FX intervention: goals, strategies and tactics[1]

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Abstract

Foreign exchange intervention is an important tool for central banks in many emerging market economies (EMEs). Drawing on a recent survey of 21 EME central banks as well as inputs from their contributions published in this volume, this paper summarises the main issues with regard to FX intervention. It focusses on the goals, channels, effectiveness and the different methods and tactics used by central banks. It leverages data from similar surveys conducted in the past to illustrate how central banks' views and conduct have evolved over the years along each of these dimensions.

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[1] This note examines "sterilised" FX interventions. "Non-sterilised" interventions alter the level of bank reserves and, all else equal, go hand in hand with a change in the policy rate. The exception is when central banks operate with a floor (excess reserves) system, so that the policy rate is set equal to the deposit facility. But, in that case, bank reserves are effectively perfect substitutes for short-term government paper, making the distinction dubious at best. See eg Borio (1997). Borio and Disyatat (2009) discuss the role of exchange rate policy under the broader umbrella of balance sheet policies.

1. Introduction

FX interventions are extensively used in emerging market economies (EMEs).[2] To explore the goals, channels, effectiveness, methods and tactics of such interventions, this note draws on a survey of the 21 central banks participating in the meeting. It also uses contributions from these institutions, as well as data from previous surveys, to show how central banks' views and actions have evolved over time.[3]

The note begins with a discussion of the main goals and intermediate objectives. It then outlines the different channels through which interventions work and summarises central banks' views and the evidence for their effectiveness. Finally, it discusses methods and techniques.

2. Goals and intermediate objectives of intervention

In order to understand the aims and intentions of FX interventions, it is useful to make a distinction between "goals" and "intermediate objectives". "Goals" refer to the ultimate purposes of the intervention; "intermediate objectives" operationalise the goals. For example, a central bank might intervene with the goal of maintaining price stability, and its intermediate objective could be smoothing the exchange rate path.

2.1 Goals

Curbing excessive FX market speculation is a key concern for most central banks (Graph 1). This motivation is rather broad and, in the strict sense above, not a goal per se; rather, it could be consistent with a number of other goals (see below).

The answers to the survey reflect the fact that intervention often responds to unwelcome financial developments. These include shifts in risk aversion, global liquidity or market sentiment. Depending on their strength and persistence, they can give rise to destabilising exchange rate dynamics that may in turn generate market stress, drive exchange rates away from fundamentals and ultimately threaten macroeconomic and financial stability. For example, as reported in its contribution, Bank Indonesia intervened in 2018 mainly to counteract downward pressure on the rupiah from tighter global financial conditions and risk-off market sentiment. By contrast, if the exchange rate adjusts in response to evolving macroeconomic fundamentals, its movement either tends to be stabilising (eg a depreciation following a fall in export demand[4]) or, if undesirable, is best counteracted by tackling the problem at its root (eg fiscal consolidation in the case of a weak fiscal position).

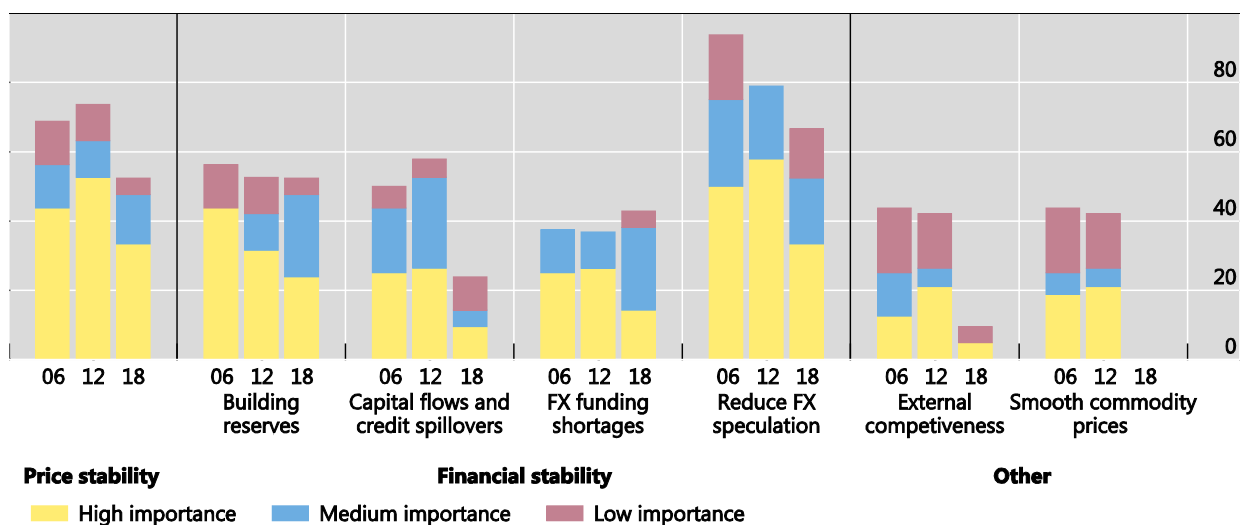[2]   See for instance BIS (2016), BIS (2013), BIS (2005) and Sarno and Taylor (2001).

[3]   Exchange rate regimes vary substantially across countries and over time. While most EME central banks operate under a managed floating regime, there is wide variation within our sample, including two countries that are classified as "pegged" by the IMF. Recognising the inherent challenges in classifying exchange rate regimes that lie along a continuous spectrum, and to maintain consistency with past surveys, the note does not distinguish between different exchange rate regimes.

[4]   This channel is likely to be more important for commodity exporters than manufacturing exporters. See Stevens (2012) for a discussion of the effects of real and financial shocks on the Australian dollar.

Price stability and curbing FX speculation remain key goals for FX intervention

As a percentage of respondents

Graph 1

Price stability	Financial stability				Other	
06 12 18	06 12 18	06 12 18	06 12 18	06 12 18	06 12 18	06 12 18
	Building reserves	Capital flows and credit spillovers	FX funding shortages	Reduce FX speculation	External competiveness	Smooth commodity prices

■ High importance ■ Medium importance ■ Low importance

Source: BIS surveys from 2012, 2018 and 2019.

More than half of the central banks report intervening to maintain price stability (see also *The size of foreign exchange reserves*). This is not surprising, as the exchange rate has a major influence on inflation.[5] Its impact is especially strong when expectations become unanchored (see contribution by Argentina). Furthermore, exchange rate misalignments caused by financial shocks might also shift the domestic Phillips Curve, such as by driving a wedge between production and consumption[6] or changing the prices of intermediate goods. Naturally, the reliance on exchange intervention will depend on the monetary policy regime (*The size of foreign exchange reserves*). And while in theory adjusting the interest rate is the best tool to achieve price stability, exchange rate interventions may be used in support or even as an alternative when the room for manoeuvre on the monetary front is limited.[7]

Financial stability goals lurk behind many of the survey answers, often as part of the broader aim of stabilising output fluctuations (see also *The size of foreign exchange reserves*). This applies to intervention with the aim of accumulating reserves. Two thirds of the surveyed central banks intervene to achieve the desired level of reserves, up from 50% in 2012. Another example is intervention to alleviate FX funding shortages (around 40% of respondents). These interventions are aimed at providing short term liquidity to the FX market or hedges to the private sector, either to avoid stress (Central Bank of Brazil; see below) or for more structural reasons, such as to

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[5]   The large depreciation of the peso that started in May 2018 caused a sharp increase in inflation expectations and their dispersion. In order to prevent de-anchoring, in October the Central Bank of Argentina introduced a new monetary policy regime, including a clear mechanism for when to intervene.

[6]   See Kamin and Klau (2003). For another possible formalisation, see Cavallino (2019).

[7]   For example, in response to a capital outflow shock that weakens the domestic currency, tightening monetary policy would further exacerbate the downturn, which may not be desirable.

develop and deepen hedging markets. This is one reason why Bank Indonesia has started conducting domestic non-deliverable forward transactions.[8]

Another way of supporting financial and macroeconomic stability is to curb the build-up of destabilising capital flows or contain the effects of their implosion (*The size of foreign exchange reserves*). That said, only a quarter of the respondents reported intervening to prevent sharp capital flow movements, and none to stabilise domestic credit conditions.

Central banks can use FX interventions to stabilise capital flows and moderate domestic credit growth in various ways. For example, buffering sharp depreciations limits adverse balance sheet effects on domestic borrowers (Bruno and Shin (2015)) and foreign investors (Carstens and Shin (2019)). For this reason, FX intervention may have benefits that go beyond the consequent accumulation of reserves. These balance sheet effects, in turn, could lead to large capital outflows and second-round effects. Similarly, when monetary easing triggers the unwinding of carry trades, FX intervention can increase the currency's expected excess return and limit capital outflows (Cavallino and Sandri (2019)). Conversely, when a capital inflow surge threatens domestic financial stability, interventions can absorb the excess liquidity and help offset its impact on domestic credit growth (BIS (2018)).

Other goals appear to play a less of a role. While exchange rate misalignments from economic fundamentals can also affect exports, only three central banks report external competitiveness concerns as a goal, down from seven in 2012. This decline might be due to the prevalence of depreciating pressures in the past year.[9] Similarly, the moderation in commodity price volatility after the large swings of 2014–15 might explain why only one central bank intervened to smooth the effects of commodity price fluctuations in 2018.

2.2 Intermediate objectives

Central banks set intermediate objectives to operationalise their goals. Restricting exchange rate volatility and providing liquidity to thin markets are particularly important ones (Graph 2).

The aim of providing liquidity to FX markets moved from being the least important objective in past surveys to becoming the second most important (Graph 2), perhaps reflecting the period of weakness for EME currencies in 2018. The increased frequency of market liquidity-driven interventions may be the outcome of two post-GFC trends (BIS (2016)): greater issuance of foreign currency debt, and growth in foreign institutional investors' holdings of EME securities. This is likely to have increased both the need for liquid FX markets and demand for FX hedging.
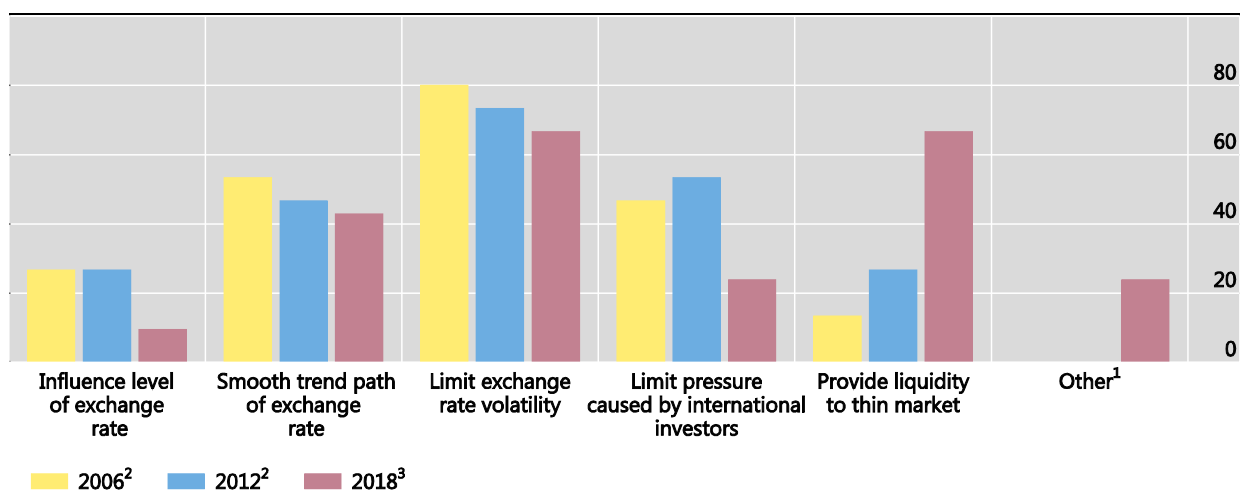
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[8]   At very short horizons, intervention may be designed to address disorderly market conditions, for example during flash crash episodes.

[9]   In line with survey results, *The size of foreign exchange reserves* finds no strong evidence of reserves accumulation to maintain competitiveness in recent years.

Intermediate objectives of FX intervention: Increasing role of liquidity provision

As a percentage of respondents   Graph 2

| Influence level of exchange rate | Smooth trend path of exchange rate | Limit exchange rate volatility | Limit pressure caused by international investors | Provide liquidity to thin market | Other[1] |

2006[2]   2012[2]   2018[3]

[1] Mostly non-floating exchange rate arrangements. The "Other" option was not provided in 2006 and 2012.   [2] 15 central banks.
[3] 19 central banks.

Source: BIS surveys in 2012 and 2018.

By contrast, the number of central banks intervening to limit exchange rate pressures has declined, from more than 50% of respondents in 2012 to fewer than 30% now. But it is unclear whether this reflects a change in central bank reaction functions or is driven by mostly depreciating exchange rates on the back of the strengthening US dollar.

Limiting exchange rate volatility and providing liquidity to thin markets serve as the primary intermediate objectives for most goals (Table 1). Even for the goal of maintaining price stability, limiting FX volatility serves as a more important intermediate objective than influencing the level or the trend path of the exchange rate. While expected inflation dynamics are determined by the trend path of the exchange rate, higher volatility might affect the price-setting behaviour of firms and cause average import inflation to rise.[10] Furthermore, higher volatility may spur financial instability and derail the transmission from monetary policy to inflation. Finally, and not surprisingly, alleviating FX funding shortages correlates highly with liquidity objectives.

[10]   Devereux and Yetman (2010) show, in a model with endogenous frequency of price adjustments, that exchange rate volatility can reduce price stickiness and thus increase the exchange rate pass-through.

Limiting FX volatility strongly linked to most intervention goals[1,2]

The number of central banks that pursue the goal is indicated in brackets   Table 1

| | **Goals** | | | | | |
	Price stability **(9)**	Building reserves **(9)**	Capital flows and credit spillovers **(3)**	FX funding shortages **(9)**	Reduce FX speculation **(12)**	External Competiveness **(2)**
Intermediate objectives						
Influence level of exchange rate	1	0	0	0	1	1
Smooth trend path of exchange rate	1	0	0	0	0	1
Limit exchange rate volatility	5	2	1	0	6	0
Limit pressure caused by international investors	0	0	1	2	2	0
Provide liquidity to thin market	0	3	1	7	3	0
Achieve reserve target	0	2	0	0	0	0
Other[3]	2	2	0	0	0	0

[1] 18 central banks.   [2] Central banks indicated one objective per objective.   [3] Mostly non-floating exchange rate arrangements and combinations of multiple objectives.

Source: BIS survey 2019.

3. Transmission channels and effectiveness

3.1 Channels of influence

The literature identifies two channels through which interventions can affect the exchange rate. A portfolio balance channel operates when agents regard assets denominated in different currencies as imperfect substitutes. A signalling channel, shifts market participants' expectations about macroeconomic fundamentals or future policy.[11]

According to the central banks, the effectiveness of intervention stems mostly from its signalling power (Graph 3). Nearly three quarters identify the signalling channel as often or sometimes important. More specifically, all of these respondents report that intervention affects market expectations of future exchange rates and

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[11]   Not surprisingly, these two channels are the same as those identified for balance sheet policies in domestic assets, such as large-scale asset purchases. In addition, the literature has identified a coordination channel. Sarno and Taylor (2001) argue that, in the presence of multiple equilibria, a publicly announced intervention can serve to coordinate market actions. This channel can be seen as a particular case of the signalling channel.

interventions, while only five reported that it alters expectations about the future stance of monetary policy.[12]

Signalling remains most important channel of FX intervention

As a percentage of respondents   Graph 3

Often   Sometimes   Rarely[1]
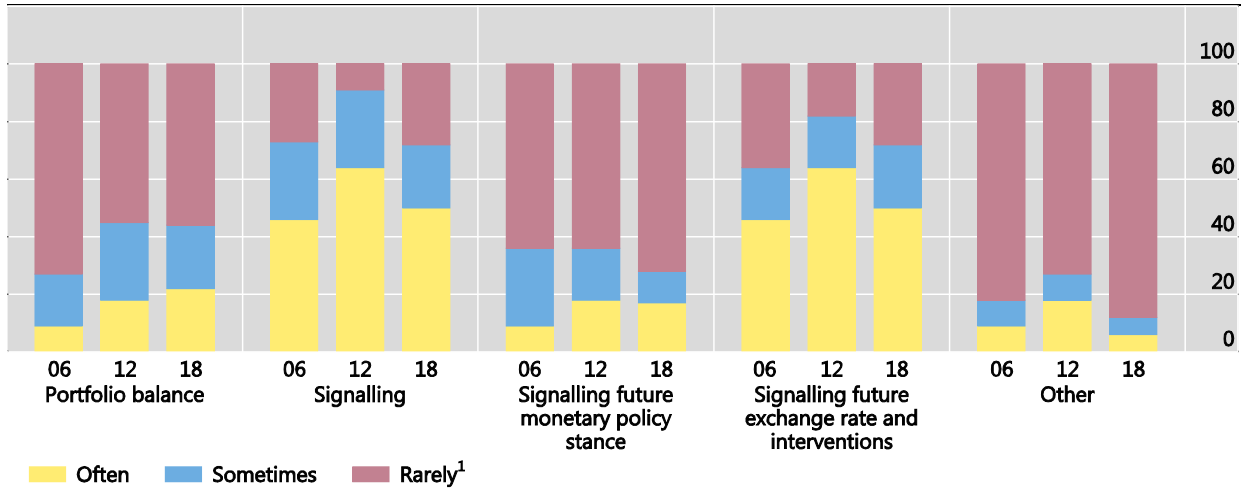
2006: corresponds to the "Up to 2007" period in the 2012 survey, based on the responses of 11 central banks. 2012: corresponds to the "After 2008" period in the 2012 survey, based on the responses of 11 central banks. 2018: based on the responses of 18 central banks.

[1] Central banks which did not provide an answer for a channel category but did fill out at least one other category are assumed as "Rarely".

Source: BIS surveys in 2012 and 2018.

In order for the signalling channel to be effective, the signal must be credible. If the intervention is to signal the future exchange rate path, the central bank must provide market participants with new and credible information.[13] Some argue that this may apply to the central bank's better understanding of the future evolution of the domestic macroeconomic and financial forces driving the exchange rate. While this may well be true in some circumstances, it is not easy to reconcile with the view that most currency fluctuations for EMEs reflect push rather than pull factors. More plausibly, the source of informational asymmetry is that the central bank has better information about its intentions and hence the future monetary policy stance. Of course, regardless of the specific source of informational advantage, the signalling channel requires that the central bank reveals the intervention to market participants – which is not a common practice (see below).[14]

The share of central banks that mention the portfolio balance channel has remained broadly constant at around 40%.[15] In the light of more developed financial

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[12]   In addition, the off-diagonal elements in Appendix Table A highlight a significant increase in the assessment of the importance of the signalling channel by a sizeable number of central banks.

[13]   See Battacharya and Weller (1997), Vitale (1999), and Popper and Montgomery (2001).

[14]   Market participants might detect the intervention even if the central bank does not wish it, but then any inference, even if correct, would not reflect the central bank's intentions. Vitale (1999) demonstrates that some level of secrecy is optimal if the intervention signals the central bank's exchange rate target when the latter is inconsistent with fundamentals.

[15]   Among the central banks that select the portfolio balance channel, all but one also report that intervention provides signals about future exchange rate and interventions. This is not surprising.

markets this may be surprising, as enhanced financial integration should lead to deeper and more complete markets. However, the provision of immediacy services has undergone structural changes over the past years.[16] Many banks and other market-makers have cut back on the amount of risk capital they allocate to trading activities. While alternative liquidity providers have stepped in, this may have exacerbated market segmentation and reduced assets substitutability.[17]

Effectiveness of FX intervention on the exchange rate and volatility : recent evidence

There is a long-running debate, far from settled, on how effective FX interventions are in influencing the exchange rate or its volatility.

Cross-country studies have mostly found FX intervention to have a strong impact on the level and volatility of exchange rates (see Ghosh et al (2018) and Menkhoff (2013) for an overview). For instance, Blanchard et al (2015) find that FX intervention successfully mitigates the impact of capital flow shocks on exchange rates and capital accounts. Across a sample of advanced economies and EMEs, Fratzscher et al (2019) confirm the effectiveness of FX intervention in taming exchange rate volatility, although they find less convincing evidence of its impact on the exchange rate itself.

Evidence from recent individual country and regional studies, most of which come from Latin America, is less consistent. For instance, using intra-day intervention data from Brazil between 2011 and 2015, Janot and Macedo (2016) report that unexpected interventions influence the exchange rate level to some extent, but not the volatility. Using intra-day data for four inflation targeting Latin American economies, Fuentes et al (2014) find that daily auctions do not affect the level of the exchange rate for more than a few minutes. On the other hand, Durán-Vanegas (2016) shows that the intervention of the Central Reserve Bank of Peru over the period 2003–15 has been effective in moderating volatility. Using daily data from Colombia, Echavarría et al (2017) find that the effect of pre-announced interventions adopted in 2008 is larger than that of discretionary purchases, and Kuersteiner et al (2016) find that volatility options seem to have the largest impact on the exchange rate. Using FX intervention and options market data from the Czech Republic, Disyatat and Galati (2007) find very little impact on the level and volatility.

The high-frequency identification approach used in many of the studies mentioned above is not well suited to analysing the persistence of the effects. That said, the limited number of studies that examine persistence find it to be fairly weak. Survey responses also indicate that the effectiveness of FX intervention is mostly confined to the short run, ie less than one month (Graph 4). This is particularly true for the impact on market liquidity and volatility. The impact on the exchange rate itself, on the other hand, is seen as longer-lasting.

An important caveat applies to many of the studies referenced in this section. As FX intervention is almost always conducted in response to economic developments, precise identification and interpretation of the results with respect to the correct counterfactual are very challenging.[①]

① Chapter 4, Section II in a forthcoming book on FX interventions by the IMF provides a detailed discussion of econometric challenges associated with estimating the impact of FX interventions and the empirical strategies that can be used to tackle them.

Even when effective through the portfolio balance channel, the effects of future interventions on future exchange rates propagate back in time through the uncovered interest parity relation and affect the spot exchange rate. Fanelli and Straub (2018) formalise this argument.

[16] For a more general discussion of the drivers and implications of changing market liquidity, see BIS (2018) Chapter III.

[17] For example, the increase in the cost of capital observed since the GFC might have reduced the ability of FX traders to take advantage of arbitrage opportunities, making the portfolio balance channel more potent.

3.2 Effectiveness

The effectiveness of intervention can be judged only against its goals and objectives.

Several central bank goals can best (and in some cases only) be achieved by influencing the path and volatility of the exchange rate – the typical evaluation yardstick in the vast empirical literature (Box A). In particular, this is true of goals such as price stability, maintaining external competitiveness and smoothing the impact of commodity price fluctuations. From a practical perspective, another ex post measure of effectiveness, relevant for many cases where the goal is to stabilise the path of the exchange rate, is whether interventions are on average profitable or not for the central bank over the relevant horizon.[18]

However, this is not the case for other goals, such as managing the stock of FX reserves (eg to reach a reference level of reserve adequacy), providing liquidity in times of market stress, and achieving more structural goals (eg developing deep and liquid financial markets). In fact, in these cases, an intervention can be sufficient to achieve the stated goal. Indeed, the lack of impact on the exchange rate may even be a sign of effectiveness. Building reserves for purely precautionary reasons may be one such example (contribution by South Africa).

The effectiveness of an intervention also needs to be evaluated against the right counterfactual, ie what would have happened had the intervention not taken place? This is an aspect where empirical studies face serious limitations (Box A), and theoretical frameworks become particularly valuable.

FX interventions are mostly effective in the short to medium run, but not beyond

As a percentage of respondents who pursue the respective objective, as indicated in Graph 2   Graph 4

Short run[2]   Medium run[3]   Long run[4]
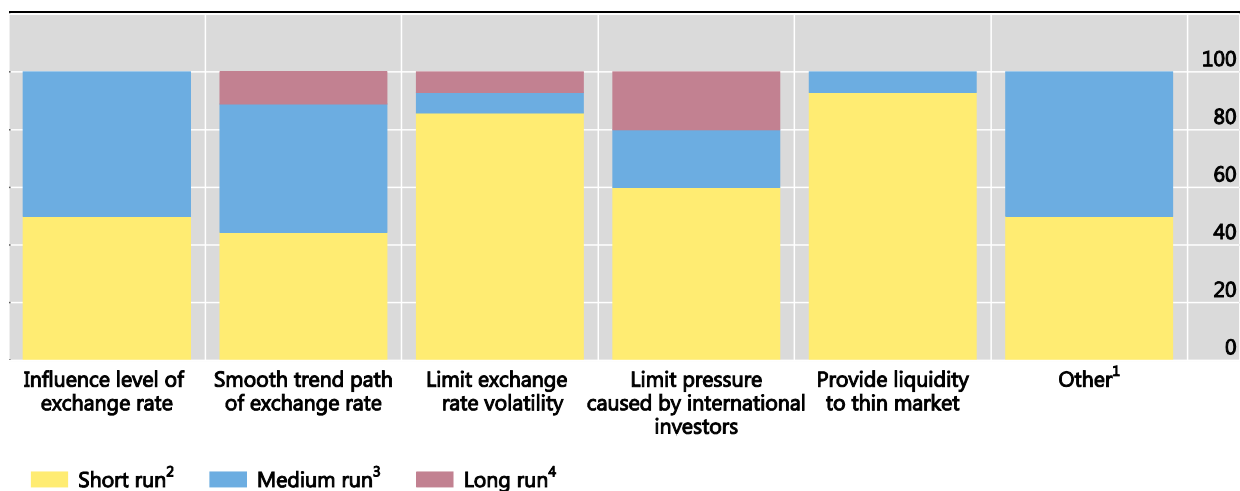
[1] Based on the responses of four instead of five central banks, as one central bank did not make an assessment.   [2] Up to one month.   [3] One to six months.   [4] More than six months.

Source: BIS survey 2018.

Survey responses indicate that FX intervention is effective mainly in achieving objectives in the short run (less than a month), with virtually no impact in the long

[18]   For instance, this is likely to be a good metric in cases where the exchange rate is driven by financial shocks that temporarily drive the exchange rate away from its equilibrium value.

run (here defined as beyond a six-month horizon) (Graph 4). This is particularly true with respect to making the market more liquid and exchange rates less volatile. With regard to influencing the exchange rate and smoothing its trend path, central banks' views are roughly evenly split between being effective in the short and medium runs. While it is not straightforward to interpret the responses unambiguously,[19] they suggest that if the authorities wish to have a longer-run impact, they need to intervene repeatedly. Indeed, of the 13 central banks that reported the number of intervention days, the average was close to 30 per year.

4. Strategy and tactics

4.1 Instruments

The FX intervention toolkit has continued to expand, but spot market interventions remain the most common instrument (Graph 5).[20] All central banks except one intervene in spot markets, at least occasionally. More than a quarter also operate routinely in derivatives markets, up from 18% in 2012. Among derivatives, swaps are used most often, followed by forwards. The vast majority of central banks intervene on-shore.

For each of the different objectives, spot interventions are the primary instruments, reflecting their overall dominance in the FX intervention toolkit documented above. That said, the use of derivatives is equally important for the objectives of providing market liquidity and limiting exchange rate volatility. (Table 2).[21] Country contributions confirm that the use of derivatives is increasing. For example, so-called FX swaps,[22] which settle in domestic currency, are the Central Bank of Brazil's preferred instrument for FX hedging.

Three reasons may be particularly important for the more widespread use of derivatives. First, the increasing importance of financial stability considerations. With rising FX debt levels and increased foreign asset holdings, the vulnerability to large FX moves has increased (BIS (2016)). By providing market participants with instruments to self-insure, derivatives may be better suited to mitigate these tail risks. Second, there has been a structural change in FX markets. Non-bank financial intermediaries play a bigger role, and they rely more than banks on FX forwards and other derivatives.[23] Third, at least in the short run, this can help economise on the FX

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[19]   The survey asked this question in the context of achieving objectives. Even if the impact of FX intervention with respect to an intermediate objective is short-lived, the broader impact can extend beyond. For example, slowing the pace of appreciation over the short run can affect credit growth over a longer horizon. Furthermore, according to the Central Reserve Bank of Peru, intervention reduces volatility in the short run directly, and indirectly in the medium term, through expectations of future central bank interventions.

[20]   Many country notes (including those from China, the Philippines, South Africa and Thailand) state that spot market interventions remain the most commonly used instrument in EMEs. This is also in line with previous studies and surveys (see for instance BIS (2013) and BIS (2005)).

[21]   The note from Turkey describes in detail the set of instruments in its intervention toolkit together with their costs and benefits.

[22]   In practice, these contracts are closer to forwards than swaps.

[23]   This trend has been particularly pronounced in Latin America; eg BIS (2017).

reserves, which may be needed for funding purposes.[24] In addition, operating outside the spot market reduces the risk of having to report unwelcome changes in FX reserves, which might generate perverse market dynamics. Indeed, economising on reserves is one of the main criteria highlighted by several central banks in their respective contributions.

FX intervention toolkit has continued to expand, but spot market interventions remain most common

As a percentage of respondents   Graph 5
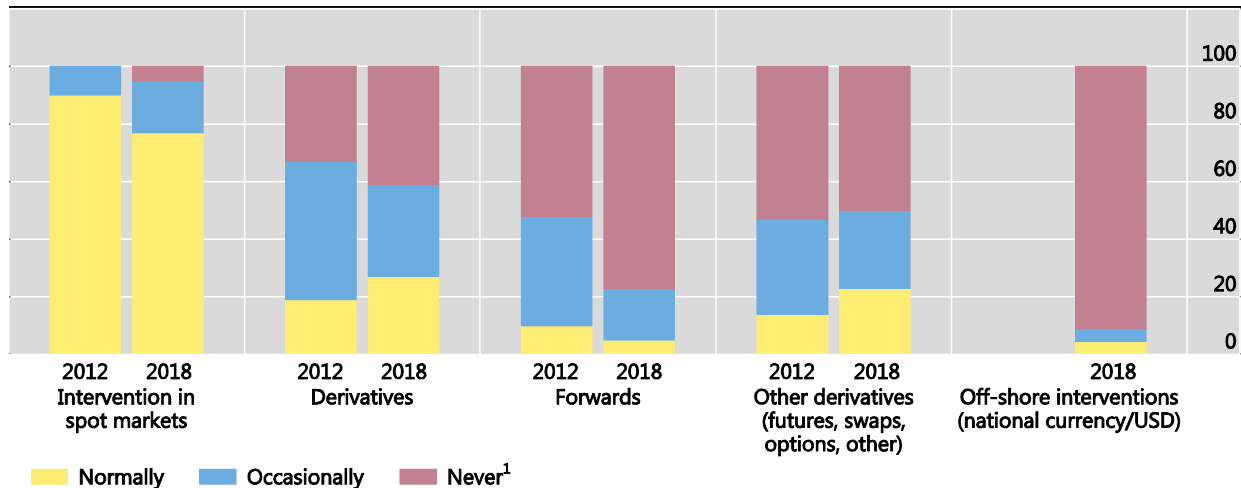
2012: Based on the responses of 21 central banks. 2018: Based on the responses of 22 central banks, answers from one central bank correspond to 2017.

[1] Categories for which a response is lacking are assumed to constitute a "Never".

Source: BIS surveys in 2012 and 2018.

While derivatives can ostensibly economise on gross reserves in the short run, they may lead to a build-up of substantial vulnerabilities on the central bank's balance sheet over time. In the case of South Africa, for example, the frequent use of FX swaps led to the build-up of a large net open currency foreign position on the central bank's balance sheet ($26 billion) in 1995, which took almost a decade to correct (see contribution by the South African Reserve Bank).

In theory, when the intervention is aimed at affecting the path of the exchange rate, spot market operations seem to be the (weakly) better instrument in some circumstances. This is the case in the presence of convertibility risk.[25] For example, FX swaps, which involve exchange of principal at a future date, may be vulnerable to the risk of capital controls.

The survey also touches on the use of complementary tools that could support FX intervention. As expected, macroprudential measures are used more often than capital controls; other tools are rarely employed. Somewhat surprisingly, perhaps,

[24] Table 2 in Domanski et al (2016) summarises how much commonly used FX intervention instruments help to economise on reserves.

[25] Eaton and Turnovsky (1984) formalise this point. Nedeljkovic and Saborowski (2016) provide empirical support using Brazilian intervention data.

reliance on such instruments appears to have declined over the past six years, notably in the case of macroprudential measures (Graph 6).

Declining trend in use of measures to complement FX interventions

As a percentage of respondents   Graph 6

| Often | Sometimes | Rarely[5] |
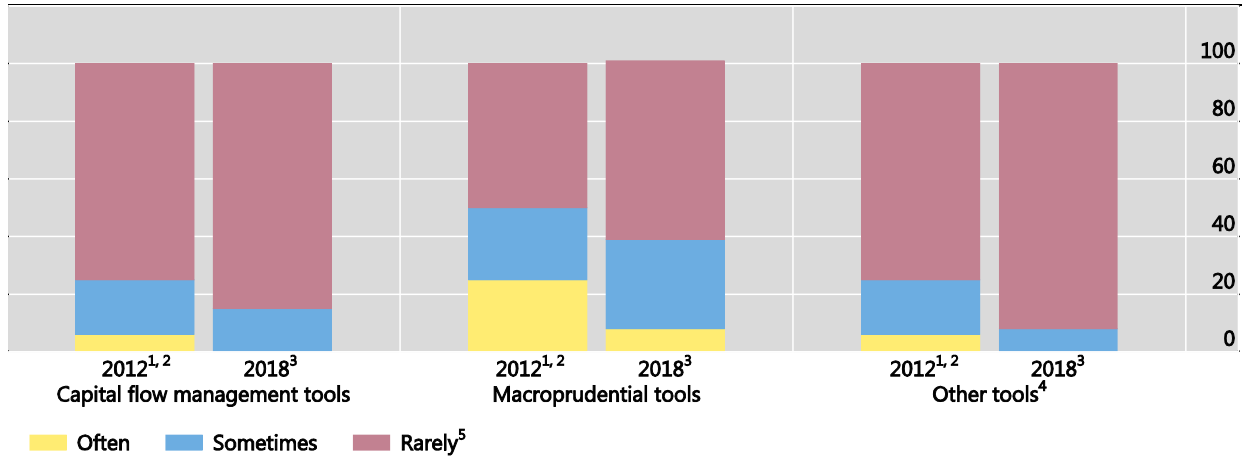
[1] Based on the responses of 16 central banks.   [2] The figures correspond to the answers provided for the "After 2008" period in the 2013 survey.   [3] Based on the responses of 13 central banks.   [4] For 2018, liberalisation of existing regulation and capital flow restrictions.   [5] Central banks that did not provide an answer for a channel category but did fill out at least one other category are assumed as "Rarely".

Source: BIS surveys in 2012 and 2018.

Cross-product between instruments and objectives[1]

The number of central banks which follow a certain objective are indicated in brackets[2]   Table 2

	Influence level of exchange rate (3)	Smooth trend path of exchange rate (4)	Limit exchange rate volatility (10)	Limit pressure caused by international investors (5)	Provide liquidity to thin market (12)	Achieve reserve target (2)
Intervention in spot market	3	3	8	3	8	2
Derivatives[3]	1	3	5	2	8	1
Futures	0	1	2	0	2	0
Forwards	1	1	2	0	0	0
Swaps	0	1	2	2	4	0
Options	0	0	0	0	0	1
Other	0	0	2	0	4	0
Off-shore intervention (national currency/USD)	0	0	2	2	0	0

[1] Based on the responses of 16 central banks.   [2] As most central banks indicated they have more than one instrument per objective, the sum of each column always exceeds the number of central banks that pursue the objective.   [3] Central banks are considered to use derivatives if they use at least one derivative for the objective. The sum of derivative sub-categories can exceed the number of central banks which use derivatives, as central banks sometimes use multiple derivatives per objective

Source: BIS survey 2019.

## 4.2 Timing and amounts, rules versus discretion and communication

The survey results suggest an overwhelming preference for intervening in response to market developments (Graph 7). More than two thirds of the central banks surveyed normally intervene after the market has moved in a certain direction, while only three report that they occasionally intervene pre-emptively. Concerning the choice between rules and discretion, only six central banks report that they normally follow an intervention rule; four additional ones do so only occasionally.

With regard to the choice of timing and amounts in response to market developments, a comprehensive practical and operational knowledge of the functioning of global foreign exchange markets is especially valuable. This underpins the flexibility to calibrate interventions so as to maximise their effectiveness. Market intelligence is key. Such knowledge can help gauge the intensity and likely persistence of pressure on the currency. For example, if the pressure is considered to be broadly based and persistent, it might be better to wait before intervening. Otherwise, the central bank may simply deplete reserves without much impact. Similarly, if the pressure on the currency is seen as reflecting proxy hedging,[26] it is more likely to be self-correcting and hence an intervention may not be needed. Market knowledge may also help the central bank to choose locations and periods with shallow market activity, thereby increasing the intervention's effect, or to exploit technical factors such as market positioning. And it may inform choices on how far to spread trading across different venues or counterparties.

Intervention mostly discretionary and in response to market developments

As a percentage of respondents

Graph 7

| Normally | Occasionally | Never[4] |
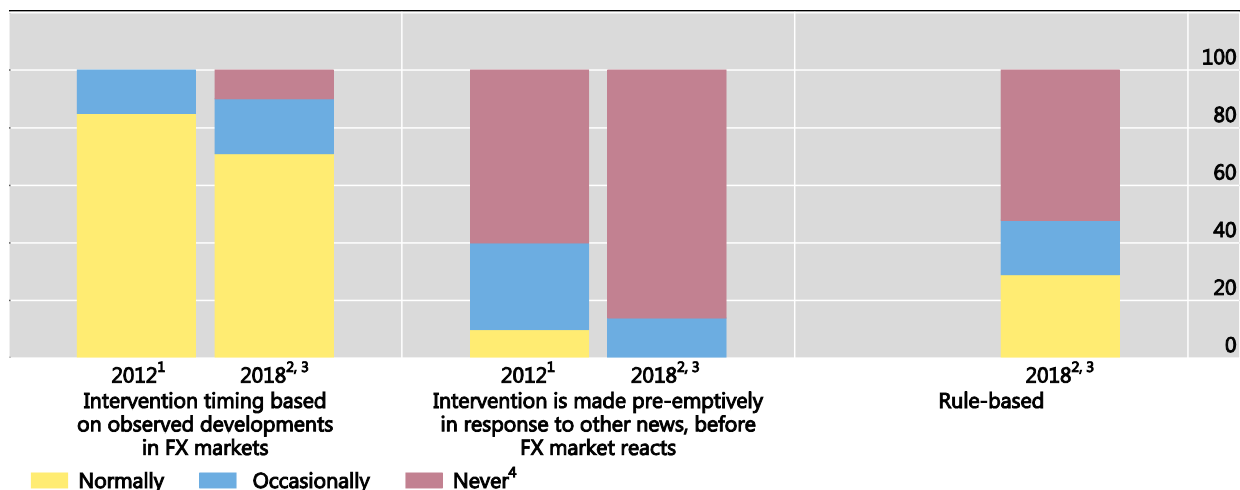
[1] Based on the responses of 20 central banks.   [2] Based on the responses of 21 central banks.   [3] Answers from one central bank corresponds to 2017.   [4] Categories for which a response is lacking are assumed to constitute a "Never".

Source: BIS surveys in 2012 and 2018.

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[26] Proxy hedging refers to the practice of using a price- or rate-correlated financial instrument to hedge a particular risk when a direct hedge is not available. One example is using a currency which moves in concert with another one to hedge the risk in the second currency.

The predominant use of discretion may be the result of several factors. As discussed below, discretion might be necessary whenever the central bank wishes to prevent detection. It is also the best way of maximising the surprise factor and hence market impact, although it could be calibrated so as to reduce it (see South Africa's contribution). The limited use of rules may also reflect difficulties in formulating simple ones based on real-time information.[27]

Public information provided

As a percentage of respondents[1]   Table 3

	Normally		Rarely		Never/no response	
	2012[2]	2018[3]	2012[2]	2018[3]	2012[2]	2018[3]
Does the central bank pre-announce FX interventions?	18	32	9	0	73	68
Latin America	50	83	17	0	33	17
Asia	0	13	0	0	0	88
Emerging Europe	0	20	25	0	75	80
Other emerging economies	33	0	0	0	67	100
Size	23	27	0	0	77	73
Time span	23	27	0	0	77	73
Instrument	23	32	5	0	77	68
Intervention rule	…	27	…	5	…	68
FX intervention data made public ex post	59	59	0	5	41	36
Latin America	100	100	0	0	0	0
Asia	33	25	0	0	67	75
Emerging Europe	60	90	0	0	40	20
Other emerging economies	67	33	0	33	33	33
Size	…	55	…	5	…	41
Time span	…	41	…	9	…	50
Instrument	…	45	…	9	…	45
Intervention rule	…	27	…	9	…	64

If intervention data are made public ex post, what is the reporting lag?	Real time/hourly		Daily		Weekly		Monthly		Annually	
	2012	2018	2012	2018	2012	2018	2012	2018	2012	2018
	14	14	23	18	5	14	27	5	5	0

[1] The regional subcategories within the shaded bands show the percentage of respondents from each region.   [2] Based on the responses of 21 central banks for the pre-announcement section and 20 central banks for the ex post information section.   [3] Based on the responses of 22 central banks.

Source: BIS surveys in 2012 and 2018.

[27]   For example, in a theoretical model, Cavallino (2019) shows that the appropriate measure of exchange rate misalignment is the (cumulated) time-varying wedge in the uncovered interest rate parity (UIP) condition.

Survey responses highlight a marked difference across regions with regard to transparency in communication (shaded rows in Table 3). In particular, a much higher fraction of central banks in Latin America than in Asia, 83% versus just 13%, preannounce their interventions. Similarly, all central banks in Latin America, but only 25% in Asia, make the data public post-intervention. This information is typically released within one week or less, and almost always includes data about the size, instrument and time span.

Transparency has some advantages.[28] Indeed, it is indispensable if the central bank intends to provide a signal. As in the case of domestic balance sheet policies, transparency could strengthen the portfolio balance channel, given that markets are forward-looking. For similar reasons, a credible commitment to a future intervention path could reinforce the effect.

Transparency naturally prevails when central banks rely on rules and wish to anchor expectations. This may be relevant in at least two cases. First, when the goal is to stabilise inflation. This was, for instance, one motivation when the Central Bank of Argentina announced an intervention rule in 2018. Second, when the central bank wishes to enhance market liquidity as expectations about future market liquidity boost current liquidity. For instance, the Bank of Mexico has relied, as directed by the country's FX Commission, on a number of occasions on preannounced, rule-based tools to smooth volatility and provide liquidity to the market.

However, transparency also has limitations. First, by generating predictable returns, it invites FX traders to trade against the central bank. Second, since the central bank is typically a small player in the market, it may make sense at times to conceal its activities so as to lead market participants to believe that the exchange rate is shifting in response to market sentiment. Finally, the central bank may worry that intervention might be interpreted as indicating an exchange rate target.

Whether transparency is useful when the goal is build up reserves is open to debate. On the one hand, the Central Bank of Chile preannounced its interventions to build up reserves in 2008 and 2011, in a move analogous to the current unwinding of central bank balance sheets in advanced economies. On the other hand, to take advantage of favourable conditions and to avoid affecting the exchange rate, South Africa has built up its reserves discreetly, without informing market participants.

4.3 Sterilisation

Survey responses reveal that central bank securities are by far the preferred sterilisation instrument (Table 4). Market-based instruments are on average also seen as very helpful in supporting overall market development (last three columns). The use of changes in reserve requirements and government deposits has seen a sharp decline in the last six years, a development that seems to have started even before this period (Mehrotra (2012) or Filardo and Grenville (2012)).

Several trade-offs are relevant for central banks when choosing the optimal mix between different sterilisation instruments. On the one hand, non-market-based instruments such as changes in required reserves are clearly less costly, but they may hinder smooth market functioning and are likely to have a disproportionately larger

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[28]   Governance structures and accountability are also important factors determining communication strategies, as discussed in detail in the context of reserve management in Note 3.

negative impact on smaller and weaker banks (Kuttner and Yetman (2016)). On the other hand, market-based instruments may help to achieve longer-term and structural objectives, such as development of deep and liquid domestic bond markets and a local currency yield curve, aspects that are particularly relevant for EMEs (Carstens and Shin (2019)).

Sterilisation instruments: central bank securities remain predominant

Ranked by central banks, as a percentage of respondents, with 1 being the highest score and 3 being the lowest

Table 4

Instrument	Percentage of central banks that use this instrument		Assessment (2018)[1]								
			Effectiveness			Costs			Beneficial to overall market development		
	2012[2]	2018[3]	1	2	3	1	2	3	1	2	3
Market instrument											
Central bank securities	71	73	63	25	6	31	44	19	56	19	13
FX swaps	33	27	67	17	17	67	0	17	67	17	17
Government bonds	29	18	100	0	0	50	25	25	75	25	0
Other	29	32	57	29	14	43	43	14	29	43	14
Non-market instruments											
Reserve requirements	38	18	75	25	0	75	25	0	25	50	0
Government deposits	33	18	75	25	0	50	50	0	25	25	50
Special deposit facilities	10	14	67	0	33	100	0	0	67	33	0
Other	19	27	83	17	0	83	17	0	50	33	17
No sterilisation by monetary instruments	14	9									

[1] As a percentage of those which use the instrument. The sum might not add up to 100% as some central banks did not fill out assessments for the instruments that they use.   [2] Based on the responses of 21 central banks.   [3] Based on the responses of 22 central banks.

Source: BIS surveys in 2012 and 2018.

References

Bank for International Settlements (2005): "Foreign exchange market intervention in emerging markets: motives, techniques and implications", *BIS Papers*, no 24.

——— (2013): "Market volatility and foreign exchange intervention in EMEs: what has changed?", *BIS Papers*, no 73.

——— (2016): "Foreign exchange market intervention: what has changed", note for the meeting of the Governors in May.

——— (2018): *Annual Economic Report*, June

Bhattacharya, U and P Weller (1997): "The advantage to hiding one's hand: speculation and central bank intervention in the foreign exchange market", *Journal of Monetary Economics*, vol 39, no 2, pp 251–77.

Blanchard, O and G Adler (2015): "Can foreign exchange intervention stem exchange rate pressures from global capital flow shocks?", *NBER Working Paper*s, no 21427.

Borio, C and P Distyatat (2009): "Unconventional monetary policies: an appraisal", *BIS Working Papers*, no 292.

Bruno, V and H S Shin (2015): "Capital flows and the risk-taking channel of monetary policy", *Journal of Monetary Economics*, vol 71.

Carstens, A and H S Shin (2019): "Emerging market economies and global financial conditions: original sin redux?", Council Of Foreign Relations, *Foreign Affairs*, forthcoming.

Cavallino, P (2019): "Capital flows and foreign exchange intervention", *American Economic Journal: Macroeconomics*,vol 11, no 2, pp 127-70.

Cavallino, P and D Sandri (2019): "The expansionary lower bound: contractionary monetary easing and the trilemma", *BIS Working Papers*, no 770.

Devereux, M and J Yetman (2010): "Price adjustment and exchange rate pass-through", *Journal of International Money and Finance*, vol 29, no 1, pp 181–200.

Disyatat, P and G Galati (2007): "The effectiveness of foreign exchange intervention in emerging market countries: Evidence from the Czech koruna", *Journal of International Money and Finance*, vol 26, no 3, pp 383–402.

Domanski, D, E Kohlscheen and R Moreno (2016): "Foreign exchange market intervention in EMEs: what has changed?", *BIS Quarterly Review*, September.

Durán-Vanegas, J (2016): "Un análisis de la efectividad de las intervenciones cambiarias en el Perú", *Revista Estudios Económicos*, vol 31, pp 45–57.

Eaton, J and S Turnovsky (1984): "The forward exchange market, speculation, and exchange market intervention", *The Quarterly Journal of Eco*nomics, vol 99, no 1, pp 45–69.

Echavarría, J, L Melo-Velandia, and M Villamizar-Villegas (2018): "The impact of pre-announced day-to-day interventions on the Colombian exchange rate", *Empirical Economics*, vol 55, no 3, pp 1319–36.

Fanelli, S and L Straub (2018): "A theory of foreign exchange intervention", memo.

Fatum, R and M Hutchison (1999): "Is intervention a signal of future monetary policy? Evidence from the federal funds futures market", *Journal of Money, Credit and Banking*, vol 31, no 1, pp 54–69.

Filardo, A and S Grenville (2012): "Central bank balance sheets and foreign exchange rate regimes: understanding the nexus in Asia*", BIS Papers*, no 66, pp 76–110.

Fratzscher, M, O Gloede, L Menkhoff, L Sarno and T Stöhr (2019): "When is foreign exchange intervention effective? Evidence from 33 countries", *American Economic Journal: Macroeconomics*, vol 11, no 1, pp 132-156.

Fuentes, M, R Moreno, P Pincheira, M Julio, H Rincón, S García-Verdú and M Zerecero (2014): "The effects of intraday foreign exchange market operations in Latin America: results for Chile, Colombia, Mexico and Peru", *Banco de la Republica de Colombia (No. 849)*

Ghosh, A, J Ostry and M Qureshi (2018): *Taming the tide of capital flows: A policy guide*, MIT Press.

Janot, M and L Macedo (2016): "Efeitos das intervenções cambiais sobre a taxa de câmbio futura no Brasil", *Revista Brasileira de Economia*, vol 70, no 4, pp 457–80.

Kamin, S and M Klau (2003): "A multi-country comparison of the linkages between inflation and exchange rate competitiveness", *International Journal of Finance and Economics*, vol 8, no 2, pp 167–84.

Kuersteiner, G, D Phillips and M Villamizar-Villegas (2018): "Effective sterilized foreign exchange intervention? Evidence from a rule-based policy", *Journal of International Economics*, vol 113, pp 118–38.

Kuttner, K and J Yetman (2016): "A comparison of liquidity management tools in seven Asian economies", *BIS Papers*, no 33.

Mehrotra, A (2012): "On the use of sterilisation bonds in emerging Asia", *BIS Papers*, no 66, pp 111–31.

Menkhoff, L (2013): "Foreign exchange intervention in emerging markets: a survey of empirical studies", *The World Economy*, vol 36, no 9, pp 1187–208.

Nedeljkovic, M and C Saborowski (2018): "The relative effectiveness of spot and derivatives-based intervention", *Journal of Money, Credit and Banking*, forthcoming.

Popper, H and J Montgomery (2001): "Information sharing and central bank intervention in the foreign exchange market", *Journal of International Economics*, vol 55, no 2, pp 295–316.

Sarno, L and M Taylor (2001): "Official intervention in the foreign exchange market: is it effective and, if so, how does it work?", *Journal of Economic Literature*, vol 39, no 3, pp 839–68.

Stevens, G (2012): "Economic conditions and prospects", address to the Credit Suisse 15th Asian Investment Conference, Hong Kong SAR.

Vitale, P (1999): "Sterilised central bank intervention in the foreign exchange market", *Journal of International Economics*, vol 49, no 2, pp 245–67.

Appendix

Table A summarises the change in the relative importance of different FX intervention transmission channels based on a comparison of survey responses between 2006 and 2018. Each panel corresponds to a particular channel. Within each panel, the shaded diagonal cells indicate the fraction of central banks that did not change their response between the two surveys, whereas off-diagonal elements indicate the fraction of central banks that did change. For instance, with regard to the portfolio balance channel, 8% of central banks considered it as important "often" in both 2006 and 2018. On the other hand, 28% of the central banks which considered it as "rarely" important in 2006 switched to reporting that it is "sometimes" important in 2018.

Relative importance of different channels for FX intervention

Based on the responses of 11 central banks   Table A

Portfolio balance		2018		
		Often	Sometimes	Rarely/no response
	Often	1	0	0
2006	Sometimes	1	0	1
	Rarely/no response	1	2	5

Signalling		2018		
		Often	Sometimes	Rarely/no response
	Often	4	1	0
2006	Sometimes	1	1	1
	Rarely/no response	3	0	0

Signalling future monetary policy stance		2018		
		Often	Sometimes	Rarely/no response
	Often	0	1	0
2006	Sometimes	1	0	2
	Rarely/no response	2	1	4

Signalling future exchange rate and interventions		2018		
		Often	Sometimes	Rarely/no response
	Often	4	1	0
2006	Sometimes	0	1	1
	Rarely/no response	4	0	0

Other		2018		
		Often	Sometimes	Rarely/no response
	Often	0	0	1
2006	Sometimes	0	0	1
	Rarely/no response	1	1	7

Shaded cells indicate respondents who indicated a constant importance level. 2006: Corresponds to "Up to 2007".

Source: BIS surveys in 2012 and 2018.

Timing of FX intervention

Based on the responses of 18 central banks   Table B

Timing based on developments in FX markets		2018		
		Often	Sometimes	Rarely/no response
	Often	12	2	1
2012	Sometimes	1	1	1
	Rarely/no response	0	0	0

Intervention is made pre-emptively in response to other news, before FX market reacts		2018		
		Often	Sometimes	Rarely/no response
	Often	0	1	1
2012	Sometimes	0	1	5
	Rarely/no response	0	0	10

Shaded cells indicate respondents who indicated a constant importance level.

Source: BIS surveys in 2012 and 2018.