

BANK FOR INTERNATIONAL SETTLEMENTS

Capital flows, exchange rates and monetary policy frameworks in Latin American and other economies

A report by a group of central banks including members of the Consultative Council for the Americas and the central banks of South Africa and Turkey

15 April 2021

Central Bank of Argentina

Central Bank of Brazil

Bank of Canada

Central Bank of Chile

Central Bank of Colombia

Bank of Mexico

Central Reserve Bank of Peru

South African Reserve Bank

Central Bank of the Republic of Turkey

Bank for International Settlements (Secretariat)

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Preface

In early 2020, the Bank for International Settlements (BIS) Representative Office for the Americas contacted a group of nine central banks that includes the members of the Consultative Council of the Americas (CCA) except the US Federal Reserve (Argentina, Brazil, Canada, Chile, Colombia, Mexico, Peru), and two non-CCA members, the Central Bank of the Republic of Turkey and the South African Reserve Bank, to take stock of their monetary policy frameworks (MPFs) and understand whether they continue to be fit for purpose in the face of rapidly changing economic and financial conditions.

Central banks were asked to answer two questionnaires. The initial one asked central banks to report on the main drivers of swings in exchange rates and capital flows as well as the transmission channels through which those impact on their economy. The survey also covered the indicators and models central banks use to evaluate the nature of the shocks to exchange rates and capital flows and their impact. In addition, the survey explored the challenges central banks face in communicating to financial markets and the general public. A second supplementary survey circulated a few months after the beginning of the Covid-19 pandemic asked central banks to assess how well their policy frameworks had worked during these latest challenging times. The report presented here summarises the answers to these questionnaires, complementing a similar report on “Capital flows, exchange rates and policy frameworks in emerging Asia” by a Working Group established by the Asian Consultative Council of the BIS.

Introduction

Over the last two decades, many emerging market economies (EMEs) have opened up to trade and financial flows, adopted flexible exchange rate regimes and integrated further into the global economy and global financial markets. With these changes, **swings in capital flows and exchange rates have become larger and more persistent**. And the role of the exchange rate in influencing domestic financial conditions – the so-called financial channel of the exchange rate – has also gained greater relevance.¹ In the aftermath of the Great Financial Crisis (GFC), EMEs also had to contend with the spillovers of large-scale asset purchases by advanced economy (AE) central banks. One important implication is that the trade-offs faced by EME central banks have become more complex. In addition to the contemporary trade-off between stabilising output and inflation, there is an intertemporal trade-off between stabilising economic growth and inflation today and minimising the risk of financial instability in the future. To cope with this more challenging environment, EME central banks have increasingly complemented monetary policy measures with foreign exchange interventions, macroprudential measures and, in certain cases, capital flow management measures. Recently, central banks have had to deal with the sharp currency depreciations and large capital outflows caused by the Covid-19 pandemic.

Against this backdrop of larger and more volatile capital flows, **this report takes stock of how central banks have used or adapted their policy frameworks** – including some aspects of their decision-making process – in the pursuit of low and stable inflation and financial stability.² The focus is on the major countries in Latin America and other EMEs such as South Africa and Turkey. Canada, being part of the CCA, was included even though it is an AE. Nevertheless, it shares some key characteristics with the other economies that made it compelling to incorporate it in the exercise: it is a small open economy, its currency floats and it targets inflation. The report complements a similar exercise completed by a group of central banks in the Asia-Pacific region with the help of the BIS Asian Office.

In the pursuit of price stability and financial stability, the vast majority of the central banks surveyed consider the exchange rate and, to a lesser extent, capital flows an important or very important input into their policy decisions. The few central banks that do not take this view still regard the exchange rate as an important part of their monetary transmission mechanism and therefore take it into consideration in their economic analysis and forecasting.³

This report draws the following key conclusions.

First, the flexible exchange rate regime has served most economies well.⁴ **Most central banks acknowledge that the exchange rate acts as a shock absorber most of the time and under most circumstances:** in other words, the trade channel typically dominates the financial channel of the exchange rate so that a change in the exchange rate normally helps reduce current account imbalances and stabilise output. For most central banks, the financial channel is quantitatively less relevant than in the past or applies only in rare instances. This reflects the improved resilience of the domestic financial systems, including lower currency mismatches, and the accumulation of large international reserves. In addition, **the decline in the exchange rate pass-through to inflation – due to better anchored**

¹ The BIS Annual Economic Report 2019, Chapter II, highlights the three main channels through which capital flows and associated exchange rate fluctuations affect macroeconomic and financial stability: (i) exchange rate pass-through to inflation; (ii) the trade components; and (iii) domestic financial conditions. See Section 2 for a more detailed description.

² Annex A summarises the domestic and external context faced by the countries of participant central banks over the past two decades.

³ This is the case of the Central Bank of Chile and the Bank of Canada. In particular, the Bank of Canada is less subject to capital flow volatility than other surveyed central banks. The Bank of Canada has not intervened in the foreign exchange market since 1998.

⁴ However, for a few central banks, the regime is implemented as a managed floating variant.

inflation expectations – has provided greater scope for exchange rate flexibility, especially in response to terms of trade shocks.

But there are some instances in which the exchange rate could turn into a shock amplifier. In the case of a large and disorderly depreciation, the financial channel may become far more relevant, as the effects on balance sheets and credit may exhibit important non-linearities. Thus, as indicated by a number of surveyed central banks, **a “confidence” or “uncertainty” amplification mechanism may kick in**. That is, a large devaluation may increase the uncertainty perceived by firms and households and hence induce them to cut their spending. This mechanism may be particularly relevant in countries with a history of fiscal weakness and balance of payments crises, whose memory remains vivid in the minds of economic agents. Financial and/or confidence effects associated with large depreciations may overturn any positive impact of the depreciation on trade, making the overall effect on output contractionary.

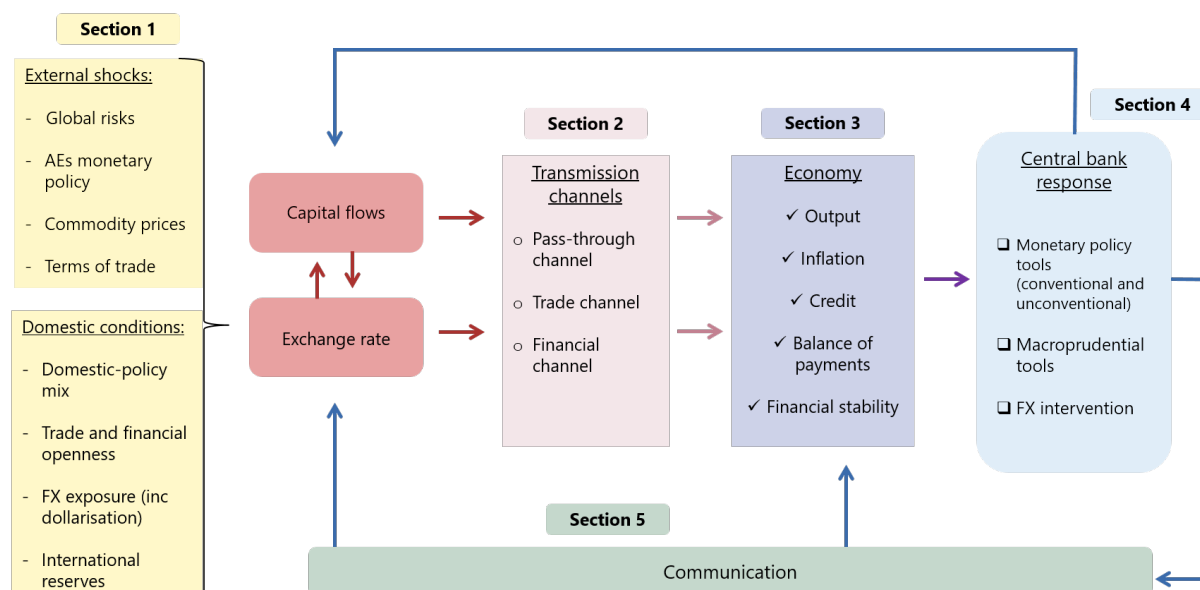
Second, FX intervention and macroprudential tools have helped to foster financial stability, while providing more leeway for interest rate policy to focus on the primary objective of low and stable inflation. All surveyed central banks have made greater use of the tools available, especially since the GFC. In addition, they have **expanded their toolkit**. In particular, many have intervened more in FX markets and expanded their tools to include derivatives. Some central banks have also used capital flow management tools under exceptional circumstances. Importantly, **FX intervention has aimed at dampening FX volatility rather than targeting exchange rate levels**, which are largely determined by fundamentals. And, following the Covid-19 crisis, some central banks have also intervened on a greater scale in bond markets to minimise market disruptions. That said, while the use of these policy instruments is important in several economies, sound macroeconomic fundamentals remain key to ensuring that economies reap the benefits of an open capital account.

Third, there is no “one size fits all” policy response to capital flows and exchange rate swings. Instead, the response depends on the nature and size of the underlying shock as well as its expected impact on the broader economy. Specifically, it rests on whether the source of those swings is financial or real, short-lived or persistent, external or domestic. It also depends on the magnitude of the shock (as small changes may not warrant a response regardless of the source of the shock), the overall level of volatility, the cyclical position of the economy and structural characteristics such as trade and financial openness, the level of economic and financial development, the share of foreign investors and the level of foreign currency debt. Together, these factors determine the relative strength of the various channels of the exchange rate.

The multitude of factors affecting exchange rates and capital flows and the multiple channels of transmission call for a complex analytical and decision-making process. This starts with a wide range of indicators and models to assess the nature and strength of the various mechanisms and ends with the choice and calibration (and re-calibration) of a wide range of policy tools.

The report is organised as follows (Diagram 1): Section 1 describes the main drivers of exchange rates and capital flows. Section 2 explains the transmission channels through which the exchange rate impacts the economy. Section 3 details the indicators and models central banks use to evaluate the nature of the shocks to the exchange rate and capital flows and their impact. Section 4 discusses what tools central banks have used to respond to exchange rate and capital flow movements. Section 5 explains the challenges central banks face in communicating to the public the use of different tools in a complex environment. Section 6 touches on the policy response during the Covid-19 crisis. Finally, Section 7 concludes.

Diagram 1. Schematic illustration of the analysis based on survey responses



1. Exchange rate and capital flow swings: what drives them?

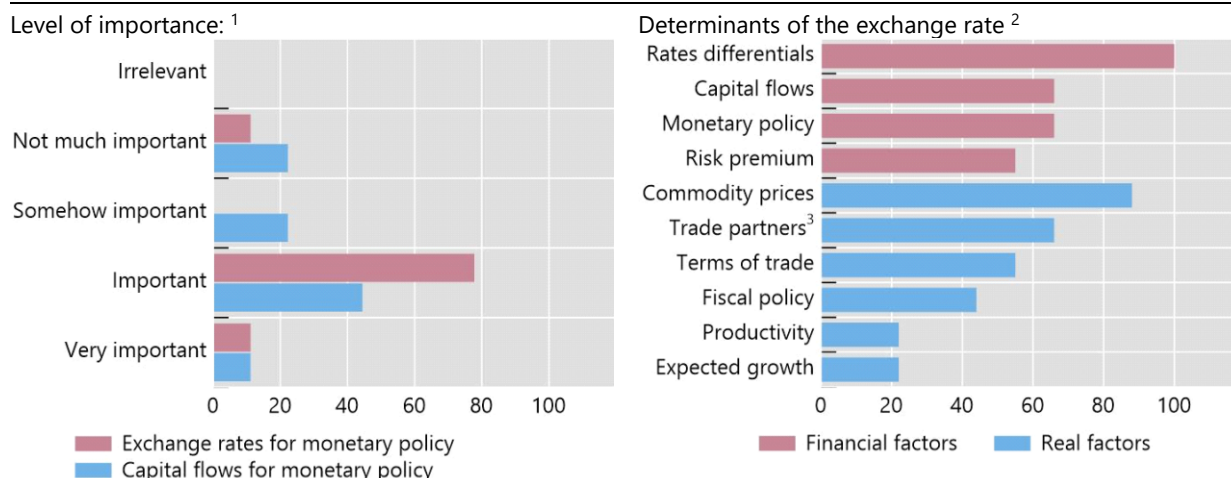
Exchange rates and capital flows as well as the nature of the shock underlying their changes are important inputs for policy (Graph 1, left-hand panel). The surveyed central banks judge several drivers, both financial and real, to be particularly relevant (Graph 1, right-hand panel). **The main real factors** are long-lasting changes in commodity prices, main trade partners' growth developments and prospects, terms of trade, fiscal stance, productivity shocks, and domestic growth outlook. Among the **main financial determinants** of the exchange rate are the differences between foreign (mainly the US) and domestic monetary policies, long-term interest rates, capital flows, global and domestic equity markets, and global risk sentiment. Some central banks emphasised that their currencies are perceived to have a **high "beta"** (eg Brazil, Mexico and South Africa), meaning that the exchange rate response to global risk metrics is relatively high compared with other EMEs.

The importance of **structural domestic factors** is underlined by the experience of a number of countries. For instance, in Brazil and South Africa, the strengthening of economic fundamentals in the past two decades was key to attracting foreign investment. In some cases, financial liberalisation and better tax treatment also helped. In Colombia, non-residents were granted in 2010 the right to purchase domestic securities through a local intermediary and since 2012 benefited from a gradual reduction of the tax rate on portfolio investment income from 33% to 5%.

Exchange rate and capital flows in policy decisions

In per cent

Graph 1



¹ Answers are mutually exclusive. ² Answers are not mutually exclusive. ³ Trade partners refers to the performance of their principal commercial partners.

Source: BIS Questionnaire.

A related important factor is the inclusion of a country's local currency sovereign bonds into global bond indices. Eligibility normally requires that foreign investors face no significant barriers to enter or exit the market, and can easily access currency and derivative markets. Several countries of the surveyed central banks were included in the past few years: eg Mexico in the FTSE World Government Bond Index (WGBI) in 2011; Peru and Colombia in the Bloomberg Barclays Global Aggregate Index in 2020. Inclusion in global bond indices is often an important factor drawing in investment from large foreign institutional investors such as pension funds and insurance companies. Given their long-term investment horizon, their presence is generally viewed by surveyed central banks as having a stabilising influence on capital flows. However, in response to extreme global volatility, these investors can also pull back more sharply and persistently.

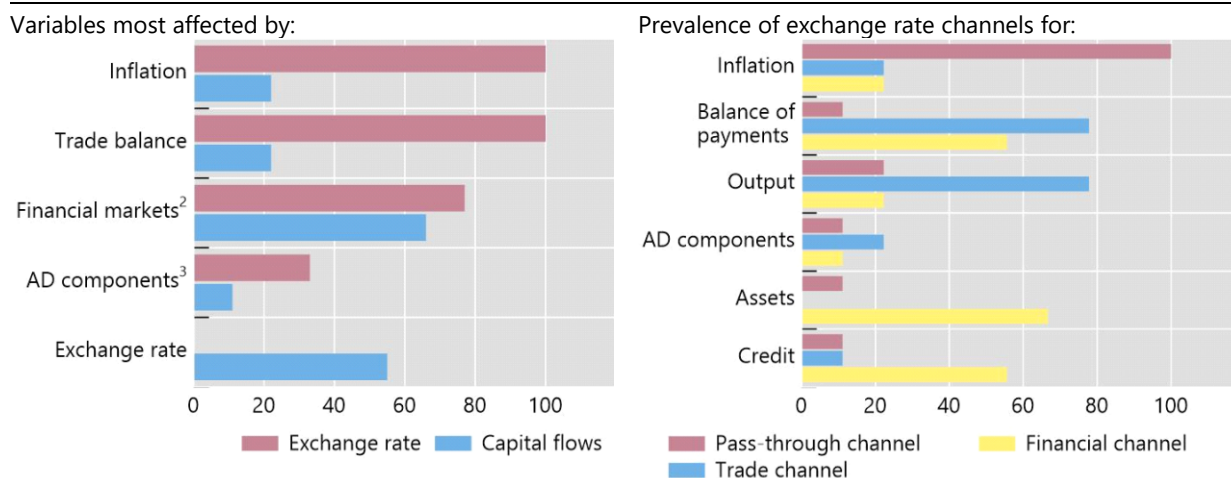
2. Transmission to the economy: what channels are relevant?

Capital flows and exchange rate fluctuations affect many key variables, including inflation, interest rates, credit, and exports and imports (Graph 2, left-hand panel) **primarily through three broad channels** (BIS (2019)). The first is the inflation (or exchange rate pass-through) channel, whereby exchange rate changes affect domestic inflation through its impact on the prices of imported finished and intermediate goods as well as in the markups charged by firms. The second is the trade channel, whereby the exchange rate affects the relative price of exported and imported goods and therefore their quantities. The third is the financial channel, which refers to a broad range of effects on domestic financial conditions. In particular, capital flows exert a direct quantity effect on credit and asset markets. In addition, asset prices can move substantially even without significant transactions. Thus, there might be exchange rate movements that do not initially involve capital flows.

Effects in the economy and transmission channels

In per cent ¹

Graph 2



¹ Answers are not mutually exclusive. ² "Financial markets" includes domestic interest rate markets, credit markets and government bond markets. ³ Aggregate demand components are private consumption and investment.

Source: BIS Questionnaire.

The channel most closely monitored by surveyed central banks is the **pass-through channel** (Graph 2, right-hand panel). In most countries, the average pass-through has diminished over time thanks to higher credibility and better anchoring of inflation expectations resulting in smaller second-round effects from supply shocks. Yet, as stressed by some central banks, the pass-through may vary depending on the underlying drivers and the size of the exchange rate change. In particular, **a larger pass-through generally results from larger shocks to financial conditions, either foreign or domestic, especially if they are persistent and are accompanied by high volatility**. In addition, the pass-through could be asymmetric, depending on the sign of the exchange rate change (appreciation or depreciation) and the phase of the business cycle (expansion or recession).

The trade channel is also important. However, in some countries it appears to have weakened over time. A few central banks attribute this change to the price-taking nature of international commodity markets and the invoicing in foreign currency, mainly in dollars, as well as to the dominance of the US dollar in the financing of global value chains.⁵

Central banks generally acknowledge the presence of a **financial channel**. In most countries, an increase in the share of foreign investors in local currency debt markets and/or foreign currency debt have made domestic financial conditions more sensitive to external financial conditions and exchange rate movements.⁶ In particular, changes in global risk appetite (periods of risk-on and risk-off in global markets) and movements in the US dollar against major currencies tend to have a significant impact on domestic financial conditions, especially for those countries with a high-beta currency.

That said, in the view of most central banks surveyed, these effects are not large enough in most circumstances to overturn the expansionary effect of a currency depreciation. In the case of a moderate and orderly exchange rate depreciation, in particular, the boost to exporters' margins outweighs the rising cost of servicing private sector external debt. This outcome largely owes to the **effectiveness of financial regulation and prudential measures**, including those implemented during large inflow

⁵ See G Gopinath, E Boz, C Casas, F J Díez, P Gourinchas and M Plagborg-Møller, "Dominant currency paradigm", *American Economic Review*, vol 110, no 3, 2020.

⁶ Some countries have suffered debt and balance of payments crises, so their empirical analysis of the financial channel could reflect episodes of sudden stops and of abrupt exchange rate depreciation and current account sharp reversals with economic contractions. This would imply a strong financial channel.

episodes.⁷ In particular, regulation over the past two decades has contributed to limiting currency mismatches on debtors' balance sheets. In addition, the accumulation of large international reserves in some countries has provided an important backstop. Finally, the development of derivatives markets in some economies has helped provide financial instruments to further insulate exporters and importers from FX volatility – at least in the short run.⁸ As emphasised by some central banks, stress tests confirm the lesser sensitivity of their financial systems to changes in the exchange rates, even under extreme scenarios.

In most economies and occasions, the exchange rate acts as a shock absorber. It helps the economy to adjust to external shocks, reducing volatility in inflation, economic activity and long-term interest rates. This increases the scope for the policy rate to be used independently to influence domestic inflation and output. And it reduces the incentives for excessive foreign currency risk-taking by domestic economic agents, including but not limited to currency mismatches. The latter is key to preserving financial stability.

While this is true in most circumstances, there may be cases in which the ability of the exchange rate to absorb shocks could be diminished and the net effect of a depreciation on output could, in some cases, turn contractionary. In the view of some central banks, these include large and disorderly depreciations, possibly triggered by episodes of high volatility and extreme risk aversion in global markets and exacerbated by the presence of significant domestic vulnerabilities, including fiscal and balance sheet imbalances. Put differently, **the financial channel remains a potential source of instability** and is therefore closely monitored by central banks. Recent history offers a few examples of economies that, even in the presence of macroprudential measures, experienced large capital inflows, rapid credit growth and strong aggregate demand followed by sudden stops or reversals of capital flows. In addition, many central banks indicated that the large share of foreign investors in local currency-denominated debt market and high foreign currency corporate debt constitute a vulnerability.

In some cases, it was the magnitude rather than the nature of shocks that destabilised the economy. Some central banks mention an **amplification mechanism**, which works through **higher uncertainty and/or loss of confidence**.⁹ A large devaluation may increase the uncertainty perceived by firms and households as well as their risk aversion, and thus induce them to cut their spending. At the same time, high uncertainty can amplify other channels, for instance by destabilising inflation expectations, resulting in a larger pass-through to inflation.¹⁰ In addition, uncertainty may strengthen the financial channel. This may be especially true in countries with a history of persistent fiscal imbalances and frequent balance of payments crises, in which sharp depreciations (including past exits from fixed rate regimes) were accompanied by high inflation and a slump in economic activity. The presence of fiscal imbalances and other macroeconomic vulnerabilities could enhance this mechanism. Therefore, when confidence collapses, the exchange rate may become contractionary, affect inflation expectations and turn out to be a shock amplifier.

⁷ A variety of prudential policies are already implemented, ranging from microprudential ones that are implemented by banking supervisors such as dynamic provisioning, and some macroprudential ones such as loan-to-value ratios and countercyclical capital buffers.

⁸ Financial hedges, for instance in derivatives markets, may only partly reduce the effects of exchange rate movements on financial conditions. This could be because of their short horizons or because they cover only part of their exposure owing to the high costs of such contracts. Moreover, markets for such instruments, especially long-term ones, are still shallow in some countries.

⁹ Some central banks also refer to this mechanism as a potential fourth channel of the exchange rate. A similar mechanism is identified in the ACC report on "Capital flows, exchange rates and policy frameworks in emerging Asia", although it is not referred to as an additional channel.

¹⁰ Some central banks mentioned that in the event of persistent capital outflows, high uncertainty may feed into expectations of further currency depreciation, generating a self-fulfilling adverse cycle whereby foreigners as well as locals contribute to exacerbating the outflows.

Monetary policy trade-offs are more challenging when the financial channel dominates and the exchange rate amplifies the original shock. In these cases, the exchange rate channel of the monetary transmission mechanism will not help stabilise inflation and output. For example, in an expansionary exchange rate depreciation that tends to increase output and inflation, the textbook policy response is to increase the policy rate to dampen output growth and inflation and reverse the depreciation. However, with a contractionary exchange rate depreciation that tends to reduce output due to the financial channel and increase inflation owing to higher pass-through, the nature of the policy response is not clear. Such a situation may require the use of more than one instrument – for example, hikes in interest rates, intervention in bond markets and in foreign exchange.

3. Monetary policy indicators and models

Central banks use a **variety of tools** to assess the impact of exchange rate and capital flow swings on the economy and to decide on the adequate policy response. Since this impact varies with the type of shock, central banks are using an increasing amount of indicators to identify the type of shocks and the environment in which it affects the economy.

3.1 Indicators

The amount of data available to central banks has grown significantly and indicators have become increasingly complex. This has increased the demands on the resources used to identify the reasons behind sharp fluctuations in FX and capital flows so that authorities can formulate their policy response.

The complexity starts with **choosing the adequate exchange rate indicators**. Rather than focusing on a single rate, central banks analyse diverse series for different purposes (see Annex B). Effective real exchange rates are more relevant for trade analysis, while nominal bilateral exchange rates and their volatility are closely monitored for financial stability purposes. In addition, most countries follow the dollar index to assess financial conditions given the index's correlation with market liquidity and to determine whether changes in the value of the domestic currency are driven by global or idiosyncratic factors. Moreover, the dollar index is important because the dollar serves as a unit of account for many products and assets, for example commodities.

Another set of indicators aim at **gauging market liquidity**. Liquidity disruptions, or market malfunctioning, can undermine price discovery, drive the exchange rate far away from fundamentals and generate financial instability. In addition to looking at the liquidity of the FX market, central banks also analyse related markets such as domestic and international capital markets. In particular, staff look at three types of information: liquidity in FX and fixed income, derivatives markets as well as the composition of capital flows. Since liquidity has several dimensions, central banks use a variety of volume and price indicators for the different markets (Graph 3, left-hand panel).¹¹

Central banks also closely watch several **volatility** indicators because high volatility can distort market functioning and complicate the identification of asset price movements, making it difficult to distinguish underlying supply and demand changes from noise. Indicators include implied volatility for

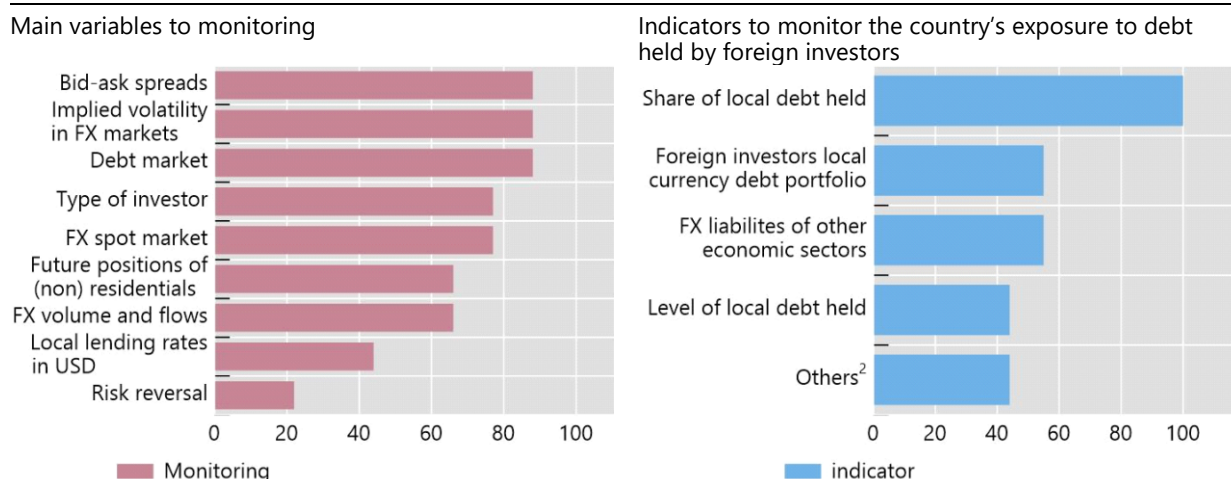
¹¹ On the transaction side they monitor: turnover data from the spot, forward and swap markets; traded volumes and change in investor portfolio positions in derivative markets; and buy and sell positions of residents and non-residents. When a significant share of FX transactions happens abroad, central banks closely monitor developments in the onshore and offshore markets. On the price side they monitor: bid-ask spreads on the spot exchange rate market; intraday price variation in different market segments; non-delivery forward (NDF) prices at different maturities (where relevant); carry to risk ratios; daily term rates implied by FX swaps; and spreads between these rates and spot money market rates.

different maturities and risk reversals. The latter not only capture volatility but also help understand investors' positioning and sentiment.

Monitoring of key financial variables

In per cent ¹

Graph 3



¹ Answers are not mutually exclusive. ² Others include government bonds interest rates, 5-years CDS, JP Morgan index GBI-EM and balance of payments.

Source: BIS Questionnaire.

Another important indicator is the **participation of foreign investors in the domestic fixed income market**. While their greater presence over the last several years has increased the depth and liquidity of government debt markets, it also constitutes a potential vulnerability, as the risk of “sudden stops” could be enhanced. To keep track of this, most central banks monitor the composition of the investor base, trends in foreign purchases and ownership as well as the size of FX liabilities in the domestic economy (Graph 3, right-hand panel). Some central banks also use composite indicators for the fixed income market.¹²

Finally, most central banks also carefully track the **size and composition of capital flows** as swings in capital flows affect financial conditions and can result in destabilising exchange rate dynamics. They place a particularly large emphasis on **portfolio investment**, which are more volatile and susceptible to sudden stops than other important components such as foreign direct investment.¹³

3.2 Models

Since no single model incorporates all potentially relevant factors and transmission mechanisms, central banks use a suite of models to produce forecasts and compare alternative scenarios. Most central banks have one main model that they use for forecasting and policy advice. In addition, they use a range of satellite models to analyse specific relationships, to capture certain conditions not incorporated into the main model and to form a judgment.¹⁴ The output of these models then feeds back into the main model.

¹² Central banks also closely follow derivatives markets since these can exert pressure on the exchange rate. In several economies, derivatives markets have deepened over the years, becoming key to price formation in FX and fixed income markets. Market transactions embed information on foreign and local negotiations of currency swaps, forwards and options, which help assess the risk perception of different participants.

¹³ Not all central banks pay as much attention to capital flows. Given the low sensitivity of their financial markets to changes in capital flows, the central banks of Canada and Chile find that it is not essential to have a detailed modelling or analysis of capital flows.

¹⁴ For example, in Chile, the base forecast for economic growth is the average of a DSGE and a semi-structural model.

The suite of models includes fully structural general equilibrium (DSGE) models, small and medium-scale semi-structural models, macroeconometric “core” models and reduced form time series models. This last class includes VAR, error-correction and ARMA models, which “let the data speak” (first, second and third columns of Table 1).¹⁵

Models for policy decisions

Table 1

Main models for assessing exchange rate and capital flows effects				Regarding primary structural model:		Do you consider a long-run equilibrium exchange rate? ² (Y/N)	Does your model capture FX intervention (FX), capital flows management (CFMs) or macroprudential tools (MT)?
	Structural model (eg DSGE)	Semi-structural model	Empirical models (eg ECM, VAR)	Assumes uncovered interest parity (UIP) (Y/N)	Exchange rate is endogenous (D) / exogenous (X) variable ¹ :		
AR	√	√	√	Y	D	Y	FX, CFMs, MT ³
BR	√	√		Y	D, X	N	
CA	√	√		Y	D	Y	
CL	√	√		Y	D	N	
CO	√	√	√	Y	D, X	Y	
MX		√	√	Y	D, X	Y	
PE		√	√	Y	D	Y	FX
ZA		√	√	Y	D	Y	FX, CFMs
TR		√	√	Y	D	Y	FX, MT ³

AR = Argentina; BR = Brazil; CA = Canada; CL = Chile; CO = Colombia; MX = Mexico; PE = Peru; ZA = South Africa; TR = Turkey.

¹ Brazil, Colombia and Mexico stated that also simulate scenarios where the exchange rate is an exogenous variable. ² For the long-run equilibrium, Argentina and Canada consider a long-run co-integration equation from the exchange rate fundamentals; Mexico, Colombia and Peru find the long-run equilibrium from the fundamentals of their structural models; South Africa use a vector error correction model (VECM), and Turkey use a Kalman filter for the long-run equilibrium. ³ The Central Bank of Argentina simulates cash requirements policies, and the Central Bank of The Republic of Turkey considers credit policy tools.

Source: BIS Questionnaire.

The way different models capture the exchange rate channels differs. In DSGE or semi-structural models, the main equation for modelling the exchange rate is an **uncovered interest rate parity (UIP) condition**. This links the change in the exchange rate with the interest rate differential and a country risk premium (Table 1, fourth column). Some central banks also include lags to capture the observed persistence in these variables. Other, less structural, models replace UIP by empirical relationships.¹⁶

In most cases, central banks’ models allow the real exchange rate to be determined **endogenously, alongside the policy rate**. Thus, both the exchange rate and the policy rates are flexible and can absorb some of the effects of external shocks, facilitating the economy’s adjustment to a new equilibrium. That said, in some cases central banks publish inflation projections that consider a constant or exogenous exchange rate (eg markets expectations) over the projection horizon (Table 1, fifth column). In addition, most central banks produce **forecasts for the exchange rate** using their main models or with alternative models such as short-term satellite models (eg dynamic factor models).

¹⁵ These assessments also rely on the technical staff’s own judgment.

¹⁶ Some models have a foreign block that consist mainly of external variables such as trading partners’ GDP, US policy rate, domestic risk premium indicators such as the emerging markets bond index (EMBI) and credit default swaps (CDS), international financial conditions, external price index (trade weighted), and commodity prices.

Most models do not capture the various exchange rate **transmission channels** separately. The trade channel (impact of real exchange rate variations on output) is typically captured in a coefficient of the exchange rate in the IS curve. Some models also include the country risk premium in the IS curve to capture the financial channel. In other cases, central banks use satellite equations or ad hoc exercises to capture changes in financial conditions. To assess exchange rate pass-through, some central banks separately estimate the effect of exchange rate movements on prices through econometric models and then incorporate those estimated coefficients into the main forecast model.

Central banks use several approaches to model **equilibrium exchange rates**. Comparing the actual with the equilibrium exchange rate (real exchange rate gap) gives information on inflationary pressures and on the sustainability of external positions, not least the current account. There are several ways to define an equilibrium exchange rate. In estimated DSGE models, it corresponds to the steady state fundamentals, for instance a purchasing power parity augmented by the inflation target, the neutral rate of interest and long-term output growth. Another approach consists in identifying a long-term relationship between the equilibrium real exchange rate and its macroeconomic fundamentals (behavioural effective exchange rate (BEER) and the fundamental effective exchange rate (FEER)).¹⁷ That said, some central banks say that they do not consider specific equilibrium rates in the policy formulation given the high degree of uncertainty in the measurement of equilibrium exchange rates (Table 1, sixth column).

While **capital flows** lurk in the background of most models that include an exchange rate, only the central banks of South Africa and Argentina have specifications that give an explicit role to capital flows. Their models estimate the capital flows required to finance any current account deficit while keeping international reserves unchanged. All other central banks do not explicitly model capital flows. Instead, some undertake ad hoc or alternative exercises that illustrate how capital flows affect real GDP growth, the exchange rate, inflation and the interest rate policy response via a Taylor rule. However, some mentioned that interest rates, exchange rates and credit conditions (credit spread and credit growth) are all affected by the country risk premium, which captures the essential features of capital flow shocks.

Finally, not all **policy instruments** are explicitly modelled. All models include a Taylor rule or version thereof. Some also have a credit block with a credit policy tool that captures macroprudential policies. Some central banks complement model-based analysis with a financial conditions index that captures the overall policy stance. A few central banks noted that one of the reasons it is difficult to integrate the interaction among several policy tools in their standard projection models is that the financial stability risks build up over a term that may go beyond the projection horizon of generally around two years. Furthermore, existing projection models only imperfectly capture financial vulnerabilities. But even so, the financial stability analysis is regularly part of the monetary policy decision-making process.

4. Policy: interest rate, FX intervention, macro and microprudential tools

While interest rates remain at the core of monetary policy frameworks, central banks have responded to the sharp movements in exchange rates post-GFC and the tighter link between domestic and foreign financial conditions by deploying additional tools to reduce the exposure of the domestic economy to capital flows and exchange rate swings.¹⁸ Three important developments increase the sensitivity of domestic financial conditions to external shocks, prompting this shift of tack: a rise in foreign currency debt (mainly corporate), a larger foreign participation in domestic bond markets (mainly government securities) and the development of deep derivatives markets. Several central banks mentioned that expanding the policy toolkit helps mitigate the trade-offs cited earlier.

¹⁷ For more details about the BEER and FEER methodologies see eg A Filardo, G Ma and D Mihaljek, "Exchange rates and monetary policy frameworks in EMEs", BIS Paper, no 57, pp 37–63, September 2011.

¹⁸ A summary of all micro and macroprudential measures is presented in Annex C.

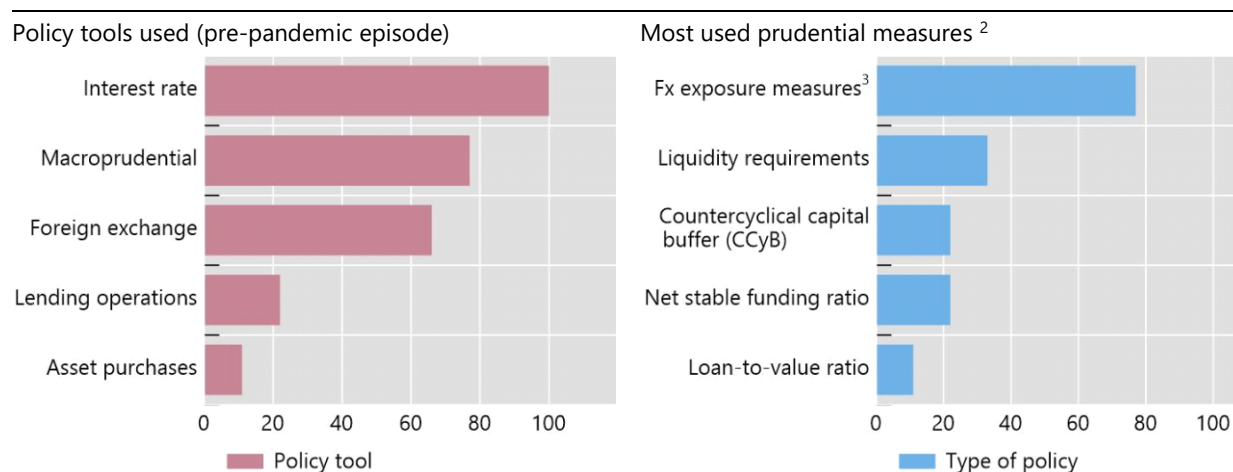
The policy response to external factors rests on **two main pillars**. First, central banks (and other authorities) have used **prudential tools** to strengthen the resilience of the financial sector to capital flows and exchange rate movements. This includes reducing currency mismatches, curbing risk taking and protecting financial institutions' balance sheets from extreme exchange rate movements. For example, authorities have employed macroprudential tools to smooth the credit cycle, especially to prepare for episodes of flow reversal (Graph 4, left-hand panel). Several countries also used measures such as restrictions on holding foreign currency deposits at local banks or FX reserve requirements to limit the dollarisation of their economies and reduce currency mismatches (Graph 4, right-hand panel). Other central banks highlighted that macroprudential policies could also have an ex-post nature and not only be pre-emptive. A key example is changes in reserve requirements. Some central banks have also used capital flow management tools during exceptional circumstances, although their use has declined over time.

The second pillar has been **FX intervention with macroprudential purposes**. In their response to the questionnaire, central banks stressed that the aim of interventions has been to ensure markets remain orderly, rather than improving competitiveness or pursuing an exchange rate objective. Importantly, most central banks say that the type and size of interventions depended on the specific types of investor or flows associated with market disruptions (Table 2, third column). The buildup of reserves has also been the result of policy decisions guided by a macroprudential objective. Central banks could then use this buffer to stabilise market conditions,

FX intervention and macro- and microprudential policies

In per cent ¹

Graph 4



¹ Answers are not mutually exclusive. For a few economies macroprudential include capital flow management measures. ² The survey enquired on prudential measures as part of the toolkit to deal with FX and capital flow volatility. ³ FX exposure measures include reserve requirement measures.

Source: BIS Questionnaire.

The **assignment of policies** to particular objectives varies across countries. In four economies, each policy (and the associated tools) is used to achieve a specific primary objective. In one economy, several complementary policies are used to meet both the central bank's price and financial stability objectives. In yet other three economies the assignment varies over time, depending on the circumstances: policies can be used to achieve their primary objective or policies can be combined to attain multiple objectives (first and second columns of Table 2).

One factor complicating the multi-pronged policy response in the wake of the GFC has been **split decision-making authority**. In most jurisdictions, monetary policy, exchange rate policy (such as FX intervention) and macroprudential policy decisions are in the purview of different institutions (Table 2, fourth column). As a consequence, deploying a menu of tools requires a significant degree of

coordination across different institutions. But even where central banks do not have the full legal authority for all macroprudential measures, they regularly assess the effects of such policy actions on the economy (both ex-ante and ex-post) and use different methodologies to gauge the impact of FX interventions and other tools. For example, the CBRT emphasises that they conduct research to develop models that capture the interaction among monetary, micro and macroprudential, and exchange rate policies.

The central banks surveyed generally believe that the available **tools have been adequate** to address all the major challenges their economies have faced in the past two decades. At the same time, some of them recognise that the toolbox is work in progress and they are always looking for new tools as financial markets evolve. For example, the SARB intends to increase the range of macroprudential tools to include debt-to-income, loan-to-value and leverage ratios. At the moment they have a single macroprudential tool, the counter-cyclical capital buffer, although muted credit growth since the GFC meant that they have never activated it.

Finally, central banks have the legal authority and are prepared to act as **"market maker of last resort"**, even if there is no well-established operating procedure to carry out this type of interventions (Table 2, seventh column). In the recent Covid-19 crisis they acted to quell market instability. However, these operations are not devoid of longer-term risks. According to some central banks, a role of central banks as a potential buyers of local currency securities could attract a greater share of short-term and less stable investment.

FX intervention and macroprudential policy

Table 2

	Considerations for the implementation of FX intervention and macroprudential policy:				Is your current policy toolbox adequate? ³	Is the central bank prepared to act as “market maker of last resort”? (Y/N)	
	Are policies deployed to achieve a single (S) objective (eg Tinbergen rule) or multiple (M) objectives? ¹		Does the policy response depend on the type of capital flow and/or investor? (Y/N)	Is the legal power concentrated in a single or multiple authorities? ²			Has your central bank’s response to capital flows and exchange rate fluctuations changed after the GFC? (Y/N)
	(S)	(M)					
AR		√	Y	CB	Y	5	N
BR	√		Y	CB + GOV	Y	5	Y
CA	√		N	CB + GOV	N	4	Y
CL	√		N	CB	N	4	Y
CO	√		Y	CB + GOV	Y	4	Y
MX	√	√	Y	CB + GOV	Y	4	Y
PE	√	√	Y	CB	Y	4	N
ZA		√	N	CB + GOV	N	4	N
TR	√	√	Y	CB + GOV	Y	5	Y

Country codes defined in Table 1.

¹ Central banks with both marks stated that, depending on specific circumstances, they could set one tool to address single or multiple objectives. ² CB= central bank; GOV= government institution (ministry of finance, ministry of economics, etc). ³ 5: very much; 4: very much but working in some new tools; 3: yes, but needs some improvement; 2: not much, needs major improvement; 1: far from adequate.

Source: BIS Questionnaire.

5. Communication challenges

The shift from a single objective (price stability) and a single instrument (policy rate) to one with multiple objectives (price stability and financial stability, whether de jure or de facto) and multiple instruments poses significant challenges. The **communication challenges** identified by most of the surveyed central banks are: (i) improving the quality of analysis, while keeping it comprehensible to the targeted audience; (ii) explaining the central bank's policies and the latest economic developments to a non-expert audience; (iii) reaching out to the public through modern digital channels, such as social media, while avoiding fake news and content overload; and (iv) enhancing forward guidance and improving the ability to provide appropriate signals about future monetary policy changes.

Over the past two decades, central banks have therefore stepped up their communication efforts.¹⁹ First, they increased transparency by greatly expanding the range of outlets and channels, so that they can reach a wider audience than just market analysts. Second, their communication has become more complicated as the use of additional policy instruments has increased.

Communication

Table 3

	In your communication...				Do you feel comfortable with the degree of understanding that market participants have regarding your communication? (Y/N)
	do you explain the role, if any, that capital flows and ER fluctuations had in your MP decisions? ¹ (Y/N)	do you refer to any interaction that macroprudential policies may have with MP in your policy decision? (Y/N)	do you present a balance risk (BR) and/or quantitative analysis (Q) to explain the uncertainty around forecasts? ²	do you consider sensitive issues (eg fiscal policy, social unrests)? ³ (Y/N)	
AR	Y	Y	BR	N	N
BR	Y	Y	BR, Q	Y	Y
CA	N	Y	BR, Q	N	Y
CL	N	N	BR, Q	N	Y
CO	Y	Y	BR, Q	N	N
MX	Y	N	BR, Q	N	Y
PE	Y	N	BR, Q	N	Y
ZA	Y	N	BR	N	Y
TR	Y	Y	BR, Q	N	N

Country codes defined in Table 1.

¹ Central banks answered "Yes" (Y) even when they do not follow an exchange rate target, but they consider how capital flows and ER fluctuations affect the economic outlook or inflation expectation. ² A balance risk analysis (BR) considers statements communicating up/down risk factors compared with a baseline scenario. A quantitative analysis (Q) considers statements involving fan charts, forecasts ranges and bandwidths compared with a baseline scenario. ³ "No" answer (N) means that they only consider sensitive issues to the extent that they are related to price stability, using a neutral tone on the particular issue they analyse.

Source: BIS Questionnaire.

They **increased transparency** by expanding the information they provide and by explaining what they do to the public. In particular, they have: (i) published the models that provide inputs for policy decisions; (ii) explained their choice of macroeconomic scenarios and the underlying assumptions; and (iii) increased the number and widened the range of outlets through which they publish their analysis.

¹⁹ The main advances in central banks' communication are summarised in Annex D.

Central banks have become more explicit about the possible future paths of monetary policy, conditional on alternative macroeconomic scenarios. Some central banks have introduced press conferences as a vehicle for elaborating on the board's deliberations. Some also regularly reach out to market participants and specialist journalists to inform them about the central bank's reaction function (Table 3, fifth column). In most cases, central bank economists regularly interact with private sector economists and hold briefing sessions for them following the release of important publications.

But central banks not only increased the amount of information put out to the public, they also stepped up efforts to make the material accessible, for instance through shorter and easier-to-understand publications. For example, the Bank of Canada includes a **plain-language summary** of public speeches by members of the Governing Council. It also launched in 2018 a digital publication series called "The Economy, Plain and Simple" that explains key economic concepts and issues in an easy-to-understand way for the general public.

In addition, the **content of communication** has evolved, especially concerning exchange rate fluctuations and macroprudential measures. While most central banks neither publish exchange rate forecasts nor comment on potential misalignments, they do discuss the effects of exchange rate movements on inflation forecasts and market expectations. Some also find it useful to refer to exchange rate fluctuations (and credit growth) when explaining monetary policy decisions or communicating their forecasts. For example, the Central Bank of the Republic of Turkey reports discussions on capital flows and exchange rate movements in their minutes if they are of the opinion that these matter for inflation forecasts or financial stability (Table 3).

While macroprudential and monetary policy decisions are generally reported in different outlets – financial stability reports and monetary policy statements, respectively – several central banks have explained the relationship between these measures. Some have stressed to their audiences that the policy interest rate adjustments are not the best tool to address financial vulnerabilities, such as high household debt and housing market imbalances. Others have pointed out that macroprudential measures can improve the functioning of credit markets and thus strengthen the transmission of monetary policy.

Most central banks abstain from **commenting on issues directly outside their mandate**, eg fiscal policy or social unrest. If they do comment on such issues, they concentrate on the impact that these have on the outlook and risks to inflation and/or financial stability. In this case, they explain the mechanisms through which these issues affect the outlook and risks and warn of potential consequences for economic variables, trying to strike a neutral tone.

6. Covid-19 crisis challenges for MPFs

The Covid-19 pandemic represents the most severe test faced by central banks in recent years. What has been learnt so far is that the policy frameworks of the central banks surveyed in this report have generally worked well. By and large, they have proved flexible enough to allow a forceful and effective response and have helped preserve central banks' credibility and autonomy. **No significant changes were needed.** In a few cases, as a precautionary move, central banks sought and obtained changes in their legal mandates to expand the range of usable tools, but the need to use these new tools has not arisen (and is not likely to arise in the foreseeable future).²⁰

Most operations were not qualitatively new, but their scale and scope were much larger, commensurate with the unprecedented size and nature of the shock. In particular, central banks expanded both the range of securities eligible as collateral for liquidity facilities and the set of

²⁰ In Chile, the constitution was changed to allow the central bank to purchase government bonds in the secondary market for financial stability purposes only and with the vote of at least 4 of the 5 members of the central bank's board. In Brazil, the central bank obtained the legal authorisation to purchase private bonds in the domestic secondary market.

counterparties for these operations. They also adapted existing liquidity facilities to support bank credit targeted at small and medium-sized enterprises (SMEs). In addition to providing ample liquidity, **several central banks acted as “market makers of last resort”** in several markets. Their intervention mainly focused on the FX market, although in some cases they also included purchases of government and/or corporate bonds. For some central banks, purchases of bonds in domestic markets were rather new, aimed at restoring market functioning rather than compressing yields. Partly due to these interventions and the margins built in before the pandemic, in the view of most surveyed central banks, **flexible exchange rates have in most cases, continued to work as shock absorbers.**

While the Covid-19 crisis has not led to major changes in the key aspects of policy frameworks, it has brought about **some changes in policy analysis, decision-making processes and communication.** In terms of analysis, models, projections and scenarios have been adapted to incorporate the unique features of the shock, including the higher degree of uncertainty. For example, the central banks of Mexico and Canada temporarily adopted a set of scenarios for growth and inflation in replacement of baseline forecasts. In the case of central banks that introduced forward guidance, the path of interest rates became exogenous rather than endogenous.

Communication challenges went beyond the need to acknowledge greater uncertainty. The wider array of tools has made communication more complex. And the rapid evolution of the crisis has increased the frequency of announcements and press releases. In some cases, monetary policy decisions and communications regarding liquidity and lending facilities were made instantaneously, outside scheduled meetings, announcements or press conferences. In addition, several central banks teamed up with the ministry of finance and other financial authorities to convey the message of a coordinated response.

Finally, in the opinion of several central banks, the crisis has also led to **closer cooperation and coordination among different divisions within the central banks** in the analysis of and decisions regarding multiple instruments – monetary, FX intervention and macroprudential policy. Yet, in the absence of better models and analytical tools, assessing the interaction between different tools remains a major challenge.

In executing a wide range of large-scale operations, central banks have been mindful of **potentially important trade-offs or risks.** First, they have recognised that exceptionally large-scale provision of liquidity and other unconventional monetary policy measures may increase financial stability risks in the longer run through excessive risk-taking, high leverage, and asset price distortions. In addition, such measures may also attenuate the incentives for fiscal discipline. Second, they have also been aware that short-term stabilisation of economic activity may come at the expense of allowing non-viable firms and/or banks to continue operating, thereby reducing long-term productivity. Finally, the continuation or delayed withdrawal of many of the unconventional measures once the recovery is well advanced and inflation is firmly within target may pose risks to the credibility of central banks. To minimise these risks, clear exit strategies with clear objectives are of the essence.

Conclusions

In general, most central banks confirm the **benefits of inflation targeting and flexible exchange rate regimes**.²¹ They consider that the exchange rate acts as a shock absorber most of the time and in most circumstances. At the same time, however, the tides of global liquidity, deeper financial integration and domestic factors – growth differentials and investment opportunities – have led to **larger and more volatile capital flows** that may result in large effects on exchange rates: for most countries, this poses a bigger threat to financial stability than in the past. That said, in several countries the accumulation of large international reserves has provided an important degree of protection.

Central banks highlight the presence of the **three exchange rate channels** commonly cited in the literature and central bank analysis: exchange rate pass-through to inflation, trade and financial channels. Several central banks also mention an amplification mechanism capturing the potential impact of the very high uncertainty that could be generated by large currency depreciations in countries with some vulnerabilities.

Since the GFC, all central banks have **expanded their toolkit** to better pursue their primary objective of low and stable inflation and to foster financial stability. Most central banks have found the recourse to multiple instruments useful as it has increased flexibility to deal with capital flow swings. Most central banks have intervened in the FX market to dampen excess volatility and provide liquidity when required. The accumulation of international reserves has been key in this respect. They have also implemented macroprudential and other policy measures– including, in certain cases, capital flow management tools to strengthen their financial systems and mitigate the impact from large capital flows. All these have also helped improve short- and long-term monetary policy trade-offs. The **large presence of foreign investors** in domestic fixed income markets provides a valuable source of funding, but in some cases it could also represent a vulnerability, especially where local currency funding markets are shallow. Hence, most central banks monitor several indicators related to their positions and activities.

The **Covid-19 shock** has tested central banks' monetary policy frameworks. However, by and large, the MPFs proved flexible enough to allow a forceful and effective response to the crisis. They have reduced reference rates, acted as "market maker of last resort", and implemented unconventional monetary policies, while preserving central banks' autonomy and credibility. Finally, **communication strategies and practices** in central banks have improved. As messages have become more complex due to the use of additional instruments, central banks have enhanced transparency by expanding the range of communication outlets and have made efforts to reach a wider audience.

²¹ In a few cases these include managed floating regimes, where central bank intervention and regulation prevents disorderly exchange rate volatility.

Annex A – Local and external conditions

The scheme below provides a short description of external and local primary considerations that central banks stated as relevant to a better understanding of how exchange rates and capital flows affect their country's economy (pre-Covid-19 pandemic stage).

External and domestic conditions

Table A1

	External factors/events	Local factors/events
AR	<ul style="list-style-type: none"> Monetary policy response of major advanced economies to the GFC Episodes of EME currency depreciations since 2011 Low interest rates in international markets in 2016–2017 Increasing volatility in EME financial markets during 2018 	<ul style="list-style-type: none"> High level of dollarisation in private resident portfolios in a small FX market Debt restructuring and dollar-denominated debt crisis during 2001 and 2018 Adoption of an inflation-targeting regime in 2016 Reintroduction of CFMs (similar to those of 2011–2015) in the second half of 2019
BR	<ul style="list-style-type: none"> Increasing flight to safety during the GFC and the taper tantrum episodes High exposure to commodity prices Developments in the global economy, in particular, China as a main commodity importer 	<ul style="list-style-type: none"> Changes in the annual inflation targets, to be set for three years ahead, instead of two years. Targets set at decreasing values (from 4.5% for 2005–2018 to 4.25%, 4.0%, 3.75%, 3.50%, and 3.25% for 2019, 2020, 2021, 2022, and 2023, respectively. Improvement in the regulatory framework and market infrastructure
CA	<ul style="list-style-type: none"> Greater global financial integration (beneficial) Accommodative monetary policy in advanced economies CAD considered more liquid currency by other countries 	<ul style="list-style-type: none"> Healthy balance of payments that contributed to valuation effects in softening the impact of 2014–15 oil shocks Ability to borrow in its own currency Increased role as a reserve currency
CL	<ul style="list-style-type: none"> High resilience from the exchange rate and its fundamentals during the GFC and the Taper Tantrum episodes. 	<ul style="list-style-type: none"> A recent financial openness relative to last 10 years that allow that local agent can hedge currency risk Local episodes of social unrest Massive changes in the portfolio of pension funds associated with financial advisors' recommendations
CO	<ul style="list-style-type: none"> Inclusion of Colombia in the JP Morgan GBI index in 2014 	<ul style="list-style-type: none"> Developments in the purchase of local securities by non-residents. Reduction of the income tax rate for portfolio investments by non-residents in 2012 (from 33% to 14%) Changes in the application of the income tax to fixed-income securities in 2013 Another reduction in the income tax rate for portfolio investments by non-residents (from 14% to 5%)
MX	<ul style="list-style-type: none"> Unconventional monetary policies in advanced economies introduced during and after the GFC 	<ul style="list-style-type: none"> Deepening of the fixed-income market The use of the Mexican peso to hedged risks that are not related to Mexico
PE	<ul style="list-style-type: none"> Periods of high commodity prices Global investors' appetite for EME sovereign bonds since 2013 	<ul style="list-style-type: none"> Strong macroeconomic fundamentals and positive growth prospects Growth of local institutional investors Easing of foreign investment caps by the BCRP

ZA	<ul style="list-style-type: none"> • Synchronisation with overall EMEs trend • No evidence that changes in the global financial system post-GFC is significantly affecting the direction or magnitude of capital flows into the country. 	<ul style="list-style-type: none"> • Greater credibility of the central bank with the 3–6% inflation target • Downtrend in potential real GDP • Rise in public deficits on the backdrop of weak growth • A greater attractiveness given its strong fundamentals
TR	<ul style="list-style-type: none"> • Sharp increase in portfolio flows between advanced and emerging market countries • Increased sensitivity of capital flows to the monetary policy stance, interest rates and central bank balance sheets of advanced economies after the GFC • Quantitative easing and monetary policy normalisation by advanced economies 	<ul style="list-style-type: none"> • Domestic growth prospects • Changes in real interest rates and country risk premium • Political and social attributes and the financial resilience of the country • The overheating of the economy and a sharp widening in current account deficits by the end of 2010

Country codes defined in Table 1.

Annex B – Relative importance of exchange rates

Central banks make a clear distinction between bilateral and effective exchange rates as well as between nominal and real exchange rates, as different concepts are associated with different effects on trade and financial stability (Table B1). Specifically, **real effective exchange rates (REER)** are more relevant for trade while nominal and **bilateral exchange rates** vis-à-vis the US dollar and their volatility are closely monitored for financial stability considerations. In addition, most countries follow **the dollar index**, as discussed in section 3.1.

When there is a **change in the REER**, the policy response is to accommodate and let it adjust, perhaps smoothing the transition to a new equilibrium. This is the case for terms-of-trade changes, negotiation and/or implementation of trade agreements and productivity improvements. But REER changes could also be driven by other swings in nominal exchange rates. In this case, adjustments may not be smooth and may require intervention to stabilise the nominal exchange rate and prevent financial instability. This could temporarily affect the REER too. Some central banks stated that persistent changes in the REER are more likely to influence medium term inflation dynamics, so these kind of adjustments receive more weight in their framework. They consider **the gap between the actual level of the REER and its long-term or equilibrium value** as a gauge of possible inflationary pressures. If there is a significant and persistent gap between the actual real exchange rate (RER) and its equilibrium reference, this would mean a temporary appreciated or depreciated exchange rate, which in the medium-term could imply pressures for a depreciation or appreciation with the corresponding effects on inflation. That adjustment should be monitored to ensure a smooth transition even with some pass-through to inflation but without second-round effects.

Exchange rate and capital flows in policy decisions

Table B1

	Which exchange rate matters more for:							
	trade channel				financial stability			
	Bilateral (USA)	NEER	REER	Level (L) or Volatility (V)?	Bilateral (USA)	NEER	REER	Level (L) or Volatility (V)?
AR			√	L	√			V
BR			√	L	√			V
CA			√	L	√			V
CL			√	L		√		V
CO			√	L	√	√		L
MX			√	L	√			V
PE			√	L	√			V
ZA			√	L	√			L
TR			√	L	√			V

Country codes defined in Table 1.

Source: BIS Questionnaire.

Annex C – Micro and macroprudential measures implemented in EMEs

The next table summarises the micro and macroprudential policies that central banks have used before the Covid-19 pandemic (measures implemented during the pandemic will be included separately).

Micro and macroprudential tools implemented

Table C1

AR	<ul style="list-style-type: none"> - In 2002, the establishment that foreign currency deposits may only be used by banks to finance debtors with income from foreign trade transactions and related activities. - Minimum reserve requirements on deposits. - The obligation for banks to keep available (liquid) all and any funds from foreign currency deposits not applied to loans also in foreign currency. - In May 2003, the prudential regulation on the Net Global Position in Foreign Currency implemented on which both minimum and maximum limits were imposed (in terms of banks' capital level). - The regulation on minimum capitals for financial institutions in the Market Risk categories. - Second half 2019, the reintroduction of capital flows management measures (CFMs). Similar to those implemented from 2011–15.
BR	<ul style="list-style-type: none"> - Countercyclical capital buffer (CCyB). - Domestic Systemically Important Bank (DSIB) capital surcharges. - Loan-to-Value (LTV) caps. - Liquidity Coverage Ratio (LCR). - Net Stable Funding Ratio (NSFR). - Non-discriminatory reserve requirements.
CL	<ul style="list-style-type: none"> - Regulation targeting FX mismatches and liquidity mismatches in the banking sector, including the more recent adjustments in line with Basel II and III. - Loan-loss-provisions take into account the debtor's FX-mismatches, an issue that has been highlighted as relevant for limiting the consequence of capital inflows on credit growth. - During the GFC, a change in FX-reserve-requirements was implemented in order to help banks partially overcome the consequences of the dollar shortage faced at that time.
CO	<ul style="list-style-type: none"> - From 2007 to 2008, the imposition of deposits requirements to FX indebtedness. - Macroprudential measures for local FX intermediaries: <ul style="list-style-type: none"> o The three-day average of the total FX position, positive FX risk indicator and of negative FX risk indicator. o The individual short-term exposure indicator and consolidated short-term exposure indicator.
MX	<ul style="list-style-type: none"> - The imposition of restrictions to local banks to take positions on FX that are greater than 15% of their capital in absolute terms. - The prohibition to individuals to open foreign currency accounts in local banks.
PE	<ul style="list-style-type: none"> - Cyclical management of FX reserve requirements ratios (RRRs). - Additional RRRs on the excess above the limit for derivative instruments sales (forwards and swaps). - In 2014, the BCRP established a credit de-dollarisation programme using FX RRRs. - Additional RRR applies if a bank's FX loan portfolio (currently suspended until December 2020 due to the Covid-19 crisis): <ul style="list-style-type: none"> o is higher than 80% of the loan portfolio as of September 2013; or o is higher than the loan portfolio as of December 2018 plus 4%; or o FX loans increase 40% above PEN loans.
ZA	<ul style="list-style-type: none"> - During 2016, the implementation of the countercyclical capital buffer (CCyB). - <i>The SARB is in progress to increase the panoply of conventional macroprudential tools.</i>
TR	<ul style="list-style-type: none"> - In 2011, the reserve option mechanism (ROM). - Reserve requirements ratios (also, the RRRs have been more linked to the annual growth rates of banks' Turkish lira-denominated standardised cash loans).

Country codes defined in Table 1.

Annex D – Main advances in central banks communication’s practices

The scheme below shows the main changes that central banks have made in their communication’s strategy to adapt to a more complex and uncertain environment, including the increasing use of FX intervention and other instruments than the policy rate.

Major changes in monetary policy communications

Table D1

	What major changes in monetary policy communications have the central bank implemented (especially after the Great Financial Crisis)?
AR	<ul style="list-style-type: none"> A major communication during changes on the monetary policy regime or during important modifications introduced (through the various channels available, to improve public understanding). The use of usual reports were employed, such as the Monetary Policy Report, or some ad-hoc reports, as well as speeches, presentations, press conferences etc.
BR	<ul style="list-style-type: none"> In 2012, the board made public the votes of each member of the Monetary Policy Committee (Copom, including this information in the Statements and Minutes). In 2016, the Statement become more informative and the Minutes and Inflation Report both became more objective. The exposition of the vote’s motivation was expanded with more detail, an also includes the balance of risk to inflation discussed at every meeting. The website has been redesigned to enhance communication. It has become more modern and user friendly. There was a reduction in the inflation report, from six chapters (activity, prices, credit, monetary and fiscal policy, international economy, external sector and inflation outlook) to only two chapters (economic outlook covering external sector, local economy, and prices, and inflation outlook – covering short and medium-term projections, a review of the monetary policy and the balance of risks). In 2017, another change was to eliminate the faculty of the Governor to change the policy rates without calling an extraordinary meeting of the Copom (this instrument potentially generated misinterpretation). The BCB has made changes to its financial stability report, making it more concise and forward looking and conveying the BCB’s risk assessment and policy stance more clearly (the BCB recognise communication as a macroprudential policy per se). Recently (2020), the Inflation Report has undergone important changes, with a more analytical and user-friendly text, higher transparency, and more details about determinants of inflation projections and about risk analysis.
CA	<ul style="list-style-type: none"> Since 2009, the quarterly Monetary Policy Report has had a separated section spelling out what they see as the main risk to their outlook. In 2015, the Governor delivered a public speech, which announced and updated the framework for unconventional monetary policy measures. In addition, the establishment of the staff analytical notes series in 2015 helped the Bank share more of its background analysis with the public (in response to an external interest in the analysis Governing Council has access to). In 2017, the CB re-opened the Bank of Canada Museum in Ottawa, formerly the currency museum, with a new mandate to explain the work of the CB to Canadians. In 2018, the CB launched “The Economy, Plain and Simple”, a digital publication that explains key economic concepts and issues in an understandable way for the public. Starting in 2018, a member of the Governing Council delivers an “Economic Progress Report” speech and holds a press conference the day following an interest rate decisions not accompanied by a MPR.
CL	<ul style="list-style-type: none"> Transparency has increased about the CB’s use of models and judgment when arriving at macroeconomic scenarios. The communication is more explicit regarding the possible future paths of policy rates, conditional on alternative macroeconomic scenarios. Since March 2020, the CBC began publishing an explicit path range called the monetary policy corridor (MPR).

CO	<ul style="list-style-type: none"> In August 2019, the Board adopted a new communication scheme for monetary policy decisions. The main changes are as follows: <ul style="list-style-type: none"> The minutes will be published on the working day following the meeting of the Board of Directors. The quarterly Inflation Report produced by the technical staff will now be known as the Monetary Policy Report. The Deputy Technical Governor of the CB or the Chief Officer for the Monetary Policy and Economic Information will be in charge of presenting the MPR on the Wednesday following the meeting of the Board of Directors. The MPR will have a more forward-looking approach and seeks to deliver information in a more timely manner. Each presentation of the MPR will be transmitted openly and live via their livestream channel.
MX	<ul style="list-style-type: none"> Throughout the period 2008–18, the main changes to communication were the conduction of monetary policy through the settings of targets of the interbank interest rate, the publication of fan charts around growth and inflation forecasts, the publication of minutes to the Monetary Policy Meetings and the video transmission of the Quarterly Report presentation and press conference. In 2018, Banco de México implemented a number of adjustments to its communication strategy: <ul style="list-style-type: none"> The Minutes on MP decisions began listing the names of the voting members, and, in case of disagreement, a justification of the dissenting vote is included. The transcripts of the Governing Board meetings of the monetary policy decisions were set to be published three years after the date of the corresponding meeting The press release on the MP decisions started to be published simultaneously in Spanish and in English. The speeches and presentations of the Governing Board members and the materials associated with such documents began to be published and made available to the public at Banco de México's website two business days after the events at the latest. In February 2020, Banco de México announced changes to its general communication strategy. It updated and made public the General Criteria or Communications that is applicable to Board Members and Bank Staff. It also added that the Monetary Policy Statements as well as the Minutes would become more clear and concise with the objective of contributing to a better communication with the public. Finally, it announced that the Monetary Policy Statements would now include the quorum of the meeting in which the monetary policy decision was taken.
PE	<ul style="list-style-type: none"> During the decade following the GFC, the BCRP has implemented the following communications policies: <ul style="list-style-type: none"> Monetary policy and the price stability mandate: The BCRP signalling about possible future monetary policy changes (forward guidance) focuses on explaining potential changes in the BCRP's stance in response to different scenarios. Macroprudential policy and macro-financial stability: The BCRP communicates the results of the de-dollarisation programme launched in 2014. Exchange rate policy: The BCRP explains its new instruments (notably ER swaps) to the public.
ZA	<ul style="list-style-type: none"> Since the GFC, the SARB has taken the decision to publish the key elements of its macroeconomic forecast, including – since it started using the QPM as its main projection model in 2017 – the endogenous rate path generated by the QPM. The SARB emphasises, however, that this published rate path is only a guideline to future policy under certain specific macroeconomic assumptions, and does not represent a pre- commitment to any future decisions.
TR	<ul style="list-style-type: none"> Switching from a monetary policy framework with a single objective (price stability) and a single instrument (policy rate) to one with multiple objectives (price stability and financial stability) and multiple instruments has created important challenges for monetary policy communication after the GFC. To alleviate these communication challenges: <ul style="list-style-type: none"> The CBRT put more emphasis on the exchange rate and credit growth as two intermediate targets (variables) that are strongly linked to both price stability and macro-financial stability (reducing risks regarding external sustainability). In its main policy documents, the CBRT explicitly discussed the need to mitigate excessive movements in the exchange rate and credit growth to maintain price stability and financial stability objectives and addressed how each instrument is related to these two crucial variables exchange rate and credit growth.

Country codes defined in Table 1.

Annex E – Primary questionnaire

Questionnaire on “Capital flows, exchange rates and monetary policy frameworks in Latin American and other economies”

Innovation BIS 2025, the BIS medium-term strategy, puts special emphasis on investigating the design and resilience of emerging market and small open economies’ monetary policy frameworks in the face of volatile capital flows.

The purpose of this questionnaire is to take stock of the experience of central banks over the past two decades and especially after the Great Financial Crisis (GFC) in dealing with strong capital inflows and large swings in the exchange rates. We are interested, in particular, on how monetary policy frameworks have evolved, how effective the use of multiple instruments have been, and how communication has changed to meet the challenges of an increasingly complex post-crisis environment.

1. Exchange rates and capital flows in policy decisions

This section sets the context by investigating why central banks care about exchange rates and capital flows. First, we would ask you to provide a short description of your central bank’s monetary policy framework and the main changes over the recent years. This would help interpret the answers to the subsequent questions.

- 1) Have major structural changes in the global financial system since the Global Financial Crisis (GFC), the Taper Tantrum or any other episode relevant for your country (such as global banking system reforms, the emergence of non-bank finance and the financialisation of commodities) led to changes in the dynamics of capital flows and exchange rate volatility in your economy? If so, in what ways and what are the reasons behind these?
- 2) Are there any local developments that can also be important for changes in the dynamics of capital flows?
- 3) How important are exchange rates for monetary policy decisions? (Please select one of the following, 5: very important, 4: important, 3: somehow important, 2: not much important, 1: irrelevant. Please explain your choice). What roles do they play in your policy framework?
- 4) How important are capital flows for monetary policy decisions? (Please select one of the following, 5: very important, 4: important, 3: somehow important, 2: not much important, 1: irrelevant. Please explain your choice). What roles do they play in your policy framework?
- 5) Which exchange rate(s) (eg the bilateral exchange rate against the US dollar, NEER, REER, the dollar index) matter for your monetary policy framework and why? Is it the level, the rate of change or the volatility that matters most for policy?
- 6) How does the exchange rate respond to different shocks, eg terms of trade or financial? In addition, how does the policy response depend on the adjustment in exchange rates as a result of the type of the shock, eg real versus nominal adjustment or transitory versus permanent?
- 7) Regarding capital flows, does the type of investor behind the flows matter? In particular, in case the government bonds are included in some global bond index (WGBI etc) and there is a surge in those flows. Does the type of flows matter, eg FDI versus portfolio?
- 8) How does the central bank incorporate exchange rate volatility in its monetary policy decisions?

2. Models for policy decisions

- 1) Regarding the analytical frameworks used for forecasts and alternative policy scenario analysis, what models are used at your central bank to assess the possible effects of exchange rates and capital controls on the economy and thus in policy decisions? Do you use any guiding principles or rules of thumb (eg a monetary conditions index)? Please briefly describe the scope of the model(s) (eg, which variables are included? Do they include an external sector?).
- 2) What role does the exchange rate play in the models?
- 3) Do your models control for other policies set by the central bank in response to capital flows and exchange rates?
- 4) Do you consider any equilibrium exchange rate in your policy formulations? If so, how is this determined and used in the policymaking process? What equilibrium exchange rate (NEER or REER) model(s) or methodologies do you use to gauge over- or under- valuation?
- 5) Do you make exchange rate forecasts? If so, what models do you use?

To provide context to the answers of the previous questions it may be useful to know how models are used in your central bank:

- 6) Do you use a single model or more models for medium to long-term macroeconomic forecasting? If you use more than one model, please explain why and describe their use in the policy analysis process. For example, do you combine model forecasts in a single forecast? If so, how? Do you report (to the MPC and/or the public) the forecasts of each model? Is there one model for forecast and other (satellite) models for policy analysis?

3. Transmission channels

This section explores the importance of different transmission channels for exchange rates and capital flows that make them relevant for central bank policymaking. Here, we would ask you to provide a short description of your country's growth composition, external sector and financing sources that are relevant to provide context to your answers and to a better understanding of how exchange rates affect your country's economy.

- 1) What are the main determinants of the exchange rate? Please distinguish between real and financial factors.
- 2) What are the key transmission channels through which capital flows and exchange rates affect the domestic real economy?
- 3) What variables do capital flows and exchange rates affect the most?
- 4) What is the relative importance of these channel(s) for key macroeconomic and financial variables such as the balance of payments, inflation, output, different aggregate demand components, asset prices and credit? Does this vary depending on the time horizon being considered?
- 5) Is an exchange rate depreciation thought to be expansionary or contractionary? Does this depend on the type of the shock affecting the exchange rate? In what context and under what circumstances the response is different (eg which phases in the business cycle and in the financial cycle)? In other

words, under what circumstances does the exchange rate act as a shock absorber versus a shock amplifier?

- 6) How important are the different exchange rate channels for financial stability considerations?
- 7) Regarding the impact on domestic financial conditions, such as long-term interest rates and total credit growth, how do you assess the importance of the following sources of spillovers: (i) monetary policy decisions of major advanced economy central banks; (ii) global investors' risk appetite; (iii) US dollar appreciation (or depreciation); and (iv) changes in advanced economy regulatory frameworks, inflation rates and bond yields?

4. Information for decision-makers

This section discusses the information that is available to policymakers in order to decide how to respond to exchange rates and capital flows.

- 1) What key FX liquidity, volatility and market development indicators do you regularly monitor? Should FX liquidity be considered in terms of its implication for the exchange rate or orderly market functioning? Does the set of indicators differ depending on the policy decision (eg monetary versus FX intervention)?
- 2) How important are the data and the evolution of the derivatives market in analysing the exchange rate policy?
- 3) What information (eg conjunctural information, economic outlook, alternative policy scenarios, analytical exercises) is provided to decision-making bodies within your central bank (eg the monetary policy committee, financial stability committee) in order to inform their views?
- 4) Are decision-makers provided with forecasts? If so, on which variables and at which horizon(s)?
- 5) How frequently are model-based simulations used to compare alternative policy decisions?

5. FX interventions and macroprudential tools

This section examines how central banks respond to exchange rate volatility and capital flows in terms of the choice of policy tools, ordering of their use and calibration of the response.

- 1) How do you respond to fluctuations in (or volatile) exchange rates and capital flows?
- 2) What policy tools do you use, including macroprudential ones?
- 3) Under what circumstances are the different tools (monetary policy, FX intervention and macroprudential policy) most appropriate? Are they implemented in separation? Are tools strictly assigned to singular objectives (ie Tinbergen rule), or do some tools straddle multiple objectives? Have policies to manage capital flows or exchange rate volatility resulted in unwanted side effects? For FX intervention, how do you balance the desire of minimising the disruptive effects of excessive exchange rate volatility with that of enabling efficient price-discovery?
- 4) How do you assess the effects of these different tools in the economy? How do you analyse the interaction among them?
- 5) Does the policy response depend on the types of capital flows and/or investors involved? Or on what other variables or factors (eg level of exchange rate, macroeconomic conditions, the degree

of financial development) does the response depend on? Do reactions differ between unanticipated surges of capital outflows versus persistent trend outflows?

- 6) Are there constraints that limit your use of different tools (eg new regulation)? In addition, do financial market developments constrain policy decisions?
- 7) Have your central bank's responses to capital flows and exchange rates changed in the post-GFC period? If so, can you describe the changes and the reasons behind them?
- 8) Are the legal powers that implement controls on capital flows or FX interventions concentrated in a single authority or do they belong to multiple authorities? Is there any analysis of the efficiency of these arrangements in your country?
- 9) Is your current policy toolbox adequate? (Please select one of the following, 5: very much, 4: very much but working in some new tools, 3: yes, but needs some improvement, 2: not much, needs major improvement, 1: far from adequate. Please explain your answer). What additional tools might be desirable?
- 10) An important feature that may have increased the vulnerability of Latin America economies is the greater role of global portfolio investors in local currency securities, especially sovereign bonds: How has this new feature affected the conduct of monetary policy and the assessment of financial stability risks?
- 11) What indicators are used to monitor the country's exposure to debt held by foreign investors?
- 12) Is the central bank prepared to act as a "market maker of last resort" in case of a "sudden run of foreign investors"? For example, central banks may offer interest rate swaps or purchase domestic long-term bonds in exchange of short-term bonds to ease investors' portfolio adjustment in times of stress. This is what the Bank of Mexico did in 2008–09. Does the central bank have a plan or protocol to carry out this type of intervention?

6. Communication

This section examines how central banks communication's strategy and tools have changed to adapt to a more complex and uncertain environment, including the increasing use of FX intervention and other instruments than the policy rate.

- 1) What major changes in monetary policy communications have the central bank implemented, especially after the GFC? How do you communicate adjustments in your expanded toolkit (capital flow management, FX interventions, macroprudential policy)?
- 2) In your communication, do you explain the role, if any, that capital flows and exchange rate fluctuations had in your monetary policy decisions?
- 3) Likewise, do you refer to any interaction that macroprudential policies may have with monetary policy in explaining a policy decision?
- 4) How do you convey the uncertainty around forecasts? If so, how? Do you attribute any of this uncertainty to global factors, capital flows or exchange rate fluctuations?
- 5) How do you manage sensitive issues in your communication, eg those that relate to fiscal policy, social unrest or political pressure?

- 6) Considering that after the GFC the conduct of monetary policy became more complex, do you feel comfortable with the degree of understanding financial markets analysts and specialised journalists have regarding the central bank reaction function and, more generally, its communication
- 7) What are the main challenges that your communication faces at present? How can communication in your central bank be improved?

Annex F – Supplementary questionnaire

1. Additional questions on policy responses to the Covid-19 outbreak

There was consensus on adding a small number of questions on responses to the Covid-19 outbreak to be used to frame the report in light of ongoing events. The extra questions were applied in June 2020.

- 1) To what extent and how have your existing monetary policy frameworks been able to cope so far in the current crisis?
- 2) What major trade-offs have you faced in monetary policy decisions?
- 3) What modifications, if any, have you made to your framework and/or your communication to address recent developments? Or what changes are you contemplating?
- 4) Has your policy response included the use of instruments that were previously not part of the toolbox? If so, which ones?

Central bank officials participating in the drafting of the report

Members

Central Bank of Argentina	Horacio Aguirre German Feldman
Central Bank of Brazil	Andre Minella
Bank of Canada	Lena Suchanek
Central Bank of Chile	Miguel Fuentes
Central Bank of Colombia	Hernando Vargas Juan Ospina
Bank of Mexico	Gabriel Cuadra Juan Ramón Hernández
Central Reserve Bank of Peru	Carlos Montoro
South African Reserve Bank	Chris Loewald
Central Bank of the Republic of Turkey	Çağrı Sarıkaya

BIS Secretariat

Basel	Benoît Mojon
Representative Office for the Americas	Ana Aguilar Fabrizio Zampolli