Reserves management and FX intervention

Central Bank of Brazil

Abstract

Over the last decade, emerging market economies have faced shocks arising from both external events and idiosyncratic factors. Brazil took advantage of benign conditions in the first decade of the century to substantially increase its foreign reserves, achieving reserves adequacy on several different criteria in the view of the IMF 2018 External Sector Report. These reserves served as macroeconomic insurance, reducing FX volatility and the risk premium during periods of market turmoil, while underpinning monetary and financial stability. In addition to accumulating reserves from interventions to "lean against" capital inflows, Brazil's FX interventions have been designed to address liquidity shortages and excess volatility, and to provide hedging. To these ends, the Central Bank of Brazil has used instruments that range from regular spot transactions through forwards, repo lines of credit to FX swaps – or synthetic futures. The ultimate aim of these interventions is to guarantee a properly functioning FX market.

Keywords: Foreign reserves accumulation, FX intervention instruments, FX intervention motivations.

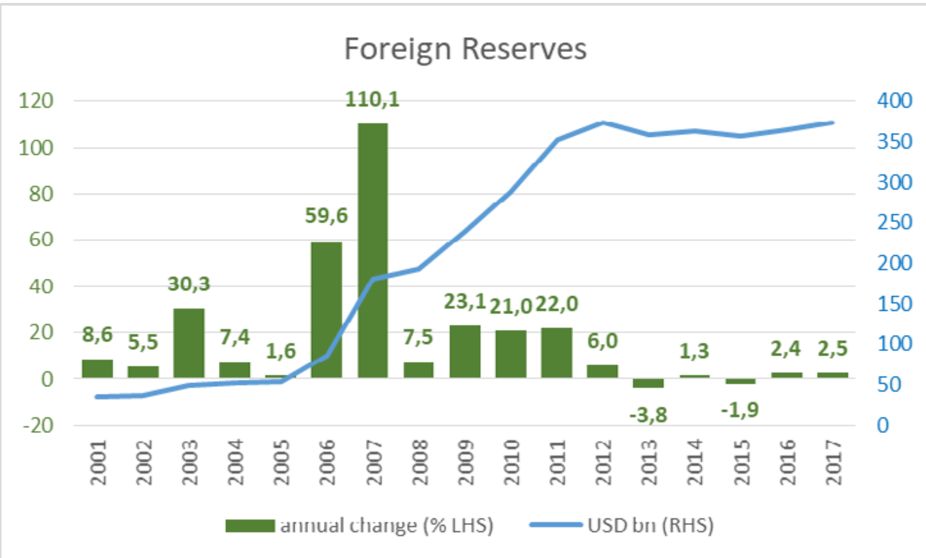
JEL classification: E5, E6, E60, H1, H12, O2, O24.

Drivers of reserve accumulation from a policy perspective

1. What have been the determinants of reserve levels in the past decade? To what extent have FX reserves been accumulated for precautionary reasons and as a by-product of other policies (eg maintaining competitiveness, limiting exchange rate overshooting, maintaining financial stability, supporting market liquidity)? Has there been peer pressure to increase reserves? What are the costs of reserve holdings? To what extent have low returns on reserves influenced their accumulation?

Brazil's foreign reserves have increased by more than 100% over the past decade, especially in 2009–11.[1] The most recent occasion on which Brazil intervened to buy or sell foreign currencies outright was in April 2012. Since then, the Central Bank of Brazil (BCB) has been active in the FX derivatives market via FX swaps, which do not involve the interchange of foreign currencies, as contracts are settled in domestic currency (BRL), paying the exchange rate change (while receiving the domestic interest rate). Foreign reserves have been accumulated for precautionary reasons and have worked as macroeconomic insurance, reducing exchange rate volatility and the risk premium, especially in periods of market turmoil. Despite various shocks over the last few years, there has been no major impact on trade or capitals flows. There has been no pressure to increase reserves in Brazil and, despite criticism about their supposedly elevated levels, Brazil has managed to keep the level of its reserves relatively stable since 2012. Considering the relatively long time span (of around 10 years), the realised cost of holding reserves has been low and, at times, even negative, due to the BRL's depreciation. This has occurred despite high interest rate differentials during most of this period. Although the expected return on reserves is a concern, safety and liquidity, in that order, are regarded as more important. Hence, low expected returns on reserves have not substantially influenced past decisions to accumulate them.

Graph 1



[1] Reserves reached USD 373.97 billion in 2017 (USD 180.33 billion in 2007), according to the BCB Time Series (SGS 3545).

2. How does the cost-benefit trade-off for reserves depend on structural features of the economy (eg exposure to terms of trade shocks, degree of dollarisation)?

The expected cost of holding reserves would fall if the interest rate differential between Brazil and the rest of the world were lower, given that open market operations (reverse repos) have been used to sterilise the BCB's purchases of foreign currencies. In this regard, a consistent fiscal policy is key to reducing the risk premium, by lowering the volatility of the local currency and the possibility of sudden capital outflows. Therefore, the implementation of reforms, especially those related to fiscal policy, such as the pension system reform, is crucial for improving macroeconomic conditions.

3. What is the best way to assess reserve adequacy? Are the best measures country-specific? Is it better to consider several measures simultaneously?

Countries have specific characteristics that make it difficult to propose a universal and adequate cross-country assessment of reserves. Despite a body of economic literature and some measures proposed by the IMF,[2] there is no standard measure for assessing an optimal level of reserves.

It is noteworthy that over the last few decades, emerging market economies (EMEs) have tended to prefer self-insurance as the Global Financial Safety Net (GFSN) has been unable to provide timely and sufficient liquidity when needed.

Approaches to assess reserve adequacy should consider not only balance of payments statistics but also exchange rate flexibility. A higher level of reserves is necessary if (i) the exchange rate is managed; (ii) short-term debt is high; (iii) external indebtedness is high; (iv) financial regulation and supervision are insufficient; and (v) the current account is susceptible to external shocks. We consider that it is appropriate to take into account several measures simultaneously.

One approach is to compare reserves holdings between countries in relative terms (eg in relation to a country's imports or GDP). Another method is to use coverage rules, such as the ratio of the reserves to variables such as foreign debt, exports, imports and monetary aggregates. A third approach is to assess the optimal relationship of costs and benefits in carrying a given holding of reserves.

As mentioned above, it is important to note that there are country-specific characteristics that can distort the assessment. When analysing the ratio of reserves to imports, for example, the Brazilian case suggests that this measurement is not reliable, since Brazil's imports have historically been low (in comparison with those of other EMEs), distorting this measure. In this case, the ratio of reserves-to-GDP would offer a better way to compare different countries.

There are different approaches to assessing reserve adequacy using coverage rules, as a measure of how far capital outflows would be covered. Wijnholds and Kapteyn (2001)[3] proposed the coverage of short-term debt plus a percentage over M2, multiplied by a country-risk measurement. The IMF's adequacy measure, known

[2] IMF, *Guidance Note on the Assessment of Reserve Adequacy and Related Considerations*, June 2016, source: https://www.imf.org/external/np/spr/ara/.

[3] J Wijnholds and A Kapteyn, "Reserve adequacy in emerging market economies", *IMF Working Papers*, no 01/143, 2001.

as ARA (assessment of reserve adequacy), suggests that Brazil´s FX reserves are slightly above the suggested range of 100–150% of the ARA metrics, reaching 160% in 2017.[4]

Another way of assessing reserves adequacy is to evaluate the opportunity costs involved in holding reserves, considering the interest rate spread between domestic and international rates.

It is advisable to use a variety of approaches to assessing reserves adequacy, in order to avoid arriving at a misleading conclusion based on only a single criterion. It is also important to acknowledge that the level of foreign reserves is not an isolated policy decision, as the operations of buying and selling foreign currency affect the exchange rate policy.

4. What are the alternatives to reserve accumulation? To what extent can macroprudential tools or capital flow measures help? How have changes in the global financial safety net and regional arrangements influenced the optimal level of reserves?

Changes in the Global Financial Safety Net and regional financing agreements have not influenced the optimal level of reserves. According to the IMF 2018 External Sector Report, Brazil´s level of reserves is considered adequate relative to various criteria, including the IMF's reserve adequacy metric.

Macroprudential tools and capital flow measures could help to mitigate financial risk, requiring a lower level of reserves, but should be used only under very specific conditions. Accordingly, we do not see them as a substitute for reserves accumulation.

Additionally, a consistent fiscal policy can strengthen the sovereign rating and reduce the volatility of capital flows. We consider that exchange rate flexibility has been important in absorbing external shocks, but that reserves accumulation has helped to achieve a more predictable path.

5. Have there been any unintended consequences of reserve accumulation? Does reserves accumulation support or weaken monetary policy or financial stability objectives? For instance, has reserve accumulation helped to "lean against" capital inflows or has it reinforced them by being perceived as a form of insurance? Do these implications vary with the time horizon?

Reserves accumulation has supported monetary policy and financial stability – and economic policy more broadly – by serving as a buffer against adverse shocks. In the case of Brazil, reserves have helped to reduce the volatility of the exchange rate and strengthen the sovereign rating, improving access to external financial markets and reducing funding costs for Brazilian companies and financial institutions. Additionally, lower FX volatility has helped to reduce inflation volatility.

4 www.imf.org/en/Publications/CR/Issues/2018/08/03/Brazil-2018-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-46154.

FX interventions: motivations, strategies and tactics

6. How important are different motivations for intervening in FX markets (eg smoothing out volatility, acting as a circuit breaker, provide liquidity, leaning against capital flows, containing excessive credit growth)?

Motives for intervening in the FX market vary according to market conditions. Historically, the BCB has intervened mainly to deal with liquidity shortages and/or volatility spikes. It has also taken advantage of capital inflows to accumulate international reserves.

Over the last 18 months, liquidity has been the main factor to decide whether an intervention is advisable. The BCB assesses the local FX market by monitoring key variables to gauge liquidity in the spot and derivatives markets, as well as volatility.

Leaning against capital flows was useful during the period when international reserves were being accumulated, from 2005 to 2012, with an interruption during the Global Financial Crisis (GFC) between September 2008 and March 2009, when the BCB focused on providing liquidity to the FX market.

7. What factors, including objectives or circumstances (eg nature of the shocks, appreciation or depreciation pressures), influence the choice of (i) instruments and markets; (ii) timing, market conditions and size; (iii) counterparty choice or platform; (iv) rules vs discretion; and (v) the degree of transparency (ex ante and ex post)? To what extent are interventions influenced by the operation of other public sector entities (eg sovereign wealth funds, commodity stabilisation funds)?

(i) instruments and markets:

The BCB may intervene in the interbank market – using spot, forward or repo lines – and in the derivatives market, using FX swaps. To decide on the appropriate market for an intervention, the BCB assesses whether the observed distortion was caused by imbalances in the spot market or in the derivatives market.

Since 2012, the main instrument for intervening in the interbank market has been auctions of repo lines of credit. This provides liquidity when the BCB believes that market conditions are temporary and are likely to normalise by the time its instruments mature, although rolling over these transactions is not unusual. On the other hand, if the imbalance is assessed to be extreme and the overshooting of the exchange rate has the potential to affect FX flows, spot auctions are judged to be more efficient. Forward operations are unusual but have been used to deal with significant occasional flows deriving from transactions such as those associated with mergers and acquisitions.

When the BCB perceives imbalances in the derivatives markets, Brazilian FX swaps are the appropriate tool to deal with price asymmetries. These offer an FX hedge through swaps when the market supply for hedging is scarce. Alternatively, FX hedges can be absorbed through swaps in periods of abundant supply. Brazilian FX swaps are adequate to meet the demand for hedging and speculative exposure in the derivatives segment amid excessive price volatility as long as convertibility risk is low. Given the large amount of foreign reserves and the belief that convertibility will be maintained, Brazilian FX swaps are an appropriate substitute for spot market intervention. It is noteworthy that the Brazilian FX derivatives market is large and more liquid than the FX spot market. This is the reason why swaps have become the most used FX instrument in the BCB's FX interventions.

(ii) timing, market conditions and size:

Changes in liquidity and volatility variables are important in estimating the scale and timing of an intervention. A key measure of liquidity in the spot market is the short-term "cupom cambial" rate, or the local USD interest rate, whereas bid-ask spreads and intraday volatility are important gauges of liquidity conditions in the USD futures market, where price settlement in USDBRL takes place.

In continued intervention actions, the bidding process in each auction is also used to evaluate the adequacy of the auctioned amount; this assessment is used to size subsequent auctions. Maturing amounts versus current market liquidity is also considered when deciding amounts to be offered in rollover auctions in both markets.

Seasonality is also a key variable in repo lines of credit auctions. The BCB usually offers this instrument in December, when dividend remittances and other large balance sheet-related outflows typically occur.

(iii) counterparty choice or platform:

By regulation, the BCB may intervene in the interbank market only with authorised FX dealers, unless there is a public offer. In this case, any institution authorised to deal in the FX market may participate. Historically, public offers in the interbank market have happened only during an extremely acute crisis, such as that of 2008–09. The choice of counterparty in the interbank market determines the platform. When intervening in the interbank market exclusively with FX dealers, the BCB does so by means of electronic auctions; when intervening with a broader set of participants, the BCB uses telephone auctions. All FX swaps auctions are executed using an electronic platform, and they are always directed to a broad set of participants.

(iv) rules vs discretion:

The Deputy Governor on Monetary Policy is responsible for implementing foreign exchange and monetary policy operations. When the economic environment may result in greater volatility and less liquidity in the domestic foreign exchange market, with a potential impact on other domestic markets, such as for interest rates, and in the real economy itself, the Deputy Governor on Monetary Policy may ask the Governor to convene the Foreign Exchange Advisory Group, which comprises the Governor; and the Deputy Governors on Monetary Policy; Economic Policy; and International Affairs and Corporate Risk Management.

For its part, the BCB's Board of Directors is responsible for defining and approving the Bank's strategic guidelines, including those on the foreign exchange market, for formulating and monitoring exchange rate policy; and for deciding on any measures necessary for the smooth functioning of the foreign exchange market. Whenever the estimated amount of operations exceeds 2.5% of international reserves over five working days, among other possible market conditions, the Board is called upon to fulfil these responsibilities.

(v) the degree of transparency (ex ante and ex post):

Transparency and objective communication by the Board of Directors have proven to be important tools in addressing FX market volatility and turmoil. Hence, the BCB has used only a limited degree of discretion in its transparency policy regarding the publication of data on FX intervention. For auctions in the interbank market, the BCB always publishes communiqués announcing the start of auctions. The auctions of repo lines of credit are also announced on the previous day but, depending on market conditions, the announcement may also be made in the course of the day. Communiqués are also published immediately after each auction with details of the cut-off rate. Traded volumes may or may not be published in the same communiqué. The total amounts of FX interventions in the interbank market are published weekly. For FX swaps, the BCB announces auctions on the previous day, but, if needed, the announcement can also be done in the course of the day. The BCB publishes the results, rate and volume immediately after the auctions. The outstanding amount of FX swaps is published monthly.

To what extent are interventions influenced by the operation of other public sector entities (eg sovereign wealth funds, commodity stabilisation funds)?

Other public sector entities have little influence over interventions. Such entities have played an occasional role in FX interventions when dealing with significant one-off flows, such as payments made from or to state-owned companies. However, this is unusual, as these companies have active and experienced financial departments that are usually able to plan such flows to mitigate their market impact, unless there is a contractual provision to make or receive such payments on a specific date.

8. To what extent have the modalities of intervention changed? If so, why?

Since the free-floating regime was established in January 1999, FX intervention has gone through major changes in Brazil, going from exclusively direct telephone orders to electronic auctions. As different types of auction have been added to the BCB's repertoire, the approach towards FX interventions is now to observe the needs of the market and adapt the style of intervention accordingly. If necessary, this includes the adoption of new types of operation to address specific imbalances. Recently, the BCB has adapted its repo lines for credit auctions in order to prevent the hedging of the outstanding amounts from causing additional stress in the yield curve during turbulent market conditions.

9. How effective have interventions been? Why? How do the tactics used affect effectiveness? Does it matter whether the exchange rate is appreciating or depreciating? What are the main economic mechanisms through which intervention operates?

The BCB does not publicly assess the effectiveness of each intervention, but it monitors a variety of market stress indicators, such as volatility and liquidity, and the effects of FX interventions.

Historically, FX interventions have been carried out to address issues that have spanned several months or years and have dealt with both currency appreciations and depreciations.

During the period of international reserves accumulation, which lasted from 2006 to 2012 (with a pause during the most acute period of the GFC), the BRL appreciated and the interventions did not aim to reverse this trend. As the main objective of the buy auctions was to accumulate reserves, the amount of external flows to the country was the targeted volume of the auctions. This approach also had a secondary effect of smoothing out the appreciation trend. This round of interventions was considered very effective as international reserves reached USD 370 billion in December 2012.

During the 2008–09 crisis, the main objective of FX intervention was to address extreme liquidity scarcity. Besides the sharp depreciation in the exchange rate, data showed a drop in exports and rollovers of external debt by private agents. Facing this scenario, the BCB acted through a diverse set of instruments – FX swaps, spot, repo lines of credit and loans earmarked to finance export transactions – and through assertive communication to the market of its determination to provide the necessary means to guarantee market functionality during the period of setbacks brought by international circumstances. The speed of market normalisation, given that this round of interventions lasted only from September 2008 to March 2009, demonstrated the effectiveness of the early start to the intervention, as well as the significant volumes offered and the simultaneous use of different instruments.

The most recent round of continued interventions started in 2013 to deal with the effects of the Fed-induced taper tantrum. After trying discretionary intervention actions without effectively smoothing out volatility, the BCB decided to announce an intervention programme. Making a predictable amount available to market participants tamed the turmoil that was beginning to develop in the domestic market and, consequently, volatility returned to acceptable levels.

10. To what extent has FX intervention hampered or supported the day-to-day implementation of monetary policy (eg sterilisation operations, control of the interest rate)? How does this depend on the context (eg normal times vs crises)?

In the context of the inflation targeting regime, monetary policy has sterilised the effects of the FX reserve accumulation on money markets through open market operations (reverse repos) in order to keep the overnight interest rate close to the Selic target rate, as defined by the Monetary Policy Committee (Copom). As a consequence, the mechanisms for overnight interest rate control have not been affected by these interventions, as there has been a very good coordination between FX interventions and monetary policy implementation. In terms of liquidity management, all the effects of FX interventions have been forecast and sterilised through the open market desk. In this sense, the FX interventions have supported the implementation of monetary policy.

FX interventions have been more supportive for monetary policy during a crisis than in normal times due to the greater exchange rate volatility during crises. In a crisis, the BCB's FX interventions have been crucial in stabilising fixed income markets. In recent years, the bulk of interventions have been conducted via FX swaps in the derivatives markets. In general, the aim has been to dampen exchange rate volatility in order to keep markets functioning properly. However, it should be noted that there is no direct or mechanistic relationship between monetary and exchange rate policies. The effects of external shocks, such as exchange rate depreciation, on monetary policy are related to their secondary effects on inflation.

Reserve management

11. Which overall motivations guide the composition of reserves portfolios? How can the various motivations best be balanced? How does the strategic asset allocation reflect that balance? Is there any link between the portfolio composition and intervention strategies?

The BCB holds reserves for various purposes, one being the precautionary motive of signalling a lower economic cost of adjustment in the case of a severe balance of payments crisis. In addition, a relatively large level of reserves boosts financial market confidence and provides funding for Brazilian sovereign bond cash flow payments when necessary.

The strategic asset allocation also aims for a countercyclical profile. This functions as insurance against a balance of payment crisis or exacerbated foreign exchange volatility, thus assuring a sufficient cushion when excessive foreign exchange volatility argues for intervention by the central bank. Brazil has a deep local exchange derivatives market, which allows certain types of FX intervention to be conducted without actually drawing on the reserves.

Consequently, safety, liquidity and return, in this order of priority, are the key principles behind the central bank's strategic asset allocation. Those guidelines are applied via a mean-variance framework focusing on the long-run strategic preferences, leading to an allocation highly concentrated in USD (82.3%) and some allocation to other G10 currencies, mainly the euro and Canadian dollar. Regarding asset class distribution, the bulk of reserves are allocated to G10 sovereign fixed income bonds and US agencies with a relatively short duration.

This allocation reflects the expected conservative nature of the international reserves, the asset-liability management profile, its countercyclical behaviour and the potential need for FX intervention.

12. What have been the most important shifts in the composition of reserves over the past decade (eg expansion into new asset classes, shifts in currency composition)? Along which dimensions, such as market, liquidity, or credit risk, has risk-taking changed? In prompting these shifts, what has been the role of changes in mandates/laws, in risk preferences, in the macro-financial environment, and in other factors? Has the search for yield been a significant consideration?

Over the past decade, the reserves composition has been diversified, even though the US dollar is still predominant. Currencies such as the SEK, DKK, CAD and AUD have been added to the benchmark. More recently, this movement has been partially reversed over the last three years, with the US dollar regaining importance.

In terms of asset classes, a very small allocation to equity indices has been added to the benchmark composition, and authorisation sought for equity futures and ETFs for active positioning. The same applies to commodities contracts, such as Brent and WTI.

Regarding risk-taking, there have been no significant changes over the past decade, as the central bank has kept to its conservative approach, especially regarding credit risk. The main driver for the changes on reserves composition were changes in financial markets and the economic environment after the subprime crisis, and, as a consequence, the risk preferences of the Board of Directors. The search for yield has played a role, but this has been secondary to liquidity and volatility.

13. Have there been important changes in risk management, remuneration, or the degree of outsourcing? If so, why? Can governance arrangements, including remuneration policies, help to limit procyclical investment behaviour, in particular when selling into a stressed market?

The BCB has made no significant changes to its risk management and remuneration policies in recent years. The tools used to manage risk were established many years ago and they have been continually improved. Remuneration policies are stable and, as public servants, staff are subject to the laws that apply to all federal employees.

In regard to outsourcing, the external asset management programme in place since 2000 was suspended in early 2017. The reason was to assess the benefits of the programme against its objectives: knowledge transfer, diversification and expanded scope for investing in new asset classes. Previously, the BCB outsourced the management of around 1.6% of its reserves, but it currently outsources just one mandate, to the BIS in CNY (assets under management: USD 250 million). Surveys indicate that around 70% of central banks outsource part of their reserves.

A governance arrangement has been implemented recently to enhance the process of investing reserves. A committee has been set up with responsibility for implementing strategic and tactical allocations. The committee meets regularly, and includes technical staff, as well as governors, from three different areas of the Bank: reserves management, international and economic affairs, and risk management. In our opinion, this is one way of guarding against procyclical investment behaviour.

14. Have there been important changes to disclosures (eg their granularity and frequency) over the past decade? If so, why, and what have been the trade-offs? What effect have they had?

The BCB has increased the transparency of its international reserves management process. In 2009, the Bank's webpage started to periodically publish the International Reserves Management Report describing historical data and performance, both in Portuguese and English. The response was positive, and aligned the BCB's reserves management with international best practice. We have received positive feedback from market participants who are impressed with the level of transparency and professionalism displayed in this publication.

15. How far are reserve management practices constrained by political economy considerations (eg impact of losses on the central bank's reputation, equity or profit distribution)? What arrangements or practices can help manage these risks (eg communication vis-à-vis the Treasury or the general public; involvement of loss-sharing arrangements)?

The reserves management practices have gained a great level of autonomy over political economy considerations, both Brazilian society and its policymakers accept the principle that the reserves management must play a specific role and that it should be seen as an insurance against external turbulence. It is true that, from time to time, the BCB faces some questioning from politicians regarding the cost of holding the reserves, given the high interest rate differential between domestic and external assets and the negative carry that it implies.

In that context, the Brazilian Senate has recently approved changes to the legislation governing the accounting for profits and losses from the foreign reserves, which will no longer be transferred to or from the Treasury, but will be accumulated in a separate account on the central bank's balance sheet. The new legislation is expected to increase transparency for reserves management but it still has to be approved by the legislature.