Central bank views on foreign exchange intervention

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Abstract

This note reviews central banks' views on the objectives, methods and effectiveness of foreign exchange intervention, according to their responses to a survey questionnaire. Due to the recent global financial crisis, objectives have shifted to focus more on curbing capital flows and exchange rate volatility. Central banks prefer less transparent intervention practices, which they time by monitoring the most liquid segments of the market. Interventions are often perceived as being successful in achieving the desired objective. Combining intervention with macroprudential and capital control measures may have contributed to recent successes. Besides analysing these and more findings of this year's meeting, this paper compares them to the results of the last survey from 2004.

Keywords: FX intervention, exchange rate volatility, monetary policy

JEL classification: F31, E58, E52

Introduction

This note summarises the views of central banks represented at this meeting about intervention. It draws on the responses to a survey questionnaire and the papers prepared for this meeting.

Three main questions are addressed:

- How have the objectives and the methods of intervention changed since the Deputy Governors first discussed this topic in 2004?

- How effective do central banks think intervention is in moving the exchange rate in the desired direction?

- What are the effects of intervention on monetary policy and the financial system?

The previous survey conducted for the 2004 Deputy Governors' meeting suggested that many emerging market economies (EMEs) intervened to influence either the level or the volatility of the exchange rate (the results of the survey are summarised in BIS (2005)). Although several central banks held the view that intervention had succeeded in calming disorderly markets and correcting exchange rate misalignment, questions remained about the durability of the impact. While stabilising the exchange rate at the shorter-term horizon was seen as feasible, continuous intervention to attain longer-term exchange rate goals implied large costs. In addition, there was a view that large-scale intervention created challenges for central banks in sterilising excess liquidity and that it raised long-term inflation risks.

A subsequent survey by Neely (2008) summarising the views of a number of advanced and emerging economy central banks concluded that, contrary to the findings in empirical studies, most central banks did not agree that intervention caused higher exchange rate volatility. Several central banks believed that although the portfolio balance channel had weakened, intervention still worked through the signalling, coordination and liquidity channels. Moreover, the same survey noted that "central banks are un-persuaded by most of the common arguments against intervention. The only argument that participants tended to support is that intervention might be used to substitute for other necessary policy changes."

The present survey updates many of the aspects of intervention identified in the 2004 BIS survey. One finding is that, in many cases, intervention in the foreign exchange market has been motivated by efforts to reduce risks to financial and monetary stability in the wake of the 2007–09 global financial crisis. In addition, several central banks have stepped up intervention to support liquidity in the foreign exchange market. In a majority of cases, intervention was seen to be successful in achieving the exchange rate objectives, although the outcome may also partly depend on capital and macroprudential controls. And persistent intervention attenuated the challenges faced by central banks in maintaining consistency in monetary policy and reducing the monetary consequences of issuing large amounts of short-term debt to sterilise their purchase of foreign exchange reserves.

The rest of this note is structured as follows. Section 1 looks at the objectives, methods and techniques of intervention. Section 2 reviews central banks' views about the effectiveness of intervention and the channels it works through. Section 3

discusses the monetary and financial sector effects of intervention. Section 4 concludes.

1. Objectives and methods of intervention

Previous studies have suggested that central banks intervene for various motives, such as to control inflation, maintain competitiveness, ensure financial stability and build foreign exchange reserves; see Moreno (2005) for a review. These motives – not mutually exclusive – depend not only on countries' choice of monetary regime but also on their exposure to external shocks and their balance sheet positions. Moreover, successful intervention depends on the choice of instruments, markets and timing to maximise the impact on the exchange rate.

Have the motives changed?

Table 1 summarises central bank responses regarding the motives of intervention. The motives are ranked according to their importance – high, moderate, low – based on the scores given by the central banks. Although the broad objectives of intervention have remained similar over the past decade, changes are significant in several directions. Curbing excessive exchange rate speculation – the prime motive for intervention – has gained further prominence in the aftermath of the 2007–09 global financial crisis. Of the 19 central banks that responded to this question, 15 (or 79%) considered this to be either highly or moderately important in 2011–12 compared with 12 (or 63%) in 2005–06.

Motives of intervention

Based on the responses of 19 central banks   Table 1

	Importance[1] in 2005–06			Importance[1] in 2011–12		
	High[2]	Moderate[3]	Low[4]	High[2]	Moderate[3]	Low[4]
To curb excessive exchange market speculation	8	4	0	11	4	0
To maintain monetary stability	7	2	2	10	2	2
To discourage sharp capital inflows or outflows	4	3	1	5	5	1
To build or reduce foreign exchange reserves	7	0	2	6	2	2
To smooth the impact of commodity price fluctuations	3	1	3	4	1	3
To maintain or enhance competitiveness	2	2	3	4	1	3
To alleviate FX funding shortages of banks and corporations	4	2	0	5	2	0

[1] On a scale of 1 to 7, where 1 is most important and 7 is least important.   [2] 1 or 2.   [3] 3 to 5.   [4] 6 or 7.

Source: BIS questionnaire, February 2013.

The other crisis-related intervention motive that has gained prominence is the desire to discourage sharp movements in capital flows, with five respondents reporting this motive as highly important and an equal number as moderately important. In addition, five central banks mentioned that alleviating FX shortages was the chief objective of intervention in 2011–12, compared with four in 2005–06.

After the goal of preventing speculation, maintenance of monetary stability remains the second most important objective of intervention, with 63% of respondents reporting this as highly or moderately important in 2011–12, compared with 47% in 2005–06. This is surprising in the light of the recent rapid decline in the pass-through of the exchange rate into inflation in EMEs, which should have reduced the role of the exchange rate in monetary policy. Among other objectives, building foreign reserves continues to be the top priority for several central banks. Enhancing competiveness was not considered to be a primary motivation of intervention in a majority of cases; nevertheless, four respondents consider that objective as highly important, compared with two in the mid-2000s.

To achieve its final objective, the central bank needs to set an intermediate one in terms of either the level or the volatility of the exchange rate, or both. Table 2 summarises what central banks consider as their exchange rate objectives. Most consider limiting volatility and smoothing the trend path of the exchange rate ("leaning with the wind") as more important than influencing the level of the exchange rate. Going by the number of responses, it is interesting to note that the relative position of the three objectives has not changed since the mid-2000s. Where the changes have been most significant is in the desire to limit upward or downward pressures on the exchange rate caused by international capital flows and to inject liquidity into a thin FX market. As shown by the last two columns of Table 2, the number of central banks intervening for these two purposes increased dramatically in 2008 and 2009 but fell in the following years as market conditions improved gradually.

Immediate objectives and success of foreign exchange intervention

Based on the responses of 19 central banks   Table 2

	Influence the level of the exchange rate	Smooth trend path of the exchange rate	Limit exchange rate volatility	Limit upward or downward pressure caused by international investors	Provide liquidity to a thin exchange market
2005	4	7	11	8	2
2006	4	8	12	7	2
2007	5	8	12	7	2
2008	5	8	12	12	10
2009	4	8	13	10	8
2010	3	9	12	7	6
2011	3	8	12	8	4
2012	4	7	11	8	4

Source: BIS questionnaire, February 2013.

In sum, these results suggest that the preference among EMEs for managing the exchange rate has strengthened since the 2007–09 global financial crisis. Note that the results are not affected by responses from economies that have formally fixed their exchange rate, since the respondents included only one fixed exchange rate regime. Although the survey did not seek to identify the factors underlying changes in objectives, there are several candidate explanations. One is an increase in perceived risk to financial stability arising from volatile capital flows. Intervention

may be seen as a tool to break the momentum effect on the exchange rate, as noted in the paper by Ehlers and Takáts.

A second reason could be increased exposure to liquidity shocks caused by the greater interconnectedness of markets. Although many emerging markets avoided going into "free fall" during 2008–09 because of the strength of their balance sheets (in terms of eg reduced currency mismatches, large FX reserves and improved fiscal positions), the crisis also demonstrated their exposure to large deleveraging pressures and sudden loss of liquidity in several markets. The paper from Korea illustrates this point very well. Although Korea enjoys current account surpluses, its vulnerability to capital flow shocks had risen before the crisis because of extensive forward FX hedging by exporters and the increased involvement of banks in supplying these hedges. Because banks have to borrow abroad and/or use the swap markets to hedge their FX exposures, they have been highly vulnerable to international liquidity shocks.

Finally, exchange rate intervention may substitute for interest rate policy in macroeconomic management. The paper from the Czech Republic demonstrates a rather unique challenge for an emerging market, as the policy rate in the economy has dropped to almost zero since November 2012. The central bank has used foreign exchange intervention as a monetary policy tool for stabilising the economy.

Methods and tactics of intervention

Methods and tactics matter, as central banks may use their advantages over market participants – access to information, and market and regulatory powers – to make intervention a success. Previous surveys by Canales-Kriljenko (2003) and Archer (2005) indicated that there is a great deal of consistency in the choice of mechanics of intervention across EMEs. A majority of countries used wholesale spot markets, preferred secrecy to transparent operations, and selected the timing and the size of intervention so as to exert maximum influence on the exchange rate. The current survey attempts to provide further evidence on these aspects.

Table 3 summarises the responses regarding the tactics of intervention on three main dimensions: monitoring of markets; timing of intervention; and instruments of intervention. It is clear that central banks refer to a range of indicators in determining their intervention decisions. There is a strong preference for monitoring global risk sentiment indicators such as the VIX and bond spreads. Of the 21 central banks that responded to this question, 15 stated that they use these indicators regularly, and two use them occasionally. In addition, central banks pay a great deal of attention to cross-border banking activity and possible shifts in international portfolio flows as well as developments in specific markets such as the United States and Europe.

Timing of intervention and markets targeted

Regarding timing, the results suggest an overwhelming preference for intervening only after the market has moved in a certain direction, and very little appetite for pre-emptive intervention. Of 21 respondents, 17 stated that they regularly time their interventions according to market developments, and three said that they do so only occasionally. By contrast, only eight central banks reported that they regularly or occasionally conduct pre-emptive interventions. This is not surprising, as pre-emptive intervention may increase market uncertainty and cause unwarranted volatility. To the extent that pre-emptive intervention is more difficult to justify than

reactive intervention, it also exposes the central bank to political criticism. In contrast, timing intervention relative to a certain positioning of market participants (such as build-up of speculative order flows) can lead to faster and more concrete results.

Intervention tactics

Based on the responses of 21 central banks
Table 3

	Regularly	Occasionally	Never
Monitoring activity for FX intervention			
Monitoring of cross-border bank lending	12	2	5
Monitoring of cross-border security purchases/sales	13	2	4
Monitoring of equity/corporate bond market developments in the US or Europe	11	2	6
Monitoring of risk indicators in industrial countries (VIX, sovereign spreads, etc)	15	2	3
Timing			
Timing of intervention based on observed developments in FX markets	17	3	0
Intervention is pre-emptive, in response to other news	2	6	11
Market-based instruments			
Direct or indirect intervention in spot markets	19	2	0
Intervention in forward markets	2	8	11
Use of derivatives (futures, swaps, volatility options, others)	3	7	11

Source: BIS questionnaire, February 2013.

Table 3 confirms the findings of the previous survey about instruments of intervention. Most central banks (19 out of 22) intervene in the spot market. Only two central banks reported that they regularly use forward markets for intervention, and eight said that they do so only occasionally. The use of derivatives markets also remains limited. One reason for concentration on the spot market could be that it is the most liquid market in many countries, helping to reduce any unintended consequences from intervention in terms of market volatility. A second reason, as mentioned in the note from the South African Reserve Bank, is that spot interventions can help limit central banks' net forward positions, which themselves can be a reason for currency speculation.

Yet the paper from Korea suggests that spot and forward market interventions can serve very different purposes. The Bank of Korea operates in the spot market when the objective is to limit exchange rate volatility, but prefers to use the swap market when the goal is to supply FX liquidity. In Colombia, during the early 2000s the central bank primarily used FX options for its intervention operations (sell/buy US dollars when the exchange rate moves beyond a certain threshold in any one single day) partly because the market for hedging was not well developed.

Average size of daily FX interventions

Table 4

	In USD millions				As a percentage of daily FX market turnover				As a percentage of average monthly FX reserves			
	2007	2010	2011	2012	2007	2010	2011	2012	2007	2010	2011	2012
Latin America[1]	109.2	185.1	194.6	166.6	8.3	5.1	6.0	11.0	0.5	0.5	1.0	0.7
Asia[2]	2.6	...	...	9.7	1.0	...	0.1	0.2	0.2	...	...	0.2
Emerging Europe[3]	50.6	41.3	55.8	81.8	95.0	65.0	70.0	105.0	13.0	4.0	5.5	10.0
Other emerging economies[4]	222.5	230.0	438.0	40.0	0.1	1.4	0.6	0.2	0.1	0.1	0.1	0.1
Total	99.7	133.5	179.6	99.6	21.2	14.4	14.8	26.6	2.7	1.0	1.4	2.2

[1] Based on the responses of six central banks. [2] Based on the responses of two central banks. [3] Based on the responses of two central banks. [4] Based on the responses of two central banks.

Source: BIS questionnaire, February 2013.

Size of intervention

Table 4 shows information about the size of interventions. Note that the regional averages are not strictly comparable, because the number of respondents is much smaller for Asia and emerging Europe than for Latin America. Therefore, comparisons have been made mostly across time. Compared with the levels in 2007, the absolute size of daily intervention has increased in most regions following the recent crisis. The typical average size of daily intervention in EMEs increased from less than $100 million per day in 2007 to about $133 million and $180 million, respectively, in 2010 and 2011. In 2012, the average size of intervention fell to close to the 2007 level.

The size of intervention relative to FX market turnover has often been suggested as an indicator of central banks' market power to affect the current exchange rate, and its share in FX reserves as a measure of their potential "firepower" to influence the future exchange rate. Based on the previous survey, Mihaljek (2005) reported that the typical share of intervention in turnover in EMEs had fallen from 12% in 2002 to 8% in 2004. The middle four columns of Table 4 report the corresponding results of the current survey.

Notwithstanding significant fluctuations over the years, these shares are significantly higher now than they were a decade ago. The last four columns of Table 4 report the ratio of intervention size to the stock of FX reserves. The current survey confirms the findings of the previous survey in that these ratios have remained small in most EMEs (with the exception of emerging Europe), largely because the reserves have in many cases risen over the past decade. This suggests that central banks possess substantial power to defend a weaker exchange rate, should there be a need.

Note that the survey results do not provide evidence on the direction of central bank intervention. Up until 2007, many EMEs faced strong appreciation pressures, so intervention was often carried out to weaken the exchange rate. However, several country papers suggest that the direction of intervention has changed significantly since the 2007–09 crisis. During the crisis, the Bank of Korea sold large amounts of dollars ($10.3 billion to foreign exchange banks through swap transactions) to

contain the depreciation pressure on the won. In Poland, intervention in the second half of 2011 was prompted by the sharp depreciation of the zloty as risk sentiments deteriorated markedly around the world (see the paper from the Bank of Poland). Other countries, such as India, which intervened to limit appreciation for several years, have been combating strong currency depreciation pressures over the past two years (see the paper from India).

Public information provided

Based on the responses of 22 central banks

	Regularly	Rarely	Never		
Does the central bank preannounce FX intervention?	4	2	15		
Accompanied by information on which of the following aspects?					
Size	5		1		
Time span	5		1		
Instrument(s) used	5	1			
Are intervention-related data made public ex post	13		7		
If so, what is the frequency of the data published?	Real time / hourly	Daily	Weekly	Monthly	Annually
	3	5	1	6	1

Source: BIS questionnaire, February 2013.

Transparency of intervention

Table 5 contains survey responses on the transparency of intervention. Many authors have argued that central banks conduct secret interventions to maximise the impact on the exchange rate (Dominguez and Frankel (1993), Neely (2000), Sarno and Taylor (2001)). Some central banks prefer secrecy to transparency, especially when intervention is inconsistent with the goals of monetary policy. Others have argued that transparent intervention is preferable because it increases the power of the signalling and coordination channels, thereby enhancing the efficacy of intervention (Archer (2005)).

It is clear that few central banks conduct preannounced interventions. A majority of EME central banks (15 out of 22) keep intervention secret. Only four central banks reported that they announce their interventions on a regular basis before carrying them out, while two said that they rarely do so. It is not surprising that central banks conducting a preannounced intervention provide full details of timing, size and types of instrument used. Behind many of these interventions, the objective may simply be to accumulate reserves rather than affect the exchange rate. In addition, the survey results show that post-intervention transparency is quite limited. Only a few countries (those conducting preannounced interventions) publish intervention-related data on either a daily or a real-time basis.

2. Effectiveness of intervention

Have interventions been successful? Previous surveys reported that most central banks regarded their interventions as successful in moving the exchange rate in the

desired direction (Neely (2000, 2008), Mihaljek (2005)). This contrasts with some empirical literature, which finds that intervention has had very little or no effect on the exchange rate (see the paper by Miyajima and Montoro for this meeting for a review). This section attempts to provide new evidence on this issue based on survey responses and central bank research.

To enable comparison over time, the survey sought feedback from central banks on the success of intervention since the mid-2000s. The results, shown in Graph 1, are noteworthy in at least two respects. First, they confirm the findings of the previous surveys about the effectiveness of intervention: of the 19 respondents, around 70% reported that interventions were successful in achieving the exchange rate objective, while roughly 20% reported that they were only partly successful. In the remaining cases, intervention was seen to have had no effect on the exchange rate.

Central bank views about the success of intervention

Based on the responses of 19 central banks to the question "Did intervention succeed?"   Graph 1

Percentage of overall response
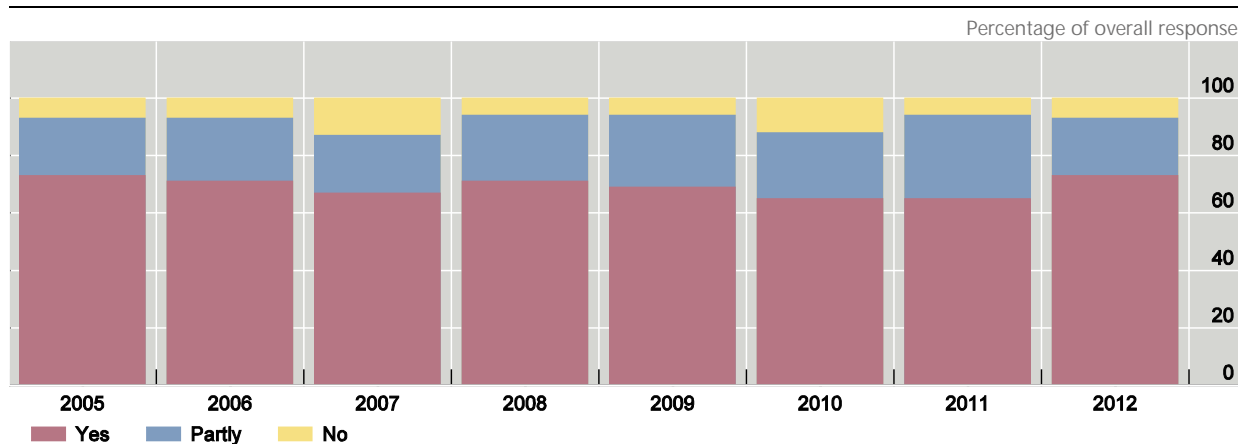
Source: BIS questionnaire, February 2013.

Second, the pattern of responses has not changed much over the past eight years. According to these central bank assessments, there is no significant evidence to suggest that intervention was more successful during the crisis than it was before, even though many countries introduced exceptional liquidity measures and sold large amounts of dollars during the crisis to combat currency depreciation pressures.

Nevertheless, the survey results provide no evidence on the magnitude of the impact, or on its persistence – where disagreement with the empirical literature seems to be the greatest. Indeed, country experiences and recent evidence vary significantly on this issue. For instance, the evidence presented by Miyajima and Montoro for this meeting suggests that interventions do not generally have the intended effect on the expected future exchange rate. The paper from Chile makes a similar point. Although the peso depreciated in the second half of 2011 (following the announcement of dollar purchases by the Central Bank of Chile), it quickly converged back to the path consistent with the scenario of no intervention. Likewise, several recent studies conducted at the Czech National Bank suggest that

intervention has had very little or no effect on the exchange rate (Gersl (2006) and Egert and Komarek (2005)).[2]

By contrast, in the case of Peru most studies by the central bank's staff demonstrate that intervention has been successful in dampening exchange rate volatility in the context of the country's partially dollarised economy (Rossini et al (2011), Humala and Rodríguez (2009)). As pointed out by Batini et al (2008), foreign exchange intervention could be a component of the optimal policy in a dollarised economy, to stabilise inflation and output.

Some studies show that interventions have also been successful in Brazil and Poland, even though these countries have differed markedly from Peru in terms of balance sheet conditions. In the case of Brazil, Kohlscheen (2012) shows that small changes in dollar purchases/sales by the central bank lead to large changes in private sector pricing behaviour, as seen from order flows. This could be taken as indirect evidence that the monetary authority has a coordinating role in price setting in the foreign exchange market. The paper from Poland for this meeting points out that the central bank intervened several times during the second half of 2011. The interventions were successful in influencing FX returns and implied exchange rate volatility in the desired direction for several days.

Compared with Latin America and emerging Europe, evidence in Asia about the impact of intervention is generally scant. Nevertheless, one central bank reported that the impact depends on the direction of intervention, implying a certain asymmetry in the central bank's influence over the exchange rate. While dollar sales by the central bank have had a statistically significant effect on exchange rate volatility, dollar purchases have led to higher rather than lower exchange rate volatility.

Channels of influence

These findings raise issues about the channels through which intervention works. A significant amount of literature (eg Dominguez and Frankel (1993), Taylor (2005)) has focused on the traditional channels, such as the monetary policy channel, when intervention is not sterilised. Even when fully sterilised, intervention may change the risk premium, which occurs when domestic and foreign bonds are imperfect substitutes (the portfolio balance channel); alter the expected future values of the exchange rate and interest rate (the signalling channel); and affect the order flows of traders, and market liquidity more generally (the microstructure channel). These channels are believed to be stronger in EMEs than in advanced economies because of the lower substitutability of EME assets for other assets, and due to smaller market size. And the information advantage of the central bank is often greater, given its role as the regulator and supervisor of the financial system (see Disyatat and Galati (2005) for a review).

Another approach is to examine the impact of intervention in the context of other policies (eg capital controls and macroprudential tools) which can influence

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[2]   In addition, different authors have come up with very different results focusing on the same intervention episodes. For instance, of the two studies furnished by the Central Bank of Turkey for this meeting, one reported that large and sporadic intervention was successful in changing the trend path of the Turkish lira (Akinci et al (2005)), while the other showed that intervention led to higher rather than lower exchange rate volatility (Herrera and Özbay (2005)).

the success of intervention. Such an approach may also include various macroeconomic and financial sector linkages with intervention in the context of a general equilibrium model (see the paper from Colombia for this meeting).

Table 6 reports the results of the survey with reference to the traditional channels. According to the central banks questioned, intervention is effective mainly through the signalling channel, a finding which confirms the results of previous surveys reported by Lecourt and Raymond (2006) and Neely (2008). Importantly, this channel works primarily by changing the expectations of the future exchange rate rather than the interest rate. Taking the post-crisis period as a whole, nine out of 16 respondents (56%) reported that intervention was often accompanied by a change in expectations regarding the future exchange rate. This is a significantly higher percentage than that reported for the pre-crisis period (37%). Two central banks reported that the signalling channel was sometimes important for the impact of intervention, while three said that it was rarely important (the same number as in the pre-crisis period). By contrast, only two central banks reported that intervention changed expectations regarding the future stance of monetary policy.

Effectiveness of intervention, by channel

Based on the responses of 16 central banks   Table 6

	Unsterilised intervention		Sterilised intervention							
	Monetary policy[1]		Portfolio balance[2]		Expectations about:				Other[4]	
					future monetary policy stance[3]		future exchange rate and interventions			
	Up to 2007	After 2008	Up to 2007	After 2008	Up to 2007	After 2008	Up to 2007	After 2008	Up to 2007	After 2008
Often	2	2	1	2	1	2	6	9	2	3
Some-times	1	1	3	4	3	2	2	2	1	2
Rarely	4	5	4	3	2	4	3	3	2	2

[1] Domestic interest rates are affected when interventions are not fully sterilised.   [2] The composition of domestic and foreign assets held by market participants changes after sterilised intervention.   [3] Sterilised intervention changes exchange rate expectations by signalling about the future monetary policy stance.   [4] For example, the microstructure channel, where intervention affects orders placed by traders who follow past market trends.

Source: BIS questionnaire, February 2013.

What is important to note is that other channels made very limited contributions to the success of intervention. Central banks' views on this have not changed much following the recent financial crisis or with the development of financial markets in EMEs. Interestingly, only two central banks reported that the portfolio balance channel was often important to the success of intervention during the post-crisis period, compared with one in the pre-crisis period. There is some evidence that intervention may work through the microstructure channel (last two columns of Table 6). However, overall, the results do not support the operation of a strong order flow or liquidity channel.

Finally, the importance of the pure monetary policy channel is limited. The survey results indicate that in most EMEs interventions were sterilised, as is to be expected with an independent monetary policy regime. Two central banks reported that interventions were often unsterilized, and one reported that they were

sometimes sterilised. The former group includes Hong Kong SAR, where, given the currency board, all interventions are in principle unsterilised. The paper from Hong Kong notes that the monetary authority has strictly adhered to this rule at all times, even when the interest rate level is incompatible with the prevailing economic and asset market conditions.

A broader question is how far the success of intervention was in some cases influenced by capital controls and other prudential measures that restrict certain types of capital flows or position-taking by market participants. Table A1 in the annex shows the details of the measures introduced over the past five years by countries that answered this question. These measures include reserve requirements on short-term inflows (Argentina, Brazil, Colombia and Russia), taxes on capital flows (Brazil and Russia), a macroprudential stability levy on banks (Korea), enhanced reporting requirements for forward positions (Israel and Korea) and in some cases limits on FX hedging.

Measures to complement FX interventions

Based on the responses of 16 central banks   Table 7

	Capital control measures		Prudential measures		Other	
	Up to 2007	After 2008	Up to 2007	After 2008	Up to 2007	After 2008
Often	2	1	1	4	0	1
Sometimes	3	3	5	4	2	3
Rarely/never	7	7	6	7	6	6

Source: BIS questionnaire, February 2013.

Table 7 shows that, in several cases, interventions were often combined with measures to stabilise capital flows. In the aftermath of the crisis, many countries especially used macroprudential controls as a policy complementing foreign exchange intervention. Half of the 16 respondents used them in conjunction with intervention either often or sometimes, compared with six in the pre-crisis period. In addition, four countries combined intervention with capital control measures, one of them often doing so (compared with five in the pre-crisis period). In four countries, other restrictive measures were in place to support intervention.

The survey did not cover the contribution of these policies to the success of intervention. Although many empirical studies have examined the effectiveness of capital controls in reducing capital flow volatility, few have examined their role in foreign exchange market intervention. One recent study in the context of Colombia reported that intervention and capital controls by themselves were generally unsuccessful in preventing currency appreciation (Rincón and Toro (2011)). By contrast, during 2008–10, the authorities used both policies simultaneously and were successful in stemming currency appreciation without increasing the volatility of the exchange rate.

3.   Intervention and monetary policy

Intervention in the foreign exchange market has direct implications for monetary policy. Research has highlighted two major issues: (i) the consistency of intervention with the monetary policy stance; and (ii) implications for domestic monetary

conditions and financial markets (see Mohanty and Turner (2005)). The first issue relates to the possibility that intervention to appreciate or depreciate the exchange rate may run counter to a monetary policy stance geared to stabilising inflation and output. For instance, the monetary authority may find it difficult to combat inflation (or recession) pressures at the same time as attempting to depreciate (or appreciate) the currency. In addition, intervention can send the wrong signals about monetary policy. Such inconsistency can reduce the efficacy of both exchange rate and monetary policy.

As regards the second issue, previous research suggested that the domestic implications of intervention depend not only on the extent to which it is sterilised but also on the instrument of sterilisation (and who holds the sterilisation securities). The associated balance sheet changes can affect bank lending behaviour and monetary conditions more generally in the economy.

When FX reserve purchases are sterilised by selling long-term government bonds to the non-bank sector, private holding of money balances falls. In addition, bank balance sheets are unaffected, eliminating any expansionary implications of sterilisation for bank credit. In contrast, sterilisation of interventions through the selling of government or central bank securities to banks leads to changes in the banking system's balance sheet. In addition, the maturity composition of sterilisation bonds has monetary implications in the sense that short-term debt is a close substitute for bank reserves (see Filardo et al (2012) for a review).

Policy consistency

The survey collected central bank responses on both of the above issues. On the question of the consistency of intervention with monetary policy, central banks' qualitative responses suggest that conflicts have indeed arisen in this connection in recent years and have affected intervention decisions. One central bank cited an occasion when it would have been desirable to intervene in the FX market to contain excessive exchange rate volatility; yet no intervention took place, as it might have further accelerated inflationary pressure in an environment where inflation was exceeding the central bank's target. Another central bank mentioned that intervention to stem appreciation was suspended as inflation expectations increased and raised the risks of future inflation. In another case, efforts to curb depreciation pressure through both higher interest rates and intervention in the FX markets created a difficult policy dilemma for a central bank seeking to limit risks to growth.

Graph 2 demonstrates a generalised illustration of policy consistency for inflation targeting countries. The graph shows the deviations of inflation from the target and the change in the foreign exchange reserve in the same year. Policy consistency implies that when intervention is motivated by inflation concerns, and inflation is above target, FX reserves should not increase, as the central bank should allow for more rapid appreciation. In the same way, efforts to resist appreciation by increasing reserves should be accompanied by a decline in inflation below the target. When there is no conflict between the policies for one particular year, the observation for that year should be in quadrants 2 or 4.

Graph 2 shows that there have been cases where above-target inflation was accompanied by an increase in FX reserves (observations falling in quadrant 1), suggesting that intervention possibly came into conflict with the objective of domestic monetary policy. Interestingly, however, when inflation has been below

target, FX intervention has mostly been consistent with inflation targets (observation falling in quadrant 2).

Inflation targeting and FX intervention[1]   Graph 2
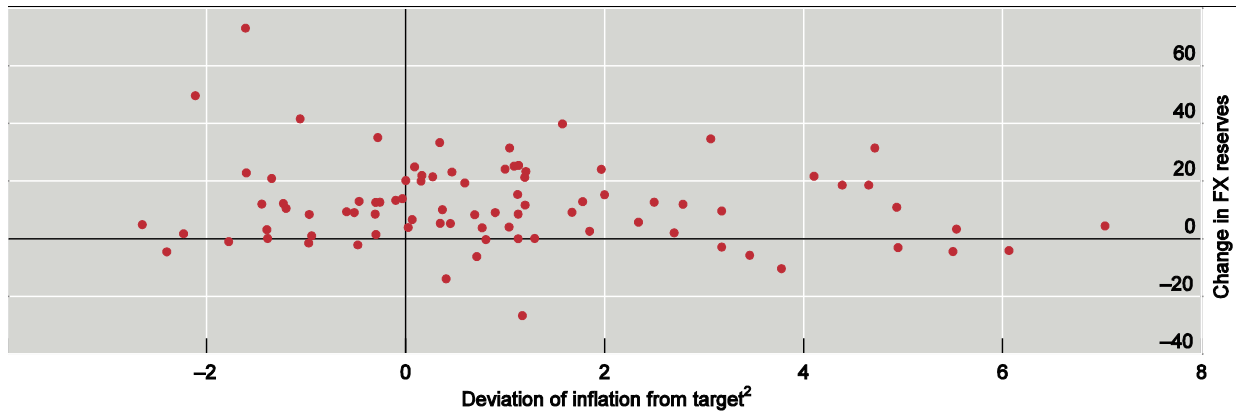
[1] Year-on-year percentage changes over the period 2001–11; for Turkey, 2003–11.   [2] Deviation of inflation is expressed as the difference between actual inflation and the inflation target (point target, or lower or upper bound of target range), based on annual data. Economies included: Brazil, Chile, Colombia, the Czech Republic, Hungary, Indonesia, Israel, Korea, Mexico, Peru, Poland, the Philippines, South Africa, Thailand and Turkey.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; national data; authors' calculations.

Intervention and sterilisation

Sterilisation can be implemented in various ways. A traditional way to absorb liquidity on a relatively permanent basis involves an increase in reserve requirements, effectively transforming excess liquidity into required reserves. Another way is to shrink the domestic assets side of the central bank balance sheet through the sale of government paper to commercial banks. Given that prolonged intervention reduces the stock of government securities (particularly in economies that have mostly run fiscal surpluses in the past), however, central banks have increasingly issued their own securities to finance the increase in foreign assets. Based on data reported by the central banks for the meeting, at the end of 2011 the stock of such securities outstanding amounted to $354 billion in emerging Asia (a nearly fivefold increase from 2000) and $197 billion in Latin America (close to a fourfold increase).

The survey asked central banks to rank each sterilisation instrument on a scale of 1 to 3 according to its effectiveness, cost affordability and impact on market development. The survey responses, shown in Table 8, highlight the perceived benefits of using market-based methods, in particular central bank securities, for sterilisation. Of the 21 central banks that responded, 15 said that issuing their own securities is the most effective way to sterilise intervention. And that method is generally seen as conducive to financial sector development. But it is costly, as central banks have to pay the market rate of interest, which could rise given an increased supply of securities. Next in order of importance are FX swaps, although they are not perceived as being as effective as central bank securities. It is not surprising that reserve requirements are viewed by central banks as one of the most cost-effective tools for sterilisation, but at the same time this relatively blunt instrument is not regarded as beneficial for market development.

Sterilisation instruments

Ranked by 21 central banks, with 1 being the highest score and 3 the lowest   Table 8

Instrument	Number of central banks using instrument	Assessment								
		Highly effective			Low-cost			Beneficial to overall market development		
		1	2	3	1	2	3	1	2	3
Market instrument										
Central bank securities	15	14	1	0	4	7	3	11	4	0
FX swaps	7	2	4	0	4	2	0	3	3	0
Government bonds	6	1	3	1	2	1	2	5	0	0
Other[1]	6	2	4	0	0	5	0	2	4	0
Non-market instruments										
Reserve requirements	8	3	1	3	4	2	1	0	1	6
Government deposits	7	4	1	1	3	3	0	3	0	3
Special deposit facilities	2	0	0	1	1	0	0	0	0	1
Other[2]	4	3	1	0	3	1	0	1	2	1
No sterilisation using monetary instruments	3									

[1] Mostly (reverse) repos and uncollateralised borrowing.   [2] Mostly bank deposits.

Source: BIS questionnaire, February 2013.

The survey also highlighted two other aspects of sterilised intervention, namely maturity and the identity of the holders of government and central bank securities. As noted above, a shortening of sovereign debt maturities implies an expansionary monetary policy, and an increase a contractionary policy. It is striking that the average maturity of government debt securities in EMEs has increased over the past decade while that of central bank securities has fallen and generally remained below one year (Table 9).

Average maturity of government and central bank securities at year-end

Table 9

| | Government securities (percentage of total outstanding) | | | | Central bank securities (percentage of total outstanding) | | | |
	Less than 1 year	Between 1 and 3 years	Above 3 years	Average remaining maturity in years	Less than 1 year	Between 1 and 3 years	Above 3 years	Average remaining maturity in years
2000	32.6%	25.9%	41.5%	3.8	72.7%	14.3%	7.7%	0.8
2005	18.6%	21.2%	57.1%	5.7	78.1%	18.9%	20.5%	1.1
2010	18.4%	24.0%	59.7%	6.2	86.4%	17.5%	6.9%	0.6
2011	17.2%	22.8%	60.8%	6.2	75.4%	15.3%	8.2%	0.8

Sources: BIS questionnaire, February 2013; BIS calculations.

As regards the holders of sovereign securities, it is clear from Table 10 that a large part of the stock has been held by the banking sector. Consistent with the scale of intervention, banks' share of sovereign debt holdings has remained particularly high in Asia, even though it fell from a peak of 56% at the beginning of

the 2000s to 40% at the end of 2011. In emerging Europe, the share has increased rapidly over the past decade, to about 48% in 2011, exceeding the figure for Latin America in recent years.

Holders of government and central bank securities

As a percentage of total holders of government and central bank securities; regional averages[1]   Table 10

	Latin America		Asia		Emerging Europe		Other emerging economies	
	Banks	Non-banks	Banks	Non-banks	Banks	Non-banks	Banks	Non-banks
2000	31.9	68.1	55.8	44.2	18.7	81.3	23.3	76.7
2005	36.0	64.0	39.2	60.8	38.5	61.5	25.8	74.3
2010	36.3	63.7	42.5	57.5	46.7	53.3	25.5	74.6
2011	35.8	64.2	39.6	60.4	48.2	51.8	26.2	73.8
Median	36.7	63.3	43.1	56.9	39.2	60.8	25.1	74.9

[1] Averages weighted by US dollar values of securities holdings. "Banks" refers to commercial banks. "Non-banks" refers to other domestic financial institutions, non-residents and other holders of securities.

Sources: BIS questionnaire, February 2013; BIS calculations.

4. Conclusion

The survey highlights a number of facts about central bank foreign exchange intervention which are consistent with the results of previous surveys. While maintaining monetary and financial stability continues to be the primary motive for intervention in most countries, there has been a significant shift of emphasis in the wake of the recent global financial crisis, towards reducing risks to the economy. Most recent interventions have been directed at preventing speculative currency pressures and reducing risks to inflation, as well as curbing volatility in capital flows. Alleviating FX funding liquidity has also remained an important objective in many countries.

The survey results indicate that many countries attempt to achieve these objectives by limiting exchange rate volatility rather than by setting a path for the exchange rate level. The basic intervention strategy has remained unchanged, that is: monitoring of information about international investors' positions; a focus on the most liquid segments of the market; and a preference for less transparent intervention practices to maximise results.

Most central banks believe that their interventions have been successful in achieving the desired exchange rate objective, although differences of opinion exist as to the size and the duration of impacts. As regards the channels of influence, many central banks think that intervention works primarily through the signalling channel, that is, by changing expectations about the future exchange rate as well as signalling forthcoming interventions. The recent success could also be due to the fact that many countries used macroprudential and capital control measures as a complementary tool to intervention.

As regards monetary policy implications, there is some evidence to suggest that intervention may have at times proved inconsistent with the stance of monetary

policy. In addition, prolonged interventions have been accompanied by significant balance sheet effects such as large or growing holdings of sovereign securities in the banking sector and a substantial increase in short-term central bank paper, with implications for bank lending behaviour and monetary conditions in general. These monetary effects will determine the sustainability of interventions in the long run.

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Appendix

Non-market-based measures taken by the central bank or the government in the last five years

Table A1

	Taxes	Reserve requirements	Other
Argentina		Interest-free deposit for 365 days equivalent to 30% of certain capital inflows (financial sector and non-financial private sector financial liabilities)	Time restriction on financial borrowing traded in the domestic foreign exchange market and on rollovers of non-financial private sector external liabilities. Minimum one-year term requirement for foreign financial debts and portfolio investments. Residents require central bank approval to access the local FX market to buy foreign assets. Repatriation of foreign direct investment in banking institutions requires central bank approval. Non-residents can also repatriate portfolio investments up to a monthly limit of USD 500,000.
Brazil	Various increases and decreases of the Tax on Financial Operations (IOF) for foreign transactions	Reserve requirement for banks holding short spot positions larger than USD 1 billion (down from USD 3 billion)	Local banks prohibited from lending, swapping or renting securities to foreign investors. Registration of export prepayments limited to contracts with a maturity below one year.
Colombia		Imposition of a deposit of 50% (up from 40% before May 2008) on inflows towards portfolio investments Imposition of a 40% deposit on foreign borrowing (had been reduced to 0% in 2008), complemented by the imposition of reserve requirements for the purpose of curbing leverage	Minimum period of two years imposed for all foreign direct investments. Limits on pension fund positions, among others.

Non-market-based measures taken by the central bank or the government in the last five years (cont) Table A1

	Taxes	Reserve requirements	Other
Israel	Cancellation of the tax exemption granted to foreign investors on gains from investments in Makam (short-term loans issued by the Bank of Israel) and in short-term government bonds	Imposition of reserve requirements on banking corporations for FX derivatives transactions with non-residents	Residents and non-residents are required to report to the Bank of Israel any transactions in FX swaps and FX forwards exceeding USD 10 million in a single day. Non-residents are required to also report transactions involving Makam and short-term government bonds exceeding ILS 10 million in a single day.
Korea	Reintroduction of a withholding tax on foreign purchases of treasuries and monetary stabilisation bonds Macroprudential stability levy		Limit imposed on local companies' FX hedging ratios. Subsequent reduction in the cap on local companies' FX hedging ratios from 125% to 100%. Reinforcement of regulation on foreign currency lending for domestic use. Limit imposed on banks' foreign currency forward positions: 50% of capital for domestic banks, 250% for foreign banks; subsequently cut to 40% and 200% of capital, respectively. Limit imposed on investment in non-KRW-denominated bonds issued in the domestic market.
Russia	Introduction of special measures that slightly tightened the tax regime with regard to corporate sector foreign borrowing	Use of differentiated reserve requirements for banks' domestic and foreign liabilities (higher level for foreign liabilities)	The Bank of Russia issued recommendations to banks to keep stable net foreign assets and currency positions. Adherence to these recommendations was taken into account when determining banks' individual credit limits for unsecured loans from the Bank of Russia. If a bank ignored these recommendations, its individual limits for Bank of Russia unsecured loans were considerably cut.

Source: Central bank responses to the February 2013 BIS questionnaire.