



MEXICO

FINANCIAL SECTOR ASSESSMENT PROGRAM

TECHNICAL NOTE ON SYSTEMIC LIQUIDITY MANAGEMENT

November 2022

This Technical Note on Systemic Liquidity Management for the Mexico FSAP was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed in October 2022.

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International Monetary Fund
Washington, D.C.



INTERNATIONAL MONETARY FUND

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October 24, 2022

TECHNICAL NOTE

SYSTEMIC LIQUIDITY MANAGEMENT

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

This Technical Note was prepared by IMF staff in the context of the IMF-WB Financial Sector Assessment Program (FSAP) in Mexico. The note contains the technical analysis and detailed information underpinning the FSAP findings and recommendations. Further information on the FSAP program can be found at <http://www.imf.org/external/np/fsap/fssa.aspx>.

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Glossary

Banxico	<i>Banco de México</i> (Central Bank)
BONDES F	Floating-rate government securities
BONOS M	Fixed-rate nominal Federal Government bonds
BREMS	Monetary Regulation Bonds
CAR	Capital adequacy ratio
CEB	<i>Comité de Estabilidad Bancaria</i> (Banking Stability Committee)
CET1	Common Equity Tier 1
CETES	Federal Treasury Certificates
CNBV	<i>Comisión Nacional Bancaria y de Valores</i> (National Banking and Securities Commission)
DRM	Monetary Regulation Deposits
ELA	Emergency Liquidity Assistance
EM	Emerging market
FED	Federal Reserve
FLAO	<i>Facilidad de Liquidez Adicional Ordinaria</i> (Additional Ordinary Liquidity Facility)
FSAP	Financial Sector Assessment Program
FX	Foreign Exchange
FXC	Foreign Exchange Commission
HQLA	High Quality Liquid Asset
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commissions
IPAB	<i>Instituto para la Protección al Ahorro Bancario</i> (Bank Deposit Insurance and Resolution Agency)
LCR	Liquidity coverage ratio
LOLR	Lender of last resort
MXN	Mexican peso
NBFI	Non-bank financial institution
NDF	Non-Deliverable Forward
NSFR	Net stable funding ratio
OMO	Open Market Operation
RSP	Repos for Liquidity Provision to the Payment System
SHCP	<i>Secretaría de Hacienda y Crédito Público</i> (Ministry of Finance and Public Credit)
SOE	State-owned enterprise
SME	Small and medium-sized enterprise
TIIE	Interbank Equilibrium Interest Rate
TIIEF	Overnight TIIE Funding Rate
UDIBONOS	Fixed rate real Federal Government bonds
USD	United States dollar

EXECUTIVE SUMMARY¹

1. Mexican money markets are well-regulated and function efficiently, with significant mitigants to systemic liquidity risks. This is supported by the dominance of the repo market in system-wide liquidity management, the marginal level of interbank unsecured transactions, as well as commercial banks' full compliance with the Liquidity Coverage Ratio (LCR). However, development banks are not subject to liquidity regulation. These banks have development objectives and the sovereign backstops their capitalization and explicitly guarantees all of their liabilities, however, some of them have a significant reliance on short-term funding with low levels of unencumbered high-quality liquid assets. This might contribute to systemic liquidity risk during periods of extreme market stress in severe tail risk scenarios. Thus, the authorities could consider steps to strengthen the development banks' liquidity risk management framework by improving the monitoring of their liquidity, leveraging their internal risk committees to take stock of their risk profile and contribution to systemic risk, making use of Pillar 2 requirements, and/or devising appropriate action(s) to improve these entities' maturity transformation.

2. NBFIs' currently one-sided participation in the repo market should become more symmetric. Regulatory constraints on NBFIs' ability to lend securities via repos, despite the recent pandemic-related relaxation, may constrain their risk management activity as they can only reduce their exposure to government bonds via interest rate swaps or outright sales. To help address this risk, the authorities should continue to explore and address the remaining impediments to NBFIs' more balanced participation in the repo market.

3. Interest rate benchmarks are robust and representative, and further reform is in progress in line with international best practices. Money market benchmark interest rates' representativeness and robustness is fundamental for efficient market functioning and effective monetary policy transmission. In Mexico, given the overnight repo market's dominance in banks' funding structure, a repo-based reference rate is the most suitable. To promote the adoption of the Overnight TIE Funding Rate (TIEF) and explore the best way to develop risk-free term rates, a Working Group on Alternative Reference Rates has been established. Banxico's assessment of the suitable methodology for computing risk-free term rates is in progress and the options considered are in line with best international practices.

4. Banco de México (Banxico) implements monetary policy through a state-of-the-art mid-corridor operational framework that ensures almost perfect control over liquidity. Its operating framework fully supports the efficient pricing and distribution of liquidity. Banks have certainty about day-to-day liquidity conditions and have access to a collateralized intraday facility and an overnight overdraft facility as backstop. The collateral policy provides for a sufficient volume of securities to efficiently implement monetary policy while the high quality and liquid nature of the securities minimizes the risks to Banxico's balance sheet.

¹ This Technical Note is prepared by Istvan Mak (IMF, Monetary and Capital Markets Department, Central Bank Operations Division). The FSAP thanks the authorities for the constructive dialogue and the many insights that they have shared.

5. The Mexican peso is one of the most actively traded emerging market currencies in the global foreign exchange market. Mexico maintains a freely floating exchange rate regime with very small market footprint by the central bank. The FX Commission generally abstains from spot foreign exchange (FX) interventions and FX funding support measures. This incentivizes market participants to manage FX risk exposures in a prudent way. Regulatory limits for bank net open position are in place.

6. Banxico has timely and accurate information on domestic banks' FX funding needs. Domestic banks provide daily information on their FX funding needs and FX market activity. Also, Banxico keeps its market monitoring tools up to date amid the continuously changing market conditions.

7. The central bank has the capacity to effectively respond to FX market stress where market-based risk management is no longer possible. While in the latest FX funding market stress event, Banxico benefitted from the Fed's U.S. dollar swapline, it has other means to provide adequate U.S. dollar funding to the domestic banking system, such as other credit facilities, and its own reserves.

8. The government bond market is highly liquid and is also the most liquid of Mexico's securities markets. The liquidity of government securities is underpinned by a diverse investor base and the availability of interest rate derivatives for risk management. In addition, market participants have a high degree of information about the Ministry of Finance and Public Credit (SHCP) issuance plans with annual announcements and quarterly updates on volumes and instruments. Domestic corporate bond market activity is moderate and private short-term debt securities are marginal.

9. Non-residents' participation in the government bond market has gradually declined in recent years and their sell-off created liquidity stress during the COVID-19 crisis. During the COVID crisis, local commercial banks and NBFIs were able to substitute foreign investor's presence benefitting from Banxico's liquidity support. Nonetheless, the stress points to the potential importance of the liquidity aspects of the sovereign-financial nexus in tail risk scenarios, requiring close monitoring.

10. The Mexican authorities have demonstrated a clear ability to effectively manage liquidity stress across the financial system. During the COVID-19 crisis, Banxico deployed targeted support to securities market participants by providing them funding liquidity in well calibrated amounts and against good collateral. The programs were introduced as price-based facilities and served as effective backstop. Direct market intervention was very limited and risk transfer to Banxico balance sheets remained completely controlled. Exit strategies were provided from the onset as most facilities were effectively term repo or swap transactions. Overall, the COVID support programs had several design features that provide useful lessons for potential future market support programs.

11. The prospects for liquidity stress arising in Mexico from the first sustained tightening of global liquidity conditions in many years, will bear close monitoring. Severe inflationary

pressures have led many central banks, including Banxico, to hike policy rates. However, the war in Ukraine has aggravated spikes in commodity prices. As non-residents still hold about one-fifth of the Mexican sovereign debt securities despite the recent declining trend, a surprise monetary tightening, particularly in the U.S., could, in a tail risk scenario, result in significant capital outflows and system-wide liquidity stress. In such a case, Banxico's liquidity assistance framework, as well as the Mexican authorities proven ability to effectively manage liquidity stress across the financial system will be a crucial backstop.

12. Banxico carries out its lender-of-last-resort function through the Emergency Liquidity Assistance (ELA) framework, which would benefit from some improvements. Banxico's ELA framework has a sound legal basis and robust governance. However, while credit claims are eligible as collateral, their encumbrance is time-consuming and the operational arrangements could be enhanced. Counterparty eligibility is limited to credit institutions (commercial and state-owned banks) and the decision is made by the board on a case-by-case basis. While the current framework to assess the granting of ELA includes an assessment by a specially devoted internal committee, which considers solvency and liquidity indicators beyond regulatory requirements and other considerations, including a forward-looking analysis, Banxico should evaluate potential improvements to the assessment of banking institutions in order to reduce risk-taking associated with granting ELA. One way to achieve this would be to formalize in the ELA policy the current practice of performing the solvency assessment on a forward-looking basis. This policy should also contain a binding minimum threshold for its interest rate above the interest rate of Banxico's standing liquidity providing facility to discourage moral hazard.

Table 1. Mexico: Recommendations on Systemic Liquidity Management			
Recommendations	Responsible Authorities	Time¹	Priority²
Improving the resilience of the money market			
Continue the good progress made on the interest rate benchmark reform and complete the transition to term alternative reference rates. (¶13)	Banxico	NT	M
Authorities could (i) improve the monitoring of development banks' liquidity, (ii) leverage their internal risk committees to take stock of their risk profile and contribution to systemic risk, and (iii) consider making use of Pillar 2 requirements, and/or (iv) devise appropriate action(s) to improve these entities' maturity transformation. (¶17)	CNBV, SHCP, Banxico	NT	H
Emergency Liquidity Assistance			
Explore the possible options to make credit claims promptly and effectively available as collateral in time-critical ELA operations. (¶67)	Banxico	NT	H
ELA policy should stipulate that the solvency assessment by Banxico on which counterparties' eligibility is based shall be a forward-looking one. (¶62)	Banxico	I	H
Set a binding minimum threshold for the ELA interest rate above the interest rate of Banxico's standing liquidity providing facility. (¶70)	Banxico	I	H
1/ "I (immediate)" is within one year; "NT (near-term)" is one–two years; "MT (medium-term)" is three–five years. 2/ H: high; M: medium; L: low.			

INTRODUCTION

13. This Technical Note is focused on systemic liquidity management issues in Mexico. The review evaluated the Banco de Mexico's (Banxico) operational framework and its ability to address systemic and idiosyncratic liquidity shocks. The review also assessed the functioning and resilience of key funding markets in Mexico. The analysis was mainly focused on the revealed vulnerabilities during the COVID-19 crisis and the effectiveness of Banxico's support measures.

14. This note is organized as follows. Section I assesses the main liquidity risks and the functioning and resilience of the short-term money markets including the representativeness of the interest rate benchmarks. Section II covers the systemic liquidity risk management framework, with a focus on the Banxico's monetary policy operational and collateral frameworks. Section III assesses the functioning of the foreign exchange markets. Section IV covers the main characteristics of Mexico's securities markets. Section V presents the assessment of Banxico's liquidity and market support measures. Last, Section VI focuses on the emergency liquidity assistance framework.

MONEY MARKET FUNCTIONING AND BANK LIQUIDITY

A. Functioning of Money Markets

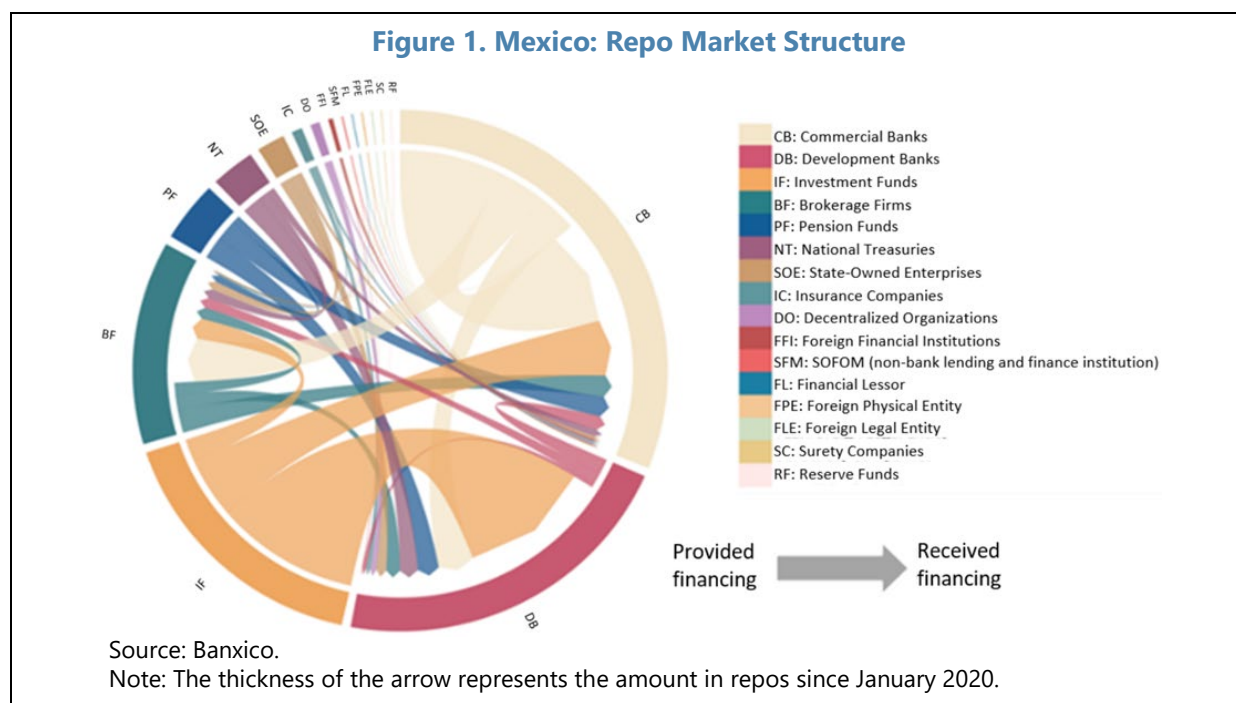
15. In Mexico, the repo market is the dominant venue for short-term liquidity management and funding operations. The main market participants are commercial banks, development banks, investment funds, brokerage houses and pension funds (Figure 1). Daily average turnover in the repo market amounts to 2,400 billion of Mexican pesos (MXN).² The typical ticket size for interbank transactions is MXN 800-900 million while trades with pension funds and investments funds are about half that size. About 92 percent of the interbank trading volume is concentrated in the one-day tenor, and 7 percent in the below seven-day tenors, percentages for the market different to interbank are 97 percent and 2 percent, respectively. The unsecured money market is relatively small (2-3 percent of the repo market) and is almost exclusively used by commercial banks for overnight lending.

16. Government bonds and IPAB securities are the most used collateral in the repo market. About two thirds of the traded volume is secured by government securities, mostly floating rate bonds, and a quarter involves IPAB securities. The rest involves corporate bonds.

17. The securitized money market is relatively small. Banks, non-bank financial institutions (NBFIs), and non-financial companies' debt funding activity is geared towards medium- and long-term bonds. Issuance of commercial papers, certificates of deposits, and other private short-term

² Mexico is one of the top 20 repo markets globally (including advanced economies according to the [ICMA](#)).

debt instruments is legally and technically possible but those are rarely supplied as potential issuers prefer long-term maturities when issuing debt securities.



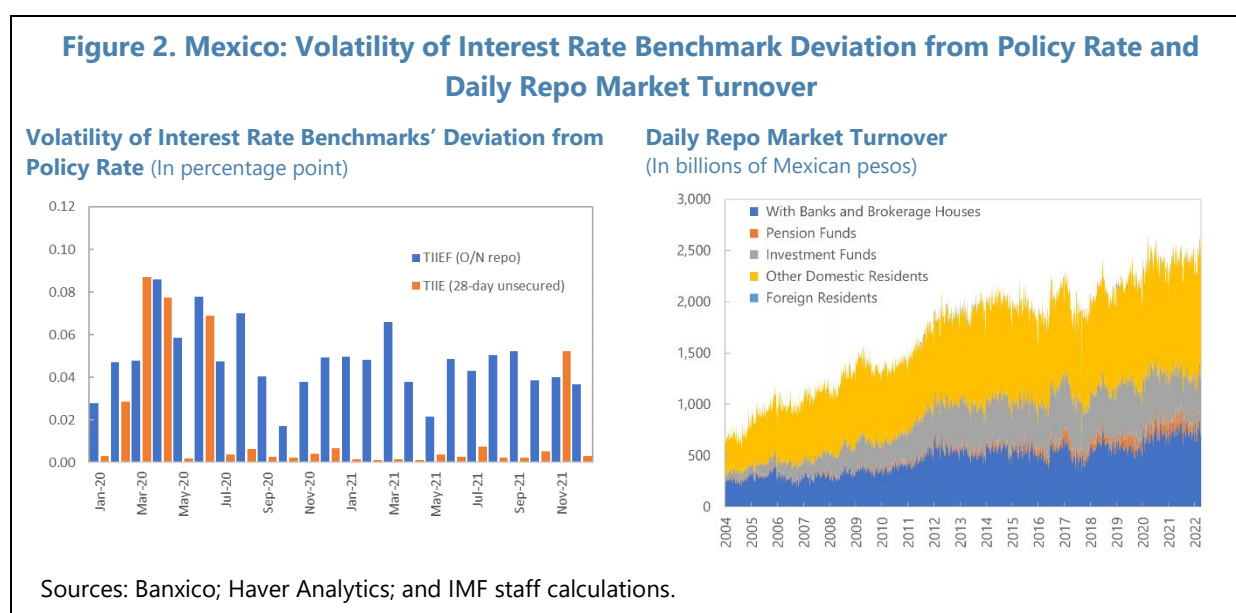
18. NBFIs' participation in the repo is asymmetric despite a recent regulatory easing. Since 2020, investment funds can borrow by repoing securities in the repo market to increase their leverage up to 5 percent of their assets, and in situations of extreme financial stress, this percentage increases to 10 percent. Nevertheless, pension funds and investment funds only borrow securities but never lend them in the repo market, due to regulation in place. Regulatory constraints on NBFIs' ability to lend securities via repos, despite the recent pandemic-related relaxation, may constrain their risk management activity as they can only in fact reduce their exposure to government bonds via interest rate swaps or outright sales. To help address this risk, the authorities should continue to explore and address the remaining impediments to NBFIs' more balanced participation in the repo market. NBFIs' main counterparties in the repo market are commercial banks and development banks. For the latter, repo funding from NBFIs' represents a relatively concentrated source of funding.

19. The diversity of funding sources helps protect commercial banks against liquidity shocks to which development banks may remain exposed. On aggregate, commercial banks benefit from well-diversified funding sources, with demand deposits of various sectors accounting for more than half of total liabilities. The other half comprises term deposits (21 percent) and bond issuance (3 percent) and repo funding (17 percent). Development banks secure more than 30 percent of their funding from bond issuance, 34 percent from repo operations and the rest from term deposits, call money transactions and other funding sources including from non-residents. This is a more concentrated funding profile relative to commercial banks, which can be explained by their

different objectives, mandates, and legal structures and a perception of a lower need to diversify their funding sources, as all of their liabilities are guaranteed by the Federal Government.

20. The existence of a collateralized interbank money market is the first line of defense against liquidity shocks. In crisis times, perceptions of bank credit risk and trust between market participants may change rapidly, resulting in a more fragmented interbank market—particularly when it rests solely on unsecured transactions, a situation that has so far been avoided in Mexico due to the small activity seen in the latter and the high usage of repo operations.

21. The repo market exhibited resilience during the COVID-19 crisis in terms of volume and interest rate stability. Repo market trading remained relatively stable in the main channels of funding between market participants. Volatility of interest rates increased only temporarily and moderately (Figure 2).



22. Money market benchmark interest rates' representativeness and robustness is fundamental for efficient market functioning and effective monetary policy transmission.

Central banks can operate interest rate-based monetary policy frameworks the most efficiently if they can impact banks' marginal funding costs directly. In Mexico, given the overnight repo market's dominance in banks' funding structure, a repo-based reference rate is the most suitable, as it is currently the case. Setting such a reference rate in a robust way requires timely and comprehensive data on repo market transactions.

23. Banxico has recently introduced³ the overnight TIIE funding rate (TIIEF) which is the new near risk-free reference rate. The TIIEF is determined as a volume-weighted median of wholesale overnight repo transactions settled by banks and brokerage firms. Banxico ensures that

³ The 2020 FSB Progress Report on Reforming Major Interest Rate Benchmarks is accessible here: <https://www.fsb.org/wp-content/uploads/P191120.pdf>

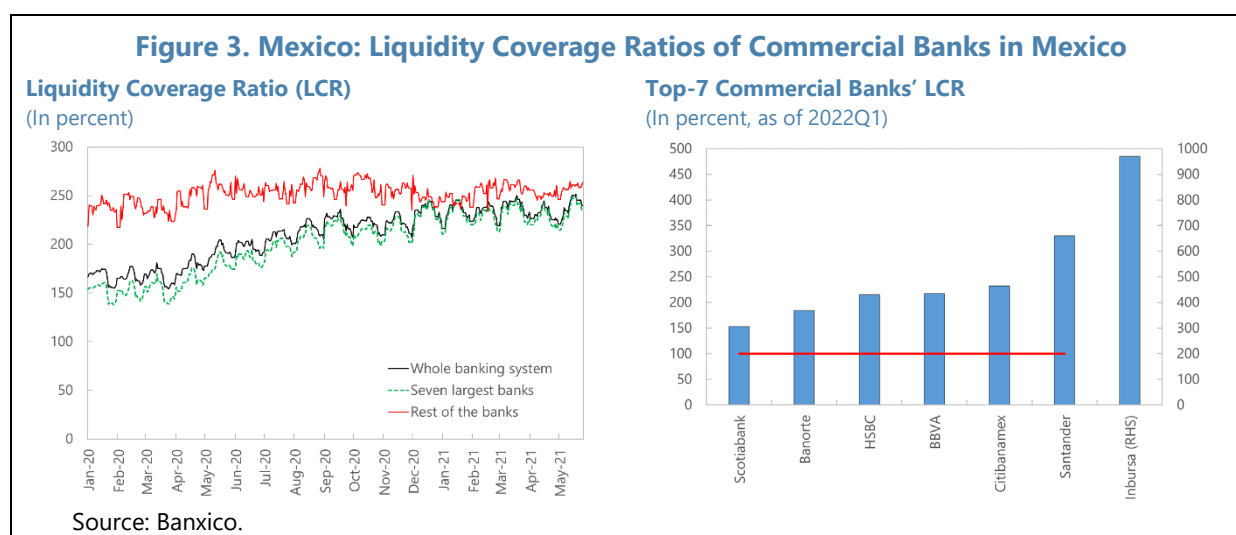
the TIEF methodology is in full compliance with the IOSCO principles on financial benchmarks. The TIEF is transaction-based, which eliminates the risk of manipulation which has been a key weakness of contribution-based interest rate benchmarks like the LIBOR or the TIE. In addition, repo-based benchmarks ensure that the reference rate is near risk-free.

24. To promote the adoption of the TIEF and explore the best way to develop risk-free term rates, a Working Group on Alternative Reference Rates has been established. The composition of the group (representatives of banks, brokerage houses, inter-dealer electronic and voice brokers, stock exchanges, financial authorities, non-banking financial entities and corporates) is diverse enough to be able to incorporate a wide range of inputs from market participants which could help facilitate the broad adoption of the TIEF.

25. The assessment of the most suitable methodology for computing risk-free term rates is in progress and the options considered (arrears or in advance) are in line with the best international practices. An in advance structure would reference an average of TIEF observed before the current interest period begins, while an in arrears structure would reference an average of TIEF over the current interest period. An average of TIEF in arrears will reflect what happens to interest rates over the period; however, it provides very little notice before payment is due. In other jurisdictions, there have been a number of conventions designed to allow for a longer notice of payment within the in arrears framework. These include payment delays, lookbacks, and lockouts.

B. Bank Liquidity Conditions

26. As of Q3 2021, all commercial banks surpassed the 100 percent LCR threshold. The LCR increased steadily over the last few years, including the COVID-19 crisis and its average level for the whole banking system and the LCRs of six D-SIBs are currently well above 150 percent (Figure 3).



27. Nevertheless, in response to the COVID-19 crisis, the authorities temporarily eased the LCR regulations. First, to avoid fire-sales and abrupt corrections, banks could continue to register as liquid assets those that were classified as liquid assets as of February 28, 2020, before markets

reflected the impact of the COVID-19 outbreak. Second, to avoid procyclicality banks could exclude the information for the month of March from the calculation of liquidity reserves to be able to face potential margin calls or changes in the valuation of the operations portfolio with derivative instruments (Look Back Approach in LCR standards). Third, temporary exceptions were granted to some of the consequences and corrective measures applicable when the LCR falls below 100 percent. This relaxation measures were in place from February 28, 2020, to August 31, 2021. After this period, the exceptions on the liquidity requirements were gradually unwound until March 1, 2022, to avoid any abrupt behavior corrections that could negatively affect banks' liquidity management.

28. Development banks have a high reliance on short term funding which could contribute to system-wide pressures in periods of acute market stress. Some of these entities rely on short-term wholesale borrowing and repos (mostly overnight), which accounts for more than 50 percent of aggregate funding of the sector that provides financing to long-term projects (e.g., infrastructure), small and medium-sized enterprises (SMEs), exporters, and low-income populations. In addition, they do not have a significant level of “unencumbered” high-quality liquid assets such that liquidity ratios—for example the monitored ratio of unencumbered HQLA to short term liabilities—are low. While all of the liabilities of development banks are explicitly guaranteed by the federal government, the low levels of liquidity may raise the potential for idiosyncratic liquidity distress in individual entities, in shorter-term periods of acute market stress, that might generate negative externalities for other regulated financial entities that are closely interconnected with them through the repo transactions and lending operations and contribute to system-wide liquidity stress.

29. There is thus a case to strengthen the liquidity risk mitigation framework for development banks. Unlike commercial banks, development banks are not currently subject to prudential requirements on liquidity. The authorities assess that development banks would have access to additional liquidity either from the private sector, probably at high interest rates, or from the public sector, in the event of stress. However, this could take time to operationalize such that in practice, it is the central bank that would need to provide liquidity support to entities that are not subject to liquidity regulation. During the COVID-19 market turbulence, Banxico extended the perimeter of its FLAO facility to include development banks to “provide an alternative source of liquidity to [them] so that they [could] channel resources to productive projects”⁴ In the IMF staff's view, the high reliance of these banks on short term funding might raise risks of amplification in future episodes of acute market stress. As such, while these banks largely have development objectives and the sovereign backstops their capitalization and explicitly guarantees their liabilities, the authorities could consider steps to strengthen the overall liquidity risk mitigation framework for them. To contain the liquidity risk ex ante instead of relying on ex post state support, the authorities could (i) improve monitoring of development banks' liquidity, (ii) leverage their internal risk committees to take stock of their risk profile and contribution to systemic risk, and (iii) consider making use of Pillar 2 requirements, and/or (iv) devising appropriate action(s) for development banks to improve their maturity transformation. The authorities also need to apply the proportionality

⁴ See the [Banxico's press release on April 21, 2020](#) for the details.

approach to two small deposit-taking development banks, which is embedded in the Basel Committee's Core Principles for Effective Banking Supervision (BCPs).

C. Recommendations:

- Authorities should continue the good progress made on the interest rate benchmark reform and complete the transition to term alternative reference rates.
- Authorities could (i) improve the monitoring of development banks' liquidity, (ii) leverage their internal risk committees to take stock of their risk profile and contribution to systemic risk, and (iii) consider making use of Pillar 2 requirements and/or (iv) devising appropriate action(s) to improve these entities' maturity transformation.

MONETARY POLICY IMPLEMENTATION AND LIQUIDITY MANAGEMENT IN NORMAL TIMES

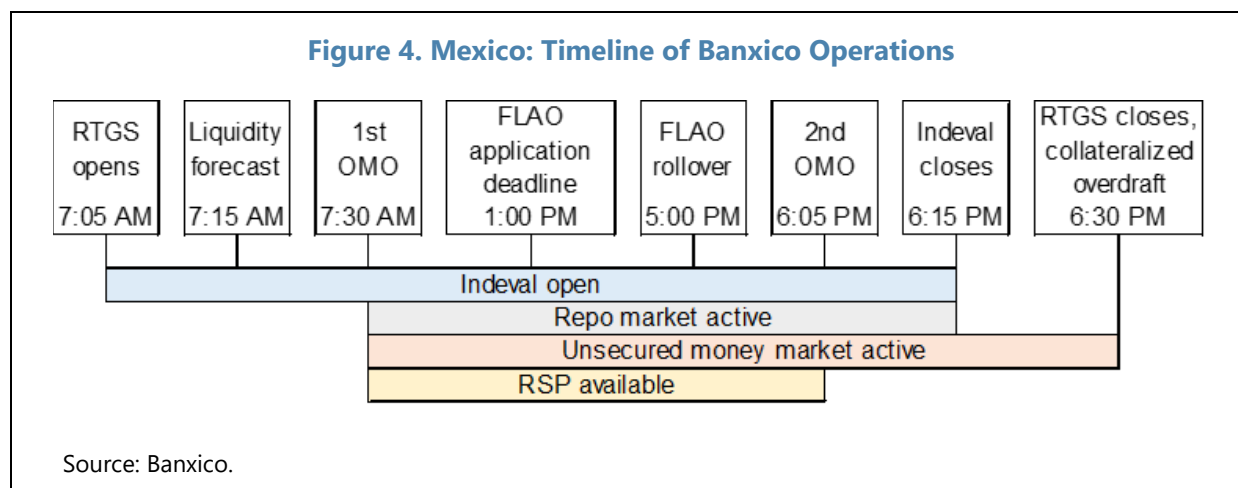
30. Banxico has a very effective operating framework for implementing monetary policy

Two particular features of the operating framework allow Banxico to exert precise control over liquidity conditions. First, the effect of Government transactions in liquidity is known with certainty as the fiscal authorities must provide one-day notice of any change to their accounts held at Banxico. Second, Banxico conducts two open market operations (OMOs) every day: usually lending at around 7:20–7:30 a.m. and deposit taking around 6:00 p.m. (Figure 4). Still, the effective removal/injection of liquidity, and hence, the type of operation can change between lending and deposit according to autonomous factors and financial programming considerations. The afternoon OMO is conducted after the autonomous factors on liquidity have been settled and can therefore compensate for any unexpected transactions, given that FX transactions are settled on a T+2 basis, the only autonomous factor not known at the beginning of the day is currency in circulation, but Banxico has models to have a relatively good forecast. With such certainty about the liquidity flows, banks are able to square off their accounts at Banxico to zero at the end of almost every day.

31. In addition to the near-perfect liquidity forecast, the design of the OMO allocation mechanism ensures that the targeted interest rate remains close to the middle of the interest rate corridor. The OMOs, which are typically for between one and 25 days, are variable-rate, fixed-volume auctions with a reserve price set at the policy rate. This price is set as a floor in the case of injections of liquidity, and as a ceiling in the case of withdrawals of liquidity. Prices invariably are very close to the reserve price.

32. Banxico has several layers of liquidity providing facilities in place to address different levels of liquidity stress. First, to ease the potential liquidity pressures in the payment system, an intraday funding facility in the form of intraday repo operations, has been put in place (see paragraph 21). Second, a collateralized overnight overdraft facility, against banks' deposits in the central bank, or in the form of repo, is a backstop for liquidity shocks banks may experience at the end of the day. Third, the FLAO is provided during the day, to address temporary and short-term

liquidity needs. The FLAO has a higher funding cost than the reference rate and needs a special request to Banxico to be used. Finally, the emergency liquidity assistance arrangement serves as the lender-of-last-resort instrument to address liquidity stress of uncertain term arising from more structural issues (e.g., collateral scarcity) with the bank.



33. Banxico provides payment system participants an intraday funding facility to further reduce short term liquidity risks.

The objective of these Repos for Liquidity Provision to the Payment System (RSP) is to enable participants to temporarily go into overdraft in their payment system operations. The RSP can be initiated anytime between Banxico's morning and afternoon OMOs, but collateral must be prepositioned in the morning. Eligible collateral includes actively traded securities issued in Mexico by the Federal Government, IPAB, or Banco de México (Table 2). The interest rate charged for intraday RSP is zero. The repo transactions will mature when INDEVAL (the Central Securities Depository in Mexico) closes for repo operations. Eligible counterparties are payment system participants, which includes banks and brokerage firms. The process for the latter, not being Banxico's counterparty, is to require the authorization of at least one bank, which establishes a limit to the value of all the repo agreements the brokerage firm can enter. When a brokerage firm wants to initiate a repo, it issues a request to the RSP, indicating the bank through which the operation will be conducted.

34. A collateralized overdraft provides insurance against end-of-day liquidity shortages.

Banks can overdraw their Banxico account up to a limit, equal to the amount of Monetary Regulation Deposits (DRM), Special Deposits constituted with funds from repo operations with securities issued in the local market by the Federal Government, IPAB, or Banco de México, OMO Term Deposits, Deposits constituted for the process of determining current term TIIEs and USD deposits they have placed in a segregated account at Banxico for this purpose—haircuts are applied on the latter to account for currency risk. The overdraft is automatic, overnight and priced at two times the policy rate (with the policy rate as of July 2022 is 7.75 percent makes for an overdraft cost of 15.5 percent). And with positive cash balances (i.e., excess reserves) at Banxico not being remunerated, there are strong incentives for banks to manage their liquidity efficiently.

Table 2. Mexico: Eligible Collateral for Standard Banxico Operations

(In billions of Mexican pesos, as of June 2020)

Collateral Type	Total in the Market	Commercial banks and development banks			
		Holdings	Encumbered	Available	Percentage Available (In percent)
Mandatory long-term deposits	167,220	167,220	17,020	150,201	90
USD deposits (USD)	4,194	4,194	488	3,705	88
OMO term Deposits	6,895	6,895	0	6,895	100
Term TIE Deposits	3,400	3,400	200	3,200	94
<i>Government securities:</i>					
Cetes	1,270,443	236,457	75,696	160,761	68
Mbonos	3,247,425	676,540	150,864	525,675	78
Udibonos	1,852,829	30,443	17,028	13,415	44
Bondes	1,473,995	223,137	48,235	174,902	78
IPAB Bonds	1,008,200	216,039	120,286	86,543	40
Monetary regulation bonds (BREMS)	102,773	102,773	20,938	81,835	80
TOTAL	9,137,373	1,667,097	450,756	1,207,131	72

Source: Banxico.

35. Furthermore, Banxico provides an additional overnight funding facility (FLAO) to commercial banks upon request. This standing facility could be considered as part of the normal monetary operational framework given that it is granted automatically despite having characteristics that resemble the LOLR function. Although the FLAO is automatic, it only becomes so after Banxico has received a Letter of Request from the requesting bank's director general, thereby ensuring that knowledge of use of the facility is elevated both in the requesting bank and Banxico. The FLAO is provided against a broader range of collateral and is priced at 1.1 times the policy rate and can be extended without additional request letters. In addition to the collateral eligible for the overdraft, collateral that can be delivered to access this facility includes peso-denominated securities as follows; securities issued by IPAB, development banks, public sector enterprises, local and municipal governments, and commercial banks with a minimum rating of AA in local scale and a minimum rating equal to the one granted for the Federal Government in global scale (provided they were issued at least six months prior to the request for liquidity). Also, are eligible the securities denominated in units linked to inflation and foreign currency, securities issued by foreign governments and central banks, all of which are subject to a minimum rating of AA.

36. The banking system's structural liquidity position is managed mainly by the sale of Government Securities but in rare occasions, when the amount of liquidity to be withdrawn is large enough, liquidity can be managed by the imposition of monetary regulation deposits. In such rare cases, banks are required to deposit with Banxico a nominally fixed amount based on their deposit base and capital. Banxico converted MXN 105 billion of DRM to BREMS. While this conversion did not alter the quantum of collateral available for Banxico operations, it does increase

the amount that can be used in repos with market participants. As of the end of 2021, total outstanding DRM was MXN 270 billion, 62% in cash and 38% in BREMs.

37. The legal possibility and practical feasibility of government bond transactions enables Banxico to carry out market support measures in a prompt and flexible way. Banxico has a financial agency agreement with SHCP allowing it to allocate government securities (Cetes, Bonos, Udibonos, and Bondes) to meet its monetary policy objectives. The proceeds of this issuance are placed in a blocked account at Banxico. This is an efficient arrangement which supports liquidity in the government securities market while ensuring Banxico meets the cost of monetary policy implementation and without financing the government.

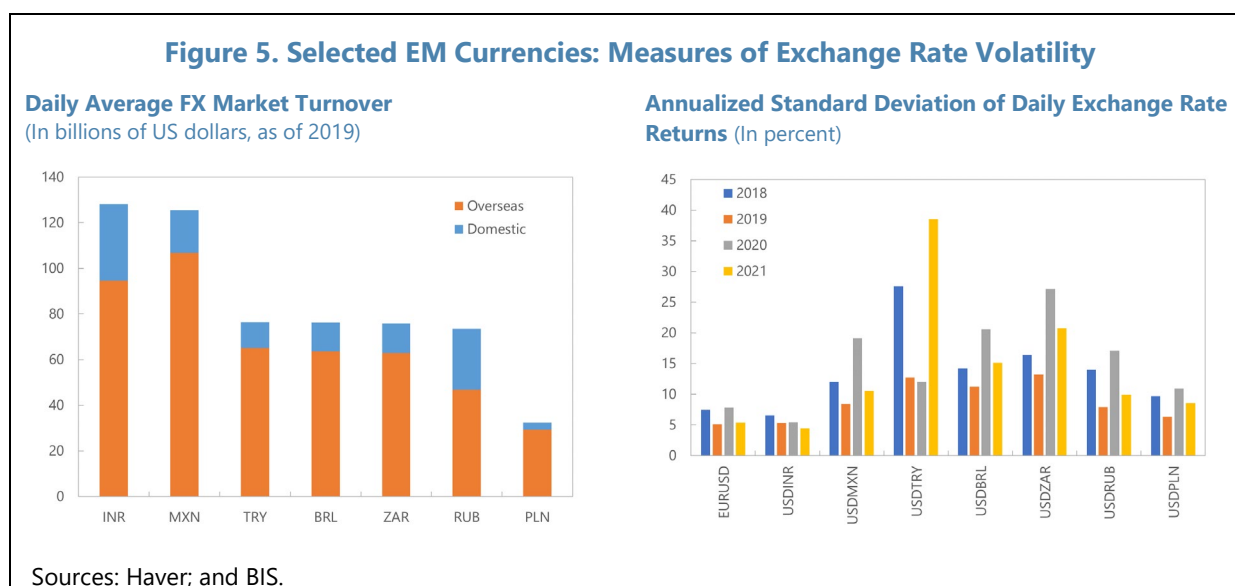
FOREIGN EXCHANGE MARKET FUNCTIONING

38. The global use of the MXN as a proxy for managing EM exposure gives it a high correlation (or beta) to global risk shocks. The global market for MXN derivatives is massive, with offshore trading activity supported by the availability of exchange traded MXN derivatives. Futures and options open interest and trading volumes of MXN on major exchanges are significantly higher than most other EM currencies and are comparable to those of major currencies (Figure 5).⁵ As a result, the volatility of the MXN exchange rate tends to increase the most among peers in periods of global risk aversion reflecting non-resident investors' asset sales and position closing in offshore trading venues.

39. Foreign exchange derivatives in the Mexican market have gradually become an effective and liquid alternative for many market participants to complement and/or hedge their spot positioning. In that way, spot market volatility is contained as market participants can adjust their FX exposures with diverse strategies via derivative instruments. In terms of the turnover distribution by type of instrument, volume is mainly concentrated in forwards and foreign exchange swaps (Figure 5).

40. Foreign exchange derivatives' trading has been growing among Mexican banks, while the degree of NBFIs' participation in the market varies by their business models. Mexican banks, subsidiaries of foreign banking institutions, and non-resident participants rely on derivatives for hedging, and arbitrage strategies. Other less-sophisticated market participants tend to adapt their usage to their specific time horizon, investment strategy, the nature of their client needs, as well as their own risk tolerance, for mainly hedging purposes. For instance, among NBFIs, participants such as insurance companies, which are less sophisticated in their FX trading activities, are considerably less active in their derivatives usage, concentrating mainly on hedging purposes. On the other hand, pension and investment funds rely on this type of instruments for both hedging and arbitrage strategies, usually with a longer time horizon than institutions in the banking sector.

⁵ <https://www.cmegroup.com/market-data/volume-open-interest/fx-volume.html>



41. Commercial banks' FX risk management is supported by FX liquidity limits. Commercial banks must hold enough liquid assets in foreign currencies to cover the sum of the largest gap (liabilities minus assets) for the maturities of 1 day, 1–8 days, 1–30 days, and 1–60 days, as well as a percentage of all other liabilities up to 60 days that are not covered by assets (excluding derivatives) with the same or shorter maturity. The objective of this measure is to limit banks' short-term liquidity risks in foreign currency.

42. In addition, there are structural FX liquidity requirements. At the end of each day, no commercial bank may have an amount of Net Foreign Currency Liabilities (excluding derivatives) greater than 1.83 times its core capital. Net Foreign Currency Liabilities are defined as the difference between liabilities weighted by maturity (with 100 percent weight for maturity up to 1 year and decreasing to 0.05 percent for liabilities maturing beyond 3 years) and assets weighted by maturity and degree of liquidity (with 100 percent weight for liquid assets and 50 percent weight for highly graded loans up to 1 year). Thus, a bank may increase the size of its balance in foreign currency as long as it does not create a large imbalance between the maturities of its assets and liabilities.

43. Commercial banks and development banks are also subject to net open FX position limits. To minimize currency mismatch, the net open position in foreign currency is limited to 15 percent of Tier-1 capital (including peso denominated products linked to the exchange rate). This minimizes (balance sheet) losses if the peso were to experience large adjustments.

44. Foreign exchange funding is a key element of Mexican banks liquidity management. The most important foreign funding currency for Mexico is the US dollar, which can be sourced mainly via FX deposits (more than 80 percent), and to a lesser extent, via FX swaps (less than 20 percent). 75 percent of the FX swaps are shorter than one week. USD funding pressures are easily measurable with the FX swap basis, which indicates the magnitude of deviation from the covered interest rate parity between the MXN and the USD. The costs associated to funding resources are quite dependent on global and local factors impacting interest rate differentials (spreads between

local and foreign interest rates), the local currency outlook and general market conditions in the derivatives markets.

45. One of the main risks to USD FX funding is related to episodes of globally increased volatility and risk aversion sentiment. In such an environment, funding squeezes can be exacerbated by a low liquidity and one-side positioning by local market participants. Nevertheless, distortions in funding markets have been short-lived in recent years, except for tail events, such as the COVID-19 crisis, in which USD funding costs spiked considerably.

46. FX funding risks impact domestic institutions and foreign banks' subsidiaries differently. Although increasing costs of USD funding via credit lines and FX swaps impact all market participants, local subsidiaries of foreign banking institutions can in principle benefit from their parents' access to funding alternatives in their respective jurisdictions. Anecdotal evidence suggests that domestic banks have relied on market-based USD funding sources over a longer period of time and to a greater extent than the subsidiaries of foreign banks.

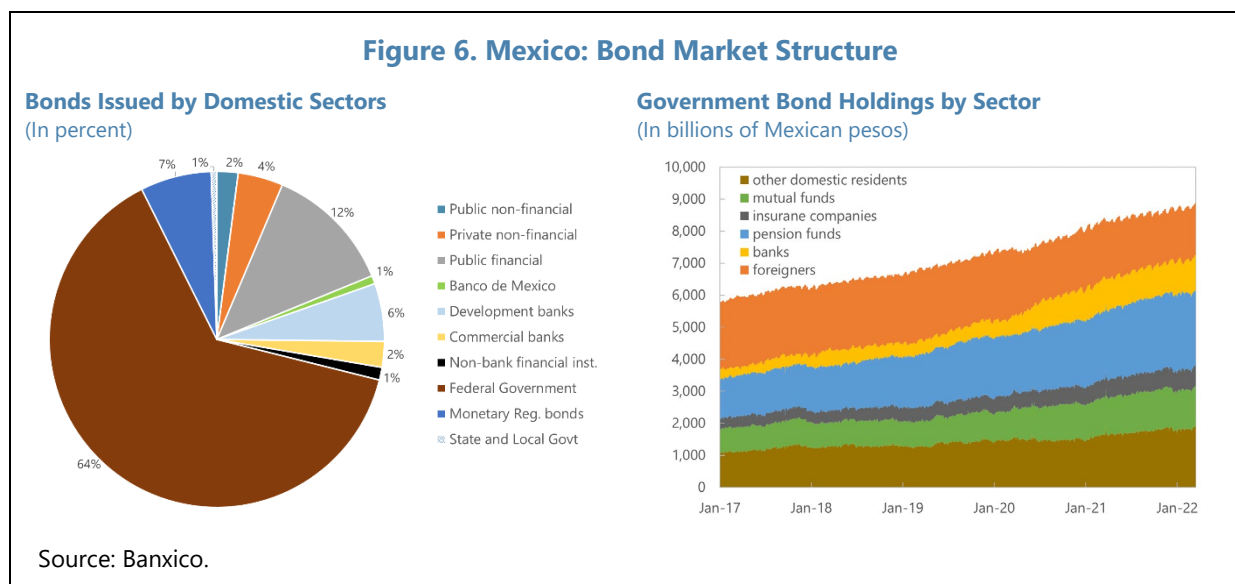
SECURITIES MARKET FUNCTIONING

47. Mexican debt securities markets comprise of a diverse array of instruments that are mainly government issued or guaranteed. Of the total MXN 13,065 billion debt securities issued by residents (about 48 percent of GDP), the lion's share (more than 90 percent) is either issued by SHCP, including discount bonds (CETES), floating rate bonds (BONDES F), inflation-linked bonds (UDIBONOS) and fixed coupon bonds (BONOS M), or guaranteed by the state (e.g., debt securities issued by SOEs, IPAB, the development banks).

48. A gradually expanding domestic institutional investor base holds almost half of the locally issued debt securities (Figure 6). The total assets of the NBFIs amount to less than 50 percent of the GDP, only half that of emerging market (EM) peers. The NBFIs sector has grown gradually in recent years, but its growth was one of the slowest among its EM peers.

49. The efficient functioning of secondary government bond market is facilitated by a long-standing Market Makers' Program. Market makers in Mexico are credit institutions and brokerage firms—appointed by SHCP—conferred with the obligation of participating very actively in the fixed-rate government securities market. These institutions must present bids at competitive prices in each primary auction of securities and must also permanently quote bid and offer prices in the secondary market to provide liquidity.

50. Foreign participation in the government securities market has been declining gradually since March 2017, with an acceleration during the COVID-19 crisis. Over the last five years, non-resident ownership of Mexican government bonds declined from 35 percent to 17 percent. In the short-term CETES market, foreign investors' holdings declined from 37 percent to 11 percent while in the fixed rate BONOS M market, from 63 percent to 38 percent. The pace of the decline was the fastest in the first half of 2020 with 10 percentage points and 6 percentage points in the case of the CETES and the BONOS M, respectively. The gradual decline continued in the subsequent years at a slower pace.



51. Securities lending activity remains small in Mexico. Less than 1 percent of the outstanding government bonds are used in securities lending transactions. The overall volume of the market has not grown significantly over the last five years. Pension funds and insurance companies are the main counterparties of market making banks while investment funds abstain from this activity. However, financial authorities are working towards enhancing this market to promote further development of the bond market in general.

52. The Mexican government bond market is liquid by international standards but remains vulnerable to external shocks. BONOS M securities are the most liquid segment of the government bond market. Their average bid-ask spread is 4 basis points which is in line with the typical levels observed in the most liquid emerging markets. In March 2020, the BONOS M bid-ask spread increased to 9 basis points and the average trade size declined by 15 percent. The prospects for the first sustained tightening of global liquidity conditions could cause some liquidity stress for emerging markets such as Mexico. Strong inflationary pressures, with prospects for further increases in commodity prices and associated second-round effects, have led many central banks, including Banxico, to hike policy rates. As non-residents still hold about one-sixth of the Mexican sovereign debt securities despite the recent declining trend, a faster than anticipated monetary tightening, particularly in the U.S., could potentially result in significant capital outflows and system-wide liquidity stress.

MARKET SUPPORT MEASURES

53. Central banks' market support measures can address two key sources of risk. The first is funding liquidity risk, whereby market participants (e.g., banks and broker-dealers) experience a shortage of funding, either because their precautionary demand for liquidity (the amount of liquidity they want to hold to meet expected outflows) has increased, or they have lost access to funding (e.g., wholesale funding markets have dried up). In these situations, the central bank can step in

through various lending operations, including with short- and long-term repo operations, standing facility operations (possibly at longer maturities), and FX swaps to help banks to roll over US dollar funding. Central banks could also reduce banks' funding needs (as opposed to increase the supply of funding) by reducing the reserve requirement (which increases the available precautionary liquidity held) if the collateral available for repo in the market has become scarce. The second risk is that market liquidity may be impaired, so that the market for various assets is very thin, and dealers cannot trade assets at reasonable prices and without excessive price fluctuations. In this case, outright asset purchases may be appropriate to improve market liquidity, which can take the form of a program to buy or sell securities or FX.

54. Effective financial market support programs by central banks incorporate five key features. First, the programs should identify and address the key market failures (e.g., to reduce informational asymmetries and balance sheet constraints). Second, program designers should be conscious about the side-effects and maximize positive spillovers while mitigating possible adverse effects on other markets. Third, central banks must minimize the financial risks to their balance sheet to preserve their capacity deliver on their core mandate. Fourth, policymakers must strive to minimizing moral hazard to prevent misallocation of resources provided by the central bank and foster prudent behavior by market participants. Finally, already before launching the support program, an exit strategy must be prepared.

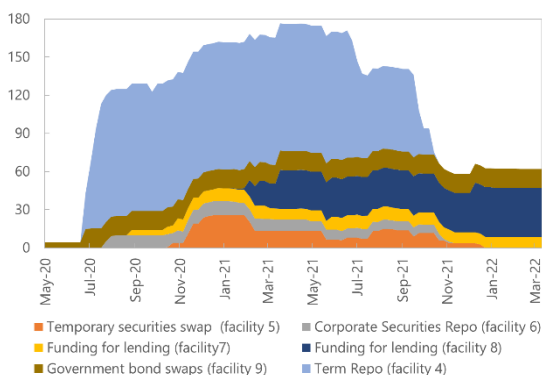
55. Banxico has launched a diverse set of financial market support programs in response to the COVID-19 crisis⁶. The measures included funding provision as part of reinforcing the accommodative monetary policy stance, general liquidity provision and collateral easing measures to support market functioning, USD lending to support the FX funding market, as well as targeted market liquidity support measures, and funding for lending facilities (Figure 7).

56. The COVID support programs had several design features that provide useful lessons for potential future market support programs. The programs were introduced as price-based facilities and served as effective backstops. Moral hazard was addressed and Banxico was able to manage and contain risk transfer to its balance sheet as the program sizes were well-calibrated and were subject to the provision of collateral by market participants. Exit strategy was provided by construction from the onset as most facilities were effectively term repo or swap transactions.

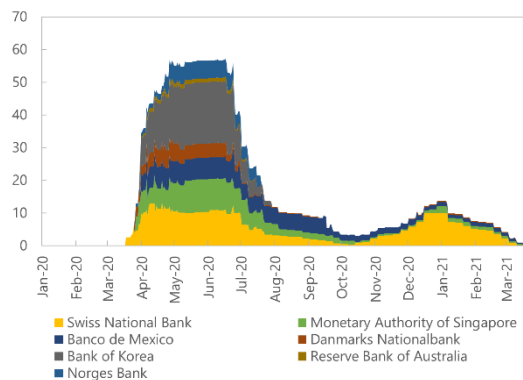
⁶ The press release briefly describing the market support measures can be accessed here: <https://www.banxico.org.mx/publications-and-press/other-announcements/%7B6F7FECBA-44CB-6AA5-4E4B-269DDBD9B5A8%7D.pdf>

Figure 7. Mexico: Banxico's Market Support Programs and Recourse to the Fed Swapline**Banxico Market Support Program**

(In billions of Mexican pesos)

**Recourse to the Fed's Swapline**

(In billions of U.S. dollars)



Source: Banxico.

Notes: Outstanding amounts of Banxico Facilities 7 and 8 can be renewed partially (targeting households and SMEs) but most measures ended in 2021.

A. Securities and Money Market Support Programs

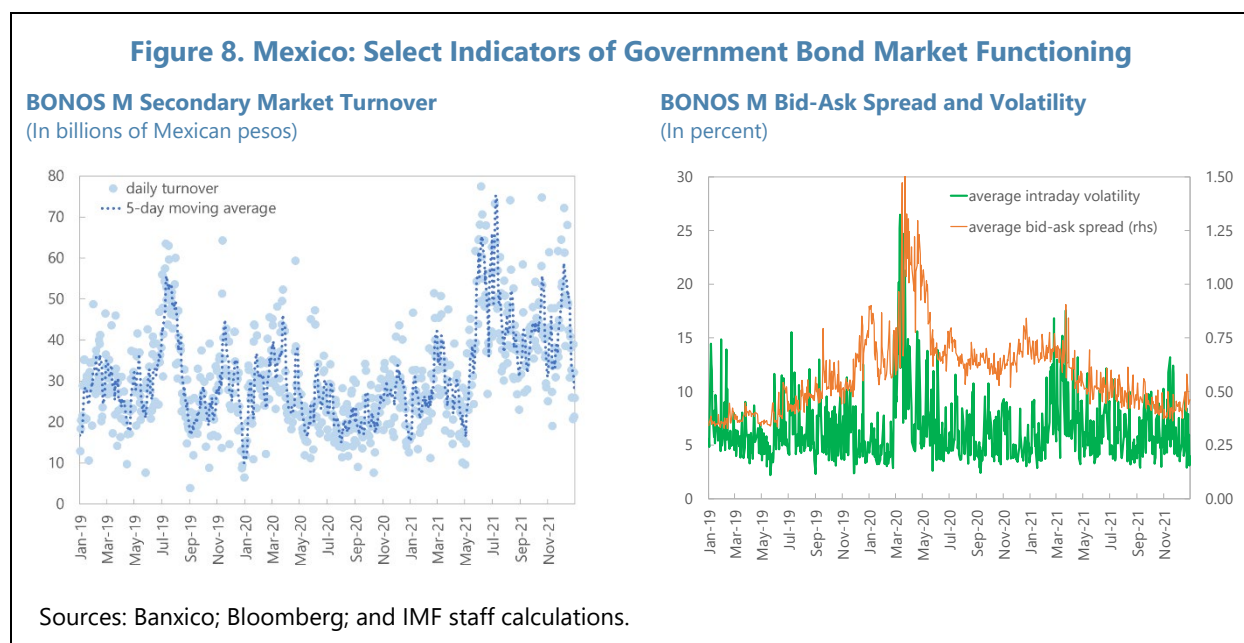
57. In March 2020, Banxico reduced by MXN 50 billion the amount of the DRM held by commercial and development banks. As a result, the stock DRM declined to approximately MXN 270 billion. The monetary impact of this measure was sterilized automatically as part of the normal open market operations. While this was the easiest way to provide banks additional liquidity, its quantitative impact was moderate. Banks were reluctant to use the funds for alternative investments, and mostly chose to maintain voluntary precautionary reserves instead. The signaling effect was likely positive though.

58. As a precautionary measure, Banxico eased the terms and eligibility of its FLAO instrument. The FLAO interest rate is linked to the policy rate and before the Covid-19 pandemic was set at 2.0 - 2.2 times of its level. To ease banks' burden when using this facility, Banxico reduced the FLAO interest rate to 1.1 times the policy rate, this measure became permanent. In addition, the access to FLAO was temporarily extended to development banks from April 2020 to February 2021. The latter is viewed by authorities as a precautionary step which provided more signaling effect rather than actual financial support.

59. To add further precaution, the universe of collateral for the FLAO, FX hedging operations and USD lending facility was temporarily extended. During the Covid-19 pandemic, the credit rating accepted for eligible securities in MXN was relaxed so that they must have credit ratings equal to or higher than the equivalent to "A" in the local scale rating (AA before), or those equivalent to "BB+" in the global scale for securities denominated in foreign currency (same as the Federal Government before the pandemic), as ranked by at least two rating agencies for each case. This measure was in place from April 2020 to September 2021.

60. To provide liquidity to financial institutions holding government debt, Banxico opened a term repo facility with government securities financing credit institutions at longer terms than those of regular open market operations (facility 4). The term of this repo facility was three months, and its interest rate was 1.02 times the monetary policy rate. This facility had an overall envelope of MXN 100 billion which was reached by July 2020; the amount was adjusted with an extra MXN 50 billion which were to be used if financial conditions deteriorated further. The individual allocations were proportional to the amount of total bids. The securities to be provided by banks in this operation were limited to Cetes, Bonos M, Udibonos, Bondes D and BPAs. This operation helped significantly in the orderly functioning of the funding markets and the orderly behavior of fixed income markets (Figure 8). The instruments posted as collateral for this facility were mostly IPAB securities. The liquidity and trading conditions of eligible securities remained at an acceptable level given the certainty that the instruments could be used in repo operations with the Bank of Mexico in case it was needed. As a result, the risk transferred to Banxico's balance sheet was limited. The facility was phased out by Q4 2021 as the repos matured.

61. To provide a controlled risk transfer and collateral upgrade to the banking system, Banxico launched a temporary security swap window (facility 5). In this facility, banks could provide securities eligible for the FLAO and receive government securities (Cetes, Bonos M, Udibonos, Bondes D). The swaps were carried out at market prices. The recourse to this facility was less than 30 percent of the allocated MXN 100 billion envelope (later reduced to MXN 50 billion) and all swaps matured by January 2022.



62. Banxico created a corporate bond repo facility (facility 6) to provide liquidity to the corporate bond market. This was necessary as Banxico's assessment showed that the illiquidity of the secondary market created higher volatility and resulted in greater liquidity premium, which inhibited corporate bond issuances and thereby jeopardized the sector's funding capacity. The term

of this repo facility was three months, and its interest rate was 1.1 times (later reduced to 1.03 times) the monetary policy rate. The securities eligible for these operations were a subset of the FLAO collateral universe. They initially included bonds issued by domestic non-financial institutions in the private sector, although a broader collateral of the FLAO was later admitted, albeit, with some constraints. The recourse to this facility was about 10 percent of the allocated MXN 100 billion envelope and all repos matured by November 2021.

63. To promote the proper functioning of the government debt market, Banxico implemented debt exchange auctions of government securities (facility 9). In this scheme, Banxico received long-term securities (10 years and longer) and delivered securities with maturities of up to 3 years allowing market participants to reduce their duration risk. The characteristics and terms of each swap were determined in each auction call, to promote the proper functioning of the government debt market. The amount of the program was of up to MXN 100 billion but only MXN 15 billion were allotted, which shows that the need to hedge interest rate risk through this mechanism was not as large as expected.

64. Banxico established two novel funding for lending facilities targeting SMEs. The first one (facility 7) financed loans to SMEs and households up to MXN 250 billion and the second (facility 8) provided funding for existing credit lines up to MXN 100 billion. The total funding provided was MXN 54.2 billion which corresponds to less than 1 percent of the banking system's loans to non-financial corporates. Both facilities had a term of up to 36 months, and its interest rate was equal to the monetary policy rate. The eligible collateral for facility 7 was either the universe of assets eligible for the FLAO or the funds available from the DRM reduction. Very few banks chose the latter. The eligible collateral for facility 8 was the existing credits to firms with a credit rating equal to or above "A" in the local scale, as ranked by at least two rating agencies. The encumbrance of credit claim collateral involved a complex legal procedure to create distinct trusts for the credit claims to ensure these could be easily repossessed by Banxico in the event of default. This process also provided banks a learning experience, through which they have developed the capacity to encumber credit claims as collateral for Banxico in approximately two weeks.

FX Market Support Programs

65. Banxico has an FX hedging auction program in place since 2017. When the program was initiated, MXN was under severely stressed market trading conditions. In this environment, domestic NBFIs and non-financial corporations needed to hedge their exchange rate risk but did not want to enter into outright FX transactions (spot or forward). In response, Banxico introduced the FX hedging mechanism, offering non-deliverable forwards (NDFs) denominated and settled in Mexican pesos to local banks through a system of interactive and competitive auctions at a variable price. The total initial program envelope was US\$20 billion but only US\$5.5 billion were allotted in the year it was initially implemented.

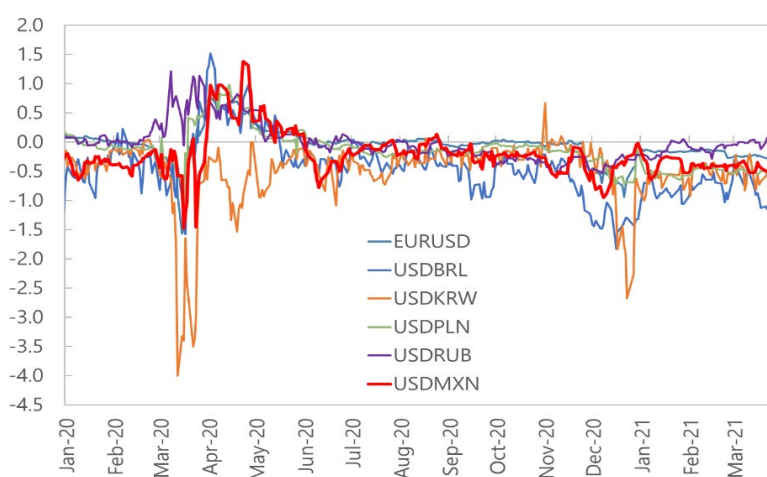
66. This mechanism offered several advantages for banks and other FX maker participants. First, it offered local banks an effective hedging instrument against FX risk. However, since it was denominated in Mexican pesos, it would not have an impact on international reserves. Second,

although only local banks could participate in the auctions, they could later offer the instrument to other market participants, including corporates. In this way, the agents and sectors that most needed a hedging instrument were able to acquire it from local banking institutions. Third, the large size of the program had a strong signaling effect in the FX market, providing additional support to the MXN as market participants were provided with a backstop facility to adjust their FX exposure instead of carrying out potentially sizeable transactions in the spot market.

67. The NDF hedging program was increased to US\$30 billion at the onset of the COVID-19 crisis. Beyond the signaling effect, the actual impact was small. Demand was less than US\$2 billion in two auctions at various maturities up to three months. This amount has been added to regular roll-over auctions with a current total amount outstanding of almost US\$7.5 billion.

68. Banxico's participation in the Federal Reserve's (Fed) USD swapline arrangement has supported the FX funding market. In March 2020, global USD shortage resulted in FX funding pressures in many advanced and EM economies. This pressure was reflected in the widening of exchange rates FX swap basis spreads (Figure 9). Through the swapline several central banks could receive USD liquidity against local currency collateral up to three-month tenors to ease the USD funding shortages in their respective banking systems. Following the announcement of the swapline, Banxico initially received US\$6.6 billion, which it lent on to domestic banks for three months. This helped ease the stress in the FX funding market. Further auctions of USD funding to roll-over existing operations showed lower demand until the swap line expired in December 2021, reflecting a relatively fast improvement of USD funding conditions.

Figure 9. One-Month FX Swap Basis Spreads of Selected Exchange Rates
(In percent)



Sources: Bloomberg; and IMF staff calculations.

69. Looking ahead, Mexican authorities have the resources and the mechanisms to promote an orderly behavior of local FX markets. Mexico has comfortable levels of international

reserves (US\$207.7 billion at the end of 2021). Furthermore, Banxico has three swap lines with the Fed (US\$3 billion), Bank of Canada (CAD 1 billion) and the U.S. Treasury (US\$9 billion). Further support is provided by the US\$50 billion FCL with the IMF.

70. Overall, the combination of large-scale funding liquidity provision and limited and targeted acquisition of debt securities via swaps were effective tools in restoring banks' market making activity. Banxico identified the key markets and was largely successful in tackling the market failures (e.g., reducing balance sheet constraints by providing funding). Market support programs were designed in a sophisticated way which allowed for mitigating against possible side-effects. While most programs were price-based, which allowed for maintaining effective backstop to asset prices, firm total envelope amounts were set to limit the risk transfer to the central bank's balance sheet. Another very important consideration, is that all programs, and the liquidity provided by them, were set against collateral minimizing the abovementioned risk transfer. Against the initially committed total MXN 800 billion, the combined actual allocation was less than MXN 200 billion and only one of the programs was exhausted, which suggests that overall, moral hazard was likely eliminated effectively. Finally, most facilities were swap or repo operations that, by design, enabled self-liquidation, which simplified the exit strategy.

EMERGENCY LIQUIDITY ASSISTANCE

71. An effective lender-of-last-resort (LOLR) function is an essential part of the financial systemic liquidity management framework. The absence of a sound LOLR usually results in (i) a financial system more exposed to idiosyncratic liquidity risks (through contagion), (ii) overburdening monetary policy liquidity-providing operations as a suboptimal tool to address financial stability risks, (iii) moral hazard as banks and other market participants anticipate system-wide liquidity measures by the central bank as soon as the slightest idiosyncratic shock occurs, and (iv) suboptimal monetary policy design and implementation. When it cannot rely on an effective, conditional instrument to address idiosyncratic liquidity stress situations, the central bank tends to calibrate its system-wide measures so that even the weakest links in the banking system (those that should normally benefit from LOLR support) can maintain appropriate liquidity. This disincentivizes banks to diversify their funding sources and might eventually contribute to an inappropriate liquidity management and monetary policy for the entire banking system. By contrast, an effective LOLR framework allows the central bank to calibrate its monetary policy measures based on purely monetary policy objectives, as residual stress situations can be addressed by LOLR support.

72. A well-designed LOLR framework has four fundamental features. First, the institutional eligibility criteria must be set. Second, collateral eligibility criteria, valuations, and risk control measures should be defined by robust internal procedures to ensure that collateral can be effectively and efficiently mobilized when needed. Third, the pricing and the term of the emergency support must be clearly defined. Finally, a high-frequency liquidity monitoring arrangement should be in place.

73. Banxico's ELA framework is based on a sound legal foundation and includes an internal policy which covers several relevant parameters but leaves the interest rate to be set by the Governing Board on a case-by-case basis. The Governance arrangement provides broad flexibility to Banxico's Governing Board in its ELA-related decisions. The Board has the authority to assess whether a bank's ELA application may have systemic aspects or not (the final determination is taken by the Banking Stability Committee, see paragraph 63). If the liquidity stress of a bank is deemed to have systemic implications, the Board can approve deviations from several parameters of the ELA conditions, including the eligibility criteria which is a common practice.

74. The ELA policy limits counterparty eligibility to credit institutions but could be strengthened further with respect to their solvency assessment. Commercial banks are eligible to receive ELA. Guidelines to deploy ELA to commercial banks are in place and are public. When requesting ELA, banks must submit a credible liquidity restoration plan. ELA is provided at the discretion of Banxico's Board, which may require that the bank's shares are pledged to supplement other collateral. Banks requesting ELA must have a CAR over 8 percent, be under COR (with CAR between 4.5 and 8), or the Banking Stability Committee (CEB) must deem the bank is systemic for resolution purposes. In addition, banks under conservatorship and bridge banks operated by IPAB can also receive ELA. To reduce risks to Banxico, the current framework includes an assessment by a designated internal committee, which includes solvency and liquidity indicators beyond regulatory requirements. To help strengthen the credibility and institutional independence of Banxico, the ELA policy should formalize the current practice of performing the solvency assessment on a forward-looking basis.

75. Banxico's Governing Board may waive some of the requirements, if the liquidity constraints faced by the commercial bank could pose a risk to the stability of the Mexican financial system. In this regard, whether there may or not be systemic risk is decided by the Banking Stability Committee (CEB). The CEB is a body comprised by top ranking officials from the Ministry of Finance (Minister and Deputy Minister), Banco de Mexico (Governor and a Deputy Governor), CNBV (President and the Vice-president in charge of the supervision of the specific troubled bank) and IPAB (Executive Secretary and a member of the Board). In the event of need, the CEB would meet to determine whether revoking the license of a commercial bank (with its corresponding liquidation process) may have systemic consequences such as contagion to other banks and risks to the functioning of the payment system.

76. The Governing Board can also decide to provide ELA to development banks. While Banco de Mexico is entitled to act as LOLR of credit institutions (commercial and development banks), there are no specific guidelines on ELA provision to development banks. However, this does not preclude the Governing Board from providing ELA to development banks, should the Board of Banco de Mexico consider it necessary.

77. The range of eligible collateral for ELA is well defined but the valuation methodology allows for significant flexibility. It is assumed that banks have already exhausted their alternative collateralized funding sources by the time of applying for ELA. Therefore, the ELA policy only lists the additional collateral that can be used for ELA only. These assets include debt instruments

denominated in MXN or foreign currency, the common stock of the bank or its subsidiaries, the applicant's loan portfolio (credit claims) and even physical assets under extreme circumstances. While there are valuation methodologies for some of these additional assets, the methodology is not included in the ELA policy, to allow for flexible methodology which can be swiftly adjusted if needed, and the ELA policy requires that such valuation process should be in place. The valuation process is based on a sound quantitative risk assessment (CVaR for market risk and credit risk).

78. In the current state of the ELA framework, credit claims, an important asset class in most ELA frameworks, cannot be promptly and effectively used as collateral. In the event of an ELA request, it is reasonable to assume that the applicant bank has already exhausted its available means to secure funding against customary collateral and has mostly credit claims available. If credit claims cannot be encumbered without delay as collateral for the central bank's ELA operation, a properly secured lending operation cannot be carried out in a timely manner. In this case, liquidity can be provided against the banks' shares or other collateral, for which the risk assessment and haircut methodologies are established in internal manuals and approved by the Board of Banxico.

79. As described in the last section, the introduction of the funding for lending facility (Facility 8) confirmed that in the existing legal framework, credit claims cannot be promptly encumbered as collateral. Currently Banxico only accepts credit claims as collateral if those assets are transferred into a distinct trust, so that in the event of default, they can be repossessed with legal certainty. The experience with facility 8 suggests that the creation of such a trust would require about two weeks, which is too long for the completion of an ELA process. However, under extreme circumstances, the Board could approve the immediate delivery of the funds, as long as there is an endorsement of the owners of the bank, the shares of the bank have been pledged, and there is a commitment to create the trust as soon as possible.

80. Legal certainty and operational feasibility of ELA collateral mobilization should be balanced carefully. In the treatment of credit claim collateral, Banxico's ELA framework currently prioritizes legal certainty over operational feasibility, although there are certain elements to favor operational feasibility. The use of a distinct trust for the credit claims by the central bank is a unique arrangement in Mexico but the trade-off between legal certainty and operational feasibility is not. Many central banks manage these tradeoffs in various ways, including by prepositioning the credit claim collateral (Box 1). To facilitate the prepositioning, credit claims could be added within strict risk limits to the eligible collateral for standard monetary policy operations.

81. As for risk sharing between the central bank and the government, there are indirect indemnities provided by the Federal Government to Banxico in the case of ELA. The Institute for the Protection of Bank Savings (IPAB), a decentralized agency of the federal government, would pay Banxico an amount equal to the credit it granted to a commercial bank as the loan would be transferred to IPAB. According to the Credit Institutions Law, if the Banking Stability Committee resolves that the default of a commercial banks' obligation may pose a systemic risk and said bank defaults on the payment of the credit of last resort granted by Banco de Mexico; the receiver, on behalf of the commercial institution, must enter into a credit agreement with IPAB for the amount

necessary to cover the credit granted by Banxico. In such case, IPAB shall assume the rights that Banxico had against the borrowing bank, including the guarantees.

Box 1. Collateralization of Credit Claims

Credit claims are accepted as collateral in several central bank's normal and lender-of-last-resort operations. In economies dominated by bank-based financing bank loans are often the most important asset class on banks' balance sheets. Bank loans have relatively low opportunity costs as collateral because they are rarely traded, and counterparties have limited alternative uses for them.

Collateralization can be achieved by different legal techniques depending on the jurisdiction. Methods such as pledge, assignment or floating charge may require different legal procedures to be followed. The ultimate objective is to ensure that a valid security interest is created over the credit-claims and that the existence of the security interest can be verified, and the collateral realized swiftly without obstacles. One way to operationalize the pledge is to create a pledge register (e.g., Luxemburg).¹ The registration of the credit claim in this register can be performed automatically upon the counterparty's request (MT540 swift message) to mobilize the asset with the central bank. Having a credit claims master agreement in place can be useful in this process.

As operational requirements of credit claim collateral are more complicated relative to marketable asset collateral, prepositioning the credit claim collateral is encouraged in several jurisdictions (e.g., United Kingdom)² This means that some parts of the legal due diligence process are frontloaded well before the foreseen encumbrance of the collateral. Prepositioning provides assurance on the quality of the counterparty's loan origination and servicing policies, risk management practices, and the quality of management information on which it will rely. This helps the central bank identify the credit risks and other financial risks of the collateral, allowing it to value the collateral accurately and set a suitable haircut. Valuation and credit-risk assessment of credit claims is not straightforward in the absence of secondary market prices and independent credit ratings.

The central bank must define in advance the eligibility criteria for credit claims collateral. In terms of asset classes, interbank loans as well as undrawn credit lines, current account overdrafts and letters of credit are typically excluded from eligibility. Central banks typically accept loans denominated in local currency, provided to domestic debtors, and governed by the national law. To benefit from the economies of scale, minimum thresholds for the loan size can be set.

1/ The relevant guideline of Banque Centrale du Luxembourg can be accessed here: https://www.bcl.lu/en/Monetary-policy/collateral/User_guide_for_credit_claims_v7.pdf

2/ The Bank of England's guidance on prepositioning loan collaterals can be accessed here: <https://www.bankofengland.co.uk/-/media/boe/files/markets/eligible-collateral/loan-prepositioning-guide>

82. In Mexico, the maximum term of the ELA is clearly defined but the pricing is not.

Banxico's internal ELA policy stipulates that ELA can be provided up to 90 days, which can be further extended. This is longer than typical among central banks but not a large outlier. The pricing of the ELA is left completely to the Governing Board's discretion. While some flexibility can be warranted, the absence of any guidance may result in setting the ELA interest rate at a level so low that may give rise to moral hazard. While the current ELA framework addresses moral hazard issues to some extent through granting ELA in strictly confidential terms, requiring the pledging of the shares of the institution, forbidding dividend payments and restricting banks operations, introducing a minimum interest rate threshold would create additional disincentives.

83. A high-frequency liquidity monitoring arrangement is implemented in Mexico. Routine liquidity monitoring is performed by Banxico and CNBV, including monitoring of several liquidity indicators such as the LCR, NSFR, survival horizon, concentration metrics, Liquidity-at-Risk, interbank funding conditions metrics (funding rates in interbank market, terms of funding, volumes of funding, etc.) and other funding indicators that may signal stress. According to the Provisions by which the LCR is implemented in Mexico, banks are required to comply with the LCR regulation daily. Banks report daily information to Banxico, with a 10-day lag since 2017. However, should a bank find that it fails or will likely fail to comply with the LCR, it must immediately inform the authorities.

84. In addition, banks must have an up-to-date framework and governance arrangements to assess potential liquidity needs. The framework must be documented. It should include (i) the policies and operational procedures to request liquidity to Banxico, (ii) the procedures and governance to determine liquidity needs, trigger liquidity requests, and monitor that the resources are used to overcome the liquidity needs, and (iii) the periodical evaluation of available collateral.

A. Recommendations:

- Banxico should explore the possible options to make credit claims effectively available as collateral in time-critical ELA operations.
- The ELA policy should formalize the current practice that the solvency assessment by Banxico on which counterparties' eligibility is based is a forward-looking one.
- The ELA policy should set a minimum threshold for the ELA interest rate above the interest rate of Banxico's standing liquidity providing facility.