



BRAZIL

FINANCIAL SECTOR ASSESSMENT PROGRAM

TECHNICAL NOTE ON SYSTEMIC LIQUIDITY MANAGEMENT

November 2018

This Technical Note on Brazil was prepared by a staff team of the International Monetary Fund. It is based on the information available at the time it was completed on July 13, 2018.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
PO Box 92780 • Washington, D.C. 20090
Telephone: (202) 623-7430 • Fax: (202) 623-7201
E-mail: publications@imf.org Web: <http://www.imf.org>
Price: \$18.00 per printed copy

International Monetary Fund
Washington, D.C.



BRAZIL

FINANCIAL SECTOR ASSESSMENT PROGRAM

November 14, 2018

TECHNICAL NOTE

SYSTEMIC LIQUIDITY MANAGEMENT

Prepared By
**Monetary and Capital Markets
Department, IMF**

This Technical Note was prepared in the context of a joint IMF-World Bank Financial Sector Assessment Program (FSAP) mission in Brazil during February 28–March 21, 2018 led by Jodi Scarlata, IMF and Mariano Cortes, World Bank, and overseen by the Monetary and Capital Markets Department, IMF, and the Finance and Private Sector Development Vice Presidency, World Bank. The note contains the technical analysis and detailed information underpinning the FSAP assessment's findings and recommendations. Further information on the FSAP program can be found at <http://www.imf.org/external/np/fsap/fssa.aspx>.

CONTENTS

Glossary	3
EXECUTIVE SUMMARY	4
THE STRUCTURE OF BRAZIL'S KEY LIQUIDITY MARKETS	7
A. Money and Fixed Income Markets	7
B. The Foreign Exchange Market	11
THE AUTHORITIES' APPROACH TO MANAGING LIQUIDITY	14
A. The BCB's Monetary Policy Operational Framework	14
B. Foreign Exchange Intervention	17
C. Government Bond Market Liquidity Support	19
KEY ISSUES OF RELEVANCE TO FINANCIAL STABILITY	21
A. The Reliance of Markets on the BCB	21
B. The Development of The FX Spot Market	26
C. The Representativeness of Key Money Market Benchmarks	27
D. Market Maker of Last Resort	28
SUMMARY AND RECOMMENDATIONS	30
BOXES	
1. Specification of the Key CDI and SELIC Overnight Benchmarks	9
2. Proposed Changes to the BCB's Distribution and Capital Policies	16
3. International Experiences with Term Deposit Auctions	22
4. The Potential Need for Alternative Sterilization Instruments	23
5. A Preliminary Assessment of SELIC And CDI Versus the IOSCO Benchmark Principles	29
FIGURES	
1. Structure of Key Liquidity Markets	8
2. Foreign Exchange Markets and Intervention	13
3. BCB Liquidity Management and Bond Market Interventions	15
4. Flow of Funds in the Money Markets	21
TABLES	
1. Brazil FSAP—Systemic Liquidity—Key Recommendations	6
2. Overview of the Brazilian Money and Fixed Income Markets	7
3. Indexation of Money Market Instruments	10
4. Interest Rate Derivatives Markets	11

Glossary

ANBIMA	Associação Brasileira das Entidades dos Mercados Financeiro e de Capitais
BCB	Banco Central do Brasil
BRICS	Brazil, Russia, India, China and South Africa country group
BRL	Brazilian Real
CCP	Central Counterparty
CDI	Certificado de Deposito Interbancário
CDS	Central Securities Depository
CLS	Continuous Linked Settlement bank
FMI	Financial Market Infrastructure
FSAP	Financial Sector Assessment Program
IMF	International Monetary Fund
LCA	Asset backed Agribusiness Credit bills
LCI	Real Estate Credit Bills
MOF	Ministry of Finance
NDF	Non-Deliverable Forward
OMO	Open Market Operation
OTC	Over the Counter
SELIC	Sistema Especial de Liquidação e Custodia
TSA	Treasury Single Account

EXECUTIVE SUMMARY¹

Brazil's financial markets are generally liquid and sophisticated. Brazil is blessed with a wide array of instruments which investors can use to manage and hedge interest rate and FX risks. The infrastructure supporting markets appears sound and is widely attributed by market participants to ensuring the resiliency of Brazil's markets despite a multitude of significant shocks. A key foundation of the resiliency of Brazil's markets is the large structural liquidity surplus (around 20 percent of GDP) and Brazil's substantial FX reserves. Market participants generally have ample cash reserves that provide a key buffer against liquidity shocks.

Brazilian investors have a strong preference for high quality short term liquid investments. Brazil's history of economic instability drives investors towards short term liquid investments of the highest credit quality such as overnight repos and short-term government bonds. Dollarization is low reflecting restrictions on FX investments available within Brazil but hedges against FX risk are widely available and give investors' confidence to hold Real. Government bonds are the centerpiece of the securities markets.

The Brazilian markets are highly interconnected. Concentration is high in the Brazilian market (the top 6 asset managers/banks control over 60 percent of assets under management and 80 percent of banking system assets respectively) and banks and asset managers are parts of wider conglomerates that do substantial amounts of business with each other. The foundation of the all-important repo market is the BCB which, by virtue of its regular Open Market Operations (OMOs), takes funds from banks in return for government bonds which are then channeled to asset managers.

Well-developed derivatives markets allow investors to manage and take risk. Investors use interest rate and FX derivatives markets to price and manage risks. These markets are sophisticated, deep, liquid and have sound infrastructure such Central Counterparties (CCPs) to clear transactions.

But the underlying instruments that derivatives are based on are much less liquid. Interest rate derivatives use the overnight unsecured interbank CDI rate as their benchmark—a market that is very lightly traded is not generally perceived to be representative of the true cost of funding for large banks relative to the much more active SELIC repo market. The CDI benchmark needs urgent reform with most thinking that replacement with SELIC is preferable but need the authorities to take leadership to encourage markets to move away from CDI. International efforts to reform interest rate benchmarks provide a good guide on the approach the BCB could take (see paras 48–50). FX derivatives are based on a spot market that is relatively small and less accessible to some market participants with derivative exposures.

¹ This Technical Note has been prepared by Kelly Eckhold, IMF. The guidance of Carlos de Barros Serrao from the IMF is gratefully acknowledged although all errors are my own.

The development of the spot FX market lags Brazil's peers reflecting regulatory impediments.

Longstanding FX regulations limit transactions that physically settle in FX to the 189 authorized bank FX dealers. Hence price discovery occurs in less restricted derivatives markets with spot transactions reflecting the needs of end-users such as importers and exporters. This means that when FX derivatives markets become illiquid or close (for example when daily circuit breaker limits are reached on the B3 exchange) then investors have more limited alternatives to trade and manage risk. Spot markets need to develop to support their larger derivative counterparts. The FX regulatory regime should be updated to reflect the current level of development of Brazil's markets so more entities can trade in deliverable instruments (see paras 43–47).

The authorities play a key role in backstopping market liquidity. The BCB is a key supplier of high quality liquid assets to banks and asset managers through its large OMO repo operations. The BCB has at times intervened extensively in the FX futures markets to provide FX hedges at times when few alternative options were available to markets and continues to have an ongoing presence in the market. The MOF takes an active approach to issuing domestic debt and is responsive to changes in market conditions including using reverse auctions to provide liquidity in the bond market during periods of high volatility. Markets are comforted by the authorities' intervention roles in the bond and FX markets, the BCB's significant FX reserves and the high degree of coordination between the MOF and BCB during stress periods. However, reliance on the authorities is high and may at the margin discourage incentives by markets to develop the capacity to manage risks for themselves.

Planned changes to the central bank's operating framework could challenge markets.

Legislative changes designed to reduce the variability of transfers between the BCB and MOF, while desirable, may mean the BCB has fewer government bonds to use in OMOs over time. The BCB plans to introduce term deposits as an alternative tool to sterilize liquidity. It may not be easy or seamless for the BCB to introduce term deposits as these do not currently fit within asset manager's investment mandates. Deposits may also be costlier for the BCB due to their lower liquidity. Using BCB securities would be better—the BCB should pursue the legislative changes so they can issue their own securities (see para 40).

The BCB should review its operational framework to accommodate new instruments and better align operations with policy settings. New instruments demand a revised approach. The BCB should reform its OMO approach to accommodate more conventional fixed volume, variable priced auctions targeted at keeping rates close to the SELIC target rate (see paras 41–42). It would be sensible to align the interest rate paid on the Treasury Single Account with SELIC as that's better benchmark for a short-term risk-free deposit (see para 41).

Table 1. Brazil FSAP—Systemic Liquidity—Key Recommendations

Recommendations	Responsible Authorities	Time¹
Monetary Policy Operations and Liquidity Management		
BCB to seek authority to issue term deposits for short-term sterilization purposes and to seek authority to issue its own securities for monetary policy purposes if an additional structural tool is required (¶ 40)	BCB and MOF	I
BCB to develop an operating approach that incorporates variable rate auctions of term deposits and eventually BCB securities (¶ 41)	BCB	I
BCB to reform its operational target to better align OMOs with the SELIC policy target rate (¶ 42).	BCB	I
BCB to set the interest rate on the TSA equal to SELIC (¶ 41)	BCB and MOF	NT
Improving the resilience of money, bond and FX markets		
Replace the CDI benchmark with the overnight SELIC benchmark (¶ 48-50)	B3, BCB and ANBIMA	NT
Review the regulatory framework governing the spot FX market to allow a wider range of participants to trade contracts that are deliverable in FX (¶ 43-47)	BCB and MOF	NT
¹ "I (immediate)" is within one year; "NT (near-term)" is one–three years; "MT (medium-term)" is three–five years.		

THE STRUCTURE OF BRAZIL'S KEY LIQUIDITY MARKETS

A. Money and Fixed Income Markets

1. **Brazil's money market is dominated by overnight instruments.** The SELIC repo market is the deepest and most actively traded money market segment by far, followed by the small onshore FX swaps and the unsecured CDI interbank markets (table 2). SELIC repos and the interbank market are largely traded overnight (figure 1). Most money market instruments have shallow markets.

Table 2. Brazil: Overview of the Brazilian Money and Fixed Income Markets

	<u>Money Market</u>				<u>Bond Market</u>
	SELIC Repo	Interbank Unsecured CDI	Certificates of Deposits	Commercial Paper and Asset backed securities¹	Federal Government
Participants	Banks and BCB, broker-dealers, mutual funds, pension funds, insurance companies, institutional investors and individuals	Banks and intermediaries	Banks, institutional investors, mutual funds, NBFIs corporates and non-residents	Banks and intermediaries	Banks, broker-dealers, mutual funds, pension funds, insurance companies, institutional investors and individuals
BCB's Role	OMO Counterparty	None	None	None	Settlement system provider
Outstanding issuance (2017)	1,273 billion	52.7 billion	198 billion	254.8 billion	3,187 billion
Average maturity (2017)	1.3 days	1 day	83 days	225 days	4.4 years
Daily traded volume (2017)	1,289 billion	2,634 million	4,574 million	687 million	28,789 million
Turnover ratio	281	12	0.5	0.6	2.2

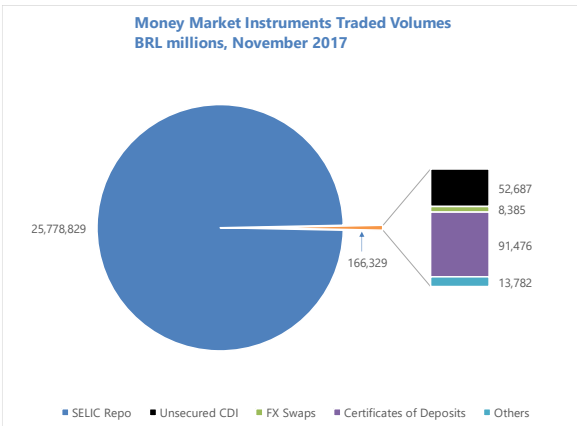
Sources: BCB, ANBIMA and IMF.

¹ Includes Asset backed Agribusiness Credit bills (LCA) and Real Estate Credit Bills (LCI)

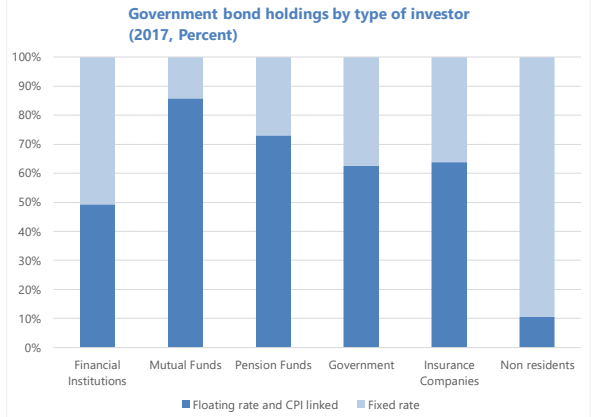
Note: FX swap market turnover is as provided by the April 2016 BIS Triennial FX Turnover Survey and FX swap maturity data are from the BCB.

Figure 1. Brazil: Structure of Key Liquidity Markets

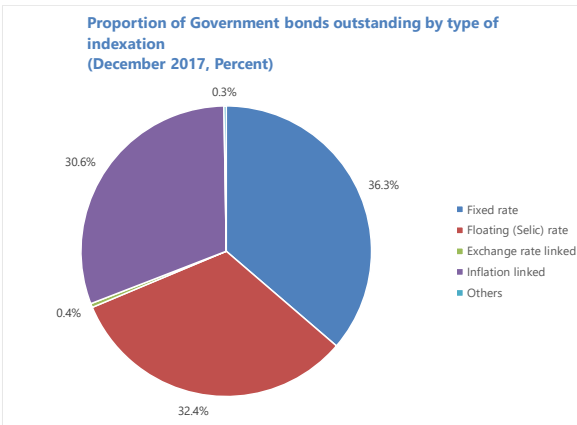
The money market is dominated by overnight repos...



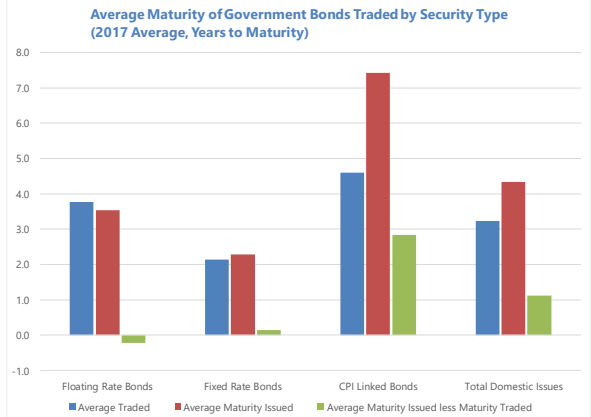
... reflecting local investors' preference for liquidity and safety



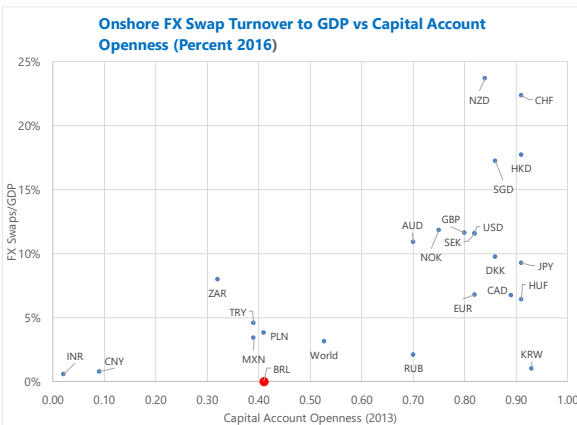
The federal bond market is largely indexed or floating rate



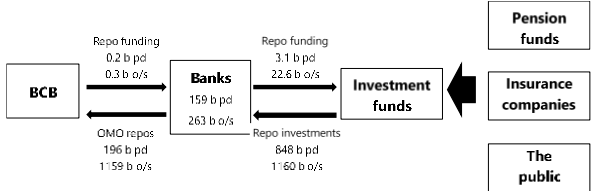
Government bond turnover is heaviest at shorter durations and in floating rate bonds



Brazil's FX swaps market is very small



Investment funds dominate repo trading



Source: BCB, BIS 2016 Triennial FX Survey and IMF staff estimates.

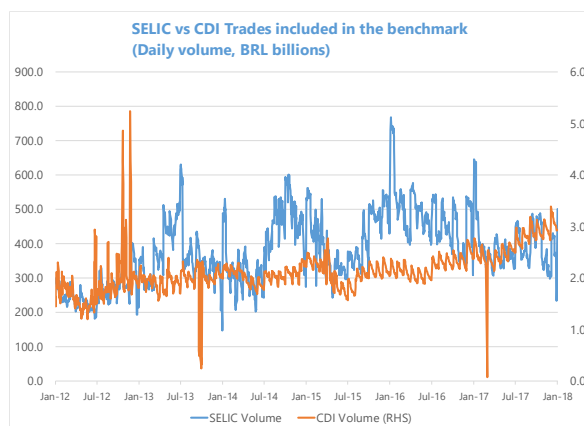
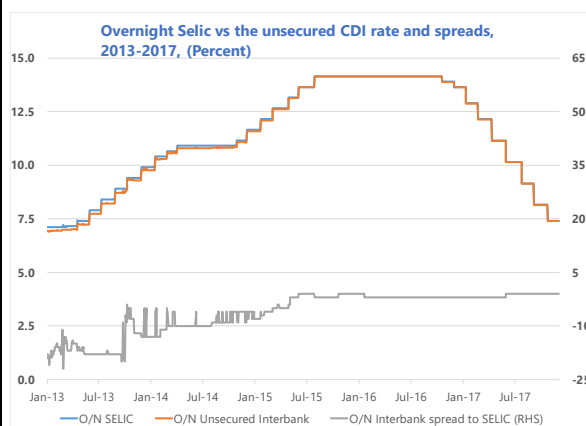
Box 1. Specification of the Key CDI and SELIC Overnight Benchmarks

Both the key overnight benchmarks are based on interbank trades. The SELIC repo rate is calculated by the BCB based on repo trades captured in SELIC while the B3 exchange calculates the CDI rate.¹ Both rates move very closely together and CDI lies at a margin below SELIC.

SELIC comprehensively reflects market trades whereas CDI captures few overnight interbank transactions. All repo market transactions between SELIC system participants, including transactions involving the BCB, are included in SELIC. CDI is based on a subset of larger interbank market transactions in the “fixed overnight DI” market and excludes overnight interbank transactions negotiated at a margin to CDI “floating overnight DI trades”. The trade volumes underlying SELIC are hence significantly greater (almost 150 times in 2017) than for CDI.

Frequently, there are insufficient CDI trades, hence a fall-back rule based on SELIC is used. The CDI can only be calculated if more than ten trades are available. Much of the time this criterion is not met (on around 92 percent of occasions in the first half of 2017) and the CDI rate is calculated at a margin below SELIC.

CDI is not representative of interbank funding costs. Large banks do not use the CDI market for funding. The trades that occur are generally from smaller banks with excess funds but limited options to invest whom are forced to deposit funds with liquid larger banks. CDI transactions hence tend to occur below SELIC reflecting the negotiating power of the receiving bank. The relationship used in the CDI fall-back rule is estimated based on these transactions but is not very relevant for bank’s funding costs as banks are not raising much funding in the CDI market.



Sources: BCB and IMF Staff Estimates

¹ For the regulations defining SELIC see "Metodologia de Cálculo da Taxa Selic" - Circular 3,671, of 2013, at http://www.bcb.gov.br/pre/normativos/busca/downloadNormativo.asp?arquivo=/Lists/Normativos/Attachments/48860/Circ_3671_v1_O.pdf and for details on construction of the CDI benchmark see "Nova Metodologia de Apuração da Taxa DI" at http://estatisticas.cetip.com.br/astec/di_documentos/metodologia1_i1.htm

2. Government bonds comprise the bulk of liquid fixed income instruments. Longer term fixed income trading is centered around the government bond market. This market has grown significantly over the last ten years and the average maturity of government bonds has lengthened. Despite these positive trends, market activity is concentrated in shorter maturity bonds and the bulk of government bond issuance is either CPI indexed or floating rate, reflecting the domestic investor

bases' preference for liquidity and safety (figure 1, middle panels). Most participants in the government bond market are buy-and-hold investors. Government bonds are the lynchpin of the repo market—repos of non-government securities are relatively thinly traded.

3. Many money market and fixed income instruments are issued at floating rates. Around 75 percent of non-government issued money market instruments are indexed to the unsecured interbank CDI rate (table 3). Only around 10 percent of non-government securities are tied to the overnight SELIC repo rate. Government bonds, on the other hand, are indexed to the SELIC government bond repo rate.

Instrument	Indexed to:				
	Interbank Unsecured CDI	SELIC Repo	Fixed rate	Inflation indexed	Others
Time deposits	682,855	8,450	22,639	3,628	1,245
Interbank deposits	194,460	162,098	157,937	0	0
Asset backed securities	144,095	0	4,476	73	0
Real estate backed securities	176,508	0	4,982	1,094	912
% of Total	76.5	10.9	12.2	0.3	0.1

Source: BCB

4. The benchmark CDI overnight rate is illiquid compared to the SELIC repo benchmark. The overnight CDI rate is the primary benchmark for most financial instruments aside from government bonds.² The CDI rate moves very closely with the SELIC rate but is generally a few basis points lower despite the higher credit risk of CDI. CDI moves closely with SELIC as much of the time there are insufficient CDI transactions to determine a benchmark rate, hence a fallback rule is used that bases the CDI rate on the SELIC benchmark less a margin (box 1). The SELIC benchmark is actively traded and well defined and much more representative of interest rates in the market compared to CDI. Banks use overnight repo to manage their liquidity and hence the SELIC repo rate is a superior indicator of bank short term cost of funds compared to the CDI rate.

5. Relatively deep derivatives markets exist that allow investors to manage and take interest rate risk. Interest rate derivatives markets based on both the CDI and SELIC rate exist but almost all trading occurs versus the overnight CDI rate (table 4). The CDI futures curve is the main benchmark yield curve for term instruments and investors use CDI futures to either hedge or take interest rate risk. Bid-offer spreads are low and market depth is high relative to trading government

² Historically, the interbank CDI market was an important component of bank funding costs and hence the CDI rate was a natural benchmark for the market to use.

securities hence investors manage risk using derivatives as opposed to trading in cash money market or fixed income instruments.

6. Most participants cannot or choose not to use the FX swap market for liquidity management. Brazil's FX swaps market is very small, both in absolute size, and relative to peer countries (table 2 and figure 1, bottom left panel). This means that market participants cannot easily use foreign exchange to meet Brazilian Real liquidity needs on a hedged basis without resort to the derivative markets (the deep SELIC repo market is a more preferred liquidity management instrument). The size of the market reflects Brazil's FX restrictions that prohibits many domestic market participants from participating in any deliverable FX denominated contract onshore (see latter discussion on FX markets).

Table 4. Brazil: Interest Rate Derivatives Markets, December 2017
(BRL Millions)

	Traded Volumes (Daily Avg, 2017, BRL billions)	Open Interest (Daily Avg, 2017, BRL billions)
CDI futures	144.6	2031.9
SELIC futures	0.008	1.7
CDI Interest rate swaps	3.7	N/A
< 30 days	35%	
30 to 365 days	29%	
1 to 5 years	31%	
5 years and longer	4%	
SELIC swaps	0.0	N/A

Source: BCB

B. The Foreign Exchange Market

7. Brazil's FX market is in the top 20 largest markets globally. Brazil's FX market is small compared to advanced economies but around the median in terms of turnover to GDP of its BRICS peers once Brazil's relatively important FX derivatives markets are considered (figure 2). The Real market is relatively liquid and well developed compared to other FX markets in Latin America and is frequently used by regional investors to proxy-hedge risks from investments elsewhere in Latin America. Bid-offer spreads compare favorably to other FX markets.

8. The FX spot market is relatively small, partially reflecting regulatory constraints. The Spot (and onshore FX swaps) market is relatively small – even after accounting for Brazil's low level of capital account openness compared to the most actively traded global markets (figure 2, top right panel). Brazil's FX regulations do not allow some domestic market participants to enter into any contract settled in FX.³ These regulations constrain access to the spot market for some purposes such as speculation or hedging, Banks, exporters and

³ Kang and Saborowski (2015) note that Brazilian law (Decree-Law No. 857) states that every contract, security, document or obligation, in order to be fulfilled in Brazil, cannot stipulate payment in gold or foreign currency, or, in any form, restrict or refuse fulfillment in the Brazilian currency. The exceptions to that law are: currency exchange

(continued)

Importers have the widest access to the spot market (end-users must trade with one of the 189 authorized FX dealers). Much spot market activity reflects end user needs to convert to and from Reals as opposed to hedging, trading and risk management. The relative liquidity of FX derivatives (discussed below) is no doubt also another factor contributing to lower spot market activity.

9. Liquidity and price discovery is concentrated in the relatively large and sophisticated FX futures market. FX derivatives are much more widely accessible to market participants and, as a consequence, much more actively traded, and the center of price discovery, trading and hedging (figure 2, middle right panel).⁴ The key FX hedging market is the DOL US dollar futures instrument listed on the B3 exchange. This instrument is a BRL settled futures contract based on a notional USD 50,000 investment in Real earning the overnight CDI rate and paying the onshore USD Cupom Cambial interest rate. Turnover in 2017 averaged around 15.7 billion USD per day.

10. The bulk of FX contracts are cleared or registered with the B3 exchange. Exchange traded FX derivatives such as the US dollar futures contract are cleared through the B3 central counterparty (CCP). OTC derivatives contracts such as onshore NDF's and BRL settled FX swaps are registered with the exchange. All domestic entities are required to register (but not clear) OTC derivatives with the B3 exchange. The B3 exchange determines margins for exchange traded derivatives settled through its CCP. These margins are conservatively set and vary with market conditions. The B3 exchange re-margins positions once a day, hence margins need to be sufficient to cover FX risks for two days once margin is received.

11. Even interbank spot FX transactions settle through the B3 CCP. Interbank market participants can settle spot FX transactions through the B3, which helps eliminate settlement risk in deliverable FX transactions. The Real is not part of the Continuous Linked System (CLS) for settlement of global FX transactions hence the B3 CCP is playing the role of reducing counterparty risks in FX in Brazil. Market participants have limits on the volume of spot FX transactions that can be settled through the B3 exchange on a day (around USD 1 billion per counterparty) as the B3 has limited access to USD funding. Larger transactions need to be split up or settled outside the B3 exchange directly between counterparties.

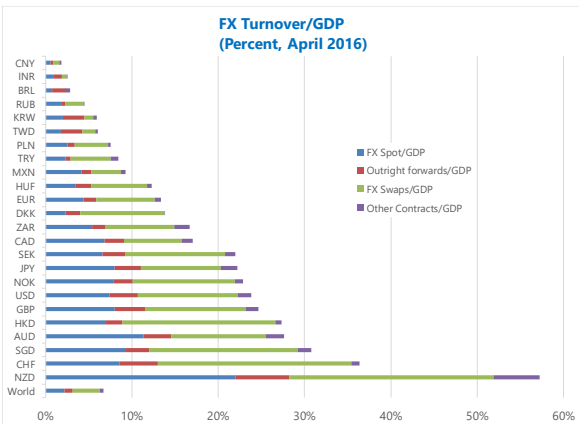
12. FX hedging markets allow for term FX hedging. The key dollar futures instrument is much more heavily traded in the nearest maturing contract which typically matures within 2 months. Other OTC instruments have longer tenors although those markets are much smaller (figure 2, bottom panels). Nonetheless investors (for example foreign investors) can put in place long term FX hedges by combining rolling dollar futures contracts with the CDI and Cupom Cambial USD futures curves which are deep and liquid for long tenors.

operations, import/export contracts, export financing (when a Brazilian bank buys, paying in Reals, in advance, the amount of foreign currency to be received by an exporter in an export operation) or loans or any obligations in which the creditor or debtor is domiciled outside Brazil.

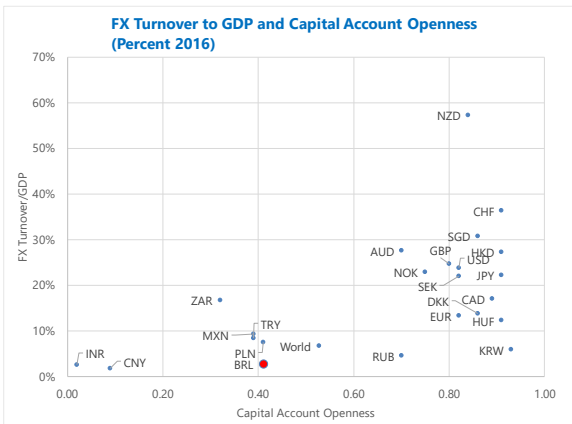
⁴ The literature well documents the importance of the futures market as the center of price discovery in Brazil—see for example Garcia, Madeiros and Santos (2015) "Price Discovery in Brazilian FX Markets" *Brazilian Review of Econometrics*, v. 35, no 1, pp. 65–94 May 2015.

Figure 2. Brazil: Foreign Exchange Markets and Intervention

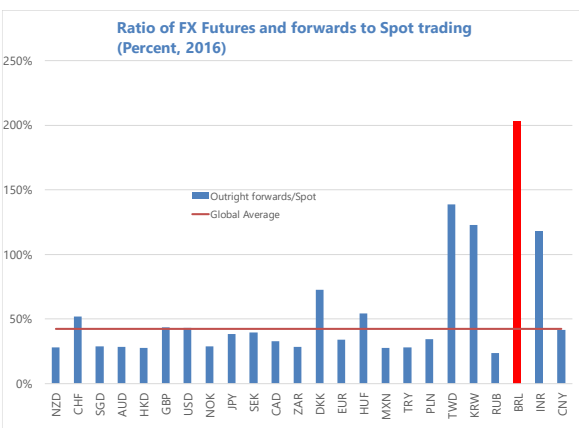
Brazil's FX market is small relative to advanced markets...



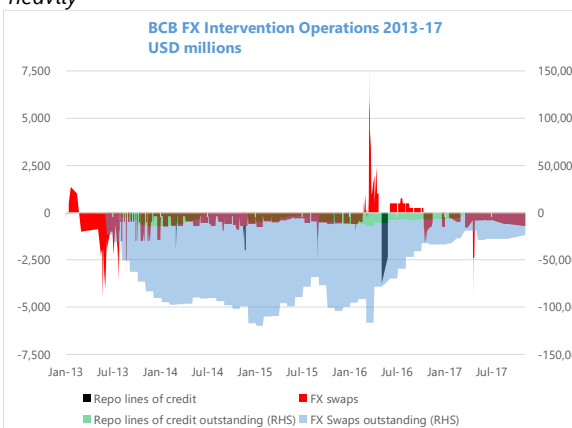
... partially reflecting capital controls



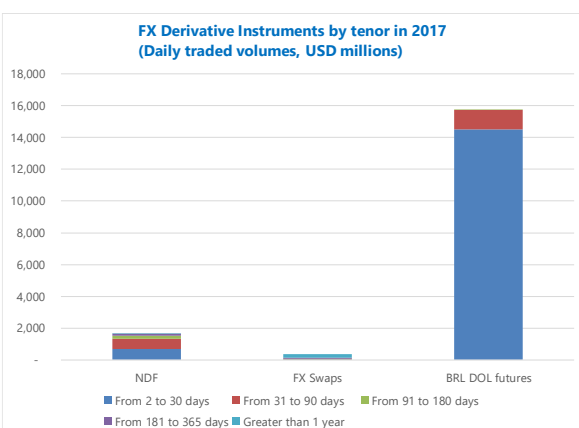
Derivatives markets are unusually important



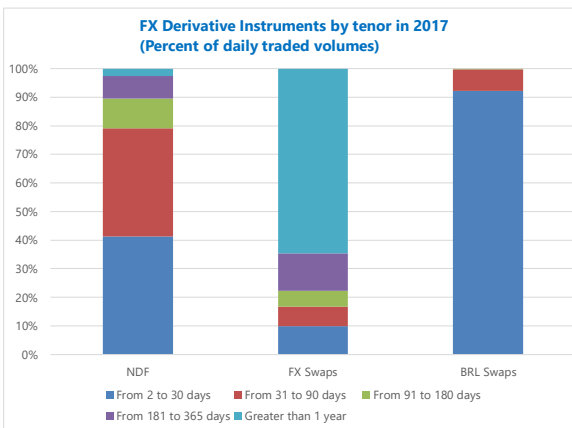
The BCB intervenes using FX derivatives – sometimes heavily



FX futures are the main FX hedging instrument



FX Hedging instruments are relatively short maturity



Sources: BCB, BIS 2016 Triennial FX Survey, Jahan (2015) and IMF staff estimates.

THE AUTHORITIES' APPROACH TO MANAGING LIQUIDITY

A. The BCB's Monetary Policy Operational Framework

13. The BCB operates a mid-corridor interest rate implementation framework. The BCB's operational target is the overnight SELIC repo rate which it influences with Open Market Operations (OMOs) using government bond repos. While the BCB policy rate is specified as a target for the overnight SELIC rate, in practice the BCB has been happy for the market overnight SELIC rate to remain around 10 basis points below the policy target rate. The BCB has two day standing lending and deposit facilities to limit interest rate volatility priced at 80 basis points around the market SELIC rate.⁵

14. Brazil has a large structural liquidity surplus whose management is the BCB's main focus. The structural liquidity overhang is large in Brazil at around 25 percent of GDP (figure 3, top left panel), mainly reflecting the BCB's significant FX reserves. Without the issuance of significant volumes of sterilization instruments interest rates would fall to the BCB's overnight deposit rate. Hence liquidity sterilization is the BCB's main liquidity management objective.

15. Structural liquidity is absorbed using high reserve requirements and repo operations. Reserve requirements are very high (40 percent for demand deposits) and currently account for around 25 percent of total sterilization (figure 3, top right panel).⁶ The balance of sterilization occurs using repos ranging between a maturity of overnight to 6 months (figure 3, top right panel). Overnight repos are offered daily while other maturities are offered periodically throughout the week. Most liquidity is sterilized using 45-day repo operations that span the time between MPC meetings. The average maturity of BCB repos is around 20 days. The BCB is not permitted by law to issue its own securities but does have the power to conduct outright government bond sales from its portfolio, but does not do so in practice.

16. The BCB's capacity to sterilize using repo operations is underpinned by the MOF. The BCB regularly receives government securities from the MOF when valuation losses accrue on the BCB's foreign reserves. In addition, regulations allow the BCB to receive further government securities from the MOF if their unencumbered holdings fall below 20 billion BRL. Box 3 below discusses how the BCB distributes income from foreign exchange and domestic market operations to the government. The key aspect of relevance to the BCB's capacity to conduct repo operations is

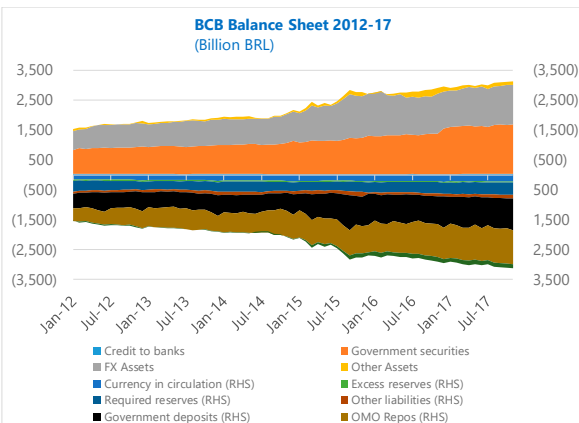
⁵ The standing lending and deposit facilities have a two-day maturity so any transactions at these facilities do not enter into the overnight SELIC benchmark calculation. Intraday liquidity is available secured on government securities and is free intraday and rolled over at 100 basis points over SELIC if still outstanding at the end of the day. The BCB only accepts Brazilian government securities as collateral in its normal operations. The BCB determines its collateral haircuts considering the volatility of government securities prices and the maturity of collateral and transmits these haircuts daily to market participants.

⁶ Reserve requirements are partly remunerated depending on the nature of the liability. Required reserves on demand deposits are not remunerated whereas required reserves on time deposits and savings deposits are remunerated at the SELIC rate and savings deposits interest rates respectively.

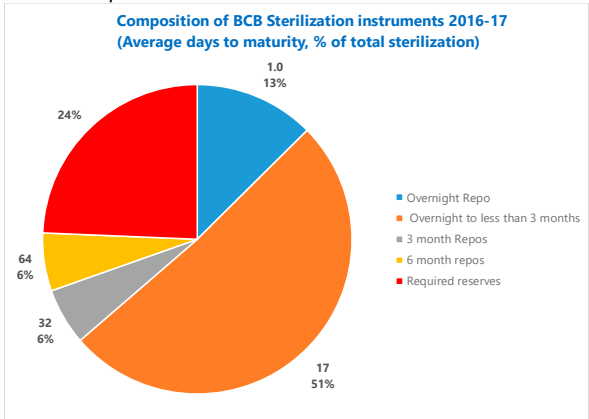
that FX losses—realized or unrealized—are covered by the MOF on a semiannual basis through injections of government bonds to the BCB balance sheet.

Figure 3. Brazil: BCB Liquidity Management and Bond Market Interventions

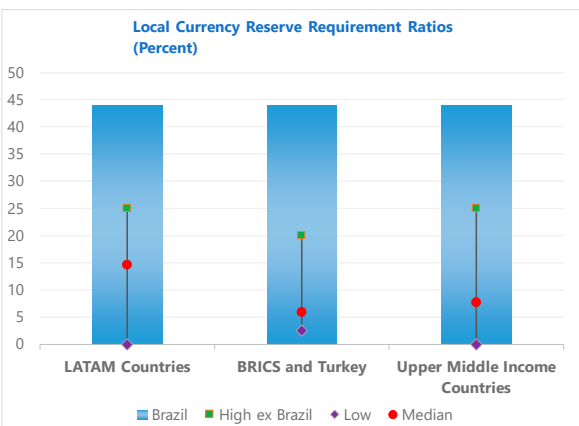
Liquidity management is focused on sterilization



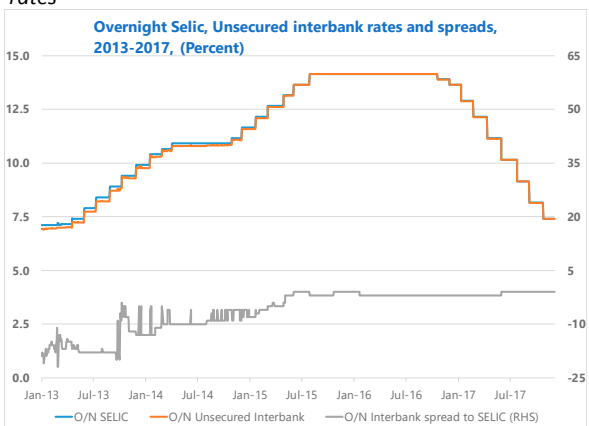
... using short term repos of government securities and reserve requirements



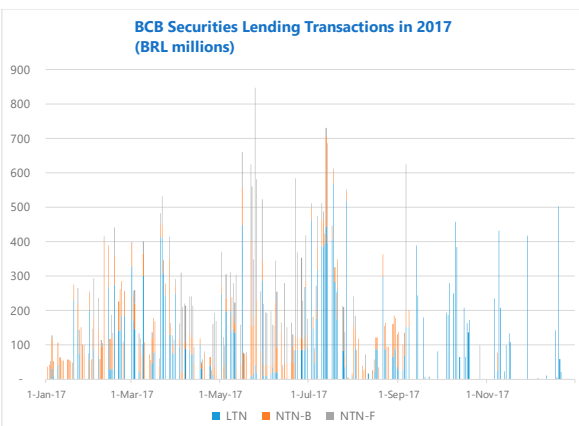
Reserve requirements are very high in Brazil



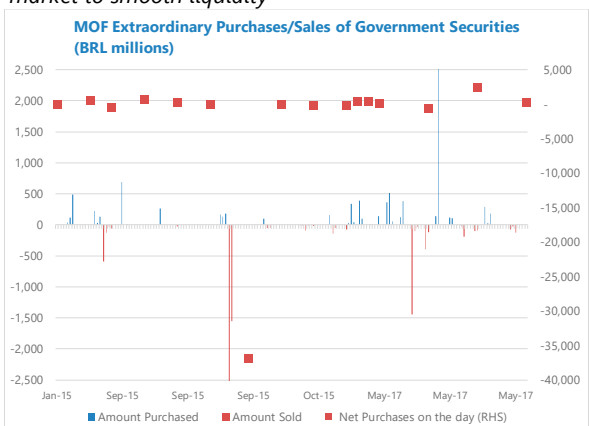
Benchmark overnight unsecured rates trade below secured rates



The BCB liquefies the bond market via securities lending



The BCB and MOF intervene in the government bond market to smooth liquidity



Source: BCB and IMF staff estimates.

Box 2. Proposed Changes to the BCB's Distribution and Capital Policies

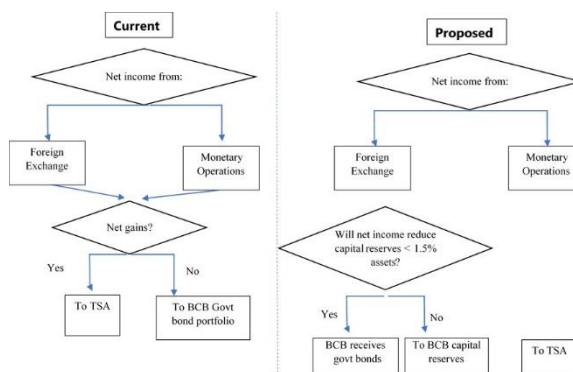
The complexity of financial flows between the BCB and the Government impedes transparency. The Fund's 2017 evaluation of Brazil's fiscal transparency noted that the existing practices of income transfers between the BCB and MOF makes it hard to assess financial outcome associated with FX policy and FX reserves management as well as hindering the assessment of government debt dynamics and the cost of public debt.¹

Net income is treated differently to net losses. Net income is transferred to the government's TSA account every six months, while losses are returned to the BCB in the form of government securities.²

The impact of these arrangements has been growth in the BCB's balance sheet. FX gains have boosted the TSA while offsetting FX losses due to fluctuating exchange rates have been reflected in increased BCB government bond holdings.

It is proposed that future FX gains and losses accrue to the BCB's capital reserves. This would reduce the size of flows going to and from the TSA and would reduce the extent to which the BCB builds up its portfolio of government bonds. Recapitalization of the BCB would occur if capital reserves falls too low and funds would flow to the TSA if reserves grow too large.

The proposed arrangements are conventional but may have implications for the BCB's monetary operations. The BCB's government bond portfolio might not grow over time in line with growth in the structural liquidity surplus. Hence the BCB might need to find other instruments to sterilize liquidity. It is currently being proposed that the BCB be authorized to accept term deposits as an alternative sterilization tool. BCB securities would be a superior alternative tool but would require changes to the Fiscal Responsibility Law.



¹ Annex 2 of Country Report No 17/104 discusses these issues.

² The rules currently in force are established in Provisional Measure N° 2.179-36, of August 24, 2001 and in Law N° 11.803 of November 5, 2008.

17. The government retains a large deposit in its account at the BCB. The government's balance in the Treasury Single Account (TSA) is large at around 33 percent of BCB assets and 15 percent of GDP. These deposits are used by the government as a cash buffer against unexpectedly poor financing conditions in the debt markets and largely reflect accumulated transfers of past BCB unrealized gains on foreign reserves and foreign exchange intervention. The TSA is remunerated based on the average accrued yield the BCB earns on the government securities it holds and interest is paid every ten days.

18. Changes to the BCB's operational framework are proposed that might shift the focus from repos to other instruments. The Brazilian Senate is considering revised legislation which includes provisions that allow the BCB to accept remunerated sight or term deposits. Such deposits

could be used as a substitute for repo transactions of government securities.⁷ Thus there is potential for these changes to change the composition of the instruments the BCB uses to sterilize liquidity as currently around 75 percent of total sterilization (or around 19 percent of GDP) occurs using repo (figure 3, top right panel).

19. Reforms to the BCB's income distribution arrangements may impact the BCB's capacity to rely on repo operations over time. The Senate proposal would cease such injections as FX losses would accrue to a newly created BCB capital reserve that would be funded through any FX gains received on the BCB's FX reserves over time. The Senate proposal does codify a minimum threshold for unencumbered BCB government bond holdings of 4 percent of total BCB holdings and allows for the BCB to receive emergency injections of bonds if serious liquidity management pressures emerge.⁸ But on balance, the new set of arrangements might reduce the flow of new bonds to the BCB balance sheet and the BCB's capacity to use repo compared to the status quo.

B. Foreign Exchange Intervention

20. The BCB has an active FX intervention approach. The BCB has no formal written FX intervention policy and objectives have varied over the years from foreign reserves management to exchange rate volatility management objectives. More recently the focus has been on leaning against exchange rate volatility as opposed to concerns about the level of the exchange rate. BCB intervention have been frequent and at times relatively large. From 2013-2015 the BCB intervened heavily to stem volatility emanating from the US Federal Reserve "Taper Tantrum" and sold FX in the form of Brazilian swaps of around USD 115 billion or around 20 percent of BCB FX reserves (figure 2, middle right panel).⁹

21. The BCB can intervene in both spot and derivatives but mainly intervenes in the futures market. The BCB has a wide variety of instruments available and has used them all at times (Figure 2, middle right panel). More recently (since mid-2012) the BCB has exclusively used FX derivatives for intervention in the form of FX repo lines of credit (equivalent to standard FX swaps), and sales of "Brazilian FX Swaps" (cash settled contracts for difference based on the change in the USD/BRL exchange rate and the accrued SELIC interest rate over the life of the swap). Intervention operations occur through preannounced multiple price auctions (for FX spot and FC repos), and single-priced auctions for Brazilian FX swaps. The volume offered in FX swap auctions is announced and the BCB has flexibility to allot less than the amount offered depending on bids received. The volume offered in spot FX auctions is not fixed in advance of the auction.

⁷ Article 9 of draft Senate Law 314/2017 of Senator Ricardo Ferraco.

⁸ The proposed new 4 percent minimum threshold is an effective increase in the existing minimum threshold of 20 billion Reals.

⁹ See Kang and Saborowski (2015) "Assessment of Foreign Exchange Intervention", Selected Issues in IMF Country Report 15/122, March 2015, for a thorough discussion of the BCB's intervention approach up until 2015 <https://www.imf.org/external/pubs/ft/scr/2015/cr15122.pdf>

22. The choice of intervention instrument reflects the relative liquidity of markets and the source of exchange rate volatility.

As price discovery and liquidity is centered on the Brazilian futures market, intervention mainly occurs there. Spot market intervention would be more likely if convertibility risks emerge to the extent that the onshore US dollar interbank rate—the Cupom Cambial—rises relative to offshore US interest rates.¹⁰ Repo lines of credit are used in situations where FX demand stems from temporary FX funding shortages while Brazilian swaps are used if hedging or outflow pressures are predominant.¹¹

23. The BCB has used both discretionary and rules based intervention approaches.

The BCB took a discretionary approach up until 2013 but then switched to a preannounced regular program of interventions using FX repo lines of credit and Brazilian FX swaps until March 2015. The adoption of a rules based approach reflected the view that exchange rate pressure was being driven by hedging demand from corporates and households which would be best met with a more predictable and transparent approach.

24. The BCB has at times been a large part of the futures market and a key hedging counterpart.

The scale of the BCB's FX intervention operations have, at times, dominated the FX hedging markets leaving the BCB as the primary counterpart to the market's hedging needs. For example, in late 2014, when the BCB FX swap program was at its peak, Brazilian banks accounted for around half of the BCB's outstanding swaps, institutional investors around 45 percent and foreign investors around 5 percent.¹²

25. The BCB has relatively transparent communications protocols surrounding intervention.

Auctions are preannounced and results released by communique immediately after the conclusion of the auction. Volumes transacted and outstanding of intervention instruments are published weekly allowing full transparency of the BCB's intervention ex-post.¹³

26. Banks play a key role in intermediating the BCB's derivatives interventions to end users.

Banks are in the unique position of being able to operate in both the spot and derivatives markets and are also a key BCB intervention counterpart.¹⁴ Banks trade with the BCB and then on-

¹⁰ The list of entities eligible to participate in BCB spot FX intervention operations is available at <http://www4.bcb.gov.br/pec/dealers/principal.asp>

¹¹ Repo lines of credit are often offered at the end of the calendar year when foreign firms operating in Brazil remit profits to their parents offshore resulting in increased demand for FX. Year-end US dollar funding pressures are generally high globally making it difficult for Brazilian banks to fund these FX needs cost effectively. The BCB's lines of credit help meet these FX needs and are generally repaid a few months later when commodities revenues are received by the banking system.

¹² See Figure 7 in Kang and Saborowski (2015) for a discussion of these data and related charts.

¹³ Traded volumes are available at www.bcb.gov.br/pec/Indeco/Ingl/indecoi.asp. FX Swap auction results are available at <http://www.bcb.gov.br/htms/selic/selicedital.asp?idpai=SELICOFERTA>. The BCB's International Reserves and Foreign Currency Template is available at <http://www.bcb.gov.br/ingles/economic/seriehistqsriliq-i.asp>.

¹⁴ The BCB selects 13 banks to participate in spot FX auctions but a larger set of counterparts including banks, financial institutions and non-residents can participate in Brazilian FX Swap operations (financial institutions registered in the Oferta *Pública* system).

sell and re-package FX hedges with their customers (corporates, foreign investors) using the spot, outright forward, futures and OTC derivatives markets, leaving banks with a modest net FX exposure.

C. Government Bond Market Liquidity Support

Debt Management Framework

27. Debt management strategy is directed by the MOF and operations are implemented through the BCB's SELIC system. The national treasury publishes an annual borrowing plan and a monthly auction schedule which provides details of upcoming operations. The MOF determines debt management strategy and decides on auction composition and results. The auctions themselves occur within the BCB's SELIC system where all government bond transactions are registered.

28. MOF government bond issuance is focused on maturities longer than a year. A key objective of debt management strategy has been to reduce refinancing risk while minimizing costs through lengthening the maturity of bonds issued and focusing on market segments where demand is greatest. Practically this has meant increased volumes of floating rate and inflation linked bonds as these tend to be in greater demand at longer maturities.¹⁵

29. The MOF has a flexible domestic debt issuance strategy that can respond to changed market conditions. The MOF can adjust its issuance strategy monthly in response to changed market conditions by changing its monthly auction schedule. The MOF has a variety of instruments and tools it can employ including changing the composition of auctions and offering exchange and buyback operations.

The Market Maker of Last Resort role of the Authorities

30. The MOF conducts Market Maker of Last Resort (MMLR) operations. The MOF conducts a form of MMLR through changes to the scheduled auction program as well as outright sales, purchases and switch operations. A key objective of the MOF is to preserve price discovery and liquidity in the bond market.¹⁶

31. Interventions are focused on benchmark actively issued securities during periods of unusual volatility and illiquidity. Operations occur infrequently—often when there are large changes in government bond yields (figure 3, bottom right panel). The focus is on benchmark securities and enabling price discovery to occur and allowing the market to re-price and adjust to changed market conditions.

32. Most bond market support operations have been two-way operations aimed at supporting price discovery without significantly changing the net supply of government

¹⁵ While this approach reduces refinancing risk through lengthening the average maturity of government bonds, the MOF remains exposed to interest rate risk given inflation linked and floating rate bonds are not issued at fixed rates.

¹⁶ The BCB is authorized to also operate in the government bond market but does not do so in practice.

bonds. Two-way operations: where purchases are partially balanced with bond sales are very commonly used. Such operations allow the MOF to conduct operations in different parts of the curve, stimulating price discovery, while minimizing the net volume of securities purchased. Nonetheless, most operations result in net purchases consistent with the MOF aiming to perform a stabilizing role during times of uncertainty. Operations aimed at providing liquidity during times of falling bond yields are less common, but have occurred.

33. The MOF also offers a buy back facility to retail investors to support bond market liquidity. Retail investors who invest through the “Treasury Direct” program can sell back securities purchased should they need liquidity.

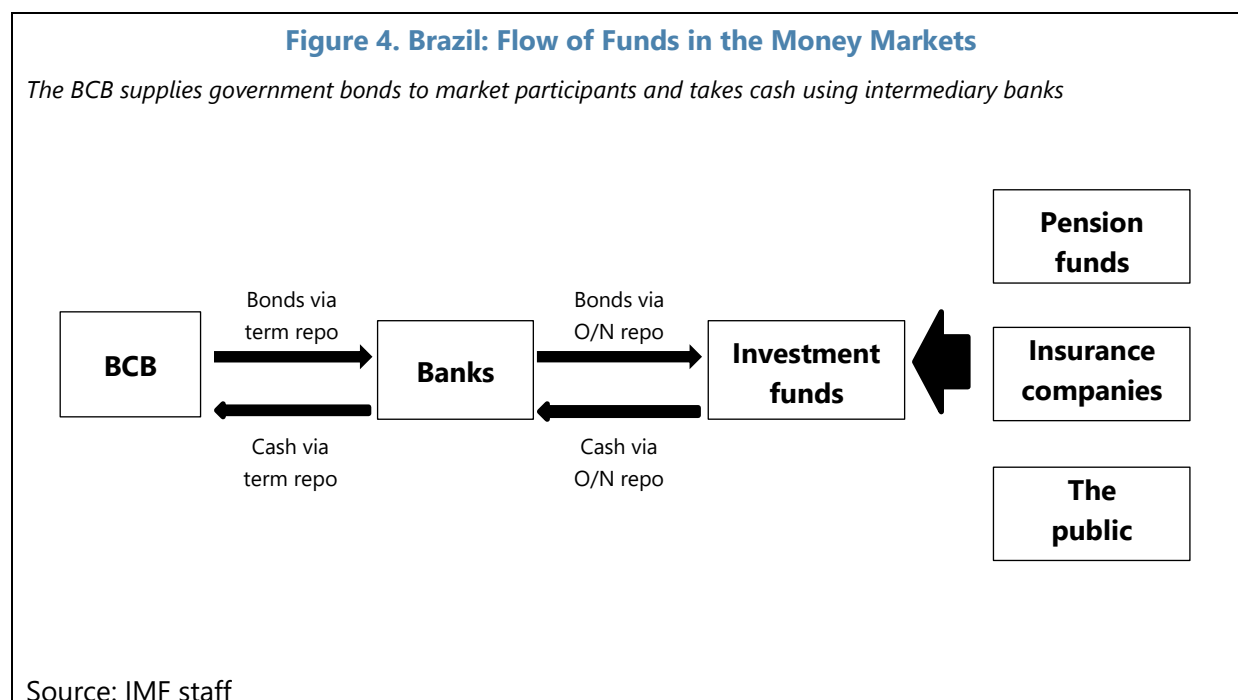
34. The BCB supports bond market liquidity by offering a securities lending facility to banks. The BCB offers a securities lending facility twice daily to dealers in need of specific securities for settlement purposes. The BCB has a limit on the amount of securities it can lend to market participants set at 25 percent of BCB holdings.¹⁷ Demand for securities lending is regular although aggregate volumes are not large compared to secondary market trading volumes. The BCB lends securities for a 15-basis point net fee on a security for security basis. The fee is set through competitive auctions but has been very stable suggesting dealers do not generally encounter shortages of securities.

¹⁷ The volume of securities lent is determined through the Central Bank Circular Letter 3,336, of 2008.

KEY ISSUES OF RELEVANCE TO FINANCIAL STABILITY

A. The Reliance of Markets on the BCB

35. The BCB plays a central role in providing HQLA to the financial system. Banks and asset managers both have a strong preference for overnight repo investments which are provided by the BCB via its sterilization operations. Banks are the key conduit for the flow of funds from investment funds and play a maturity transformation role by placing funds and repo government bonds from the BCB for maturities longer than overnight (average maturity around 20 days) and then taking funds from and supplying government bond collateral to investment funds on an overnight basis.



36. The current model might be challenged if the BCB's bond holdings do not grow in line with the structural liquidity surplus. As noted earlier, changes in the BCB distribution model, while very desirable, have the side effect of reducing the inflow of government bonds to the BCB balance sheet. While the new legislation provides mechanisms for the BCB to continue to receive bonds for use in OMOs, if these provide insufficient or there is a desire by the MOF or BCB for fewer government bonds to be used in OMOs then alternative instruments will be required. The proposal to introduce term deposits to the BCB tool-kit is designed to fill any gap that might arise. A key issue is the degree to which new BCB tools fit with the existing market structure.

Box 3. International Experiences with Term Deposit Auctions

Term deposits are a reasonably common instrument used by central banks for liquidity management. Central banks frequently employ term deposits for liquidity management purposes—either in the form of standing deposit facilities—or in auctions of term deposits in OMO auctions. In the 2013 Instruments of Monetary Policy (ISIMP) survey conducted by the IMF 54 out of 121 (45 percent) central banks said they were using term deposits in some form. The key reported characteristics reported are provided below.

Use of Term Deposits by Central Banks in the 2013 ISIMP Survey					
	Feature				
	Taking deposits	Maximum maturity (% of CB's)		Pricing ¹	
Yes	54 (45%)	7 days or less	35%	Multiple price	30 (57%)
No	67 (55%)	7 days to 1 month	29%	Single price	25 (47%)
Total	121	1 to 3 months	12%	Fixed rate full allotment	1 (2%)
		3 to 6 months	4%		
		6 months to 1 year	6%		
		Longer than 1 year	14%		

Sources: IMF ISIMP Survey and IMF Staff Estimates

Term deposits are typically used for shorter terms due to their illiquid characteristics. Maximum maturities of one month and less are the most common although some employ very long-term deposit instruments.

It is possible to allow early redemption to encourage deposits over a longer maturity. The US Federal Reserve cannot issue its own securities and is planning to use term deposits as part of a suite of tools for withdrawing structural liquidity during their exit from unconventional monetary policy. The Fed may need to use a significant volume of such deposits given the size of the structural excess (over USD 3 trillion or 18% GDP). To make deposits more attractive to investors the Fed allows early termination of deposits for a fee. The cost is the forfeiture of accrued interest plus 0.75% per annum. The objective of such a fee is to provide access to liquidity but at a cost equivalent to borrowing from the discount window.²

¹ Percentages add to greater than 100% as some respondents use more than one type of auction format.

² For more details see <http://www.federalreserve.gov/newsevents/press/monetary/20141106a.htm>

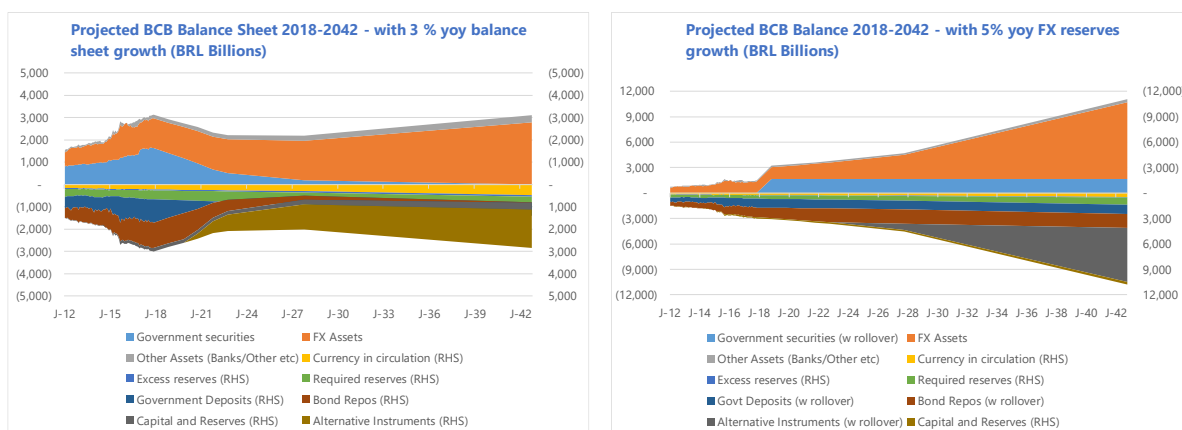
Box 4. The Potential Need for Alternative Sterilization Instruments

Historically, growth in the BCB's sterilization need has been met by government bonds. The volume of the BCB's sterilization operations tends to grow over time reflecting growth in factors such as foreign reserve assets as the economy and markets grow. In the past, growth in offsetting liquidity absorption factors such as currency in circulation or reserves requirements hasn't kept pace with growth in the BCB's balance sheet, hence use of government bond repo has grown.

Looking forward, sterilization needs will likely grow but sufficient bonds may not be available.

Growth in the BCB's balance sheet will continue in the future as the economy and markets grow. However, the BCB's bond portfolio might not keep pace with that. A pessimistic assumption might be that the BCB's portfolio matures over time. In this case, trend growth in the BCB's balance sheet of 3 percent per annum would see a significant need for new instruments within a few years (bottom left chart). Alternatively, the government and BCB may choose to roll-over the BCB's existing stock of bonds. This would reduce the need for alternative instruments but a need might still arise if the BCB increases FX reserves holdings such as is as depicted in the bottom right chart below. Other factors, such as the BCB's plans to reduce reserve requirements or changes in the size of the governments deposit at the BCB could also drive an increased need for other instruments.

The BCB may need a new structural sterilization tool – BCB securities would be ideal. BCB securities would be the better choice for the types of ongoing sterilization needs depicted in the scenarios below.



37. Term deposits may not be suitable or cost effective for structural sterilization but might be useful for short-term fine tuning. The end-users of BCB OMOs—banks and investment funds—have a limited capacity to place term deposits at the BCB. Banks have more capacity as they have significant free liquidity whereas investment funds do not currently have direct access to the BCB's OMOs and cannot place deposits with the BCB.¹⁸ Even if investment funds were given direct access to the BCB's OMO their demand for deposits longer than overnight would be very limited as their mandates require them to invest in overnight instruments (currently repos). The BCB would

¹⁸ The BCB believes that some of the liquidity of banks might be potentially available for investment in deposits as opposed to repo operations but there is uncertainty regarding the amount. Discussions with banks confirmed that banks have some capacity to invest in very short-term deposits (for example overnight or less than one week) – although the total volume might relatively small. Reduced reserve requirements could increase banks' capacity to invest in term deposits.

need to offer higher interest rates to entice banks and asset managers to place term deposits, increasing the costs of implementing monetary policy. Nonetheless, banks noted they have some capacity to invest in very short-term deposits if available and that these deposits likely would not cost much more than repos.

38. Term deposits are not ideal for structural sterilization. Term deposits tend to be used for shorter horizons at times when fine tuning of system liquidity is required. Central banks often use term deposits (see box 3 above) but maturities are commonly less than a month. The BCB would need to roll over significant volumes of deposits frequently to achieve their structural sterilization objectives (the main sterilization instrument currently is 45-day repos offered between Copom meetings). Countries with large structural liquidity surpluses often use central bank securities to manage liquidity (for example Thailand and Korea) unless legislative barriers exist.

39. BCB securities would be superior if a back-up structural sterilization instrument is required. Brazil's existing system of cooperation between the MOF and BCB to allow the use of government bond repo for sterilization is an ideal model that provides the BCB capacity to manage liquidity conditions in a cost-effective way without interfering with the MOF's domestic debt program. But if an alternative structural sterilization instrument is needed (perhaps because it might not suit the MOF to provide as many government securities going forward as it has in the past) then BCB securities would be the next best option. Box 4 outlines some scenarios where a significant structural sterilization need grows that may not be matched with increased government bond holdings by the BCB. The Fiscal Responsibility Law would need to be adjusted to allow the BCB to issue securities. BCB securities would fit naturally into investor portfolios and would be more liquid than term deposits and hence be able to be used at a lower cost. BCB securities issuance would need to be coordinated with the MOF to ensure segmentation does not emerge in the securities markets. But given that the government does not issue securities at the very short end of the yield curve (less than six months) there is a gap in the market the BCB could fit into.¹⁹ Introducing the ability for the BCB to issue its own securities would not undermine the existing approach of using government bond repo for structural sterilization. If sufficient bonds are available to the BCB then there would be no need for BCB securities to be issued. But the option would be available should the need arise.

40. Term deposits could be a useful addition for some sterilization purposes. Central banks often use term deposit facilities to a mechanism for placing a floor on interest rates as part of an interest rate corridor system. Such overnight deposit facilities are simpler to implement than repo facilities and have little or no marginal cost. If the Senate approves the BCB's request to issue term deposits then this would usefully give the BCB the option to implement an overnight deposit facility. Similarly, short-term deposits (for example for a week or two) could have a place in the BCB's fine-tuning tool-kit and might not be very costly relative to repo operations if the total volume used was

¹⁹ The BCB's repo operations currently focus on the 45 day to 6 month maturities—hence BCB bills would substitute for repo operations already occurring in this area of the curve thus limiting any impact on the government bond market relative to the status quo.

not too large. Hence, the BCB's proposal to request to the Senate for the authority to offer term deposits has merit and is in line with common practices among central banks (see box 3).

41. Introducing new instruments will be easier if the BCB reforms its operational approach. The BCB uses an unusual OMO auction approach to allocate repos. The BCB does not set the volume of repos offered in its overnight or 45-day repo operations. Rather banks are invited to first suggest an interest rate for the operation and then, once the interest rate is set, volumes are bid and allocated.²⁰ The system works well normally as banks can be sure they will receive their full desired allocation given the size of the liquidity surplus. However, introducing term deposits or BCB securities to these operations would be problematic as there is no easy way to discriminate between competing instruments or instrument maturities and there is no direct link between volumes bid and prices. The BCB should ideally move to using fixed volume—variable price OMO auctions.²¹ The Fund could offer the BCB technical assistance to help it develop a new operational approach if desired. The current practice of linking the interest rate paid on the TSA to the return on the BCB's government bond portfolio should also be adjusted given the changed distribution framework. SELIC would be a more natural interest rate to pay on the TSA.²²

42. SELIC should be more closely aligned with the BCB policy rate to reduce communications and operational challenges. Historically, when Brazilian interest rates were much higher, the market didn't see a 10-basis point gap between the policy rate and SELIC as meaningful. However, it is more relevant now and represents a more meaningful deviation of the de-facto policy stance from the de-jure stance. Further, introducing new instruments such as short-term deposits could further complicate the communication of the BCB's policy stance (is the stance the policy rate or the rate the BCB pays on short term deposits?). The BCB could adjust its operational target such that it aims to achieve a SELIC rate in line with the BCB policy rate (i.e. 10 basis points higher than currently) to erase these communications concerns.

43. The BCB's plans to simplify and reduce reserve requirements are desirable. The BCB aims to simplify their reserve requirements and lower the requirement rate. Reducing the rate is

²⁰ The BCB's 3 and 6-month repo operations work differently as in these cases the BCB determines the total volume offered and the maximum amount of each bond banks can bid for as collateral. Allocation occurs using Dutch (single price) auctions.

²¹ The authorities have some concern that, by moving to fixed volume, variable rate auctions that some downward pressure on, as well as volatility in, the SELIC rate may emerge. The mission did not share the same concern because the market is clearing at the current SELIC rate, indicating a balance of supply with demand for funds. A greater concern is that the existing allocation system may not be robust to changes in the structural liquidity situation as the price of liquidity is not directly tied to the quantity of liquidity sterilized. The result would be an inability of the market to clear and reduced relevance of the SELIC rate as an indicator of liquidity conditions. Fixed rate-full allotment operations would be another alternative for short-term repo auctions if unacceptable volatility in SELIC did arise.

²² The authorities note that the current approach is useful as it helps minimize income mismatches between income earned on its bond portfolio and interest paid on the TSA. The mission acknowledges that this approach has been useful but thinks that looking forward, given the changes in distribution arrangements and the potential use of term deposits for sterilization, the existing model may be less useful.

possible if the BCB widens the reserves base. The BCB is considering widening the base by including public sector deposits in the reserves base. Reducing reserves requirements is very desirable and a good initiative.

B. The Development of The FX Spot Market

44. The resiliency of the overall FX market could be improved if the spot market was better developed. Brazil's FX market compares well with Latin American markets and its derivatives market is well developed compared even with most advanced economy markets. In normal market conditions the market is liquid while in periods of stress it generally performs well supported by its strong risk management infrastructure. However, derivatives markets can be prone to freezes when volatility is very high and not all classes of investors are comfortable or can use derivative instruments. Generally spot markets are the basis of the derivatives markets.²³ A liquid spot market in conjunction with developed money markets gives investors alternatives to price and manage risks when derivatives markets are not available (for example when daily circuit breakers are hit on the B3 exchange). The Brazilian FX market has capacity to operate in the absence of the derivatives market but is much more constrained as the spot FX market is small.²⁴

45. The key impediment to the development of the spot market is legal restrictions on who can use deliverable FX instruments. Brazil is unusual in that the law significantly limits the types of entity who can trade in deliverable instruments (spot, outright forwards and FX swaps) without an accompanying economic interest, while at the same time there are no significant limitations on the use of non-deliverable FX hedging instruments.²⁵ In a sense the market for hedging is very open and hence derivatives have flourished but spot markets are fairly closed and more restricted.²⁶

46. Opening the availability of deliverable instruments would help the markets grow. Brazil's FX market is small despite being well developed by Latin American standards. The aggregate size of the market (measured relative to GDP) lags Brazil's peers such as Turkey and South Africa and

²³ The BCB notes that spot markets are more important drivers of liquidity in derivative markets in countries where most FX trading occurs OTC – which is very common globally. The BCB notes that in Brazil, exchange trading is much more important – hence they see spot market activity as being less relevant in the Brazilian context.

²⁴ On May 18, 2017, turnover in the spot market increased by around 30 percent as some activity moved from the unavailable derivatives market to the spot market.

²⁵ 13 banks are eligible to participate in the BCB's FX spot market intervention auctions while a larger group of 189 financial institutions can trade in deliverable instruments such as spot FX including banks, brokers and money changers. The current list of financial institutions is available at http://www.bcb.gov.br/rex/IAMC/Port/Instituicoes/inst_autorizadas.asp

²⁶ See BIS (2016) "Derivatives markets in Brazil" https://www.bis.org/publ/qtrpdf/r_qt1612x.htm, IMF (2015) <https://www.imf.org/external/pubs/ft/scr/2015/cr15122.pdf> and Garcia, Medieros and Santos (2015) <http://www.economia.puc-rio.br/mgarcia/Pricediscovery.pdf> for discussions on the relevance of regulatory constraints in shaping the FX markets in Brazil. Itau (2017) provides details on rules applying to the use of spot transactions in Brazil including that Mutual funds do not have authorization to trade spot FX – see https://www.itau.com.br/arquivosstaticos/itauBBA/contents/common/docs/Handbook_FirstEdition_20170717.pdf.

is much smaller than advanced country markets, many of which do not have as developed derivative markets as Brazil.²⁷ It's possible that a larger spot market would drive growth in spot and derivatives and could entice investors to participate in the FX markets who are not comfortable with FX derivatives. Money market liquidity could also improve as Brazilian banks and corporates could more easily harness global money markets to raise funding while remaining hedged against FX risks.

47. Counterparty risks from spot FX transactions can be managed similarly to derivatives.

A reasonable concern is that Brazil's FX derivatives have low counterparty risks due to their settlement through the B3 CCP whereas spot transactions counterparty risks might not be as well managed if bilaterally settled interbank spot trading volumes grew. Brazil could become a member of CLS bank to manage these settlement risks, essentially mimicking the derivatives market risk management infrastructure. The capacity of the market to settle FX transactions could be enhanced relative to the status quo where the B3 exchange has limitations on the volume of transactions that can be settled without introducing additional counterparty risk.

48. Changes to the FX regulatory regime need to be carefully considered and timed. The IMF's "Institutional View" on the liberalization and management of capital flows describes the considerations countries should make when adjusting their capital flow management regimes.²⁸ Key issues include a supportive macro-financial backdrop for any loosening in the regime and the existence of sufficiently robust alternative tools to manage capital flow volatility should it arise (for example macro-prudential policies). Brazil's already liquid derivative hedging markets is another factor that helps make the case for a looser regime. The BCB could seek technical assistance from the Fund to help work through the considerations and develop a robust alternative regime and transition path.

C. The Representativeness of Key Money Market Benchmarks

49. SELIC is a far superior and robust benchmark compared to CDI and should replace CDI.

The CDI benchmark falls short of the properties required of a financial benchmark laid down by the FSB (see box 5). The main issue is that CDI does not really have an underlying market that is reflective of the funding costs of large banks with alternative liquidity management and funding options. The fall-back rule that ties CDI to SELIC has dealt with the symptom of this underlying deficiency but the core problem remains. Market participants agree that SELIC should replace CDI but the significant amount of work required to implement such a change across banks, investment funds and in markets has meant little progress has been made despite efforts by the BCB to prompt a move.

50. The BCB needs to work with the CVM, ANBIMA and the B3 exchange to transition away from CDI. The approach being taken offshore with LIBOR in the UK, EURIBOR in Europe and Fed Funds in the US provides a useful guide on a way forward. Regulators can help push markets to

²⁷ The BCB notes that, if spot FX turnover occurring within the country only is considered, then Brazil fares better in comparisons with Turkey and South Africa as relatively more activity occurs in Brazil.

²⁸ See IMF (2012) <http://www.imf.org/external/np/pp/eng/2012/111412.pdf> for the Fund's "Institutional View".

change by indicating a date after which the use of CDI won't be suitable from a regulatory perspective. At the same time the BCB could work with ANBIMA (the key money and bond market association) and B3 to adjust the fall back rule such that the CDI is fixed to SELIC thus eliminating any financial difference between the benchmarks. B3 would then find it easier to novate its existing derivative contracts from referencing CDI to referencing SELIC.

51. An adequate transition plan and period should be allowed to prevent disruption risks.

The FSB principles clearly require that transitions to new benchmarks be clearly and carefully planned and communicated. Brazil has experience with such transitions as there have been changes in the past to SELIC and CDI.

D. Market Maker of Last Resort

52. The MOF and BCB have coordinated well to manage liquidity pressures that have emerged in the bond market. Market participants generally report that the authorities have done a good job at deploying the tools at their disposal to calm markets in turbulent times. An example was in May 2017 when elevated political risks saw volatility increase sharply in FX, bond and money markets. The BCB and MOF worked together to provide FX hedging (through BCB FX intervention) and bond market support (through the MOF cancelling bond auctions and then beginning reverse auctions of government bonds).²⁹

53. The authorities are targeting the key securities market and are adopting an operational approach orientated at maintaining price discovery and enabling adjustment by markets. Generally, the approach of the authorities conforms well to best practices in responding to securities markets dislocations.³⁰ The authorities are targeting the most systemically important securities market—the government bond market—and are using a transparent approach focused on promoting price discovery and liquidity that allows markets to adjust.

²⁹ The authorities approach to managing volatility in May 2017 is discussed in more detail in chapter 2 of the BCB October 2017 Financial Stability Report, http://www.bcb.gov.br/ingles/estabilidade/2017_10/fsrContents.pdf pages 38–43.

³⁰ See King et al (2017) for a discussion on the conduct of Central Bank operations to support securities markets at <https://www.imf.org/en/Publications/WP/Issues/2017/07/10/Central-Bank-Emergency-Support-to-Securities-Markets-45012>.

Box 5. A Preliminary Assessment of SELIC And CDI Versus the IOSCO Benchmark Principles¹

The FSB has endorsed IOSCO's principles for the construction of financial benchmarks. The principles lay out standards well designed financial benchmarks should meet to ensure their robustness. The mission has prepared a preliminary assessment of how the key Brazilian benchmarks fare below.

Principle	SELIC	CDI
Overall responsibility of the Administrator	The BCB administers SELIC	CETIP administers CDI and publishes the methodology applied
Oversight of third parties	Not applicable	
Conflict of interests	The BCB has a conflicts of interest policy in place and the area of the BCB that calculates and manages SELIC has a different governance structure than the BCB's operations	No conflicts of interest policy related to CDI is in place.
Control framework	BCB regulations promulgated by the BCB Board define a comprehensive and robust control framework and processes	An internal framework is in place and work is ongoing to produce a formal internal procedures manual
Internal oversight	SELIC is subject to both internal and external audits of both the outputs and the IT infrastructure producing SELIC	CDI is periodically audited and the production process is subject to automated checks.
Benchmark design	SELIC is based on all transactions between SELIC participants and is hence very robust	Only some classes of interbank transactions are used.
Data sufficiency	Very large number of transactions ensures representativeness	Data is often insufficient resulting in use of the fall-back rule
Hierarchy of data inputs	An appropriate hierarchy of inputs is used with limited judgement	An appropriate hierarchy is used and data adjustments are transparent and rules-based
Transparency	BCB publishes data describing the distribution of SELIC trading and formulae used for calculations	Calculation formulae are published as are summary transactions data.
Periodic Review	Both SELIC and CDI have been subject to periodic review and adjustments to methodology have occurred. No regular review process is in place.	
Methodology	Both the BCB and CETIP publish the methodology employed	
Changes in methodology and transition	The BCB Board approves any changes in methodology but such changes have been infrequent	Changes are consulted in with the BCB and market participants.
Submitter code of conduct	Not applicable as based on transactions data	
Internal controls over data collection	Two separate processes compare data and SELIC calculations and significant differences or anomalies are followed up promptly	The production process is automated and cannot be manually changed. Data are checked for input errors from banks.
Complaints procedures	Users have defined channels through which they can give feedback or question SELIC outcomes	Users have defined channels through which they can give feedback or question CDI outcomes
Audits and audit trail	Audits are usually done four times a year – two internal and two external	Audits are usually conducted every couple of years.
Cooperation with regulatory authorities	The BCB consults with CVM and ANBIMA as required	The B3 consults with CVM and ANBIMA as required

¹ The principles are available at <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf>

SUMMARY AND RECOMMENDATIONS

54. The Brazilian markets have fared well despite periods of turbulence, demonstrating their resiliency. Political and macroeconomic shocks have been frequent in Brazil but markets have generally continued to operate and develop. Market participants have a strong risk management culture which has translated into development of hedging markets.

55. The authorities have significant buffers to backstop markets and well-developed policies to intervene if required. Structural liquidity is significant as are BCB FX reserves. The Brazilian authorities have a well-defined and targeted set of policies to mitigate financial market stress.

56. A key area for reform is to replace the CDI benchmark with the superior SELIC benchmark. The overnight interest rate benchmark is critical to risk management infrastructure. Fortunately, Brazil has one relevant, well-structured and liquid benchmark – the SELIC rate – to rely on. Existing areas of the markets that use the CDI benchmark need to change to the SELIC rate under the guidance of the BCB in conjunction with other relevant authorities.

57. Changes to the BCB-MOF financial arrangements may imply a need for alternative BCB instruments with BCB securities being the superior choice. The future may need that the BCB needs instruments beyond government bond repo. The best alternative option is for the BCB to be able to issue its own securities for liquidity sterilization. Authority should be sought for that.

58. The BCB's monetary policy operational framework should be enhanced to accommodate new instruments and to improve consistency with the BCB's policy targets. The existing framework relies on a large liquidity surplus and a single instrument for managing that surplus. The BCB should review its operational approach, potentially with the help of technical assistance, to enhance their ability to operate with multiple instruments in more variable liquidity conditions. The operational target for SELIC should lie closer to the SELIC policy rate.

59. The spot FX market is relatively underdeveloped and can grow and become more robust if FX regulations governing access to deliverable instruments are eased. Wider access to deliverable instruments in the FX market will help the market to grow and reach its full potential.³¹ It will also help improve the FX market's resiliency in periods when derivatives trading is not possible or desirable. Easing the FX regulatory regime should be carefully sequenced and occur once the authorities are confident that a more liberalized regime is sustainable over the long term.

³¹ The BCB believes the spot FX market is adequately developed at present.