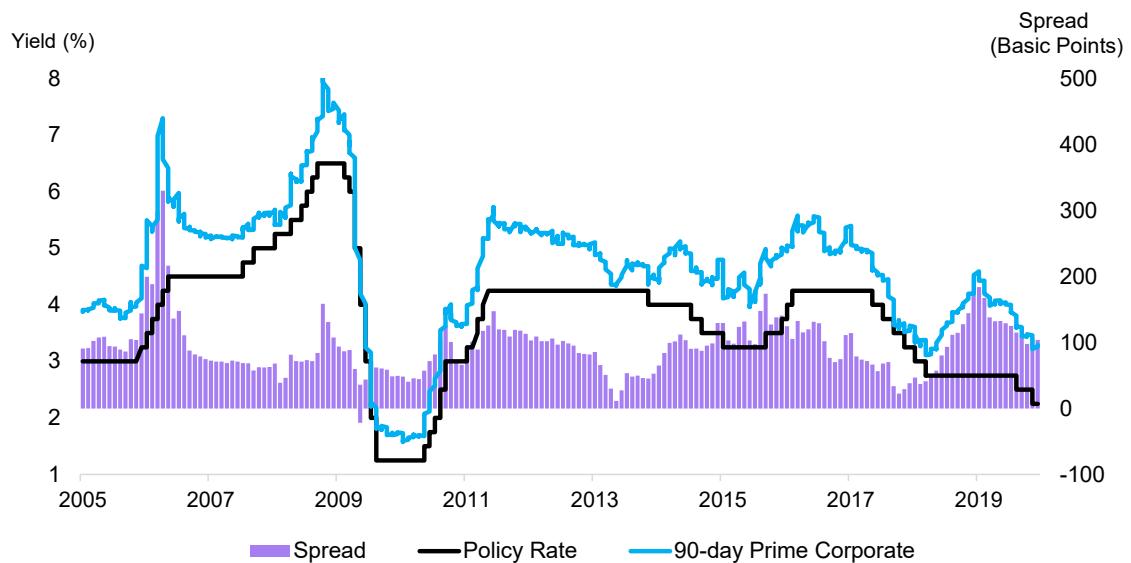
¹ Orthogonal shock in a FAVAR model for Peruvian economy. Factors estimated by principal components. Monthly data from September 2010 to October 2019. Median values are computed using a Bootstrap simulation with 2000 draws.

Recently, new factors have started to affect the formation of the yield curve. In particular, implementation of the Liquidity Coverage Ratio (LCR) by the Superintendence of Banking and Insurance (SBS) has created a greater demand for high-quality liquid assets, such as CDBCRP, and for sources of stable funding, such as Treasury and pension fund deposits. This in turn generated downward pressure on CDBCRP rates and upward pressure on deposit rates at end-2018 and early 2019, respectively. This distortion was reflected in an increase in the spread of the prime corporate rate relative to the reference rate. BCRP monetary operations normalised

conditions in the money market by increasing the supply of high-quality assets through greater CDBCRP issuances (offset by longer-term repo operations).

Spread 90-days corporate prime and monetary policy rate

Graph 10



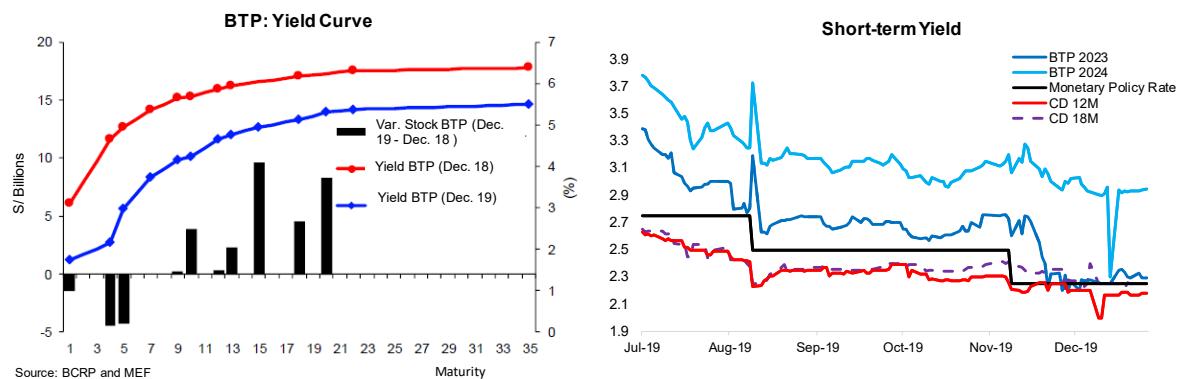
Effect of Liquidity Coverage Ratio on domestic rates

Table 4

	Policy Rate	Interbank	90-Day Active Prime Corporate	90-Day Passive Prime Corporate
Dec. 15	3.75	3.76	5.01	4.30
Dec. 16	4.25	4.39	5.37	4.92
Dec. 17	3.25	3.26	3.63	3.39
Mar. 18	2.75	2.81	3.11	2.73
Jun. 18	2.75	2.77	3.56	3.14
Sep. 18	2.75	2.75	3.90	3.23
Dec. 18	2.75	2.76	4.52	4.01
Mar. 19	2.75	2.75	3.98	3.51
Accumulated Variation (Basic Points)				
2018	-50	-50	89 ↑	62 ↑
Mar. 19 - Dec. 18	0	0	-54 ↓	-50 ↓

Source: BCRP

At the same time, recent government debt management operations consisting of debt repurchase and exchange operations (from 2018 operations for around PEN 17.5 billion total in six operations) have increased the average public debt maturity from 11.6 to 12.3 years, thereby reducing the size and liquidity of the short section of the yield curve (up to five years). This has generated distortions in the yield curve; eg in December 2019 the three-year BTP yield was below that of the 18-month CDBCRP. This originates in the lack of a benchmark for short-term private sector issuances.



Concluding remarks

In parallel with IT adoption and the use of the interest rate as operational target in Peru, the creation of a secondary market for CDBCRPs and BTPs has improved the depth and liquidity of the fixed income market and promoted the creation of a risk-free yield curve for maturities of up to 40 years. This yield curve serves as benchmark for domestic private sector bond issuances. Other factors contributing to this result are good macroeconomic fundamentals, the improvement in sovereign credit ratings, an external environment of low interest rates, and abundant global liquidity after the GFC. In particular, BTP market development has improved the pass-through of the reference interest rate to other domestic currency market rates.

In Peru, financial intermediation is mostly through banking, with corporates as the main participants in the capital markets. Therefore, while the bond market is not yet fully developed, monetary policy transmission is as effective as in other countries in the region. This structure of the Peruvian financial system also contributes to the effectiveness of unconventional monetary policies, since the macroprudential instruments used (ie RRs) take effect through their impact on banking.

Some factors have recently affected the functioning of the money market. For example, the adoption of the LCR generated distortions in the formation of market rates at end-2018 and the beginning of 2019 (especially in the shape of an increase in the corporate preferential rate to 90 days, as compared with the reference rate). This was normalised through BCRP monetary operations, such as an increased supply of high-quality assets and the provision of longer-term liquidity.

Likewise, recent government debt management operations have increased the average duration of public debt, reducing the size and liquidity of issuances with maturities up to five years, which in turn has created distortions in the short stretch of the yield curve. The BCRP will carry out CDBCRP issuances with maturities of up to three years to complete this stretch of the yield curve.

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The development of financial markets in the Philippines and its interaction with monetary policy and financial stability¹

Francisco G Dakila Jr²

Abstract

This paper analyses financial market development in the Philippines and its interaction with monetary policy and financial stability. The interlinkages between financial market development and monetary policy were evident in the Philippines even prior to the global financial crisis (GFC). Rapid developments in financial intermediation due to the financial liberalisation in the 1980s led to shifts in the monetary policy framework, particularly the introduction of an inflation targeting framework in 2002. Strong capital inflows in the post-GFC period contributed to the weakening of the interest rate channel of monetary policy. This prompted a reassessment of monetary policy operations, which eventually led to the implementation of the Interest Rate Corridor (IRC) System in 2016. The increasing reliance of IRC on market-based instruments is expected to aid the development of the domestic money and capital markets in the country.

Meanwhile, financial market development increases market resilience and reduces risk concentration in the country's bank-centric financial system. However, it may also engender greater systemic risk, encourage the growth of shadow banking, amplify global spillovers, and raise the leverage of the non-financial sector. Notwithstanding, the domestic financial markets remain resilient owing to the continued implementation of structural and financial reforms. Based on various financial market indicators, the country has made significant improvements in terms of financial stability and efficiency and is now on a continued path towards improving financial depth and accessibility.

To be at par with its neighbours in terms of financial market development, the country will endeavour to implement the consolidated roadmap for local currency debt market development. The country is also coordinating with other central banks in Asia for the establishment of a local currency settlement framework that would allow a foreign currency to be directly priced against the Philippine peso, and vice versa. The Bangko Sentral ng Pilipinas (BSP) will continue to pursue the reform agenda on macroprudential and microprudential tools to strengthen financial supervision, mitigate financial stability risks, and strengthen financial risk surveillance. The BSP will also closely monitor and assess future developments such as the emergence of new players from fintechs to big techs. It will keep a watchful eye on possible signs of market imbalances in carrying out its price and financial stability mandates.

JEL classification: D53, E52, E58, G15, G32.

Keywords: financial market development, monetary policy, financial stability, financial risk, Philippines.

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Introduction

Financial markets in the Philippines have developed considerably since the Asian Financial Crisis (AFC). Financial liberalisation, prudential supervision, and regulatory reforms have significantly improved the stability, efficiency, depth, and accessibility of the domestic financial markets and institutions. Although the financial system remains dominated by banks, there have been important changes in the structure of financial intermediation. Among the most striking changes are the expansion in the share of foreign funding and a rise in the external indebtedness of the non-financial sector, owing largely to the prolonged period of low global interest rates and ample global liquidity after the global financial crisis (GFC).

Financial market development provides important information to policymakers given their intrinsic links with monetary policy³ and financial stability. It has propelled changes in the BSP's monetary policy framework beginning in the second half of the 1990s until inflation targeting was adopted in 2002, including the adoption of measures to improve monetary operations of the BSP. While financial market development helps reduce risk concentration and increase market resilience, greater global integration has also increased systemic risk.

This note discusses how financial market development has affected monetary policy and financial stability in the Philippines. It starts with a discussion on the development of financial markets in the country since the AFC (Section 2), followed by the interaction of financial market development with monetary policy (Section 3), and financial stability (Section 4), and finally with a discussion of recent challenges and corresponding policies in the last section (Section 5).

Financial market development in the Philippines

There has been significant improvement in terms of financial stability and, to a certain extent, efficiency in the Philippine financial markets. They are on a sustained path towards improving their financial depth and accessibility as compared with those of selected EMEs in South East Asia (World Bank (2016)).⁴

Financial depth in the Philippines has improved since the AFC. Based on the traditional indicator of financial deepening, the country's broad money (M3)-to-GDP ratio increased by more than 2,000 basis points (bp) from 42.1%⁵ in 1999 to 67.3%⁶ in 2017, further rising to 69.7%⁵ in 2019.⁷ The improvement in depth has been observed for both financial institutions and financial markets. The depth of financial institutions measured in terms of the ratio of domestic private credit to the real sector by deposit money banks to GDP averaged 41.7% from 2015–17, a slight improvement

³ Hildebrand (2006).

⁴ World Bank (2016). This approach was also based on Milo (2019).

⁵ For 1999, BSP data based on monetary survey.

⁶ BSP data based on the Standardized Report Forms (SRFs).

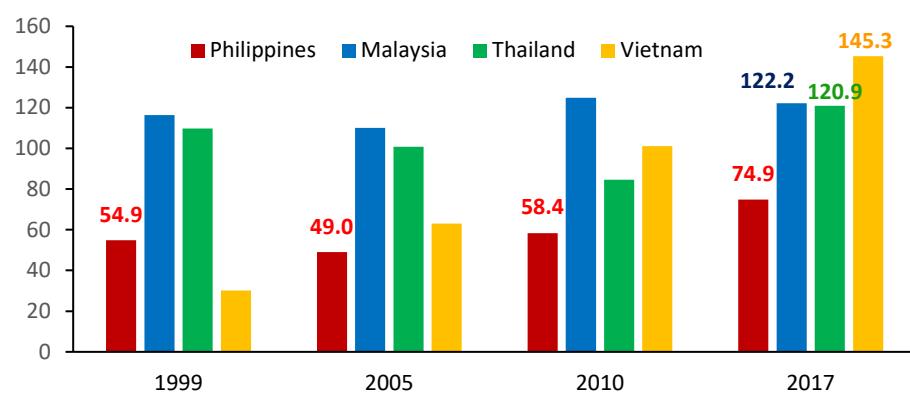
⁷ The marked increase in the Philippines' M3-to-GDP ratio is corroborated by the data from the World Bank,⁷ which showed a 2,000 bp increase in liquid liabilities to GDP ratio, from 54.9% in 1999 to 74.9% in 2017.

from 39.2% in 1999,⁸ but much better than the 35.1% average of lower-middle-income economies for 2015–17.⁹ The depth of financial markets in terms of the ratio of stock market capitalisation to GDP has averaged 81.0% from 2015–17, a marked improvement from 47.9% in 1999. The figure is also much higher than the 54.8% and 33.6% recorded for upper middle income and lower middle-income economies, respectively, for the same period.¹⁰

However, the country's financial depth is modest compared with neighbouring EMEs. Relative to selected EMEs in South East Asia, the country's 2017 ratio pales in comparison with that of Malaysia (122.2%), Thailand (120.9%) and Vietnam (145.3%) as shown in Graph 1.

Liquid liabilities-to-GDP ratio (in %, 1999–2017)

Graph 1



Source: World Bank (2019a).

A similar story can be seen in the Philippines' share of domestic credit to the private sector to GDP (Graph 2). While it increased from 38.5% in 1999 to 47.8% in 2017 and 50.2% in 2019,¹¹ the 2017 share is still low compared with those of Malaysia (118.8%), Thailand (145.0%), and Vietnam (130.7%). The size of the banking sector in the country is also smaller as the ratio of total assets of deposit money banks to GDP in 2017 was only 58.3%,¹² compared with 131.9% in Malaysia, 139.0% in Thailand, and 137.4% in Vietnam.

⁸ World Bank (2019a).

⁹ World Bank (2019b).

¹⁰ World Bank (2019b).

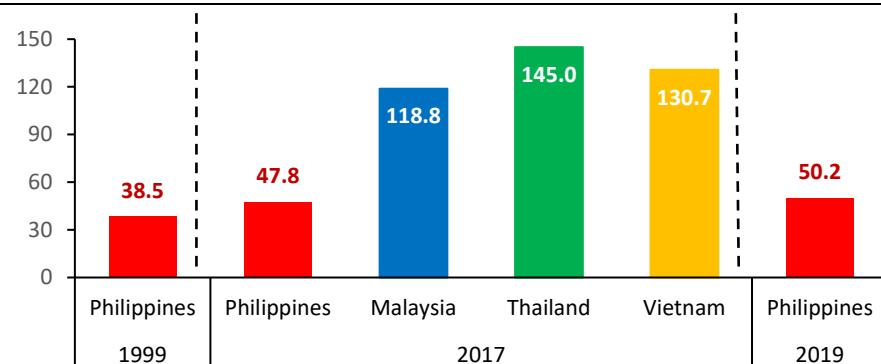
¹¹ Based on both BSP and World Bank data.

¹² Based on BSP data, the total assets-to-GDP ratio of the Philippine banking system was 95.9% in 2017 and 95.7% in end-October 2019 while that of universal/commercial banks was 87.1% in 2017 and 88.1% in end-October 2019.

Domestic credit to private sector-to-GDP

(in %, 1999, 2017, October 2019) liquid liabilities-to-GDP ratio (in %, 1999–2017)

Graph 2



Sources: World Bank (2019a), Bangko Sentral ng Pilipinas.

While the 82.1% share of stock market capitalisation-to-GDP of the Philippines in 2017 is greater than the world's average for middle income economies, it is still small compared with those of Malaysia (128.1%) and Thailand (109.5%).¹³ The total value of stocks traded-to-GDP even declined from 18.3% in 1999 to 10.8% in 2017, lagging behind Malaysia (37.0%), Thailand (74.3%), and Vietnam (15.7%). Moreover, the country's ratio of corporate bond issuance volume-to-GDP marginally increased from 0.6% in 2004 to 0.9% in 2017. This is also lower than those of Thailand (3.7%), Malaysia (4.2%), and Indonesia (1.3%).¹⁴

The provision of financial services in the country has expanded but lags behind EMEs. Relative to working population, the share of individuals¹⁵ with an account at a financial institution increased from 26.6% in 2011 to 31.8% in 2017. However, this is lower than the 39.7% average for lower-middle income economies from 2015–17 and 2017 data of Malaysia (85.1%), Thailand (81.0%), and Indonesia (48.4%) (Graph 3).

¹³ Based on BSP data, stock market capitalisation to GDP of the Philippines was 111.2% in 2017 and 89.8% in 2019.

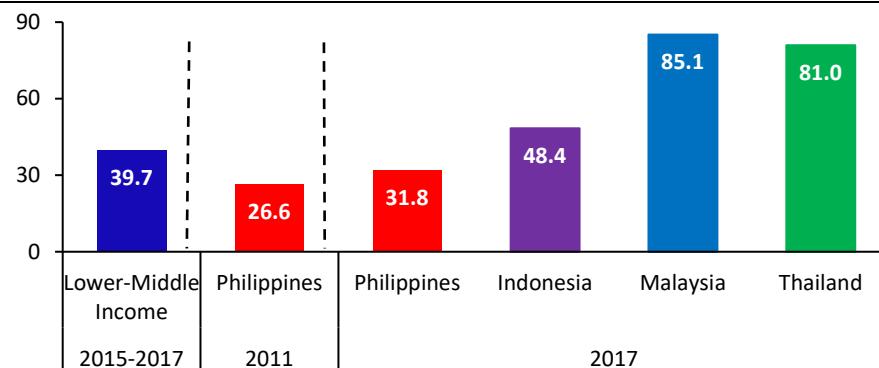
¹⁴ The country's ratio is higher than that of Vietnam (0.1%). In terms of insurance, the country is in a similar position to that of Indonesia and Vietnam as the volume of life and non-life insurance premium to GDP in the country was still less than 2% in 2017 and the share of insurance company assets to GDP did not improve that much and remained below 10%. Malaysia and Thailand continued to lead among EMEs in the region, with 20% of GDP worth of insurance company assets and around 5% share of volume of life and non-life insurance premium to GDP.

¹⁵ Total population of 15 years old and above.

Individuals who reported an account at a financial institution

(in % of 15 and above years old population, 2011, 2015–17, 2017)

Graph 3



Sources: World Bank (2019a).

The country also trails behind its neighbouring countries in terms of access to banking services. The number of deposit accounts per 1,000 adults increased only to 510.1 in 2017 from 394.6 in 2006, which is relatively low compared with 846.3 in Malaysia and 1,270 in Thailand (no data available for Vietnam and Indonesia). The country's shares of population above 15 years old that used debit cards and made use of digital payments in the past year were 21.0% and 13.6%, respectively, in 2017. These are also low compared with Malaysia (73.8% and 60.1%), Thailand (59.8% and 43.2%), Vietnam (26.7% and 16.1%), and Indonesia (30.8% and 26.8%).

Nevertheless, financial institutions in the country are fairly efficient in managing their investment portfolios. Efficiency means the ability of financial institutions to successfully intermediate resources and facilitate transactions.¹⁶ With a net interest margin (NIM)¹⁷ of 4.1% in 2017, banks in the Philippines are the most profitable among those of South East Asian EMEs after those of Indonesia (6.0%). This improvement in the NIM of banks in the Philippines, from 2.8% in 1999 to 4.1% in 2017, indicates a relatively more efficient investment of funds than in Malaysia (2.3%), Thailand (3.5%) and Vietnam (3.6%) in 2017¹⁸ (Graph 4).

¹⁶ World Bank (2019b).

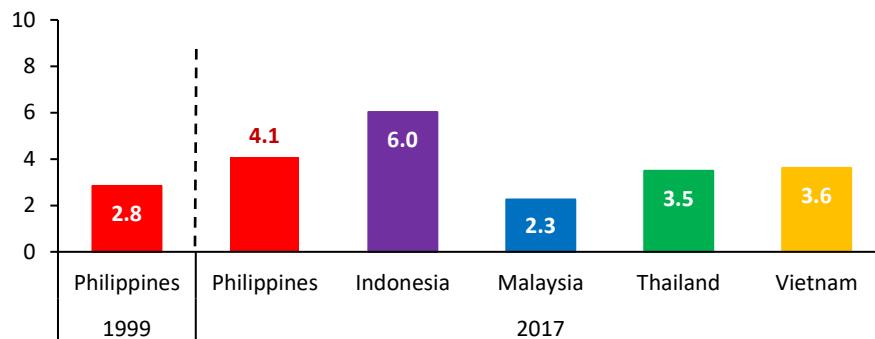
¹⁷ Difference between interest income earned and interest paid relative to interest-earning assets (Milo (2019)).

¹⁸ A similar story can be seen using BSP and IMF data, which showed that the interest margin-to-gross income ratio as of September 2019 was at 73.4% in the Philippines, higher than in either Malaysia (57.5%) or Indonesia (65.9%).

Net interest margin

(in %, 1999, 2017)

Graph 4



Source: World Bank (2019a).

Almost the same is implied by the latest return-on-assets (RoA) and return-on-equity (RoE) data of banks in these Asian EMEs. As of September 2019, the RoA of banks in the Philippines at 1.5% is comparable with that of Malaysia, although lower than in Indonesia (2.5%).¹⁹ The RoE of banks in the country at 13.8% is better than that of Malaysia (12.9%), but still lower than in Indonesia (16.0%).²⁰

In the stock market, however, the turnover ratio²¹ declined from 48.8% in 1999 to 13.1% in 2017. This indicates a less liquid stock market compared with selected South East Asian economies (Malaysia at 34.1%, Thailand at 68.1%, Vietnam at 45.1% and Indonesia at 19.6%).

The Philippine financial system is also one of the most stable among EMEs in the region. The Philippine financial system's Z-score²² declined from 22.7 in 1999 to 17.7 in 2017. However, this level is still high, next to Malaysia (23.4) but better than in Vietnam (12.3), Thailand (7.9) and Indonesia (6.2). The country's average Z-score from 2015–17 at 18.0 is also higher than the 13.6 of upper-middle income and 14.6 of lower-middle income economies.

Moreover, the ratio of non-performing loans-to-gross loans of banks in the country substantially declined from 14.6% in 1999 to 1.6% in 2017.²³ This latest NPL ratio is comparable with that of Malaysia (1.5%) and much better than that of Thailand (3.1%), Indonesia (2.6%) and Vietnam (2.3% in 2015) (Graph 5).

¹⁹ Data cited were sourced from BSP and IMF. Using World Bank data, the RoA of banks in the Philippines improved from 0.3% in 1999 to 1.2% in 2017. This is better than that of Thailand (1.3%) and Vietnam (1.0%), but lower than those of Indonesia (1.9%) and Malaysia (1.6%).

²⁰ Data cited were sourced from BSP and IMF. Using World Bank data, the RoE of banks in the Philippines improved to 11.0% in 2017 from 1.7% in 1999. This is slightly lower than in Vietnam (14.2%), Indonesia (12.8%) and Malaysia (12.3%) but better than in Thailand (9.6%).

²¹ Value of domestic shares traded divided by market capitalisation.

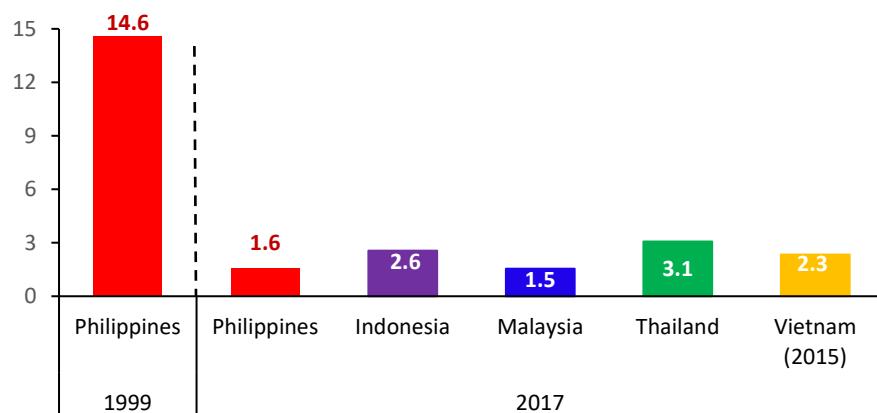
²² Defined as the ratio of capitalisation and return-on-assets to the volatility of return-on-assets.

²³ Data cited were sourced from the World Bank. Using BSP data, the NPL ratio of the Philippines declined from 12.3% in 2009 to 1.2% in 2017, although it increased to 1.6% in 2019.

Non-performing loans to gross loans ratio

(in %, 1999, 2017)

Graph 5



Source: World Bank (2019a).

Meanwhile, the country's financial system continues to be dominated by the banking sector. According to the ASEAN+3 Bond Market Guide 2017,²⁴ the corporate bond market is relatively small despite a significant pickup in recent years. This is reflected by the 1.2% average share of corporate bond issuance volume to GDP from 2015–17 data for the Philippines.²⁵ The Philippine domestic bond market also continued to be dominated by Treasury notes and bonds. Further, banks continued to be the preferred source of financing due mainly to the relative ease of accessing bank loans compared with the issuance of bonds.

The current stability of the Philippine financial system benefits from the lessons learned from the AFC and the GFC. The experiences from the two crises significantly shaped the emerging regulatory and supervisory architecture of the Philippine financial system. The AFC revealed weaknesses in risk measurement and management as well as vulnerability to currency and maturity mismatches. The GFC further underlined the importance of monitoring not only the strength of individual banks but of the financial system and of effective collaboration between the central bank and other regulators in maintaining financial stability.²⁶

Notwithstanding the crisis episodes, the country's economic fundamentals have been generally strong, backed by a resilient and stable banking system. Even with the increasing exposure of the country's financial system to global shocks in recent years, its economic strength has been reinforced by more prudent policies and conservatism in the banking system. The country also maintains sufficient reserves that have helped to absorb shocks. The BSP's implementation of banking reforms, such as disclosure requirements, enhanced risk management framework, and consolidated supervision, has enabled financial markets to withstand domestic and global shocks.²⁷

²⁴ Asian Development Bank (2017).

²⁵ World Bank (2019a).

²⁶ Diokno (2019).

²⁷ Guinigundo (2011).

Interaction of financial market development with monetary policy

Financial market developments are expected to affect monetary policy since the latter is implemented mainly via the financial markets. The various channels – which include the interest rate, credit (eg bank lending and balance sheet), exchange rate, asset price or wealth, and expectations – through which monetary policy affects the real economy largely depend on the structure of the financial system, particularly on the level of financial market development.²⁸ In general, improvements in financial market development are expected to make the conduct of monetary policy more efficient and effective. Meanwhile, monetary policy and its operations also have implications for the development of the financial markets. These could promote or limit financial market development and in recent years, these include not only domestic but also external monetary policy decisions, particularly of the advanced economies.

Prior to the GFC, financial market primarily affected monetary policy through its role in transmitting monetary policy changes to the real sector via short-term interest rates. A hike in the policy rate usually leads to an increase in the short-term market interest rate, which in turn could lead to higher borrowing and lending rates.²⁹ This could also result in higher long-term interest rate and asset prices through the expected future path of short-term interest rates.³⁰ According to Mohanty and Rishabh (2016), since banks are at the centre of financial intermediation in most EMEs, the effects of monetary policy have been largely determined by developments in the banking system in these countries. While the financial system was already relatively open during this period, capital flows were still limited, so that domestic interest rates were tightly linked to the central bank's key monetary policy instruments. The introduction of inflation targeting by many EMEs in the 1990s, together with interest rate reforms, the strengthening of central bank credibility and the development of local bond markets also increased the role of interest and exchange rates³¹ in monetary policy transmission.³²

However, major modifications have occurred in the pattern of financial intermediation in EMEs since the GFC. The quantitative easing policies of advanced economies have led to an abundant supply of short-term and volatile global liquidity in the financial markets and a decline in global interest rates. These have resulted in the expansion of credit markets and the availability of low-cost borrowing for EMEs. These factors may have improved the strength of monetary policy transmission since financial deepening (ie a higher share of financial assets and liabilities relative to income) makes the behaviour of savers and borrowers more sensitive to interest rate

²⁸ Singh et al (2008).

²⁹ Mohanty and Rishabh (2016).

³⁰ Based on the Expectations Theory of the Term Structure, expected future short-term interest rates primarily determine bond yields. The longer is the maturity of the long-term rates, the weaker is the link of long-term rates with the current short-term rates. This is due to uncertainty about the future evolution of short-term interest rates and time-varying risk premiums (see Hildebrand (2006)).

³¹ The exchange rate is the fastest transmission channel for monetary policy. This is affected by monetary policy via the yield curve of both the home and foreign countries (ie interest rate parity relations). However, in practice, exchange rate movements often deviate significantly from what interest rate differentials indicate (Source: Hildebrand (2006)).

³² Mohanty and Rishabh (2016).

movements.³³ However, these have also led to a shift in the structure of financial intermediation as the share of foreign funding, both in terms of foreign-denominated funds from domestic sources and direct external financing, has significantly increased. Financial intermediation through debt markets has also expanded, with most of the debt issued internationally.³⁴ This has also been observed in the increased issuance of international debt by non-financial corporations.³⁵ As a result, the role of banks has declined, although they continue to be driver of credit allocation in EMEs, particularly in Asia.³⁶

Structural changes in financial intermediation post-GFC affect the monetary policy transmission in EMEs. The larger share of foreign currency in the domestic assets and liabilities of EMEs after the GFC may have weakened the influence of monetary policy. This is because policy rates are mainly effective through domestic currency assets and liabilities.³⁷ Moreover, foreign funding is less sensitive to monetary policy as it is more influenced by foreign interest rates and global financial conditions. The limited pass-through of monetary policy and the greater influence of foreign interest rates could cause market interest rates to deviate from the policy rate. Aside from the interest rate and credit channels of monetary policy, financial market developments after the GFC have also affected the exchange rate channel, whereby exchange rate-induced capital flow movements affect domestic financial conditions and hence, increase the transmission of global financial markets developments to the domestic economy.

A number of studies point to an increasing correlation of EME long-term interest rate with global long-term rates, particularly the US long-term rate, after the GFC. Some studies even indicate that global factors exert a much stronger influence on long-term interest rates than do local factors such as the domestic business cycle or monetary policy.³⁸ The growing importance of global factors makes the management of domestic financial conditions more challenging for central banks in EMEs.³⁹ The weakened role of policy rate in the transmission mechanism also creates risks to monetary and financial stability due to the reduced effectiveness of policy responses by the central bank to shocks. However, some studies indicate otherwise. For instance, Mohanty and Rishabh (2016) suggest that India's monetary policy may have been relatively insulated from global shocks due to the country's cautious approach to securities or financial market liberalisation.

In the Philippines, the liberalisation of the financial sector beginning in the 1980s has led to rapid development in financial intermediation and shifts in the monetary policy framework in the 1990s. Rapid developments in financial intermediation and proliferation of various forms of financial innovations (eg increased use of ATMs, plastic money and other modern financial products and

³³ Alper et al (2015).

³⁴ Op cit.

³⁵ Ibid.

³⁶ Ibid.

³⁷ Alper et al (2015).

³⁸ Op cit.

³⁹ Op cit.

services) resulted in volatility in money demand in early 1990s.^{40, 41} The “structural breaks” in the income velocity of money and volatilities and instabilities in the money multiplier,⁴² weakened the link between quantitative monetary targets and inflation. As the BSP found it increasingly difficult to attain its domestic liquidity target and price stability, it modified its monetary aggregate targeting framework in the mid-1990s, putting greater emphasis on price stability instead of strict observance of the targets set for monetary aggregates. However, the unstable relationship between money, output and inflation increasingly complicated the conduct of monetary targeting.⁴³ This eventually led to a shift in the monetary policy framework to inflation targeting, which was first considered in the late 1990s and then implemented in 2002.

Under the inflation targeting framework and continued financial market development, the conduct of monetary policy in the country has become more efficient and effective. Based on Guinigundo (2015), financial development in the country has led to stronger interest rate pass-through, particularly since the inflation targeting regime was introduced. Guinigundo argues that monetary policy has become more effective in influencing the cost of funds in the country. He attributed this to enhanced transparency and accountability in a stronger banking system and greater banking convenience through technology and market innovations.

However, strong liquidity growth brought about by strong capital inflows poses a significant challenge to the BSP. The prolonged period of accommodative monetary policy in the major economies, and the country’s greater financial market openness, created an excess structural liquidity condition. This drove short-term interest rates in the country to unusually low levels and the government’s short-term Treasury bill rate (ie traditional benchmark reference rate) fell outside the corridor of BSP interest rates. This put pressure on monetary operations as market interest rates began to disconnect from the BSP’s policy rate. This, in turn, hampered the ability of the BSP to implement monetary policy and manage liquidity effectively. The situation was exacerbated by the BSP’s institutional constraints, such as its inability to issue its own debt instruments and its limited capitalisation.

In response, the BSP initially turned to alternative instruments such as the Special Deposit Account (SDA) as a means of absorbing excess liquidity. Banks and other qualified financial institutions (such as trust entities) place their excess funds in the SDA instead of deploying these to other productive uses (eg credit, interbank loans etc). This hindered the development of the domestic money market as counterparties considered the SDA to be an investment vehicle rather than a tool for monetary policy and liquidity management. As a result, market interest rates gravitated towards the SDA rate, which was far below the BSP’s official policy rate or the overnight RRP rate. To address this, the BSP ultimately rationalised the SDA by prohibiting non-resident funds from being placed in the SDA facility in 2012 and by limiting the access of trust institutions to the facility in 2013.

To help strengthen the transmission of monetary policy to market interest rates, amid a huge structural liquidity surplus due to strong capital inflows, the BSP adopted the Interest Rate Corridor (IRC) System in 2016. Under the IRC, the operational framework for monetary policy implementation was redesigned to

⁴⁰ Guinigundo (2005).

⁴¹ Guinigundo and Cacnio (2019).

⁴² Lim (2008).

⁴³ Guinigundo and Cacnio (2019).

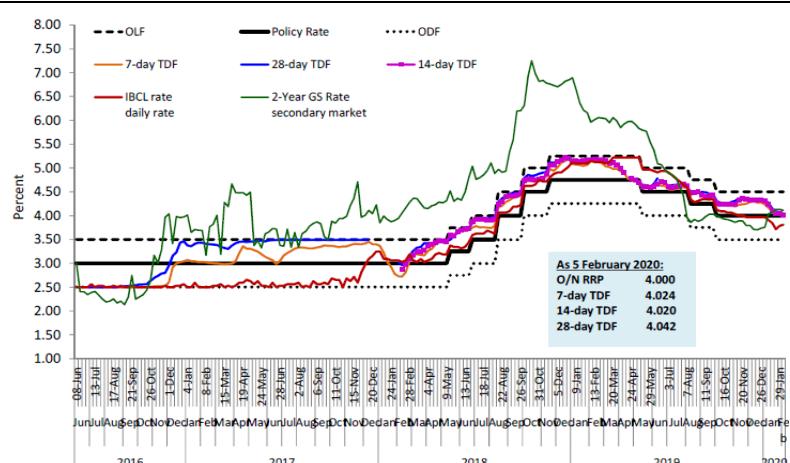
accommodate a varying balance of monetary instruments, including rules-based and market-based instruments. The BSP allowed for more active liquidity management with the use of market-based instruments for open market operations to steer short-term market interest rates towards the policy rate. Moreover, access to the term deposit facility (TDF) was limited only to aid in the development of the domestic money market, particularly the interbank market.

Market rates have moved in line with the BSP's policy rate since 2018 (Graph 6). A closer relationship between the policy rate and the market interest rates enables the BSP to generate a more effective policy signal. The BSP also introduced further refinements to the IRC framework to encourage active and dynamic liquidity management by banks as well as provide the BSP with greater operational flexibility.⁴⁴ These refinements help lessen the BSP's reliance on reserve requirements to manage liquidity in the financial system over the medium term. This, in turn, should reduce intermediation costs and free up resources to finance productive economic activities.⁴⁵

Market rates closely track BSP policy rate

(in %, June 2016–February 2020)

Graph 6



Source: Bangko Sentral ng Pilipinas.

With the increasing reliance on market-based instruments, the IRC is expected to aid the development of the domestic money and capital markets. IRC will support increased money market transactions as well as promote more active liquidity management by individual financial institutions. The BSP also encourages the development of an active and liquid repo market that will support the establishment of interest rate benchmarks and strengthen the monetary policy transmission process. The repo market allows market-makers to consistently provide two-way prices for traded securities, improving price discovery. This environment will help provide valuable information on the prevailing cost of liquidity, thereby, facilitating the establishment of sound interest rate benchmarks.

⁴⁴ BSP (2019).

⁴⁵ BSP (2019).

Meanwhile, the BSP continues to implement a flexible exchange rate regime, which serves as the country's first line of defence against external shocks. By helping reduce spillovers to the economy, adherence to a flexible exchange rate strengthens the BSP's monetary policy autonomy. The flexible exchange rate regime allows the BSP to intervene only if volatility in the foreign exchange market is perceived to adversely affect the inflation outlook. In recent years, a number of studies have shown that exchange rate pass-through has declined, particularly under the IT regime.⁴⁶

Moreover, the BSP has been using macroprudential policies to complement monetary policy in the face of financial market developments. Monetary policy is considered better suited to managing aggregate demand and addressing broader macroeconomic conditions.⁴⁷ Using monetary policy to mitigate the effects of financial distortions can be destabilising, as seen in the 1970s and the 1980s. Hence, the BSP has made several regulatory reforms to further strengthen risk management practices in the banking system and enhance capital buffers against possible unforeseen shocks. Currently, the BSP also has an ongoing rationalisation of reserve requirement policy that aims to promote a more efficient financial system and to reduce market distortions. The BSP also constantly refines its monetary operations and continues to closely monitor developments in domestic credit and liquidity conditions in conjunction with the evolving inflation outlook in order to assess the need for further adjustments, as necessary.

The BSP also continues to use financial market development indicators in aid of monetary operations and monetary policy formulation, given that financial market prices reflect market expectations about future economic developments.⁴⁸ The BSP evaluates the information contained in financial market data, together with other monetary and economic indicators.

For instance, the BSP continues to use the information contained in the yield curve to gauge inflation expectations. Also, following the implementation of the IRC in 2016, transactions in the interbank call loan (IBCL) market have increased in volume, with the average IBCL rate now closely tracking the policy rate. Notwithstanding increased activity in the IBCL market, the IBCL rate may not always be a precise indicator of aggregate liquidity conditions due to market segmentation, with smaller banks often unable to borrow at the IBCL rate. Hence, the BSP supplements the IBCL with other market-determined rates, eg the term deposit facility (TDF) rates. The BSP also looks at credit thresholds developed by the Bank for International Settlements and the International Monetary Fund to help identify periods of excessive credit growth, as well as the NPL ratio, NIMs, the loans-to-deposit ratio (LDR) of the Philippine banking system, and residential real estate prices (RREPI) to monitor house price inflation.

Together with financial market development, communication has become a more important tool for monetary policy through the policy signalling channel. The BSP believes that the effectiveness of its monetary policy depends largely on its ability to anchor the public's expectations, particularly of its key stakeholders. Clear and credible communication is an indispensable tool in anchoring economic agents' expectations. For instance, following the BSP's adoption of the IRC system in June

⁴⁶ Dakila et al (2019); Delloro et al (2017); Glindro et al (2016); Tuano-Amador et al (2009).

⁴⁷ Guinigundo and Cacnio (2019).

⁴⁸ Hildebrand (2006).

2016, clear and effective communication was very important in allaying market concerns. The BSP clarified that the changes implemented were mainly operational adjustments that did not involve a change in the stance of monetary policy. Moreover, the ILC reforms were specifically calibrated to have a neutral impact on monetary conditions upon implementation. At the same time, the expected migration of liquidity from the overnight deposit facility (ODF) to auction-based instruments (such as the TDF and the RRP facility) is seen to bring market interest rates closer to the BSP policy interest rate.

The BSP's monetary policy communication strategy has been generally consistent even as the domestic financial market continues to evolve. It follows a targeted approach in its monetary policy communications, with financial market participants as the key target audience. Alignment of commentaries of financial market analysts with the BSP's messaging is seen to reflect the effectiveness of BSP in conveying its key monetary policy messages to its main target audience. Meanwhile, the BSP also hopes to reach a wider audience, especially the non-financial sector public, to help in managing inflation expectations. To do this, the BSP has recently been expanding its online presence on various social media platforms via infographics and live streams of its press conferences on monetary policy decisions and data releases.

Interaction of financial market development with financial stability

Financial market development is intended to control systemic risk and to promote price discovery and transparency, with the ultimate goal of ensuring the stability and effectiveness of the financial system. A well functioning financial market helps avoid disruptions and provides an avenue for the smooth functioning of the financial system. Financial stability is needed to ensure smooth flow of financial transactions and efficient allocation of resources, in which financial asset prices are in sync with economic fundamentals.⁴⁹

The BSP strongly supports financial market reforms for a more balanced financial ecosystem where a "well-functioning banking system is complemented by deep and liquid debt and equity markets and where there are viable alternative sources of financing for long-term investments, including the development of necessary financial market infrastructures" (Espenilla (2017b)). Financial market development could help reduce risk concentration in the banking sector, specifically the inherent maturity mismatches in the banking books. A less-than-balanced financial system could make the banking sector more vulnerable than it would be, had other complementary markets been better developed. Moreover, well developed financial market segments (eg capital, money market, derivatives and foreign exchange) are necessary in credit intermediation as they promote efficiency, productivity and innovation. For instance, a well developed foreign exchange market allows investors to hedge or mitigate exchange rate risk.

Recognisably, financial market development may result in greater systemic risk. The concept of systemic risks, arising from correlation risks and the interlinked behaviour of the agents in the system, gives vulnerability assessments a new

⁴⁹ See the Bank of Korea's definition of financial stability.

perspective beyond the usual risk analysis involving credit, liquidity and market risks. Interlinkages between products, market players and institutions are now recognised to have a greater significance in the assessment of risks as they can serve as channels for transferring risks and amplifying vulnerabilities in the financial system.

The growth of shadow banking is an offshoot of greater financial market development. Since the purpose of financial markets is to manage risk, there could be a shift in the pattern of financial intermediation from banks to the non-bank sector. On one hand, this may foster the growth of "shadow banking" as financial market development strengthens credit intermediation not only in the banking sector but also provides access to non-bank financial institutions (NBFIs). On the other hand, the proliferation of "shadow banks" could likewise be a risk to financial stability unless appropriate monitoring and regulations are in place.

Financial market development enables the broadening and deepening of the financial sector and encourages the entry of foreign investors. Initiatives to develop the financial market have increased the external positions of different sectors. Based on the international investment position data of the Philippines, external financial liabilities increased particularly for deposit-taking corporations (banks except BSP), general government, and NBFIs. The increase in external financial liabilities was mostly due to investments in equity capital and debt instruments (Table 1).

International investment position of the Philippines (BPM6)

Table 1

	2009	End-Sep 2019
Assets growth rate (%, 2009 vs 2006; end-Sep 2019 vs 2009)	53.7	140.9
Contribution to asset growth (in ppt)		
Direct investment	15.3	54.9
Portfolio investment	-2.4	23.3
Financial derivatives	0.2	0.4
Other investment	-0.4	10.7
Reserve assets	40.9	51.7
Liabilities growth rate (%, 2009 vs 2006; end-Sep 2019 vs 2009)	11.1	107.6
Contribution to liabilities growth (in ppt)		
Direct investment	6.2	55.2
Portfolio investment	1.6	39.8
Financial derivatives	0.2	0.2
other investment	3.2	12.5
Liabilities (without direct investment) by sector growth rate (%, 2009 vs 2006; end-Sep 2019 vs 2009)		
Deposit-taking corporations, except central bank	-28.7	218.7
Other sectors	11.4	74.8
General government	17.7	24.3
Central bank	-54.2	-28.4

Source: Bangko Sentral ng Pilipinas.

Moreover, foreign transactions in the Philippine stock exchange have accounted for the majority of the total value traded in recent years. From a 28.6% share after the AFC in 1999 to a 32.5% share after the GFC in 2009, foreign transactions started accounting for more than half of the total value traded in 2016 with a 51.5% share, and rising further to 57.4% in the first two months of 2020.

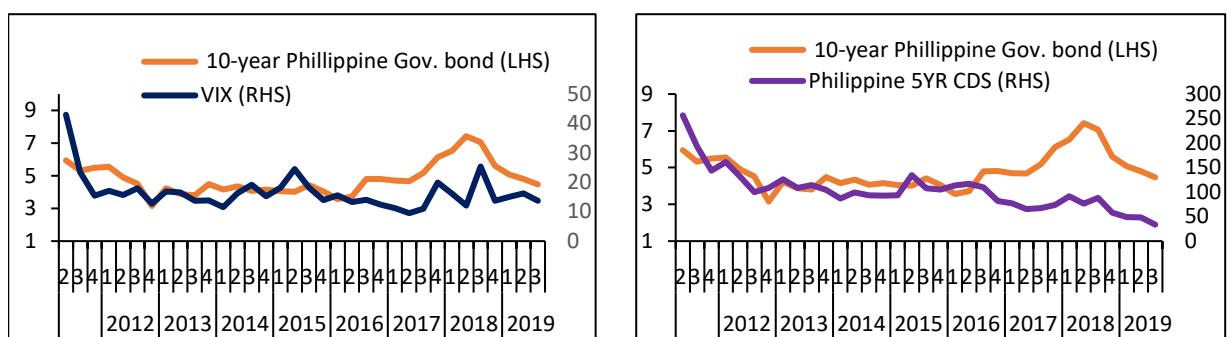
As a result, financial market development amplifies, to some degree, the global spillovers to Philippine financial markets. With the development of

domestic money, bond and equity markets, offshore players have found increasing investment opportunities in the Philippines, leading to substantial inflows of foreign funds. As the Philippine financial markets have grown more integrated with the global economy, domestic asset prices and the Philippine peso have become more responsive to economic developments that affect investor sentiment abroad (Graph 7). This was also shown by Guinigundo (2014)⁵⁰ in his vector autoregressive model analysis, which indicated that the degree of pass-through from the US 10-year bond to the Philippine 10-year bond became more significant between 2008 and 2013 than in the pre-crisis period of 2003–07. This can be a source of vulnerability, as foreign investors have increasingly displayed a tendency toward risk aversion and are now quick to rebalance their portfolios.

Risk appetite (VIX), CDS and 10-year Philippine government bond interest rate

(in %, Q1 2011–Q4 2019)

Graph 7



Sources: Bureau of Treasury; Bloomberg.

The low domestic interest rate environment and greater availability of credit after the GFC could also pose potential risks to financial stability. One possible risk is the rise in leverage of non-financial corporations (NFCs) as firms channel the funds sourced from both the banking system and the capital markets to fund regular business operations and investments in financial assets. Initial findings from the Corporate Financial Trends Survey (CFTS) conducted by the BSP in August 2018⁵¹ show a continued rise in corporate borrowings. This can also be seen in the increase in bank lending to the non-bank private sector in the country in recent years (Graph 8).⁵² The increase in corporate debt exposes firms to greater interest rate and foreign exchange risks.

⁵⁰ Guinigundo (2014).

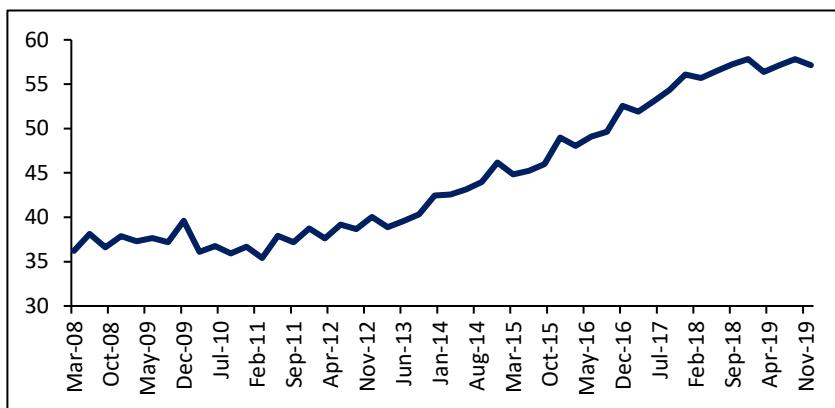
⁵¹ Preliminary results are still subject to the approval of the Monetary Board as of writing.

⁵² Based on limited data, household debt in the Philippines remained modest. Data from the Family Income and Expenditures Survey show that from 2000 to 2015, total household debt had a compounded annual growth rate of 6.5% (BSP Financial Stability Report (2017)) but in terms of its ratio to GDP, it declined from 2.0% in 2000 to 1.4% in 2015. Guinigundo (2015) also made a similar observation but using outstanding consumer loans data.

Bank credit to non-financial private sector

(in % of GDP, March 2008–November 2019)

Graph 8



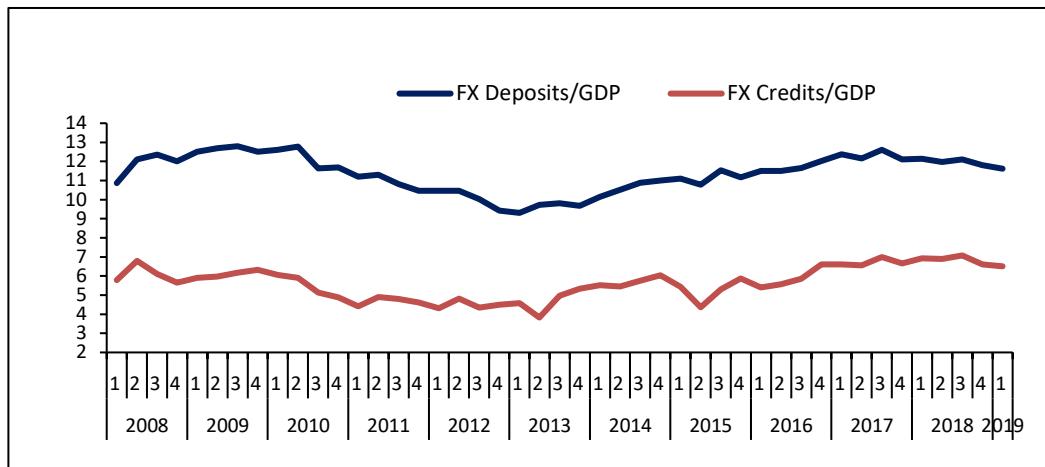
Source: Bangko Sentral ng Pilipinas.

The Philippine financial markets have demonstrated resilience in the face of recent economic pressures and geopolitical tensions. This resilience is attributed to the implementation of structural and financial reform programmes that expand the depth and breadth of financial markets as well as enhance their efficiency in funds intermediation. This may also be partially traced to the flexible exchange rate regime and close monitoring of foreign currency exposures in the public and private sectors, with the aim of ensuring that foreign borrowing remains manageable. The BSP's presence in the market, together with the BSP's regulations, keeps the peso's volatility at levels comparable with that of regional peers. Data from universal and commercial banks indicate that FX funds in the country have been relatively stable in recent years as shown by the ratios of FX deposits and credit to GDP (Graph 9) and to the UKB's balance sheets (Graph 10).

Ratios of universal/commercial banks FX credit and FX deposits
Q1 2008–Q1 2019

(in % of GDP)

Graph 9

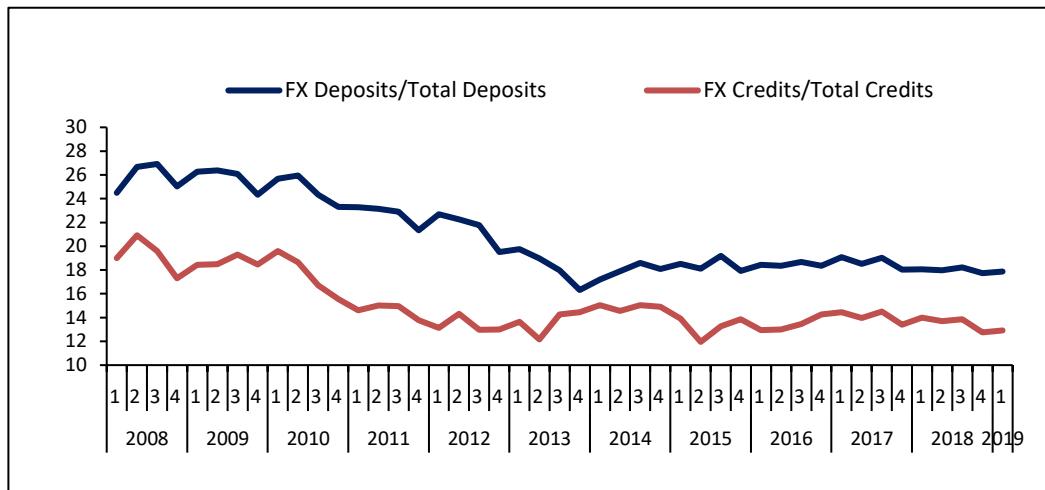


Source: Bangko Sentral ng Pilipinas.

Ratios of universal/commercial banks FX credit and FX deposits
Q1 2008–Q1 2019

(in % share of total deposits/credits)

Graph 10



Source: Bangko Sentral ng Pilipinas.

While greater foreign participation in the domestic markets may lead to increased sensitivity to global risk dynamics, it may actually increase market resilience. Increased participation by offshore investors in the domestic financial markets makes these markets deeper and more liquid. The influx of funds also contributes to the growth of the real economy, as the supply of capital to finance productive endeavours increases. Moreover, as investor types diversify, selling pressures during periods of increased global uncertainty may lessen, as increased interest from one group of investors may serve to offset divestments by another

group. Also, the presence of foreign investors encourages Philippine issuers to adopt global best practice in governance and disclosure frameworks.

Major reforms in the local currency debt market lead to lower financing costs at home, providing an incentive to reduce foreign currency exposure. The BSP believes that a sound local currency debt market supports the development of the country's financial sector and efficiently channels foreign capital into the economy. This could be a valuable source of long-term financing. As pointed out by Espenilla (2017a), this is important for more efficient fiscal operations since a robust local currency debt market supports a sustainable, market-oriented debt strategy at reasonable cost and with a desirable mix of maturities. A more liquid money market could also strengthen the monetary transmission mechanism.

The development of the domestic currency debt market is valuable to the private sector as it broadens investment opportunities and paves the way for increased availability of financial products (Espenilla (2017a)). This may include hedging instruments that could help boost the country's economic resilience to external shocks. The development of interest rate and foreign exchange-related hedging instruments supports risk management and hence financial stability as these allow market participants to mitigate risks related to rising interest rates and volatilities in the exchange rate. Also, developments in non-residents' use of the Philippine peso, particularly in the non-deliverable forwards (NDF) market, are important from a policy perspective. For instance, there are important linkages between the onshore markets and the offshore NDF market. For one, there could be volatility spillovers from the NDF market to the onshore spot market, particularly during uncertain market conditions. NDF prices also provide useful information for policymakers about market expectations of potential pressures on the exchange rate or changes in perception about country risk.

The development of the local money market plays an important role in the evolution of FX cash and derivatives markets. Reforms to further deepen the domestic money markets (eg the IRC system and the development of the overnight indexed swap market) are essential to adequately price FX risk-management (or hedging) instruments such as forwards and swaps, and to improve liquidity to support the growing hedging market. Deepening the domestic money market could strengthen the country's resilience against external shocks such as capital flow volatility and FX volatility. Hedging markets are important when pressures arise from sudden flight of capital due to narrow return differentials in a domestic financial market. The ability of market participants to hedge their exposures reduces the impulse for destabilising capital flight.

Borrowing in local currency may help overcome "original sin"⁵³ or a situation in which a country is unable to borrow abroad in its own currency, resulting in a currency mismatch in the balance sheet. However, while the local currency bond market could protect the borrowing country from the adverse effects of large currency depreciations, this does not totally ensure financial stability when the share of foreign participants in the market is large. The country will still be susceptible to capital flow reversals when foreign exchange risk materialises.

The BSP has also been coordinating with other central banks in Asia for the establishment of a local currency settlement framework (LCSF), which, in a way, may help overcome "original sin". An LCSF would allow a foreign currency to be

⁵³ Eichengreen et al (2003).

directly priced against the Philippine peso, and vice versa. This could reduce foreign exchange risks and encourage a wider use of both currencies. This is expected to boost trading and investment volume and is also viewed as a good opportunity to deepen bilateral economic and commercial ties between the countries involved. A well developed financial market paves the way for smooth and easy cross-border capital movements. This financial market infrastructure could also foster risk-sharing between resident borrowers and foreign investors in terms of foreign exchange risk and interest rate risk, as well as credit risk.

For instance, the Philippines has signed three pairs of bilateral letters of intent on LCSFs with Indonesia,⁵⁴ Thailand⁵⁵ and Malaysia⁵⁶ in 2019. The bilateral arrangement between two central banks centres on the use of their local currencies for the settlement of trade in goods and services, which may later include direct investments and other similar activities such as income transfers. The framework promotes use of the local currency and reduces reliance on the US dollar, and it could also strengthen economic linkages among countries, thereby moderating financial stability risks. It also supports the development of domestic financial markets due to increasing demand for regional currencies and ultimately support regional economic and financial integration. Aside from ASEAN, the Philippines is also coordinating with other countries in Asia.⁵⁷

While important strides have been made in deepening the Philippine capital market, further reforms are needed for the country to be at par with its neighbours. To date, the local currency bond market in the country consists mostly of public issuances and the corporate bond market remains small. This is partly due to the strong policy bias of the national government in favour of domestic borrowing in order to reduce foreign exchange risks and support the development of the domestic bond market. Based on investor profile data, domestic investors, mostly banks and investment houses, hold the largest share of government bonds. The availability and take-up of hedging solutions in the domestic market in the country appear to be limited at present.⁵⁸

To further develop the local debt market, the BSP will spearhead the implementation of the consolidated roadmap for local currency debt market development, which was jointly introduced by the BSP with other government agencies⁵⁹ in 2017. It comprises harmonised programmes and policies that specify a set of steps to expand market depth and breadth as well as encourage active trading and the development of market-based benchmarks. The initiatives follow a deliberate, sequenced programme of immediate to medium-term action plans to ensure that urgent and important issues are tackled without disrupting the financial markets. The

⁵⁴ A BSP-BI bilateral meeting was held on 8 August 2019 to discuss the technical details of the proposed LCSF, which include the criteria and process for the selection of ACCDs and the foreign exchange administration flexibilities that may be extended to support the proposed LCSF.

⁵⁵ The BSP is currently reviewing the list of regulations that will be affected by the implementation of LCSF with Thailand.

⁵⁶ In November 2019, the BNM delegation informed the BSP that it is undertaking a review of its existing LCSF agreements with BOT and BI before proceeding with discussions with the BSP.

⁵⁷ With Japan, China and Russia.

⁵⁸ Based on the 2019 Financial Stability Report, the total outstanding notional amount of derivatives positions as of December 2018 was lower than its level three years previously (in 2015) and is equivalent to 2% of the total resources of all Philippine UKBs.

⁵⁹ Includes the Securities and Exchange Commission (SEC), the Department of Finance (DoF), and the Bureau of the Treasury (BTr).

BSP has also further liberalised foreign exchange rules to facilitate the flow of foreign portfolio investments to fuel the development of the local debt market. These reforms aim to promote greater ease in the use of the foreign exchange resources of the banking system for legitimate needs by relaxing FX rules and streamlining procedures and requirements.

Meanwhile, to further strengthen the Philippine banking system, the BSP has consistently pursued a reform agenda on macroprudential and microprudential tools to strengthen financial supervision and mitigate financial stability risks. After the AFC, the BSP learned that while micro regulatory oversight is crucial in ensuring that financial institutions continue to be safe and sound, this is insufficient for maintaining financial stability. This is because the interlinkages within the financial network create risk behaviours that are distinct from the risks that are seen at the firm level. As a result, the BSP started to implement macroprudential measures to mitigate systemic risk or the likelihood of failure of a significant part of the financial system. The early implementation of combined macroprudential and microprudential measures is one of the reasons why the country was not as heavily affected as other emerging economies when the GFC hit in 2008.⁶⁰ The GFC also underscores the need for a more systematic and wide-ranging macroprudential supervision due to the great potential damage from systemic breakdowns.⁶¹ Based on the BSP's experience, macroprudential measures are effective if these are administratively manageable and can alter risk behaviours by, for example, making banks more risk-sensitive and prudent in managing their risk-taking activities. Meanwhile, effective microprudential measures require not only adherence to the technical and quantitative aspects of regulatory standards, but also the development of an appropriate culture within a sound corporate governance framework.

The BSP also continues to strengthen its financial risk surveillance. With high-quality data, timely insights on system-wide and idiosyncratic risks can be derived. The BSP has put in place a number of tools to enhance data capture in support of its financial stability framework. These tools enable the BSP to provide a holistic assessment of the condition and performance of the banking system, identify emerging vulnerabilities and risks confronting the banking sector and their potential impact on financial stability. They also allow the BSP to make more informed and calibrated policy decisions in areas that require careful supervisory action. Aside from strengthening the surveillance of the financial system to identify and manage these risks, clear, transparent and timely communication is essential for a more effective financial stability framework. The BSP communicates financial system vulnerabilities and corresponding actions or responses primarily through media releases, interviews and speeches within a communications framework.

Future challenges and policies

Due to their intrinsic links, financial market developments interact with monetary policy and financial stability. Hence, central banks should closely monitor and assess

⁶⁰ Fonacier (2019).

⁶¹ Ibid.

future developments in the financial market as these could affect the efficiency and effectiveness of monetary policy as well as the stability of the financial system.

Central banks in EMEs also grapple with the emergence of new players from fintechs to big techs⁶² that may disrupt some sectors of the financial market.

These innovations include new business models such as peer-to-peer (P2P) payments and lending, crowdsourced funding and social network credit scoring, as well as enhanced solutions to traditional businesses in the payments sphere. While new entrants could bolster market competition and enhance financial inclusion efforts, these firms may also pose financial stability risks. These businesses could be a destabilising force for banking businesses and the payments system. For one, they could also be a channel for capital outflows, promoting currency speculation and capital flight, over which the central bank would have little control. Moreover, new lending platforms may introduce financial stability risks if the credit activity of new entrants were to grow, given the uncertainties in the quality of data being used in assessing risks and the lending standards. Risks may also arise from the increasing utilisation of cloud services as these may be exposed to cyber threats or widespread disruption in the financial system should cloud services malfunction or be inaccessible.

In response, regulators should recognise that they are now operating in a more complex financial landscape, where traditional banks compete or cooperate with these new players. As new forms of risks arise, the goal of policymakers is to find the right balance such that rules do not become a burden to the entry of innovative players while ensuring that new entrants not entail financial stability risks.

The BSP remains dedicated and committed to supporting beneficial innovations through an enabling policy and regulatory environment. It openly engages with fintech players and innovators through a flexible "test and learn" environment or the "regulatory sandbox", which enables it to fully understand emerging business models while assessing the attendant risks. The BSP is also undertaking capacity-building programmes that would help operationalise the institution's duty to ensure resilience against the risks that new technologies may bring to the financial system. Training opportunities are being deployed to provide regulators with the proficiency and competence to keep track of fast-evolving innovations. The BSP is crafting a roadmap that espouses collaborative engagement, capacity-building initiatives, and commensurate regulation.

Going forward, the BSP will keep a watchful eye on possible signs of imbalances in the market in carrying out its price and financial stability mandates. In particular, the digitalisation of the payments system, the adoption of new forms of electronic payments and stores of value, and the issuance of digital currency could fundamentally affect money demand. As these forces take root in the Philippines, the BSP will need to assess how any resulting changes in money demand could affect its liquidity forecasts for monetary operations. In this regard, it is also exploring the use of big data to supplement its current data needs for monitoring liquidity conditions.

The BSP envisions its monetary policy operations and financial policy to be more flexible and dynamic to adapt to emerging financial market developments. It will continue to calibrate monetary tools to address the greater role

⁶² Big techs are large technology firms providing digital services such as messaging services, search engines, and e-commerce platforms. In the process, they have accumulated large amounts of data which can be used to further expand their businesses.

of financial markets in policy transmission. It will also push for continuous and sequenced reforms of its financial policies as well as the modernisation of its internal processes through the adoption of technology-enabled solutions. It will transform its supervisory assessment framework into a seamless, dynamic and more-forward-looking supervisory model.

Monetary operations will be supported by the restoration of the BSP's ability to issue debt securities under the Republic Act No 11211⁶³ on 14 February 2019.

The restoration of the BSP's authority to issue its own debt securities even in normal times⁶⁴ provides the BSP with additional tool for managing financial system liquidity. Issuance of BSP securities will be used for the absorption of any structural liquidity surplus in the face of persistently large capital inflows as well as for siphoning off liquidity released from the planned operational reductions in reserve requirements over the medium term. At the same time, issuance of BSP securities will help in the development of the domestic bond market as it facilitates the construction of the benchmark yield curve at the short end.

Moreover, the Charter further strengthens the BSP's capability to promote the stability of the financial system and addresses supervisory gaps in the areas of data and information-gathering⁶⁵ as well as wider institutional coverage, among others. For instance, BSP's regulatory and examination powers have been expanded to include the quasi-banking operations of NBFIs (eg money service businesses and credit granting entities) to manage the build-up of systemic risks such as those that could possibly stem from shadow banking. The law also paves the way for the BSP to implement a more forceful inspection and disciplinary authority over the banks and other financial institutions it regulates nationwide.

Lastly, the BSP is committed to implementing timely, necessary, and appropriate measures to address any turbulence in the financial market. While the Philippine financial system remains sound with adequate capital and liquidity buffers, the volatility in the domestic financial market in the early part of 2020 due to uncertainties over the impact of Covid-19 has led the BSP to undertake extraordinary measures to support domestic liquidity, shore up market confidence, and ensure the proper functioning of the financial market.⁶⁶

⁶³ An Act Amending R.A. No 7653, otherwise known as the "New Central Bank Act".

⁶⁴ Prior to the approval of the amended BSP Charter (RA 11211) on 14 February 2019 (which amended RA 7653), the BSP was allowed to issue its own debt securities only during periods of extraordinarily high inflation.

⁶⁵ On data information and gathering, the new law provides the BSP with the authority to require from any person or entity, including government offices and instrumentalities, or government-owned or – controlled corporations, any data, for statistical and policy development purposes in relation to the proper discharge of its functions and responsibilities.

⁶⁶ BSP (2020).

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How to benefit from financial deepening while preserving financial and macroeconomic stability: the case of Poland

Piotr J Szpunar¹

Abstract

Poland has achieved a successful economic transformation. The banking crisis of the early 1990s resulting from a faulty licensing policy and a difficult economic situation was adequately managed at a relatively low cost. State intervention was well targeted and no bad banks were needed. Bad loans continued to be managed by the institutions that granted them, which significantly reduced moral hazard. After the situation stabilised, banks were privatised by selling blocks of shares to international investors. At the same time, some of the banks' shares were floated on the Warsaw Stock Exchange, which was important from the point of view of information transparency and effective supervision. The new ownership structure, with foreign strategic investors in many banks, made it easier to avoid forbearance. The supervisory authority also used a wide scope of soft powers, which proved to be effective and flexible. As a result, it was possible to avoid a credit bubble and systemic risk, which set the stage for economic development with relatively low level of indebtedness. In general, recent decades have seen a gradual process of financial deepening. A major challenge for the future will be the development of the capital markets, especially the corporate bond market. However, due to the dominance of the banking sector as well as supply and demand factors, the development of the corporate bond market will require the involvement of the authorities.

JEL classification: G21.

Keywords: Economic transformation, banking crisis, financial deepening, banks, privatisation, supervision, financial stability, macroeconomic stability, systemic risk, capital market.

¹ Director, Economic Analysis Department, National Bank of Poland (NBP). The views presented here are those of the author and do not necessarily reflect the official position of the NBP.

Introduction

The last two decades have been turbulent in both advanced and emerging market economies. Although the early 2000s were characterised by robust economic conditions and moderate inflation, significant imbalances accumulated in many countries, not least in the form of real estate bubbles. The Great Financial Crisis (GFC) not only led to a contraction of GDP and welfare in a number of countries, but also had significant implications for the functioning of financial markets and banks. Moreover, policymakers recognised the need to address systemic risk in financial systems, which resulted in acknowledging macroprudential measures as a crucial element of stabilisation policy.

Against this background, the Polish economy appears as one of the most resilient, especially among emerging markets. After a painful transformation at the turn of the 1980s and 1990s, Poland has experienced uninterrupted economic growth for almost three decades. Even the GFC did not bring the Polish economy to a halt. Prudent macroeconomic policies were among the key reasons for this success. This remarkable resilience is also partly attributable to a sound banking sector, which two decades before the GFC was practically non-existent. Although by the 1990s, the socialist monobank had already been replaced by newly created commercial banks, this only marked the beginning of a process leading up to the emergence of a modern, competitive and strong banking sector.

This note focuses on factors that – based on the Polish experience – could either facilitate or hamper the development of the financial system. The first part describes the main lessons drawn from historical developments in the financial sector. The second part discusses potential steps that could further strengthen the positive role of financial institutions for the development of the Polish economy. The final section concludes.

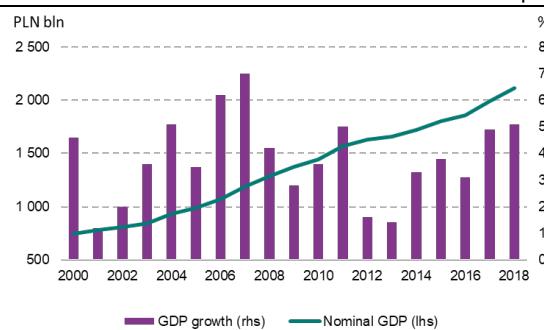
Creating a financial system conducive to sustainable economic growth

Today Poland could serve as an example of economic success story (Graph 1). Almost three decades of GDP growth constitute one of the longest confirmed periods of economic development in the world. This uninterrupted growth allowed for significant narrowing of the economic distance to western Europe and visible improvement of the financial conditions of Polish households and enterprises. But looking three decades back, these positive developments could hardly have been expected. The beginning of the 1990s was marked by extremely unfavourable economic conditions with large imbalances. The Polish economy suffered from major structural weaknesses bequeathed by the socialist command economy. The lack of capital as well as adequate skills and know-how hindered the development of enterprises. At the same time, the underdeveloped banking system could not provide credit to facilitate the growth of the private sector. Considering these circumstances and following the example of other European economies that had a strongly bank-dominated financial system, building a banking sector that would more efficiently allocate capital in the economy became an official priority. Over the following years, a number of decisions and reforms have paved the way for the emergence of a modern, two-tier banking system. As there was no precedent to learn from, this restructuring has been a trial and error process. Although this approach allowed for some mistakes, it proved to be successful and led to the emergence of a sound, competitive and properly managed banking sector. This approach also provided some important lessons regarding the "dos and don'ts" of banking system development, as discussed below.

Real GDP growth and nominal GDP in 2000–18

Number of commercial banks in Poland

Graph 1



Graph 2



Source: Polish Statistical Office.

Source: Bank supervision 1989–2006, Reports on bank situation, NBP.

Growth of banking sector is not an end in itself

Having recognised the need to build competitive banking system, in the early 1990s, the Polish authorities chose the privatisation of state-owned banks as the means of reaching this goal. However, considering the low level of domestic private savings and the perception of Poland as a high-risk economy among foreign investors at that time, such a solution seemed unattainable. Consequently, to kick-start the privatisation, NBP initiated a lenient bank-licensing policy, with low capital

requirements. This policy encouraged the registration of almost 90 new commercial banks, as of 1993 (Graph 2). However, the quality of these new institutions was not in line with their quantity. On the contrary: the newly created banks were usually small and poorly capitalised. Moreover, many suffered from insufficient know-how that led to poor risk management. These flaws were quickly exposed, as the recession accompanied with strong structural changes in the economy resulted in a dramatic increase in non-performing loans. The deterioration of loan portfolios was especially severe in the case of the new banks, triggering many failures. The poor performance of these banks in the adverse economic environment clearly showed that a strong and resilient banking sector could not be built on numerous but weak entities. Only a banking system comprising well capitalised and prudently managed institutions could facilitate sustainable economic development.

Supporting troubled institutions could be a better solution than relieving them of their problems

The recession took its toll not only on the most vulnerable banks, but on the whole banking sector. Mounting bad loans eroded the financial position of many private banks, undermining their ability to continue their operations. To prevent the negative consequences of widespread bank failures, the authorities had to step in. Both the State Treasury and the NBP participated in restructuring the banking sector. In the case of private banks, the restructuring took several different forms: some institutions were taken over by the authorities, and others by banks in better financial shape that additionally received aid from the government. Still other entities received the financial assistance necessary to implement rehabilitation plans. At the same time, big, state-owned banks were provided with aid in form of high-yielding restructuring bonds issued by State Treasury. Restructuring bonds – eligible as capital – allowed state-owned banks to significantly strengthen their capital position and create adequate reserves against bad loans. In return, banks were obliged to restructure their credit portfolios within one year, by separating non-performing loans and shifting them to newly created debt-collection departments that were expected to gradually collect or liquidate low-quality loans.

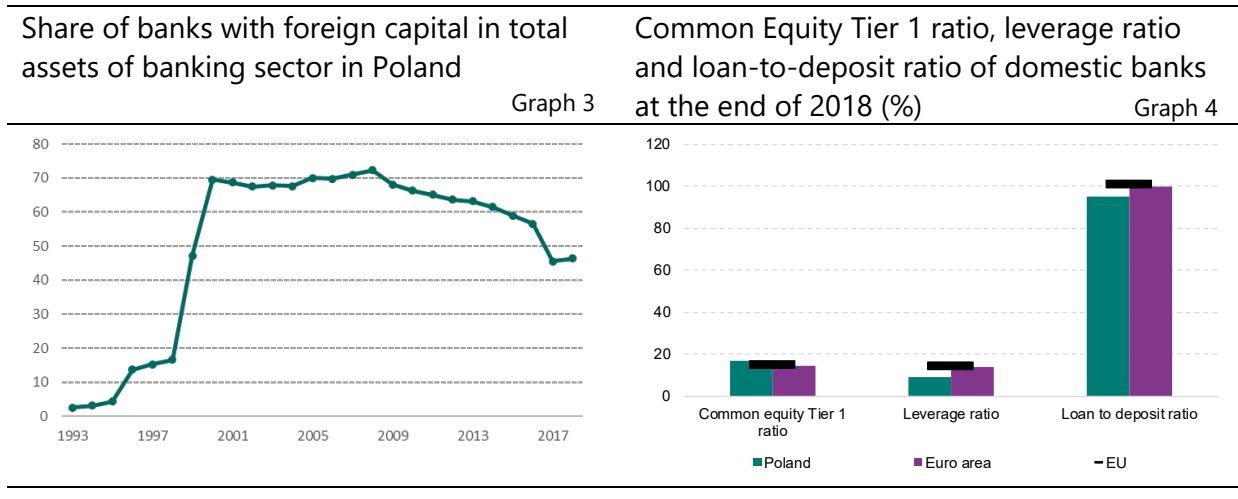
It is worth noting that, although banks received substantial financial support from the state, they were left to solve the bad loan problem on their own. This approach contrasts with methods used by some other central European countries, where bad loans were carved out and accumulated in a "bad-bank". The Polish decision-makers decided against such a solution, on the grounds that it could have created a moral hazard. Moreover, the authorities believed that making banks cope with the bad debt burden in-house would provide these institutions with a valuable learning experience. The Polish approach to bank restructuring proved successful, with the relevant banks improving their profitability and maintaining their capital adequacy.

Foreign capital can spur development of banking sector, but timing of its arrival and conditions are crucial

The end of the recession revived the interest of foreign investors in Polish assets, including banks. Yet, considering that the banking sector restructuring process was still under way, the authorities were reluctant to let foreign investors establish new entities that would compete with troubled domestic institutions. However, they also

saw an opportunity to facilitate the restructuring process by allowing foreign financial institutions to help ailing banks with both capital injections as well as transfer of know-how. In order to encourage foreign investors, the supervisory authority granted them the eventual option to take over the restructured banks. Such an approach – the involvement of foreign players, but within stated boundaries – contributed to the success of the restructuring process and reduced its cost to taxpayers.

With time, as the sector matured and the banks improved their market positions, the restrictions regarding foreign involvement in the banking system could be safely lifted. Indeed, at the beginning of 1999, foreign institutions gained access to the Polish banking sector and promptly started to build their position in the financial market. In 2000, the share of foreign-owned banking assets rose from less than 50% to 70% (Graph 3). Notably, the authorities once again employed a strategy designed to benefit the banking sector's development, namely selling controlling packages of privatised bank shares to highly regarded financial institutions ready to make a strategic investment in Polish banks. This method of privatisation was expected not only to provide banks with additional capital, but also to bring efficiency-enhancing changes to banks' operations. However, to avoid putting too much reliance on single investors and to ensure an external check on management performance, the minority stakes were sold on the Warsaw Stock Exchange. This privatisation strategy brought the anticipated results: the technologies and practices brought in by foreign investors strengthened bank finances and helped to build a competitive and resilient banking sector.



The combination of strong supervisory powers with soft instruments proved to be an effective way to ensure financial stability

The ownership structure of Polish banks shaped by the privatisation process has some important implications for supervision. Strategic investors are natural partners for supervisory authorities to cooperate with and – hence – help them to monitor institutions and – if necessary – enforce corrective actions. Moreover, foreign ownership reduces the risk of supervisory forbearance due to political interference, as any strong links between political bodies and foreign financial institutions are unlikely to emerge. These features of the Polish banking sector help the supervisor

authority to fully exploit the broad competences granted by the Polish law. At the same time, the important role played by foreign institutions has also increased the need for supervisors to act. For example, pressures from foreign owners on local management – concerning, *inter alia*, increased exposure to parent company assets – could have a detrimental effect on the stability of Polish banks and hence need to be counteracted. The supervisor has indeed frequently and decisively used its power to avoid any such harmful influence from parent institutions. These as well as other actions aimed at correcting excessive risk-taking have proved successful in maintaining the capital and liquidity positions of Polish banks. Currently, the Common Equity Tier 1 ratio in the Polish banking sector is 2.4 percentage points higher than for all euro area banks, while the leverage ratio and loan-to-deposit ratio in Poland are respectively 4.8 percentage points and 5.1 percentage points lower than in the euro area (Graph 4).

Part of this success was attributable to the way that the Polish supervisory authority chose to act. Instead of resorting to administrative decisions or legislative changes, it made use of more flexible, “soft” instruments, mainly recommendations. Although not legally binding, recommendations proved to be effective in creating a set of market practices that are strictly followed by banks. Thanks to this setup, the supervisory body was able to introduce some macroprudential measures even though it had no formal macroprudential policy mandate. Consequently, the flexibility provided by the “soft” approach played an important role in safeguarding the stability of the Polish banking sector. In particular, it allowed for sufficient flexibility in the conduct of supervisory policies despite the relatively rigid and harmonised EU regulatory environment.

Strong supervision is not a silver bullet for financial stability

The financial system is not ring-fenced from the rest of the economy. On the contrary, it has a strong bearing on real and monetary developments, which – in turn – feed back into the situation of the financial sector. Consequently, the stability of financial system hinges not only on the situation within the system, but also on the developments in the whole economy and the economic policies pursued by all relevant authorities. This point could be illustrated by the impact of monetary policy on the stability and development of the Polish banking sector.

Monetary policy played a major role in the development of financial system right from the start of the transformation. The high dollarisation of the economy and extremely high inflation at the beginning of 1990s hindered the development of financial intermediation. Rebuilding trust in the domestic currency was a prerequisite for the successful reform of Polish banking sector. Hence, the conservative monetary policy that resulted in gradual disinflation – to the extent that it strengthened the confidence in domestic currency – was important for the development of Polish banks. At the same time, the long period of high real and nominal interest rates moderated the growth of financial intermediation, as it encouraged enterprises to rely on internal resources and financing from parent companies, instead of on bank credit. High interest rates also affected banks’ business models. First, higher interest rate volatility made retail deposits the preferred source of funds for banks instead of wholesale funding. Second, they promoted the widespread use of floating rate contracts for both loans and deposits. These factors were ultimately conducive to the longer-term resilience of the banking sector.

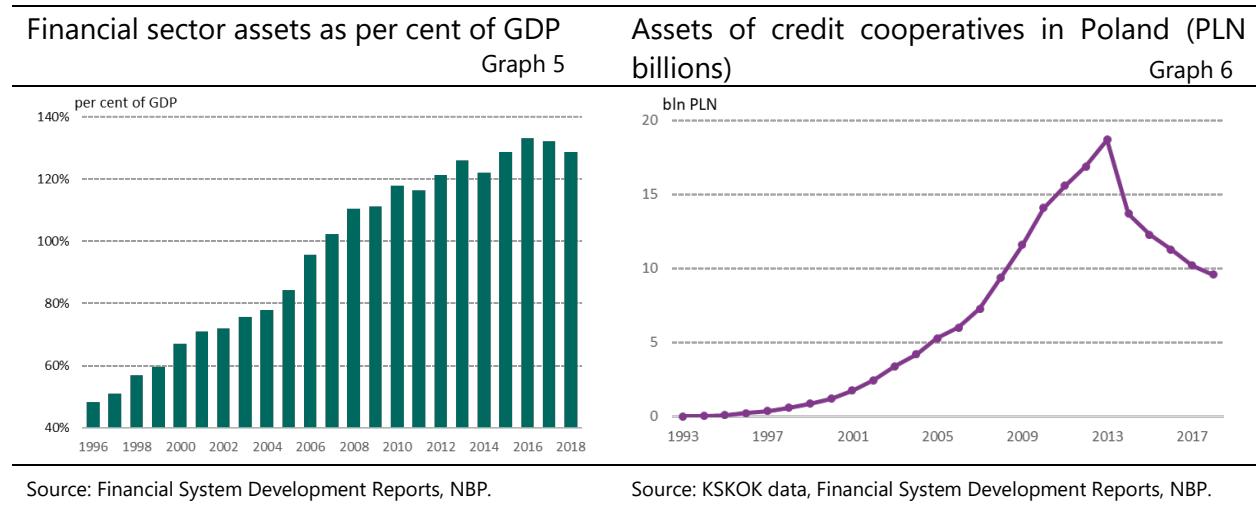
However, conservative monetary policy also created some unintended risks for financial sector stability. Relatively high interest rates in Poland, together with the strong presence of foreign-owned banks that had access to FX funding from parent institutions, led to a large increase in FX mortgages granted to unhedged borrowers in the early 2000s (Brzoza-Brzezina et al (2010)). As the build-up of FX credit portfolios created potential risks for the banking sector – including higher credit risk and spillover risk from parent institutions – the supervision authority stepped in, issuing a recommendation that initially mitigated credit risk stemming from FX loans and later – after amendment – banned FX credits to unhedged borrowers altogether (KNF (2013); Willmann (2013)). Fortunately, the large portfolio of FX loans caused no major disruption in the banking sector, even after the strong zloty depreciation in 2009. As these loans were based on floating rates, the effect of a weaker currency was, to a significant extent, offset by a fall in market interest rates after monetary policy easing by the Swiss National Bank and the ECB (Głogowski and Szpunar (2012)).

To sum up, the development of the financial system in Poland has been unusual for two main reasons. First, at the beginning of 1990s, Poland started to build its financial sector nearly from scratch amid challenging economic conditions. Second, as there were no precedents to learn from, Poland was forced to adopt a “learning-by-doing” approach. Consequently, the development of financial system has not been free of mistakes. However, this provided important lessons that have influenced the subsequent decisions of Polish authorities and which could constitute a valuable insight for other economies.

Keeping up with the economic development – a way forward

Considering the severe underdevelopment of the financial system that Poland inherited from the socialist command economy, facilitating the development of this sector for many years has constituted an important goal for Polish authorities. Consequently, over the last three decades, the Polish financial sector has experienced a significant evolution: starting nearly from scratch, the size of financial sector increased to nearly 129% of GDP in 2018 (Graph 5). According to IMF experts, the size and structure of financial system in Poland is optimal with regard to its ability to facilitate economic growth (Sahay et al (2015)). Such an assessment indicates that Poland was successful in terms of developing adequate financial system.

However, for this statement to remain true, there are still some issues to be addressed. First, the Polish banking sector – despite being strong and resilient – still has its weak points and challenges. The proper management and correction of these flaws are necessary to avoid potential setbacks in the future. Second, even in the areas that clearly constitute a strong feature of the Polish financial system – eg effective macroprudential policy – there is still some scope for improvement. Finally, as the Polish economy evolves, its needs regarding financial intermediation change. Yet, the financial system might not adjust to these changes on its own accord, but rather may require a “nudge” from the authorities.



Weaknesses to be addressed

Lack of proper supervision – especially vis-à-vis numerous smaller institutions – might have long-lasting adverse effects. Although a deteriorating financial situation or even the failure of small entities would not create systemic risk for the financial sector, it could have negative spillovers in the form of loss of confidence in the financial system. Such risks are potentially material if fragmented, small and fragile but numerous entities have a relatively large client base. In Poland, this is exactly the case with cooperative banks and financial cooperatives, known as SKOKs.

The cooperative banking sector as a whole is functioning in a stable manner, although it still faces a number of challenges associated with the financial distress of individual entities and the need to define its long-term strategy. Cooperative banks in most cases meet the supervisory and liquidity requirements; however, in the case of certain banks, firm action has to be taken to define their business model. The sector's low efficiency associated with its business model and its low integration rate pose challenges to cooperative banks' profitability and their capacity to expand in the future (NBP (2019)).

The total assets of the SKOKs account for less than 0.5% of banking sector assets. However, the number of the SKOK members remains high (approx. 1.5 million clients). Consequently, a potential failure of these institutions may create problems that cannot be disregarded. The risk of such a scenario materialising is not negligible, as the quality of SKOK loan portfolios is poor, their efficiency is low and currently five of these cooperatives fail to meet capital requirements (KNF (2019)). The weak position of the sector is to a large extent the legacy of past supervisory neglect. SKOKs were included under the supervision of the Polish Financial Supervision Authority (KNF) in late 2012, ie after 20 years of operations during which the sector had continued to grant a large volume of high-risk loans. In subsequent years, some financial cooperatives were taken over by commercial banks, many were suspended in their operations and several merged with other cooperatives. The impressive expansion of SKOKs over many years has proved to be unsustainable (Graph 6). Despite recovery programmes that most of credit cooperatives have been obliged to join, the situation in this sector has remained complex.

The fragile financial condition of some cooperative financial institutions is problematic for at least two reasons. First, – due to the high number of SKOK members – it may create social and reputational problems. Second, the ongoing restructuring process of credit cooperatives requires a significant use of the financial resources of the Polish deposit guarantee fund (BFG). Hence, it reduces the capacity of the BFG for any problems that might be identified in other financial institutions, especially in the banking sector, which still remains the main contributor to the BFG.

The central bank's role in safeguarding financial stability should be strengthened

Macroprudential supervision in Poland has proved effective in mitigating systemic risk. Although a formal macroprudential authority – the Financial Stability Committee (KSF) – was established only in 2015, the steps aimed at curbing sector-wide risks had previously been taken informally by the microprudential supervisor.

The institutional setup of macroprudential policy created in 2015 is in line with international best practice. The KSF comprises representatives of four major financial safety-net institutions, the NBP Governor, the Chair of the KNF, the Minister of Finance and the President of the Bank Guarantee Fund (BFG), with the central bank playing a key role within this framework as far as macroprudential policy is concerned. Meetings devoted to macroprudential issues are chaired by the NBP Governor (as opposed to crisis management meetings, which are chaired by the Minister of Finance), who has a casting vote in case of a tie. Moreover, the KSF has a clearly stated mandate and formal independence, which is vital for the committee's ability to pursue this mandate. It also has an appropriate set of policy instruments.

Despite this institutional setup and track record, keeping systemic risk in check in the years to come might require further efforts. These should be partly aimed at addressing the problems that could emerge irrespective of the state of the economy, including the inaction bias of macroprudential authorities, political resistance to macroprudential actions or an inability to clearly show the benefits of measures as opposed to their costs. Apart from these universal challenges, Poland – as a relatively small, open economy with strong role played by foreign strategic investors in its banking system – could be prone to some specific risks. These risks include vulnerability to regulatory arbitrage or negative spillovers – mainly in the form of capital and liquidity outflows – should the parent financial institution become distressed. For a small open economy, it is also crucial to keep all channels for credit flows under scrutiny, including the cross-border direct lending and cross-border capital flows, since both may fuel domestic credit booms (Davis and Presno (2017)). Addressing these risks could require a more active macroprudential policy than in the bigger European economies. However pursuing such a policy could be quite challenging as room for manoeuvre for local authorities is limited by the harmonisation process applied to all EU countries under the CRD IV/CRR package. One way to build up authorities' capacity to address country-specific risks is by using non-standard tools, including microprudential or fiscal measures. To pursue such an approach effectively requires a strong cooperation between fiscal, monetary and supervision authorities, which is to a great extent ensured by the current macroprudential institutional framework in Poland. However, the ability to effectively mitigate risks to financial stability could be strengthened by bringing microprudential supervision back to the central bank, which would benefit not only from the trust and authority the NBP enjoys, but also from the data and expertise at its disposal. Further

improvement of the institutional framework of prudential policy and effective use of non-standard measures would allow Poland to face up to both universal as well as country-specific challenges that would emerge in the years to come.

The growing role of the state in the domestic financial system is another reason why the microprudential supervision should be moved back to the central bank. The role of the state manifests itself through: (1) ownership of a number of large financial entities, including in the banking and insurance sectors; (2) a significant representation of the government sector in the decision-making body for microprudential supervision of the entities; and (3) the growing share of government bonds on bank balance-sheets. Amid the growing state role in the financial system in recent years, it is desirable to reduce the risks that may arise as a result of a divergence of objectives between the supervisory and ownership functions. The effective separation of the supervisory and ownership functions could be achieved by the reintegration of financial market supervision into the structures of the NBP. Such a change would be in line with the global trend towards placing microprudential supervision with the central bank (NBP (2019)).

The need to develop market-based financing for enterprises

Over the last three decades, credit growth has broadly been maintained at a level that facilitated economic development without creating imbalances. However, much of this credit has supported consumption rather than production: as of November 2019 consumer and mortgage loans accounted for 60% of banks' credit portfolios. Corporate credit has not only lagged behind loans to the household sector, but also – due to the high risk aversion of banking institutions – has flowed mainly to bigger, well established enterprises. In turn, small or young companies that have neither a good credit history nor high-quality collateral have limited access to bank financing, which could have an adverse effect on the development of new technologies and innovations, and consequently on long-term economic prospects. Another result of banks' reluctance to accept risk is the strong procyclicality of the financial system based on these institutions (eg Huizinga and Laeven (2019)). In turn, capital markets are more willing to accept higher risk, if it is rewarded with a higher expected return. As a result, they are more apt to finance start-ups, small enterprises or innovative products that, if successful, might help to fuel economic development. Moreover, the equity and bond markets provide a more effective mechanism of risk-sharing and consumption-smoothing, as it is investors – as opposed to depositors – who bear any losses. For these reasons, moving from mainly bank-based to a more market-oriented financial system might prove beneficial, as it would not only create more opportunities to increase the innovativeness and long-term growth potential of the economy, but also would reinforce its financial stability (ESRB (2014)).

Poland's financial markets are still heavily dominated by banks. Although its capital markets have also grown substantially over the last two decades – with stock exchange capitalisation increasing from 18.8% of GDP at the end of 2000 to 53.4% of GDP at the end of 2018 and the value of corporate debt securities rising from 0.2% to 1.0% of GDP – they provide financing for only a limited number of Polish enterprises, mainly large ones. It seems that such organic growth – hindered by a number of barriers – will not be enough to drive a significant move towards more market-based financing. Hence, speeding up the development of capital markets would require public intervention aimed at eliminating both supply- and demand-side obstacles to growth. On the supply side, the major impediments – pertaining

mainly to SMEs – include limited financial literacy and the high cost of obtaining funds. On the demand side, the lack of a diversified investor base strongly hampers the ability of firms – especially SMEs – to secure funding. Addressing these issues with proper public interventions would make capital markets a viable source of funds for larger share of Polish enterprises. Such a change could not only spur economic growth, but would also be conducive to the more efficient and stable functioning of the financial system.

Conclusions

The last three decades have seen a steady development of Poland's financial system. Although this has been to a large extent a process of trial and error, it has proved to be quite successful, resulting in a strong and competitive banking sector. The lessons learnt have surely contributed to this success and could provide important insights for other economies, especially with regard to the Polish approach to restructuring distressed banks, as well as conducting supervisory policy. However, for the financial system in Poland to remain resilient and supportive of further economic development, there are issues that should be addressed. First of all, further restructuring of the lending cooperative sector is necessary to avoid potential negative spillovers to the whole banking sector. Secondly, to mitigate risks for financial stability, the macroprudential framework and toolkit need further adjustments and microprudential supervision should be moved back under the umbrella of the central bank. Finally, decisive steps to spur the development of market-based financing for enterprises seem crucial for enhancing the financial stability and long-term growth of the Polish economy.

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Financial markets in EMEs – what has changed in the last two decades

Central Bank of the Russian Federation

Abstract

During the last two decades, financial market development in Russia was driven mainly by changes in monetary and fiscal policies rather than being itself the driver. The specifics of Russia's financial markets (the dominance of banks and big companies; an advanced FX segment; self-financing; a shallow government debt market; thin regulation) produced both positive and negative effects. On the one hand, the Russian financial sector has been more resilient to contagion effects than those of many advanced economies (AEs) and emerging market economies (EMEs). On the other hand, banks as the core of the system have needed more support in crisis times.

At the beginning of the century, owing to the low level of FMD, the central bank could influence the economy mainly by managing the exchange rate using FX interventions. The interest rate channel was underdeveloped. After the 2007–09 Great Financial Crisis, the interest rate channel started to gain importance along with the widening exchange rate corridor and a transition to a liquidity deficit. In 2013, the key rate and the interest rate corridor mode were introduced. Banks' adaptation to a stable liquidity deficit coincided with the implementation of asset and liability management (ALM) and, specifically, funds transfer pricing (FTP). Banks created individual internal transfer curves based on interbank loan rates, government bond zero coupon (OFZ) yields or their own estimates as a base for loan and deposit pricing. In effect, FTP has made transmission faster and synchronised it with the Bank of Russia key rate. The effect of overnight interest rates on long-term interest rates became more consistent. As a result, FMD has significantly contributed to the effectiveness of monetary transmission. Now interest and exchange rate channels remain the most developed while other channels (balance sheet, risk-taking) are less visible. They may become more influential in future, along with FMD.

In 2015–16, the Bank of Russia absorbed all excess liquidity caused by reserve fund spending under a corridor mode and thereby maintained further FMD. In addition, a number of Basel III regulations were implemented that incentivised banks to hold government and central bank bonds.

Traditional banks still dominate financial services because they have developed their own digital services, implemented new instruments and platform solutions, and are improving their business processes, while non-banks pose no serious threat to their profitability. However, in future, the role of fintech and big tech companies may become more important.

JEL classification: E44, O16.

Keywords: financial markets, monetary policy, monetary transmission, macroprudential policy, cross-border flows.

The Russian financial market through the lens of history and macroeconomic policy

In the 1990s, financial market development (FMD) in Russia started from scratch. The core segments (stock market, corporate¹ and government debt markets, money market and spot FX market) emerged on the back of the transition to the market economy. In this period, FMD was marked by hyperinflation and a lack of trust. To tame inflation, an orthodox stabilisation programme was established. This involved a fixed exchange rate (corridor) and a tight monetary and fiscal policy stance. The shift from monetary financing (1992–94) to debt financing (1995–98) led to the rapid growth of the short-term government debt market (GKOs) and the FX forward market.² However, the economy remained vulnerable to domestic or external shocks. The financial turmoil of 1998 – a sizeable devaluation, a default on government debt and a banking crisis – set FMD back. At the same time, it laid the ground for the long-awaited recovery, which in turn gave FMD a new impetus.

The favourable external conditions of the early and mid-2000s not only let the authorities pay off debt in advance but also caused the exchange rate to overshoot, leading to a loss of competitiveness. In response, the Bank of Russia bought foreign currency while the government established a stabilisation fund in 2004 to accumulate windfall oil revenues. Although the floating exchange rate was managed within a narrow corridor, it was perceived by the public as fixed. The lifting of capital controls in 2006 led to an increase in capital inflows and, hence, rising pressure on the exchange rate. Economic growth was fast (5–8%) while inflation remained high (9–13%) but under control. In spite of low rouble money market rates, long-term rouble rates were much higher and depended on other factors. As a result, banks and companies preferred to borrow abroad on the back of attractive interest rate differentials, while foreign currency debt rocketed. When the Great Financial Crisis (GFC) hit, the Bank of Russia had to gradually devalue the rouble to alleviate the debt burden.

After the GFC, the transition to inflation targeting gained speed. The Bank of Russia gradually widened the exchange rate boundaries and optimised the operational framework. Consequently, rouble markets developed sufficiently for inflation targeting to be conducted. The floating exchange rate was introduced in November 2014, and inflation targeting began in January 2015 (as planned). Strong external shocks in 2014 exacerbated the problems with collateral and the remaining dominance of FX segments. To curb inflation and devaluation expectations, the Bank of Russia nearly doubled its key rate. As the interest rate channel had by then matured, rates and yields significantly rose as well. Notably, the monetary and fiscal authorities reacted to the latest crisis in different directions, opting for a "tight-loose" policy mix. Government expenses did not soar, deficits were financed with reserve fund spending, and debt issuance was still constrained by high yields. Moreover, a new fiscal rule was introduced in 2017, with the aim of smoothing out the effects of

¹ At the time, bills were used as substitutes for money to make payments and even to pay taxes.

² GKOs were short-term coupon bonds. Soon, owing to high yields, they became attractive for non-residents, which hedged their purchases of GKOs with three-month FX forwards. As a result, the market was prone to capital outflows.

oil price volatility.³ In 2018, these operations were temporarily suspended because of capital outflows and heightened exchange rate volatility, then in 2019 they were resumed. Currently, FMD is constrained by sanctions, which, however, also make it immune to negative spillovers.

The main drivers of FMD: the role of crises

During the last two decades, FMD was driven mainly by changes in monetary and fiscal policies rather than itself being their driver. Financial markets developed fast and in the 2010s, as the Bank of Russia moved from exchange rate to interest rate management (see Appendix Graph 1), they became mature enough for the implementation of inflation targeting.

The specifics of Russia's financial markets (the dominance of banks and big companies,⁴ an advanced FX segment,⁵ self-financing,⁶ a shallow government debt market,⁷ thin regulation⁸) have produced both positive and negative effects. On the one hand, the Russian financial sector has been more resilient to contagion effects than those of many advanced economies (AEs) and emerging markets (EMEs). On the other hand, banks as the core of the system have needed more support during a crisis.

The 2007–09 and 2014–15 crises exacerbated the problems of foreign currency liquidity availability⁹ and collateral scarcity. As the banking sector moved to a liquidity deficit, collateral scarcity became critical in the moments when the structural liquidity deficit reached its peaks. In these circumstances, interest rates rocketed (see Graph 2 in the Appendix). In 2008–09, the Bank of Russia had to grant loans against non-

³ The rule implies FX purchases by the Ministry of Finance if the oil price exceeds \$40 per barrel and FX sales otherwise.

⁴ By nature, the Russian financial system is bank-based – domestic private credit to GDP amounts to 76% of GDP as of 2018. Institutional investors, such as pension funds or insurance companies, played a minor role (their share is less than 5%). All these, together with the conditions outlined above, accounted for the growth of mainly “bank-related” segments: deposits, loans, FX and money markets and FX derivatives. Also, historically, Russian financial markets were highly concentrated, and dominated by a number of big resource-extracting companies.

⁵ High dollarisation, typical for emerging market countries, as well as a tightly managed exchange rate and elevated inflation were also favourable for the development of FX spot and forward markets and the dominance of the interbank FX market in the 2000s.

⁶ Russian companies have tended to finance their investments with their own sources of funding or budgetary resources. This may be conditioned by the shallowness of financial market segments and high interest rates.

⁷ During the last two decades, borrowings were either not needed (budget surpluses) or the Ministry of Finance was reluctant to borrow owing to high interest rates. In good times, the Ministry of Finance would accumulate reserve fund(s), absorbing excess demand and spending them when a crisis came.

⁸ A legal framework was slow to emerge. Lax protection of property rights hindered the development of the market for years.

⁹ In 2014, the Bank of Russia shifted to FX reverse operations (swaps, repos and loans) from FX interventions (which it conducted earlier in 2014). For a discussion, see Section 7: FMD, cross-border flows and the vulnerability to external shocks and global spillovers.

marketable assets or even offer them unsecured. In 2014–15 too, the largest amounts of liquidity were provided in the form of loans backed by non-marketable assets.

The mutual influence of FMD on monetary policy implementation

Exchange rate targeting (2002–08). From the beginning of the 2000s to 2008, the Bank of Russia concentrated mainly on exchange rate management. In these circumstances, the Bank of Russia could only partially control interest rates (see Appendix Graph 2). The period gave rise to a number of new instruments: FX swaps, corporate bonds and interdealer repos. Nevertheless, the price of these rouble instruments was determined to a large extent by FX market dynamics.¹⁰ Banks enjoyed comfortable liquidity conditions and did not need to actively interact in the money market. The painful experience of the 1998 crisis weaned the government away from the short-term segment (GKO). In addition, the government no longer needed to place large volumes of debt. As a result, the government debt market was shallow. Buy and hold strategies predominated throughout this period.

Thus, the favourable external environment and the policy mix of the time contributed to the development of FX segments while the rouble money market or the government debt market were less in demand and, as a result, less liquid.

Transition to inflation targeting: dual system (2009–14). After the GFC, the transition to a floating exchange rate regime gained speed. The Bank of Russia started expanding the exchange rate boundaries. The growing volatility of exchange rate set the ground for the development of FX derivatives. The declining involvement of the Bank of Russia in the FX market also gave a free hand to liquidity-absorbing forces (rising cash in circulation and budget surpluses), which led to a structural deficit in 2012. Stable demand for liquidity as well as the Bank of Russia's measures to optimise the operational framework¹¹ contributed to the development of the interbank lending market. Nevertheless, even the minimally managed exchange rate was not fully compatible with an independent monetary policy under this regime. It became more difficult to influence the economy via interest rates to achieve the inflation target and anchor inflation expectations. In general, however, the degree of FMD in this period was sufficient for the introduction of inflation targeting.

Full-fledged inflation targeting (2015–19). In 2015–16, unsterilised reserve fund spending generated a liquidity surplus. Other countries in similar situations have usually remunerated bank reserves and/or introduced a floor system. The Bank of Russia, instead, tried to absorb all excess liquidity under a corridor mode and

¹⁰ For instance, the principal of corporate bonds was denominated in roubles but their coupons were linked to the USD/RUB exchange rate. The FX part of the money market outpaced the rouble one too.

¹¹ The Bank of Russia created the framework for inflation targeting (planned to be completed by 2015), including an interest rate corridor with the key rate in the centre. In this period, the Bank of Russia ceased to conduct repo auctions twice a day, gradually shifting to one-week auctions, and got rid of redundant facilities. These helped simplify the operational framework and brought it closer to those used by inflation targeters.

succeeded. In addition, a number of Basel III regulations were implemented.¹² The implications were, however, less severe for corporate bond market and short-term uncollateralised segments than in AEs.

After 2015, activity in the overnight rouble interbank market declined but remained sufficient to be an operationally important segment for the central bank. At the same time, the repo segment (especially against the pool of collateral and with the central counterparty) developed fast. In the new context of a floating exchange rate, low inflation and low interest rates, Russian banks have struggled to hedge interest rate risks and face legal issues with hedging the foreign currency risks of corporate customers. At the same time, as compared with other countries, interest rates (especially real ones) were high, which brought non-residents back to the market. While FX borrowing became more complicated for residents due to sanctions, non-resident flows went into government debt (OFZ).¹³ Currently, the share of non-residents in OFZ amounts to almost 30%. At the same time, market volatility is lower than in other EMEs.

In this period, notwithstanding a structural liquidity surplus, the Bank of Russia has managed to maintain the effectiveness of its operational framework by preserving an interest rate corridor. Households, firms and banks have adapted to a flexible exchange rate, and interest rate risk has become an issue in the absence of liquid markets to hedge it.

FMD and monetary transmission

Over the last two decades, monetary transmission has significantly improved. At the beginning of the century, owing to both the low level of FMD and weak exchange rate targeting, the central bank influenced the economy mainly by the level of exchange rate and the volume of FX interventions. The interest rate channel was underdeveloped. The Bank of Russia was able to set the floor for interest rates,¹⁴ using deposit auctions and central bank bonds. Nevertheless, interbank interest rates were much lower than other yields in the financial market and experienced large swings. The rouble money market was weak and unconnected to other financial market segments.

The interest rate channel started to gain importance after the 2008–09 crisis, along with the widening exchange rate corridor and the transition to a liquidity deficit. In 2013, the key rate and the interest rate corridor mode were introduced. Banks' adaptation to a stable liquidity deficit coincided with the implementation of asset and liability management (ALM) and, specifically, funds transfer pricing (FTP). Banks created individual internal transfer curves based on interbank loan rates, OFZ yields

¹² Specifically, the Basel III regulations incentivised banks to hold government and central bank bonds.

¹³ In Russia, foreign investors conducted carry trades of two different types: (i) positions in the FX market: exchanging foreign currency (dollars) for roubles in the spot market and selling them on through FX swaps; (ii) fixed income/equity positions: exchanging foreign currency (dollars) for roubles in the spot market and buying rouble assets.

¹⁴ The key policy rate did not exist at the time. The Bank of Russia's refinancing rate played the principal role. Nevertheless, some banks linked their deposit rates to the refinancing rate, so that a weak transmission through the interest rate channel may have existed.

or their own estimates as the basis for loan and deposit pricing. In effect, FTP has made transmission faster and synchronised it with the Bank of Russia key rate. The development of the government bond market¹⁵ also contributed to the efficiency of the transmission mechanism. Owing to the development of interest rate swaps (OIS), the effect of overnight interest rates on long-term interest rates became more stable. Also during the past decade, long-term loans with floating rates have become more widely used.

Thus, FMD contributed significantly to the effectiveness of the monetary transmission channel. The interest and exchange rate channels are currently the most developed while others (the balance sheet channel and risk-taking channel) are less visible. They may become more influential in future, in parallel with FMD.

Financial market indicators for calibrating monetary policy

Indicators of operational framework. Under inflation targeting, the Bank of Russia regards the money market (interbank unsecured lending) interest rate as its operational target. In official communications, it does not specify precisely which rate this is, but the most informative for liquidity management purposes are the two rates estimated from statistics reported by banks: MIACR¹⁶ and RUONIA.¹⁷ Substantial deviations of these rates from the key rate may point to discrepancies between the supply of liquidity and demand and be an argument in favour of a fine-tuning operation (FTO).

Indicators of interest rate expectations, country risk premium and others. To estimate market participants' expectations of future policy decisions, the Bank of Russia considers a number of interest rate derivatives: MosPrime¹⁸ forward rate agreements, futures on RUONIA and overnight RUSFAR.¹⁹ Other derivatives are also useful in the monetary policy decision-making process: credit default swap spreads as a measure of the country risk premium, option-implied currency and stock market volatility, and others. In the next few years, due to the global reform of market interest rate indicators, some new indicators for the Russian money and derivative markets may emerge. This may alter the relative importance of the various interest rates that now prevail.

¹⁵ In 2013, the government bond (OFZ) market was liberalised: non-residents gained access to the Russian market through Euroclear and Clearstream.

¹⁶ MIACR (Moscow Interbank Actual Credit Rate) reflects the cost of unsecured overnight rouble borrowing by banks. MIACR is calculated by the Bank of Russia on the basis of the information on actual market transactions.

¹⁷ RUONIA (Rouble Overnight Index Average) reflects the cost of unsecured overnight rouble borrowing by banks with a minimum credit risk. RUONIA is calculated by the Bank of Russia on the basis of the information on actual market transactions.

¹⁸ MosPrime (Moscow Prime Offered Rate) is the National Foreign Exchange Association (NFEA) fixing of reference rate based on the offer rates of Russian rouble deposits as quoted by contributor banks – the leading participants of the Russian money market.

¹⁹ The RUSFAR (Russian Secured Funding Average Rate) family of indicators is calculated based on trades and orders for REPO with Central Counter-Party (CCP), secured via General Collateral Certificates (GCP).

Indicators of inflation expectations. In 2015, the government issued bonds linked to inflation (OFZ-IN). The Bank of Russia extracts financial market inflation expectations from their yields (see Graph 3). However, the amount outstanding is small, totalling in 2019 only 0.3% of GDP (only two issues are in circulation so far).

FMD and monetary policy communication

In recent years, the Bank of Russia has taken a large step towards transparency, actively using forward guidance in its official communication. It now publishes a wide range of materials on the Bank of Russia website that explain the strategy and the reasons for decisions, including press releases, the Monetary Policy Report, the Guidelines of the Single State Monetary Policy, and economic and financial market outlooks. Press conferences are regularly held, and public speeches by the Bank of Russia's management or comments on topical issues are given and so on.

FMD, cross-border flows and the vulnerability to external shocks and global spillovers

Up to 2008, high inflation, the appreciating rouble, the shallowness of financial markets and cheap dollar funding all pushed Russian banks and corporates to borrow abroad. In other words, falling government debt and budget surpluses coincided with the massive accumulation of foreign currency debt by the private sector. Growing foreign currency imbalances severely constrained the policy space. The authorities could only partly meet the challenges of this period – the available instruments (to influence exchange rate dynamics, absorb liquidity and prevent the economy from overheating) were not sufficient to avoid a hard FX landing. As a result, the Russian financial markets were dramatically hit by the sudden stop of capital inflows in 2008. Soon the country became unable to service its foreign currency debts, and the Bank of Russia had to gradually devalue the currency, running down its international reserves and deepening the recession.

In 2014, high corporate foreign currency indebtedness again limited policy space. Owing to sanctions and falling oil prices, Russian banks became short of foreign currency liquidity. In response, the central bank promoted deleveraging. At first, it stepped up its FX interventions and then started to lend foreign currency liquidity.²⁰ Notably, capital controls were never considered an option after they were lifted in 2006. As the economy's heavy dependence on foreign currency is a risk factor for financial stability, the Bank of Russia encouraged the de-dollarisation of the Russian financial sector. It imposed increased reserve requirements on banks for liabilities in foreign currency to residents and non-resident legal entities as well as higher capital risk weights for foreign currency loans. Since 2016, reserve ratios on liabilities in foreign currency have been increased four times. Capital risk weights for bank foreign currency exposures have been increased from July 2018. In order to encourage de-dollarisation, as of July 2019, the Bank of Russia increased the compulsory reserve

²⁰ The Bank of Russia used reverse (sell-buy) FX swaps, FX repo auctions and FX loans secured by the pledge of claims on loans in foreign currency.

ratio for obligations to individuals in foreign currency from 7% to 8%. In addition, an amendment is under discussion of the current legislation aimed at increasing deposit insurance premiums for deposits in foreign currency with high rates.

FMD, derivatives and shadow banking

The experience of a number of EMEs shows that risks can spread through derivatives and offshore markets, leading to higher exchange rate volatility. For example, in 1997–98, Thailand, Malaysia, Indonesia, the Philippines, Korea and Singapore implemented a number of measures to dampen speculation in offshore segments of the FX market. By contrast, Russia has not faced any risks of contagion through derivatives or offshore segments owing to the small size of these markets. Currently, the FX segment dominates the Russian derivatives market, with a 97% share. Overall, the Russian derivative market provides insurance against FX risks but market participants are still unable to fully hedge their interest rate risks.

In EMEs (excluding China), the share of other financial institutions (OFIs) and shadow banking tends to be much smaller than that of the traditional banking system. This may be the result of lower FMD accompanied by low financial literacy and weak overall trust in the financial system. For example, in Russia the share of OFI assets is slightly more than 5% of total financial system assets whereas actual shadow banking (ie companies that pose financial stability risks) accounts for less than 4%. This is much lower than in the majority of developed countries. Therefore, the shadow banking sector was not traditionally considered to be a significant source of systemic risk. Still, the Bank of Russia continuously monitors the perimeter of regulation, which includes constant assessment of innovations in the financial market, including those stemming from the growth of fintech.

Investment funds are estimated to account for the largest part of shadow banking activities globally, but their nominal growth has almost stopped recently. Yet, other shadow banking activities are flourishing, such as the provision of long-term lending based on short-term funding. The entities that perform these activities include finance companies such as leasing, factoring and microfinance institutions. The growth of this sector is most marked in China, India and Russia. Globally, the share of EMEs in this sector is around 25% (with the United States dominating the global share at more than 30%). For Russia, the overall size of leasing, factoring and microfinance companies accounts for an estimated 69% of the shadow banking sector. For comparison, the investment fund sector accounts for only around 2% of financial system assets. Therefore, reforms aimed at improving the resilience of leasing companies could be considered a key area for reducing shadow banking risks in Russia.

Finance companies are very susceptible to regulatory arbitrage. Indeed, with the tightening of banking regulation after the Great Financial Crisis, lending activities have become more attractive to unregulated entities. However, this is not the case in Russia. In 2013, the Bank of Russia became a lead regulator. Currently, the Bank of Russia sees no significant trend towards the migration of credit activities into the non-bank sector. Moreover, the Bank of Russia seeks to reduce the scope for regulatory arbitrage by taking a regulatory approach to microfinance institutions that is similar to one taken vis-à-vis banks (ie risk-oriented supervision). For example, measures based on debt-to-income ratios are also applied to microfinance companies.

FMD by increasing financial inclusion will undoubtedly further increase the role of non-bank financial intermediation, including shadow banking. The recently observed decline according to some indications was reversed in early 2019 by rebounding global markets.

The influence of fintech and big tech developments on financial stability

Fintech and big tech developments, including large third-party payment companies and global stablecoins have the potential to transform the financial industry, and in doing so influence the effectiveness of macroprudential measures and the monetary policy transmission. Many new fintech players (such as robo-advisors, P2P lenders, payment providers etc) are now competing directly with banks in many of their core functions.

Currently, the volume of financial operations of fintech and big tech firms is limited, as is their effect on financial stability. However, their swift growth could change this situation. Greater competition from fintechs could sap the profitability of other entities, erode capital and lead to a higher tolerance for risk. Fintech and big tech firms may also cause financial stability concerns by creating dependencies on certain critical services (or third-party dependencies), increasing contagion and concentration risks. Some fintech applications such as robo-advice could depend on the same algorithms and gain information from the same services (moreover, such algorithms may not accurately distinguish fake news from sound information, and therefore might execute faulty investment decisions). Prolonged disruptions in such services (eg due to cyber attacks or system failures) might generate significant systemic stress. Contagion could occur due to concentration risk among financial market players (both banks and fintech/big tech companies).

In Russia, technical innovations affect virtually all banking products. At the same time, the competition from non-banks is less severe than in AEs since big banks are developing their own digital services, implementing new instruments and platform solutions, and improving their business processes. As a result, traditional banks still dominate financial services, and new actors pose no serious threat to their profitability. However, in future, the role of fintech and big tech companies may become more important.

The role of macroprudential policy in mitigating financial stability risks

In Russia, financial stability concerns have been mainly connected with traditional market segments (FX market, rouble and foreign currency bank loans) rather than with the newer phenomena (shadow banking, derivatives and securitisation, fintech).

The experience of Russia has shown that, to mitigate changing financial stability risks, it is necessary to safeguard strong macroeconomic fundamentals and conduct forward-looking macroprudential policies to reduce dollarisation and to limit the impact of potential risks and spillovers. The resilience of the Russian economy against

external challenges has increased in recent years due to improvements in macroeconomic fundamentals (transition to a budget surplus, increase in the current account surplus, falling inflation, decrease in external debt, growing international reserves). The Bank of Russia also has a wide range of macroprudential measures to mitigate potential shocks from capital flow reversals.²¹

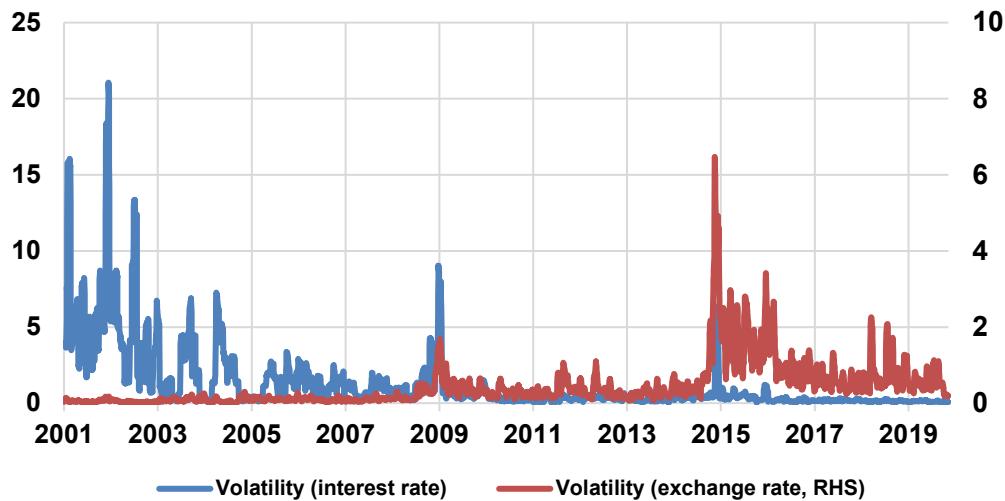
The Bank of Russia's experience shows that the efficiency of increased capital risk weights in curbing growth of unsecured consumer lending was limited, at least in the years 2011–13. By mid-2012, the annual growth rate of unsecured consumer lending exceeded the 50% threshold (while the overall lending growth rate was below 30%). In January 2013 to January 2014, in order to restrain further unsecured lending growth, the Bank of Russia took a number of steps to increase capital risk weights and tighten the provisioning requirements for unsecured consumer loans. Capital risk weights were differentiated based on the level of effective lending rates for loans. Since the transition to inflation targeting, the rouble has shifted to a floating exchange rate. The Bank of Russia does not intervene to support any specific exchange rate. The budget rule unpeggs the rouble from the oil process, makes interventions more predictable and stabilises the domestic currency.

²¹ See Chapter 7 (FMD, cross-border flows and the vulnerability to external shocks and global spillovers).

Appendix

Changing operational targets: from exchange rate to money market interest rate

Graph 1

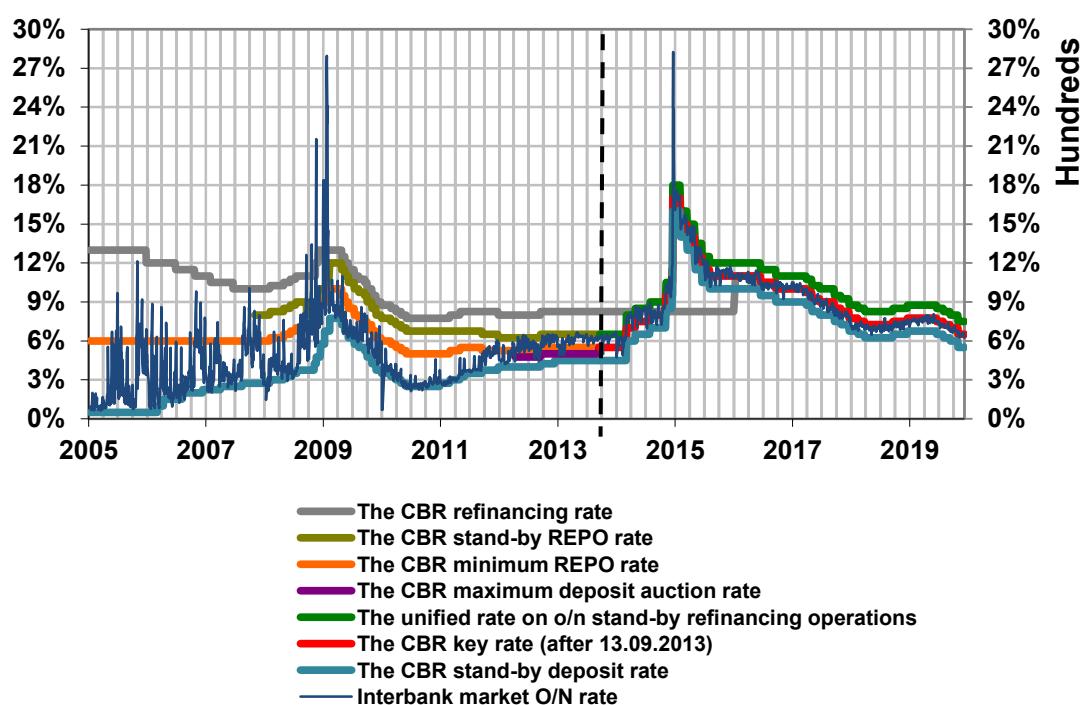


Note: volatility was estimated as a 20-day standard deviation moving average.

Source: Bloomberg.

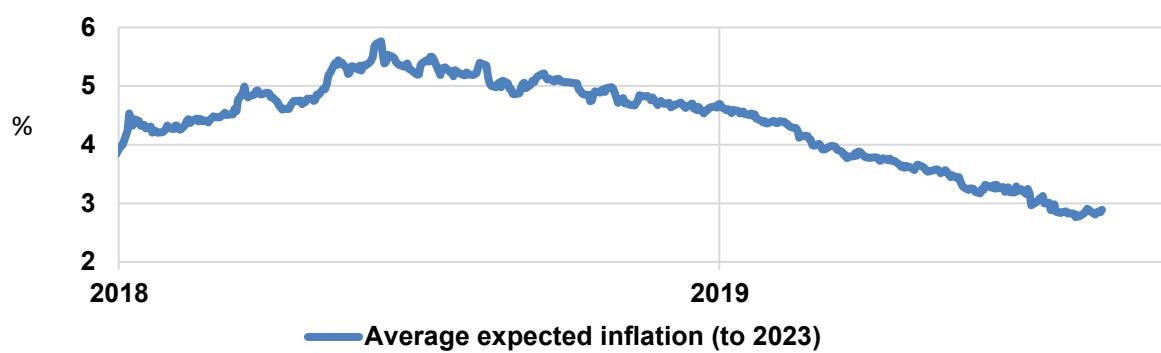
Operational framework

Graph 2



Note: volatility was estimated as a 20-day standard deviation moving average.

Sources: Bank of Russia; Bloomberg.



Note: each point in the graph corresponds to a value of perceived inflation, estimated as an average from that point to 2023 (maturity date).

Source: Bank of Russia estimates.

Financial markets in EMEs – what has changed in the last two decades?

Saudi Arabian Monetary Authority

Abstract

This contribution discusses financial market developments in EMEs and, more specifically, in Saudi Arabia. It presents the experience of the Saudi Arabian Monetary Authority (SAMA) and its views on the changes that have occurred during the past two decades in terms of financial market developments and their impact on monetary policy and financial stability in the country. It also illustrates the progress made, along with other authorities in the Kingdom, on the use of financial market technology (fintech) in various fields and the potential impact of prospective developments regarding fintech.

JEL classification: E52, E58, G20, N25, O38.

Keywords: Financial market development, fintech impact on monetary policy and financial stability.

Financial markets in EMEs – what has changed in the last two decades?

In the last two decades, many significant changes have occurred in Saudi Arabia's financial markets, of which the key developments can be summarised as follows:

- The establishment of the Capital Market Authority (CMA) in 2004. The CMA's main responsibilities include regulating and developing the Saudi Arabian capital market by issuing rules and regulations for implementing the provisions of the Capital Market Law, and by promoting appropriate standards and techniques for all entities involved in securities trade operations. The basic objectives are to create an appropriate investment environment, boost confidence, and reinforce transparency and disclosure standards in all listed companies, and to protect the investors and dealers from misconduct by market participants.
- The establishment of the Debt Management Office (DMO) in 2015 to secure the Kingdom's fiscal financing needs at the best financing costs in the short, medium, and long term at an acceptable degree of risk in compliance with financial policies and to maintain its ability to access the international financial markets on fair pricing. On October 2019, the DMO was converted into the National Center for Debt Management. The centre will enjoy financial and administrative independence, and it will provide advisory services and propose executive plans for government agencies and companies in which the state owns a stake of more than 50%. The powers of the centre include the collection, processing and follow-up of public debt data, negotiating debt restructuring, re-pricing or re-contracting, or services related to hedging policies or managing investor relations in public debt instruments, or securing a credit rating.
- The establishment of the Securities Depository Center (Edaa) in 2016 as a closed joint stock company in accordance with the Saudi Companies Law. The principal responsibility of Edaa is to operate and maintain the Depository and Settlement System (DSS), an electronic book-entry system used to record and maintain securities and to register the ownership of securities, in addition to linking centre members through the DSS.
- The Saudi Arabian Monetary Authority (SAMA) with the cooperation and support of the commercial banks and other government agencies has developed a number of payment and settlement systems such as the Saudi Arabian Riyal Interbank Express (SARIE) system, and the SADAD Payment System (SADAD) to facilitate economic development and promote financial stability in Saudi Arabia. The SARIE system is the mainstay of the Saudi payments infrastructure. It has been fully owned and operated by SAMA since May 1997. SARIE essentially provides a platform that links all Saudi commercial banks enabling them to settle payments in Saudi riyals. In doing so, SARIE provides a platform for new, interbank payment streams, supporting new (financial) product development and the goal of broadening financial inclusion.
- A further major driver has been the Kingdom's 2030 Vision, which endeavours to reinforce economic growth and investment activities. The Kingdom's 2030 Vision has been further developed into 12 Executive Programs, which includes the Financial Sector Development Program (FSDP). This programme seeks to develop the financial industry as a diversified and effective financial services sector to

promote the development of the national economy by stimulating savings, finance and investment by, *inter alia*, enabling financial institutions to support private sector growth.

- In order to understand and assess the impact of new technologies in the Kingdom's financial services market, as well as to help transforming the Saudi market into a sophisticated financial centre, SAMA has designed a regulatory sandbox that welcomes local as well as international firms wishing to test new digital solutions in a "live" environment with a view to deploying them in the Kingdom in the future.
- The establishment of the Saudi Payments Company in 2018. The aim is to increase financial inclusion through the organisation and development of the payments sector and the establishment of an independent entity. This will provide a common infrastructure to ensure competitiveness among payment service providers in line with the objectives of the Financial Sector Development Program.
- Saudi Arabia's QFI Program was introduced in 2015 to facilitate participation by international investors in the Saudi capital market. Through this programme, international investors have direct and full access to the Saudi Stock Exchange (Tadawul). QFI qualifying criteria and foreign ownership limits were recently eased and the Saudi IPO market is now open to QFIs.
- The Tadawul has completed its full inclusion on the MSCI emerging markets index in June 2019. The Kingdom was also added to the FTSE Russell as a "Secondary Emerging Market" in March 2018.
- SAMA and the Central Bank of the United Arab Emirates have launched a digital currency known as "Aber" for use in financial settlements between the two countries via distributed ledger technology. The proof-of-concept stage will establish if remittance costs can be reduced and assess the technical risks and how to deal with them. Furthermore, it will establish an additional channel for the central financial transfer systems of the two countries.

To ensure financial stability and mitigate systemic risk within the banking sector, SAMA has applied a wide range of macroprudential measures in recent years. SAMA has also launched several other initiatives that have contributed positively to economic and financial stability, including the implementation of Basel III requirements, the establishment of a formal framework for macroprudential policies, the establishment of a deposit protection fund, and the regulation of finance companies. Responsible lending principles have also been put in place.

The impact of financial market development on monetary policy

Following the Great Financial Crisis, concerns over central banks' ability to respond to another recession has increased due to their limited monetary policy space. More recently, a notable shift towards increased monetary policy accommodation has absorbed the impact of trade tension on financial market sentiment and activity. With global inflation below targets, central banks in major advanced economies have turned to a more accommodative policy stance since early 2019. However, monetary

policy space remains constrained by the effective lower bound in many countries, limiting the policy options available to address future shocks. Except for the United States, most major central banks in Europe and Japan are already in a negative rate zone and face limits on how much lower they can go. Furthermore, with already large balance sheets from successive rounds of quantitative easing (QE), central banks will also face constraints if they were to return to large-scale asset purchases. The forward guidance tool may also face constraints in the future.

Some emerging market economy (EME) central banks have also cut rates driven mainly by a slowdown in the global economy and trade frictions.¹ Monetary policy in Saudi Arabia remains committed to the fixed exchange rate and aims to maintain monetary stability mainly through liquidity management and the standing facility (repo and reverse repo agreement).

Globalisation may influence the transmission of monetary policy. Monetary policy spillovers spread via three common channels, which are aggregate demand, the credit channel and the exchange rate channel. Recent financial market development has had a direct impact on the credit channel in particular. The credit channel proves a strong monetary transmission mechanism with an impact on the financial system, and thus the real economy.

The recent academic literature suggests that the "natural" rate of inflation may fluctuate over time due to forces such as technology, globalisation and demographics. For example, increased trade with China and other EMEs has led to a slower growth in the prices of imported-manufactured goods. In addition, as technology is more prominently used to produce goods and services, companies in all industries are achieving lower production costs.

The inflation target rate of 2 percent may not be the appropriate for every region and it might vary depending on the economic structure. Therefore central banks might review their objective of maintain a 2 percent inflation target and calibrate their operational target and instruments accordingly.

Transmission of monetary policy in Saudi Arabia has remained stable, relying mainly on adjustments to the standing facility that influences the overnight interbank rate (SAIBOR), which translates ultimately into lending rates. Based on reductions in the SAMA policy rate, SAIBOR-based rates have declined for mortgages and corporate lending. But the development of financial markets will play an important role in changing other funding rates, for example, via new bonds issued by the corporate sector.

Domestic financial conditions in small open economies tend to follow those applying abroad, as evidenced by the strong co-movement in interest rates across advanced countries and EMEs. The international interdependence of interest rates, particularly at short maturities, has been widely interpreted as evidence that small open economies lack monetary autonomy.²

More recently, lower interest rates in advanced economies have triggered capital flows to EMEs.³ External conditions and financial spillovers pose additional challenges.

¹ See IMF, *World Economic Outlook*, October 2019 – Chapter 1.

² See C Caceres, Y Carriere-Swallow and B Gruss, "Global financial conditions and monetary policy autonomy", *IMF Working Papers*, June 2016.

³ See IMF, *Global Financial Stability Report*, October 2019.

The shift in monetary policy stance in advanced economies has contributed to large capital flows and sharp exchange rate movements with implications for domestic monetary policy.

In Saudi Arabia, the banking sector is well capitalised and resilient to external shocks, as reflected by the financial soundness indicators. Moreover, the Kingdom has accumulated a large stock of foreign reserves, which also help ensure its ability to weather external shocks.

Broad domestic capital market reforms have resulted in the country's inclusion in global EM equity and bond indices, leading to additional portfolio inflows. Since portfolio (and bank) flows are more volatile than FDI flows, the central bank has a role to play in mitigating potential risks of sudden large outflows.

Investors have always been looking into emerging markets in searching for yield and growth potential. Therefore, capital flow could have significant impact on EMEs. As such, to make an informed investment strategy, it is imperative to assess the financial position, as well as measure the performance of the financial system, banking profitability and private sector credit growth.

The banking sector in Saudi Arabia, due to SAMA's regulations and macro-prudential measures, remains sound, resilient and profitable. Economic liquidity, as measured by the broad money supply (M3), recorded a growth rate of 2.7%, due to an increase in bank credit to the private sector by 3.8% as of the third quarter of 2019. Government spending and improved confidence is a key factor in overall credit growth, especially bank credit to building and construction and manufacturing.

The low inflation rate (-1.12%) in the third quarter of 2019 is attributed to the decline in housing and utilities caused mainly by rentals for housing (compared with 2.19% in 2018). Inflation is expected to reach 0.4% due to multiple factors such as the expected growth of the private sector and money supply, in addition to higher aggregate demand due to government spending.

Monetary policy in Saudi Arabia is anchored by a fixed exchange rate to the US dollar. A "credible peg" backed by SAMA's substantial foreign exchange reserves has been in place since 1986, so that interest rates follow US rates with a small premium. Monetary policy aims to maintain monetary stability through a wide range of tools, mainly the standing facility (repo and reverse repo agreement) and liquidity management. Liquidity management has been crucial in the most recent financial market developments and fiscal reforms during 2015–16. In its efforts to strengthen its liquidity management framework, SAMA has developed a liquidity-forecasting model to support decision-making and calibrate interventions.

In the light of financial market developments, communication with all stakeholders has become increasingly important for achieving monetary policy objectives over the past decade. Indeed, communication is increasingly seen as a policy tool in itself. Communication plays an integral part in both monetary and fiscal policy. For example, in monetary policy, communication takes place within a well established policy framework and plays a central role in managing inflation expectations. Moreover, for fiscal/economic policy, with clear communication, reforms can be understood and accepted by those whom they affect, thus helping to achieve the policy target.

Although recent financial market development has heightened the importance of policy communications, SAMA's practice remains consistent due to its effectiveness and practice of announcing all policy changes publicly and to all stakeholders. In

addition, SAMA continues to publish monetary development reports quarterly and annually. As for communication with financial institutions specifically, SAMA holds regular meetings with banking sector management in order to increase the effectiveness and transparency of communication with all stakeholders.

Best practice for central banks includes the announcement of a clear objective and frequent and regular publication of statements and reports that give an account of the factors behind policy decisions. Improvements along these lines over the past decade have brought the level of transparency in EMEs much closer to that seen in advanced economies.⁴

Impact of financial market development on financial stability

The Saudi banking sector has shown a high degree of resilience in recent decades. The strong capitalisation of Saudi banks has been an important factor here. Asset quality has also continued to show a sustained improvement as a result of supportive factors and regulatory initiatives. This includes a favourable economic and business environment, SAMA's hands-on regulatory oversight coupled with risk-based supervision, and the obligation for banks to adopt improved risk management practices following the implementation of Basel III. Banks are also subject to all other relevant standards and principles issued by the Basel Committee and the Financial Stability Board. In addition, the establishment of the Saudi Credit Bureau (SIMAH) has also helped banks to enhance their risk management capabilities, strengthen the credit information system, speed up various processes and improve lending decisions.

Despite the comfortable position for banks with regard to assets, capitalisation and liquidity, the banking system faced a liquidity shortage in 2016 due to the domestic debt issuance programme that began in 2015 and continued into 2016. This put some pressure on the banking system's deposits, resulting in higher market rates as banks competed for deposits to shore up funding. The liquidity pressure was short-lived due to the prompt SAMA response, causing market rates to trend down by the end of 2016, thereby bringing down the cost of funding in the interbank market. To ensure robust liquidity supervision, SAMA collects monthly liquidity coverage ratios from the domestic banks, which serves to anticipate any potential liquidity strains in the system. This also ensures that domestic banks invest adequately in their operational infrastructure to meet the reporting requirements.

SAMA's prudent regulatory framework requires banks to maintain a capital level (regulatory capital to risk-weighted assets) well in excess of the Basel Committee's minimum requirements. For example, the Basel requirement for the bank capital adequacy ratio (CAR) is 8% while minimum CAR required by SAMA is 12%. Furthermore, SAMA was at the forefront of implementing the Basel III capital adequacy regulations in 2008. The Saudi banks are not facing challenges in adopting the Basel III standards. They were among the first in the region to fully implement the enhanced CAR under Basel III (standardised approach), with all banks reporting their Basel III CAR in their March 2013 financial statements.

⁴ See IMF, *World Economic Outlook*, October 2018 – Chapter 3.

Moreover, SAMA periodically performs top-down stress testing to evaluate banks' resilience against hypothetical macroeconomic shocks. The current stress test is based on three different scenarios that range from mild to severe macroeconomic shocks. In addition, SAMA requires individual banks to semiannually perform and report the outcomes of their own stress tests. These outcomes are reviewed regularly and used in SAMA's top-down stress tests to ensure consistency and resilience on both the macro and microprudential levels.

In the shadow banking area, a new law was passed in 2012 to license and regulate finance, leasing and mortgage finance companies. With these reforms, a part of the shadow banking sector is being regulated by SAMA, which already regulates money exchange companies and insurance companies.

As for the Saudi capital market, shadow banking activities are limited. The 2008 crisis highlighted excessive risk-taking by less regulated institutions and transactions involving liquidity transformation, maturity mismatches and leverage conducted via the shadow-banking sector. Regarding capital markets-based intermediation; shadow banking (mainly via collective investment scheme products) is insignificant in scale in Saudi Arabia.

Moreover, in line with the Kingdom's Vision 2030 to advance and diversify digital services, alternative payment options are now available such as STC pay, which is a digital secure wallet, and MADA Pay, which is a smart device application service that allows holders of the MADA debit or credit cards to make contactless payments. These innovations have also contributed to the reduction of shadow banking in Saudi Arabia.

Financial market development is uneven across EMEs. Growth in derivatives turnover is positively related to trade, financial activity, cross-border capital flows and floating currencies. About 10% of global derivatives turnover is reportedly in contracts denominated in EME currencies, much lower than the share of these economies in global GDP or world trade. Derivatives in EME currencies also tend to be less complex and more likely to be traded outside the home economy than those in advanced economy currencies. Global turnover in non-deliverable forwards (NDFs) continues to rise in aggregate.

Growth in renminbi foreign exchange derivative activity has been underpinned by Chinese financial market liberalisation. This includes the exchange rate and domestic interest rates gradually becoming more market determined. A substantial proportion of the rise in renminbi denominated foreign exchange derivative turnover has occurred outside of China, largely in Hong Kong SAR and Singapore. Within China, foreign exchange derivative activity remains small relative to trade and capital flows.

Original sin refers to EMEs inability to borrow abroad in their own currencies. It is now largely outdated for sovereign debt as EME sovereigns now issue debt in hard and local currency. EME corporates are also issuing in their own currencies to diversify their investor base.

As a continuation of the Kingdom's efforts to open up its financial markets to international investors, the Tadawul has completed its full inclusion in the MSCI emerging markets index and it has also joined the FTSE. According to the Institute of International Finance (IIF) report, foreign equity inflows to Saudi Arabia surpassed those into India and China in the first eight months of 2019. Strong inflows to Saudi

Arabia in 2019 are in sharp contrast to other emerging markets, where renewed US.-China trade tensions are said to be responsible for weaker equity flows.

The gradual opening of the market to foreign investors has helped to limit the volatility that would result from a sudden large-scale entry of foreign investors. In an attempt to deepen the market, regulators have implemented a number of supportive measures in the past to gradually open it up to foreign investors. Indirect foreign investment was allowed through mutual funds in 1999, and foreign resident investors were granted direct access to the Saudi capital market in 2006. A year later, GCC residents were also granted direct access to the Saudi capital market. In 2008, non-resident foreign investors were also allowed to indirectly access the Saudi market through Saudi Equity Swap (SES) agreements. In 2010, exchange-traded funds (ETFs) were launched to allow non-resident foreign investors to directly invest in them.

There is some evidence that floating exchange rate regimes and financial markets that are more integrated with the global economy are associated with foreign exchange derivative markets. Country experiences also demonstrate that foreign exchange derivative activity need not occur within the domestic market. The development of foreign exchange derivative markets is part of broader financial market development, which is still work in progress.

The onshore FX derivative market in EMEs is at a nascent stage and access to offshore investors is very limited. Onshore markets tend to be used by central banks to implement macroprudential measures rather than to provide access to market participants.

Documentation, liquidity, credit risk of local counterparties, and lack of transparency in FX fixing are some of the constraints for derivative markets. For example, Indonesia started an onshore FX derivative market in 2018 for onshore banks, with access for very few offshore dealers. Bank Indonesia is using this market to lower the volatility in the rupiah and help its domestic banks hedge bond portfolios. The Bank of Mexico started an intervention programme via the onshore NDF market in the peso three years ago, with no access to offshore managers. Malaysia also has an onshore NDF market to hedge bond exposure but it is extremely illiquid.

Given the constrained development of FX cash and derivative markets, EMEs remain exposed to FX volatility and spillovers. Offshore NDFs are the result of an underdeveloped onshore market and its anomalies.

Many EME currencies shadow the dollar or (to a lesser extent) the euro in some form ranging from explicit currency pegs to undisclosed currency baskets. This makes them potentially vulnerable to FX speculation about an impending devaluation. Commodity currencies are often subject to speculative pressures, reflecting softer commodity prices, and the forward market route tends to be the cost-effective channel for taking a speculative position. Such episodes (ie speculation as opposed to genuine hedging) trigger central bank intervention in the forward market, with a directive to the domestic banks to restrain from actively participating in quoting forward prices.

Saudi Arabia has an active cash market in USD/SAR, but activity in FX derivatives in the form of forwards and options as well as that in interest rate swaps is very modest.

SAMA continues to adopt a wide range of macroprudential measures to ensure financial stability and mitigate systemic risk formation within the banking sector. Over

the years, SAMA's macroprudential policy has ensured that the banking sector is able to withstand financial and economic shocks and vulnerabilities. SAMA gives high priority to ensuring that banks are fully capable of managing their liquidity mismatch of assets and liabilities, and that they are well positioned to meet cash flow obligations in a timely manner. Consequently, the banking sector's asset portfolios comprise largely high-quality liquid assets such as Saudi government bonds, SAMA bills and reserves with SAMA. The leverage ratio is an additional stability factor as it acts as a credible supplementary measure to the risk-based capital requirements.

As a part of SAMA's commitment to build a comprehensive macroprudential toolkit, SAMA included the Loan-to-Value (LTV) Regulation in 2013 as part of the Real Estate Finance Law. The LTV helps SAMA to fulfil its mandate of protecting and safeguarding financial stability, by curtailing speculative purchases that may serve to increase volatility in the real estate sector, and possibly fuel asset bubbles.

SAMA closely monitors credit growth in general and credit to the private sector in particular. It also encourages Saudi banks to increase their capital buffers on a countercyclical basis.

Looking ahead

Fintech and big tech companies use technology to automate manual processes, reducing costs and speeding up the transaction process. Large third-party payment companies can scale their operations quickly either across a country or internationally. As a result, there is likely to be a faster movement of capital globally. This is likely to have a number of effects on monetary policy implementation and transmission:

- Faster movement of capital may make monetary policy more effective. This is because the impact of changes in monetary policy is likely to be accelerated.
- However faster international capital flows may also increase the risk that domestic monetary policy has a greater impact on the international monetary system as it can trigger faster outflows or inflows of capital.
- Faster capital flows may also create more volatility in the financial system, requiring higher levels of reserves to mitigate such risks.
- Greater participation in financial services by fintech and big tech companies will increase non-banking activities. This may reduce the impact of monetary policy transmission as monetary policy would have less of an impact over non-banking capital.
- The impact of global stablecoins (GSCs) on monetary policy transmission will depend on the use cases for GSCs.
- If GSCs are used as a medium of storage and gain significant traction, monetary policy transmission is likely to become less effective as monetary policy will only impact domestic currency and will not be able to influence changes in GSCs.
- If GSCs are used to process payments, there is unlikely to be an impact on monetary policy as GSCs will be converted to and from the local currency.
- If a GSC is used as a currency competing with central bank-issued currencies, the impact of monetary policy transmission is likely to be reduced in economies

where a GSC is more widely used than the national currency, as monetary policy may not be able to influence the GSC.

- The increased participation of fintech firms and big techs in new funding and lending models is likely to create a number of risks to financial stability:
- Lending provided by fintech or big tech firms tends to focus on customers that are either too small or too high-risk for traditional banks. If these borrowers are underbanked and are provided with loans without fully understanding how loans work, there is a high risk of default. In markets where a large proportion of the population are underbanked or unbanked, such defaults on a large scale could create financial instability.
- Fintech firms and big techs providing lending may not have the same level of risk management as banks and may therefore not conduct sufficient checks on their clients. This could open the market to a higher level of financial crime and a stronger shadow economy, which could create greater financial instability.
- New solutions in funding and lending tend to use technology to automate functions in order to provide cheaper and smaller loans. This has the potential to create a number of risks to financial stability. First, if the technology is not fully understood, there could be unintended consequences that may create financial stability risks. Second, if the same technology provider is used by a large proportion of the fintech solution providers, there is a technology concentration risk where a disruption to the technology provider could impact a large number of fintech solution providers, creating a financial stability risk. Finally, increasing use of technology is also likely to result in more cyber attacks. As the dependency on technology increases, such cyber attacks could threaten financial stability.
- Greater use of alternative models for interbank funding and lending may reduce the impact of monetary policy. If monetary policy is less effective, this could increase the risk of greater financial instability.
- Big tech companies have the potential to scale internationally and dominate the lending market due to their global reach. This creates a concentration risk where, if such tech companies attained a large enough market share and their operations were disrupted, this might create greater financial instability.
- Banks tend to have high levels of regulated reserves. Big tech and fintech companies may not be required to have similar levels of reserves. This would mean that they are more susceptible to economic shocks. If they control a large share of the market, such disruption is likely to impact financial stability.

There are a number of approaches that policymakers could take to mitigate emerging risks:

- A robust and internationally coordinated legal, regulatory and oversight framework: while banks tend to operate more locally, big techs and fintech firms are likely to have a more international reach. It is therefore important to have an internationally coordinated framework to share knowledge between regulators and effectively regulate fintech and big tech companies. In fintech areas that are well understood, international coordination and agreement will support the effective regulation of companies that can operate internationally and prevent regulatory arbitrage. Furthermore, big tech companies have the potential to dominate financial services activities internationally. It is therefore important that

regulators monitor the level of competition in the marketplace to avoid a small number of firms dominating financial services.

- International coordination on regulatory sandboxes: for emerging innovation and business models, the regulatory sandbox approach enables regulators to evaluate innovative solutions before regulating them. International coordination on regulatory sandboxes will support greater knowledge-sharing on emerging innovation in order to reach an international consensus on regulating these areas.
- Regulation and reserve requirements should be correlated with the size of activities: as fintech and big tech companies play a more active role in financial services, the level of regulation and reserve requirements should be correlated to the scale of their activities. This is to ensure that, when such companies gain in importance in financial services, they are able to sustain economic shocks.
- Technology understanding and monitoring: as technology plays a growing role in financial services, it is important that the technology used is fully understood and that international standards are developed for emerging technologies. It is also important that the technology providers used by financial services companies are monitored to mitigate concentration risk among technology providers. International knowledge-sharing and coordination on regulation of new technologies used in financial services can help mitigate the risk to financial stability.
- Greater investment in cyber security: as technology plays a larger role in financial services, cyber attacks will become a greater threat to financial stability. It is therefore important for regulators to share knowledge related to cyber security and continue to encourage investment in the area.
- Initiatives to improve financial literacy: as big tech and fintech activities tend to focus on unbanked or underbanked customers, regulators should encourage initiatives to improve financial literacy to ensure such customers understand the financial activities and transactions they are undertaking. This will reduce the default risk of such customer groups, contributing to overall financial stability.

The monetary policy transmission mechanism and its effectiveness are to a large degree influenced by financial sector developments. Essentially, monetary policy transmission is a financial process with the financial system as the channel through which monetary policy decisions affect the real economy. SAMA continues to enhance its monetary policy framework and contribute to financial infrastructure developments, through which monetary policy transmits to real economy, of which we mention:

- Interbank repo market: a working group has been established under SAMA's supervision and with banks as members to develop a legal and operational framework in order to establish country-specific guidelines better suited for the local financial system and compatible with both sharia and conventional standards.
- Open market operation: in line with SAMA's role in managing liquidity, the Open Market Operations framework has been enhanced to complement the liquidity management framework at SAMA and to support banks in managing their liquidity.

Balancing the risks and rewards of fintech developments¹

Monetary Authority of Singapore

Abstract

The entry of fintech and big tech can drive competition in financial services, leading to efficiency gains, but also raises potential financial stability concerns.

This note reviews the financial stability implications for banks and the financial system of fintechs engaging in payment and lending activities. It also explores a more recent fintech-backed innovation – global stablecoins – that could also raise broader implications for the financial system and economy if widely adopted. The note reviews Singapore's approach to managing the risks of fintech and big tech developments and their effects on incumbent banks, including by adopting a risk-based and proactive approach to regulation and surveillance.

JEL classification: G1, G2, G15, G18, G21, G28.

Keywords: Asia, bank profitability, big tech, fintech, competition, financial stability, proactive risk management, stablecoins, Singapore.

¹ Background note prepared by the Monetary Authority of Singapore (MAS) for the BIS Emerging Market Deputy Governors Meeting, February 2020.

Introduction

As a small open economy and important regional financial centre, Singapore is subject to short-term external real and monetary shocks, increasing the importance of macroeconomic stability and financial resilience. Over a longer-term horizon, the financial system has also had to adapt to technological, competitive and regulatory shifts. In this note, the focus is on structural developments and, in particular on Singapore's approach to fintech, and how MAS balances financial stability considerations while flexibly and robustly embracing the benefits of innovation.

Fintech has transformed the provision of financial services. Its adoption has accelerated in recent years, including in Southeast Asia, where the relatively larger underbanked and unbanked population presents a huge opportunity for fintech firms.

Fintech developments can bring about benefits to society through improved social welfare and economic efficiency. However, studies have shown that the adoption of fintech by incumbent financial institutions alone will not help the full potential benefits of fintech to be realised. Philippon (2017) and Bazot (2013) find that the unit cost of financial intermediation has remained relatively unchanged at 2% over the past century.² This is contrary to the expectation that the increased use of technology in finance over time should increase productivity and hence reduce the cost of finance. A possibility is that the benefits accrued have not been passed on to consumers, owing largely to lack of competition within the financial system. Consequently, Philippon suggests that fintech players should be encouraged to enter the finance industry to drive competition and improve its efficiency.

While the entry of new players introduces competition that will cumulatively help to improve the overall quality and reach of financial services, the advent of fintech has raised concerns about potential financial stability implications. This note outlines those risks and also the mitigating actions authorities could adopt to address them. The note focuses on fintechs engaged in the payments and lending businesses as these are major areas of fintech growth, and also on global stablecoins.

Fintech investments and activity are growing, particularly in payments and lending

Global investments in fintech totalled more than US\$ 55 billion in 2018,³ more than double the amount in 2017, with the largest share going to Asia-Pacific companies. Excluding the oversized Series C funding for Ant Financial in 2018, most of the investments in fintech were to firms conducting payment services, followed by lending. Fintechs in other business lines such as insurance and investment

² Philippon (2017) and Bazot (2013). Bazot (2013) finds similar unit costs in France, Germany and the United Kingdom.

³ Accenture (2019).

management received less investment. This trend is mirrored in ASEAN.^{4, 5} In Singapore alone, fintech firms raised more than US\$ 735 million in the first nine months of 2019, with funds flowing towards more mature firms rather than newer start-ups.⁶

Fintech activity in payments and lending is also flourishing. The global transaction value of digital payments has risen from approximately US\$ 3.2 trillion in 2017 to US\$ 4.1 trillion in 2019, a 28% increase.⁷ This is projected to almost double by 2023. Focusing on Southeast Asia, digital payments currently amount to US\$ 600 billion and is expected to grow to US\$ 1.1 trillion by 2025, accounting for one of every two dollars spent.⁸ In a recent survey of global financial consumers, it was noted that the adoption rate of "Money Transfers and Payments" was just 18% in 2015 and stood at 75% in 2019. "Borrowing", which was only 6% in 2015, stood at 27% in 2019.⁹

These trends suggest that the financial stability implications of fintechs' involvement in the payments and lending functions warrant a close look.

Financial stability implications of fintechs engaging in payments and lending

Competition from fintechs will affect incumbent banks' profitability and resilience

Fintech companies could disintermediate incumbent banks and erode their operating income. This would reduce banks' ability to build capital organically, with implications for their resilience. As incumbent banks are likely to include domestic systemically important banks, any weakening of their resilience would also weaken that of the financial system.

The most immediate impact of increased competition from fintechs for payments and lending will be on incumbent banks' payment fee income and net interest income, which are at risk of erosion due to competition in retail and consumer banking. Fintech companies can potentially reduce banks' fee income through lower payment transaction volumes as consumers switch to purely digital payment channels, away from bank-intermediated and credit card payments. Fee income would also face further compression as banks may look to lower the Merchant Discount Rate (MDR) they charge for card payments so that they can stay competitive.

⁴ Some 42% of fintech investments in the ASEAN-6 countries flows into payment companies. See UOB et al (2019).

⁵ The main business lines conducted by fintechs in ASEAN were payment solutions (33%), loan application or financing (25%), money transfers or remittance (21%) and data analytics (18%). See Ernst and Young (2018).

⁶ Aw (2019).

⁷ Statista (2019).

⁸ Bain et al (2019).

⁹ Ernst and Young (2019).

Traditional banks will also likely face increasing costs from fintech competition, as e-wallets or digital banks begin to capture deposits and raise traditional banks' funding costs. As a number of jurisdictions (including Singapore) start to grant digital bank licenses, digital banks may end up taking deposits away from traditional banks by offering better interest rates. Consumers may be amenable to a shift away from traditional banks, with a McKinsey survey¹⁰ indicating that 29% of banked consumers surveyed from Developed Asia¹¹ and 14% from Emerging Asia¹² were willing to open an account with a fully digital bank. Further, across Asia, 30–60% of these consumers were willing to shift their deposits into accounts with these fully digital banks. In 2017, consumers in Developed Asia were five times more likely to access their bank through a digital platform instead of going into a branch. The same phenomenon is also prevalent in developing Asia, although to a much lesser extent.¹³

The resultant squeeze on banks' net interest income will be twofold, as banks may initially need to lower fees and lending rates to compete, while at the same time they may be forced to offer higher deposit rates to retain their deposit base. Incumbent banks may also increasingly seek funding from less stable sources (eg interbank or wholesale) to maintain their current rates of loan growth. Such a move may end up increasing funding costs and potential liquidity risk.

Aside from the immediate impact on net interest income, the potential disintermediation of incumbent banks may also cause some loss of valuable customer data, information and insights as fewer transactions are processed through their platforms. This could potentially affect banks by (i) reducing the accuracy of customer credit risk assessments, further eroding their income in the future; and (ii) depriving them of insights into consumer behaviour, hindering them in providing more targeted services to their customers.

Some big tech firms already have a large digital footprint with a critical mass of customers that would allow them to pivot more effectively into roles that retail banks used to dominate. The ability to adapt quickly, and sell financial services to their established customer base, allows such big techs to pose a strong challenge to incumbent retail banks when competing in this space.

Fintechs providing credit could increase the procyclicality of credit provision

With the emergence of fintechs providing credit through either direct lending or by matching investors and borrowers through peer-to-peer (P2P) platforms, credit provision could potentially become more procyclical. While banks have exhibited procyclical lending behaviour in the past, there is potentially a higher risk of such lending with fintechs.

Fintechs that lend on their own balance sheets may be less resilient than some banks are today. Fintechs tend to be less diversified in their lending, as they have tended to lend in smaller volumes to individuals and smaller corporates, and are less

¹⁰ McKinsey (2014).

¹¹ McKinsey's (2014) definition of Developed Asia consists of Hong Kong SAR, Korea and Singapore.

¹² McKinsey's (2014) definition of Developing Asia consists of China, India, Indonesia, Malaysia and Thailand.

¹³ McKinsey (2018).

active in lending to larger corporates. Fintechs are also generally smaller in scale than banks, with correspondingly smaller capital reserves.

Fintechs that facilitate lending through P2P platforms may be susceptible to investor sentiment and hence swings in their credit risk appetite – resulting in credit provision that is more procyclical, including a weakening of lending conditions in an upswing and a pullback in credit in times of stress.

These effects are exacerbated for borrowers who were previously unable to obtain funding from traditional sources, and could only borrow from fintechs. Should there be a pullback in fintech lending, these borrowers may be unable to secure alternative funding and would find themselves under liquidity stress, which could subsequently lead to a contraction in the real economy.

The failure of a fintech lender could impact traditional banks collaborating with them

Banks and fintech/big tech companies are increasingly considering whether to collaborate in providing credit, and banks have agreed to specific tie-ups.¹⁴ For example, a widespread model used by fintech lenders is one where the online platforms act as an agent that brings together creditors and borrowers, with banks originating the loans. Earlier this year, Tencent announced a partnership with Bank of Gansu, a commercial bank listed in Hong Kong SAR, where it will establish an online loan management platform with newer marketing tools and an improved risk system. Similarly, in the United States, fintech firm Kabbage has partnered with Celtic Bank to make small business loans, with Kabbage taking over client assessment and loan processing. In both situations, the fintech party is involved in the setup of the risk and lending models while the bank leverages the fintech firm's client base. This means that banks rely on the fintech lender's credit risk analysis. A failure of such fintech partners due to, for example, the unsustainability of their business models could have a negative effect on the banks collaborating with them.

Implications of global stablecoins

A more recent fintech-backed innovation – global stablecoins (GSC) – could also have broader implications for the financial system and economy if widely adopted. Apart from being able to disintermediate financial institutions, as with some other fintech developments, GSCs also give rise to specific risks. These relate to both financial stability and monetary policy-related issues.

Widely used global stablecoins could disintermediate the existing financial system

A widely used GSC could add to disintermediation pressure on the core financial system. If confidence in GSCs as a store of value increases, users could be increasingly

¹⁴ This could be because a bank may not have the expertise (for instance in making credit assessments from alternative data sources) or where the fintech may not wish to take on the regulatory burden associated with lending.

comfortable holding large balances in stablecoin wallets, reducing the deposit base for banks. This could potentially induce banks to turn to less stable and more expensive funding sources, exacerbating their maturity mismatch risk.

As balances in GSC wallets or issuers grow, issuers may begin lending from their balance sheets to manage their float, which could not only have a procyclical effect leading to extreme boom and bust cycles from excess credit creation, but might erode lending standards.

Fiat-currency backed global stablecoins could lead to destabilising capital flows

Where fiat-currency assets back the GSC, new and potentially destabilising capital flows could arise. Stablecoin-related capital inflows (outflows) would be driven purely by the demand for the token itself. This might exert appreciation (depreciation) pressures on the underlying currencies without regard to the economies' position in the business cycle. Correspondingly, exchange rates could turn from being a shock absorber into a propagator of shocks. This could complicate domestic monetary policy-making by central banks.

These effects on credit, asset prices and exchange rates could be exacerbated if a widely used GSC becomes a vehicle currency for international financial transactions. By providing increased access to near-frictionless money across borders for all investors, including retail, a stablecoin might induce short-term, volatile capital flow movements.

Global stablecoins could reduce the efficacy of monetary policy

If GSCs were to displace the use of central bank-issued money and bank liabilities (the two forms of money over which central banks have the most direct control), monetary policy would be challenged. While volatile currencies clearly risk being displaced by stablecoins, stable currencies could face a similar risk. Households and businesses could be incentivised to use a GSC if its underlying technological platform could provide a cheap and efficient means of payment and transfers (both within and across borders). In addition, network effects and the digitalisation of all aspects of economic life could result in a GSC becoming the preferred means of exchange in its own extensive ecosystem within an economy.

Balancing the tension between encouraging innovation and managing risk of fintechs

Authorities need to tread a fine line in terms of ensuring that financial stability risks from fintech developments are addressed, yet simultaneously ensuring that innovation is not being stifled. This section outlines several approaches that MAS has adopted in responding to these fintech developments.

Risk-based and agile regulatory approach

A risk-based approach, where regulatory requirements are commensurate with the risks of the business activities, aims to consciously balance risk mitigation with an innovative environment.

For example, the Singapore Payment Services Act (PSA)¹⁵ applies to entities conducting various payments services, and is designed to enable MAS to "right-size" regulations. It applies proportionate regulatory measures to each type of payment service provider, depending on the scale of their activities and the risks they pose. The PSA has three classes of license, with entities in each class regulated differently according to the risks posed by the services provided. The regulatory requirements become proportionately stricter as these risks increase.

Given the rapidity of developments in the fintech landscape, it is also important that regulations are designed to be applied in a manner that promptly responds to changes in risks. The PSA has adopted a modular approach to enable MAS to respond nimbly to fast-changing payment solutions and business models, by tailoring regulatory oversight to the type of payments service provided.

Level playing field that is open to sustainable competition

Allowing for competition will spur greater innovation in financial services, while a level regulatory playing field will guard against financial stability risks.

A recent example is MAS' plans to issue up to five new digital bank licenses. MAS' approach is to set prudent baseline requirements to mitigate the risk of untested business models, and contain costs to the financial system in the event of a failure. Applicants for the license need to demonstrate that they have a sustainable digital banking business model, so that competition is not value-destructive or at the expense of long-term financial stability. By adopting a phased approach to digital banks' permissible activities, innovation is facilitated while reducing the risks for retail depositors. In time, successful digital banks in Singapore can also complement the incumbent local banks in anchoring domestic financial stability.

Another example is in the area of cyber risk, where MAS requires all MAS-licensed fintech firms to abide by the same high cyber security standards that are expected of the current FIs. Cyber risk management is particularly pertinent in the fintech space as the increased adoption of technology could give rise to increased cyber attack surface areas, potentially making FIs and fintech companies more prone to cyber-related vulnerabilities. All regulated FIs are expected to perform comprehensive risk assessments and ensure that there are sufficient risk-mitigating controls to protect systems and outsourcing arrangements with fintech companies. MAS regularly updates the technology risk management requirements and guidance issued to FIs to ensure that they remain relevant to the heightened risks that can be posed by fintech adoption.

¹⁵ Refer to Annex A for more details of PSA.

Adopting a proactive approach in reviewing the appropriateness of our regulatory perimeter

Given the fast pace of fintech developments, a framework that encompasses the regular surveillance of these developments and an assessment of potential risks could help authorities to take an informed and proactive stance in addressing potential regulatory gaps. This may require a reliance on less conventional data and information sources for more effective surveillance and analysis of risks. For example, MAS has adopted novel techniques and data sources to overcome the scarcity of traditional data in our crypto asset monitoring framework, to assess potential emerging financial stability risks. As a proof of concept,¹⁶ MAS utilised a clustering algorithm to find 10,000 Bitcoin wallet addresses that were controlled by a major wallet provider and broker dealer in Singapore. This allowed for a better monitoring of that particular entity. Similarly, blockchain-level clustering techniques can be used to monitor the magnitude and potential drivers of cross-border flows. This can be done by analysing bitcoin transfers between entities in different jurisdictions.

There needs to be a good understanding of potential risks, and an assessment of whether certain risks need to be addressed immediately. Correspondingly, regulation should be applied where the risk posed by the new fintech activity is material, such as in the PSA mentioned above.

Providing guidance on newer applications of technology

Some guidance would also be useful to help build a progressive and trusted environment for the use of newer technologies within the financial sector. For example, MAS has worked closely with a group of senior industry partners to develop a set of principles to promote fairness, ethics, accountability and transparency (FEAT) in the use of Artificial Intelligence and Data Analytics (AIDA) in finance.¹⁷ The FEAT principles provide guidance to firms offering financial products and services on the responsible use of AI and data analytics, to strengthen internal governance around the management and use of data. MAS is also working with financial industry partners to create a framework, known as Veritas, for FIs to evaluate their AIDA-driven solutions against the FEAT principles.¹⁸ Proper governance around the use of AIDA is critical to fostering trust and confidence in AIDA-driven decisions and financial services.

Global coordination in regulatory approaches

Where the regulatory principles described above can be applied by individual jurisdictions, some of the financial stability implications of these fintech developments would be of a global nature (eg GSCs). For such cases, there would be a need for a global, coordinated approach, so as to minimise regulatory arbitrage and increase the efficacy of risk mitigation.

¹⁶ MAS (2018a).

¹⁷ MAS (2018b).

¹⁸ MAS (2019).

Facilitating innovation in incumbent banks to mitigate the impact of fintech competition

While incumbent banks have an incentive to innovate to withstand competition from fintechs, regulatory authorities can provide conditions to facilitate this, and thus reduce the financial stability impact arising from competition to incumbent banks.

An example is the streamlining of the requirements in MAS' anti-commingling framework, which imposes limits and prohibitions on banks conducting certain non-financial businesses, to safeguard the banks from contagion risk from these non-financial businesses. These were streamlined to make it easier for banks to conduct or invest in permissible non-financial businesses that are related or complementary to their core financial businesses, and allow banks to broaden their ability to provide a fuller suite of services to their customers. For example, the revised rules will better facilitate banks that wish to operate, or collaborate with, online platforms matching buyers and sellers of customer goods or services.

At the same time, MAS also addressed associated risks through, for instance, requiring banks to have commensurate risk management and governance arrangements as well as tightening the aggregate size limit for banks' non-financial businesses.

In Singapore, the incumbent banks have invested heavily in making massive digital platforms to entice their customers to continue to maintain their banking relationships. In some cases, they have established partnerships with fintechs to harness capabilities of new technology and deliver more customised solutions. As an example, United Overseas Bank (UOB) has partnered with Personetics to use artificial intelligence to identify individual transaction demands, allowing UOB to provide customers with real-time and personalised financial guidance.

Incumbent banks have also built digital banks in overseas markets, leveraging a lower-cost operating model to quickly acquire new customers. In these markets, they are acting as fintech disruptors, but doing so with an established regional brand name. DBS launched digibank in 2016 in India, acquiring over 2.5 million customers in its initial two years of operations as India's first mobile-only bank. The bank has also recently replicated its digibank strategy in Indonesia, launching in Q3 of 2017. DBS was ranked by Euromoney as the world's best digital bank in July 2018, a first for any Asian bank.

They have also adopted more customer-focused approaches, integrating financial choices with traditionally non-financial needs. For instance, Oversea-Chinese Banking Corporation (OCBC) launched a platform in 2018 that focused on the end-to-end needs of mothers-to-be and young mothers and, at the point of launch, had over 600 listings of goods and services. The bank has also launched a programme for people aged 55 years and over, to provide a one-stop solution for financial advice, insurance products and lifestyle options.

Conclusion

Fintech developments and innovations have already benefited many users through improved efficiency, greater financial inclusion, and improved customer experience. These gains stand to increase as existing technologies mature or new technologies arise. However, they could bring about new financial stability risks, which will require timely monitoring and addressing. Financial stability implications that cut across borders will need international cooperation in order to be effectively addressed. Appropriately designed approaches that monitor and address these risks, while not second-guessing innovation, will be key in ensuring that fintech can develop sustainably for the benefit of people and society.

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Annex A

Payment Services Act (PSA)

Aim of PSA

The Act aims to provide regulatory certainty and establish consumer safeguards while not impeding the innovation and growth of payment services and fintech in Singapore. The PSA is a combination and update of the 2006 Payment Systems (Oversight) Act and the 1979 Money-Changing and Remittance Business Act. Specifically, it aims to mitigate four key risks, namely (1) loss of customer monies; (2) money laundering and terrorism financing; (3) fragmentation and lack of interoperability across payment solutions; and (4) technology risks including cyber risks.

Approach of PSA

The PSA includes two regulatory frameworks: a designation regime and a licensing regime. The first regime gives the MAS power to designate payment systems in instances where that system is widely used in Singapore or when the system impacts on the operations of other payment systems. It allows MAS to act to protect and encourage efficiency and competition within the payment space. The second regime is the licensing regime that allows MAS to regulate a wide range of payment services in particular tailoring oversight to the type of service provided. These services can be grouped into seven types, namely, (1) account issuance; (2) domestic money transfers; (3) cross-border money transfer; (4) merchant acquisition; (5) e-money issuance; (6) digital payment token dealing and exchange; and (7) money-changing.

Mitigating key risks

There are four key risks that are common across many payment services: (1) loss of customer monies; (2) money laundering or terrorism financing risks (ML/TF); (3) fragmentation and lack of interoperability across payment solutions; and (4) technology risks, including cyber risks.

The act requires major payment institutions to safeguard customer monies from loss through an institution's insolvency using an (i) undertaking or guarantee by any bank in Singapore or a similar prescribed financial institution to be fully liable to the customer for such monies; (ii) a deposit in a trust account; or (iii) any other manner approved by MAS. To avoid placing such onerous requirements on all licensees, this requirement is only required for major payment institutions with other licensees just required to make a declaration to the customer.

On the risk of payment services being used for ML/TF, MAS conducted a consultation in June 2019 with industry partners and outlined a number of rules in two different Notices through the MAS Act, PSN01 and PSN02, which created a number of tiers of control depending on the license held.

On the risk of fragmentation of e-payment solutions, MAS has persuaded the industry to undertake various measures to ensure that the solutions are ultimately interoperable within an open architecture. The Act gives MAS formal powers to ensure interoperability of payment solutions in the interest of customers and market development. For example, a designated payment system operator or major payment

institution must allow third parties to access any payment system it operates, and the access regime imposed must be fair and not discriminatory.

To address technology risks, the Act grants MAS the power to impose technology risk management requirements, including cyber security risk management requirements, on all licensees. MAS will require that payment service providers ensure that there is adequate risk governance and implementation of adequate controls, particularly in the area of user authentication, data loss protection and cyber attack prevention and detection.

Financial market development, monetary policy and financial stability in emerging market economies

South African Reserve Bank

Abstract

The South African financial market remains deep and liquid, allowing for effective monetary policy implementation through a classical cash reserve system where the money market shortage is refinanced via repurchase operations. This has further facilitated the monitoring of both interest rate and inflation expectations through particular market indicators. The inflation targeting regime has helped to mitigate the impact of swings in the exchange rate on monetary policy, thus allowing the South African Reserve Bank (SARB) to refrain from active intervention in the foreign exchange market. Over the past decade, the domestic financial sector has remained resilient, despite increased financial stability risks emanating from heightened uncertainty around global and domestic economic policy. Policy options available to deal with financial stability risks include the standard macroeconomic and structural policies, macroprudential policies, as well as capital flow management measures. However, EMEs' monetary policy implementation and transmission may be affected by big techs' forays into finance.

JEL classification: E42, E43, E44, E52, E58, F31, G01, G23.

Keywords: inflation, interest rates, monetary policy, market development.

The impact of financial market developments (FMD) on monetary policy

Recent financial market developments (FMD) have not changed the way in which South Africa implements its monetary policy. With regards to the operational target and monetary policy instruments, some major changes occurred a number of years prior to the global financial crisis (GFC) when the country adopted an inflation targeting regime (IT). South Africa announced its intention to adopt an IT framework in August 1999 and formally introduced IT in February 2000, and has targeted inflation within a range of 3– 6% since. At present, the SARB is reviewing its monetary policy implementation framework to enhance its effectiveness and appropriateness. The SARB is considering whether its operational target should be changed from a money market shortage to a short-term money market interest rate. The SARB has also undertaken to reform benchmark interest rates to promote efficient pricing in the domestic financial markets and more effective implementation of monetary policy.

The monetary policy implementation framework that gives effect to the SARB's inflation mandate has evolved from variations of a discount facility to a repurchase rate repo-based financing system. The SARB follows a classical cash reserve system, whereby it creates a money market shortage by levying a cash reserve requirement on banks to influence the credit channel of monetary policy transmission.

In addition, various open market operation tools are utilised to maintain this shortage at a particular level. Currently, the size of the shortage is maintained at ZAR 56 billion¹ and is expected to impact commercial banks' cost of funding and their ability to extend credit. Banks refinance the shortage at the weekly seven-day repurchase auction with the central bank, conducted at the policy (repo) rate as determined by the Monetary Policy Committee (MPC). The SARB lends funds to banks against eligible collateral, which comprises assets that qualify as statutory liquid assets.

A range of open market operations are conducted by the SARB on a daily basis to manage liquidity in the market – such as the issuance of SARB debentures, reverse repos, the movement of public sector funds between the market and the SARB and conducting money market swaps in the foreign exchange market. In addition, the SARB offers a range of end-of-day facilities for banks to square off the daily positions on their settlement accounts. These include access to their cash reserve balances held with the SARB, supplementary repos/reverse repos conducted at the repo rate and an automated standing facility, where end-of-day balances on the banks' settlement accounts are automatically settled at a rate of 100 basis points below or above the policy rate.² Well-developed financial markets allow for the effective and efficient implementation of monetary policy.

¹ During the Covid-19 crisis, the SARB allowed this shortage to evolve into a surplus position, in order to manage strains that appeared in various funding markets.

² The Standing Facility rates were amended to repo and repo less 200 basis points during the liquidity provision measures implemented during the Covid-19 crisis.

How has FMD affected monetary policy transmission?

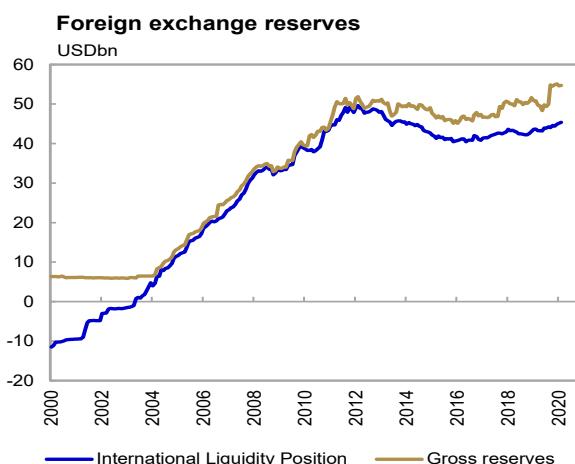
FMD has led to changes in the regulatory environment, which in turn has affected the transmission of monetary policy. After the GFC, South Africa changed its prudential regulations to ensure that banks were adequately capitalised and had adequate liquidity. These changes, as well as risk modelling requirements, have affected banks' cost of funding. Lending spreads imposed by banks have increased, while many banks have become more risk-averse in their extension of credit.

While these changes are believed to have influenced the transmission of monetary policy through the banking sector to the broad economy, the full extent of this impact is unclear. There are some indications that bank funding costs have increased and lending spreads have risen, to the extent that credit conditions could be tightening independently of monetary policy. Previously, such a tightening would have weakened the transmission of monetary policy, particularly during periods when the policy rate was reduced.

Other important FMD relates to the fluctuations in sentiment towards EMEs and the associated volatility in capital flows, which has led to large swings in EME currencies at times. Unlike other EMEs, which have made more active use of FX interventions to manage volatility in exchange rates and capital flows, the SARB's participation in FX markets remains limited to the accumulation of foreign reserves without seeking to affect the level of the exchange rate. In this regard, South Africa has gradually increased its official FX reserves from a negative net open foreign currency position of US\$ 26 billion in the late 1990s to US\$ 53.0 billion in April 2020 (Graph 1).

International liquidity position and gross reserves

Graph 1



Sources: SARB

Historically, emerging markets have experienced high pass-through from exchange rate movements to inflation. In South Africa, as in peer countries, the inflation-targeting regime has worked to lower the pass-through, with the inflation target replacing the exchange rate as the nominal anchor. In the 2011–16 period, inflation expectations were relatively stable, despite the rand's sustained depreciation. More recently, monetary policy has sought to steer expectations closer to the 4.5%

midpoint of the 3–6% inflation target range. The success of this initiative has allowed the SARB to lower the policy rate recently, despite the large depreciation in the exchange rate.

On occasion, there has been increased participation by non-resident investors in the local currency EME bond markets. This has been made possible by the increased liquidity and depth of the local currency bond market and, in the case of South Africa, by the inclusion in various global bond indices. Greater participation by non-residents in emerging markets can have a significant influence on the exchange rate, as non-residents prefer to buy or sell local currency bonds in large quantities. The longer end of South Africa's yield curve has been influenced largely by the sharp increase in government's funding requirements alongside heightened risk aversion across financial markets. As a result, the spread between short- and long-term borrowing costs is at a historically elevated level.

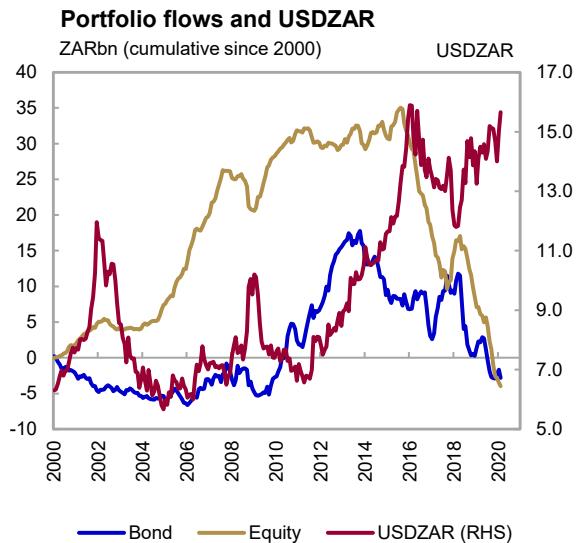
Has FMD limited or amplified monetary policy autonomy and foreign monetary policy spillovers?

Monetary policy autonomy in South Africa has been supported by well-developed fixed-income and money markets, as well as deep and liquid foreign exchange markets. South Africa's financial system is large relative to the size of the economy. A well-functioning financial system facilitates the influence of changes in the policy rate on aggregate demand and on the level of prices in the economy.

While monetary policy autonomy is enhanced by well-developed financial markets, in small open economies, particularly in those with significant foreign financing requirements, global developments will affect domestic policy decisions. For example, widening interest rate differentials in favour of the US dollar may place pressure on local authorities to tighten monetary policy. Equally, easier financial conditions in advanced economies (AEs) may provide greater leeway for EMEs to relax policy. However, while international factors matter, they do not dictate local policy choices. This is why the SARB has been able to move in the opposite direction to global interest rates, on some occasions. This was the case, for example, when the SARB reduced the repo rate by 25 basis points in 2017 and by a further 25 basis points in March 2018, even though the Federal Reserve had raised interest rates during this period. At the time, the SARB's decision was largely influenced by an improved domestic inflation outlook and constrained economic growth prospects. Other important factors include the perceptions of foreign investors and lenders. Investors have increasingly sought to differentiate between EMEs. For example, while South Africa has sophisticated financial markets, the increased fragility of state-owned enterprises and the related credit risks for the sovereign have affected portfolio flows into South Africa (Graph 2) and driven up the South African term premium (Graph 3).

South African portfolio flows and the exchange rate of the rand

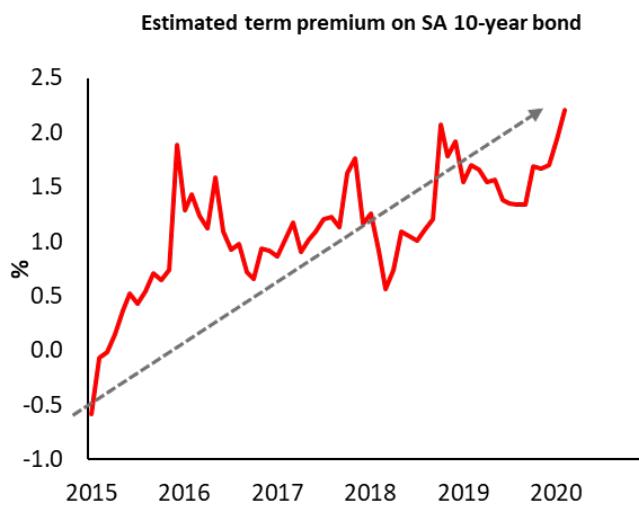
Graph 2



Sources: Bloomberg

Estimated term premium on the South African 10-year bond

Graph 3



Sources: Bloomberg and SARB.

Has FMD yielded useful indicators for calibrating policy?

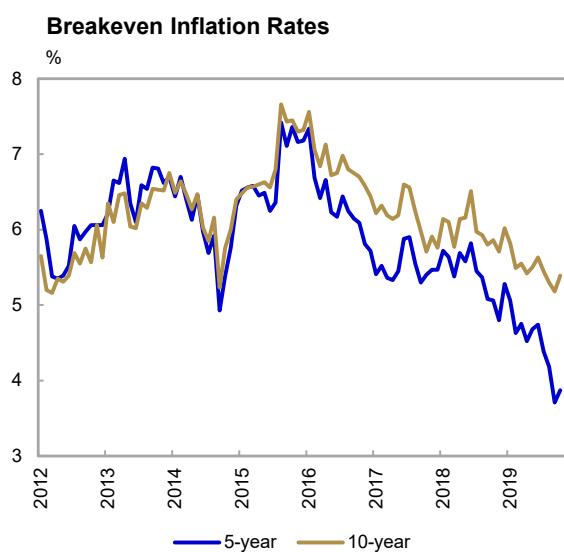
FMD has allowed for the trading of forward rate agreements (FRAs), which are over-the-counter contracts used to fix a certain interest rate, either on borrowing or lending for some future period. The assumption underlying the contract is that borrowing or lending is benchmarked against the three-month Johannesburg Interbank Average Rate (Jibar), and is typically used to take a speculative view on

domestic future interest rates. While FRAs are not used in calibrating monetary policy *per se*, they allow policymakers to assess markets' expectations of interest rates in one-, three- and six-month onwards time periods.

Apart from FRAs, South Africa introduced inflation-linked bonds (ILBs) in the 1999/2000 financial year as part of the active debt management strategy undertaken by the National Treasury. The development of the ILB market has allowed for market-based inflation expectations to be measured via breakeven rates, that is, the difference between the yield of a nominal (vanilla) bond and an ILB of the same maturity. Government issues ILBs to diversify its funding base and benefit from inflation targeting. Since the introduction of inflation targeting, the ILB market has grown to approximately ZAR 369 billion. The attraction of these bonds is the relative certainty of cash flows, notwithstanding that the real return earned by an investor over the life of the bond is dependent on the inflation rate. Currently, the maturity of ILBs ranges from two years to 50 years (Graph 4).

South African breakeven inflation rates

Graph 4



Sources: Bloomberg

How has FMD affected monetary policy communication?

South Africa has comparatively deep and sophisticated financial markets for an emerging market economy (EME), which has facilitated the relatively smooth functioning of an inflation-targeting regime that is now almost two decades old.

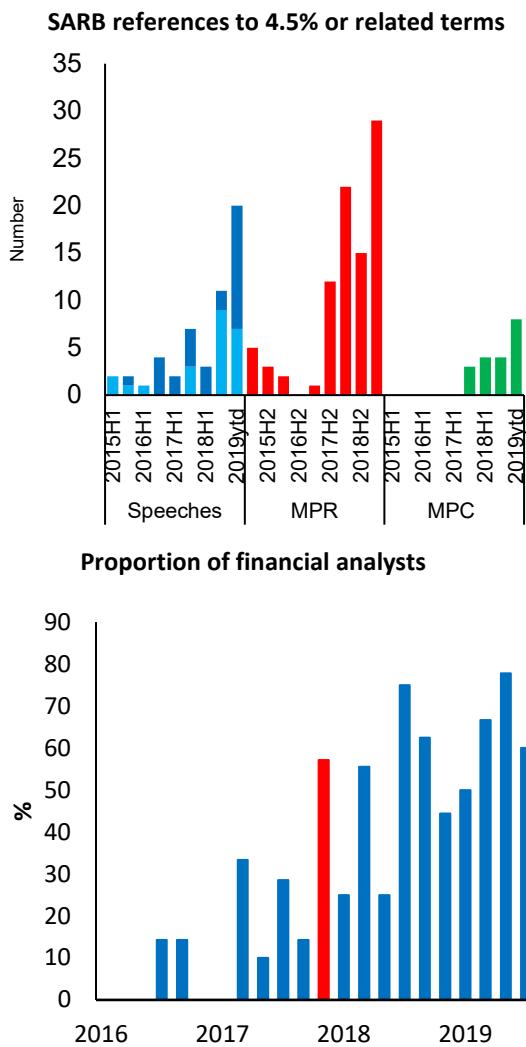
Over this period, the SARB has developed and refined its tools for communicating its policies to the public, which has helped monetary policy achieve its goals with less interest rate volatility, and therefore less output volatility, than had been the case previously. With attentive and responsive financial market participants, central bank communication is a powerful policy tool.

Since 2017, the MPC has undertaken a strategic initiative to lower inflation to around 4.5% – the midpoint of the official 3–6% target range. Prior to 2017, there

was no explicit guidance on how the public should interpret a 3–6% target range, and the upper bound of the range (6%) was widely interpreted as the de facto target. Clear communication has helped to lower inflation expectations without the SARB having to raise interest rates. This message has been conveyed through a range of channels, including speeches, investor engagements, MPC statements and the *Monetary Policy Review*.³

How the South African Reserve Bank's 4.5% preference diffused to analysts and the media

Graph 5



Sources: Monetary Policy Review, October 2019

During this period, the MPC statements have become shorter and more forward-looking. These statements are now published together with tables detailing major forecast inputs, including the interest rate path used for these projections. This

³ The charts in Graph 5 of this note were taken from SARB, *Monetary Policy Review*, Box 2, October 2019, p 8.

has enhanced transparency about the SARB's decisions and, as a result, improved public understanding of the MPC's reaction function.

The biannual *Monetary Policy Review* has also evolved to be more accessible and engaging for its readership. It is now shorter and written in a more straightforward language, and no longer attempts to provide comprehensive coverage of the inflation data in cases where such detail is not material for policy decisions.

Impact of FMD on financial stability

Has the development of domestic financial markets improved banking system stability and reduced financial stability risks arising from households and firms?
Has FMD fostered shadow banking?

FMD have not significantly changed the degree of financial stability in South Africa during the last decade. South Africa's financial system is facing a challenging environment of low economic growth and deteriorating fiscal conditions, but it remains resilient, largely characterised by a robust financial infrastructure and strong regulatory and supervisory frameworks. The SARB has put in place a comprehensive regulatory framework, which has ensured that financial firms have substantial capital and liquidity buffers to absorb shocks. Disruptions caused by Covid-19 are exacerbating South Africa's long-standing macro-financial conditions.

The domestic banking sector-sovereign nexus is a current threat to financial stability due to the government's large and increasing financing requirements. Sovereign exposures account for more than 15% of total banking sector assets, having roughly doubled over the past 12 years. In this regard, three key risks to financial stability have been identified. First, rising fiscal risks are placing upward pressure on borrowing costs across the economy, potentially exacerbating the effects of Covid-19. Second, the capacity of the government to provide a backstop to the banking sector is limited, which could make the sector more vulnerable to contagion. Third, the fiscal deficit for the current year is the largest in a century and will need to be reduced considerably over the medium term. This fiscal adjustment could impair the country's economic recovery from Covid-19.

However, the complete implementation of Basel III reforms in January 2019 has enhanced the capital and liquidity buffers in the financial sector, providing banks with greater scope to absorb shocks and to avoid procyclical tightening of credit provision during adverse shocks. More recent reforms are expected to help stabilise the banking sector in the face of adverse shocks. First, the Financial Sector Regulation Act 9 of 2017 has provided the SARB with additional legal powers to reduce the financial stability risks posed by financial institutions that are systemically important. In June 2019, the SARB finalised and published its methodology to determine whether a bank is systemically important. Second, the SARB assisted the National Treasury with the finalisation of the Financial Sector Laws Amendment Bill (FSLAB) for submission to Parliament. The FSLAB will make the SARB the resolution authority for designated institutions, which include banks and non-banks. The SARB's responsibilities will include dealing with failing designated institutions and developing resolution plans for all designated institutions, whether or not they face an imminent risk of failure. Third, the SARB is currently in the process of establishing a deposit insurance scheme for South Africa. Its key objectives include protecting less financially sophisticated

depositors when a bank fails and enhancing the financial safety net, thereby contributing to the protection and enhancement of financial stability in South Africa.

The stability of the domestic banking system was bolstered by the Basel III reforms. (The framework was revised in December 2017 with some additional requirements that will be transitionally phased in up until 2028.) These reforms have strengthened the banking regulatory framework by (i) increasing the amount and quality of regulatory capital; (ii) enhancing the risk coverage of the regulatory framework; (iii) introducing a leverage ratio as a backstop; (iv) introducing minimum liquidity standards; and (v) introducing additional capital buffers for systemically important institutions. These reforms have also led to improved risk management practices and increased demand for government bonds from the banking sector due to the minimum Liquidity Coverage Ratio (LCR) requirement.

In South Africa, 90% of trading on the domestic bond market is in government bonds. There has also been trade in the primary and secondary corporate bond markets. South Africa's well developed financial system is dominated by a small number of large financial conglomerates and a high degree of interconnectedness. From a supervisory perspective, systemic risk is concentrated in a few financial conglomerates.

With regard to non-bank financial intermediaries, South Africa's banking sector receives a relatively large share of its funding from other financial institutions (OFIs). The OFIs that have exposure to banks, or that invest in banks' assets, include money market funds and other investment funds, and finance companies. In 2018, domestic exposures to OFIs were 1.8% of total bank assets whereas South African banks' use of OFI funding was more than 12.81% of total bank assets.

Notably, OFI assets have been growing at a faster pace than banks' assets since the GFC, and in June 2019, the share of financial assets held by OFIs increased to 18% of total financial assets. Conversely, banks' share of total financial assets fell over the same period, but has remained relatively stable at around 30% since 2015.

How has FMD affected external positions in different sectors? Has this changed risk-sharing between EME borrowers and foreign investors? Has FMD helped EMEs to overcome the original sin, and if so, how?

Easy financing conditions, ultra-low interest rates in AEs and the search for yield has resulted in an increase in FX borrowing in EMEs. This has created new vulnerabilities, including exchange rate and maturity mismatches for sovereign borrowers. However, in South Africa, sovereign debt remains largely denominated in local currency, and amounted to 90% of total debt at the end of the 2019/20 fiscal year. Non-residents' participation in local currency debt has increased since 2000, from around 10% to approximately 34% at the end of March 2020. As a result, South Africa is vulnerable to a sudden stop/reversal in capital flows given the significant participation of non-residents in the local currency bond market. Indeed, as South Africa's sovereign credit rating was downgraded to sub-investment grade in April 2020 by Moody's, and the country was removed from the WGBI, there were significant capital outflows recorded in the government bond market by non-residents.

With regard to the currency market, the increased foreign participation in the South African FX market has enhanced liquidity and depth, with 70% of the rand being traded offshore. Liquid market conditions facilitate new price discovery in the domestic market, making it easier for various market participants to hedge their exposures. South Africa has embarked on a gradual phasing-out of capital controls

to encourage competition and integration, which has also attracted interest from foreign investors. In the 2020 Budget speech, the Minister of Finance announced substantial changes to South Africa's capital flow management framework. These changes involve a shift from the current negative bias framework, in which all foreign FX transactions are prohibited except those included in the Currency and Exchanges Manual for Authorised Dealers, to a positive bias framework, in which all cross-border transactions are allowed, with the exception of a short list of exclusions aimed at preserving financial stability and combating illicit financial flows.

The BIS 2019 Triennial Central Bank Survey highlighted increases in turnover data across all FX derivative instruments used for hedging purposes. Turnover in the rand FX spot market also increased to US\$ 27 billion in 2019, from US\$ 16 billion in 2016. In terms of turnover in the spot and derivatives markets, the position of the rand improved to 18th in the world in 2019, from 20th in 2016, surpassing the Turkish lira and the Brazilian real. The domestic markets have shown resilience due to technological advances and a diverse investor base.

What are the policy options to mitigate changed financial stability risks? How effective are macroprudential policies and capital flow management measures? Can the development of benchmark bonds help the growth of local currency bond issues and increase resilience?

The SARB subscribes to the view that the policy options available to deal with changing financial stability risks due to FMD, specifically capital flow volatility, include standard macroeconomic and structural policies, macroprudential policies and capital flow management measures. The SARB has opted not to intervene in the FX market in recent years, except to gradually accumulate reserves. Therefore, the aim of the macroeconomic framework is for the exchange rate to act as the primary shock absorber in the event of a capital flow shock.

Compared to its EME peers, South Africa already has a reasonably deep and broad-based domestic investor base and capital markets. A particular strength of the economy is its positive net international investment position and large holdings of foreign currency-denominated financial assets. This means that capital flow shocks and associated depreciations of the currency inflate the local currency value of these foreign assets. Meanwhile, the capital flow management framework, which sets limits on the foreign share of assets held by institutional investors, encourages the repatriation of capital into the domestic economy at times when the exchange rate is depreciating.

The SARB's macroprudential policy framework is concerned with the use of macroprudential instruments designed to limit various aspects of this risk. Macroprudential policy at the SARB has two broad objectives aimed at limiting systemic risk: first, strengthening the resilience of the financial system to economic downturns and other adverse aggregate shocks, and second, leaning against the financial cycle by limiting the build-up of financial risks to reduce the probability or the magnitude of a financial bust. Systemic risk assessment focuses on identifying both structural and cyclical vulnerabilities within the economy that have the potential to amplify and propagate negative economic shocks to the system. This is achieved by monitoring and assessing indicators of risk and the build-up of imbalances in the system.

The SARB's macroprudential toolkit consists of three sets of tools to address systemic risk. These include (i) standard macroprudential tools; (ii) microprudential and regulatory tools; and (iii) idiosyncratic risk-specific tools. Communication is

viewed as a cross-cutting tool that provides an opportunity for the wider public to understand the purpose and objectives of the macroprudential policy process, while also enhancing the accountability and reputation of policymakers, and strengthening the efficacy of their actions.

The SARB's standard macroprudential toolkit of instruments is a work in progress and includes the countercyclical capital buffer, loan-to-value ratio, debt-to-income limits, leverage ratio, dynamic loan provisioning and liquid asset requirement, as well as the Liquidity Coverage Ratio and Net Stable Funding Ratio. Work is also currently being done using capital flow management measures to deal with risks from capital flow volatility. Macroprudential instruments are useful in mitigating systemic risk arising from excessive credit growth and capital flow management, even if they are not specifically designed to limit or target capital flows. Other macroprudential policies in place include limits on the foreign exposures of banks. Meanwhile, institutional investors have significantly enhanced the resilience of the economy to exchange rate and capital flow movements.

Looking ahead

Which market development would further improve the conduct of monetary policy? Which market developments have the greatest potential for strengthening resilience? What can central banks do to support this development?

To further improve the conduct of monetary policy, and to further develop financial markets, the SARB is currently reviewing existing reference rates and benchmark rates so that they will comply with global standards. This will promote efficient pricing and greater transparency and credibility and support more effective monitoring of conditions in financial markets with the ultimate aim of achieving and maintaining financial stability. Greater transparency will also support the SARB's analyses of monetary policy transmission as well as the monitoring of conditions in financial markets with the ultimate aim of achieving and maintaining financial stability.

One of the most important reference rates in South Africa is the Johannesburg Interbank Average Rate (Jibar) calculated for various maturities up to 12 months, which is also used by commercial banks to price a sizeable portion of their assets and liabilities both on- and off-balance sheet. The current design of Jibar is not aligned with the global standard for financial benchmarks, as it is based on a dwindling component of money market activity, while the calculation methodology could benefit from refinements. Market participants have also emphasised the need for a risk-free yield curve as a benchmark for cash-collateralised derivative contracts.

How might fintech and big tech developments, including large third-party payment companies and global stablecoins, affect monetary policy implementation and transmission? How might the competition or collaboration between fintech firms, big techs and traditional financial companies in funding (eg interbank funding) and lending (eg peer-to-peer lending) markets create new financial stability risks? How could policymakers mitigate these emerging risks while not forgoing benefits from innovation for financial sector development and financial inclusion?

Fintech and big tech developments may have a greater impact on jurisdictions with large underserved, non-served or concentrated markets. The usual modus operandi of fintech players is to address such financial services gaps through innovative solutions. The impact on monetary policy and transmission may be larger if funds are moved from traditional fiat currencies to private digital currencies. This impact may be heightened if domestic regulatory frameworks do not accommodate new digital platforms. Thus, the impact on monetary policy will likely be greater if there are significant shifts from traditional players to big techs, especially if the underlying product is a global stablecoin. New stability risks may arise if the underlying business models are not well understood, or where the reserve holdings of the underlying asset by the global stablecoin issuer reach systemic significance in the domestic context. Whereas traditional players may have assets represented on their balance sheets, non-traditional new players, such as peer-to-peer lending platforms, may adopt other models such as originate-to-distribute models. Such shifts need to be better understood to keep abreast of new risks, such as heightened levels of interconnectedness, concentration risks or new business risks.

Policymakers and regulators need to be proactive, embrace fintech and be on the front foot in understanding emerging innovation. In order to keep abreast of developments, regular market outreach to understand major emerging innovations may assist. EMEs need to remain ahead of the curve in relation to this area before financial payments become a problem. There is, accordingly, a stronger imperative for EMEs than for AEs to issue a central bank digital currency (CBDC). While AEs have the power to shut down or curb big techs, EMEs may be more constrained in this regard.

EMEs' monetary policy implementation and transmission may potentially be threatened by big techs' continued foray into the world of finance. The question around how competition or collaboration between fintech firms, big techs and traditional financial companies in funding and lending markets create new financial stability risks is a pertinent one. As a small open economy, South Africa is already highly susceptible to volatile capital flows, which could be exacerbated by South Africans selling rands for global stablecoins. From a broader EME perspective, the potential for large and volatile capital flows to manifest through the exchange rate channel is of concern, unless it can be agreed internationally that global stablecoin arrangements are required to hold local currency in-country to prevent large currency fluctuations.

The challenge for EME policymakers in particular relates to crafting appropriate policies for big tech firms operating in its jurisdiction, particularly given that the host regulator's legal jurisdiction could be restricted given that the big tech firm may be domiciled elsewhere. This continues to pose a massive challenge to EMEs, which is likely to become even more prominent should a truly global stablecoin be launched. Lastly, while there are various potential benefits that could be derived from global stablecoins in the form of cheaper and more effective remittances (which in turn could enhance financial inclusion), these should be carefully balanced against the potential risk such developments could pose for smaller economies.

Conclusion

South Africa's financial markets are deep and liquid, supporting the effective implementation of monetary policy and contributing to financial stability. The floating exchange rate of the rand remains an effective shock absorber, and while it is relatively volatile compared to its EME peers, the inflation targeting regime has worked to lower pass-through, with the inflation target replacing the exchange rate as the nominal anchor. The SARB assesses the effectiveness of its monetary policy implementation framework from time to time, and has determined that there is scope for enhancement. In addition to this, and linked to possible amendments in the implementation framework, the SARB is in the process of reforming its interest rate benchmarks to allow for better transparency and price discovery in the money markets. Such transparency is important for monitoring and improving the effectiveness of monetary policy transmission via the money markets.

Financial market development, monetary policy and financial stability in emerging market economies

Bank of Thailand

Abstract

More than two decades have passed since the Asian Financial Crisis in 1997, which drastically reshaped financial markets in Thailand. An inflation targeting framework with a managed floating exchange rate was then adopted in place of the fixed exchange rate regime. The government bond market has also come to life, which promoted the development of the bond repurchase market. Issuance of corporate bonds has gradually become a funding alternative for private enterprises. Rules and regulations have also been reviewed to ensure the soundness of financial markets while promoting their efficiency. These market development efforts have necessitated an adjustment in monetary policy implementation and tools. They have also led to changes in market transmission, through new channels and players. At the same time, market development has also led to the emergence of new financial risks, which have warranted close monitoring and prompt action by the authorities.

The first and second parts of this paper provide some background on the drivers of market development in Thailand after the Asian financial crisis, and how the conduct of monetary policy has evolved to accommodate such objectives. The third part reflects on the financial stability consequences of market development and the appropriate policy responses.

JEL classification: E44, E52, E58.

Keywords: Bank of Thailand; financial market development; monetary policy; financial stability.

Financial market development in Thailand

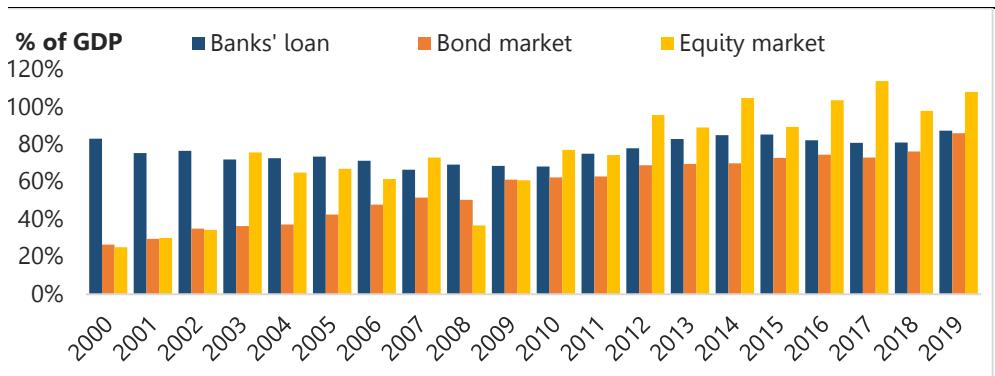
The emergence of a domestic debt market

Prior to 1997, financial intermediation was conducted almost entirely by commercial banks, while funding from capital markets was limited to equities. The crisis in 1997 brought about the massive issuance of government bonds to recapitalise the banking system. Recognising the imbalance in Thailand's capital market structure and its over-reliance on bank-based funding, the authorities and private sector participants joined forces to lay the ground for a domestic bond market, by defining the regulatory and supervisory framework, setting up a market infrastructure and ecosystem, and ensuring the good conduct of market participants.

A key development was the establishment of a primary dealer system for government bond issuance and for trading with the Bank of Thailand (BOT). The system supports the take-up in the primary market and liquidity in the secondary market. A regular government issuance calendar was also established, along with the designation of benchmark bonds, whose sizeable issuance helped ensure liquidity along the entire yield curve. The active sovereign curve has produced a reference rate for private issuance, which ultimately led to the emergence of a smoothly functioning corporate bond market as another reliable funding source for businesses. Accordingly, the three main financing pillars, bank lending, equity issuance and the bond market, have become more balanced over time, as can be seen in Graph 1.

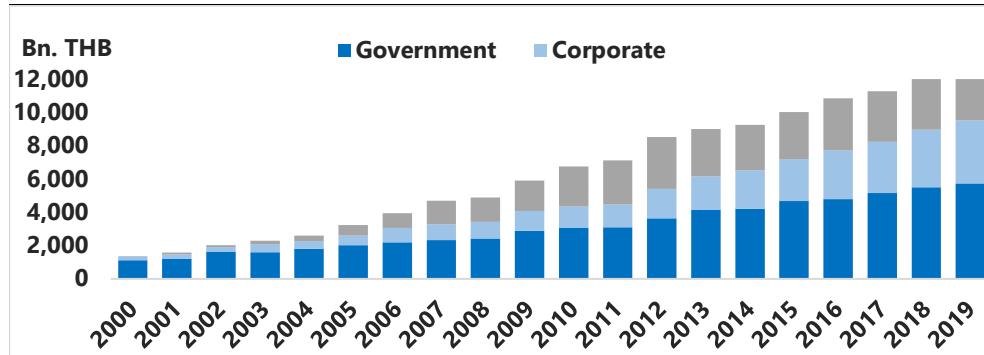
Thailand's capital market structure

Graph 1



Sources: ADB, BOT, SETSmart.

Moreover, the BOT started issuing a significant amount of BOT bonds in 2008 to absorb the large liquidity pool resulting from foreign reserve accumulation in the early 2000s and bearing in mind its bond market development goals. To avoid the emergence of two yield curves on the same sovereign credit, the BOT and MOF came to an agreement to issue bonds in different parts of the curve, whereby BOT occupied the sub-three-year range, while MOF took up the longer tenors. The arrangement has worked as intended, with the two types of bond trading in an almost seamless manner, both constituting a single liquid sovereign yield curve.



The development in bond markets also brought about the rise in the use of interest rate derivatives. The interest rate swap market in Thailand is liquid and widely utilised by local and foreign participants to manage their interest rate exposures both from investment and borrowing. It also allows players to take an interest rate view without much need for cash funding, and hence represents a good way for non-residents to take rate exposures in Thailand.

The promotion of the repo market

As the bond market became more liquid, the private repo market also took off. Until the early 2000s, in the so called BOT repo market, the BOT acted as a central counterparty for lenders and borrowers. Since all repo transactions could be carried out with the BOT, there was little incentive for market participants to transact with each other, resulting in the lack of a liquid interbank market for bond-collateralised lending, of the kind which is considered a safe and efficient funding tool in the advanced economies. Thus, the BOT gradually promoted a private repo market where banks deal directly with each other, in parallel with the existing repo market. To further foster activities in the private repo market, the BOT overhauled its own operations by phasing out the central bank-operated BOT repo market, and in 2007, it started bilateral repo transactions with newly appointed bilateral repo primary dealers (PD). With the excess liquidity in the banking system combined with limited access to BOT absorption, non-PD participants were driven to deal in the private repo market. This kick-started interbank bond-collateralised lending in the Thai market. As is the case for BOT bond issuance, where the change in BOT operations helped to promote a liquid bond market, the overhaul of the BOT's repo operation has brought about a major advance in private repo market activities.

Change in exchange rate regime and FX market landscape

After the 1997 crisis, Thailand adopted a managed floating exchange rate regime in place of the fixed exchange rate system. This has created a new environment for the FX market and entailed changes in market participants' behaviour as well as BOT's FX operations.

In the fixed exchange rate system prior to the crisis, the stability of the exchange rate made it unnecessary for market participants to manage exchange rate risk.

Following the adoption of floating exchange rate regime, FX trading activities increased for hedging purposes along with the rising availability of FX hedging tools such as FX swaps, options and cross-currency swaps (CCS), significantly increasing the depth of the FX market in the past two decades.

The role of BOT has also evolved. The days of tight control over foreign exchange transactions for residents have given way to more liberalisation as market players become more knowledgeable and well informed. The increased depth of the FX market, together with the more liquid and easily accessible bond and equity markets, has also drawn in new classes of players, such as indexed funds, which can greatly influence market movements. Such pressures have called for an adjustment in the BOT's measures. The existing "Measure to prevent Thai baht speculation", originally imposed in May 1997 to prevent the baht's depreciation, has been adjusted to structurally mitigate appreciation pressure on the currency instead. This measure, which has created a two-tier market for the baht funding of residents and non-residents, has helped the BOT to curb excessive volatility in the baht, especially that arising from offshore speculation.

BOT's FX operations have also changed since the crisis. Operations to defend the peg were replaced by foreign reserve accumulation in the 2000s. More recently, the emphasis has been on curbing excessive volatility and preventing misalignment of the baht with fundamentals. The large accumulation of foreign reserves in the past two decades has led the BOT to absorb excess reserves to maintain market interest rates around policy rate. Such action has shaped the BOT's operations and influenced market development in many ways, among which are the issuance of BOT bonds and the bilateral repo operations described above.

Impact of financial market development on monetary policy and implementation

Most of the BOT's market operations were designed with market development objectives in mind. The development of the repo and bond markets show how the choices made for market operations can shape market development. In turn, financial market development has also affected policy transmission, as outlined below.

Stronger rate transmission through bond market

A liquid sovereign yield curve and the repo market allow financial institutions to use sovereign yields and repo rates as benchmarks for their funding and lending. With excess system liquidity, most major banks hold large amounts of bonds and invest in the repo market, which act as alternative returns for banks' other activities. As bond yields and repo rates are responsive to policy rate changes, this has helped strengthen transmission of MPC policy through the interest rate channel.

The development of the bond market has also affected policy transmission in an important way. For large corporates with a good credit standing, market-based finance through bond issuance may be a cheaper alternative to bank loans. As bond yields are generally quick to respond to policy rate changes, bond market financing at times has proved a quicker transmission channel than traditional bank credit. That, in turn, has influenced banks to adjust their rates competitively and hence has helped

accelerate transmission through banks. This, however, generally applies to corporates with bargaining power while rates transmission to small businesses might still be lagging behind.

Spillover from global factors to domestic markets

Improved access implies that the Thai market has become more exposed to the actions of foreign investors. As inflows from this group of investors are mostly sizeable and at times subject to herd behaviour, these flows can substantially affect exchange rate and domestic yields. In the past decade, the volatilities of exchange rates and bond yields have risen. Global factor-driven flows could drive prices to the levels that were not consistent with the economic fundamentals, affecting policy transmission and policy formulation. In recent years, Thai bond yields have increasingly been influenced by global rate cycles through both the flow and expectation channels. Movements in US yields have caused Thai bond yields, especially at the long end, to move in tandem despite the different macroeconomic environment. As only a small portion of bank credit and bond issuances are at the long end, the effect of global yield movements on the transmission mechanism was limited. This does, however, illustrate that a broader set of participants can pose new challenges for the local market, and different approaches by authorities are sometimes necessary, such as measures to curb any surge in inflows.

Enhancing the communication strategy through transparency

In a volatile and fast-changing market environment, the role of market expectations becomes even greater in the transmission of monetary policy and in the determination of asset prices. In consequence, the BOT has stepped up the use of communication channels as one of its monetary policy tools, placing even greater emphasis on transparency. In 2011, the BOT started to disclose a summary of MPC minutes, including a record of the vote after each MPC meeting, explaining the evaluation of economic conditions and the committees' views. A year later, the edited minutes were released to anchor market expectations, provide forward guidance, and reduce undesirable signals. As the pool of market participants has broadened in the past two decades, different communication protocols for different audiences have gained in importance, with communication tools such as infographics and data visualisation coming to the fore. Communications can include actions that provide signals to participants. The effectiveness of communication, however, greatly depends on the credibility of the central bank in delivering the desired result.

Impact of financial market development on financial stability

Since the crisis, commercial banks have strengthened their balance sheets. Stress test results reveal that the banking sector is resilient to severe shocks and that systemic and contagion risks stemming from interlinkages are limited. The ensuing financial market development has also benefited the Thai economy and its agents. It has created opportunities for borrowers to fund more efficiently and from more diverse lenders, both domestic and abroad. It has opened up a new range of investment and

foreign currency products for investors, which allows for a more efficient process of portfolio diversification. It provides better access for market participants, from exporters to borrowers, to mitigate risks through hedging instruments. The access of foreign investors to local markets has introduced more sophistication to the market, despite also triggering volatility at times. These developments have helped strengthen the country's financial stability.

Despite these positive developments, some vulnerabilities could still undermine financial stability going forward. In the lower-for-longer rate environment, search-for-yield and underpricing of risks have become major concerns for authorities. Aside from the growing risk-taking through regulation-light savings cooperatives and high-yield financing alternatives, there are potential risks arising in other sectors. Enhanced market-based financing and deepened market functioning have allowed new and more sophisticated products and initiatives to flourish. Some pockets of risk that might ensue include issuance of lower-rated and unrated corporate bonds, concentration of large issuers in bond market, and the rapid expansion of foreign investment funds (FIFs).

First, as financing in the bond market has become more convenient for corporates, more have flocked to bond financing, especially those facing difficulty in obtaining financing from banks. Moreover, bond issuance has generally been subject to less stringent requirements than bank lending. Bonds have even been issued without credit ratings, particularly at the shorter end. Among yield-seeking investors who might not be sophisticated in assessing risks, these high-yielding securities have become more attractive. The cases of unrated bond defaults in 2017 have prompted the authorities to tighten their grip on such issuances by tightening the requirements for selling agents and intermediaries to screen investment products as well as improving disclosure for less well informed investors.

In addition, as a growing number of large corporates have resorted to bond issuance, some have accounted for a significant share of bonds outstanding in the market. Such a concentration of debtors might pose challenges to financial market stability if they were to experience financial difficulties. As these large borrowers are also funding through banks, the repercussions could spread to the broader financial system. The fact that these corporates are not under any official purview also complicates the issue.

Another form of search-for-yield is represented by FIFs seeking higher yields abroad. Aided by the liquid FX swap market for hedging, these funds raise money from retail investors and invest in foreign securities and US dollar deposits in foreign banks, mainly in emerging markets. Most of their investments are in highly rated issuers and banks. However, these funds seem to concentrate their investments in only a handful of debtors. Even though they are not yet a threat to financial stability, these debtors could pose a higher risk should the funds grow in size in a volatile global environment. These potential risks are closely monitored by authorities, while inter-agency crisis action plans have been put in place, for use if the need were to arise.

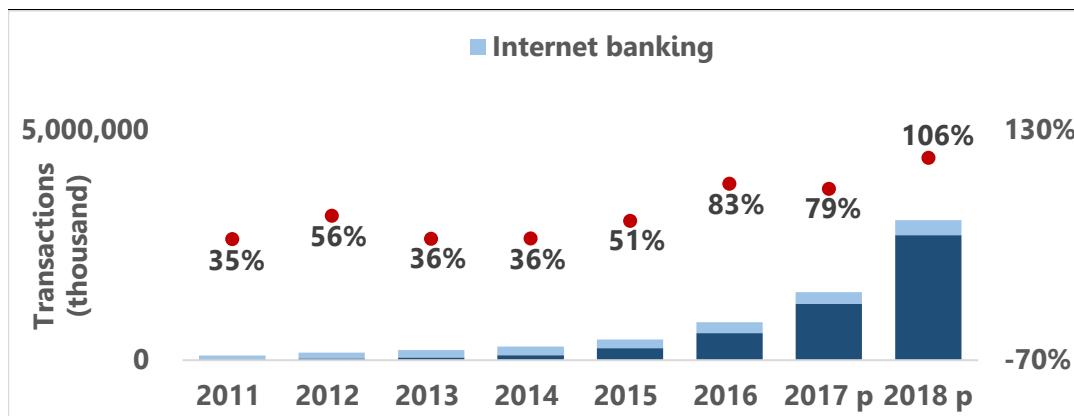
Even though market development has supported most participants in managing rates and FX risk, some are still left behind. In the current context of monetary easing in advanced economies and the easy access to local market, non-resident flows have been one of the factors that often lead to sharp swings in the baht. This has put many small and medium-sized enterprises (SMEs) at risk as they might not have access to credit and hedging instruments, especially in the agricultural sector and among thin

profit margin businesses. The adverse impacts on the unhedged FX exposure of SMEs, which are already vulnerable due to their limited ability to compete in a changing business environment, could have negative ramifications in the wider economy. In dealing with these risks, the BOT has made efforts to promote the use of hedging instruments, for example options, for SMEs as well as encouraging banks to facilitate their use in this client segment.

Recognising that domestic financial stability is crucial to sustainable growth, the Thai authorities continue to monitor warning signs for financial stability risks and tackle them accordingly. Besides the aforementioned efforts to deal with risks arising in capital markets, other measures have been imposed to handle risks on other fronts. In 2017, credit card regulations as well as uncollateralised personal loan limits were tightened, together with guidelines for banks on responsible lending, to mitigate household debt problems. Earlier this year, mortgage lending standards were also strengthened to rein in excessive speculation in the real estate market. Efforts to set up a Financial Stability Consultative Committee, comprising representatives from the BOT, the Securities Exchange and Commission (SEC), the Office of Insurance Commission (OIC), the Cooperative Promotion Department (CPD) and the Deposit Protection Agency (DPA) are likely to be realised in the next year or two, which will further enhance the capability of the Thai authorities in capturing risks and tackling financial stability issues.

Looking forward

While Thailand has a sufficient external cushion to tolerate short-term vulnerability in the global market, what would ensure the economy's stability and resilience in the longer run are productivity-enhancing infrastructures and an ecosystem for the ongoing transition towards the digital economy. Recently, more users have started to access financial services through digital channels such as mobile and internet banking (Graph 3), and more business opportunities have arisen for small entities, sectors which used to be disadvantaged given various limitations. This has sparked new innovations, particularly in the private sector such as peer-to-peer (P2P) lending and crowdfunding. At the same time, financial digitalisation can also be seen in transforming certain areas of investment such as FX and equities, where decisions previously made by humans have slowly migrated to the use of computer algorithms. For instance, the share of daily turnover from algorithmic trading within the Thai stock exchange has jumped from 2% in 2010 to roughly 25% in 2019.



Source: BOT

One effect of fintech is that the increased use of electronic money in place of banknotes might reduce central banks' seigniorage. The central bank digital currency is one avenue where central banks can explore in the new digital arena. The BOT has already taken steps to raise the technological readiness of the Thai financial system. These steps include the launch of Project Inthanon in 2018, aimed at adopting distributed ledger technology to enhance the operational efficiency of wholesale banking.

Despite the significant benefits fintech could offer to consumers, there are certain disruptive forces that can threaten financial markets and complicate the response of authorities. For instance, third-party providers have given consumers access to certain financial services which would not have been available earlier. In particular, the emergence of private platforms such as P2P lending and crowdfunding are new alternatives to conventional funding that might disrupt the transmission mechanism of monetary policy. As lending becomes more decentralised through these platforms, the ability of central banks to control and influence market rates might be diminished. Therefore, it is imperative that central banks keep up on developments in this area and respond appropriately.

Furthermore, system and operational risk becomes more of a concern for policymakers as financial markets become more reliant on complex electronic systems. Without a robust financial infrastructure and regulation to curb systemic risk, the Thai financial markets might experience serious consequences if they were to experience system failure. The Thai authorities have thus coordinated with key stakeholders to ensure cyber security crisis preparedness, with back-up plans for the worst-case scenario.

All things considered, it is a natural response that these concerns must be met with new rules and regulations in such a way that financial stability is preserved, but still maintaining an environment conducive to financial innovations. As a consequence, the BOT has introduced a regulatory sandbox framework which allows financial institutions to test new financial technologies on a limited scale to ensure that operational risks are contained, and that a sound regulatory framework is put in place before the technology is deployed to the public.

Financial market development in emerging market economies – an overview

Mathias Drehmann and Agustín Villar

The objective of financial market development (FMD) is to foster the growth of a financial system that pools domestic savings and foreign capital to fund long-term investment and consumption, and that enables risk sharing, all in an efficient manner. For capital markets in particular, important features of FMD are the promotion of deep and liquid markets that reveal clear price signals, and that allow a diverse investor base to channel funds efficiently and to help transfer risk to parties willing and able to bear them. Measuring FMD is therefore a multifaceted task involving a wide range of indicators.

To support the discussions on how FMD has affected monetary policy and financial stability in emerging market economies (EMEs) over the past two decades, this chartpack provides a broad-based overview of the major trends in EME financial systems. It draws on data submitted by participating central banks, complemented by BIS and other official data.

For ease, the summary below focuses on the major trends based on aggregate developments. But large cross-country differences exist as evident from the graphs.

Summary

Private and public sector balance sheets. Credit-to-GDP ratios for the private non-financial sector – the most basic measure of financial development – have increased, especially for households (Graph 1). While credit grew, the total financial assets of the household sector changed little (Graphs 2). The total financial liabilities of private non-financial corporates (PNFCs) also remained broadly unchanged (Graph 3), but leverage increased in many EMEs (Graph 4). The value of the private sector's external assets and liabilities rose steadily, with liabilities more so, widening the sector's net-negative external position (Graphs 12 to 17).

Relative to GDP, government debt has edged up somewhat in the last ten years, but far less than in advanced economies (AEs) (Graph 1). The international investment position of the government turned positive (Graph 12).

The financial system. The financial system has grown. The median of banking sector assets to GDP stands now at 120% (Graph 5). Other financial institutions such as pension funds and insurance companies have also become more important (Graphs 6 and 7).

The banking sector. Lending to households and non-financial corporates remains heavily bank-based (Graphs 8 and 9). Indicators suggest that banking sectors of many EMEs are healthy and that banking sector concentration has been reduced somewhat over time (Graph 10). Banking sectors in around half of the survey respondents have a net negative, on balance sheet, foreign currency position (Graph 11), even though these are typically fully hedged.

The government bond market. Government bond markets have grown rapidly in the last two decades (Graph 18). While they remain smaller, these markets increasingly resemble those of AEs in terms of instruments and maturities (Graphs 18 and 19). Moreover, even though liquidity conditions remain poor in a few EMEs, several others now enjoy liquidity conditions similar to those in smaller AEs (Graph 20).

The investor base of local currency government bonds has broadened considerably (Graph 21). Holdings of local currency government bonds of foreign investors rose sharply, as did those of domestic institutional investors.

Corporate bond markets. Driven by the non-financial corporate sector, corporate bond markets in EMEs have experienced a broad-based deepening and have grown to a similar size as AE markets (Graph 22). Many EME corporates predominantly borrow in foreign currency, a market segment that has seen a rapid expansion in the last 10 years (Graphs 22 and 23). Except in a few EMEs, mainly resident banks and institutional investors are active in the market for local currency corporate bonds; non-resident investors typically make up less than 5% of the investor base (Graph 24).

Other financial markets.

Equity markets (Graph 25). Equity markets have become much larger and the size gap between EMEs and AEs has narrowed. However, turnover generally remains below AEs and has even fallen in the last 10 years.

Repo markets (Graph 26). Repo markets have gained in significance. Yet beyond a few economies, they remain small, often below 5% of GDP.

Securitisation (Graphs 27 and 28). The market for securitised assets is still in a nascent stage but has been growing strongly in few EMEs in recent years.

Have EME financial markets emerged? In light of FMD over the last 20 years, local government bond and equity markets have started to look more like markets in AEs. This could suggest that EME financial markets have started to “emerge”.

A cluster analysis, taking not only account of financial markets but also growth potential, external vulnerabilities and institutional development, suggests that large differences between EMEs and AEs remain (Graph 29). According to the results, EMEs are more similar to each other than they are to the average of advanced economies. Yet, the differences between EMEs tend to be much greater than the variations between developed markets.

General remarks

- Throughout the chartpack, the box and whisker plots show the median (horizontal line), interquartile range (box) and the min-max range (small vertical lines).
- Country aggregates for EMEs and AEs shown may not always cover all countries of these aggregates, as data may not be available for all years.

Index

Section 1: The household, non-financial corporate and government sectors

- Graph 1 Total credit to the different sectors
- Graph 2 Total financial assets of households
- Graph 3 Total financial liabilities of private non-financial corporates
- Graph 4 The share of credit in total financial liabilities of PNFCs

Section 2: Financial institutions

- Graph 5 Total financial assets of the banking sector
- Graph 6 Total financial assets of pension funds
- Graph 7 Total financial assets of insurance companies and other non-banks

Section 3: Banking sector indicators

- Graph 8 The share of bank loans in total financial liabilities of households
- Graph 9 The share of bank credit in total credit to private non-financial corporates
- Graph 10 Aggregate indicators of banking sector health
- Graph 11 Banks' total financial assets and liabilities in foreign currency

Section 4: External balance sheet positions

- Graph 12 Net international investment positions and debt currency mismatches
- Graph 13 International investment positions and currency mismatches
- Graph 14 Total net external investment positions
- Graph 15 Net external investment positions of banks
- Graph 16 Net external investment positions of non-bank financial
- Graph 17 Net external investment positions of non-financial corporations

Section 5: Government bond markets

- Graph 18 Government bond markets: volumes and composition
- Graph 19 Maturities of government bonds and central bank securities
- Graph 20 The investor base of local currency government bonds
- Graph 21 Liquidity in government bond markets

Section 6: Corporate bond markets

- Graph 22 Volumes in corporate debt securities markets
- Graph 23 Characteristics of corporate debt securities markets
- Graph 24 The investor base of local currency corporate bonds

Section 7: Other markets

- Graph 25 Equity markets
- Graph 26 Repo markets
- Graph 27 Total value of securitised assets
- Graph 28 Mortgages, covered bonds and securitisation

Section 8: How do EMEs and AEs compare?

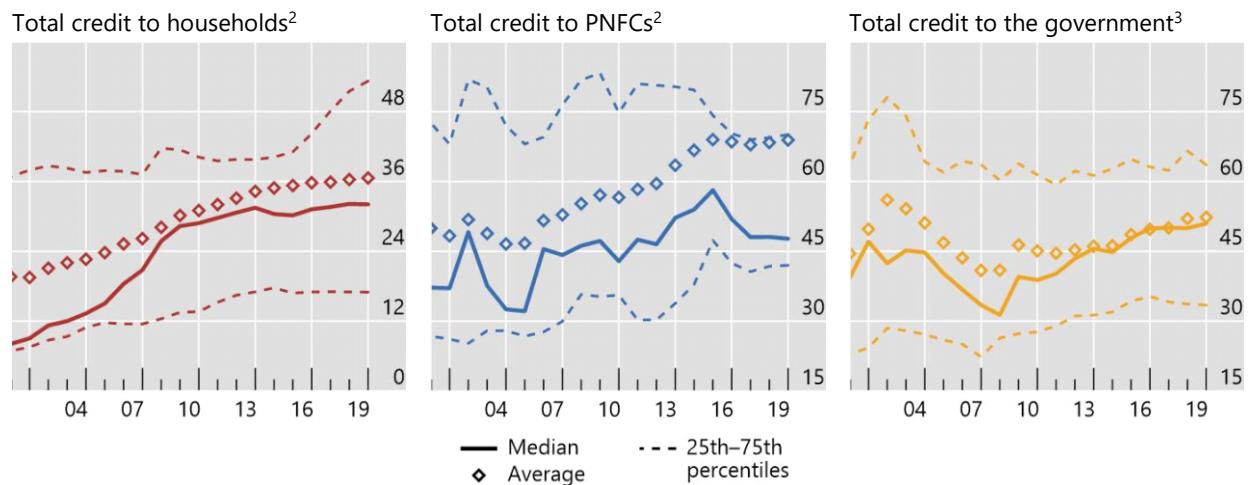
- Graph 29 Cluster analysis comparing EMEs and AEs

Section 1: The household, non-financial corporate and government sectors

Total credit to the different sectors

As a percentage of GDP¹

Graph 1



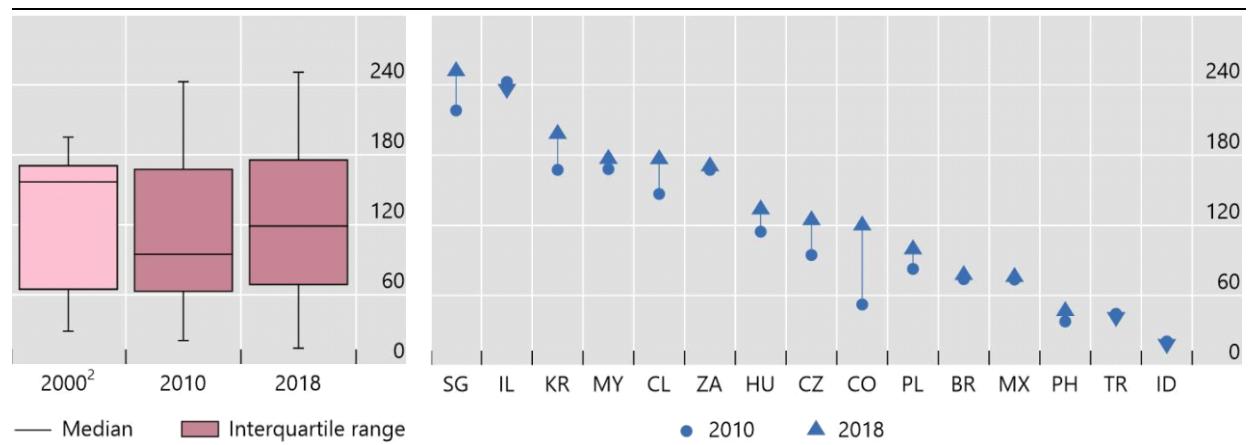
¹ Total credit as a percent of GDP. Country sample includes AR, BR, CL, CN, CO, CZ, HK, HU, ID, IN, IL, KR, MX, MY, PL, RU, SA, SG, TH, TR and ZA. Year-end figures; for 2019 end-June. ² Balanced sample starts in 2008. ID since 2001; CL since 2002; CN and MY since 2006; IN since 2007; ZA since 2008. ³ Balanced panel starts in 2001. ID and TR since 2001.

Sources: BIS credit statistics; BIS calculations.

Total financial assets of households

As a percentage of GDP¹

Graph 2



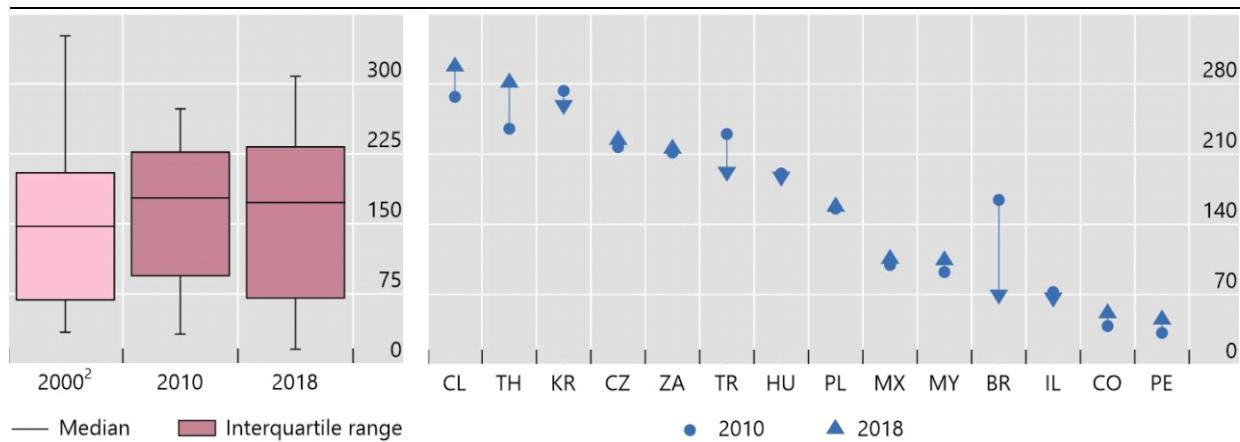
¹ Country sample in the left-hand panel includes AR, BR, CL, CN, CO, CZ, HK, HU, ID, IL, KR, MY, PH, PL, RU, SG, TH, TR and ZA. ² For 2000, the sample only covers CL, CO, HU, KR, PL, SG and ZA.

Sources: BIS survey; IMF, *World Economic Outlook*; BIS calculations.

Total financial liabilities of private non-financial corporates

As a percentage of GDP¹

Graph 3



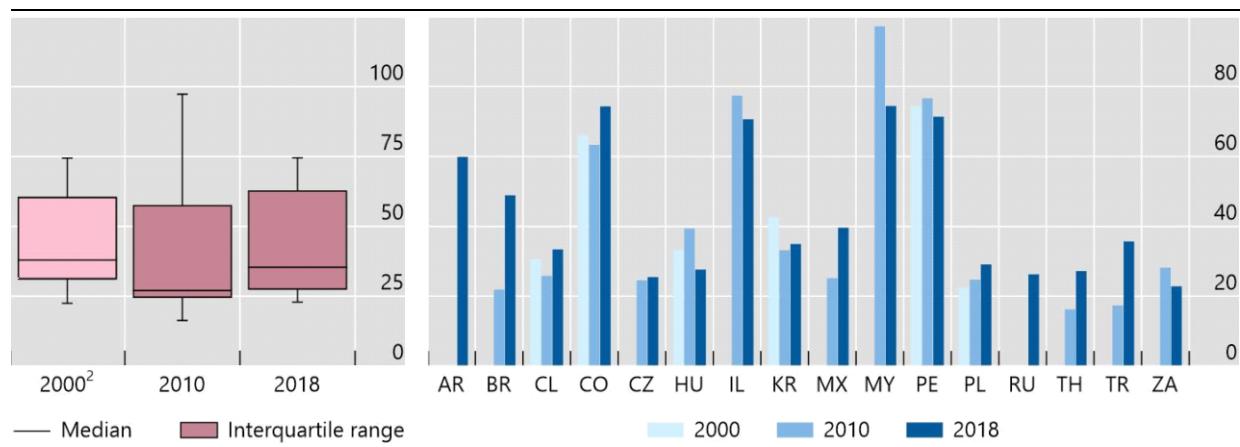
¹ Country sample in the left-hand panel includes AR, BR, CL, CO, CZ, HU, IL, KR, MX, MY, PE, PL, RU, TH, TR and ZA. ² For 2000, the sample covers only CL, CO, HU, KR, PE, PL and SA.

Sources: BIS survey; IMF, *World Economic Outlook*; BIS calculations.

The share of credit in total financial liabilities of private non-financial corporates

In per cent¹

Graph 4



¹ Country sample in the left-hand panel includes AR, BR, CL, CO, CZ, HU, IL, KR, MX, MY, PE, PL, RU, TH, TR and ZA. ² For 2000, the sample only includes only CL, CO, HU, KR, PE and PL.

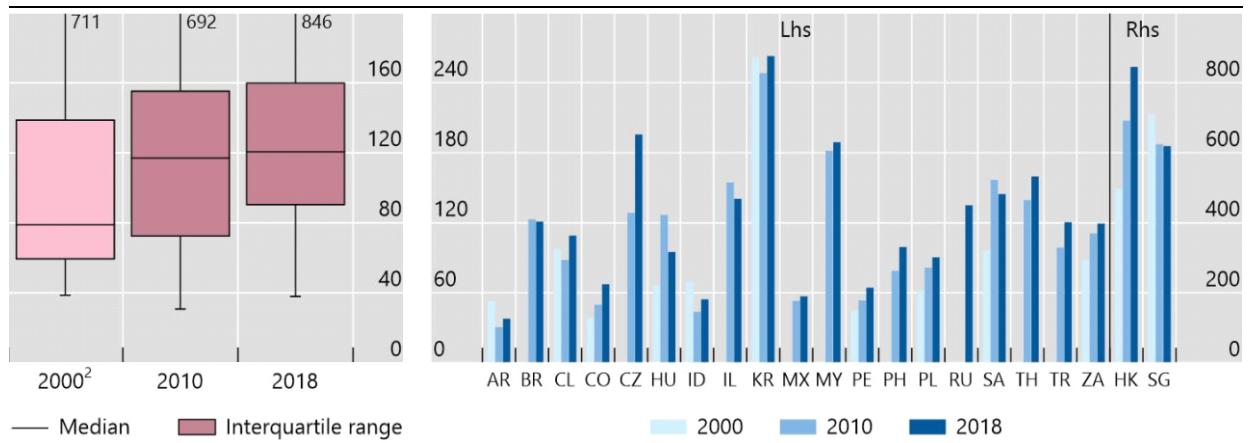
Sources: BIS survey; BIS calculations.

Section 2: Financial institutions

Total financial assets of the banking sector

As a percentage of GDP¹

Graph 5



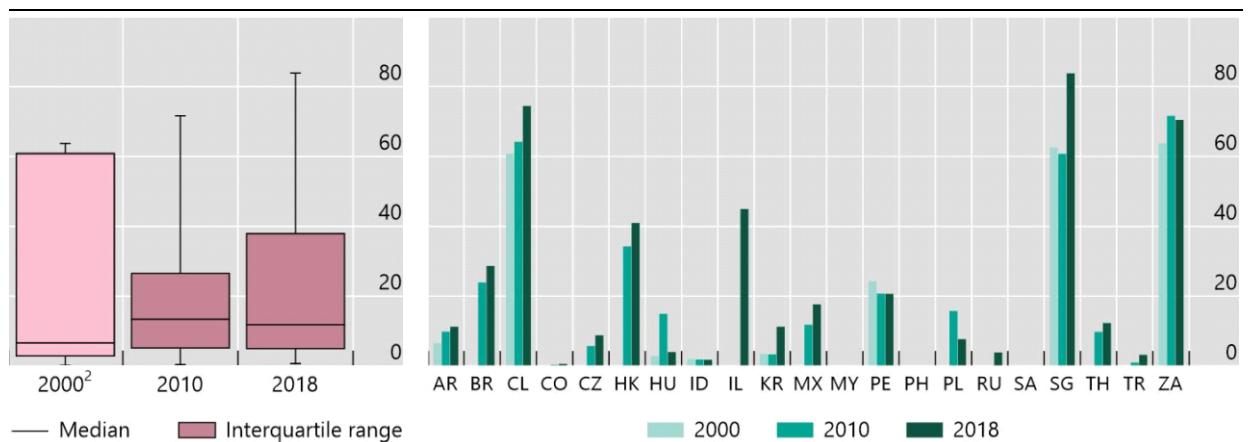
¹ Country sample in the left-hand panel includes AR, BR, CL, CO, CZ, HK, HU, ID, IL, KR, MX, MY, PE, PH, PL, RU, SA, SG, TH, TR and ZA. ² For 2000, the sample covers only AR, CL, CO, HK, HU, ID, KR, PE, PL, SA, SG and ZA.

Sources: BIS survey; IMF, *World Economic Outlook*; BIS calculations.

Total financial assets of pension funds

As a percentage of GDP¹

Graph 6



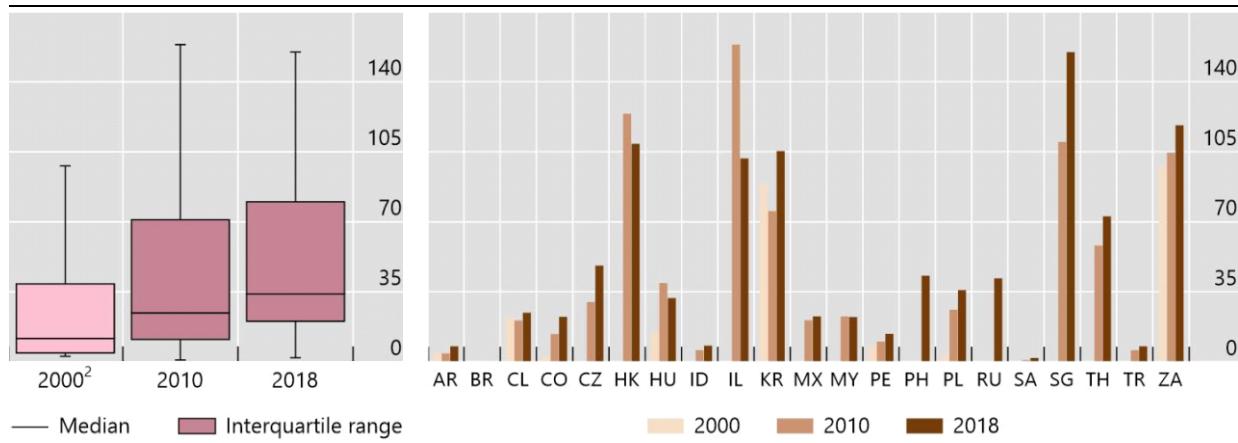
¹ Total financial assets of pension funds Country sample in the left-hand panel includes AR, BR, CL, CO, CZ, HK, HU, ID, IL, KR, MX, MY, PE, PH, PL, RU, SG, TH, TR and ZA. ² For 2000, the sample only includes AR, CL, CO, HU, ID, KR, PE, SG, and ZA.

Sources: BIS survey; IMF, *World Economic Outlook*; BIS calculations.

Total financial assets of insurance companies and other non-bank financials

As a percentage of GDP¹

Graph 7



¹ Total financial assets of insurance companies and other non-bank financials. Country sample in the left-hand panel includes AR, BR, CL, CO, CZ, HK, HU, ID, IL, KR, MX, MY, PE, PH, PL, RU, SA, SG, TH, TR and ZA. ² For 2000, the sample only includes AR, CL, CO, HU, KR, PE, PL and ZA.

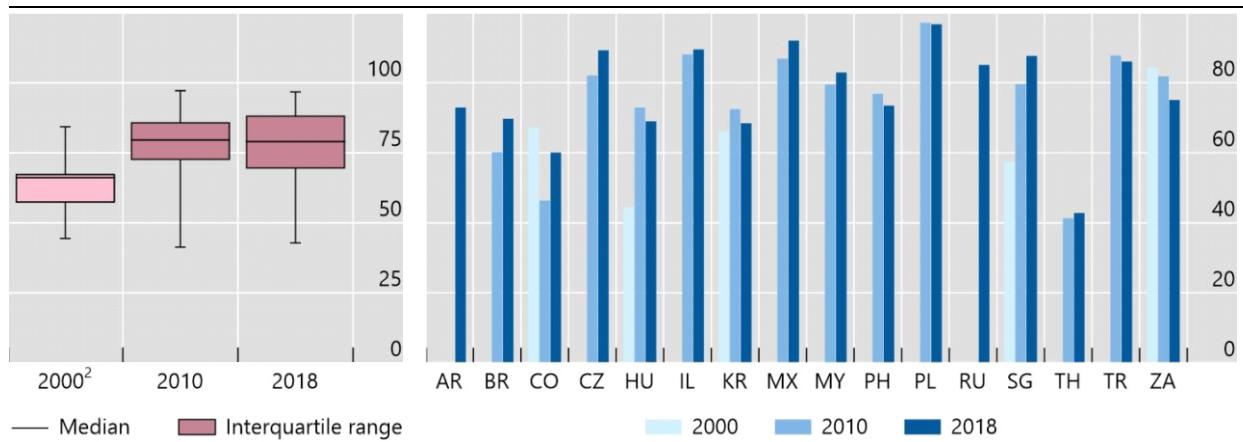
Sources: BIS survey; IMF, *World Economic Outlook*; BIS calculations.

Section 3: Banking sector indicators

The share of bank loans in total financial liabilities of households

In per cent¹

Graph 8



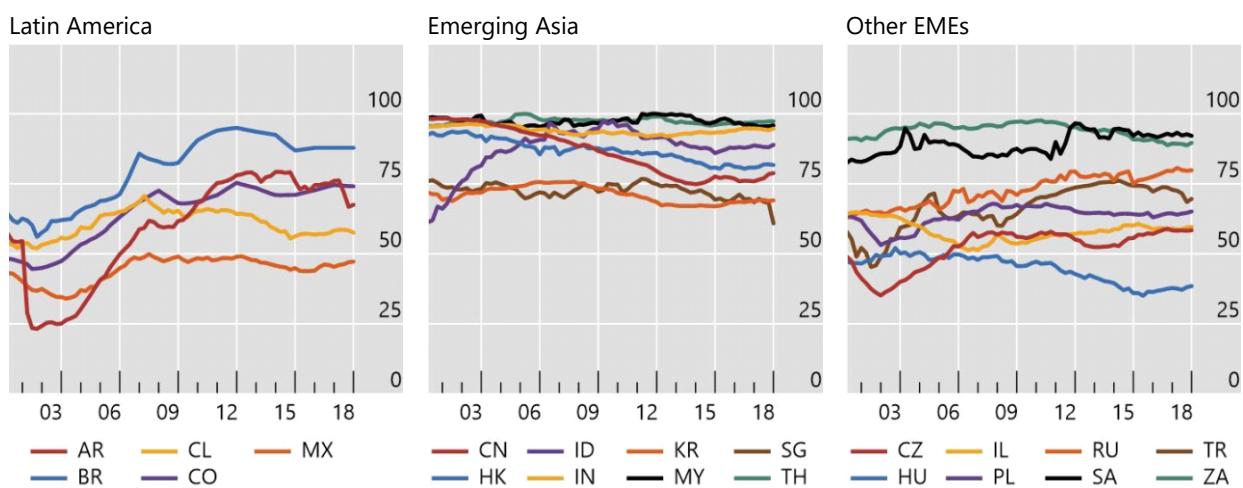
¹ Country sample in the left-hand panel includes AR, BR, CO, CZ, HU, IL, KR, MX, MY, PH, PL, RU, SG, TH, TR and ZA. ² For 2000, the sample only includes CO, HU, KR, SG and ZA.

Sources: BIS survey; BIS calculations.

The share of bank credit in total credit to private non-financial corporates

In per cent

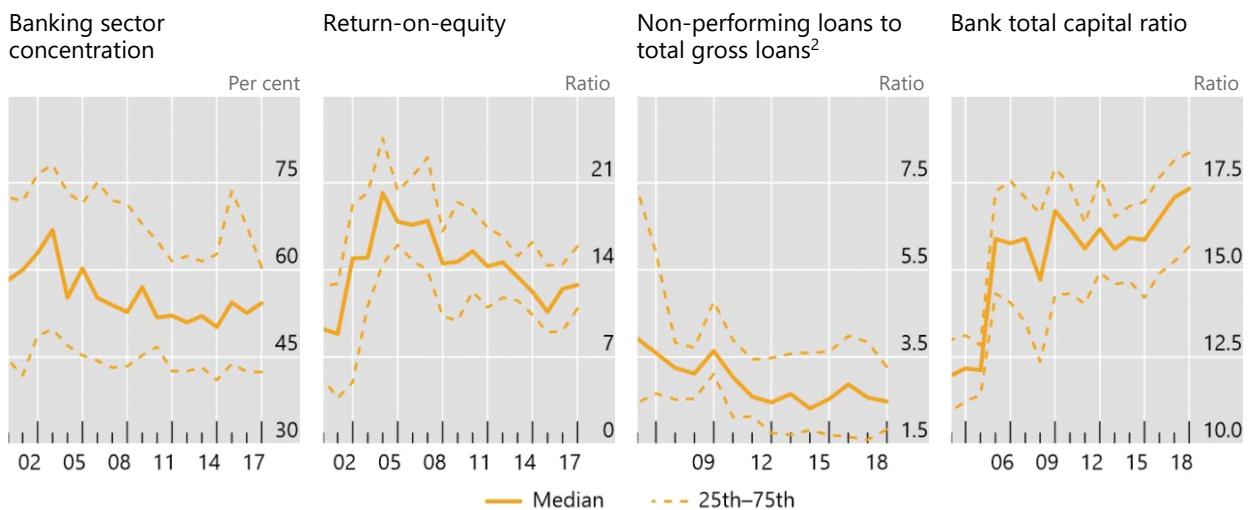
Graph 9



Sources: BIS credit statistics; BIS calculations.

Aggregate indicators of banking sector health¹

Graph 10

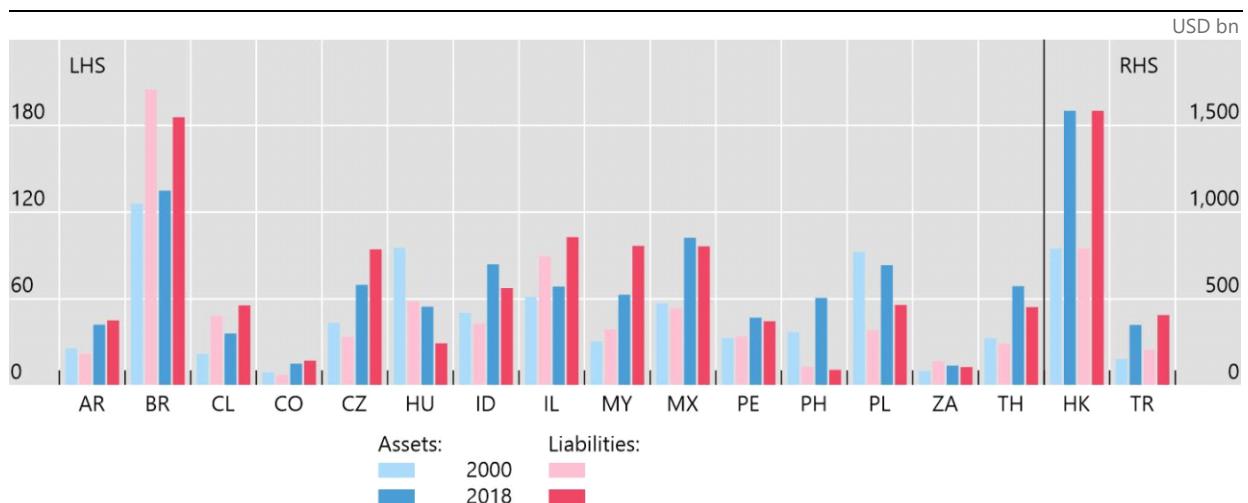


¹ Country sample includes AR, BR, CL, CN, CO, CZ, HK, HU, ID, IN, IL, KR, MX, MY, PE, PH, PL, RU, SA, SG, TH, TR and ZA. ² Balanced panel starts in 2011. CN and PE since 2010; PH and SA since 2009; HK, HU, IN, KR, PL, RU, SG, ZA since 2008, CZ since 2007; TH since 2006 and all the rest since 2005.

Sources: IMF, *Financial Soundness Indicators*; BIS calculations.

Banks' total financial assets and liabilities in foreign currency

Graph 11

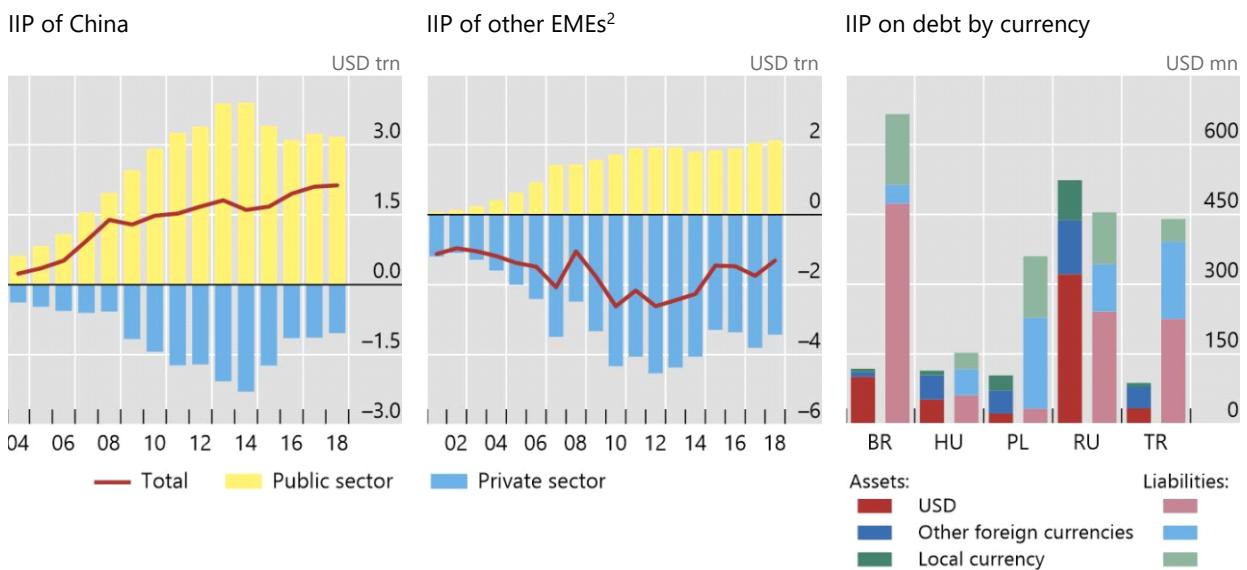


Sources: BIS survey; BIS calculations.

Section 4: External balance sheet positions

Net international investment positions and debt currency mismatches¹

Graph 12



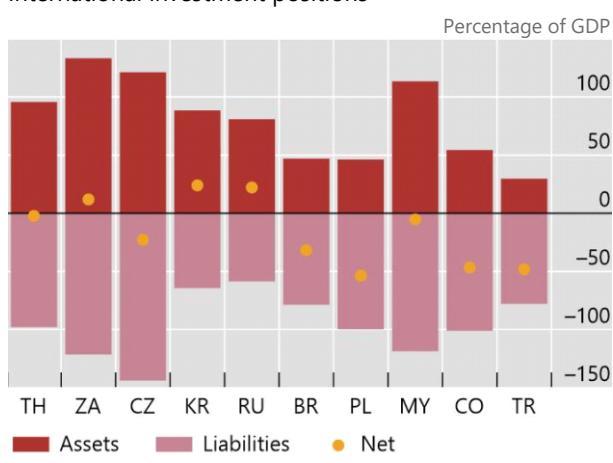
¹ Net public international investment position is calculated as the difference between reserve assets and SDR allocations at the IMF for countries where data for subcomponents are not available. ² Country sample includes AR, BR, CL, CO, CZ, HU, ID, IL, IN, KR, MX, MY, PE, PH, PL, RU, SG, TH, TR and ZA.

Source: IMF, *Balance of Payments Statistics*.

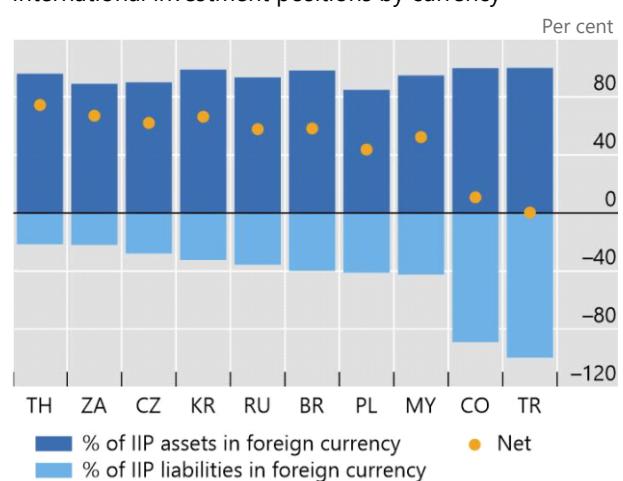
International investment positions and currency mismatches

Graph 13

International investment positions



International investment positions by currency

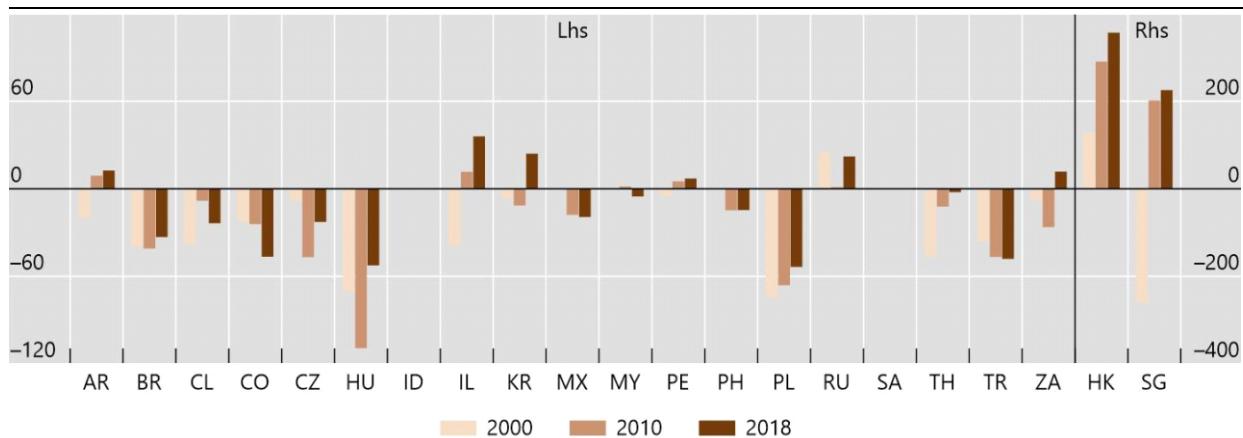


Sources: BIS survey; IMF, *Balance of Payments Statistics*.

Total net external investment positions

As a percentage of GDP

Graph 14

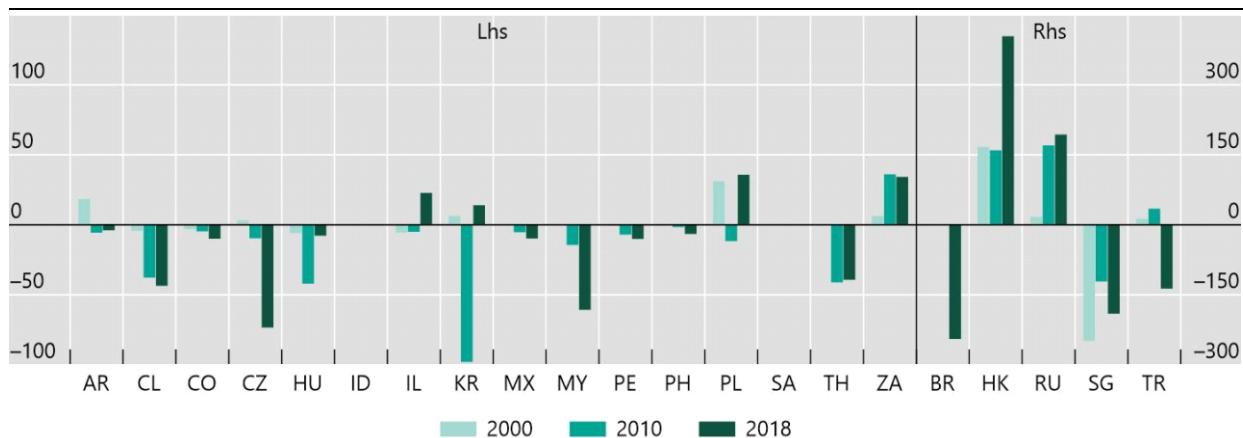


Sources: BIS survey; IMF, *World Economic Outlook*; BIS calculations.

Net external investment positions of banks

In billions of US dollars

Graph 15

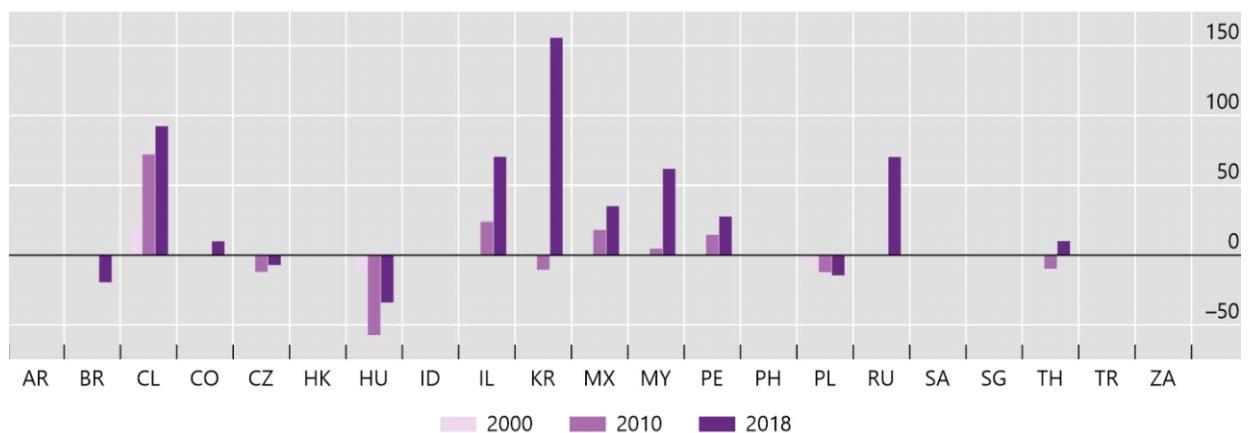


Sources: BIS survey; BIS calculations.

Net external investment positions of non-bank financial institutions

In billions of US dollars

Graph 16

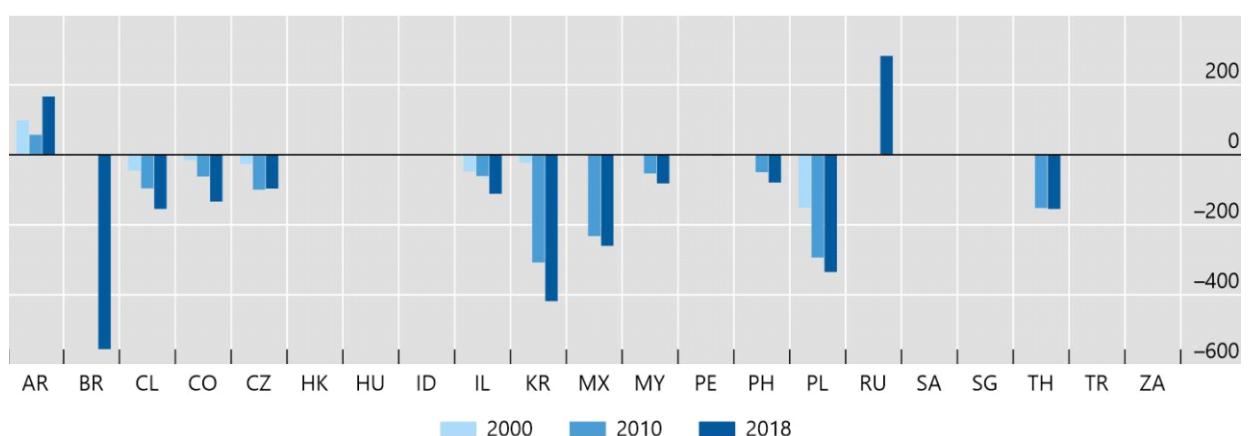


Sources: BIS survey; BIS calculations.

Net external investment positions of private non-financial corporations

In billions of US dollars

Graph 17



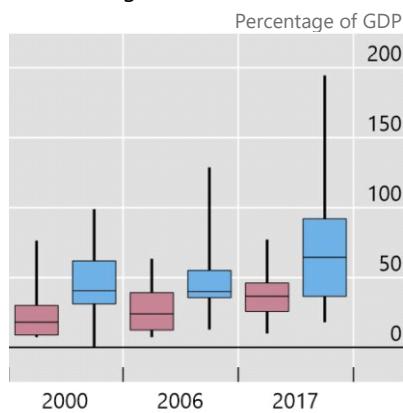
Sources: BIS survey; BIS calculations.

Section 5: Government bond markets

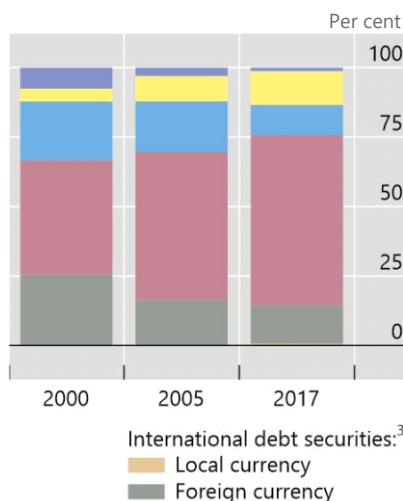
Government bond markets: volumes and composition

Graph 18

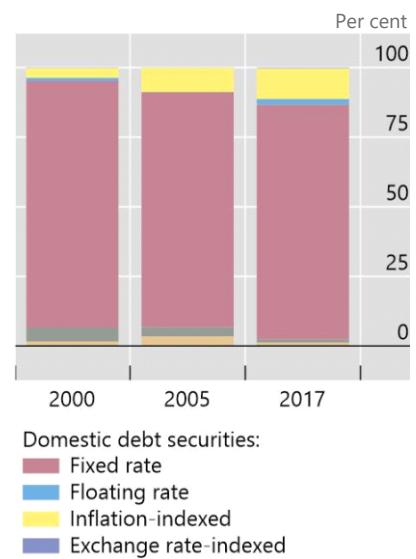
Government debt securities outstanding^{1,2}



EME composition of securities



AE composition of securities⁴



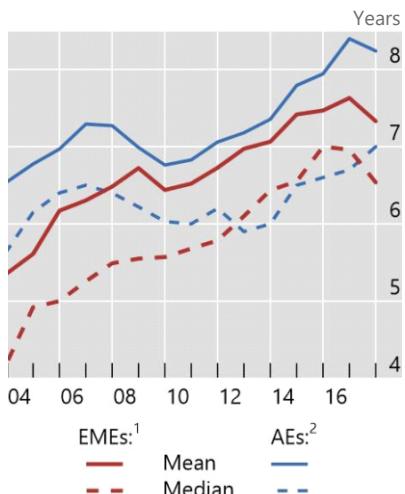
¹ Country sample includes AR, AU, BE, BR, CA, CH, CL, CN, CO, CZ, DE, DK, ES, FR, GB, HK, HU, ID, IL, IN, IT, JP, KR, MX, MY, NL, NO, NZ, PE, PH, PL, RO, RU, SA, SE, SG, TH, TR, US and ZA. ² Total debt securities, by residence. If total debt securities are not available, then the sum of domestic and international debt securities. ³ By residency. Country sample includes AR, BR, CL, CO, CZ, HU, HK, ID, IL, IN, KR, MX, MY, PE, PH, PL, RU, SA, SG, TR and ZA. ⁴ AU, BE, CA, DE, ES, GB and US.

Source: CGFS (2019).

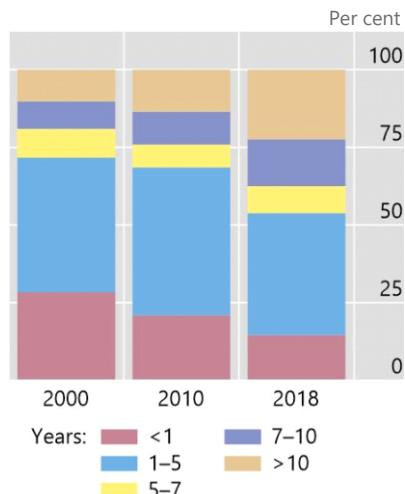
Maturities of government bonds and central bank securities

Graph 19

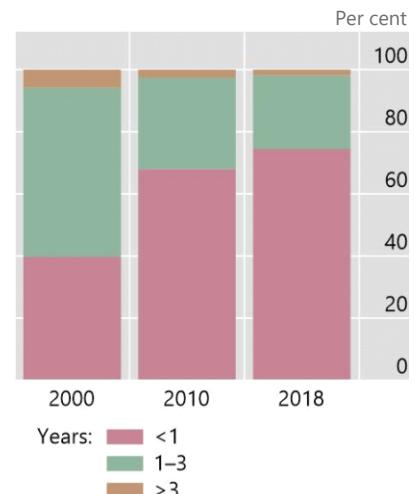
Remaining maturity of government debt



Maturity distribution of government bond markets³



Maturity distribution of central bank securities⁴



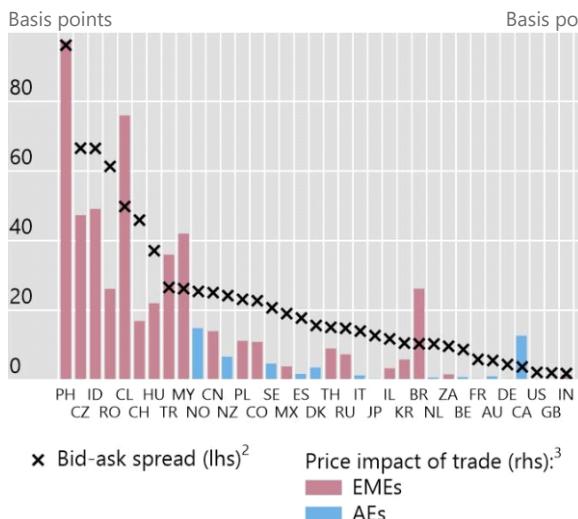
¹ AR, BR, CL, CO, CZ, HU, HK, ID, IL, IN, KR, MX, MY, PE, PH, PL, RU, SA, SG, TR and ZA. ² AU, BE, CA, DE, ES, GB and US. ³ Country sample includes AR, BR, CL, CO, CZ, HK, HU, ID, IL, KR, MX, MY, PE, PH, PL, RU, SA, SG, TH, TR and ZA. ⁴ Country sample includes AR, BR, CL, CZ, HU, ID, IL, KR, MX, MY, PE, PL, RU, SG and TH.

Sources: BIS survey; CGFS (2019); BIS calculations.

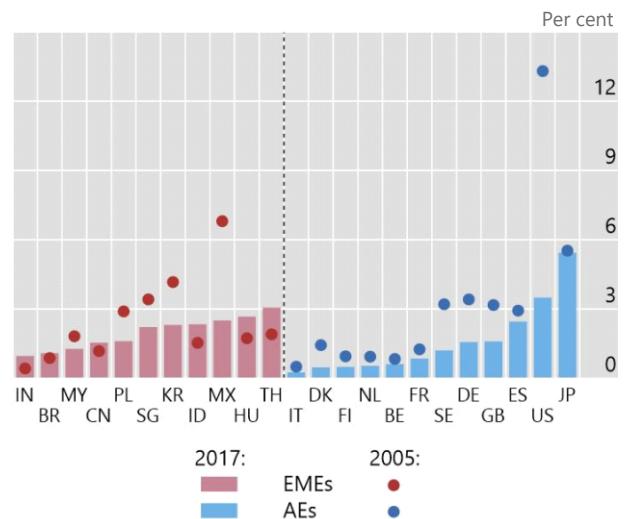
Liquidity in government bond markets

Graph 20

Ten-year benchmark government bond market liquidity¹



Average daily government bond market turnover⁴

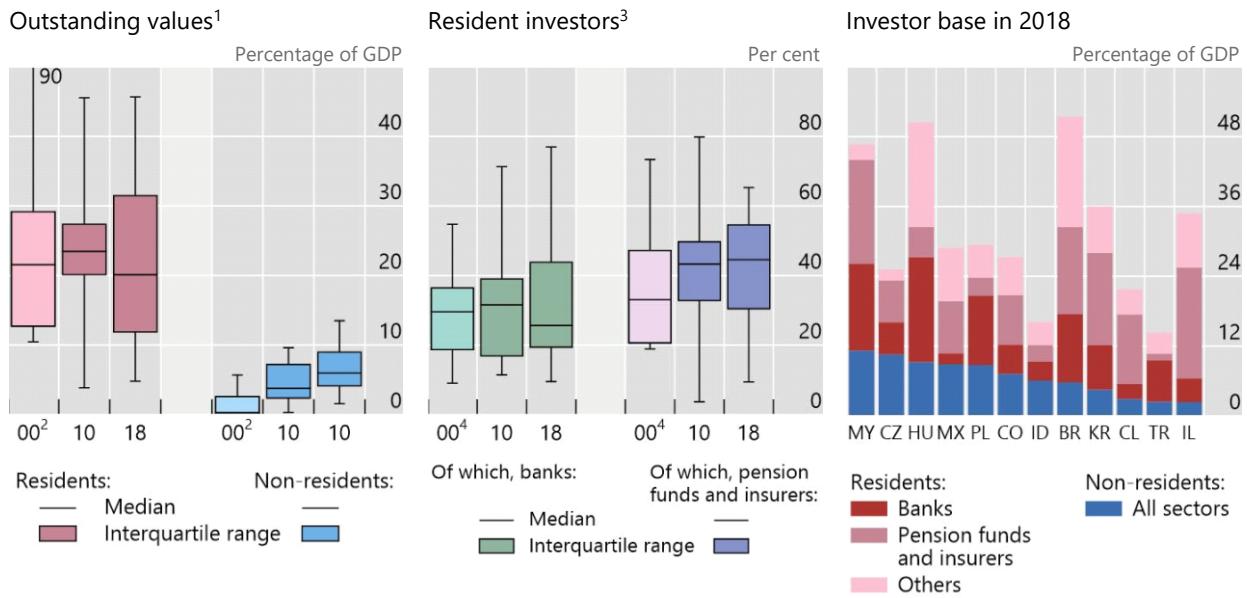


¹ Excluding HK (bid-ask spread = 88.25 basis points; price impact of trade = 266.53 basis points). ² Average of daily bid-ask spread in May 2018, defined as: (ask price - bid price) / bid price * 100, ie the return cost of executing a round-trip transaction in the bond. ³ Based on USD 10 million transaction amount using estimates from the Bloomberg Liquidity Assessment (LQA) function. Data based on 6 June 2018 5 pm Tokyo closing time, except for Korea, which is 5 June 2018 5 pm Tokyo time, and Sweden, which is 4 pm New York time. ⁴ Calculated as average daily trading volume divided by total amount outstanding. Definitions may vary depending on data availability. For 2005 observations: BE, 2014; BR, 2008; FR, 2006; NL, 2011. For NL, data up to 2016.

Source: CGFS (2019).

The investor base of local currency government bonds

Graph 21



¹ Country sample includes BR, CL, CO, CZ, HU, ID, IL, KR, MX, MY, PE, PL, RU, SA, SG, TH, TR and ZA. ² For 2000, including only BR, CO, CZ, HU, IL, KR, MY, MX, PL, SA for residents and BR, CZ, HU, KR, MY, MX, PL for non-residents. ³ Bank or pension fund holdings relative to local currency government bonds held by residents. Country sample includes BR, CL, CO, CZ, HU, ID, IL, KR, MX, MY, PE, PL, RU, SA, TH, TR and ZA. ⁴ For 2000, including only BR, CO, CZ, HU, IL, KR, MY, MX, PL, SA for banks and CO, CZ, HU, IL, KR, MY, MX and SA for pension funds and insurers.

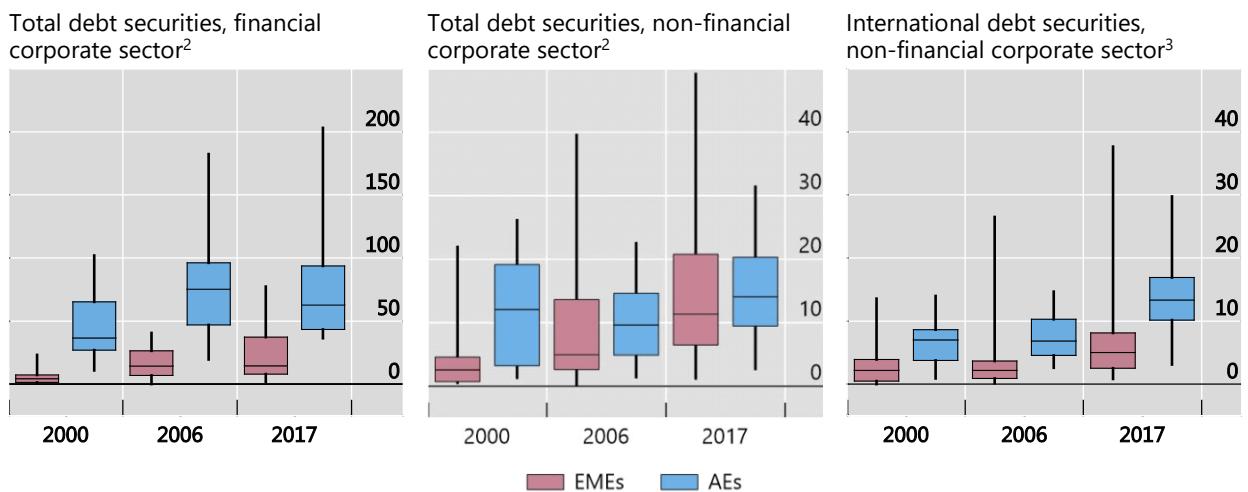
Sources: BIS survey; BIS calculations.

Section 6: Corporate bond markets

Volumes in corporate debt securities markets

As a percentage of GDP¹

Graph 22



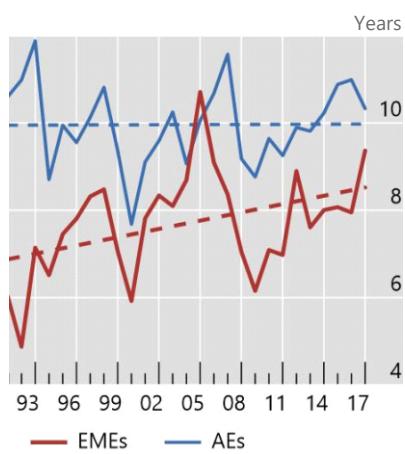
¹ If total debt securities are not available, then the sum of international and domestic debt securities. ² By residence. ³ By nationality.

Source: CGFS (2019).

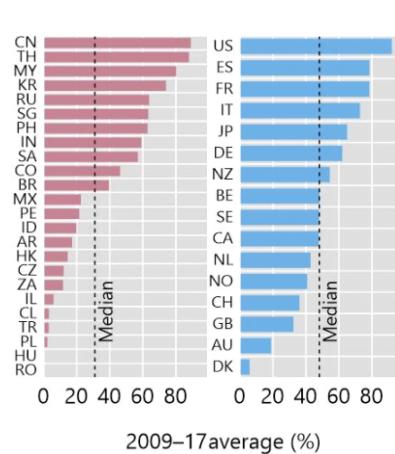
Characteristics of corporate debt securities markets

Graph 23

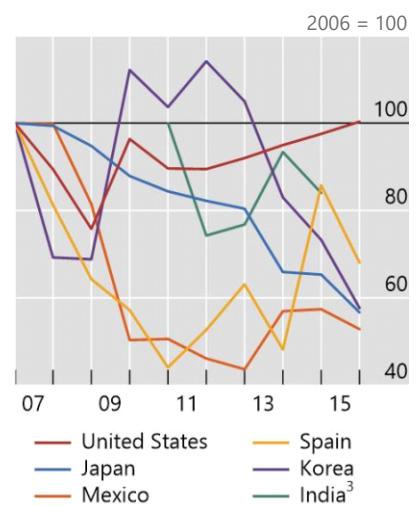
Maturity of bond issuance¹



Share of local currency bond issuance²



Corporate bond market turnover ratio

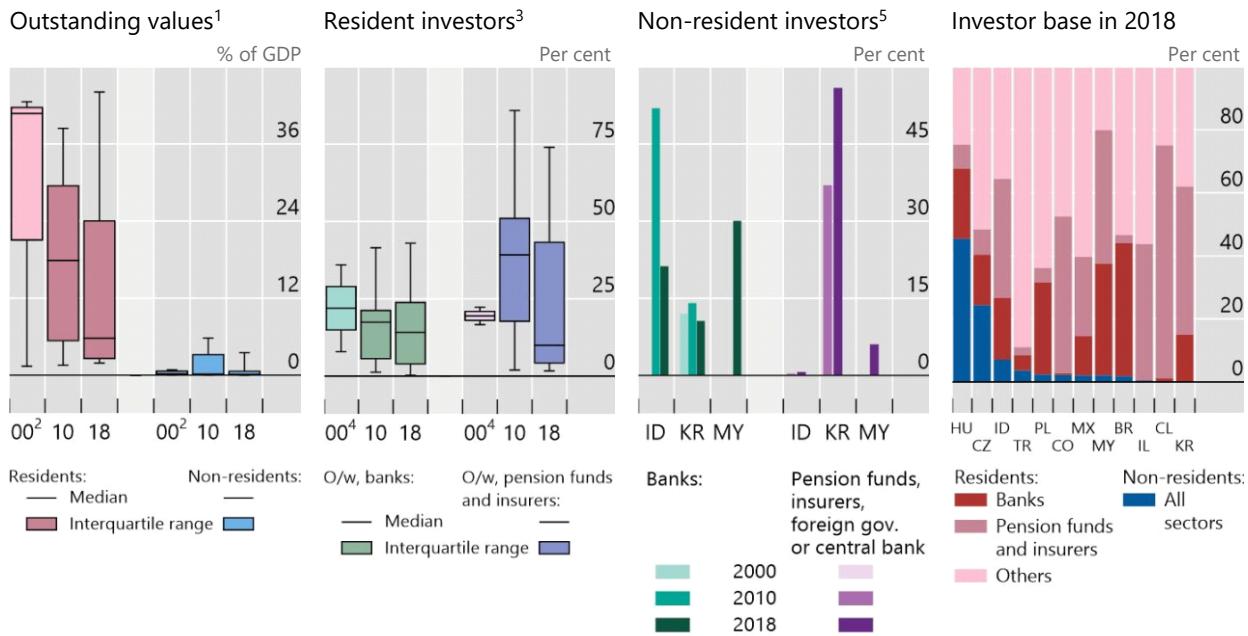


¹ Maturities weighted by value; dashed lines indicate linear trend. ² By nationality. ³ 2010 = 100

Source: CGFS (2019).

The investor base of local currency corporate bonds

Graph 24



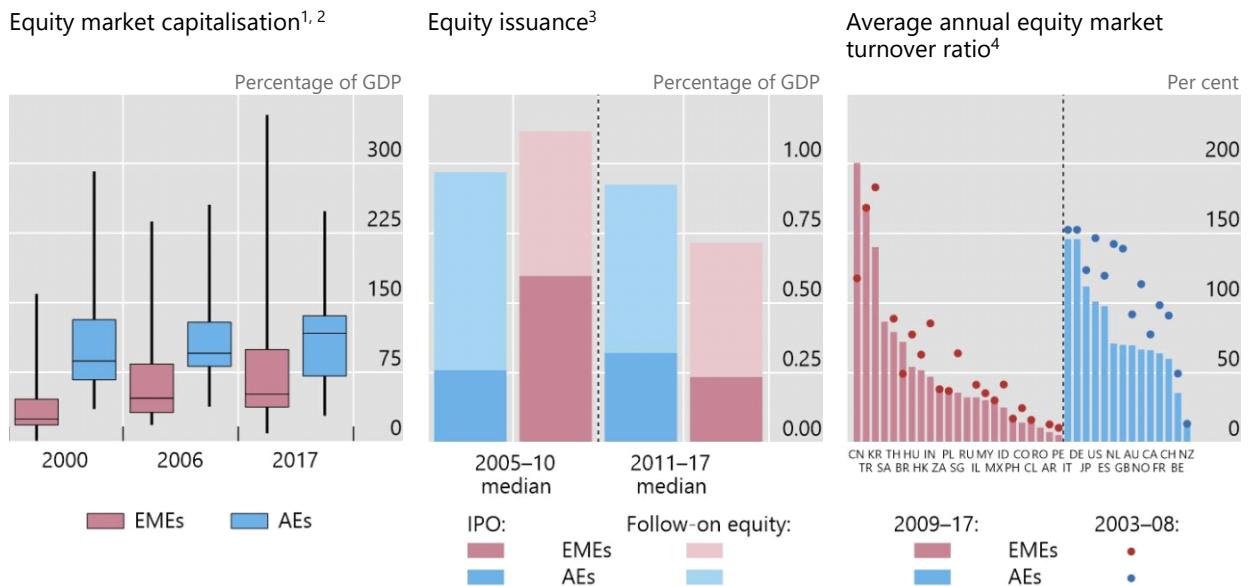
¹ Country sample includes BR, CL, CO, CZ, HU, ID, IL, KR, MX, MY, PL, SG, and TR. ² For 2000, including only HU, KR and MY. ³ Local currency domestic corporate bonds held by resident banks and pension funds as a share of total resident holdings. Country sample includes BR, CL, CO, CZ, HU, ID, IL, KR, MX, MY, PL and TR. ⁴ For 2000, including only HU and KR. ⁵ Local currency domestic corporate bonds held by non-resident banks and pension funds as a share of total non-resident holdings.

Source: BIS survey; IMF, *World Economic Outlook*.

Section 7: Other markets

Equity markets

Graph 25



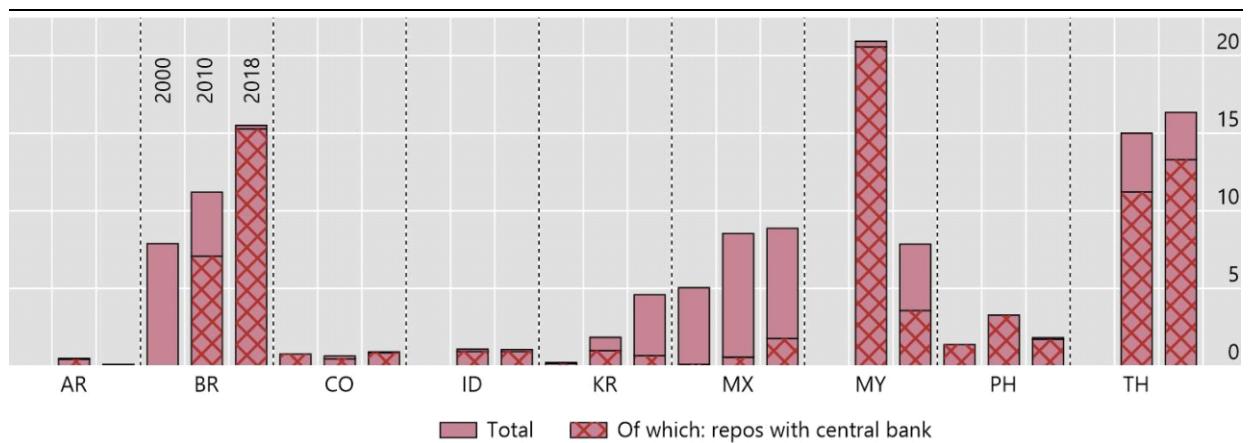
¹ Country sample includes AR, AU, BE, BR, CA, CH, CL, CN, CO, CZ, DE, DK, ES, FR, GB, HK, HU, ID, IL, IN, IT, JP, KR, MX, MY, NL, NO, NZ, PE, PH, PL, RO, RU, SA, SE, SG, TH, TR, US and ZA. ² Excluding HK, where in 2017 equity market capitalisation was 1,274% of GDP. ³ Median across economies. For each IPO, the corresponding amount in national currency is converted into USD, using the historical conversion rate (actual exchange rate values as of the fiscal year end). IPO data selected according to the geographical location (headquarter) of the issuer. ⁴ Turnover computed as the sum of the values of shares traded each year, divided by the average domestic market capitalisation. For BE, FR and NL, 2009–14 data. For NZ, excluding 2011 data.

Source: CGFS (2019).

Repo markets

As a share of GDP

Graph 26

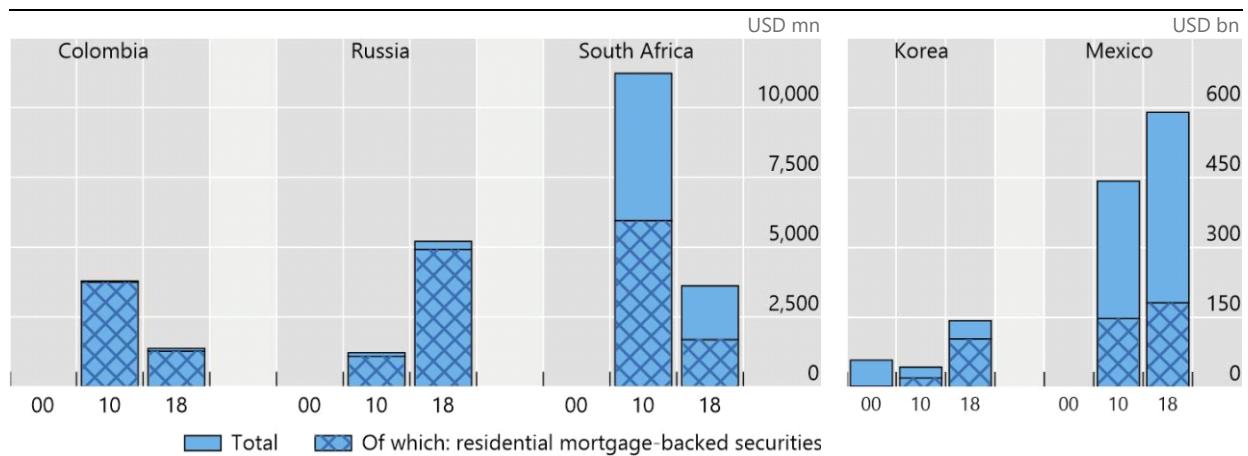


Sources: BIS survey; BIS calculations

Total value of securitised assets

Outstanding values

Graph 27

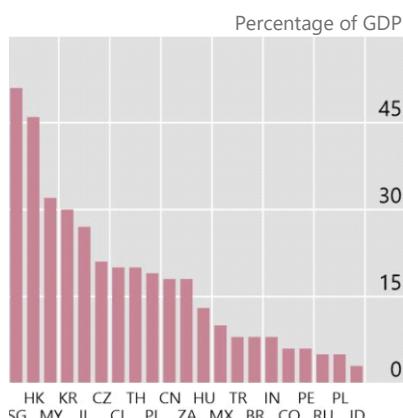


Sources: BIS survey; BIS calculations.

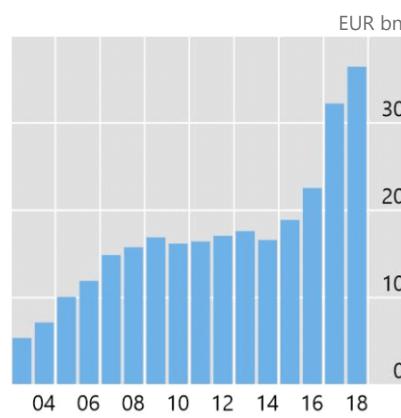
Mortgages, covered bonds and securitisation

Graph 28

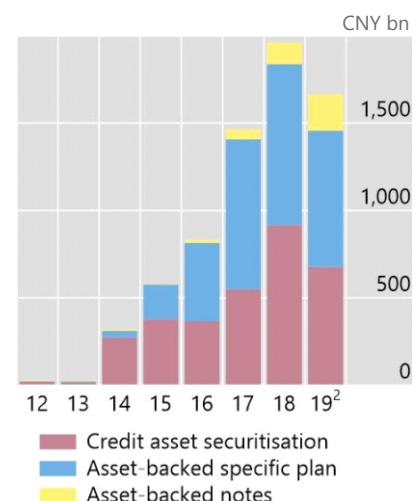
Outstanding mortgages



Outstanding amounts of mortgage backed covered bonds of selected EMEs¹



Gross securitisation issuance in China



¹ Country sample includes BR, CZ, HU, KR, PL, SG, TR. ² Data up to September 2019.

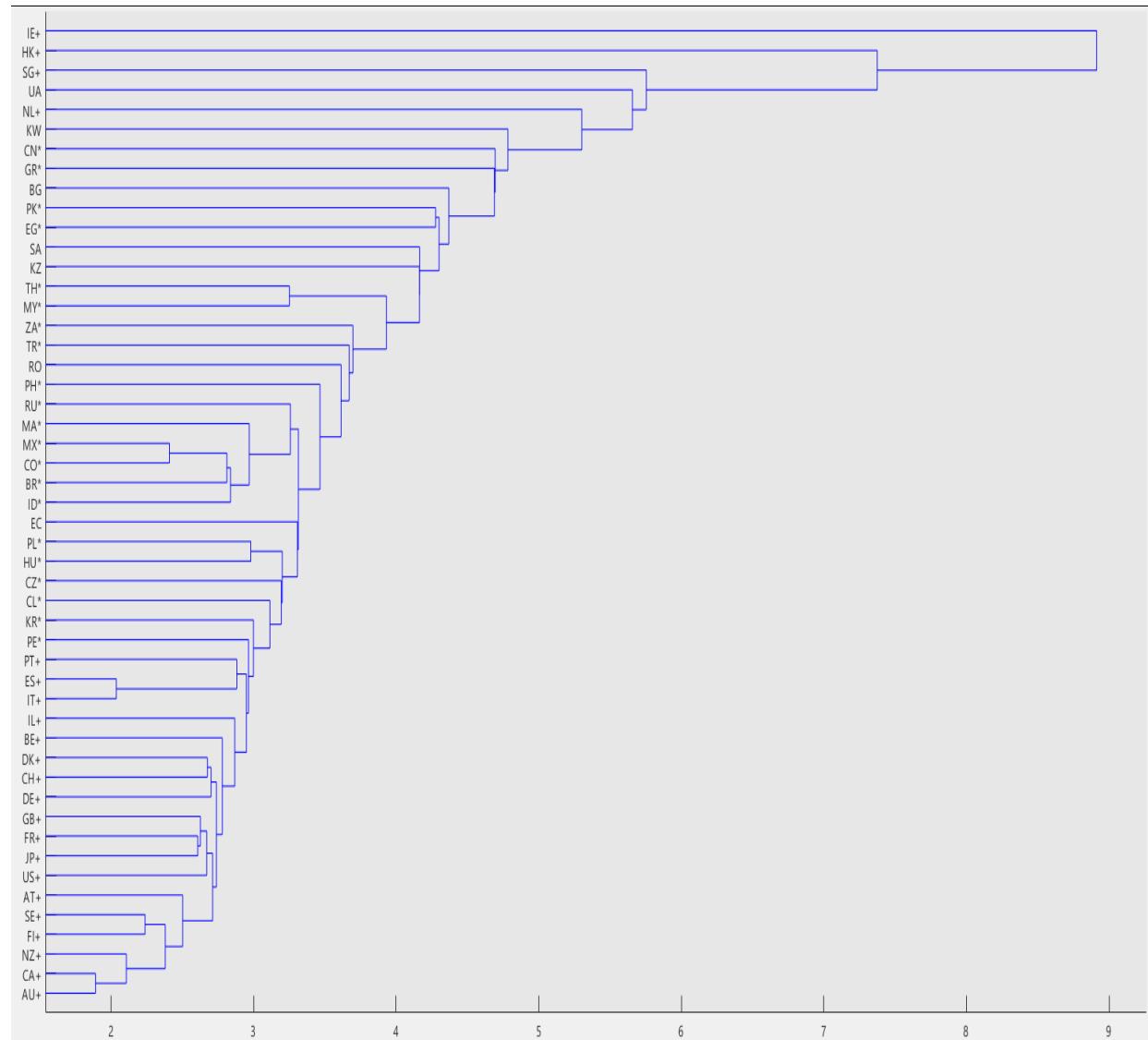
Sources: World Bank; European Covered Bond Council; Wind.

Section 8: How do EMEs and AEs compare?

Cluster analysis comparing EMEs and AEs

Euclidian distance between different countries

Graph 29



Clustering of countries according to variables from 2018 related to (i) asset returns and financial market characteristics, (ii) growth potential, (iii) external vulnerability and (iv) institutional development, all normalised.

X-axis shows the Euclidian distance between different countries. Countries link up when the Euclidian distance between them is smaller than the value on the x-axis. For example, the Euclidian distance between Canada and Australia is 1.9 and that between Mexico and Colombia is 2.4. The average distance between Brazil and the average of Mexico and Colombia is just below 3.

Countries marked with + are AEs and with * are EMEs.

Source: Baudot-Trajtenberg and Upper (2020).

References

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AR	Argentina	GB	United Kingdom	NZ	New Zealand
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